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Science and Technology Committee

6th Report of Session 2007–08

Waste Reduction

Volume II: Evidence

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The Committee's Report drawing on this oral and written evidence is published as a separate volume, HL Paper 163-I.

Minutes of Evidence

TAKEN BEFORE THE SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY
(SUB-COMMITTEE I)

TUESDAY 27 NOVEMBER 2007

Present	Crickhowell, L	O'Neill of Clackmannan, L (Chairman)
	Haskel, L	Platt of Writtle, B
	Howie of Troon, L	Selborne, E of
	Methuen, L	Sharp of Guildford, B
	Lewis of Newnham, L	

Joint memorandum by The Department for Environment, Food and Rural Affairs (Defra); The Department for Business, Enterprise & Regulatory Reform (BERR); and The Department for Innovation, Universities and Skills (DIUS)

INTRODUCTION

1. The Government welcomes the Sub-Committee's inquiry into ways in which products and production processes can be made more sustainable and therefore produce less waste. Given the main focus of the inquiry is waste reduction, this evidence sets down the policy and regulatory framework that the Government has put in place to achieve this.
2. The Government's role in addressing the issue of waste reduction can be broadly summarised as follows:
 - to put in place overarching policies focusing on waste prevention and waste reduction;
 - within this, to introduce specific product regulation, focusing on reducing waste arising from certain products;
 - to introduce voluntary agreements in place of legislation to reduce waste where appropriate;
 - to provide incentives for consumers to reduce waste, thereby indirectly applying pressure on manufacturers to produce less waste in their products or packaging; and
 - to introduce wider initiatives that encourage waste reduction.
3. This memorandum will discuss the measures that the Government has put in place to fulfil this role.

OVERARCHING POLICIES

The Waste Strategy

4. The Government published the Waste Strategy for England 2007¹ on 24 May. One of the key objectives set out in the Strategy is to decouple waste growth (in all sectors) from economic growth and to place more emphasis on waste prevention and re-use. The charts below demonstrate recent progress in achieving this aim.
5. These charts demonstrate that waste has grown significantly less than GDP since 2000. Of the main waste streams, both municipal and business waste are growing at a rate slower than GDP; municipal waste increased at about 3.5 per cent per year up to the millennium but average growth over the last five years has been less than 0.5 per cent per year.

¹ <http://www.defra.gov.uk/environment/waste/strategy/index.htm>

Figure 1

HOUSEHOLD ECONOMIC AND WASTE GROWTH

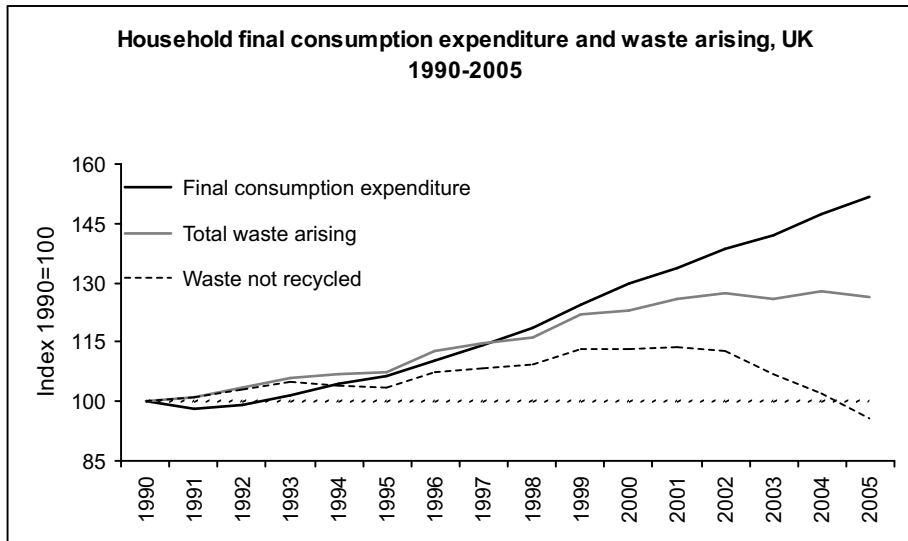
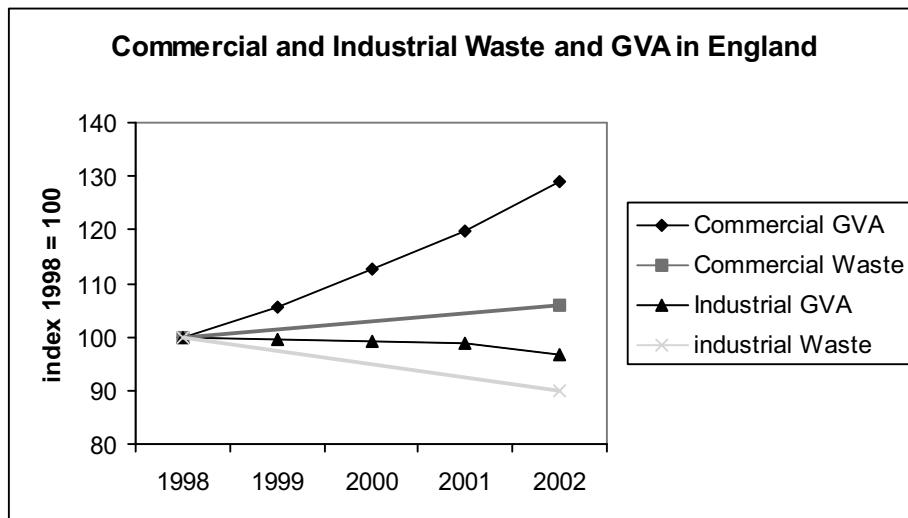


Figure 2

BUSINESS ECONOMIC AND WASTE GROWTH²

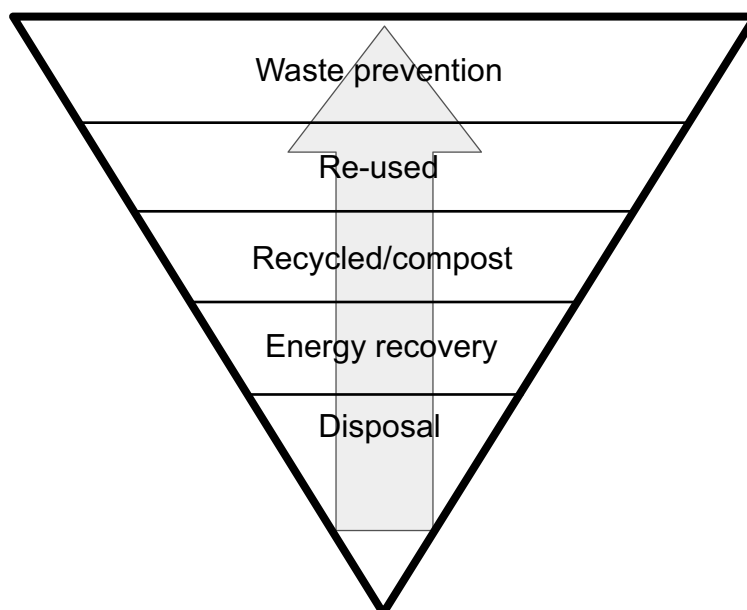
6. This performance has been achieved through a wide range of policies and programmes (many foreshadowed in the previous Waste Strategy 2000). The new strategy builds on these policy initiatives.

7. The Strategy summarises the Government's approach by reference to the "Waste Hierarchy", which enshrines the concept of resource efficiency, with reduction and reuse of resources given priority over recycling and waste disposal. Chapter 4 of the Waste Strategy discusses the specific measures intended to improve resource efficiency.

² Figure 2 shows Commercial and Industrial Waste and Gross Value Added (GVA). GVA measures the contribution to the economy of each individual producer, industry or sector. The GVA generated by any unit engaged in production activity can be calculated as the residual of the units' total output less intermediate consumption (that is, goods and services used up in the process of producing the output), or as the sum of the factor incomes generated by the production process.

Figure 3

THE WASTE HIERARCHY



8. The measures put forward in the Strategy are intended to move the treatment of waste towards the top of the waste hierarchy through a variety of regulatory, voluntary or economic means.

9. The use of economic measures which put a price on waste disposal provides an incentive to reduce waste throughout the hierarchy. A key policy is therefore the landfill tax escalator, which will increase the standard rate of tax by £8 per year from 2008 until at least 2010–11. This will increase the price of waste sent to landfill, encouraging waste minimisation and diversion of waste that does arise from landfill to more sustainable ways of managing waste.

10. Alongside that, the waste strategy sets out a range of complementary policies designed to reduce waste at various points in the life cycle of products and services.

Business and commercial waste

11. Waste reduction in this area is supported by measures including regulatory provisions and support for businesses.

IPPC

12. Waste minimisation is promoted through the Pollution Prevention and Control (England and Wales) Regulations 2000, which implement the Integrated Pollution Prevention Control (IPPC) Directive in England and Wales. Operators of industrial plant that fall under these Regulations are required to apply for an operating permit. In issuing the permit the competent authorities³ are required to ensure that, where possible, the operator has put in place measures that will mean the production of waste is minimised. Where any waste has been created, the Regulations also require that it is disposed of in a manner that will cause the minimum impact on the environment and human health.

13. In 2006 an early analysis of the costs and benefits of the implementation of the IPPC Directive in the UK was commissioned by Defra, the Department for Trade and Industry, the Scottish Executive, and the Department of the Environment in Northern Ireland. A survey of installations was undertaken and other information was analysed, including regulators' pollution inventories. Companies indicated that they are likely to perceive that benefits in resource efficiency or waste minimisation are being achieved as a direct result of IPPC and the report indicated that IPPC will result in long-term improvements in reductions in waste and improvements in raw materials utilisation efficiency. The report is available from the Defra website.⁴

³ The Environment Agency or Local Authority.

⁴ <http://www.defra.gov.uk/environment/ppc/background/pdf/ppcregs-review.pdf>

Business support

14. The Government funds a range of delivery bodies that help business to avoid or minimise waste and save costs as a result. They therefore are important in reducing business waste in production processes through better use of resources and better product design, but also cover wider aspects of waste reduction such as the ability to minimise waste in products themselves.

15. A number of these fall under the Business Resource Efficiency and Waste Programme (BREW), which provides advice and support to improve business resource efficiency. Current programme activities amount to £284 million, funded from landfill tax escalator revenues.

- Envirowise is a programme which advises and assists businesses in streamlining their production processes, thereby saving resources and increasing profits. Envirowise provides free, confidential advice to UK businesses on reducing environmental impact, including on-site audits by expert technical advisors, a dedicated telephone help-line, best practice guides and tailored business support packages. Since its launch in 1994, Envirowise has helped UK businesses save well over £1 billion, and since the increased funding brought about by the BREW programme it is now making annual waste savings of approximately two million tonnes and water savings of approximately 30 million cubic metres.
- The National Industrial Symbiosis Programme (NISP) identifies business waste with value as a raw material for other operators. This improves the sustainability of processes and helps increase operators' profits.
- The Waste and Resources Action Programme (WRAP) encourages businesses and consumers to be more efficient in their use of materials. For example its manufacturing programme is involved in commercialising the use of recycled materials in the place of virgin materials. WRAP's retail programme works with major retailers and their principal suppliers to reduce packaging, and food waste in the domestic sector. It has funded research to develop new best in class, packaging for products ranging from salad bags to wine bottles. It will launch a major consumer campaign to reduce food waste in November.
- The Market Transformation Programme (MTP) works with Government, business and other stakeholders to improve the design of products and services, such that they use fewer resources in manufacture and use, and result in less waste at end of life.

16. Practical information and detailed links to all of these programmes are provided throughout the country by the Government's Business Links network.

17. Innovation is vital to increasing our competitiveness, improving our economy and our quality of life. It can also help us address some of the most challenging issues we face surrounding issues such as the reduction of waste and pollution. The new Department for Innovation, Universities and Skills (DIUS) will work to increase the UK's innovation capacity by bringing together its leadership on innovation policy with its responsibilities for skills, higher and further education. The DIUS sponsored Technology Strategy Board (TSB) will develop and lead a programme worth £1 billion over the next three years to provide business with a coherent package of technology and innovation support, helping companies to turn good ideas into new products and services.

18. The TSB has been established to play a cross-Government leadership role, operating across all important sectors of the UK economy to stimulate innovation in those areas which offer the greatest scope for boosting UK growth and productivity. It operates within a framework laid down by DIUS Ministers and continues to work closely with Ministers, advising on policies which relate to technology innovation and knowledge transfer and delivering the national Technology Strategy.

19. Activities supported under the national Technology Strategy include Innovation Platforms, Collaborative R&D competitions and Knowledge Transfer Networks. Innovation platforms in particular, represent a new way of working for both Government and business. The platforms provide an opportunity to bring business and Government closer together to generate more innovative solutions to major policy and societal challenges. By bringing together stakeholders focused on a particular challenge, the platforms will enable the integration of a range of technologies along with better co-ordination of policy, regulation and procurement.

20. Evidence to be submitted separately by the Technology Strategy Board will show that its Key Technology Areas, which provide the framework for deciding where it should invest funding and support activities, consists of horizontal technologies including advanced materials alongside application areas such as environmental sustainability, which are recognised as key market opportunities. To date, it has launched calls for collaborative research into a number of relevant areas including the design and manufacture of sustainable products, and waste minimisation/resource efficiency. It has also funded 22 Knowledge Transfer Networks including the Integrated Pollution Management Knowledge Transfer Network (IPM-Net) and the Resource Efficiency KTN.

Other cross-cutting regulation

21. Other regulation across product areas will also help stimulate waste prevention especially where the impact will be to raise landfill costs and where opportunities for recycling or energy recovery are limited. The Waste Strategy confirms that Defra intends to consult, subject to further analysis, on whether the introduction of further restrictions on landfilling of particular waste streams would help achieve these objectives.

PRODUCT REGULATION

22. The Government has implemented EU producer responsibility Directives on Packaging, End of Life Vehicles (ELVs), Waste Electrical and Electronic Equipment (WEEE) and is in the process of transposing the Batteries Directive. These are product focused measures which encourage business to consider the end-of-life impact of their products at the design stage, by both specifying certain thresholds for the use of hazardous substances in the manufacture and import of products, but also by placing weight based collection and recovery obligations on manufacturers and importers, when their products become waste.

ELV

23. The ELV (Producer Responsibility) Regulations 2005 require vehicle manufacturers and importers to set up networks of Authorised Treatment Facilities (ATFs) to provide “free take-back” for their own makes of vehicles. Manufacturers are required to ensure that 85 per cent of the weight of their ELVs is reused, recycled or recovered. This direct responsibility encourages manufacturers to make their vehicles easier to treat, dismantle and recycle, and provides an incentive for them to identify internal and external markets for automotive recyclate. Although relatively new, these Regulations provide a good platform for reducing ELV waste. Early teething troubles with some of associated activities, such as the Certificate of Destruction, are being addressed.

24. The ELV Regulations 2003, specify maximum concentrations of lead, mercury, cadmium and hexavalent chromium which are allowed to be present in new vehicles. Vehicle manufacturers and importers must ensure that this design requirement is met in respect of the vehicles they place on the market. The hazardous properties of ELVs are thereby reduced, making treatment and recycling easier.

WEEE and RoHS

25. The producer responsibility requirements of the Waste Electrical and Electronic Equipment (WEEE) Regulations 2006 came into effect in July 2007. The WEEE Regulations require all producers that place EEE on the UK market to join a Producer Compliance Scheme (PCS) to discharge their obligations. These obligations include reporting data on amounts and types of EEE put on the UK market and financing the costs of collection, treatment, recovery and environmentally sound disposal of WEEE. The Regulations divide the compliance costs amongst producers in relation to the weight of products they place on the market. There is therefore an incentive for producers to reduce surplus materials in their products.

26. The WEEE Directive also introduced the concept of individual producer responsibility (IPR), whereby a producer would be responsible for the recycling of the waste arising from those products they place on the market. In theory, this would provide a strong incentive to design more durable products, and ones that are easier to reuse and recycle. However, the UK, like many other Member States, has found that an IPR type approach is not a pragmatic option in addition to the collective responsibility for “historic” WEEE as required by the Directive. The Government has therefore put in place a system that deals with WEEE through a collective producer responsibility approach, but has undertaken to review this with a view to introducing IPR as soon as it is possible to do so without it being overly burdensome. To this end PCSs have been asked to provide their views on how IPR can be effectively introduced in the UK by the end of 2007, and some individual producers have already come forward with their ideas on this.

27. The WEEE Regulations do, however, put the onus on the Secretary of State, through administrative means, to encourage the design and production of electrical and electronic equipment that takes into account and facilitate dismantling and recovery, in particular the reuse and recycling of WEEE, their components and materials, thereby pushing the treatment of WEEE higher up the waste hierarchy. This work is being promoted via the Technology Strategy and by working with the Design Council.

28. The Restriction of the use of Certain Hazardous Substances in electrical and electronic equipment (RoHS) Regulations 2006 restrict the use of six hazardous substances: lead, cadmium, hexavalent chromium, mercury and the two flame retardants polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) in the manufacture of EEE. Combined with the requirements of the WEEE Regulations, this legislation encourages producers to consider the end of life consequences of EEE at the design stage.

Packaging

29. Packaging has been subject to producer responsibility regulations since 1997. The Producer Responsibility Obligations (Packaging Waste) Regulations require businesses to recycle or recover a prescribed proportion of their packaging waste and provide evidence that they have done so. This evidence is provided by Packaging Recovery Notes, which are typically issued by reprocessors and sold on the market. This mechanism provides an economic incentive to businesses to reduce their packaging to reduce their compliance costs.

30. Manufacturers are also motivated to reduce packaging by other cost savings and broader business objectives, for example as part of a project with WRAP, Adnams have recently introduced a 500ml beer bottle that is 34 per cent lighter than its predecessor. The plastics industry has introduced lighter, more efficient products that replace more bulky traditional materials. Parts of the industry have made considerable progress in reducing the weight of their packaging. Other work being taken forward on packaging reduction is discussed in the section on voluntary agreements below.

31. The Packaging (Essential Requirements) Regulations place a number of requirements on all packaging placed on the market in the UK, including a requirement that packaging should be manufactured so that the packaging volume and weight are limited to the minimum adequate amount to maintain the necessary level of safety, hygiene and acceptance for the packed product and for the consumer. Responsibility for enforcing these Regulations lies with Trading Standards Officers.

EuP

32. The Framework Directive for the Eco-design of Energy Using Products (EuP) covers, in principle, all energy using products (excluding vehicles for transport) meeting the criteria of having significant environmental impact and volume of trade in the internal market which have clear potential for improvement. The Directive provides a framework for setting eco-design requirements for EuPs before they can be placed on the market. The EuP Directive will help drive reduction in the overall environmental impact of products and improve the energy efficiency of products. The Framework Directive does not contain any immediate obligations for manufacturers but will enable detailed implementing measures to be brought forward for specific products over time. The European Commission is currently considering studies on a first set of products that are candidates for implementing measures and the Government, via the Market Transformation Programme, has proactively engaged in these studies. Although this Framework Directive may result in some implementing measures dealing with a number of environmental impacts, the focus initially, will be on energy efficiency measures.

VOLUNTARY AGREEMENTS

33. In addition to the legislation highlighted above, the Government also uses voluntary agreements to provide significant reductions in waste. One example is the Courtauld Commitment, which is an agreement between WRAP and 24 major grocery organisations, which will lead to new packaging solutions and technologies so that less waste ends up in the household bin. The agreement is a vehicle for change which will result in real reductions in packaging and food waste. The objectives of the Courtauld Commitment are to:

- design out packaging waste growth by 2008;
- deliver absolute reductions in packaging waste by 2010; and
- identify ways to tackle the problem of food waste.

34. Under the agreement, WRAP works in partnership with retailers, brand owners, manufacturers and their packaging suppliers to develop solutions across the whole supply chain. These solutions include:

- using innovative packaging formats;
- reducing the weight of packaging (eg bottles, cans and boxes);
- increasing the use of refill and self-dispensing systems;
- collaboration on packaging design guidance; and
- increasing the amount of recycled material that is used in packaging.

35. Courtauld Commitment measures contribute to the Government's objective of encouraging more sustainable consumption and production. This is a key priority of Defra's Food Industry Sustainability Strategy (FISS), under which food retailers and other stakeholders are working together to help the food industry develop sustainably through widespread adoption of best practice. Defra and WRAP will be launching a new public campaign to reduce food waste in early November.

36. The Government has also encouraged voluntary commitments in other sectors, for example with the newspaper, magazine and direct mail industries, aimed at reducing waste and encouraging recycling. As set out in the England Waste Strategy 2007, the Government would like to go further in this area with a view to achieving waste prevention not just increased recycling.

INCENTIVES FOR CONSUMERS

37. Consumers have an important role to play in helping to drive up product standards through their purchasing decisions. The Waste Strategy put forward a number of policies intended to provide consumers with incentives to produce less waste. These policies are expected to deliver an overall reduction in waste as consumers become more aware of the amount of waste in products and begin to make purchasing decisions favouring alternative products that create less waste. This will apply pressure to retailers and manufacturers to cut out the waste at source. This can already be seen, for example, in the pressure being exerted on retailers by consumers to reduce packaging and make such packaging as is necessary more recyclable or compostable.

38. Consumer engagement on waste is being integrated into a wider framework on pro-environmental behaviours being developed by Defra. This framework pulls together existing and new research on consumer attitudes and behaviours towards the environment, describes a limited set of prioritised behaviour goals, introduces a new environmental segmentation model, and identifies opportunities for improving the effectiveness of consumer engagement across the different population segments and behaviours as well as more cross-cutting and lifestyle based initiatives. It will provide an evidence base for projects and programmes such as the Act on CO₂ campaign, 3rd sector partnerships, energy and water efficiency, the food chain programme, product road maps, as well as household waste.

39. Local authorities can provide important incentives to consumers in the way they design their recycling and waste services. Matching good quality recycling services with constraints on the collection of general wastes can encourage consumers to avoid waste and increase recycling. This issue was explored in the recent inquiry on refuse collection by the House of Commons Communities and Local Government Select Committee (Fifth Report 2006–07 HC 536–1).

40. Local authorities in England in turn are incentivised by the Landfill Allowances Scheme (LATS) that supports the achievement of the UK obligations under the EU Landfill Directive. The most economic as well as environmentally beneficial option for avoiding landfill is waste prevention. The Government's new performance framework for local authorities, including indicators for measuring performance on waste, were outlined by the Secretary of State for Communities and Local Government on 11 October.

41. Examples of household waste prevention policies being specifically promoted by local authorities include promotion of home composting, reusable nappies, and locally based waste prevention awareness campaigns to complement national campaigns.

42. Evidence from Europe and North America suggests that charges based on the amount of household waste thrown away are an effective way of incentivising behavioural change. On the back of this, the Government consulted recently on providing local authorities with a new power to enable local authorities to prevent waste (and promote recycling) among residents by introducing, if they wish, a revenue-neutral incentive scheme in which those who recycle effectively will be rewarded from the payments made by those who choose not to. Government hopes to make further announcements on this policy shortly.

43. The cumulative impact of all these measures is likely to be significant, to increase over time, and stimulate a wide range of less wasteful consumer products. The Government will be monitoring progress over the coming years.

WIDER INITIATIVES

44. Most of the policies and measures outlined above have been built up primarily from a “waste” perspective. They provide a strong incentive for waste reduction and, as a means to achieve this reduction, for better product design. Nevertheless, as the Committee’s questions recognise, it is also important to consider other means to support waste reduction through more sustainable products and design. These include initiatives focused on improving materials themselves; wider product-focused initiatives; and ways to help businesses and others better understand the life cycle impacts of products and materials.

Materials

45. Sustainability of materials was a key theme of the former DTI’s Innovation and Growth Team (IGT) report on the UK materials industry, and of Materials UK, the body which has been set up to help take forward the conclusions of the IGT. Other key activities include:

46. The Government has funded the creation of the Materials and Design Exchange (MADE), within the Materials Knowledge Transfer Network (KTN), to help bring together the design and material technology communities to look at key issues linking product design and manufacture. The identification of suitable alternative materials at an early stage can help product designers and engineers take sustainability factors better into account, stimulate industrial innovation and improve the competitiveness of the UK.

47. The network is formed from a partnership between the Royal College of Arts, the Institute of Materials, Minerals and Mining, the Institute of Design Engineers, the Design Council and the Engineering Employers Federation. The network has been pursuing a programme of events and other communication strategies to raise awareness of the skills that exist within each community encourage dialogues and exchange of knowledge and information and brokering collaboration on key projects.

48. The incorporation of a Materials/Design feature into this year’s Design Festival has led to an interaction of a minimum of 400 designers with materials scientists. Key themes, including those on sustainability, received excellent reviews.

49. The Waste Strategy has also identified broadly-based priority materials on which to focus efforts at waste reduction and increase reuse and recycling: these are food, paper, aluminium, plastics, textiles, wood and glass, based on evidence about the carbon savings from taking action in these areas. Measures envisaged include further voluntary agreements—for example, the Strategy put forward the idea of an overarching voluntary agreement with the paper sector. But, in some cases, we will also want to look more widely at the life cycle impacts of these materials and how they can be reduced. This work is only at a preliminary stage at present. However, in the case of textiles, for example, this is being taken forward via work on a product roadmap described below.

Skills

50. The Government is also promoting cross cutting action on waste minimisation. DIUS provides funds from the Science Budget for the seven Research Councils which support basic, strategic and applied research and related postgraduate training across the sciences and humanities. They fund a variety of research work, both individually and through cross-Council programmes, which have the potential to impact on a broad range of sectors both nationally and internationally. Comprehensive information about the Research Councils’ role in supporting waste reduction will be provided in a separate memorandum to the Committee from Research Councils UK.

51. The Technology Fund (linked to DIUS and a recipient of BREW funds) awards grants to support research and development, including to develop more resource efficient products and processes.

52. The Science Engineering and Manufacturing Technologies Alliance (SEMTA) is the Sector Skills Council (SSC) which supports training and qualifications in lean manufacturing and processes and business-improvement techniques. Energy and Utility Skills is the SSC responsible for the skills agenda of the UK waste management industry covering the activities of collection, treatment and final management of waste and recyclables.

Product Roadmaps

53. The idea of product roadmaps builds on UK and wider thinking on integrated product policy, and was an important theme of last year’s report, *I will if you will* by the Sustainable Consumption Round Table. The idea extends previous work in Defra and elsewhere. The intention of the roadmaps is to identify the environmental impacts that occur across each product’s life cycle. By looking at a product’s whole life cycle (raw materials to

end of life), it may be possible to identify improvements that could lead to waste prevention or minimisation. Examples include raw material or process changes that prevent or minimise production waste and enable the product to be economically recovered for reuse, remanufacture, recycling or energy recovery. Defra is piloting this approach in several areas such as milk, clothing, fish, lighting and televisions. A report on progress is due to be published in spring 2008.

Sustainable public procurement

54. The UK Government and wider public sector spends around £150 billion on procuring goods and services. We are working collaboratively with the Office of Government Commerce and other government departments/agencies to define and agree a process by which we can mandate minimum sustainable product standards for a wide range of categories and commodities. We are building on existing sustainable product specifications, diversifying the evidence base underpinning these standards and have the intention to provide clear signals as to where sustainable product standards should lie in the future.

Embodied carbon

55. Alongside “roadmapping”, there is also growing interest in how best to measure the life cycle impacts of products and services in ways which are consistent, practical for business to use, and can be communicated to stakeholders or consumers. In particular, there is a focus on the idea of “embodied carbon”—the carbon emissions which arise across the life of a product or material. The Carbon Trust, Defra and the British Standards Institute are taking forward a project to develop a Publicly Available Specification [PAS] for the measurement of embodied carbon. Such a standard has the strong potential to help drive sustainability in materials and product design, as it should enable designers to better discriminate between materials with similar functional properties but different impacts on carbon emissions.

International work

56. The European Commission is currently consulting on proposals to bring forward action plans on Sustainable Consumption and Production and EU Sustainable Industrial Policy, which will launch new initiatives and seek to redirect and influence existing policies. The Government has encouraged the Commission to maintain a strong product focus and market based regulation, particularly carbon trading, developed in partnership with business; the removal of market barriers within the EU and internationally, while fostering dynamic international standards.

CONCLUSION

57. Waste reduction and prevention are key priorities for Government as set out in the Waste Strategy 2007. The main policy measures set out in the Strategy are all expected to contribute towards waste prevention by pushing the treatment of waste towards the top of the waste hierarchy. These policies can take the form of overarching measures like the landfill tax, or more product-focused measures such as the various producer responsibility regulations, which are driven in the main by European legislation. Both legislative and voluntary measures, such as the Courtauld Commitment have been effective in reducing unnecessary waste and are expected to continue to do so moving forward. But further action is certainly needed, as identified in particular in the Waste Strategy; and the Government intends to give a high priority to this.

58. The Government also drives waste minimisation indirectly, by providing householders with incentives to produce less waste and by funding and supporting a number of programmes and initiatives that are geared towards improving design and production processes and minimising waste.

59. Ultimately, however, while the Government has a clear role in setting these policy measures and facilitating their implementation, the delivery of an overall reduction of waste arising is dependent on all of the players in the supply chain, from raw material suppliers to end users, playing their part, not Government alone.

October 2007

Examination of Witnesses

Witnesses: MR NEIL THORNTON, Director of Sustainable Consumption and Production and Waste, Defra, MR TONY PEDROTTI, Director of Sustainable Development and Regulation Directorate, BERR, and DR DAVID EVANS, Director for Innovation, DIUS, examined.

Q1 Chairman: Good morning. Welcome to all on behalf of the Committee. This is our opening session on waste reduction. We are very grateful to all three of you for finding time to come and for coming together because I think this enables us to compare and contrast. I suspect there may be some initiatives on which you are singing from pretty well the same hymn sheet. If that is the case, perhaps one person can answer on behalf of the others so we can get through a quite lengthy number of questions. Perhaps I might start off with a general question. What do you see as the role of Government in addressing the waste reduction issue, in terms of what it is at the moment and where you would like it to be, let us say, two years from now?

Mr Thornton: Thank you, my Lord Chairman. The Government's role in waste reduction is obviously much the same as the Government's role in relation to waste in general. You, I am sure, will have seen that we had a public waste strategy earlier this year which talks about the Government's involvement in waste business, where our purposes are the usual ones: to protect the environment, to protect public health, and, increasingly in the current world, to contribute to mitigation of climate change risks arising from waste, and there are various ways in which that happens. In that context, we followed the waste hierarchy which establishes that waste prevention—not having waste in the first place—is usually environmentally the best outcome and, thereafter, if you do have waste, the waste hierarchy defines in European compatible terms how it should be handled. So the Government's role in relation to waste is one of contributing to an economy which seeks to reduce the environmental impacts of waste, notably climate change. We have a particular responsibility in relation to municipal waste, because that is a public service provided by local government, guided, if you like, by central government, and of course we have very particular obligations in relation to the Landfill Directive to change the way in which we handle our municipal waste, where the main damage for climate change is the biodegradable waste that is going into landfill generating landfill gas. The rest of waste—and of course it is a larger amount—is very largely a market which Government influences. Commercial waste, industrial waste, mining/construction wastes are arising in the normal course of business in the economy and we seek to minimise their impacts on the environment and on climate change using the usual range of measures available to Government, influencing those markets rather than, as it were, owning them and controlling them. If I come back to waste prevention, we are

seeking to achieve less waste arising in the first place. That can be through people designing products differently; through people using products longer rather than discarding them early in their life. It can be about the materials that are put into products; it can be about the weight of the product—although weight is not always the critical question. The question is always the environmental impact. Our role is to help the economy move in the direction it seeks to. Waste is, after all, wasteful, and there is a sense generally that you do not want too much waste. If we look at people in their homes, working with recycling and so on, they are beginning to recognise the implications. There are various measures that obviously contribute to that. The big one I guess would be the landfill tax, which, although it is not operative only in relation to prevention of waste, certainly seeks to prevent waste because it changes the price of getting rid of waste. The various other measures I am sure we will touch on as we go through. The last thing I would like to say by way of general introduction on waste prevention is that we are increasingly trying to see waste in relation to the whole product life-cycle. That is a standard sense for those who think about waste at the European level—and many of the people who have sent you memoranda have talked in the same terms. Therefore it is very important that, when we look at waste prevention, we are thinking about the product on the way to the waste and reducing that by various measures, including, for example, packaging regulations, End of Life Vehicles regulations and so on.

Q2 Chairman: We have a copy of the *Waste Strategy for England 2007*, which is a Defra publication. Obviously there are three departments represented today, but the fact that you kicked off means probably that Defra has the lead responsibility.

Mr Thornton: That is correct.

Q3 Chairman: Can we discern a strategy across Government, an interdepartmental strategy? Perhaps your colleagues could, at this point, contribute to our discussion in that respect and then maybe you could come in afterwards, Mr Thornton. Mr Pedrotti, how do you see the role of BERR in the development or the implementation of the strategy, given that it would appear that Defra has the lead role?

Mr Pedrotti: This might sound a bit of a glib response, but in partnership. Certainly within my department it is not a case of looking at, say, waste issues or product development, sustainable

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development, sustainable consumption or production and saying, "That's all Defra's and we do not engage with that, we leave them alone." On product legislation, on End of Life Vehicles, on Waste Electrical Equipment and, indeed, currently on batteries, we have a joint project board that works between my department and Defra, so it is not divorced. Also, when it comes to other parts of BERR, regarding energy efficiency and climate change these departments have to work together. My department is not so much the mouthpiece of business but it understands what the challenges are of business and can bring that into the negotiation and discussion. A document, such as the one you have quoted, has been brought forward with that taken into consideration as part of that whole package.

Dr Evans: On behalf of Innovation, Universities and Skills, our role is about ensuring that the UK's knowledge base, the knowledge that is embodied in people in relation to skills, the knowledge that exists in universities and the outcomes we have secured through our support for innovation in business all leads to a better outcome in terms of exploitation of economic growth and quality of life. Our role is to try to make sure that the knowledge that we both create and support can be deployed by businesses and individuals to support the kinds of objectives which Neil talked about.

Q4 Chairman: Is the innovation unit part of the old DTI?

Dr Evans: Yes.

Q5 Chairman: Maybe the question to you should be: how are you getting on with the rest of DIUS?

Dr Evans: I think very well. There is a really good opportunity for us in taking the innovation agenda forward to think harder about the relationship with the whole world of skills, meaning the skills that are engendered through the post-19 skills at work of my department but also higher level of skills for people coming through universities at undergraduate and postgraduate level. My personal perception would be to say that we have worked quite hard on the university agenda. Lord Sainsbury, of course, is a big proponent of changing the way the UK's university structure contributed to economic growth and we have made a lot of policy changes moving in that direction. I think that was quite well-tilled territory but there are still opportunities for us to do better. I think there are further opportunities for us to work with the further education sector to ensure that the Skills Agenda, working with Sector Skills Councils and others, takes more account of innovation in the future than it did in the past. I would also like to say that it is very important that we do not lose touch with our colleagues in the business department because they have direct experience of the challenges

facing individual sectors. It is not our intention to try to reproduce that. We want to be in good connection with them, including on the kinds of challenges which can reduce the competitiveness and effectiveness of British business which we are here to talk to you about this morning.

Q6 Chairman: The impression I get is that so far the Government responses have been following European Directives like WEEE and End of Life Vehicles, and they tended to be tactical in character rather than strategic. Are you now in a position, having been buffeted by these EU Directives, to really knit the three departments responsible together? I presume, Mr Thornton, that is where Defra ought to be taking a lead role. Would that be right?

Mr Thornton: Yes, that would be absolutely right. The Waste Strategy was a Government strategy obviously. The Defra branding recognised that we took the lead. In the strategy we have made it clear that we will continue to chair a Whitehall group which will drive the strategy forward so it is very united. Of course it is not only the departments here; notably I would also refer to Communities and Local Government and the Treasury as very important players and the Environment Agency were part of the process that devised the strategy. You are right to say that European legislation is very important in waste. That is partly because waste and products obviously potentially cross boundaries and a lot of internal market freedoms need to be maintained, so most of these decisions are better taken at European level and of course many of the business decisions, like design of vehicles, for example, are frequently taken by European businesses. You are right, perhaps, to infer that to some extent we have been chasing the game in some aspects. In relation to the Landfill Directive, a few years back we were said to be a little behind the game in relation to the targets we had set and we think we have improved on them. But, of course, those European Directives are negotiated by governments in Europe at the European level and Europe itself is taking a more strategic approach. They published a series of, I think, seven thematic strategies of which one was on the prevention and recycling of waste. They are in the throes of revising the Waste Framework Directive, the overarching Directive which sets the principles of waste legislation, and they are also linking that back into the sustainable consumption and production wider agenda which I described. They will be producing a sustainable consumption and production action plan in the spring and it is encouraging that that has been linked with work in the Competitiveness Council on the greening of industry. We see a joint approach at European level which we very strongly welcome.

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Q7 Lord Lewis of Newnham: I think it is fair to say that on a number of occasions when we have visited Brussels the impression I have certainly gathered is that the UK is reactive rather than proactive as far as any problem with this waste and environmental work is concerned. How does Defra, or whoever the appropriate department is, influence the trend and in fact lead rather than follow as far as Waste Directives are concerned? It seems to me that when one looks at Germany particularly, I think, and some of the Scandinavian countries who are very much in the forefront there, we seem to be following them in a rather laggardly way. The complication is further, as far as I am concerned, in as much as that, when the legislation comes through, that area which is responsible for making sure it is implemented is the Environment Agency and I am not at all clear now exactly what influence the Environment Agency has in influencing the course of legislation. Clearly people who have to implement it have a strong knowledge and potential understanding of what the problems are going to be. I know there was a memorandum of understanding between the Environment Agency and Defra, as it then was. I am not sure how successful that has been or whether it has many implications whatsoever to this particular problem.

Mr Thornton: I certainly would not want to argue that the UK has always been in the vanguard in Europe in seeking intrusive or protective waste legislation. You are right to say that some other Member States have in the past been more active in that area. Of course, in relation to landfill, we have, in some sense, been directed by our industrial and our geographical past, so the fact that we have more landfill sites than, say, the Netherlands is a matter of necessary fact as well as a matter of history. So there are undoubtedly some areas where we have been catching up with good European practice. Also, the increased emphasis on climate change has improved the motivation and recognition here that those are proper things to pursue. I think I can best assert that we are trying to do better by taking the example of the Waste Framework Directive renegotiation where one of my colleagues is leading the policy-making end of that negotiation, in close consultation with other departments and with the Environment Agency, as it were, in the room. We agree, you cannot sensibly negotiate a Directive unless you know what it is going to be like to implement and the Environment Agency has been absolutely part of the team that has been preparing our negotiating position and we work through the usual mechanisms, obviously, keeping a very close touch with UKREP, with the Commission, working with the European Parliament's Rapporteur Caroline Jackson and so on. We think we are doing better but I am sure there is a way to go.

Q8 Earl of Selborne: In your written evidence on sustainable public procurement you note that the Government and the wider public sector spends

around £150 billion. Is there a target for sustainable procurement within government departments?

Mr Thornton: There are targets for Government departments' own procurement and own behaviour. We are seeking to reduce waste from the Government estate by 5 per cent by 2010 compared with 2004–05 levels and by 25 per cent by 2020. We are also seeking to establish recycling rates in own waste, if you like, of 40 per cent by 2010 and 75 per cent by 2020. Some of that is going reasonably well. The recycling figures are running at about 50 per cent at the moment. However, the waste reduction figures are not going so well. Waste in the Government estate is thought to have increased by about 10–13 per cent in the past year from the 16 departments who have reported figures. That may be partly a measurement issue but it certainly is not pointing in the right direction.

Q9 Earl of Selborne: What about the timetable? You talk about mandating minimum product standards for a wide range of categories and commodities.

Mr Thornton: Yes. We are working on trying to use the power of Government procurement, as you rightly identify, to improve the way the markets can work and to set standards that can then be adopted elsewhere, as well as in terms of the Government's buying power. With our Market Transformation Programme we are seeking to identify products where the best win would be had from establishing Government procurement standards and we are hoping to consult on new standards in a matter of months.

Q10 Earl of Selborne: Then you will have a timescale to deliver on?

Mr Thornton: Yes. We will then ensure there is a delivery plan and a process by which we establish those standards. We would obviously be seeking to establish standards that would also be relevant to the wider economy. They would be adopted in Government first. That is the kind of point that the Commission on Environmental Markets and Economic Performance, which just reported last week, is very strongly saying: the Government should use its power in the economy to drive performance where it can be adopted elsewhere later.

Q11 Lord Haskel: Is the intention also to encourage new technologies or to drive down price?

Dr Evans: The intention, certainly from the point of view of my department, is both. It is both to get better value for money, although I would have to say that better value for money is usually measured by whole-life cost rather than, upfront, a price of the procurement. That is probably the big problem we have come from, in that the way that

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Government has procured in the past has focused too much on the initial cost and not enough on the whole lifetime cost. My department has started thinking about what we can do to help in the area of Government procurement in order to get better value for money for the taxpayer and better performance from the point of view of business. We have worked with the Technology Strategy Board to try to identify opportunities where we have upcoming procurement. We have created something called an Innovation Platform as a model for investment. We have a couple of those running with other Government departments. One is with the Department of Transport about low carbon vehicles and another is with the Department of Communities about low environmental impact buildings, going in the direction of the “zero carbon” house which the Government has said it wants to impose regulatorily from 2016. These are ways in which we can use R&D investment, R&D grants with business to help bring forward the kind of products which meet society’s needs, as well as, we hope, creating businesses which will be world beating.

Q12 Lord Howie of Troon: You have mentioned targets and timescales. I am wondering how you arrive at them. Are they reliable or are they just “feel good” things?

Mr Thornton: We try to arrive at them, as you would expect, in a way which gives us a reasonable prospect of meeting the targets, so that would require us to have some evidence for the target: what is going on in the economy at the moment, what we think might be achievable in the timeframes we are talking about. Typically there will be quite a discussion, both amongst Whitehall departments and with our ministers, about what the level of target with most sensibly be set out. Obviously there are some targets that are aspirational, in the sense that we are saying we are seeking for the economy to achieve this kind of level of recycling, but there is not a mechanism available to us to force it. There are some targets, like, for example, the landfill allowances for local government, which are more than targets, very much more than targets; they are obligations, where we are trying to meet a European figure. The Waste Strategy does set out quite a wide range of targets of both kinds and I think the general principle would be evidence-basing and stretching but achievable. I think that would be the nearest one could get.

Q13 Lord Howie of Troon: You say there are obligations, is anyone reaching them?

Mr Thornton: Those that are obligations we are, of course, looking at very closely. On landfill allowances—and I do not know how closely you monitor that system—we have an obligation on

biodegradable municipal waste for the years 2009–10, 2012–13 and 2019–20 which are absolute obligations on us in European law. In England, where we have something like 180 disposal authorities, clearly that is not something that Government can achieve centrally so we have laid obligations on local governments, in a cap and trade system, if you like, and we are very closely monitoring how they are performing. There are penalties that they would have to meet if they were not meeting its obligations. So far that is working and it is working quite well.

Q14 Lord Methuen: You have mentioned landfill tax to some small degree. How do you see that increases in landfill tax will feed back to manufacturers to encourage waste reduction? In a lot of cases the product is going to landfill much later in its life, although obviously in the manufacturing process there is some output to landfill.

Mr Thornton: I suppose there are two versions of that for my answer. One is in the relatively narrow sense that some parts of landfill tax, revenues, have been used to help the business community to improve its product and its waste performance, using the BREW (Business Resource Efficiency and Waste) programme which has been in place up until this current year. That has helped to fund bodies like the National Industrial Symbiosis Programme, WRAP, Envirowise, to provide advice and brokerage services to the business community to help them to improve their performance and to improve their profitability. The more fundamental question is, obviously, if you put a very substantial tax into the economy, you change relative prices in the economy. It is very consistent with Nick Stern’s analysis of how one should be addressing the environmental impact of climate change. Landfill tax is changing the price of waste because landfill, almost now, and certainly in the near future, will not be the cheapest way of disposing of most wastes and therefore people will feel more reluctant to generate waste because it costs them more, so you change the economics of the business model.

Q15 Lord Crickhowell: We are getting into a dilemma here. We talk about sustainable product standards, product life-cycles in a way that involves two things: trying to make the product last longer perhaps, or, if it is disposable, making sure that it can be broken down easily and disposed of separately or taken back. But there is a problem here. Yes, with buildings you can probably make buildings so that they last much longer and you have to replace them less and they use less waste along the road, but we are in a very fast developing technology world and in most of the modern technologies, electronics and so

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on, the whole process of development gets faster and faster and faster and you no sooner have a product than you are asked to replace it and invited by manufacturers to replace it. Very often they do not ask for it to be taken back in again. How are you setting about reconciling this? In the days when I was encouraging inward investment as a minister, every time I went to a country like Japan I was simply startled by what had happened in developing the new products, which are always smaller and lighter and more attractive than the one before. There is a big dilemma here. Would you like to comment on it?

Mr Thornton: Yes. I will ask Tony Pedrotti to talk about electronic goods in particular, where, you are right, the product cycles move very fast. As a general point, there is no point in us in Government kicking against the market. We have to work with the grain of the market, we have to work with what consumers want and what businesses find they can generate, so I think our emphasis needs to be in different product areas, to think through the environmental impacts of that product life-cycle and to try to focus our policy interventions or our approaches to the consumer and the business community on those areas where the worst damages come through. Of course you are right to say that there are some areas—and End of Life Vehicles is another area which is also the responsibility of the Business department—where design is terribly important. Product design which you can influence at the front end and put some pressure there. To mention one thing that my department is involved in before I pass to Tony, we recognise in central Government that you cannot employ enough civil servants to have a life-cycle analysis of every product in the economy, even if anybody thought that was a sensible thing to do, so we are trying to take some generic product types and think through the impacts of those product types in the hope that that will inform the business community and consumers about the way in which they address products. We call those “product roadmaps”. We are looking at, for example, milk, at, for example, clothing, at where the impacts arise. Vehicles is perhaps one that we are thinking about for the future but it has, in substantial part, been thought about at the European level already. Perhaps I could ask Tony to pick up on the fast-moving electronics question.

Mr Pedrotti: Without doubt, it is a growing problem. Waste electrical equipment is the fastest growing waste stream in the EU because, as you say, the products get put on the market and, although they might not quite be obsolete, the consumer wants the next one and a lighter one, et cetera. We are trying to tackle it basically from both ends. You have two pieces of legislation: Restriction of Hazardous Substances Regulations which were developed to try to encourage (i) companies to start thinking about

the product and how to design it more efficiently, and (ii) not to put rather nasty environmental elements within that electronic equipment; you then have the Waste Electronic Equipment Regulations that put in place a system where at the end of its life it is not just landfill and it is captured and it is treated and recycled. Part of that process, obviously, is challenging manufacturers, not just within the EU but internationally, to start thinking about their products in a different way, not just, “Let’s get the latest gadget out” so you are talking about eco-design, as Neil mentioned. The other thing we have tried to do in implementing the WEEE regulations within the UK is to encourage the reuse of appliances. Whilst one consumer may feel that that product is not what they need any more, there are plenty of other people who can make full use of that product and so we have built into that system the encouragement of the reuse of old appliances, but we do have to look beyond just, say, the UK or the EU from a production point of view. You were mentioning earlier about influencing Europe and we are behind the game regarding some of the environmental legislation. I am quite pleased that a member of my team—and I will give him a big head undoubtedly—is respected around not only Europe but in the US and the Far East and China as the world expert when it comes to RoHS (Restriction of Hazardous Substances Regulations). He is working with the Chinese Government to challenge their manufacturers to start thinking about this. Rather than just seeing it as a UK problem, that when it is imported we have to deal with it at the end of its life, we are trying to get in at the start of the process. If I allowed him to be, he would be based outside of the UK virtually all year round, because he has that type of reputation to try to help these companies. Waste electrical equipment is a huge challenge.

Q16 Lord Crickhowell: I am already being pressed to upgrade my mobile at the end of this year. There may be very good reasons for doing so—every 12 months you are invited to do just that. What pressure is put on making the company which is upgrading take back your original model? None that I see at the moment, so I put it straight in the drawer of former larger, less good mobiles. Furthermore, with batteries, if I go around Europe I find that outside every chemist shop there is a container in which small batteries can be placed. There is a lot of effort made to get rid of big batteries in this country but I see practically no effort to get rid of the small batteries which most of us, even if they come out of our hearing aids, look at rather despairingly when we change them. Is regulation getting where we need it to go?

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Mr Pedrotti: I can assure you that for 99.9 per cent of the mobile phones which do not stay in drawers, if you take them back to the shop when you were upgrading they will take them off your hands.

Q17 Lord Crickhowell: There is nothing to make them do that.

Mr Pedrotti: There is no obligation on the consumer to do that. Part of the Waste Electrical Equipment Regulations is trying to shift consumer behaviour. Particularly with the smaller household item, not so much the larger domestic appliance, the message is, “Do not black bag it”. With regard to mobile phone, mobile phone companies are working very hard to try to encourage people to bring their old phones back. Indeed, when they do come back, a very high proportion are reused, either in this country or elsewhere. So it is not a case of you handing the phone back to them and then they destroy it; they are reused. Particularly the older type ones that may be sitting in your drawer, they love, because they are so hardy compared to, say, your latest upgrade. Regarding batteries, there is a separate set of legislation, a third producer responsibility regulation. We are working to a timetable of implementation for September 2008. You are quite right that at this moment in time in the UK we do have a very strong track record when it comes to large-scale industrial and also automotive but on the portable side we currently recycle around 1 per cent. So we are doing something to address this matter.

Q18 Lord Haskel: You are beginning to touch on the point I was going to ask. Most businesses sell products which they are trying to get as fashion products so that they can get a premium on them. But when they go out of fashion they are still serviceable, and there is quite a market, particularly with clothing, selling it to third world countries and so on. How do you view this from the waste reduction point of view? Do you consider that as disposed of as waste, or do you consider that as something which has just sort of disappeared from the market?

Mr Thornton: Your point is completely made, in a sense. In the opening remarks, I said that we need to look at waste as one part of the product life-cycle: it is the end of life. It might be typically responsible for 25 per cent of the environmental impacts of a product. We are working on a clothing roadmap, in consultation with stakeholders and interested partners, and clothing is also interesting because it is not only about climate change and energy impacts, it has very substantial water impact, as you can imagine, and also brings in societal concerns of child labour and so on in some of the fast-moving fashion goods. We certainly do not look at things like clothing only as an end-of-life issue but we do want to deal with them responsibly when they do reach end

of life. One of the questions with fashion garments is often that the materials are mixed materials and it is not always easy to generate something reusable or of high value from the materials you are getting at the end of life, so it is identifying how you can separate the materials and how you can bring them back into use. Obviously the role of the third sector, charity shops and so on, is reduced but it is by no means not there. There is still a great deal of reuse of clothing—as Tony has implied with electrical goods—often in other countries. We are seeking to get as much of a closed loop in the production cycle as we can, thinking about end of life as we think of front of life. With some products, the very heavily designed, the very dependent on a lot of technology up front, you may end up with a producer responsibility Directive of the kind you have with batteries and vehicles and electrical equipment. In other cases, you are trying to influence and inform the design houses, the major retailers who are handling clothing, to take an interest themselves in the environmental impact of the products they are carrying.

Q19 Chairman: You say you are going to establish a unit to monitor this with a view to producing a report in 2008.

Mr Thornton: Yes.

Q20 Chairman: This was in May of this year. Has the unit been set up yet?

Mr Thornton: Yes, it has. It works in my area of the department. On products and materials people are working hard on things like roadmaps and they are also looking hard at the priority waste materials that were referred to in the Waste Strategy. Again, one cannot think of these materials separately from the products. You cannot think of aluminium separately from window frames and soft drink cans; you cannot think of waste wood without thinking of furniture. You have to think the thing through. Yes, it is in place and we are looking forward to what they are going to say.

Q21 Baroness Sharp of Guildford: We have been talking a lot about these various Directives but how does all this fit in with the Pollution Prevention and Control Regulations? What do those involve and who is bound by them? In your written evidence, you say that these regulations require measures to be taken to minimise the production of waste. What are these measures and how, again, do they fit in with what we have just been talking about?

Mr Thornton: The Pollution Prevention and Control regime is a regime which exists in the UK but which, at the top end, is also consistent with the European Integrated Prevention Pollution and Control regime. Essentially, it is site based; so we are looking at the implications of manufacturing sites or sites where

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services are provided, like drycleaners, for example, to take the other extreme. The Environment Agency for the larger sites and local authorities for the smaller ones are seeking to minimise the environmental impacts of these sites. For the big sites, the big manufacturing sites, including petrochemical plants and power stations and large landfill sites, we are concerned about all the environmental impacts—so emissions to air, water and soil/land. For the smaller, part B sites as they are called, the regime only covers impacts to air—so, for example, dry cleaning solvent, as you would imagine, is a potential environmental ill. In each case, the great thing about these regulations is that they are self-adjusting because the obligation on the regulated site is to use something called best available technique (BAT). The Environment Agency, let us take them as an example, would discuss with the site owner—and this would start at the design stage—what would be an appropriate level of emission, level of waste generation on site, for this kind of production process at this stage of the art. Further down the track, a new plant coming in five years later would have higher standards, because the best available technique, which in some cases is defined by the European publications, moves ahead, so you do not have to re-regulate the site. It is basically site based, emission based.

Q22 Baroness Sharp of Guildford: And monitored by—

Mr Thornton: And monitored by the Environment Agency or, as the case may be, the local authority.

Q23 Baroness Sharp of Guildford: From the evidence we have received, this suggests that there is a lack of consistent data on life-cycle impacts of most products and materials. Given this lack of information, how can the data be generated in order to measure waste minimisation?

Mr Thornton: You are right, there is lack of data, and, as I think I implied earlier, there is an almost infinite capability for information if you think of everything in the economy. Something called the Market Transformation Programme is a programme generating information about the performance of products and their lifecycle behaviour, designed by us and funded by us, to put information into the public domain about how products perform—notably energy-using products, but not solely—and what kind of trajectory of improved performance the technology and the way markets are going might look like generating over the coming years. That is very much intended to inform not just Government but the business community. That programme is quite widely used and is seen as an exemplar, I think, of good practice in the UK. Again, we are seeking to generate generics, information that others can use. If

you are a major retailer or a major food manufacturer, you will want to know the performance of your own product and you have far more capability to do that than we have, so we would want to influence the business to want to know and then provide them with techniques, including, for example, carbon footprinting techniques, to help them generate information and improved performance for themselves.

Q24 Chairman: Do you share this information with your European partners?

Mr Thornton: Yes, we do. Indeed, the kind of work that the Market Transformation Programme has been doing goes wider than that. I forget the name of the institute but they host the way in which standards are being generated following up sustainable consumption and production at the world level. So we are seeking to inform, and that is an area where, I think, the UK is seen as performing well.

Q25 Chairman: Maybe you could send us a note on that.

Mr Thornton: We could certainly do that.

Q26 Lord Lewis of Newnham: I am rather cynical of the whole concept of the carbon footprint approach. I realise it is a very important aspect in trying to assess the viability of certain processes and things of this particular nature, but it is so variable and so open to an element of subjectivity in interpretation. One only has to think of the whole situation over disposable nappies. That has been going on, to my knowledge, for 25 years, and every year you get a different answer. In our papers here we have now been told that you are reassessing this particular problem and we are going to get another answer out in December. I do not wish to be too cynical on this but it strikes me that the ground rules are not at all clear and, in point of fact, a given commodity can vary quite significantly depending upon the assumptions that are made; for instance, in transportation and things of this particular nature. How effective do you believe this is going to be? I am in the dilemma of believing that what you are doing is right but I am equally in the dilemma of thinking it is an impossible task to answer.

Mr Thornton: I certainly share with you the mild frustration at the various answers we have had on nappies. Maybe that can be taken in a positive way as showing that actually there is not a blindingly obvious answer in that particular area, so maybe that is not an area where we should all spend much of our time. The roadmap approach, attempting to identify the significant environmental impact of particular product types. Let us take milk, for example, you establish some interesting things, such as, for example, that a very high proportion of the

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environmental impact is arising right at the front end of the chain, on farms and in the intensive systems that are generating the feeds and the fertilisers and so on. It might not have struck one immediately when thinking about it that that is where the main impacts are. You are quite right: any individual life-cycle analysis is terribly sensitive to its boundary conditions and the set of assumptions people are making. We are seeking to work with the business community and economists and the academic community to get better methodologies out there. Carbon footprinting, for example; the British Standards Institute and the Carbon Trust are leading work, with our very strong support in the background, in trying to generate some methodologies that people can use with some reliability and some confidence.

Q27 Lord Lewis of Newnham: In your written evidence you say that vehicle manufacturers are now required to re-use, recycle and even recover 85 per cent of the weight of their end-of-life vehicles and in the WEEE Regulations they are also required to finance the costs of collection of electrical products according to the weight of their products. I can understand the concept of weight, particularly in the case of motorcars because that corresponds to the energy you are going to use in manufacturing them, but is the development of lighter products therefore the best way to reduce waste? I am slightly concerned about that because I think, in general terms, it tends to point towards the use of plastics very often rather than metals and things of this particular sort. When it comes to recycling processes, plastics really are not very effective as a form of medium for recycling.

Mr Pedrotti: The easy answer is no. It is not a case of weight being the be-all and end-all. On End of Life Vehicles, the reason why it is written in regarding the weight was that we already knew that about 75 per cent of the weight in the car was recovered immediately because of the metal content, but nothing else was happening. So in relation to any of the fluids, the plastics, it was just: "Well, that's gone. We'll just keep the metal, thank you very much." We agreed at the European level that that was not the best way of tackling the residual. Obviously the motor manufacturers and, indeed, the electronic equipment manufacturers are conscious of the way the public are reacting, so, if you are talking about energy efficiency from a vehicle point of view, one of the important things is obviously engine capacity but also the weight of the vehicle, but then there are safety considerations: you could make an incredibly light car, but as soon as you were to have a small bump it would disintegrate. There are all these challenges from a design point of view. Indeed, the recovery percentage on the

ELVs is going to rise from 85 per cent to 95 per cent, which pushes, at the start, thinking about what they are putting in that vehicle, how it would be recycled, to try to challenge them to look to see if they could find markets for that residual product and not just say, "Oh, it's plastic, oops." Again on the weight of electrical equipment, the reason it is done on weight—and I know one of your questions touches on IPR—is because IPR is not that easy and so you have gone for the weight ratio. We did not want to have a system where I put 10 products on the market, so does he, mine are tiny, his are huge, and we are treated the same. The underlying principle obviously is to start thinking about the environmental impact of that product. Weight, at this moment in time, is the aspect we are driving the manufacturers to start thinking about. But the easy answer is not: Drive down the weight and you will have the environmental benefit at the end result. There is a lot more to it.

Q28 Lord Lewis of Newnham: The Japanese are one of our major car manufacturers. How do we go about influencing them? They are extremely sensitive manufacturers to environmental conditions, I realise that, but do you have any Directives?

Mr Pedrotti: Regarding that specific piece of legislation, we engage with all the motor vehicle manufacturers. We have very good relationships with vehicle manufacturers from wherever they come. Whether they are Japanese, American or European, the interesting thing is the engagement level. In a previous existence I had the benefit of going around with various ministers and visiting some of the plants. They showed a willingness to share their experience and how they were doing things for their vehicles, either from a design point of view or to show where their production side was stripping out waste and, shall we say, the indigenous market in the UK was not. They were quite willing to share that. The story went that when the minister asked why they were so comfortable to share that information the answer came, "You're British, you won't do it." Now, because of the work the department has done with the vehicle manufacturers, that is changing all the way through the supply chain. In the end result you get better product and much more efficiency and productivity out of it, but also the waste, particularly on the production side, is much, much, much reduced before you have even finished with the main product.

Dr Evans: You have to recognise that the treatment at the end of life is only one aspect of the desirability of any given product, so the regulations we have just been talking about are to make sure that if manufacturers put things on the European market,

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whoever they are and from wherever they come, whether they are Japanese, European or American, they have to have thought about the end of life as well as all the other things that make for a desirable product. Of course, in relation to vehicles, there has been a big drive, through the taxation system and all sorts of other things, to make people more conscious of the environmental impact as they drive, through the effect in terms of carbon dioxide. That is another way in which you can influence good, so to speak, environmental performance, but, once the car has been put on the market, you cannot do anything about the recoverability if they have put the wrong kind of plastics in at the outset. There is nothing you can do as a user to do anything about that. You have to get to the manufacturers at the outset, to try to get them to think about these things before they put goods on the market.

Q29 Lord Haskel: There are of course conflicts here. As you have been pointing out, the lighter the car the less fuel it uses yet the more difficult it may be to dispose of it at the end of life. Somehow we have to bring all these things together. Is this the purpose of the technology platforms that you have mentioned? Is this what the Technology Strategy Board does? Somebody has to bring all this together. Do you leave it to the market to make a judgment or do you try to make a judgment?

Mr Thornton: Our overall approach to a more sustainable economy, sustainable products, sustainable consumption, is very much to motivate the other players in the economy to provide them with information or techniques or methodologies that they can adopt. Sometimes we use rather heavier hands and we regulate them and we put economic instruments in place as well, but our approach is to try to get an economy that gets a virtuous circle running rather than a vicious circle, because we can see the consumer is “getting” all of this and is taking an interest. That is coming through in marketing terms to the manufacturers: the manufacturers see their corporate social responsibilities and carry out the plans. On a good day, one can feel that some of this can add up, but, you are absolutely right, there are some things that we have to put on the ground and the Technology Strategy Board is one of them.

Dr Evans: The important thing to remember about the Technology Strategy Board is that we set it up to be of benefit to business. We did not set it up to deliver some of these regulatory objectives; we have other ways of delivering regulatory objectives. The reality is that we will only make change to the things that we use in society if we as consumers want to buy them. Manufacturers put in the market place things that are attractive to us. That is the place where we hope the Technology Strategy Board can

operate, so that it can create incentives by supporting R&D, giving grants for R&D or providing support for technology transfer, to get the capability side, the scientists, engineers, technologists who have the opportunities in their minds but not yet in the products, into real products in the market place which will both meet the needs and expectations of consumers and be better for the environment. I do not think we can operate that in a command and control way. We can try to make sure the incentives are clear for successful businesses to invest themselves in the kinds of things that will go in the right direction. Technology support is one part. Another, which was emphasised again by the Commission on Environmental Markets and Economic Performance last week, is that of setting a long-term perspective for the environmental standards. Therefore, going back to the case of vehicles, creating at European level a clarity and confidence about the level of carbon emissions which will be acceptable in the year 2020, which will create an incentive so that then we can bring the plastics manufacturers, the vehicle manufacturers, the battery manufacturers, the component manufacturers, you name it, together to create the market to create vehicles which are attractive to consumers but which also perform better.

Q30 Lord Crickhowell: A major change, I believe, in market practice over the last 20, 30, 40 years is that it has become almost impossible, economically, at any rate, to have anything repaired. If you have a minor breakdown in your domestic appliance, you are promptly told that the cost of repairing it will be more than the cost to buy a new product. That seems to be waste creating, to me. Are any of these regulations likely to have any impact on the cost to the manufacturers so that it is made as it used to be, so that, if your fridge broke down and even your camera, you would not be told, “There is no point in mending it because the charge is going to be enormous, much better to buy a new one”?

Mr Thornton: I said earlier on that to some extent we do have to work with the market that is out there. There is no point in us travelling back to some different relationship between consumers and their time preference and manufacturers and so on. On the other hand, of course, you are absolutely right, the last thing we want is to encourage more of a throwaway society if that looks like having environmental disbenefits. The regulations we have been discussing quite a bit this morning, the Waste, Electrical and Electronic Equipment Regulations, do indeed make it much more expensive to the manufacturer of white goods if they are thrown away at the end of their lives, and therefore the cost of waste disposal, that economic calculation, changes—and of course it has the benefit, if they do end up in

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waste, that we recover as much as we possibly can, in terms of reuse or in terms of remanufacture or in terms of the materials. So it is not just having an economic impact, we are trying to close the loop of the materials as well. I think there is some influence—some.

Q31 Baroness Platt of Writtle: One does get the feeling, as a customer, that there is built-in obsolescence, that the item you have is going to be put out of date. That is extremely difficult to control, and I would not suggest you did, but, on the other hand, I can quite see that tax is a good measure, and the fact that the manufacturer has to get rid of the old product, but it is a temptation, is it not?

Mr Thornton: Yes. Perhaps the area we have not talked very much about is also consumer attitudes. We are seeking to generate a consumer economy of citizenry who care as much as we do about the environment; that is, saying it is important to them and they will look to us to try to generate the policies that will help. We are doing a lot of work and we will be publishing work over the coming months on what does motivate different types of consumer at different points in their own lives, what their attitudes are to products and materials and the environment and so on. There are clearly some consumers who do feel that it is all a bit too fast, it is all too wasteful, who would like to hang on to products longer, and we are very keen to encourage that, but we also have to live with the fact that some are wanting to change fast and for them we need to encapsulate the price in that fast-moving product and we need to capture the materials and the products at the end of life as best we can.

Q32 Chairman: In this armoury of weapons you have—and you use expressions like “incentives motivate designers”—could you point to instruments which are anything other than minimum standard hurdles or the kind of thing that would motivate the least-cost way of passing muster? It seems that you are very cautious. You know that carrots do not always work but you are not really very clear about which sticks you ought to be using to get to where you want to be.

Mr Thornton: I think that is perhaps a little unkind. Let us take an example from the Commission on Environmental Markets’ report last week. They are very keen that when Government sets standards for products, supposing we have all formed the view that there needs to be a standard for a product, that we at least set standards at levels that take account of the scope for innovation on the way to that date—so that we do not just build standards in five years’ time that meet today’s capabilities but that we take account of the fact that the world will move

on. They are also very keen that Government should in public procurement set some challenging forward procurement commitments, so that the public sector can share the risk with the developer, as it were, saying, “We are going to want this kind of product some way off, in the medium-term, five years, and if you can deliver to this kind of standard we give you a guaranteed market.” We are being encouraged to be more enthusiastic. We are working with those who have aspirations for a much better society—and obviously we work very closely with the green groups, the third sector—sharing their ambitions. We have a limited number of interventions that people are prepared to put up with us making but we are very keen to see more ambition generated in the economy. The more consumers come along with the story the more we can move ahead. Regulation is bound to be a balance between the impacts of the regulation and the intervention and the environmental benefits, but we are pushing the environmental benefits way up the order. I do not think you would have found these three departments five years ago quite as much in harmony in front of you—at least, appearing to be—as you do today because there is seen to be a mutual environmental benefit in eco-innovation, in products that respect the environment.

Q33 Chairman: The implication in that response is that the ambition of the green groups, as you refer to them, are not really shared by the widget makers. The question really is how you get the aspirations of the green groups to become the accepted standards of the widget maker. I am not quite sure how you are doing this. If these guys do not really respond to the moral high ground because they are too busy dealing with the other regulations that come through.

Mr Pedrotti: Obviously you have the tool, whether it is an economic instrument or legislative, but my area also covers corporate social responsibility and we have seen a change. Where a widget manufacturer sits there and says, “I don’t care about the environment; all I am caring about is making my widgets and making a profit” you are starting to see business consumer buyers/purchasers or general public consumers stop buying that widget because they can start seeing the impact it is having and say, “I would rather buy it from this company because they do care about the environment.” For the biggest companies, rather than the very, very small one, they know this in huge amounts now. You can think of a number of high-profile, negative publicity regarding, shall we say, manufacturers who are not using either environmentally sound approaches or socially ethical approaches, and, once this becomes public knowledge, you see a huge impact on their company’s profits and the amount that people will

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sell. This is permeating down. It is not a case of small companies not engaged in it. My department, through the corporate social responsibility activities, is trying to encourage many more UK companies to open their eyes to this. It is not sledge-hammer tactics. We have to encourage them to go beyond regulatory minimum standards. At an international level, we are again working with BSI. There were around 350 delegates representing various different stakeholders at a meeting in Vienna recently trying to develop a corporate social responsibility standard, a global standard rather than just for the UK. The interest is there. As Neil said earlier, five years ago that interest possibly was not. I am quite encouraged that we are moving in the right direction.

Q34 Baroness Sharp of Guildford: It seems to me that you are right in terms of saying that the consumer is a very big lever here. I also think that consumers are extremely receptive to these ideas. You only have to look at what is happening to plastic bags in supermarkets to see how quickly the consumer moves on something like this. Coming back to the point Lady Platt made about products these days not being reusable—the throwing-away society that we have—as I understand it, if, for example, we need a new toaster, which you can buy for something like £10 or £20—they are extremely cheap these days—we are not encouraged to take the old one along and give it to the sales outlet for recycling. I think they are now put into a special pot at the recycling tip with the local authority but would it not encourage the manufacturers if in fact the retail outlet had the responsibility for taking them in? Then, if they were repairable on the spot, these things could be done there.

Mr Pedrotti: Under the WEEE Regulations retailers have two approaches. If you place electronic equipment on the market, you have either to become a member of what is called the Distributor Take-Back Scheme—which is the retail industry saying, “We don’t want that approach. We don’t want people bringing their toasters back to us, thank you very much. We do not know what to do with it or how to handle that amount of waste” in which case the Distributor Take-Back Scheme has put together a funding package to support local authorities so that retailers can say, “We don’t take it back at this store but if you go to your civic amenity site, they will take it back”—or there are other retailers who are saying, “We are going to do that. We will collect it from your doorstep if we are delivering you a large domestic product and take the other one away or you can bring that toaster back.” The idea that they would then repair it for you and hand it back, I doubt. But they will take that and

sell you another toaster, thank you very much—and a telly and anything else while you are in there.

Q35 Lord Howie of Troon: You mentioned working with green groups earlier on. I confess that made me feel slightly uneasy. By their nature, the people in green groups tend to be enthusiasts and just now and again they suffer from tunnel vision. I wonder just how cautious you are in dealing with them and even how sceptical you are.

Mr Thornton: Our job obviously is to work with the whole of society to try to reach societal results that make people on balance feel better about the outcome. That means we have to talk to hardnosed manufacturers and we have to talk to people with a stronger environmental bent than even we in Defra have. That is rich and right, I think. We have to be open and sceptical to every opinion, including, I hasten to say, our own. I think the key thing is to make sure we get them all in the room. David has referred, in relation to, I think, the Knowledge Transfer Networks and the technology platforms, to the fact that getting everybody in the room together can be very healthy, even if only to see what they say to each other. We do not have a special set of approaches to any particular sub-set of the economy, but, if we are going to do the right thing by the environment, it will be very odd if we were not listening to those who have the strongest environmental instincts. We will always be sure that the regulatory reform end of my colleague’s department will keep an eye on us not overdoing it and will make sure that we do reach a balanced result at the end of the day.

Q36 Lord Crickhowell: Up to now we have been dealing mainly with regulation and exhortation, but this is a Science Committee so I come now to brief references that have been made to innovation. Are we being held back at all by the lack of use of available technologies and available materials? What is being done and what can be done to make sure that designers, manufacturers and everyone have got the latest technologies and we really are in the forefront of the use of such technologies?

Dr Evans: I am sure that as a very general proposition the answer to your question must be yes, that we are both not creating nor using as much new technology as we should in order to be successful in UK business both in reducing waste but also in terms of economic performance. Then you have to ask what the Government is doing to try to improve that. At one level you go back to the big investment that the Government makes in the core science and technology capability of the country through sustaining universities’ laboratories, through training lots of people who go through them, but then you look at the specific

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activities we have been doing under the Technology Programme, which was with DTI but is now the responsibility of my Department, Innovation, Universities and Skills. Most of these activities are delivered through the new Technology Strategy Board which came into existence in July this year and they can be thought of under two broad group headings. First, support for collaborations in R&D grants to companies to collaborate with other companies or universities or other technology institutes. We have had a number of competitions over the last three years which have been directly related to improving the waste and environmental performance generally of British business, and I can go through them if you want to. That is the first category. The second category is we promote Knowledge Transfer Networks which, as their name implies, bring together those who are knowledgeable about technologies with potential users. There are three specific Knowledge Transfer Networks relevant in this particular area. There is the Integrated Pollution Management Knowledge Transfer Network, the Materials Knowledge Transfer Network and the Resource Efficiency Knowledge Transfer Network.

Lord Lewis of Newnham: Could I return to WEEE or do you want to continue?

Chairman: Sorry, were you going to ask anything else, Lord Crickhowell?

Lord Crickhowell: No. I think it would be very useful to have those details spelt out for us and the evidence behind it.

Q37 Lord Lewis of Newnham: This refers to something you have already covered. Basically we are talking about the RoHS Regulation which is really concerned with hazardous waste involved with WEEE type equipment. As you rightly pointed out, one of your problems is that so many of these present gadgets are coming from all over the world and to know what the composition of some of them is must be quite a problem for you. Presumably if it contains things like chromium VI or mercury, things of this nature, you then have to dispose of it in a hazardous waste site rather than putting it into a normal landfill or processing it in the other ways that you should do it. How do you go about doing this? Presumably you have a blacklist of things that are undesirable. If you take so many of these electronic things, are they all analysed for the potential hazardous waste components in them?

Mr Pedrotti: I will answer the second point. The way we went about this was as soon as that Directive was being negotiated regarding the tolerance levels, regarding certain substances, mercury for argument's sake, the action that my colleague, Steve Andrews, took was to go out of, shall we say, the Whitehall area and start talking to electronic manufacturers in the

UK and then Europe, bringing together people in Europe and asking, "How is this actually going to affect your business? What are you going to start thinking about doing?" Then he went to the Far East and China. If you had read the press before the regulations came in, we were going to hit this cataclysmic, "no-one can sell any electronic products because there is not anything that is compliant", but that did not happen, primarily because we had taken steps to make sure that those manufacturers wherever they came from were aware of these new regulations and had time to adapt their practices so that they did not keep putting products on the market beyond the point where that Directive and the regulations kicked in. Our enforcement body, the National Weights and Measures Laboratory, will take products and test them to see whether they are above those tolerance levels. I can give more detail if you want. So far they have not found huge amounts of non-compliant products. I would argue the work we have done has enabled us to get to a position where people are complying.

Q38 Lord Lewis of Newnham: We have the classical example, do we not, if I remember correctly, that if you are to take a printer with a cartridge, if you are to put the cartridge into your waste bin that would be hazardous waste but if you leave it within the printer and put the printer in the waste bin it would no longer be classified as hazardous waste.

Mr Pedrotti: The Hazardous Waste Regulations, and the joys of, I have not got that much experience on. We did have an issue about what components were classed as hazardous, whether it was a printer, battery, et cetera. The main thing for me regarding RoHS and WEEE and its relationship with the Hazardous Waste Regulations is we have got to work with the manufacturers at the point that they are designing and thinking about designing their products so that we mitigate as much as possible the environmental impact. I am not too sure on the hazardous waste side.

Mr Thornton: Just on hazardous waste, the specific example you cite I am not familiar with the answer to, but if you wanted me to look into it I could certainly do that. As a general principle, there is the so-called "duty of care" on somebody who is holding a material which is about to become waste and to dispose of it in accordance with the regulations. The Environment Agency would look extremely sharply at any business that was mis-describing or showing ignorance of the materials that it was disposing of in a business situation and the obligation is on them to know whether they have or have not got hazardous wastes and to handle them appropriately and, as you rightly say, dispose of them to a facility or a waste management contractor who is competent to handle hazardous wastes. In relation to our own households,

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wastes are not usually regarded as hazardous as they pass from us into the system. They are treated as hazardous once they reach somewhere where they can be sensibly handled by a local authority, so, for example, a civic amenity site. I think it is there in the definitions and it is a matter of good sense because householders cannot sensibly deal separately with different materials. We are seeking to encourage and educate householders about the major kinds of materials, like paints, batteries and so on, where it really would be much better practice if they were to separate them out from their black bag without actually criminalising them if they were to fail to do so.

Q39 Lord Lewis of Newnham: I sympathise totally with your approach, and I am sure that is the right way to be dealing with it, but if we just refer back to an earlier point which also illustrates where I have difficulties. You were talking in your WEEE Directive about the fact that you have delegated to local authority the central point for collection but I live in Cambridge and if I want to get rid of something I have got to get in a motorcar and go to the outskirts of Cambridge in order to deposit this thing. It is much easier to open the bin and shove it in.
Mr Thornton: It is the case that some local authorities—

Q40 Lord Lewis of Newnham: At the moment I do not believe that is illegal.

Mr Thornton: No, it is not illegal, as I have just said. We do not treat householders as criminals if they fail to do the best thing they can for the environment with materials of that kind. Some local authorities do collect WEEE from the doorstep as part of their recycling capacity and I anticipate that would increasingly be regarded as good practice for the smaller materials, for example a toaster. There are some products where it is not practical to handle them in those ways and, of course, local authorities' practices do differ according to the services, the communities and disposal facilities they have got. I think the world of WEEE is learning how to live with the new regulations and in a year's time it will be interesting to see whether, as we hope, that will have settled down.

Q41 Chairman: Can we just clarify one point. I was not very clear when you were talking about IPR and CPR. You made this distinction and said that the Government would introduce IPR as soon as possible without being "overly burdensome". Where is the burden felt and what is the problem about the individual producer responsibility?

Mr Pedrotti: This was a hell of a challenge. The idea of individual producer responsibility is one that we agree with, it is just a case of how you practically

implement that. At the moment the Directive allows for a fee to be shown to the consumer to deal with historic waste electronic equipment that is coming through the system. The idea of IPR is for any new products that a manufacturer, or whoever, is placing on the European/UK market, they are then responsible at the end of its life. Some products lend themselves to that more easily than others. With smaller domestic, to have IPR in the UK you would have to have a system where all the waste electrical was collected and potentially if you want to go for total IPR you would then sort through every single piece of equipment and identify the producer. That gets even more complex in the fact that some organisations, if we take Philips, will be the manufacturer but then place it on to the European market via a second party because they bought it off of Philips and are now placing it on the UK market, so this person is the producer and not Philips, but when it comes to the end of its life it says "Philips" on the side of it. It is very, very difficult. Producer compliance schemes which are working with producers in relation to WEEE are under an obligation under our regulations to put recommendations to us via the Environment Agency by the end of this year about how they feel we could move towards it and the Environment Agency are reminding those producer compliance schemes of that duty now. The other thing is I have helped to establish a new non-departmental public body, advisory body, to look at the whole way that the WEEE system is working in the UK and to give us feedback on IPR issues. We are not against IPR and, indeed, there is nothing to stop a manufacturer/producer now putting in place an IPR system, it is not precluded, but the reason they have not done it is that it is virtually impossible.

Q42 Lord Lewis of Newnham: There is a good reason for them to do it from our point of view because it will encourage them. If they are going to get their own material back it will encourage them to consider the design programme. At the moment there is no incentive if they are going to put it in a pile with a load of other stuff.

Mr Pedrotti: There is collective responsibility and if everybody acted along that line then everyone would be taking a big hit. From a design point of view, IPR point of view, yes, we would like to get there. I am certain companies, particularly IT companies, would like to get there. We would welcome any ideas from the advisory body or the producers about how we can move towards that system. From a wider environmental point of view, I could fill the new Wembley six times with waste electrical equipment that is produced in the UK during the course of one year. I could shift it all to Wembley, fill it up six times, sort it out and now I have got to get it from there to

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the producer and the producer's site where they can recycle it and deal with it themselves. That is where I start to think that IPR is a marvellous idea and would drive innovation and eco-design and would be true producer responsibility, but how do we get there. We could put in place a system but it would be so expensive and arguably un-environmentally friendly.

Q43 Lord Lewis of Newnham: No European country does this?

Mr Pedrotti: No European country does this whatsoever. They may have put it on their statute books but they are not doing IPR. There was a meeting of the Technical Advisory Committee at the European level very recently and the Commission basically turned around and said, "We know this is not working across Europe". This is something we want to look at as part of the review which the Commission will be starting next year and we will be working with them. No-one in Europe is doing IPR.

Q44 Baroness Platt of Writtle: From the point of view of the consumer who may have bought a larger item of equipment, say a washing machine or dishwasher or something, it is absolutely vital that that piece of equipment, the old one, the obsolete one, does go back somewhere otherwise fly-tipping will become appalling.

Mr Pedrotti: I can assure you that at this moment in time there are people who are not quite knocking your front door down to get that waste electrical equipment but it is getting close because of that scrap metal value.

Q45 Baroness Platt of Writtle: That is cheering, is it not?

Mr Pedrotti: You have two routes. One, where you buy a new product and the person you are buying it from will undoubtedly offer you the opportunity for them to take the old piece of large domestic appliance away or, two, local authorities offer what is called bulky waste collection so for a fee, because obviously they are doing a service for you, they will take that piece of equipment and make sure it is treated in accordance with the WEEE Regulations and will be dealt with accordingly.

Lord Lewis of Newnham: That is jolly cheering, the idea that it might be of value in some way.

Q46 Lord Methuen: Can I ask an off-the-wall question. For instance, a major policy decision was made to go to digital TV and the implication of that is tens of millions of analogue TV sets are going to be thrown away. Has there been any consideration of the waste disposal problem of those?

Mr Pedrotti: Yes, it was. The interesting thing is when you look at the old analogue, it does not necessarily mean that the televisions you have got in your house at this moment in time are incompatible.

Q47 Lord Methuen: You can have a set-top box, yes.
Mr Pedrotti: As you say, you can have a set-top box that means the television is perfectly capable of working. We are not anticipating a huge rise in perfectly workable televisions being disposed of at CA sites. What will probably happen is, as in most people's households, and it certainly happens in mine, you will find that television moves to your son's or daughter's room and you have this merry-go-round until finally—

Q48 Lord Methuen: So it is being recycled.

Mr Pedrotti: Reused within my house.

Q49 Lord Crickhowell: Just one further question on innovation. Again, we are back to the difficulty that we are going to rely a great deal on what is going on in other countries, where a lot of manufacturing is going on. How sure are we that we are really keeping abreast with the technology and scientific development on this work that is being done in Japan, say, or elsewhere?

Dr Evans: One of the responsibilities which we have put on the Knowledge Transfer Networks is to ensure that they are up to speed with best practice and leading edge technology around the whole world. We are reasonably confident that aspiration is being met. Typically, university departments have a very international perspective and that is one of the very good reasons why the relevant universities which are expert in the specific areas are actively participating and encouraged to participate in the Knowledge Transfer Networks. I would not describe the support system that we have in place as being a nationally confined one; I would say it is very open to development, not least through things like the European Framework Programme which supports research activities across Europe as well.

Mr Thornton: Can I make a very general point about this international trade aspect because it has come up several times. Obviously we are an economy which is much less of a manufacturing economy than we were and the consumer choices people are making and the purchases they are making are tending to be designed and manufactured overseas. That is obviously something that is very important to us in our consideration of either the UK's footprint or the footprint that the UK is responsible for in terms of climate change particularly. Of course, places like China, for example, are frequently exporting to a wider number of European Member States and, therefore, European regulations are frequently quite determining of product design in overseas

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manufacturing bases. We are also trying to transfer our own techniques, for example the Market Transformation Programme which I was describing which is looking at life-cycle impacts and technology choices that are available to people. Those kinds of methodologies are frequently being exported to China, because people who are working with us on those programmes are working in places like China, to give them their own capacity to make their own choices because they too are interested in these kinds of product impacts.

Q50 Lord Howie of Troon: I am told that the European Union has a Directive concerning Eco-Design of Energy-using Products.

Mr Thornton: Yes.

Q51 Lord Howie of Troon: This is the first time I have heard of it, and no doubt you will explain it to me. I gather that this Directive is thought by some people as likely to change attitudes towards waste at the design stage of developing a product. Is the Government intending to implement this Directive in a way that would encourage the reduction of waste?

Mr Thornton: Our overall approach to the Eco-Design of Energy-using Products Directive is to think that the best and most important use of it is, if you like, for what it says on the tin. The environmental impacts or the energy in use of products is a very fundamental aspect of the impacts, particularly the climate impacts, of product use. It is the case that the Framework Directive enables Member States to import, as it were, waste aspects as well, but most of the products we are talking about here will have waste regulations applying to them because most of them will have WEEE and RoHS applying to the products themselves. Our instinct at the moment, and it is quite early days because the Framework Directive has only just been put in place, is to think that the most important thing to use it for is to focus on the energy in use of the products. We will certainly be looking at the interface with the waste regulatory system to see whether there is any fine-tuning that we ought to undertake. This is a Framework Directive so it is envisaged that later on it will have a series of daughter directives in particular product areas. Obviously work like our own Market Transformation Programme will work very closely and engage with the Commission on the early stages of the design of some of those daughter directives.

Q52 Lord Howie of Troon: I think I am a bit further forward than I was a few moments ago. Can you tell me how long you have been considering this and how far you have got? You say it is fairly recent.

Mr Thornton: The Directive has come into force fairly recently but because it is a Framework Directive it has no direct impact because there is

nothing else built under it. If you wanted to know more about our approach to the negotiation and so on, I would probably have to offer you a note because it runs out with my knowledge. I would be happy to do that.

Lord Howie of Troon: That would be fine.

Q53 Baroness Sharp of Guildford: Looking to the future, how far are we training young designers to incorporate waste reduction and how far does the syllabus incorporate this for them?

Dr Evans: Perhaps I might say something about that. The Design Council, which is a body which reports to my Department, has actually put a great deal of effort into working with the universities and colleges who train designers on the whole of the syllabus. It has done that in association with the relevant Sector Skills Council, which is the one for the creative and cultural industries, and has prepared a forward looking plan which locates the whole life performance, including the waste and disposal aspects of products, as being an essential part of the design curriculum. The Design Council itself is very enthusiastic about sustainable development and gives a high priority to that. The features of waste management as part of the overall sustainable development approach exist within the design curriculum but whether they exist sufficiently is perhaps something you could speak to the Design Council about who are more expert and more directly responsible than I.

Q54 Baroness Sharp of Guildford: How far is there a link-up between design and engineering?

Dr Evans: That is something which my Department and its predecessor have done quite a lot on. For example, we have brought together the Royal College of Art and Imperial College to a new institute bringing the design and engineering aspects of both education and product design together with significant funding. Our objective is to create similar linkages between other leading edge design schools and the engineering departments in universities. In that way you can enable the understanding between both the design capabilities, the features of good design, and the material properties, if you are talking about electronics or whatever it is, to enable the two disciplines to talk better together. It is this multi-disciplinarity which I think is a key feature which is needed if you are to have successful design in the area of waste management.

Lord Howie of Troon: This is a difficult area. If you pursue it far enough you encourage architects to design bridges which are very fancy but tend to be somewhat wasteful in the use of material.

Chairman: There speaks a civil engineer who should have declared his interest!

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Q55 Baroness Platt of Writtle: I am an engineer too, but aeronautical. I think this definition of the word “design” is rather careless if you are not careful because it is the look of the thing, but how it works is what an engineer would want to know. Okay, is it wasteful or is it not, but in the circumstances we have also talked about a motorcar and there is the beginning, the end, but there is the use in the middle, so the engineer would be much more interested in the different forms of design. That is the first thing. I was very pleased that earlier you referred not only to universities but to colleges of further education because when you are talking about car mechanics, garages, all sorts of people, it is this middle group of people, the technicians of the car, which is terribly important if you are to have good use in the middle, although it will be the chartered engineers who will be much more interested in the original design. In a way I am commenting on what you have said but what I really want to ask is what do schools do. I am the patron of the WISE campaign—Women in Science and Engineering—trying to encourage more girls into engineering, but if you are not careful in the schools the young people are put off careers, and our Committee has produced a report on that so I will not bore you with it. One of the things that I do think is important in schools is that if young people have seen what is happening they will go home and say, “You know, mummy, the day you threw that away, that wasn’t a good idea, we could have reused it”. To what extent do schools organise visits to employers locally to see what they are doing about designing not to have waste? Also, the same child who will have asked questions of mummy will ask questions of the employer as well, and quite often those questions are very good.

Dr Evans: You have asked a number of points which in some way bring together some of the earlier discussion because it also talks about the issues of planned obsolescence as well in relation to some of these things. First of all, I would have to say on behalf of the Design Council, the Design Council argues extremely strongly that design is not just about the appearance of a product or a service.

Q56 Baroness Platt of Writtle: Good.

Dr Evans: A design is all about its functionality in relation to the needs of the consumer or the user, whatever it may be, and good design cannot be at variance with usability. It may also have attributes of attractiveness to look at but good design cannot just reside in appearance. You raised a very good point about technical level skills and that may come back to some of these questions about repairability of products which have gone out of function. We definitely need to educate people at a technical level in a way which enables them to meet environmental aspirations of products as well as the economic

aspirations. I am in an exploratory phase with my new Department and I do not feel I understand enough about the way in which the technical education and the learning and skills function operates in relation to that.

Q57 Baroness Platt of Writtle: You could get City and Guilds to help you.

Dr Evans: Absolutely. However, the Sector Skills Council, working with the Design Council, has put forward the idea of a diploma in design which addresses some of these issues, so if you invite the Design Council to come and give you evidence I am sure they will be able to tell you something about the work they have been doing with the relevant Sector Skills Council so as to get design better understood at the technical level as well.

Q58 Baroness Platt of Writtle: You will not forget schools, will you?

Dr Evans: I wrote down the list.

Q59 Lord Crickhowell: The Design Council has already submitted some written evidence and it is pretty critical in many ways. It talks about there being little demand for skills in UK industry and it goes on to argue things that spring from that. I am not going to go through all their recommendations but they argue extremely strongly that certain things should happen. I think it might be helpful to the Committee if you could let us have a response to those specific recommendations set out under section four of the evidence that they have submitted because they are fairly detailed and comprehensive. I am not going to elaborate on them but it would be helpful if you could give us a response.

Dr Evans: I would be very happy to provide a note on behalf of the Department in relation to the points from the Design Council.

Q60 Baroness Platt of Writtle: You left out schools. What are you doing with schools?

Mr Thornton: I have to make the disclaimer first of all that schools are not the responsibility of my Department, it is now the Department for Children, Family and Schools.

Q61 Baroness Platt of Writtle: Okay. I will reserve that question for them.

Dr Evans: Let me say that the Sector Skills Council as well as my own Department is working very hard to try to attract school children to the discipline of design but also the whole area of science and engineering. My Department does put a lot of responsibility and a lot of its efforts behind attracting sufficient numbers of young people into science, technology and mathematics skills.

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Q62 Baroness Platt of Writtle: Do not forget that 52 per cent of the population is women and work with WISE. That is an interest, sorry.

Dr Evans: Both women and men.

Q63 Lord Haskel: If we could quickly move on to business support. The Business Resource Efficiency and Waste Programme has a number of different delivery bodies. We are told there is Envirowise, NISP, WRAP and MTP. Can you tell us how these various bodies work together and how businesses are guided to the right programme and how do you avoid duplication?

Mr Thornton: Yes, gladly. I should probably use the phrase BREW, because it is shorter, for the Business Resource Efficiency and Waste Programme. The first thing to say about the BREW Programme is that it is simply a funding mechanism, so there is not somewhere a BREW thing. BREW is a process by which we allocate funds to bodies which contribute to business resource efficiency and waste performance. It has been hitherto funded from the landfill tax escalator funds and the future of BREW will come up in the next spending round. We, sitting as the secretariat of the BREW process, engaging other departments and external stakeholders, seek to look at proposals from various players who are out there in the delivery landscape, if you like. The main ones you have mentioned, I will briskly explain what they do. Envirowise is a contract as it happens with a provider, an environmental consultancy provider, which ensures that businesses have practical advice available to them about ways in which they can improve their environmental impacts, minimise waste and make profits. So they are looking for a business solution that will contribute to environmental outputs. They provide free, confidential and tailored advice through onsite visits and they have a helpline, a website and so on. If you like, they are an advisory service. They spend quite a lot of their time in the medium to small end of the business. The smaller ones would probably use materials that already exist. The Market Transformation Programme I have referred to quite a number of times already this morning is also an external contract with an expert provider and it focuses on improving resource efficiency of products used or potentially used by business. It is largely an information source, so it seeks and generates knowledge and information about environmental performance of particular product types and publishes that. It talks about the trajectory of future environmental benefits and, therefore, can help to inform standards making and so on. As I said earlier today, it both helps us in Government to understand products and where they might go and it helps the business community, consumers, green groups and so on. To some extent we use them almost as an arm

of Government when we are talking about international negotiations, for example, on products, they can simply provide an expert service to us. The National Industrial Symbiosis Programme—I cannot claim all of these titles are terribly easy to absorb—is effectively an environmental marriage broker between businesses. The most classic example is where it identifies a business which has a waste material which will make an ideal input to another business's production. They do not limit themselves to physical goods, they can deal in waste heat and in other environmental waste. Effectively, they are bringing together businesses who, if they work together, can improve both their business output and environmental output. The Waste and Resources Action Programme, which is almost never so described, it is always referred to as WRAP, is a body we put on the pitch some years ago principally to improve the market for recyclable materials. There was recognition that there was a market failure and not only were people not showing an interest in recycling but there was not a market for the materials that could be generated out of recycling. Of course, some of those markets are overseas but they have been seeking to generate and are effectively operating a recyclable materials market. They also focus on improving waste performance in the business community at large. They have a very significant and rather successful initiative called the Courtauld Initiative in which they were working with the major retailers initially but now also some of the major food manufacturing companies, for example, to reduce food wastes, to reduce packaging in the chain. That is quite independent of the regulatory position where we place obligations sometimes. Those are the four most significant recipients but there are others that are eligible under the proposal. For example, there is a body called Action Sustainability which tries to encourage best procurement practice in the private sector amongst major private companies as opposed to the public procurement activity which we talked about earlier. You also asked how we avoid overlap and how simple it is for anybody to understand this position. We work very hard with the organisations and we are extremely angry if any of them is ever caught poaching, filching or fighting at the boundaries between them because you are right to detect that sometimes there are boundaries. We are seeking to establish a world in which they work collaboratively and co-operatively—for example, Envirowise and WRAP are working together on some construction propositions—and to hand off to each other and the Carbon Trust as well which is also a recipient. As part of the then Chancellor's initiative on business support simplification there is an intention that we should bring together the environmental supports that are available to the business community in a simpler to understand

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proposition, future environmental support for business. One of the approved mechanisms that will be presented during the course of the next year or two is one on business resource efficiency and waste. We will be seeking to make sure that there is a more straightforward and easier to understand front end for a business which happens to wake up one morning and says, "Actually, I would quite like to do something about all this", rather than waiting for one of my colleagues or delivery bodies to bang on their door.

Q64 Lord Haskel: When they wake up one morning and say, "I want to do something about this", how do they find out what services are available?

Mr Thornton: Obviously all of these bodies have active Web presences and they could come to this Department where our Web presence or anybody they talk to would be able to signpost them. Directgov and its business equivalent carry information about these bodies. We have done what we can to make information available now but it is not as good as it might be. We certainly hope that if a business goes into a Business Link or an RDA they will find out about these organisations. The expectation is the Business Link will always be one route available to business in the new model of the simplified business support.

Q65 Earl of Selborne: My question was going to address the issues facing small and medium-sized enterprises. Clearly there is a problem of scale in implementing sustainable production processes.

Mr Thornton: Yes.

Q66 Earl of Selborne: Lord Crickhowell referred to some of the recommendations of the Design Council which call for greater support for design-led innovation that will enable SMEs to embed sustainability in all their products and services. Would you accept that is a sensible recommendation? What opportunities are there to transfer waste production knowledge from large organisations to SMEs?

Mr Thornton: I will say a couple of things and Tony might well want to add something. I will not say whether I think the recommendations are sensible because David has said that he will be commenting on those already and will obviously be in touch with you about that. Our approach would not be fundamentally to say that there are different issues for large businesses and small businesses but there are clearly different capacities. Small businesses tend to

be time poor and knowledge poor and will need simple routes to market and simple routes to get the information that may be available and will frequently need to use fairly off-the-peg advice or simple advice that they can get from the Business Link because there will not be sufficient capacity to provide hand-holding, as it were, although the Envirowise service is available to small businesses. Larger businesses will tend to have corporate social responsibility departments and in many cases will be handling more complicated environmental propositions. If you take a major retailer, they are obviously hugely influential in the environmental performance not only of themselves but of their supply chain and are very alert to the environmental demands coming forward from their consumers. We have already talked about the big businesses who run petrochemical plants and their relationship with the IPPC controls. What we seek to do is ensure that where a small business or a large business wants to feel more motivated, there are support mechanisms and regulatory regimes available to them that will work for them. Within that context BERR would be our proxy for the business community and the design of such things.

Mr Pedrotti: The challenges an SME faces are completely different from a large business. Any support that the Government offers to SMEs is general on one level, but also we try to tailor it because if you tell an SME based where I live in South London regarding sustainable consumption and production, "This is how BP does it", you have lost them immediately because they will say, "BP is huge, it is not relevant to my business, I'm out the door". That is why Business Link and trade associations are more important as a mechanism to try and influence these people. Also not to be put off. I recently attended a business breakfast where it was just SMEs and when you talk to them and they understand it, they are up for doing something. It is that engagement with them rather than just, "Here's a leaflet dropped on you by a trade association". You have got to recognise their ability to do things is dependent on the resource side and the time side.

Chairman: Thank you very much, gentlemen, that has been very helpful. As you know, this is our opening session so you have given us a backdrop. I think we will reserve the right to call your political masters or mistresses, I am not quite sure who all the ministers are these days. We will be asking them back but, it has to be said, that will not be any reflection on the quality of the answers that you have given us this morning because they have been very fulsome and very helpful. Thank you very much.

Supplementary Memorandum by the Government Departments

Following the evidence session to the House of Lords Science and Technology Sub-Committee on 27 November, it was agreed that the Government would submit a follow-up note to cover the following points:

1. The work of the European institute that monitors standards for sustainable consumption and production worldwide, and the way in which the MTP works with partners abroad to share information about the life-cycle impacts of products and materials (QQ 24–25).
2. The ways in which the Technology Strategy Board is promoting the development of new technologies and ensuring that designers, manufacturers and others have access to them (Q 36).
3. The ways in which the Eco-Design of Energy-using Products Directive was negotiated, and the possibility of implementing daughter directives to change attitudes towards waste (QQ 50–52).
4. The extent to which sustainable design and engineering skills are taught to students in schools (QQ 55–58).
5. A response to the points made by the Design Council in section 4 of their written evidence—a copy of which is enclosed (Q 59).

INTERNATIONAL TASK FORCE FOR SUSTAINABLE PRODUCTS (ITFSP) (www.itfsp.org)

The UK established (in Nov 2005) with the support of thirteen other governments, including China, the USA, Australia and Canada, the International Task Force for Sustainable Products (ITFSP) in response to calls for more information sharing and international co-operation in bringing forward more energy efficient and sustainable products.

ITFSP's goal is to raise awareness of product policies such as labelling and standards as a means of achieving international development and environmental objectives. With many important energy using and non-energy using products being globally traded goods, the need to develop coherent and technically harmonised policies are a practical and political necessity if we are to deliver the Government's objectives for more sustainable patterns of consumption and production including energy, water and waste. This was a strong theme, for example, in commitments made in the Gleneagles Plan of Action "to encourage co-ordination of international policies on labelling, standard setting and testing procedures for energy efficiency appliances".

One practical activity for ITFSP is to monitor international policy and to publish maps of current activity in setting market transformation targets and benchmark product standards, by product sector and by country, to identify the practical scope and priorities for international co-operation and to support concrete actions. Such actions might include supporting international conferences and workshops, the development of harmonized technical performance measurement methodologies (metrics), development of new/improved standards, target setting for future product performance, and practical policy instruments, such as the EuP Directive, and public procurement. A useful practical deliverable for the Government is information about benchmark sustainable product standards, being used by other governments, which could be adapted for use in UK policy, for example, in public procurement.

The Task Force monitors existing networks, collaborative initiatives (eg bilateral, regional, multi-country) and other mechanisms for co-operation on sustainable products. Gap analysis enables ITFSP to identify where more international co-operation would be beneficial and if there are existing mechanisms—thus defining the areas for action and priorities for ITFSP. To date ITFSP has focused on energy using products and energy-in-use aspects—as having a clear priority for the governments involved. However some work is developing to explore the scope to encourage more co-operation in developing policy on water-using products and on waste aspects.

ITFSP encourages and facilitates the formation of a Global Sustainable Product Networks (GSPNs) which either initiate, draw together, or develop existing information sharing mechanisms or expert communities. GSPNs provide a framework for greater collaboration between existing networks of stakeholders (eg experts, policy makers, consumer groups, trade associations. Through these GSPNs, the UK, with others, has been active in expanding participation in a number of key SCP-related international initiatives, including:

- International Compact Fluorescent Lamp (CFL) Harmonisation Initiative;
- Standards for Energy Efficiency of Electric Motor Systems (SEEEM);
- EU Code of Conducts (EU CoC) on Set Top Boxes and Data Centres.

The UK is also taking a leading role in the new IEA Implementing Agreement on Efficient Electrical End-use Equipment; this initiative provides an important route for the UK/ITFSP to share its work on mapping global product standards.

Outside of ITFSP, but working closely with it, the Market Transformation Programme (MTP) works closely with officials at the EC, in other Member States and particularly with the US Environmental Protection Agency to share information and develop increasingly stringent standards for Energy Star labelling of products.

The MTP's work in relation to the development of forthcoming implementing measures for the EuP Directive is one area where life cycle aspects have risen in prominence. This Directive requires an evaluation that includes the entire product life cycle: from raw material selection and manufacturing process to packaging, transport, and distribution to installation, maintenance and use, and finally to end-of-life which includes recycling, reuse, and final disposal. The large range of implementing measures that will be developed over the next few years has meant that the MTP will need to be increasingly working with equivalent bodies in other member states and internationally on whole life aspects. ITFSP and IEA mechanisms provide a potential route for information sharing and for cost-shared standards research and development projects.

TECHNOLOGY STRATEGY BOARD

The Technology Strategy Board provides support to develop new technologies through a number of activities. For instance, the Technology Strategy Board provides funding for Collaborative R&D projects bringing together businesses with academia to research and develop new products and services. The projects supported tend to be between two and three years in duration and result in some new knowledge which can then be exploited. Projects involve a number of partners, but in most cases there is a requirement to have an end user in the project who is often a manufacturer who is looking to exploit the research outputs. Projects that are nearer to market can have a design element or more specifically competitions, such as the competition held in November 2005 on the design and manufacture of sustainable products, have design as a core part of the research.

The Technology Strategy Board also supports 23 Knowledge Transfer Networks (KTNs) including the Resource Efficiency KTN and the Environmental KTN. The networks bring together businesses and academia to exchange knowledge and share best practice with a focus on technology and innovation. These networks exchange knowledge which includes details of the latest developments in technology and innovation and include case studies based on Technology Strategy Board investments. The case studies provide a wider audience with access to details of the research and project partners, who they can then contact. The Technology Strategy Board also supports over 1,000 Knowledge Transfer Partnerships (KTPs) at any one time. Each KTP places a newly qualified graduate into a business to transfer knowledge through the person. The Partnerships, of which over 80 per cent are with SMEs, involve graduates working with businesses including manufacturers and designers to provide them with the latest academic knowledge in areas relevant to their business strategy.

ECO-DESIGN OF ENERGY USING PRODUCTS DIRECTIVE

The Framework Directive for the Eco-design of Energy Using Products (EuP) provides for the Commission, subject to certain conditions, to set mandatory performance and eco-design requirements for energy using products placed on the EU market. The main aims are to help deliver EU objectives to reduce greenhouse gas emissions, to reduce the adverse environmental impacts of products, and to ensure free-trade in energy-using products. The Commission estimates that this measure could reduce EU energy consumption by around 10 per cent.

As explained below, while the EuP directive could set eco-design requirements which would reduce waste arising from energy using products, that is not its priority. In all cases, the most important environmental impact and priority for this policy measure will be to reduce the energy used in the in-use phase. The Government's view is that we would encourage the Commission to include requirements to reduce waste where that was identified as having the potential to be controlled, cost-efficiently, via better eco-design, where there were no other more suitable policy instruments, for example WEEE and RoHS, and where that would not unduly delay implementation of measures to reduce energy consumption.

The Directive was adopted through the co-decision procedure at its second reading, and was published in the *Official Journal* on 5 July 2005. It is transposed in the UK through the Ecodesign for Energy Using Products Regulations 2007, which came into force on 11 August 2007. The Framework Directive does not contain any immediate obligations for manufacturers, but obligations will arise via a series of implementing measures, which can take the form of a Commission Decision, a Regulation or a Directive.

In order for a product to be considered for an implementing measure, it must fit the following criteria:

- it must represent a significant volume of sales and trade (more than 200,000 units a year within the EC);
- have a significant environmental impact; and
- present significant potential for improvement without entailing excessive costs.

If a product fits these criteria, the Commission can carry out a preparatory study to provide evidence to assess whether the product should be considered for an implementing measure. The study is intended to identify the most significant environmental impact of a product, which can then be addressed by the implementing measure.

The studies follow a defined methodology, intended to ensure that all aspects of a product's lifecycle are investigated and that stakeholders have the chance to provide input. There is a website dedicated to each study, and stakeholders are encouraged to participate in the development of the studies. The Government has been able to provide input to these studies through its Market Transformation Programme, which has ensured that the appointed consultants are aware of and have access to government analysis and other relevant information for use in their own modelling.

Once complete, the preparatory studies are used by the Commission to produce an initial working document for discussion with Stakeholders in the "Consultation Forum", a meeting of Member State and Industry representatives. Following discussion at the Consultation Forum the Commission will proceed, if appropriate, to produce a formal proposal for an implementing measure. This process, which includes the preparation of an Impact Assessment, usually takes around three months. All implementing measures are subject to the approval of a Regulatory Committee, which consists of the Commission and the 27 Member States.

The first 19 products to be covered by implementing measures are set down in the Framework Directive itself. At present the Commission aims to reach agreement on implementing measures for 14 of these by the end of 2009 and the rest by the beginning of 2011, although we believe that this is a very ambitious timetable.

A number of studies have now completed and we have so far seen three working documents, on standby power, street lighting and office lighting. More studies, including those on motors, boilers and water heaters are nearing completion. In all these cases, the studies have shown that by far the largest environmental impact of these products is the energy in use phase. Addressing this has therefore been the main focus of the working documents issued to date by the Commission, although they do touch on some other areas. For example, the working document on office lighting proposes lower limits for mercury used in fluorescent tubes.

The Commission has now published a work plan intended to identify a further 25 products suitable for implementing measures over the next three years. The work plan is very wide ranging, and prioritises product groupings according to their energy use, so it is clear that the main focus of implementing measures is likely to remain the energy in use phase.

A more detailed briefing note about the EuP Directive can be found at <http://www.mtprog.com/ApprovedBriefingNotes/PDF/MTP—BNXS03—2007October26.pdf>.

SUSTAINABLE DESIGN AND ENGINEERING SKILLS IN SCHOOLS (RESPONSE FROM DCSF)

The current National Curriculum programmes of study for Design and Technology say that pupils should be taught:

- at key stage 2 (ages seven to 11) to recognise that the quality of a product depends on how well it is made and how well it meets its intended purpose (for example, how well products meet social, economic and environmental considerations);
- at key stage 3 (ages 11–14) to identify and use criteria to judge the quality of other people's products, including the extent to which they meet a clear need, their fitness for purpose, whether resources have been used appropriately, and their impact beyond the purpose for which they were designed (for example, the global environmental impact of products and assessment for sustainability); and
- at key stage 4 (ages 14–16) to ensure that their products are of a suitable quality for intended users (for example, how well products meet a range of considerations such as moral, cultural and environmental) and suggest modifications that would improve their performance if necessary.

From September 2008 the programme of study at key stage 3 has been revised. One of the key concepts underpinning the study of Design and Technology is understanding that designing and making has aesthetic, environmental, technical, economic, ethical and social dimensions and impacts on the world. For each product

area the study of designing should include understanding of the impact of products beyond meeting their original purpose and how to assess products in terms of sustainability.

From September 2008 Design and Technology will not be statutory at key stage 4.

DESIGN COUNCIL

- *Recommendation 1: Greater support for embedding sustainability within business and business support programmes.*

The Design Council's design support program for businesses is already embedding design at the heart of businesses. We agree that the Design Associates, involved in mentoring businesses to help them devise design solutions to improve their competitiveness and productivity, could also promote and embed sustainability as part of their mentoring efforts. Among, other services, for example, Envirowise's DesignTrack program offers a free and confidential service focusing on reducing the environmental impact of a product over its entire lifecycle. DesignTrack's objective is to ignite cultural change towards sustainability in businesses while realising real cost savings.

Sustainability of goods and services can be enhanced through efficient manufacturing processes. Drivers of efficiency are cutting waste and saving energy. Business support programmes such as the Manufacturing Advisory Service (MAS), in addition to other forms of advice, help businesses cut waste. A variety of Carbon Trust programs help address strategic approaches to sustainable development.

- *Recommendation 2: More emphasis on sustainability in design education as part of a nationally co-ordinated skills programme.*

The UK Design Industry Skills Development Plan, *High-level skills for higher value* jointly published by the Design Council and the Creative and Cultural Skills Council, recommended a number of approaches to developing design skills in schools, in higher education and in industry. DIUS along with DCSF, HEFCE and BERR officials have met to discuss the recommendations which have been put forward in the report. The Design Council are taking the lead in completing detailed feasibility work on individual recommendations in time for incorporation in the industry's sector skills agreement in the New Year.

- *Recommendation 3: Greater support for collaboration between design, science, technology and business HEIs.*

The Government has funded the Materials and Design Exchange (MADE) to help bring together the design and material technology communities to look at key issues linking product design and manufacture. The identification of suitable alternative materials at an early stage can help product designers and engineers take sustainability factors better into account, stimulate industrial innovation and improve the competitiveness of the UK.

The network formed from a partnership between the Royal College of Arts, the Institute of Materials, Minerals and Mining, the Institute of Design Engineers, the Engineering Employers Federation and the Design Council, has been pursuing a programme of events and other communication strategies to raise awareness of the skills that exist within each community, encourage dialogue and exchange of knowledge and information and the brokering of collaboration on key projects. The Materials KTN is one of 24 knowledge transfer networks funded by the Technology Strategy Board. It has networks that specialise in sustainable packaging materials and sustainable materials for transport applications.

The incorporation of a Materials and Design feature in this year's London Design Festival has led to an interaction of a minimum of 400 designers with materials scientists. Key themes including those on sustainability received excellent reviews.

Lord Sainsbury's Review of Science and Innovation Policy recommended that the Design Council's innovation service for technology ventures—Designing Demand Innovate service—be extended to the university technology transfer sector, in order to strengthen the link between UK industry and the science base and support regional economic development. The Design Council plans to seek funds to pilot such a programme with targeted HEIs to provide design training and support for technology transfer staff and intermediaries. DIUS is leading on implementation of all the recommendations in Lord Sainsbury's review in collaboration with our partners in other departments and bodies, including the Design Council.

- *Recommendation 4: Greater emphasis on a service design approach from business.*

DIUS recognises the importance of service design techniques as a tool for businesses to gain competitive advantage and improve their services. With rapid growth in the UK services sector, service design and its management need to be properly planned. Programmes such as Designing Demand—a design support programme for UK businesses which has been developed to help businesses become more competitive,

increase their profits and boost their performance through the strategic, effective use of design—could be a good route to advise businesses on principles of service design.

- *Recommendation 5: Greater public engagement to raise awareness among the general public about the value of sustainable development and design's role in it.*

The Design Council have outlined the success of their public engagement programme, Designs of the Time (Dott07) in making a cross section of society more aware of the role of design in sustainable development.

It will be important for the Design Council to disseminate the positive results and raising the profile of the various projects undertaken as part of Dott07, including projects on sustainability, to OGDs and RDAs with a view to scaling up these projects at regional and national levels.

December 2007

TUESDAY 11 DECEMBER 2007

Present	Haskel, L Lewis of Newnham, L May of Oxford, L	O'Neill of Clackmannan, L (Chairman) Platt of Writtle, B Sutherland of Houndwood, L
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Memorandum by Cranfield University Centre for Resource Management and Efficiency

This response is submitted to the House of Lords Science and Technology Sub-Committee inquiry into Waste Reduction by the Centre for Resource Management and Efficiency at Cranfield University. The Centre is an applied research-intensive unit offering postgraduate programmes in waste and resources management, innovation and design for sustainability and environmental management for business. Our published research includes studies of waste flow in regional economies, sustainable design and the impact of producer responsibility on product design. Here, we restrict our comments to the issues of waste reduction, the design mindset and materials selection.

The relationship between products, people and waste is a complex psychological one, described by social commentators since the late 1950s.¹ As we have become conditioned to seek value in ourselves as individuals and in social groups through the purchases we make,² we can expect any attempt to reposition this relationship to be socially challenging.

WASTE REDUCTION

1. Waste reduction requires consideration of materials flow. We need to adopt a mass balance approach³ to identify opportunities to achieve dematerialisation, ie to reduce materials flow per unit of economic output as well as total materials flow within an economy. A co-ordinated, twin-track approach of sustainable design and production (reduced use of materials) coupled with improved recycling and remanufacture (reduced discard of materials), represents a sound forward strategy. We are only beginning to learn how to co-ordinate these two components. However, Defra's recent repositioning of its sustainable consumption and production function alongside its waste evidence function is a valuable step forward within Government. Understanding the influences on materials selection and the design "mindset" are also critical.

2. The price of raw materials is the main driver for waste reduction, but only where this is a significant proportion of total product cost. The barriers to waste reduction can be understood if we recognise that every product has multiple owners in its life-cycle as it progresses through the value chain, and that there is no single owner of the waste that it generates in manufacture, use and disposal. The product lifecycle requires a series of trade-offs where waste is a cost, paid at each stage. Economic trade-offs for resources vary considerably, and a product's value at any one stage of its value chain may still render high levels of waste as affordable.

For example, the weight of automotive vehicle structures has reduced progressively year on year, yet the total weight of a vehicle has remained stable as increasing components and functions add to the payload. Thus material and fuel efficiencies may not necessarily be realised.⁴ Such "product lightweighting"² is widely viewed as a better design strategy for the environment, but can itself entail the use of new materials for which there are no recycling systems.

3. The waste industry currently gains no benefits from reducing waste. The sector is driven by volume and, at present, landfill companies are capitalised by their remaining void space. Further, waste companies are disconnected from the manufacturing process. Although better design could reduce material and fuel consumption, consumers have no metric for the material and disposal costs of products and therefore cannot value any improvements in performance against these in their purchasing decisions. So, in the absence of integrated production and waste management and readily available life cycle costs, product differentiation is

¹ Packard, V. (1960) *The Waste Makers*, Pelican books, 320pp.

² James, O. (2007) *Affluenza*, Vermilion Publ, 400pp.

³ Raffield, T, Herben, M, Billington, S, Longhurst, P and Pollard, S. (2007) Coupling hidden flows and waste generation for enhanced materials flow accounting. *Comm Waste Res Manage* 8 (1): 12–18 available at http://www.enviros.com/PDF/Raffield_couplinghiddenflows.pdf

⁴ Oakdene Hollins & Associates and Cranfield University (2007) *Product Lightweighting*, Resource Efficiency KTN, www.resource-efficiency.org

difficult for consumers to identify. A strategy of (i) better design to encourage production of less waste at source; (ii) the efficient use of materials and (iii) influencing lifestyles to promote the value of functional products is required.

DESIGN MINDSET

4. While many designers are interested in sustainable product development, there are limited opportunities for experienced designers and engineers to rethink product development processes that cross disciplinary boundaries. Designers are not equally rewarded for understanding how to create value, and protect the environment. Eco-design is seen as contributing to product and market enhancement, rather than as an essential function. An improved understanding of life cycle thinking might support informed decision making and behaviour. Cranfield University's MSc in Innovation and Design for Sustainability, and our recent £3.8 million HEFCE funded initiative in creative design are attempts to foster interdisciplinary understanding by placing designers alongside manufacturing, materials, environmental and process specialists.

MATERIALS SELECTION

5. The principal factors that influence the use of materials in production processes are material availability, cost and customer demand, informalities such as habit and routine, and the design and manufacturer's knowledge of the materials they currently use. These factors are far more influential than the prospect of waste reduction. Significant investment in these features creates a reluctance to move away from established "successful materials".

6. High volume functional products (eg lighting assemblies; computers) with extended product lives are superseded when fashions change or through product innovation. Consumers in affluent nations rarely value extended life as a key product attribute. If end-of-life costs are easily transferable to consumers without an associated reduction in demand, changes to product design are unlikely.⁵ Conversely, where these costs cannot be transferred, they must be borne by the manufacturer and an environmental influence on design may be possible. This can only be influential when the true [total material] costs of raw materials are included in their price. The tracking and auditing of waste/disposal costs for specific items such as oil, tyres and aggregates can be influential in revisiting wastes as resources eg as now being progressed through the National Industrial Symbiosis Programme's work for specific sectors.⁶

7. Today, many manufactured goods are not offered in their own right but rather as part of a package that includes service components. First, manufactured goods are provided with closely aligned services, for example, finance, insurance, maintenance warranties, repurchase clauses and service agreements. Second, manufactured goods are supplied to customers as a vehicle for accessing services. In this case, the sale of the good is not the end point of the transaction, but only the beginning of the relationship between the consumer and producer.

Examples of these services include "power by the hour" from Rolls Royce and document handling services from Xerox. Increasing consumption of the second category of services as substitutes for goods in "business to business" and "business to consumer" markets may provide opportunities to promote sustainable resource use and achieve waste prevention. Critically, within these arrangements, manufacturing firms gain incentives to produce more durable goods to support service delivery. However, not only should the design of the capital goods used to support service delivery be considered, but also the overall design of service itself so to ensure, for example, that emissions to air from the transport component of service delivery do not cancel out any improvements in resource efficiency that may be attained from this approach.

December 2007

⁵ Gottberg, A, Morris, J, Pollard, S, Mark-Herbert, C & Cook, M. (2006) Producer responsibility, waste minimisation and the WEEE Directive: Case studies in eco-design from the European lighting sector. *Sci Tot Environ* 359, 38–56.

⁶ <http://www.nisp.org.uk/>

**Memorandum by Bob Lisney OBE, Director, LRL Consultancy Services Ltd and Martin Charter,
Director, Centre for Sustainable Design**

THE “WASTE” HIERARCHY

1. It has become a mantra that at the top of the waste hierarchy is “reduction”. In various interpretations of the term the words, “minimisation”, “prevention” and “avoidance” are also used, sometimes interchangeably.
2. For this submission we suggest that there is a need for a hierarchy for reduction which we feel should be adopted for general use in order to clarify terms in regular use.

DESIGN AND INNOVATION

3. Objectives sought should be wider than consideration of the materials in products. This stage should consider whole life impacts including the use phase especially in relation to energy (carbon) and end of life recovery. The incorporation of environmental considerations into product development and design (ref ISOTR14062) should be become integrated into the product creation process. For example, Philips have six focal areas of eco-design and implement them throughout the lifecycle—packaging reduction, material reduction, longevity, increased recyclability, energy reduction and substitution of hazardous chemicals.

4. Innovation is required at this level to take advantage of materials technology development, but also of product stewardship taking into account the opportunity to “own” the product during its use phase and recover it fully as a result of take back schemes. For example, “design for remanufacturing” (DfReman), is in fact a strategic concept that includes “design for closed loops” eg to effectively implement DfReman requires investment in remanufacturing factories eg Xerox, as well as thinking at the “front of pipe”.⁷ There are lessons to be learned from the Japanese “system innovation” related to resource productivity.⁸ Examples already demonstrate how widespread this service is; including vehicles, carpets, furniture, mobile phones, ink cartridges, and could extend to a much wider range of products. The outcome sought is a new business relationship with companies that better marry together the functions of design and marketing, yet still retain price competitiveness. A number of examples exist of how companies are shifting to offering the service rather than the physical products eg this is variously known as functional sales, product-service-systems, or servicing.⁹

However, we need to widen our thinking to explore the innovation system from ideas, through R&D to commercialisation. Design is one part in the system and to enable “eco-innovation” requires all elements to come together eg entrepreneurs, investors, technology suppliers, inventors, etc.¹⁰

5. The above comments apply to manufactured products. In addition to the product itself, similar consideration is regularly given to packaging although packaging is often highlighted as one area where there can be reduction. Inevitably improvements will be made but the issue should always be to look at the role of the packaging to see if it is fit for purpose as well as for recovery.

CONSUMPTION

6. Business and domestic behaviour is the driver behind patterns of consumption induced by effective marketing of products.¹¹ Consumption of goods is determined by many factors of which the most important are economic and population growth. These two predominant factors have the biggest impact on material use.¹²

More sustainable approaches to consumption and production need to be implemented. There is growing focus on the environmental impacts of consumption and the EIPRO study highlighted three key sectors: housing; food; and travel. The EC’s SCP Action Plan is likely to pick up on these areas.

7. Assuming that goods are produced with the right materials, using the necessary amount and all resource efficiency has been achieved upstream, the consumer has two impacts it can make on waste. Firstly, if a product is under a stewardship or regulatory regime and can be wholly recovered, the material is not “waste” but a secondary raw material or component part for reuse. The domestic system of recovery has to be economic and return material to market quality.

⁷ see “Design for Remanufacturing” report on www.cfsd.org.uk

⁸ see www.cfsd.org.uk and report on “information” pages on www.cfsd.org.uk/aede

⁹ see www.suspronet.org

¹⁰ see “Sustainable Innovation” report on www.cfsd.org.uk and also www.cfsd.org.uk/eco-i-net

¹¹ see www.cfsd.org.uk/smart-know-net

¹² see www.score-network.org

8. Should we worry then if consumption increases? We want a healthy growing economy and if there is little or no wastage then we shall have effectively decoupled economic growth from resource use—a major goal sought by the EU. However, we use our national statistics to count this process as “waste”.
9. We would recommend a change to the “waste” strategy so that this element of statistical accounting is established with those government departments say for Customs and Excise, Business and Regulation so the figures have a meaning and a business focus and on which better resource use policies may be made.
10. Targets can still be set for business for recycled materials. A different way of accounting should be applied.
11. The areas where increased consumption can lead to more waste lie within internal business cultures and in domestic demand.
12. For businesses, despite the good work of Envirowise and government publications of ways to reduce consumption, waste and costs, it has not been economic to focus on material reduction. Big figure cost reductions are not available or commensurate to the investment in making modest savings to the majority of the UK’s businesses which are SME’s. As energy costs increase, as regulations bite and as fiscal measures like the landfill tax increase in impact, behaviour will change as it will become important for these companies to focus on their wastage as it will have a greater impact on the bottom line than now. The knowledge of how to reduce all types of wastage including materials is widely available on many web sites, government leaflets and via NGO environmental groups and is increasingly available in articles in business journals. Most regions also have green business “angels” or sustainable business enterprises. There is thus no reason for organisations not to know what to do. Response is slow only due to the external conditions which have not hit them hard enough yet, however, there is a need to make sure the message to SMEs is put in business rather than environmental language. Awareness and knowledge of eco-design amongst is still effectively at zero in the UK—this means possible future compliance challenges, as well as missed opportunities for innovation eg eco-design as a mechanism to simply produce better products.
13. For the consumer it is a different task. Technology changes mean greater need to change, for example, consumer electronics and electrical goods, especially to derive cost and energy reduction benefits. Fashion changes rapidly leading to discard of goods which exceed the opportunity of reuse outlets to deal with.
14. Food is probably the greatest area where there can be reductions in waste. This relates to the use of organic material, farm products from home or aboard which use resources like feed, fertilisers, pesticides and water.
15. Defra in its recent review *Waste Strategy 2000 for England* has urged the separate collection of food and its treatment for compost type output material. This seems to be the wrong way of looking at the issue of resource management as it starts from the bottom upwards, at the bottom of the current so called “waste” hierarchy.
16. If food accounts for some 20–24 per cent of the dustbin, and dustbin volumes increase by 1–2 per cent per year, it would seem important to focus on something which is not only a reasonable volume but also has a negative environmental impact if landfilled. We should also consider the input volumes of material and other ingredients that go into producing the food which is wasted to see if there is potential to reduce the total system.
17. Current domestic reduction actions too often focus on high profile but low volume items like carrier bags and nappies with the generic heading of packaging coming under regular attack. Most of the country’s activities which attract a substantial cost for no ability to improve impact, focus on activities which are really reuse and recycling.
18. It would be better to focus on reducing the food waste by 50 per cent. This would reduce the dustbin size by 10 per cent and allow for some 5–10 years growth to be subsumed. It would save householders some £200 + per year, far more than any recycling incentive schemes might produce. There would also be upstream savings in resource use in the production process.
19. This action would have an impact on the recycling levels achieved by local authorities (unless their targets were changed), the collection systems that have been encouraged to be implemented, and the potential sizing and siting of processing plants which would be built expecting a certain throughput.
20. We would encourage a multi-agency approach to food waste consumption and reduction. Food consumption more than is needed is creating a health problem of obesity, which has a cost to the nation and also will require more material resources to look after people, and its general waste is really a moral and ethical issue—which is about how a developed nation uses world resources in an unequal way. So this is a matter for a wide range of government departments working together holistically, and not solely for Defra as part of a waste strategy.

Is waste an evil and should the aim be to reduce it?

21. We need to reduce resource use for its environmental damage during its excavation and process modes. It is also at those early stages that hazardous, scarce and expensive materials can be removed from inclusion in products.

22. Once products have been purchased they will become known as “waste” when the consumer discards them. Our attitudes and behaviours have been changing in the last 20 years and will continue to change so that what we currently count as “waste” will in the future be seen to be part of a recovery system. Assuming that 60 per cent average of all materials can be recycled practically, then “waste” from treatment will be 40 per cent of current figures.

23. If this amount requiring treatment is used for energy production more can be extracted from its inherent properties. Energy, a public utility which we now need for security and cost reasons as well as the ability to contribute to carbon reduction is produced, and also as a by-product—residues which can have further use to displace construction material—as well as the recycling of as much metal as is collected from conventional recycling schemes. Such material is not allowed to count in the recycling figures and so distorts real material utilisation mass balances.

24. So should our aim be to count waste that is landfilled as being our true target for reduction? If so we would not wish to default to the next immediate element of the current hierarchy, energy recovery, but to develop a set of business and total system principles which take a top down approach, so that optimum resource use can be derived throughout the cycle of (sustainable) consumption and production (SCP). It may be that we can accept more tonnage being recycled than now, even if the percentage levels we currently manage are reduced because we have a more effective total resource management system. It is not a de facto right that reuse is better than recycling, slavish adherence to a hierarchy that does not relate to business or societal principles seems to mislead policy.

Is a focus on waste reduction the right way of asking the question?

25. We believe the focus should be on ensuring that there is an effective utilisation of resources through society. There is a need for a major investment in primary, through secondary, tertiary and higher education, in the benefits of a eco-design and lifecycle approach including material and energy reduction strategies. This should be built into design, engineering, technology and architecture courses. A key target will be to bring the Deans and Heads of Departments of appropriate courses together.

26. A top down focus achieves more energy spent on the critical elements of design and material choice. But there will not be any figures produced for this, so it will be difficult to prove resource optimisation. Successful companies may well reduce the unit costs of their product by careful choice and good production methods but use more resources as a result of selling more goods.

27. It is only when goods are produced and can be weighed that it is possible to trace the best resource routes and if as we argue, the new system is about recovery and not waste, then we should take away from the waste statistics those which relate to material recovery.

28. There is a view that a better statistic is the use of kilograms per household or person per year of both recycling and waste. This allows a comparative study over time of whether there is real waste reduction on a per capita basis. It is population growth that distorts aggregated figures such as total volumes. Nevertheless this is the task that has to be managed. So setting total waste reduction targets without taking into account population growth creates a challenge that may lead to non fulfilment.

29. The OECD highlights that waste growth will rise in the next 20 years but these figures are based on expected resource use and population growth. This leads to a recognition that we are dealing with two paradigms one relating to a macro level societal development and the other micro level targets to create change in behaviour.

CONCLUSION

The outcomes of our analysis are that we need:

- To recognise that we live, work and do business in a global sustainable consumption and production system eg UK is not a closed system (therefore we need to co-operate with key players in the chains and networks eg US, China);
- A top down approach coupled with incentives on the ground;

- Smarter and joined up product policy eg how can public procurement be used to drive innovation and reduced environment impact (zero waste mattresses should be viewed as just a start and not as a tick the box exercise);
- A focus on a sustainable society that values resource use in a looped system;
- A review of our policy approach to a hierarchy for the subject;
- Encouragement for designers to work closely with marketing departments of organisations;
- Develop eco-innovation systems involving all appropriate stakeholders (avoiding “silo thinking”);
- Closer working on the issues between the former DTI and Defra;
- International co-operation eg build on Anglo-Japanese initiative (we should learn lessons from those who have been more successful);
- Sensible statistics and national performance targets based on total environmental assessments;
- To overcome the confusion in the use of terms and also the solutions eg minimisation, prevention, reuse and recycling confused with reduction;

and also:

- Need to look at the system and broaden thinking from design to innovation;
- Explore the reasons why the Sustainable Design Forum and the Product Body failed to happen— there is perhaps a need for a new body to take the strategic thinking (and implementation) forward eg WRAP is not there, the Design Council don't want the issue, etc;
- Need for smarter policy;
- Need for education.

October 2007

Memorandum by the Centre for Sustainable Consumption, Sheffield Hallam University

1. There has been a remorseless increase in waste generation in the United Kingdom over many years. Improved waste management in recent years has resulted in more recycling and energy recovery and less waste sent to landfill. Although this has may have lessened the environmental impact of waste, it is important to recognise that the creation of waste always has a negative environmental impact even if the waste is well managed because of the transportation and processing involved in waste management.

2. The origin of waste in mass consumption is too rarely recognised in public policy, which has historically focused on the management of waste rather than its reduction. At a national level, governments have always been wary of making the connection, perhaps because potential constraints upon consumption have implications for macroeconomic policy and challenge the notion of consumer sovereignty. Meanwhile, although local authorities may have a statutory responsibility for waste collection or disposal, their responsibility for shaping people's consumption patterns is somewhat obscure. Many assume a role in promoting local or regional economic development, perhaps in the context of encouraging industrial or retail developments, but few have taken significant action to influence consumption patterns within their communities.

3. The amount of waste generated by households is influenced by the life-span of items purchased. This submission focuses on products traditionally defined as consumer durables, the life-spans of which are often sub-optimal either from a consumer or environmental perspective. For example, the E-SCOPE survey, published in 2000, found that around one-half of consumers feel that, in general, household appliances do not last as long as they would like. One reason may be concern at the sheer volume of waste created through contemporary consumerism. Data published by Biffa a decade ago indicated that around 9 million tonnes (mt) of consumer durables were being discarded annually: 2.6mt of cars and car parts, 2mt of furniture and carpets, 1mt of clothing and footwear, 1mt of electrical items and 2.2mt of other durables; today's figures will be even higher.

4. In order to address product life-spans it may be helpful to distinguish different aspects of consumer durables that raise concern. First, there are products in general, whether classified as durables (such as vehicles, furniture, large appliances and floor coverings) or semi-durables (such as small appliances, clothing and footwear), for which average life-spans could be greater. Second, there are consumer durables that are increasingly subject to fashion (such as spectacles, watches and small appliances). Third, there are low quality products which are either sold cheaply or given away (such as those sold in discount stores, novelty products and free gifts) that often have short life-spans. Finally, there are products that could be designed to last but

which are also sold as disposables (such as nappies, razors, biro and single use cameras) for reasons which may not be justifiable in the context of excessive waste.

5. Many factors have led to our throwaway culture. Neither governments, manufacturers and retailers, nor consumers, are immune from blame. Since Vance Packard's influential *The Waste Makers*, first published in the early 1960s, planned obsolescence in various forms—especially technological or psychological—has been attributed to producers. At the same time, however, consumers often choose to discard functional products: our research has indicated that many consumers do not carefully maintain possessions, whether footwear, appliances or furniture.

6. Designers have increasingly taken an interest in product life-spans and are a key community in finding solutions to excessive waste. One theme that some have recently highlighted is product attachment and replacement, on the basis that the causes of obsolescence are as much behavioural as technical. In the Netherlands, where the Eternally Yours network has brought together designers concerned about product life-spans, design researchers such as Nicole van Nes and Ruth Mugge have explored how designers could respond to the tendency of users to replace functional products. Meanwhile in Britain a recent book by Jonathan Chapman has argued the case for “emotionally durable design”.

7. Despite these hopeful signs, many designers have yet to embrace the sustainable design agenda. The possibility that several key raw materials will not be available beyond 2050, recently highlighted in research by Thomas Graedel published by the US Academy of Sciences, has received scant attention. The “cradle to cradle” thinking of William McDonough and Michael Braungart is still beyond the mainstream. The “design for durability” concept remains underdeveloped and underutilised.

8. Moreover, designers often consider themselves relatively powerless, subservient to marketing directors driven by commercial pressure to supply according to prevailing market conditions rather than within an alternative, more sustainable, economic development model. Hence many products are not designed to be readily repaired. Indeed much marketing aims deliberately at accelerating the product replacement cycle. By contrast, our research has found that product information that could enable consumers to select particular models according to their intended life-span is often unavailable.

9. The policy, regulatory and legal framework has led to some significant advances in industry towards more sustainable types of product, notably today's more energy-efficient household appliances, whereas trends in life-spans for most types of consumer durable appear at best to suggest stability and, in some cases, decline.

10. In order to achieve a reduction in waste, measures need to be taken by governments, at all levels, to promote increased product life-spans. These need to address both the intrinsic durability of products and how long they are maintained and kept in use by consumers. Influences upon product life-spans vary by type of product and a range of measures will be needed.

11. The proposals summarised below, if developed and implemented, could help to transform our throwaway culture:

(a) *Regulation and enforcement:*

Minimum standards relating to product life-spans could be introduced. Alternatively, statutory life-span labels could be required on certain products as proposed by Lord Beaumont during a debate on the Sale and Supply of Goods Bill in the House of Lords in 1994. The operation of the warranties market and terms under typical repair contracts should be reviewed to ensure that these markets are operating efficiently and consumers are not being disadvantaged.

(b) *Economic instruments:*

Ecological tax reform, involving increased taxes on raw materials and waste and reduced taxes on labour, would help to improve resource productivity in the economy and could influence the price of repair work in relation to replacement. Discussion should take place with European Union partners concerning the possibility of introducing zero rated VAT on repair work, or variable rates of VAT according to the length of manufacturers' product guarantee.

(c) *Voluntary approaches:*

Improved training and continuing professional development is needed to promote understanding of “design for durability”. Business managers should incorporate optimal product life-spans within the corporate social responsibility agenda. Voluntary life-span labelling should be encouraged and life-span criteria included within existing environmental labelling schemes. Companies could use longer guarantees to signify products designed for increased durability and operate by codes of conduct to assure consumers about the long term availability and fair pricing of spare parts.

12. Action in some of these areas is already being taken in Scotland. The Scottish Executive and Scottish Environmental Protection Agency (SEPA) undertook a consultation, *Preventing Household Waste in Scotland*, in 2006. A review of responses identified support for undertaking work on the waste profiles of products with other government departments across the UK. In terms of product life-spans specifically, a need was defined for providing better information to consumers and providing more support to companies. There were also suggestions for changes in marketing to encourage consumers to move away from a “disposable” lifestyle to one based on repair and recycling. For disposable products specifically, respondents supported the introduction of producer responsibility legislation for disposable products. One of twenty action points in the subsequent *Household Waste Prevention Action Plan*, published in February 2007, was that the Scottish Waste Awareness Group should “work with consumer protection bodies, retailers and others to provide better information to consumers on the expected lifespan of key household products, product guarantees and availability of spare parts.”

13. The European Union’s *Thematic Strategy on the Prevention and Recycling of Waste* in 2005 did not address product life-spans directly but recognised that “By applying the life-cycle approach, priorities can be identified more easily and policies can be targeted more effectively so that the maximum benefit for the environment is achieved relative to the effort expended”. The UK Government’s *Waste Strategy for 2007* recognised that “Producers and retailers can reduce waste impacts through designing and marketing products that use less material and avoid the use of harmful substances, last longer and are easy to disassemble and recycle.” Evidently public authorities recognise that any attempt to prevent and thereby reduce waste must address the issue of product life-spans. Appropriate policies are now needed to translate such aspirations into reality.

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Footnote: The submission is largely based on work undertaken by staff and members of the Network on Product Life-Spans, which was established in 2004 by the EPSRC (Engineering and Physical Sciences Research Council) to promote knowledge and understanding in this field. Although our work focuses on households, many similar issues apply in a commercial or public sector context.

Examination of Witnesses

Witnesses: MR BOB LISNEY, LRL Consultancy Services Ltd; MR MARTIN CHARTER, The Centre for Sustainable Design, University College for the Creative Arts; DR TIM COOPER, Centre for Sustainable Consumption, Sheffield Hallam University; and PROFESSOR SIMON POLLARD, Centre for Resource Management and Efficiency, Cranfield University, examined.

Q67 Chairman: Good morning, gentlemen. May I welcome you to the Committee. Would you like to introduce yourselves for the record.

Professor Pollard: My Lord Chairman, good morning. My name is Professor Simon Pollard. I am Head of Sustainable Systems at Cranfield University.

Dr Cooper: Good morning, my Lord Chairman. My name is Tim Cooper. I am Head of the Centre for Sustainable Consumption at Sheffield Hallam University.

Mr Charter: My name is Martin Charter. I am a Director of The Centre for Sustainable Design at UCCA.

Mr Lisney: I am Bob Lisney. I run my own company called LRL Consultancy Services, which is an environmental consultancy. Before I set that up I was Assistant Director at Hampshire County Council involved with the environment and natural resources.

Q68 Chairman: How does waste reduction fit into the concept of resource efficiency?

Professor Pollard: Maybe I will offer some thoughts. I think resource efficiency is about doing more for less. If we are producing more waste—and waste, I guess, is widely regarded as something we do not want—

then our efficiency is low; so we are interested more than anything in processes that help improve resource efficiency. I think there are a number of concepts (some of those in design, some of those in production, some of those about recycling and the commodity market) that we should perhaps pull together in order to improve resource efficiency in the UK. Certainly there is the concept of better design, environmentally sensitive design, better selection of materials, opportunity for concepts such as product lightweighting, and design for disassembly; in other words designed to improve opportunities for remanufacturing. In terms of production and manufacture, there are opportunities with respect to lean manufacturing and dematerialisation; and concepts such as the six sigma concept, which is about production performance and reliability. A further aspect in terms of improving resource efficiency and reducing waste concerns repositioning our relationship between consumers and products, and I am sure this is something my colleagues will comment on. We do need to incentivise and continue to push recycling, of course; and there has been tremendous work done by government and local authorities over recent years on that front. We need

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to open up and create the commodity markets for recycle as well. There are a number of strategies here, I believe, that belong in different communities: the design community; production and management; waste management and amongst consumers. Where we have not been very successful to date, in my view, is in pulling these strands together in a practical combined strategy for dematerialisation. I think that is the central challenge ahead of us.

Q69 Chairman: Are there circumstances where waste reduction strategies are more bother than they are worth, in that they can, as it were, negatively impact upon resource efficiency?

Professor Pollard: Nothing immediately comes to mind with respect to that. What I would say is there is not always an obvious connection. For example, we have done work at Cranfield with respect to product lightweighting. This is about making products lighter and pulling materials out of products. Here we would naturally think this was an opportunity to reduce waste, and yet for some light materials there are not waste recycling schemes or systems available; so there is a mismatch between the desire to remove materials and the availability of recycling opportunities later downstream. I think it is another example of trade-offs and disconnects between the desire to improve design and the downstream capabilities and systems for recycling. As I said previously, in my view we need to pull all these things together in a coherent whole, and we have not done that to-date. I do not know if colleagues have other views.

Dr Cooper: My Lord Chairman, could I just add something to that. The connection is that there is an inverse relationship between increased efficiency and waste, in that increased efficiency demands a reduction in waste. If we are getting waste we are not getting the maximum value possible out of resources. My area of interest in particular is the lifespan of a product. It seems to me self-evident that if a product of a specific weight lasts twice as long as another—whether this is due to better design quality or whether it is due to user behaviour, because obviously consumers affect the lifespan of products—then it is twice as efficient in terms of resource use. Strategies that focus on the lifespan of goods combine increased resource efficiency with, at the end of the pipe, less waste.

Q70 Lord Haskel: My question was really stimulated by the point that there are so many different aspects of this. You were saying there is no disconnect. Is there any way of making some sort of comparison? For instance, if you want to compare one way of saving waste from another, do you do it by grading them by the energy that has gone into it? Do you grade it by the money that has gone into it?

Do you grade it by the raw materials which have gone into it? How do you make the comparison?

Professor Pollard: In academic terms people think in terms of resource efficiency, in terms of the materials requirement, of product compared to raw materials used. That is a mass balance, a mass ratio.

Q71 Lord Haskel: So the kilos of raw material?

Professor Pollard: Yes, that is right, in terms of materials. However, if you were to talk to manufacturers, of course, they are interested in cost reduction. They see waste as cost and they are interested in stripping that cost out of their manufacturing system. They need a different metric. Because no one individual person in the lifecycle of a product has complete ownership from materials extraction, through manufacture, through use, you have a number of communities and different audiences to stimulate with respect to removing waste. They need different metrics because they are incentivised by different aspects of the problem—whether it is materials going in, whether it is cost, whether it is the actual amount of recycle at the end. I am not convinced necessarily that one single metric is appropriate for the full set of audiences in the lifecycle.

Dr Cooper: My Lord Chairman, I agree with that last answer, and I would particularly highlight the idea that we need a complementary approach. The fact that a product is resource-efficient does not necessarily mean that it is economically efficient. For example, you can have products that are disposable which are more expensive in resource terms than in economic terms. For example, a disposable product that is relatively cheap may be using resources inefficiently, wasting resources, because those resources are under-priced.

Q72 Lord Lewis of Newnham: It strikes me that one of my problems is simply that you can isolate what is the problem involved, but it is really the solution we are looking for. What is the incentive for the manufacturer to actually deal with the problem in the way you are envisaging it? After all, Mr Charter has reported here it brings out the very interesting effect of looking at the end-of-life vehicles and comparing that with the WEEE Directive. Here in the WEEE Directive, as I think you rightly point out, the incentives for the producer have been, in my mind, significantly reduced for him or her to get involved in the recycling process of bringing the thing back, as it were, to base one. What is the incentive to a manufacturer to actually consider waste? At the end of the day their major concern must be profit, and they are not necessarily in the same vein. I would like to ask what your views would be on that?

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Mr Charter: Just picking up a couple of points there. There is a scenario where you can see if a product was moving towards increased miniaturisation and less material maybe that might make recycling less economically viable for the recycling sector. That is one scenario in relation to the previous conversation. Coming back to your point there in terms of economic incentives, you are seeing a number of the major manufacturers, particularly in electronics which I know more about, having been applying so-called eco-design or “design for environment” approaches for ten to 15 years and going through various iterations of knowledge. Once they start to look, for example, at older products they may have 100 screws in them and if they start to look through this lens it enables them to look differently, and maybe they only need ten screws, or something like this, which maybe makes both the manufacturing assembly as well as the potential disassembly more economically viable. Particularly looking at the case of Philips, for example, who in their latest sustainability report have actually identified that ten per cent of global revenue now is from their so-called green flagship products, of which one of the strategies they use is materials reduction.

Q73 Lord Lewis of Newnham: Could I just add to the question: there was a survey done a number of years ago about buying products, and the general view was that everything else being equal people would buy the green product; if it was more expensive, however, they rarely would buy the green product. At the end of the day it is the balance sheet that would influence a manufacturer. The number of screws being reduced from 100 to ten must benefit the manufacturer in addition. Really the question is when it is not—when there is an incentive to actually consider the waste as the primary, if not the secondary. The packaging industry, for instance, has had this imposed upon them because of the taxation system. Is that the way you should deal with it?

Mr Charter: Personally I think there are different types of buyers: business to business; business to government; business to consumers. Often we see maybe five per cent of consumers buy greener, all things being equal, and there is an issue there. Another hobbyhorse of mine—it is not just consumers, it is business buyers. If you are buying capital equipment maybe there is an economic argument for a smaller footprint of your product as well.

Lord Sutherland of Houndwood: I wanted to pick up the earlier point about different communities and not being brought together. I see the importance of that but I would not want to assume, and I am not sure if you are assuming, that there is a single matrix that we would use to measure what the problem is and what

the answer is; because it does really depend on the kind of question you are asking. If what you want is the product that produces the maximum profit, you will get one set of answers, and there may be more screws or not depending on how easy it is to put it together and how long it takes.

Lord May of Oxford: If I may interrupt. It seems to me one of the besetting sins is there are no screws at all so you cannot fix it!

Q74 Lord Sutherland of Houndwood: You lose your Allen keys as well, do you! Another possibility has to do with scarce materials. If you have a scarce material clearly you want to conserve that and use it in the most efficient way you can. The third one, and the one that is bound to preoccupy us, not least because the Climate Change Bill has started going through this House, is the use of energy and its impact on the climate. These will produce different answers, and different kinds and different definitions of waste will come out of those. Anything you could say that would help us to clarify these different types of approach to waste would be helpful.

Mr Lisney: I take the view that already we have a number of regulation and fiscal instruments coming through, and coming through with an impact and the market is working. I think we have got to look upstream really at what I would call “resource management” rather than “resource efficiency”. I think this whole agenda is about using our resources in a managed way and a way we have not had to do before. The reason I think companies, producers and retailers will look at this is because the costs of waste are increasing substantially; and that is because of regulation and fiscal reasons. Within two or three years, the Landfill Tax, for example, is very high. Energy you have just mentioned—those costs are going up; and also we have a substantial demand now and interest in looking at energy schemes which we did not have only a relatively short period of time away. The challenge, it seems to me, for resource management is about making judgments about how you are going to use resources through your society. There will be times when you will want to collect those resources for very good reasons—scarcity, costs and so on—and also sometimes when you will use those resources for energy, because that also represents a good use for the community. The challenges we have, it seems to me, are twofold: one is the horizontal supply chain to get some degree of balance; and then what I would call “vertical governance” whereby in terms of meeting timescales and targets we have got to look at how do we mobilise sectors of society and get that interlink between producers and consumers. I think those things represent what Simon said about the myriad of different people, the matrix. We are effectively

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managing complexity really, and there is not a one-size-fits-all, but there probably is a one-direction-and-leadership which fits all.

Q75 Baroness Platt of Writtle: In talking about the possible fight between maximum profit and minimum waste, I think one of the difficult things is fashion—not just clothes but fashion in all sorts of equipment. One only has to look at mobile phones and people are buying new things when they do not really need them because they are being marketed very hard.

Dr Cooper: I think this is an area where, upon reflection, the Waste Strategy, which was published earlier this year, does not actually get to the core of some of the economic drivers that lead to waste. I think the Government is right to be proud of the fact that household waste is now down to about half a per cent per year, whereas a few years ago it was rising at three per cent a year. Until it actually develops some more sophisticated analysis of the links between economic growth and waste growth, however, we will not actually crack the nut and achieve a significant reduction in waste. I would hope that there would be more work on areas like fashion. As you rightly say, it is affecting a whole range of products. I worry when with my students these days that my glasses appear rather out-of-date because they are not quite wide enough along the side! It is also a serious point as well, that these things have got to change in our culture if we are to move away from a throwaway culture to one that is more sustainable.

Q76 Lord May of Oxford: Perhaps a different way of asking some of these questions is to ask to what extent do designers and engineers take into account the whole-life and especially the end-of-life impacts of the choices they make in materials and the product design? Insofar as the answer to that is not to much extent, why is that? What are the things that inhibit people from looking at things in this larger perspective?

Mr Charter: I think we have to split up between product designers and design engineers, firstly. What I tend to see from my experience is where people are doing this they tend to be design engineers and they tend to be in the big companies. Some of those are doing it because they see a business argument; some of those are seeing pressures both from legislation and now increasingly, in the FMCG, from the big retailers. That now is starting to really create some big pressures I know from some companies. The next issue is you get down to the level of the SMEs and there is a virtual zero awareness and understanding of so-called eco-design, and that is global. We have been working in China and India trying to introduce

some of this thinking and it is a global problem¹. Why? Firstly, because the drivers maybe are not strong enough and are not getting passed through the supply chains; secondly, it is generally not integrated into the education systems, whether it is product design or design engineering. Related to these issues, what you tend to see globally is a few active small research groups in universities that then spin-off modules in courses, not a systematic approach.

Q77 Lord May of Oxford: If I could paraphrase the answer to make sure I have understood. You are saying you think it is a mixture of the things that both help and there is not enough so they hinder, a mixture of regulation and fashion; but also the fact the way designers talk maybe does not emphasise this enough. Taking the second of those first, what more do you think could be done? Are there ways we could alter the way designers talk?

Mr Charter: I would say the major professional bodies both covering product design and design engineering need to have coverage of issues in mission statements, and that they do not just go up and down on the agenda, or become “flavour of the month”. For example, the Design Council has shown no leadership in this area and needs to. I would like to see more initiatives like the Royal Academy of Engineering’s on professorships related to sustainable engineering. The Deans of the design schools and the engineering schools really need to get exposed to some of this thinking because it is becoming real, business driven.

Q78 Lord May of Oxford: Going a bit off-piste, may it not be that too much of what we call “design” is a subject inhabited by people with no background in science, so you have a bit of a two-cultures problem?

Mr Charter: I think again splitting between the two domains, the product designers and the design engineers, I think maybe the engineers get more exposed to the science; but maybe the product designers, who often are those charged with coming up with the new solutions, are absolutely scared of the science; they do not like it; they would run away from it for as long as they could if they possibly could.

Professor Pollard: My Lord Chairman, the Cox Report has considered some of these issues between design and manufacture and we are now seeing a number of initiatives funded, for example, by the Higher Education Funding Council for England that are deliberately looking to put designers alongside production engineers, people that deal with materials, people that deal with environmental impacts. Indeed Cranfield has been lucky enough to be in receipt of funding for a creative design initiative

¹ See www.cfsd.org.uk/aede

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that will allow us to put the design community alongside polymer and composite specialists, alongside our colleagues in production, engineering and alongside those who have to deal with issues of resource efficiency/end-of-life. These types of initiative I think are extremely valuable because they allow colleagues to speak together about their combined problems.

Q79 Lord Haskel: It seems to me there are two aspects of design and we are talking about one aspect only. The aspect we are talking about is this business of designing products so that it uses less materials, less screws *et cetera*; but there is another aspect of design and that is making the product attractive so that it sells. What is being done to try and bring these two things together, because one without the other is not going to be an awful lot of use?

Dr Cooper: One area that is gaining a lot of attention, quite properly, at the moment is design for attachment, or design for emotional attachment. There is a core group of designers, many of them are based in the Netherlands, including a network called Eternally Yours that sprang up in the early 1990s, and a young designer called Jonathan Chapman who has written a book called *Emotionally Durable Design*. They are looking at how to make products that have a reduced environmental impact, in that they are long-lasting and therefore (to go back to what I said earlier) resource-efficient, but also they are the kind of products that people want to keep, and here is a link with commercial success. I think there are too many products in the market that are barely designed at all, that are just put together. Such products have relatively short life spans and are thus inefficient in their resource use. I think there are real commercial opportunities that will bring together resource efficiency, quality and attractiveness in terms of aesthetics. Some of the work that is going on, in particular by these Dutch researchers, concerns how to create within products a sense that they are irreplaceable. We did some research at my university which found that a third of appliances that are discarded still function. They may be attractive at the point of sale but people still get fed up with them. What these young designers are looking at is how can we make products that people want to keep? It involves things like, for example, design for flexibility—so you can change the veneer of the product. It involves design for upgradeability—so you can keep in touch with the latest technology and make sure your product functions as well as other products. I think designers are looking in these areas, and there are commercial opportunities to be exploited.

Q80 Lord May of Oxford: If I may just summarise what I think I have heard, it is that the motivation for taking more account of whole-life and end-of-life is a mixture of regulation and also creating the right cultural awareness so that it becomes fashionable to want to do that; but once you put that in place there is a second problem in that you need designers and product manufacturers to be aware of the things you can do to fulfil these objectives. There is quite a range of things one would need to be thinking about more carefully?

Mr Charter: Having the right tools, in that sense the resources and support at the right level. Most SMEs, for example, have no knowledge of issues so you have to start where they are. It has to be introduced in the right way. The other key element, which links back into the other key points, is the business benefits of doing this, so it is a management and a business issue. Particularly for the larger companies this is not going to happen unless it is integrated into the product development process. Companies like Philips (and I quote that because they have got the numbers now and the revenue) have six focal areas of eco-design, of which materials reduction is one, increased recyclability is another, reduction in energy, reduction in packaging *et cetera*. They look at it more holistically and throughout the lifecycle.

Professor Pollard: There are exemplars I think of companies that do this well. There are a few but they do tend to be premium products. A good example is Velux blinds, that is a functional, durable product and Velux have an incessant desire to strip-out waste and cost from their manufacturing process. They know they are a premium product and they have applied many of these processes of efficiency and waste reduction because it is a cost during manufacturing to really manufacture in a lean way a high premium, durable product which has a real premium place in the marketplace with respect to daylight blinds. They would be worth looking at in more detail.

Dr Cooper: May I take Lord May's question and link it back to the original one on economics? You mention the influence of designers and manufacturers, may I bring in also the influence of the marketing departments in companies. The original question was about why designers behave in a particular way. My Research Centre held a seminar at the Design Council a few months ago on design for durability and one of the issues raised by the designers was that they would want to look at the whole of a product's life and the end of life stage more than they can at the moment, but within the corporate culture they are operating in, the marketing departments have more power and authority than designers; and the designers are told they have a specific brief. They would like to work

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beyond it but cannot, because at the end of the day they are working to a particular client's wishes.

Q81 Lord Lewis of Newnham: If I may just preface my remarks by saying in a sense that is exactly what we are saying, it is money that counts at the end of the day, and that is the motivation. So one has got to in some way or another involve waste within the positive rather than the negative side of the whole of this issue. The question I would like to put to you is: we are very conscious over the problems with SMEs, and I think that is a problem that really is very difficult indeed. If we take many products which are now based on a multinational rather than on a national basis, if you take motorcars for instance, they are primarily produced by the Japanese; there is no British production to any large extent at all of motorcars; although they may be being produced in the country the driving force is normally outside. You are in a pretty unique position as far as I am concerned because you have got a broad base, I assume, of experience of waste problems throughout the world. Do you see the effect of multinationals? The policy of multinationals must be that they are not concerned with the waste problems in the UK; they are concerned with the waste problems in general. Do they differ radically and does this influence, in any way whatsoever, the general design or productivity that is being involved by the multinationals?

Mr Charter: I feel there are probably several questions in that question. Quoting electronics, we are doing a project where we are trying to take out so-called eco-design to India, China and Thailand. What is happening in those countries is twofold: particularly in China and India the illegal importation, for example, of e-waste is being processed in very bad conditions and that is going to happen even though China is putting bans in. They have got a big coastline and people need to earn money, and the local governments need to earn so that is going to continue to happen. What the Thais have started to think about, and I still do not know how they get round the Basle Convention on this, is to say, "Actually we would like some of this e-waste because we are going to recondition it, we are going to remanufacture it and we are going to resell it to other parts of Asia, e.g. Laos and Cambodia". In a sense they are treating waste as a resource. What we are also seeing particularly in India and China now is a second issue, which is this huge-growing domestic consumption and production. One of the conclusions of our reports, maybe tactically it is a time in those countries that are at very early stages to start to talk about design for e-waste reduction as part of eco-design. What we see transnationally there are two issues: you have got the foreign direct investment

companies, for example, in China, the big guys basically who have knowledge about this issue; but once you get down to the nationalised companies or the smaller guys all of this is an incredibly new issue and it is not on their agenda because they do not have the drivers.

Q82 Baroness Platt of Writtle: Could you explain the "design for remanufacturing" principle and outline what skills and investments are needed to implement this?

Mr Charter: On the basis of an initial report we did, which we believe is one of the first ones to look at design for remanufacturing, this is an ill-researched area. You have got very subtle difference between remanufacturing, reconditioning, refurbishing *et cetera*. What we understand remanufacturing to be is a process where in effect the products come back into a remanufacturing factory and all the components and subassemblies are checked universally to make sure that they still function. Design for remanufacturing we believe is a much more holistic concept and, in a sense, to really talk about design for remanufacturing you need several elements. You need your factory and your remanufacturing factory. Xerox, for example, have both co-located. What you need is a take-back system. You need from a very strategic level to make a decision that you are going to develop, in a sense, forward manufacturing and reverse manufacturing. That really is a high level strategic decision about investing and doing the processes. It then gets down to the level of designers and building in, for example, design for disassembly so when the products come back they are able to be disassembled, checked, validated, replaced and then resold. Xerox claim they can get seven revenue streams out of their core platform. It comes back seven times, seven revenue streams, six diversions from landfill and a per capita reduction in CO₂ per unit. Our belief is that it has got several layers. It is very strategic; you have really got to design the system and then empower the designers themselves with the right sort of thinking to enable them to do it.

Q83 Baroness Platt of Writtle: So you are thinking in terms of a remanufacturing factory? How do small and medium businesses fit into that? You can imagine a large firm actually going into that strategy but at a smaller level that would be much more difficult. To a certain extent I suppose you might say it is very close to repair?

Mr Charter: Others may have comments on this. What we found is remanufacturing in reality for SMEs is scavenging. That is what it is. They actually scavenge off other people's technologies and products. Maybe in that sense it is not a universal

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panacea. There are certain criteria where this can happen, and in certain criteria it cannot.

Q84 Baroness Platt of Writtle: Something has got to develop actually, has it not?

Mr Charter: Yes.

Q85 Lord Haskel: Mr Lisney and Mr Charter, in your paper *Sustainable Approaches to Waste Reduction* you talk about the lessons that could be learnt from the “Japanese ‘system innovation’ related to resource productivity”. I wonder if you could explain to us what this is about, and what the benefits are of this Japanese system?

Mr Charter: On the base of our three or four year-old DTI missions my understanding is basically they have put a whole set of policy tools, a more holistic approach, to really start to move towards a more resource-efficient economy that builds on their existing strategies around energy, which they started in the 1970s. Basically they have used a green purchasing law passed in 2001 to start to really drive the supply side companies to demonstrate a lower environmental impact or else they will not get the contracts with government. That is point number one. Point number two is that they passed the home appliance recycling law, their equivalent of the WEEE law, in 2001. They started activity in the mid 1990s and really got consensus by industry and government and also key influential academics that this is the way Japan was going. In 2001 there was certainty for the manufacturers the law was going to come into place; so that was a really important point—this certainty amongst all stakeholders that thing were going to happen on time. That gave the companies the confidence to invest in developing the recycling technologies. The day the law came into place between 45 and 50 recycling factories opened, so very co-ordinated. They have also used other policy tools—and I argue it is a policy tool. They have this eco-products exhibition they have run since 1999 that has 150,000 visitors and 500 exhibitors, so it is a huge thing. They are using different tools to raise awareness and to provide incentives and disincentives. I guess the system level thing is that macro-perspective that they developed the infrastructure that works, and they are achieving their targets; we originally went in looking at the innovation related to technology around the recycling. However, basically a lot of the recycling in those recycling factories is manual; it is not high technology. It is the system that is driving it rather than any fancy technology.

Mr Lisney: They also made very clear the target per category of product or industry and that was agreed, I gather, with the industries so they were quite high. For example, if you look at the targets by 2010 most

of them will be 50 per cent plus—there is only about one I think because of its nature which is less than that—and some are up to about 80 per cent recovery, so they are very, very high. They will be achieved because of this strategic planning. They have also given a very clear target for their products in savings in resource use, some of the things Dr Cooper was talking about, extending life, repair and reuse; all those things have to be demonstrated; so it is very clear and very open that your product you are presenting to the marketplace has to have those qualities. They have also, I think, developed a culture which perhaps might be easier for Japan of take-back, leasing or service. In a way there is some thought, certainly in European areas now, about leasing and service; and, finally, labelling. It has been very clear about what consumers, whether business or domestic consumers, should do by very clear labelling of the product and what you do at its end of life, and that I think has been important. Finally, they have developed something like 35 eco-towns for this processing and remanufacturing that was broadly spatially planned, if you like. I am not sure that is a replicable thing in the UK but it did indicate they had this balance and understanding that, once you turn the tap on to get material back and products back, you have to have some places in which you undertake that activity, as opposed to the alternative which was mainly landfill.

Q86 Lord Haskel: What happens about imported products? Do the Japanese companies try to carry out these practices in their companies elsewhere, for instance the Japanese factories in Britain or in America? Is that part of the culture?

Mr Lisney: Yes. There was clearly some concern about freeloading in terms of the dismantling and the cost of that. I think one of the debates we had this time last year with them and has been followed up in July this year was about material security. As materials get very scarce around the world, you have got the development of resource needs in China, India and Brazil and so on, they are very concerned about hanging onto that material because its value will go up; so anything that comes in they will want to retain that physical material as it is a marketable product. They will operate on the basis of trying to recover it.

Q87 Lord Haskel: If you are importing products into Japan to be sold through a chain of shops and this chain of shops is committed to some of these principles you have just explained, do they insist that this culture also is put into the product which they are importing?

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Mr Lisney: I am not sure about the design stage.

Mr Charter: In terms of imported products, I do not know.

Q88 Lord Haskel: The point I am trying to get at is maybe you could explain to us what lessons we could learn here in Britain, because here we have an economy where the majority of things that we buy in the shops are in fact imported.

Mr Lisney: One of the things they do have is their 3Rs initiatives. One of their aims, the Asia-Pacific community, is to discuss these issues so that they try to get a commonality of concept. Also they have engaged with the European Union and clearly with our own government and trade missions. Part of their aim is to have some kind of world debate about these types of initiatives.

Mr Charter: They are operating through the Asia Productivity Organisation in trying to raise awareness. They have taken out within Asia versions of their green purchasing network into Malaysia, Thailand and other countries. They have also taken versions of their eco-products exhibition where generally the exhibitors tend to be Japanese technology. What they have beyond this is, a larger critical mass of the Japanese companies have this eco-design concept on-board, compared to maybe the relatively few US or European companies. So it is much more integrated into the way they are thinking. They are also taking it down through a key guy who maybe might be useful to invite here—part of the original so-called Factor Four Club, looking at a factor four reduction in energy and materials that was set up in the 1990s with Amory Lovins and Ernst von Weiszäcker—a guy called Professor Yamamoto. He is a very, very influential thought leader in terms of what goes on in Japan. They have been developing within the University of Tokyo a so-called Factor X methodology that is looking at a Factor X reduction of energy and materials that then in effect is disseminated to all the big companies. They are developing much more of a universal approach to this. In the context of a lack of global standards, and a lack of common understanding, the Japanese are trying to develop more of a common understanding in Japan that is then being fed out globally.

Q89 Lord Sutherland of Houndwood: This is very striking but clearly it is not without costs. I wondered who put up the capital, for example, for the 40 or 50 new factories that are recycling factories on day one? Where does the capital come from for the eco-towns? Are there government incentives? Are there tax incentives? Are there subsidies? How does that work?
Mr Charter: My understanding is, I forget the name of it, the Japanese have these broad systems where sometimes they have got banks in their group

business systems. It is actually the companies who own this recycling infrastructure rather than the waste management guys, so again that is a different structure, and that is since they have more control over their infrastructure. If they have got their products coming back they are in a sense in control of those loops more effectively. Going round some of the recycling factories, there have been some incentives in the sense of certain technologies within the factories; there have been some subsidies for recycling technologies.

Q90 Lord Sutherland of Houndwood: You mean the development of the technologies?

Mr Charter: Yes. The key point is it is a fundamentally different way they are organising it.

Mr Lisney: I cannot speak for every industry but when I was there I did speak to the President of one of the electronics organisations who had a very successful recovery remanufacturing factory where nothing leaves it, it is all sold. What he said was he makes money out of it and there is profit, but he knew effectively that because of this pre-planning and the signals given to the market that material was going to come; and because he was the only game in town that is where it was going. Essentially there was some kind of leadership connect between supply and demand, without perhaps other than the new design side of technology. Essentially the idea of resource management has got to be run by the market. If we are in a global market it has got to be cost-effective otherwise we get the first outcomes.

Q91 Baroness Platt of Writtle: What you have said is very interesting indeed. When one thinks of Nissan in the North-East do they do it too? Do they adopt that culture? Might they act as a centre in this country, or indeed Japanese or Asian companies?

Mr Lisney: Nissan, like other car companies now, will have accountability for recovery of their vehicles, to recover and recycle them to about the 95 per cent level now. What they do not know is how they do that and would not want to do it through their distribution networks and other things. Certainly on the electronics rather than the cars, the Japanese companies are doing their compliance through European platforms. They might be pan-European or might just be set up for this country. Because they know they have to comply they will set up a recovery system and they will make it cost-effective.

Q92 Baroness Platt of Writtle: It might act as an exemplar?

Mr Lisney: Yes, they could certainly do that.

Professor Pollard: You can also look to Nissan and the automotive sector for these key aspects of waste reduction during production and the stripping out of

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costs, because some of these have become international leaders in production efficiencies, so they have probably got both aspects. We were talking earlier about the need to put all of these aspects of design, production efficiency and end-of-life take-back together. Some of these Japanese companies are among the best at connecting these features.

Q93 Chairman: Could I just ask about the supply chain. A lot of Japanese manufacturing is not manufactured in Japan. Does it go down the line, or does it stop in Japan and the remanufacturing only happens there? If it is into places like China, and Taiwan probably adopts a similar approach to the Japanese, most of their manufacturing is done on mainland China, where you get the feeling at times that there are variable standards and there are dangers of counterfeiting and things like that. How confident are you that what is being done is done right down the supply chain?

Mr Charter: From my experience I share your scepticism. I feel a number of the global brands cannot really afford not to approach best practice; but once you get outside of that there is a lot of concern out in the region, for example, even getting down to ISO14000 (environmental management systems), to what extent those are just being bought in some instances. The auditor comes in, they have the thing on the wall, the auditor goes out and it is turned back to the wall and it is back to business as usual. What I have seen from our project in Thailand, when there is a surprisingly large amount of Japanese manufacturing, is that the Japanese have tried to influence a number of the key multipliers to raise awareness of these issues. The Thais have got quite a lot of investment out of METI and people like that, and around things like lifecycle analysis. My understanding is that they are starting to bring over some of their knowledge on recycling technologies into Asia. What I see is if you see the equivalent of WEEE laws starting to emerge in China and Thailand *et cetera*, which is being discussed, what the Japanese will be doing related to their systems innovation is selling whole recycling factories—not just the technology. They know how to run these things; they have been doing it since the mid 1990s. They set these pilots up—Hitachi in 1995—so they know how these things work. Thinking outside of the box, they are going to be heavily involved in trying to influence the whole development infrastructure.

Q94 Lord Sutherland of Houndwood: I wonder if we could move from production mainly to consumption now and the issues that arise for consumers. The evidence we have received suggests that many consumers do not maintain and repair products and they discard them, often while they are still working.

For example, I still have my gramophone but the main problem is trying to get something to play on it that it is not so crackly that you do not want to hear it. Clearly we discard things when they are still capable of use. We have mentioned the telephones already. Are there ways in which consumers can be influenced into a different culture, a different way of doing things? If so, who should try influencing them?

Dr Cooper: The evidence is quite stark. The trends recorded in the *Family Expenditure Survey* suggest the average household now spends 60p per week on repairs; it is virtually nothing. Take footwear—there was a time 40 years ago when a third of all spending on footwear was on repair work; those days have long gone. It is an issue which needs to be addressed. On the positive side, many products are more reliable than they used to be in the past. Gone are the days when we had our first colour TV and rented it rather than bought it because we were a bit worried that it would break because it was a new technology. There have been improvements in reliability and this partly accounts for the trend; but it is also undoubtedly the case that people have lost the sense that such products are investments for life. They buy them, move the old ones out and get new ones in. My Centre's survey on appliances found that 40 per cent of consumers rarely or never get their appliances repaired and the reason for that (no great surprise here) is cost. All too often the price of new products has come down as the products are made in countries where labour costs are very low, but they would have to be repaired in a country where labour costs are relatively high—the so-called “repair cost scissor”. This is a problem. As to what to do about it, there needs to be cultural change but culture is hard to change. It obviously has to start off partly in our schools, universities, churches, mosques and the other ways by which people develop their values in society. I think there are also shorter-term and practical ways in which advances could be made. In Austria, for example, one of the countries which has been taking a lead on repair work, they have done some research of different fiscal incentives. There was a European Union study into fiscal incentives which explored the possibility of reducing VAT on repair work, for example, as a means of tweaking prices. They found that this measure was not going to be as effective as reducing taxes on labour for repair work, which would be more likely to have an economic impact and bring the relative cost of repair work down. In Vienna they have quite a large community reuse programme and publish an annual guide to repair services to get information to consumers. I do not know if others have the same experience as me, but trying to find a repairer who you can trust is often the problem. The guide lists several hundred repairers just in the city of Vienna alone, although

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identifying reliable repairers is another issue. To go back to my earlier point about the power of marketing, I think there is a need for a slightly different form of system innovation here. Take the example of footwear and the system of how we obtain shoes; we buy shoes in one shop and get them repaired by a different company. In other words, the company that is selling us the good has an incentive to get us to replace those products as quickly as possible to maximise their sales. They do not really have a strong incentive to repair them because the repair shop is owned by a different company. I think there is a need for change by all parties. I must conclude by saying that in the retail sector repair services are often invisible. I have been to a well-known department store, and probably like you I keep my goods for a long period of time, whose staff were surprised when I brought an item back and asked if it could be repaired. It was a bag I wanted restitching and of course they could get it repaired—but there was nothing to advertise that fact. The retail environment is very much about the linear economy, the fast throughput economy—buy it, replace it, buy it, replace it—and I think there needs to be a change in the very structure of how we do retailing to encourage people to buy the service and not just buy the product; the service being the ability to use a product over time.

Q95 Lord Sutherland of Houndwood: You mentioned the Austrian example, which sounds very interesting. Did Japan do anything in this area in this huge change of culture on the business side to prepare the public for the idea that things would be recycled and possibly repaired?

Dr Cooper: I have not done work in Japan. I know they are said to have a culture of caring for products. I do not know if Martin knows more.

Q96 Lord Sutherland of Houndwood: Should our Government be doing anything, is the question?

Mr Charter: I do not know if the retailers in Japan are doing anything. What I do see there is that they have cascaded it. The initial thing is work on the government consumer and that has then impacted on the business. They see working on the consumer, and therefore through retailers, as a longer term strategy, so they have prioritised the way they are dealing with the different consumption chains. I do not know Japan but certainly the fact that Wal-Mart and now Tesco's, Marks & Spencer's and Carrefour and the other big retailers are starting to move on this agenda, I am sure the big Japanese retailers at the high level will be starting to look at this more.

Professor Pollard: A well-publicised example of what Dr Cooper is talking about is a company called Interface which makes carpets in the States. They

have a service mentality towards their carpets. What they have done is they have minimised the use of oil in their carpet, they have made a random design on the carpet so if there are spills aspects of the carpet could have been taken out and replaced with new carpet which matches into the old carpet, providing much greater longevity of the product, and that is a successful and well-publicised example of what is called product service systems that Dr Cooper was talking about.

Q97 Lord Haskel: If I could just explain, Interface make carpet tiles, that is the way they do it.

Professor Pollard: They do, that is quite right.

Mr Charter: Just to add, as part of their advisory group, they found problems with that service model in the fact that they are having to change the whole way they sell the product. They have had to adapt their whole marketing strategy to deal with not selling outright purchase which they have actually found more difficult than it sometimes appears in the public domain.

Q98 Lord Sutherland of Houndwood: In our economy, by and large, it seems to be that it is only the very expensive things like motor cars where repair is built into the system and central heating systems where, if you have boilers, they will service the boiler and so on. Are there any other sectors that are not high cost that are moving in this direction? You have instanced carpets.

Dr Cooper: I do not think there are other sectors moving in this direction at all. In fact, it is the reverse. I have certainly spoken to one electronics retailer and they have said that every year fewer and fewer of their products are worthy of repair. It is getting to the stage now where even things like washing machines are becoming increasingly irreparable. You asked if there is more that the Government could do. I think there is. I know that the Chancellor has been in discussion with colleagues in Europe about preferential treatment for greener goods, and the discussion that I mentioned was taking place in the European Union a few years ago, about encouraging repair, was also linked to creating jobs because of course one of the advantages of repair work is that it brings jobs to the UK economy. I think the Government would do well to investigate the possibility of greater fiscal incentives towards repair work.

Chairman: I think, gentlemen, that is very helpful. Lord May?

Lord May of Oxford: Can I apologise because after this I am going to walk out because I have got a meeting with Geoff Rooker about the Climate Change Bill, but in the paper that two of you prepared for us there are some very interesting

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comments cautioning against setting targets and the like in absolute terms without taking account of population change. One of the great silent issues in the whole climate change discussion is population which went off the agenda. It is not even mentioned in the Millennium Goals of the UN, as a very deliberate result of pressures from certain quarters. Would there be time to just ask about that for a moment or two or should we just note it for the future?

Chairman: I think it would be simpler because this is breaking new ground. There may well be other issues—and there is certainly one area that we have not covered this morning but we thought we would write to you—and perhaps we could also write to you

on this population issue. This is a dimension which we have not really covered.

Lord May of Oxford: They have raised it very thoughtfully.

Chairman: It is something that we have not picked up on and we could maybe come back to you on that. I have to say that there are not too many issues on which we need to come back to you because you have been extremely frank and open and thorough, although I think you have probably given us more problems than you have solved for us. That is perhaps the best compliment we can give you! Thank you very much for your time this morning and we will be in touch on a couple of outstanding issues.

Supplementary memorandum by Mr Bob Lisney

With regards to the questions the Committee has asked I am not competent to answer the second one as this is more in the realm of Dr Cooper's expertise. However, I have investigated waste reduction for a number of years and this is where I am able to reply.

Currently waste reduction targets are set in both tonnage and/or percentage terms. They are also differentially set for different areas of focus eg there are reduction targets in total tonnage terms for the household waste stream but in percentages for Commercial and Industrial, and Construction and Demolition.

In order to study the potential impact of population increases, a total balance of tonnage should be shown split into various categories, clearly showing potential changes as a result of activities like recycling, economic growth and population increase. This will show the relative impact population growth has on "waste" or rather the amount of materials to be processed for materials, energy or final disposal.

Currently for the household stream the Government is content to landfill 12.2 million tonnes of residual waste after reduction, recycling and energy recovery. Whilst this is a 45 per cent reduction from 2000 figures, this still leaves substantial room for variations of outcome. A zero waste to landfill aim may take longer than 13 years to achieve but it should be possible to set clear targets in absolute terms to reach that goal. This would then direct the attention to managing material recovery only.

If the economy is to grow, the agenda moves away from "waste" reduction and transfers to sustainable consumption and production. Population growth is a factor in that debate but only one. It has already been shown in the Government's Changing Patterns report of 2003, that demand even with material and energy efficient products, can still increase as a result of unit price reductions making access to goods more achievable and thus ultimately more products and materials to recover.

Other factors affect consumption; an aging population, increasing personal expenditure and reduction in numbers per household. Whilst population increase is forecast to be 1 per cent by 2030 in EU it is not expected to have a significant effect on consumption compared to these other factors (Ref Household Consumption and the Environment. EEA 11/2005).

The current reduction targets are not set to reduce consumption but residual waste from households to landfill. This seeks to reduce the total amount but also sets a per person per year target of reduction from 450Kg to 225Kg. This is not an individual target but an average. It is dependant not just on the householder but on their local authority who determines how recycling is collected and also what happens to their residual waste.

It is relatively easy to achieve the broad reduction targets and these may be set irrespective of population increases. The area of focus should be the more moral and ethical one of meeting needs and managing wants despite requiring a growing economy. Government measures decoupling statistics via the ONS and Defra and these are arguably more important than those relating to domestic waste reduction.

It is confusing to the householder, decision makers and the media that we have not got a true definition and meaning of the term. At the moment the Government means it to be reduction from landfill. However, there is also a great deal of effort spent in trying to get the weekly domestic waste reduced in volume. The Defra targets of Kg reduction do not relate to this at all. The Committee may wish to consider recommending a

transfer of this element of the agenda to that part of Defra and its counterpart in BERR that specialise in the SCP agenda.

It had been considered that an overall Kg per person level including all recyclable and recoverable material should be set. However, comparisons of Kg per person vary depending on household size and other demographic impacts. EU and world comparisons show wide variations and are very misleading since they do not often contain the same base information. For the UK it is more important to wait for the work being carried out by WRAP on food waste, which may assist in making decisions about the opportunity to reduce volumes of discarded food as well as options to divert such food from landfill. It is this area of the dustbin where positive reductions can be made where everyone will gain. Households by cost savings (although only about £200 per year maximum, but far more than by charging regimes), local authorities by savings in disposal/processing costs and the environment where less methane and CO₂ emissions will be produced.

January 2008

**Supplementary memorandum from the Centre for Sustainable Consumption,
Sheffield Hallam University**

PRODUCT LIFE-SPAN INFORMATION

1. Access to product information is one of many influences upon purchasing decisions. Three-quarters of consumers consider information about product life-spans to be “very important” according to a survey undertaken in 2000. The same survey found that more than half of all consumers were “dissatisfied” with the current level of information.
2. Empirical evidence to suggest that consumers would utilise product life-span information may be unavailable, but it is generally accepted that increased information improves market place efficiency. It could even be argued that consumers have a right to know the planned design life of products in order to enable them to identify products according to their intrinsic quality as distinct from other factors that may be considered to add value. Increased knowledge may encourage more consumers to choose products that last longer, thereby reducing waste from discarded items. Clearer expectations about life-spans may also deter people from discarding products prematurely.
3. Consumers are likely to respond positively to the provision of product-life information if (a) it enables them to compare products and identify which ones offer the best value for money (ie on the basis of cost per year of anticipated service life) or (b) they have been convinced of a need to take greater account of product life-spans in their purchasing behaviour in order to reduce the environmental impacts of consumption.
4. Product life-span information may be obtained in many various ways and takes different forms, including life-span labels, point of sale leaflets, verbal advice from retail assistants, manufacturers’ or retailers’ brochures, product reviews or personal blogs on Internet sites, specialist consumer magazines, word of mouth and environmental labels such as the EU Eco-label. Consumers may also use proxies and cues, such as the length of guarantee, the look or “feel” of a product, a BSI or ISO number, brand reputation or price.
5. If the Government accepts the case for increased product life-span information it will need to consider a range of options, the effectiveness of which may vary by product type. The introduction of a life-span label could be on either a statutory or voluntary basis. The options also include the introduction of a life-span label or the incorporation of life-span criteria into other environmental labelling schemes.
6. The approach taken by Lord Beaumont in his proposed amendment to the Sale and Supply of Goods Bill in 1994 was to give authority to the Secretary of State, after due consultation with interested parties, to require sellers “to supply to prospective buyers information stating the normal expected life span of the goods under reasonable conditions for use” for any stated class of goods.
7. A voluntary approach might involve the Government in multi-stakeholder debate within key industry sectors to promote the use of life-span labelling, encourage longer guarantees to signify increased durability, and develop industry standards and codes of conduct on life-span labels and the availability and fair pricing of spare parts. Such an approach was adopted last year in Scotland’s Household Waste Prevention Action Plan.
8. Certain technical issues with legal and financial implications need to be resolved. Should product life-spans be measured in periods of time or cycles of use? Would life-span labels make manufacturers liable to pay all costs relating to disrepair during the period in question or should allowances be made for normal wear and tear?

9. The Government could promote the communication of life-span information by measures other than labels, such as:

- date stamping products at the point of manufacture;
- integrating devices on products that monitor cycles of use/intensity of use and are visible to consumers;
- the use of longer guarantees to signify enhanced durability;
- the supply of relevant information from manufacturers to retailers and its communication to consumers through point of sale information and better trained retail staff; and
- education and information campaigns about careful product use and disposal.

10. The Government should integrate consumption, product durability and waste reduction more effectively in its sustainable development strategy. Initiatives are needed to encourage consumers to purchase higher quality, durable products and to undertake repairs. Since an amendment in 1994 “durability” has been among the criteria determining “satisfactory quality” under the 1979 Sale of Goods Act (section 14[2B]), but this is proving of little consequence in the absence of adequate life-span information.

January 2008

TUESDAY 18 DECEMBER 2007

Present	Bhattacharyya, L Crickhowell, L Howie of Troon, L Lewis of Newnham, L	O'Neill of Clackmannan, L (Chairman) Platt of Writtle, B Selborne, E Sharp of Guildford, B
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Memorandum by the Environment Agency

INTRODUCTION

1.0 The Environment Agency is the Government's principal advisor on the environment. We regulate waste management activities and are also a principal delivery body for the Government's Waste Strategy 2007. We have a keen interest in waste reduction and resource efficiency as part of our role in protecting the environment.

BETTER DESIGN AND THE USE OF MATERIALS

2.0 Clearly, manufacturing methods and designs that maximise resource efficiency will tend to reduce waste production. Similarly, the use of designs that facilitate the removal and recovery/recycling of materials, and the use of materials that are easily recovered/recycled will help to reduce the volume of wastes sent for disposal when products come to the end of their life.

2.1 We do not have the remit or technical expertise to comment in any detail about the role that better design or materials might play in the creation of waste. Although we are not the organisation to lead in this, we will be pleased to advise in any relevant field where we have expertise.

2.2 We are pleased to note that the Government plans to set up a new products and materials unit. This will identify and catalyse actions across the supply chain, to improve the environmental performance of products throughout their life cycle. The precise remit and membership of this unit is not yet clear. However, the Government's plan for the unit to produce a progress report on delivery by Spring 2008 is to be welcomed.

2.3 We would welcome clarity on responsibilities for driving and delivering the Government's waste reduction and resource efficiency programmes.

2.4 We believe that the wider use of life cycle assessment techniques in assessing alternatives should help to engender more sustainable product design.

BUSINESS FRAMEWORK

2.5 Our work with a number of industries on the development of Sector Plans has promoted sector improvement targets for environmental performance. These include waste reduction, as well as reuse, recycling and recovery.

2.6 The Sector Plans include many industries that are regulated under the Integrated Pollution Prevention and Control (IPPC). IPPC places a statutory duty on industry to reduce waste and we are using our regulation of these companies to require them to reduce the amount of material used and the amount of waste produced or, where this represents the best available technique, to recycle more. We have set a target of a 15 per cent reduction of waste disposal for these companies between 2006 and 2011.

GOVERNMENT POLICY

2.7 We support the Government's continued commitment to producer responsibility arrangements. It is right that businesses should be required to take financial responsibility for the environmental impact of products they place on the market. To date, these initiatives have focused on increasing recycling rates for end-of-life products. In the decade that producer responsibility legislation has been in force for packaging in the UK, recovery rates have more than doubled. However, there has not been a reduction in the amount of packaging used or packaging waste discarded.

2.8 We expect that the future implementation of the Batteries Directive will reduce the proportion of batteries going to landfill, an outcome we welcome. However, the legislation is unlikely to have a significant impact on the number of batteries used. We would like to see Government come forward with proposals aimed at promoting viable environmentally preferable alternatives to batteries.

2.9 We believe that, wherever possible the primary purpose of producer responsibility schemes should be to reduce the amount of waste produced in the first place, not just to increase the amount of waste recycled.

2.10 We support the use of suitable financial incentives to encourage waste reduction. For instance, increased levels of landfill tax, combined with the relatively high cost of alternative waste management methods, is now beginning to provide a real incentive for businesses to reduce their waste production. Similarly, the recent reductions in the number of landfill sites through the implementation of the Landfill Directive, together with bans on the landfilling of certain wastes and requirements for pre-treatment for other wastes have increased the financial viability of waste reduction.

2.11 The Government's Waste Strategy for England 2007 sets out a number of objectives and targets to reduce waste production. It includes a high-level action plan to deliver these objectives.

WASTE QUALITY PROTOCOLS

3.1 Our work on waste protocols will be of interest to the Committee.

3.2 The BREW waste protocols project was launched in May 2006. It is a joint project between the Environment Agency, the Waste Resources Action Programme (WRAP) and industry, and is funded by Defra's Business Resource Efficiency & Waste programme.

3.3 The purpose of the protocols work is to either:

- Produce a quality protocol which sets out criteria on how to produce a product from a specific waste type or;
- Produce a regulatory position statement or;
- Agree a low risk position.

3.4 So far the project has published:

- Compost Quality Protocol (15 March 2007);
- Blast Furnace Slag Technical Report (24 August 2007—a steel making by-product, Blast Furnace Slag (BFS), will no longer be classified as a waste, a move that will cut red-tape and allow the construction industry easier access to more than 3 million tonnes of the material produced annually);
- Regulatory clarification statement for waste wood.

3.5 The project is set to launch 12-week consultations for five Quality Protocols in the next two months.

They are:

The production of biodiesel from waste vegetable oil;

- Tyre-derived rubber materials;
- Non-packaging plastics;
- Flat glass;
- Pulverised fuel ash.

3.6 The project is currently considering the following waste streams:

- Boiler ash from the disposal of paper sludge through combustion;
- Uncontaminated topsoil;
- Steel Slag;
- Incinerator bottom ash;
- Waste plasterboard;
- Outputs from anaerobic digestate.

CONCLUSIONS

4.1 The Environment Agency is keen to promote waste reduction as a business opportunity and not be seen as a regulatory burden. We want to play our part in changing attitudes towards waste and waste reduction in particular in accordance with our vision that waste will be reduced and have the smallest impact on the environment.

October 2007

Examination of Witnesses

Witnesses: Ms TRICIA HENTON, Director of Environment Protection, and Ms LIZ PARKES, Head of Waste, Environment Agency; and Mr MALCOLM FERGUSSON, Senior Fellow, Climate and Pollution Team, Institute for European Environmental Policy, examined.

Q99 Chairman: Good morning ladies and gentlemen. Perhaps, Ms Parkes, you can introduce your two colleagues and yourself and we will get started.

Ms Parkes: Certainly. I am Liz Parkes and I am Head of Waste at the Environment Agency; to my right is Tricia Henton, who is Director of Environment Protection at the Environment Agency; and to my left is Malcolm Fergusson, who is a Senior Fellow from the Institute for European Environmental Policy.

Q100 Chairman: Thank you very much for your evidence. One of the things that we have found a wee bit difficult to get a grip on is the definition of “waste”. Is there an accepted legal definition and does this, in its way, limit the reuse of potentially useful resources? If something is classified as waste you cannot do other things with it. This is something where we have had not quite contradictory definitions but we have had a lack of definition of the definitions, a vagueness. How would you lay it down?

Ms Parkes: There is a legal definition of waste that is set out in the Waste Framework Directive and it has been there since the 1970s, so it is always slightly surprising when people say there is no legal definition. What has changed over the years is greater clarification about what it means through case law at European and domestic level. The area is very broad in its scope and it includes materials that are going to be disposed of but also materials that are going to be recovered and recycled. Over the years there has been growing clarity that the scope is very broad and also that once something is thrown away as waste it carries on being waste for a long time, so the real debate at European level has been the point at which end of waste, as the European Court likes to call it, ceasing to be waste, comes in. It would be fair to say that there are consequences of something being waste. We apply our regulatory controls as a regulator in a way that is risk-based and modern to try and ease the burden on industry. We have a number of initiatives in hand to make sure that we can ease that burden. Most crucially we have been working on what we call quality protocols. We have been working on these with the Waste and Resources

Action Programme and industry to identify the bulk of industrial materials that we think need to be turned back into beneficial use. By working in partnership with industry, we can actually devise specifications that mean we can ease the controls and actually say this is no longer waste in a way that we think still affords the right protection to the environment. That is, if you like, forcing material back into productive use at a faster rate than would have happened if this was not even waste in the first place, and that whole programme is going down very, very well with industry and is bringing an awful lot of material back into productive use.

Q101 Earl of Selborne: Does that need a redefinition therefore in order to achieve that? It seems to me eminently sensible that you should be able to force products back away from waste and into productive use, but we have always found in the past that the stumbling block has been the definition of waste as described in the 1970s.

Ms Parkes: We are satisfied that it does not need a legal redefinition. The Framework Directive is silent on when something ceases to be waste. We are taking a line on this and we are finding support for that not just in this country but across Europe. The Commission is very interested in the work we have been doing. Because it is a partnership approach with industry and with government and the Waste and Resources Action Programme, there is a lot of consensus that it is very sensible to define the point at which full recovery takes place such that waste controls can fall away. It is actually forcing industry to work together and come up with a consensus around what are the technical requirements. Often in, say, the engineering world, engineers have selected materials because of their integrity and their ability to, for example, construct bridges that do not fall down, but people have not actually looked at the environmental criteria, so doing that now means that we get more certainty around the grade of material and that it is actually fit for use.

Q102 Lord Howie of Troon: What do you mean by environmental criteria in that context?

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Ms Parkes: In that context it would be looking at whether there were any contaminants that would cause the leachability issue, if they could be washed out of a product, so looking at a material that is going to be used in what we call a “bound” process whereby the contaminants get caught up, we would then be satisfied that they could not leach out into the aquatic environment. In many cases you may be talking about very, very inert substances, and provided we can get some control on the quality of those, then we can be satisfied that they can go back into productive use without any detrimental effect.

Q103 *Baroness Platt of Writtle:* It is really rather difficult when something could be reused. Glass is being used in roads now and all sorts of things and if materials are misdescribed that is going to make it very difficult for engineers at the very beginning to be choosing materials that could be recycled later on.

Ms Parkes: If I could help on that. Just because something is waste it does not stop it being reused or recycled in any event. In fact, many businesses want to claim the credit as being the recycler. On the other hand, there is an incentive—

Q104 *Baroness Platt of Writtle:* It is the claiming of the credit that is so important, is it not?

Ms Parkes: It is. The definition of waste in that sense has not stopped glass being used for instance in aggregate. What we are keen to do though is to work with the sector and say can we say it ceases to be waste before it even gets made into aggregate because that would make life easier. So we are looking at a range of materials—non-packaging plastic and flat glass—which is not normally recycled and a whole range of industrial by-products—slags and ashes—which are produced in very large quantities and we think could provide a valuable role in terms of engineering use and saving us extracting raw materials out of the ground.

Q105 *Baroness Platt of Writtle:* Stopping landfill is the key thing, is it not?

Ms Parkes: Yes.

Q106 *Lord Lewis of Newnham:* May I just say I sympathise totally with your problem. I think it is an extremely difficult one. There is an element of considerable subjectivity involved in many of these decisions. The definition is a European definition yet there are many examples, I think you would agree, in which things are classified as waste in one country but not in another. I think of fly ash for instance, which in Germany is a perfectly acceptable thing to use in road construction and things of this sort whereas in this country there is a much greater restriction on the use of fly ash and things of this nature. How far does this give you problems because one of the major

factors of course with regards to waste is export, you are not allowed to export waste?

Ms Parkes: Again if I can clarify that last point; you can export waste provided it is for recovery. There are international controls. There are restrictions on the export of hazardous waste and export for disposal and they are complex rules. Coming back to your earlier point, yes, it has caused difficulties, and we as an environmental regulator have taken a precautionary approach. What we have been trying to do is to make sure that there is consistency and stability in not just the regulatory world but in the market-place and we have been very clear about the line we have been taking. What we have also done is adopt a number of regulatory positions. The law requires people to have licences to use things like coffee grindings if you wanted to apply those as a soil conditioner. We think that is a nonsense so we have taken a series of regulatory positions, which again have been very well received by industry and supported by government such that we do not need to regulate things where there is no environmental benefit. Again, we are pushing this approach across Europe because, you are absolutely right, we are operating in an international market-place and there needs to be consistency. We are aware of instances where other countries take a similar pragmatic approach but do not actually write it down, which of course makes it more difficult if people do not know what the rules are. What we would like to do is get these issues on the table, come up with the right position (which has led to some criticism) and get those positions written down. People are now very comfortable that we are doing that. Of course there are other examples, say in Italy, where they have legislated to take a lot of things out of waste control and they have actually been infracted by the European Commission, so that has not been helpful to the industry either.

Q107 *Chairman:* The impression I am getting is that there is this 1970s Framework definition, there are a lot of applications and interpretations of it and that the work that you are doing is to try and make it, on the one hand, more flexible but, on the other, business-friendly yet still environmentally sound, and that in fact there is still an awful lot of work to be done and that hiding behind the old definitions in the 1970s Framework is no longer any good. It kind of implies that the situation across the EU is not that satisfactory and that you are really trying to create agreements and understandings to not necessarily patch over the cracks but certainly to try and make it a bit more consistent. Am I right in saying that if you were not doing what you are doing, the situation would be pretty messy and inconsistent and ill-defined?

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Ms Parkes: We think the definition of the Framework Directive is quite a good definition and it has done amazingly well to stand the test of time. Because there has been such a body of case law now, we think it would be very unfortunate if that definition were to be unpicked. We think there is a consensus across Europe about what is waste. There are some difficulties at the edges but we think those are very small difficulties now. We think that the work we have been doing on protocols really does provide the solution for the future. That is really about defining what are products again rather than endless debates about definition of waste because, you are right, that that can be extremely time-consuming and not actually very productive for the environment or for business. We feel that we need to avoid over-prescriptive controls from Europe, keep the flexibility we have got, and do exactly what we are doing, which is work with business.

Mr Fergusson: If I could add a more generic comment. Waste is obviously an area where things have to be interpreted through national systems which pre-existed that Framework Directive. It is not unusual to find that definitions in EU Directives tend to be somewhat vague and need to be interpreted over time and in the context of national systems. I do not think it is a foregone conclusion that if the Commission were asked to more closely define these things it would necessarily come out with something better, because they do not always understand national systems as well as perhaps they might; it is more or less in the nature of the beast. I think I would be somewhat chary about assuming it would be a good idea to rewrite that at this stage.

Lord Lewis of Newnham: I am always reminded of the recognition of course that we all know what an elephant is but it would be very difficult to define it. I think this is where I put waste.

Q108 Lord Howie of Troon: You mentioned fly ash. Is there a problem with that? As a civil engineer I remember coming across fly ash in the 1960s. Has something happened to it since then?

Ms Parkes: It is generally used quite widely in this country and abroad. The challenge comes in where people are looking for absolute clarity on the rules. We have had recent controls such as the Waste Incineration Directive that has caused a lot of industry to re-examine what it is that they generate and whether that is waste, so that has raised further issues, but actually this should be about the environmental consequences rather than discussion about legal definitions, and we believe the two are not incompatible.

Q109 Earl of Selborne: The Government is relying on quite a wide range of organisations to deliver waste production and resource efficiency

programmes, whether it is government departments, regulators, local government, agencies of one kind or another. In your written evidence you say that the Environment Agency would “welcome clarity on responsibilities for driving and delivering the Government’s waste reduction and resource efficiency programmes”. Is there confusion at the moment and, if so, what needs to be done?

Ms Parkes: I think with the publication of Defra’s Waste Strategy there is room for greater clarification about the way forward and who should be responsible for what. We are very clear about our role as an environmental regulator and about where we make our interventions. We all see the need to drive this issue further up the hierarchy and to tackle it at source. Once one is looking at the whole arena of industrial products and commercial products as well as waste production, that raises a bigger question about who needs to be leading and driving that agenda, because obviously BERR have a big role within government as well as Defra, and whilst we tackle the bigger industrial polluting activities through the IPPC Directive, we are not generally charged with the broader arena of product policy, which is where this really needs to start. We think that in the same way as we have seen a push on household waste recycling for all the right reasons, if we are not careful, the public ends up being very confused about what is acceptable in their particular area. What we are very keen to see is as we collectively drive industrial and commercial resource efficiency that business is very clear who is leading that debate. There are a number of players but we need greater clarity around who is leading that and what actually works best and this is a good time for government to give that clarity.

Q110 Earl of Selborne: And have you made specific recommendations as to how this clarity should be achieved?

Ms Parkes: We are working with Defra and with government on the Waste Strategy Board, which I sit on, and within that we are looking at the priority areas for action and encouraging government to be very clear who is leading on each of those strands of work, so that is the mechanism by which we are driving that.

Mr Fergusson: Another point to add is that as things move as described from a materials and production-based approach to a more product-orientated approach, then inevitably we are talking about things which are traded internationally. You cannot necessarily take a national approach to these things. Necessarily the EU will be involved; necessarily perhaps international bodies as well, although that becomes more problematic, but there are an awful lot of products that are traded across Europe obviously, so that needs to be considered.

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Q111 Lord Crickhowell: My question is about the apparent lack of consistency in the provision of information about the life-cycle impact of materials, which makes it difficult for designers to compare them. Is there a need to develop a consistent approach to labelling materials and products, and if so, how can this be done?

Mr Fergusson: Life-cycle analysis is inevitably an extremely complex business and things which appear to be technocratic details such as systems boundaries and allocation of impacts between different co-products and so on can make an enormous difference to the outcome of the analysis. It can completely reverse the conclusions you get in the comparison of two products in some cases. That is not by any means an easy matter, but it does need greater clarity because it is not surprising that people are confused if you can get a life-cycle analysis that gives a completely different conclusion from another one on the same product. I think that is inevitably going to be a very long job however. Probably standards and labelling at EU level will be an important component of that. That will not capture everything but it can capture quite a bit and it is probably better to make progress at a European level than to hope for a global system to somehow materialise because that will not happen any time soon, so probably greater emphasis at EU level.

Q112 Lord Crickhowell: In your memorandum you say that you are “pleased to note that the Government plans to set up a new products and materials unit. This will identify and capitalise actions across the supply chain through the environmental performance of products throughout their life cycle. The precise remit and membership of this unit is not yet clear.” Then a rather surprising sentence after that: “However, the Government’s plan for the Unit to produce a progress report on delivery by spring 2008 is to be welcomed.” I find it rather difficult to know, if it is about to be set up, how it is going to produce a progress report by the spring of 2008 which we are almost into. Can you tell us a bit more about this unit and what it is supposed to be doing?

Ms Parkes: Absolutely. As I say, we welcome the fact that the Government is going to establish this unit. It is still in gestation and you have to bear in mind that the Waste Strategy itself was a long time in gestation, which is probably why it is a rather ambitious timetable now to publish a progress report, but it comes back to the earlier point that we need to be very clear both on what the priorities are and where is it more important to intervene, at the material end or at the product end, which is particularly important when we look at changing consumer behaviour, and what are the priorities for action there, and then what are the interventions that need to be made and who is

going to do them for what benefit. It is that that we are looking forward to coming out of Defra’s Waste Strategy implementation to be much clearer around what is going to be delivered by who and when.

Q113 Lord Crickhowell: I have come in rather fresh to this inquiry having been rather caught up in things like the Climate Change Bill which we were debating last night, which is actually rather relevant—
Ms Parkes: Absolutely.

Q114 Lord Crickhowell: --- because we should not simply be talking about the effect in pollution terms but the effect of waste energy and all the other factors. Looking at your memorandum I am really very woolly now about who is doing what and where. You say you are a principal delivery body for the Government’s waste strategy. Clearly in pollution terms you are concerned—and chairing the National Rivers Authority I was acutely concerned, as you continue to be—about what happens when the nasties get into the water supply and so on, but the Strategy obviously goes much wider than that and goes back to these other topics. I simply do not get a clear picture of the overall chain of command that is created. Defra presumably is at the head of it but, as you said, BERR has a particularly important involvement. Last night debating the Climate Change Bill we were looking to see how the Government was going to produce a totally coherent approach, because this is a multi-departmental operation too. How do you see this multi-departmental chain of command developing? How far has it developed? Where do you fit into that sort of pyramid, if there is a pyramid? Can you give me a picture of what is happening, because I do not get it at all at the moment?

Ms Parkes: Certainly to clarify our own role, as you say, we are the environmental regulator and we deal with the impacts of industry that generate products and we regulate those and we deal with the end of pipe issues. Increasingly we want to be working upstream with waste producers and we have a specific remit in relation to administration of parts of the Producer Responsibility legislation but not for working with producers across the board. What you are alluding to I think is the rather complex interface between Defra’s Waste Strategy and the larger Sustainable Consumption and Production agenda. It is precisely those interfaces that we are looking for clarity on as to what are the actions that are going to give rise to the best environmental outcome, and who is going to be charged with taking those actions. This cannot be confined purely to Defra. It is not just about environmental legislation and delivery, it is about getting it into the socio-economic debate, and therefore BERR have a big role to play as have other parts of government. That whole agenda is one that

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is emerging so in terms of the actions that are placed upon us all now, I think we are all very clear about what we are doing. The challenge for society and for government going forward is to be very clear about this bigger agenda and what are the interventions that are going to give rise to the best environmental outcomes.

Lord Crickhowell: Thank you very much. I think you have given us some interesting questions.

Q115 Baroness Sharp of Guildford: Could I come back to Malcolm Fergusson's answer because you were saying that we need to work with the European Union on developing labelling. What progress has been made there? What is the sort of time-frame that we are likely to see on this? In a sense it is an urgent issue yet one suspects the time-frame is actually a fairly long one.

Mr Fergusson: Things do tend to move slowly at the European level. You will have to excuse me, I do not have a very good picture across the piece. Certainly you can point to areas where the useful things have been done, for example in the eco labelling and energy efficiency labelling for appliances, and increasingly also for vehicles for example. On some of the big items there is quite good progress, but obviously we are talking about potentially complex evaluations of an immense number of different products so prioritisation is crucial. There has been a degree of prioritisation identifying priority waste streams and focusing on those in the first instance, but, yes, it is an immense job and inevitably a rather slow one I think.

Ms Parkes: Perhaps to give an example on that, obviously the Waste Electronic and Electrical Equipment Directive requires labelling as does the Batteries Directive. It is interesting that the battery manufacturers for the first time are having to think about putting something on their batteries that show how much power is in them. It is quite amazing to think that we would not buy many other products if we did not know what was in them and whether it was good value for money, and that is something that they have not done voluntarily and is obviously going to lead to behaviour change, but it is taking a legislative instrument to bring it about.

Q116 Lord Howie of Troon: Back to life cycle—are you more interested in the life cycle of materials from which products are made or the life cycle of the products?

Ms Parkes: We think both need to be looked at. We do not claim to be the experts on the life cycle of either and we think these are some of the important issues that the Government needs to look at through their Sustainable Consumption and Production agenda.

Q117 Lord Howie of Troon: If you are not an expert is there an expert?

Ms Parkes: We tend to think that most of the expertise on this lies within the academic world and the question then is who is best placed to employ that expertise.

Mr Fergusson: Also I would say there is not going to be one general rule that will fit all anyway. It varies enormously between classes of appliances. For example, with a lot of large consumer durables and so forth, the energy consumption of those products in use is possibly their most important single impact and that is something where you have to put the focus. For a lot of other products that is not the case at all and material flow is far more important.

Q118 Lord Bhattacharyya: I am a designer so therefore I need help in the sense you are talking about recycling and you are talking about reducing pollution. Let me tell you, if I am designing an engine, the first thing I look at in designing the engine is cost and performance. The last thing I would look at is how I reduce waste in the design and manufacture of that engine because that adds money to me. As far as pollution is concerned, in other words the end result of the product, that is regulated to some extent as competition forces us to do certain things. How can you have the experience and the knowledge base to come and tell industry what they should be doing, other than in general terms? Do you have a format by which you can train people in how to design products and how to use the manufacturing processes which will reduce waste or is it just in superficial, qualitative global terms that you tell them they should reduce waste? How can you help us?

Ms Henton: There are ways that we can help but they are quite limited. We are not the organisation or the body who have the intimate knowledge of product design and how to minimise waste or indeed the use of resources. We think that is where BERR has a big leadership role to play. It very much sits within the industry end of the cycle. However, where we do have an influence is in the regulation through Integrated Pollution Prevention Control where we do have some regulatory control over the use of resources within certain industrial processes, and that is an area that we already use but are keen to improve on because that is where we have a locus to do so.

Q119 Lord Bhattacharyya: How do you go about doing that? I have a car company; do you come to my company and then tell me about all of these things?

Ms Henton: It is only within the specific processes that fall under IPCC, which is quite a narrow band. It is the band of the potentially most environmentally damaging industries—things like cement, chemicals, petro-chemicals, the large industrial processes—who do tend of course to use a lot of energy, a lot of water,

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a lot of materials, and we can have an influence there, but unless it falls within that we do not have very much of a remit there. Again I think the emphasis has to be on the product end of it and the bit of government that looks after product design.

Q120 Lord Bhattacharyya: One of the things that I would look at is the Health and Safety Executive. It is pretty well-structured and you know what to do and what not to do. How does that work under your agency? It is a completely different agency and you are the Environment Agency. Do you work together and come out with regulations or come out with provisions?

Ms Henton: Our work with the Health and Safety Executive?

Q121 Lord Bhattacharyya: Yes.

Ms Henton: We work very closely with them partly because they are a fellow regulator. We regulate some of the things jointly, the Control of Major Accident Hazards legislation is joint work, and we work very closely with the Nuclear Installations Inspectorate, which is part of the HSE, on the regulation of nuclear power stations and other nuclear processes, so as a fellow regulator we have a lot to do with them.

Mr Fergusson: The motor industry which you mentioned is a good example of where a fundamental change is required and where, as you say, historically motor manufacturers have not seen it as part of their business to worry about the disposal of their vehicles, but the End of Life Vehicles Directive is beginning to change that and, on the back of that as experiences come through of what the problems are in recycling these things, then this is fed back into new regulations on the actual components, on things such as labelling them or banning certain hazardous products or things that are hard to recycle. That is an example of where there is a feedback through again at a European level because it does not make much sense to think of the motor industry at the national level, well, obviously it is international, but it is quite strongly a European-level thing, so that is an example of where the Commission has made quite a lot of proposals which are beginning to feed into the design process. That is almost a psychological thing where manufacturers, and this is across the board, have to begin to think of their products not just as something "I make, sell and forget about", but where there is this responsibility to think about the whole life cycle. It is not an easy thing, I know.

Q122 Lord Bhattacharyya: But very seldom do they design without thinking. With a new strategy for product design, they would have to think about what happens at the end of life. Therefore, the whole business of life-cycle costing has to take into account what happens in the end and, hence, the cost also

goes up, so they are quite aware of that, but how can you and your organisation help?

Ms Parkes: Coming back to the Environment Agency, we are principally here to regulate the pollution which would otherwise be caused by industrial processes. We are not charged with looking at products across the board and we do not claim to have that broad competency or the resources to tackle that, and that is why it is so important that the Government's sustainable consumption and reduction agenda looks at this in totality and is very clear about who should be discharging that function.

Q123 Lord Howie of Troon: I wonder if you are happy working with the Health and Safety Executive. It sometimes appears to be a sort of loose cannon as well as being a loose battery.

Ms Henton: Well, the Health and Safety Executive is obviously one of the major regulators and indeed just recently the Better Regulation Executive has been carrying out an audit of the five big regulators, ourselves, health and safety, food standards, financial services and competition, and I cannot remember the fifth, with a view to ensuring that the methods that we are using for regulation are indeed compliant with the principles of the Hampton Report. We work very closely with Health & Safety and they are a large, effective regulator of their particular remit which in some ways, as I have said, very slightly overlaps with our remit.

Q124 Lord Lewis of Newnham: I think you have emphasised a point that worries me tremendously. As you rightly say, you are there to implement regulation which has been established and you rightly point out that HSE can actually initiate regulation in some way or another. Now, it strikes me that here you have a certain problem between who actually makes the regulation and who actually applies the regulation, and this really reverts back to a point that occurred with a previous committee, of which I think the Earl of Selborne was the Chairman, where we were very concerned with the fact that the Environment Agency was responsible for implementing legislation that came from the European Union, but very often had very little, if any, concern with actually formulating the regulation in the initial stages. We were assured that there was going to be some form of concordat between the two of them to alleviate this particular problem. I would like to know how far that has actually worked out because it strikes me as basic. If all, in point of fact, you can do, with no disrespect, is actually deal with the problem that is there, so, for instance, the problem that Lord Bhattacharyya has been posing to you is one that is beyond you, it seems to me that it is the people at the coalface who should be really making these sorts of decisions and I worry that Defra is one stage away in a rather esoteric

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atmosphere so that it can actually formulate these rules without necessarily knowing how easy they are to apply, how applicable they are even in any sense whatsoever and, thirdly, whether they are really the things that should be being regulated at this particular moment in time because, once it comes out of the European Union, then it is there.

Ms Henton: I think in the general point of how the Environment Agency works with its sponsor department and in our role as a statutory adviser to Defra, we actually do have a very good and clear working relationship on advising on legislation, on assisting Defra in its negotiations within Europe and, for example—

Q125 Lord Lewis of Newnham: You actually go to Europe with Defra?

Ms Henton: We go to Europe with Defra. For example, on the recent Groundwater Directive, one of my staff was there on Defra's behalf, because we are acting with Defra on this, in some of the detailed negotiations going on in Brussels, and that happens across quite a wide range of different bits of legislation. To get over the point that you make, what we want is a clear line of sight from the UK's influence on European legislation, as much as it is possible to do, and then being clear with what comes to the UK that we can actually implement it, and we advise and assist Defra in drafting the domestic legislation to take that into action, so we have a very close working relationship with them on that and it is a successful one.

Ms Parkes: We have a formal memorandum of understanding between ourselves and Defra and, whereas in the past we may have been valued for our technical expertise, increasingly we are valued for our practical experience of implementation as to what actually will work. As my colleague said, it is about top-to-bottom policy-making so that Defra and BERR are just as interested in practical implementation, working with industry and saying, "Will it actually achieve the outcomes that we have set out?" One of the challenges is though that environmental legislation needs not just to tackle issues end of pipe, but it needs to look upstream and the question there is about having to brigade a number of different delivery bodies because clearly we are not charged with doing all the good things that need to be done in the name of the environment, but we have a statutory role which we need to fulfil and we need to focus our efforts on those activities.

Q126 Lord Bhattacharyya: Most businesses will get very confused if you are going there with some advice and Health & Safety are going with some of their advice. Unless there is a single method of advising businesses on the whole business of waste and the environment, it becomes very confusing. If you take

a small company where they are doing electroplating, of course there are big issues there, but they will get so confused with multiple bodies.

Ms Parkes: If I can help on that, we have very-well-established website which is specifically set up to give advice to small businesses. It is UK-wide and we work with our partner regulators and it is about giving advice that is tailored at specific sectors of all environmental legislation, not just waste legislation. That receives a huge amount of hits and people find that absolutely invaluable which helps people to cut through and find out what it is that they really need to know.

Mr Fergusson: A further point I would like to add is that there is a very effective pan-European network of regulators who work together, and the EA is of course a very active member of that and we work quite a lot with it on European legislation. I have colleagues sitting behind me who will know better than I do about this, but in most respects, I think, it is able to engage fairly effectively with the Commission and there is a good feedback into the detailed design of legislation from the experiences of legislators at the European level. It does not always work, but it exists and it is quite an effective network.

Q127 Lord Crickhowell: Can I say how pleased I am that progress has clearly been made since the old NRA days in getting the act together with the departments in Brussels and in Europe and that we are making the effort. It had not quite got there in those days, so it is good news. The emphasis that you have been putting very understandably has been on the European role here and the pan-European network, but we have got on to WEEE, the Waste Electrical and Electronic Equipment Directive. We have received evidence from HP saying that the crucial factor in doing all that was that it really had producer responsibility and they point out that in quite a large number of European countries the responsibility has not been translated into national legislation, national law, in the way that makes producer responsibility the centrepiece; it has been a joint responsibility. They say that it is really a serious threat to the whole Directive because quite clearly, if the thing is going to work, it has got to work right across Europe. In your discussions both in Brussels and indeed with the pan-European network, are you seeing problems like that emerging and is there an effort, particularly with these newly joined countries which perhaps have not got their act together, to make sure that the thing is working in a universally applicable way right across Europe?

Mr Fergusson: Well, I think it is early days, particularly with, as you mentioned, the new Member States. I should add that we have done more work on the End of Life Vehicles Directive than WEEE, but some similar comments have been made

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in both. Certainly for the new Member States, they have come very late to this and they have not long had these responsibilities put upon them and I think it is fair to say that it is early days and that things have not emerged in a uniform way. Even with the existing Member States, still the Commission is only at an early stage in assessing what Member States are doing and how effective that has been. There is absolutely no doubt that there are significant differences in the way Member States have implemented some of this legislation which, as I said earlier, reflects largely the fact that they begin from different systems of waste management and responsibilities which could, for example, be with local authorities or some separate agency and so on, so it is almost inevitable that there are these differences. The key question will be whether, and to what extent, individual companies end up being made responsible. It is generally not all that efficient for individual companies to be expected to make their own arrangements, especially in pan-European markets, for example, it would not make any sense shipping all the scrapped Volkswagens back to Germany to be recycled, so almost inevitably some sort of, I think, pooling arrangement with third-party agencies actually doing the work of dismantling, recycling and so on is an almost inevitable part of the system, but the key issue will be to what extent companies are actually in the end made responsible. Certainly with the motor industry, I think, by and large, they have been. There are problems as yet with the system, but I think there is not much doubt that the individual manufacturers are, by and large, being held responsible, though I am not fully aware of the issues that HP has raised with you, however.

Q128 Lord Crickhowell: It is not just the newer countries. In their evidence, they include the UK as having omitted the requirements of Article 8.2 in transposing the WEEE Directive into the national law and, instead of legislation in these countries, it makes producers jointly responsible for the recycling of future products, making it impossible to implement individual producer responsibility, so, according to HP, it is not even working as it should be in this country. Would you agree with that?

Mr Fergusson: I cannot comment in detail on that myself.

Ms Parkes: In relation to the ELV Directive, as my colleague said, there is an element of individual producer responsibility in that Ford, for instance, do have to take back their own products that get taken back to their own sites. When we come to look at something like WEEE, it is, I would say, impracticable to think about individual producer responsibility because one would need to identify the source of every item of WEEE and that is clearly not feasible for such a vast number of small items that are

coming in from all over the world. Actually, the only way in which we think producer responsibility can be made effective is through the collective system and the question then is how far does one get to actually challenging product design through collective producer responsibility and, when one is looking at product policy, it has to be looked at on a European, if not an international, footing.

Lord Lewis of Newnham: But is this not one of the problems really? With no disrespect, I think the vehicle side is the easy question compared with WEEE, and I am totally in agreement with you on that, but one of the incentives for the whole concept was in fact that it would encourage the producer to involve themselves with recycling possibilities so that they would modify their particular piece, a television set or something of this nature, to minimise the problems involved in recycling, whereas at the moment of course that incentive has been removed because of course there is not a basic overall responsibility, but it is now involved with a large number of firms. Now, this is compounded by the fact, a point I think you referred to earlier, that in many instances one is dealing here with multinationals which are not associated with one individual country and, if there are different regulations within Europe and, goodness gracious me, many of these things are not restricted even to Europe, it does strike me as providing a very difficult situation which really has got to be addressed. There are big parts of WEEE, and I do agree that the small ones are going to be difficult to deal with, but the big ones should in principle, in my mind, be dealt with. Then, of course there is the whole problem of the orphan situation.

Chairman: That is as much a statement as a question!

Q129 Baroness Sharp of Guildford: To some extent, keeping on the same subject, the Integrated Pollution Prevention Control Directive places a statutory duty on industry to reduce waste. Which sectors of industry are covered by the Directive and how is compliance assessed and enforced? Do all companies have to meet the same standards or are there special requirements, for example, for small companies?

Ms Henton: Well, there is quite a wide range of industries that are covered by IPPC, the energy industry, the production and processing of metals, the mineral industry, chemicals, waste management, and then there is a category called "other activities" which actually again covers quite a wide range of things, like pulp and paper, carbon, black tar and bitumen, printing, textiles, timber, animal waste and intensive farming, the pig and poultry sector which is the very last one just being brought in. To give you an indication of the scale of what that means, we have just under 4,000 permits in the UK which have been issued and indeed 30 October was the final date for

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the implementation of this Directive. We are very pleased that within the UK we have managed to reach that objective and there are about 100 difficult obstacles outstanding, so this is quite an achievement. In terms of how we deal with waste reduction within IPPC, we impose conditions within the permit that require the operators to take measures that will ensure that waste is avoided or is reduced or, where it is reduced, they either recover it wherever practicable or that they dispose of it in a manner that minimises its impact on the environment. Then, as part of our regulation of IPPC, we require them to review every four years or so the changes that have taken place in these measures, whether they are actually reducing the amount of waste that they generate and the amount of resource that they use. That is the prime way that we review this. Another way, the second route, is that we have developed with some of these sectors what we call "sector plans" and these are sort of voluntary arrangements with the specific sectors, for example, the chemical sector, the nuclear sector, the cement manufacturing sector, whereby we are looking in partnership with them at where their environmental performance should move in the future, so it is going a bit beyond regulation, but how do they want to take full ownership and responsibility for their environmental impacts and actually do something about it. The development of these sector plans is very much welcomed by the different sectors and it is a way in which we can help advise and influence them to get their own thinking right and to take responsibility for improving their environmental performance.

Q130 Baroness Sharp of Guildford: You set, I think, industry a target of 15 per cent reduction of waste disposal between 2006 and 2011. To date, can you tell whether there has been progress made on these targets?

Ms Parkes: It is early days obviously because that is a target for 2011, but generally about half of all the waste from those industries is being recovered in any event and that is about the work we have done with them over recent years, so it is about going through perhaps some of the more challenging aspects of those waste streams now.

Q131 Baroness Sharp of Guildford: Are you monitoring all these 4,000 permits?

Ms Parkes: Absolutely. They get inspections by us and many of them also have their own environmental management systems which means that they are audited by a third party and then we will again look at the evidence of that, so we focus our efforts on those that are performing least well and those that actually stay outside regulation.

Q132 Baroness Platt of Writtle: We have heard that, following the implementation of producer responsibility obligations for packaging waste, recycling has increased, but there has been no reduction in the amount of packaging used or discarded. What is the explanation for this, and how could producer responsibility schemes be improved to encourage waste reduction?

Ms Parkes: These Directives are predominantly about encouraging recycling, so that is the first thing to note. Most of them have elements about minimising production and looking at the design, so, for instance, there is also something called the Restriction of Hazardous Substances Directive that has been implemented alongside the WEEE Directive which is actually looking at the components. In terms of what it is achieving in reduction of packaging overall, it is true that we do not believe it is having as much impact there as it perhaps could do, but again that is a challenge looking at changing behaviours and looking at what is actually put on to the marketplace. The other aspect, because there are two aspects to the Regulations and we implement the producer responsibility requirements, but there is a separate set of Regulations, the Essential Requirements Regulations, and those really are looking at product design. Those are enforced by local authority trading standards and it is fair to say that there have been problems with enforcing those Regulations. Trading standards obviously have a wide range of roles to play, but it is predominantly about protecting consumer safety and making sure that the consumer is not short-changed rather than necessarily environmental outcomes, so it has been an extra obligation for those local authorities to enforce, but we do believe they have had practical difficulties. The Directive itself, not just the Regulations, contains a set of statutory defences, so, if the manufacturer thinks that what they are doing is in the best interests of the consumer and they can evidence that by the fact that their products are selling, then that gives a statutory defence to the accusation that they have over-packaged, so you can appreciate that that is quite an easy one maybe to walk away from. In fact, the half a dozen offences that have been prosecuted under these Regulations, we think, probably could have been achieved under other trading standards legislation, so there is a real question mark that we have been discussing with the Government about what more needs to be done to revisit the essential requirements, and in fact I believe the Minister has written to the Commission to say that this needs to be looked at not just domestically, but on a European-wide basis to say that this needs to be made to work more meaningfully.

Mr Fergusson: Obviously it is a bit of nonsense to try and tackle that at the local level through trading standards officers, I would say. The other point I

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wanted to make though is that just because that particular requirement has not resulted in reduced packaging waste does not mean it is not valuable in its own right because it certainly is. The point is that an added focus on reducing at source is needed to go alongside that target.

Q133 Baroness Platt of Writtle: What support has there been to help businesses comply with packaging producer responsibility obligations and has this support been tailored for companies of different sizes to avoid unnecessary burdens?

Ms Parkes: All the work we do around implementing producer responsibility is done in partnership with industry, and we have particular regard to small businesses, making use of, as I said, the website which I mentioned earlier, but we also have, for instance, a national customer contact centre and that is our front line dealing with any member of the public, industry or commerce that wants advice. We do make sure with any new legislation that we work very hard to reduce the burden and make sure we focus on the what are the real environmental outcomes, so the good news is that we are generally meeting our packaging targets, and that is good news, and we do not believe that it is at a huge cost to industry by comparison with maybe some other Member States.

Q134 Baroness Platt of Writtle: In your evidence, you say, “We don’t have the remit or technical expertise to comment in any detail”. It seems to me that, in the new and environmentally changing situation, you need more technical expertise. Are you going to get it?

Ms Parkes: I think that was in relation to our role around the whole material and product area which we talked about earlier. We are confident that we have the expertise we need to discharge our key role as an environmental regulator and as an adviser to government, but we also have a crucial role in supporting local government in trying to make sure there is an adequate network of waste management facilities because, if we have not got the infrastructure, then we cannot do the recycling here at home. We do not profess to be the body that is there to give advice to industry on all aspects of products policy.

Q135 Baroness Platt of Writtle: All through what we have been asking today has been this need for innovation to go from both ends and surely that does need technical expertise.

Ms Parkes: Absolutely, and we think that is the role which, between BERR and Defra, they have. They have set up the Market Transformation Programme and that is the body that is looking at things like energy efficiency, labelling and appliances, and we have also referred to the new Material and Products

Unit, so this is about what our role is as an environmental regulator, and we are dealing with those.

Q136 Baroness Platt of Writtle: Do you work closely with whoever you speak for?

Ms Parkes: Absolutely, and through the Waste Strategy Board we are looking for greater clarity about priorities and to try and make sure that people are clear and that business, in particular, has a clear way of going to for advice, but we have a particular job to do that we are charged with doing which is perhaps at the less attractive end of environmental regulation which is about dealing with the polluters, and it is important that that is where we focus our resources.

Q137 Chairman: My former constituency was engaged in producing bottles for the Scotch whisky industry, a very laudable activity, but what was quite clear was that the more expensive the Scotch, the more expensive the packaging, and it is the same for perfumes and things like that. I find it difficult to know how you can actually intervene in a process where you know that, if you package it in a very attractive, but usually expensive and wasteful, manner, you can sell something for an awful lot more than you would otherwise be able to do. As a consequence, you are very often creating waste and actually spending money on the production and sale of glass bottles and really you could have a bog-standard bottle and everything could go into it. Does this concern you? This is obviously a BERR responsibility rather than yours, but you at the end of the day have to clear it up.

Ms Henton: I think this goes to the absolute heart of this whole discussion. We deal with waste, but we operate within a whole climate that is global, industry is global, and we are working in a world that is about consumption and it is not necessarily about sustainable consumption, but it is about consumption, it is about marketing, it is about getting people to consume more, to use more stuff. We are coming up to Christmas now and you look at the amount of product, wrapping and packaging, et cetera, that is being used, it is because that is the way that society operates nowadays. If we are going to make real progress on the whole sustainable consumption and production agenda, we are into an enormous issue of changing public behaviour, changing the way that society operates and it is in a global context as well, it is not just a UK issue, so it is an immensely difficult thing to actually get a grip on. We play our part as best we can, government plays its part and we need leadership from government in dealing with this issue, but I think we have to recognise the reality of where we sit in the whole global marketplace.

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Q138 Lord Bhattacharyya: But is that not what happens in all of these sectors? You cannot actually intervene in the market. I will produce something which is competitive and, if you come and say to me that my process is old, it is polluting or that my process is wasteful, as long as I can make money, as long as I am competitive, in other words, I will go on and do it, so why should you intervene?

Mr Fergusson: Again, there is a big question of EU context because, although it is increasingly difficult even at the national level to intervene, the European market is a very large market which is a regulated market, so it can be effective to intervene at that level, to impose requirements at that level, as we have already seen in a couple of things that we have been talking about today. Personally, and it will figure in later questions somewhat, although the global dimension is no doubt important, I think in practical terms it is probably going to be a lot more effective to focus on putting our house in order at the European scale and not wait for some international process to sort these things out because it is often the experience that actually a regional-level initiative from Europe, for example, will pre-figure a more global framework which might follow on from it, but it is genuinely quite difficult to wait for it to happen the other way round.

Ms Henton: I certainly would not want to give the impression that there are not things that could be done, there are of course, and you can see already because of the way that the whole sustainable development agenda has been reinvigorated over the last year or so, which has been incredibly encouraging, that there are organisations and companies which are now taking up this challenge. They recognise that we cannot go on using the world's resources in the way that we have done, we have to do something about it and they have a role in it. We have our role in advising, assisting and as a delivery body in the hard end of that. I certainly would not want to preach that it is impossible to do something, but I think we all have to recognise it is a long uphill struggle.

Q139 Lord Lewis of Newham: May I say, you seem to be involving the stick rather than the carrot.

Ms Parkes: In our role as a regulator we are charged with tackling pollution when it is caused and trying to prevent that pollution, we are not charged with looking at the whole life cycle and intervening right upstream, that would be very difficult to do for a domestic regulator. As Tricia has said, there are a whole range of activities that need to be taken—let us not forget the role of consumer behaviour in here—and there has been recent research that shows one-third of all the food we buy goes to our fridge and then goes straight into the bin. There is a very similar figure for material going onto construction sites that has been overspecified, oversupplied, damaged that,

again, goes straight off to landfill. What is it about our behaviour as consumers, business and industry that is leading us to be so wasteful in the purchase? That is not about manufacturing, that is just about poor practice and this is where, again, we are very proud of the work we have done around the whole area of public procurement, leading by example, not just in using recycled office paper, post-consumer waste, but actually making sure that when we purchase, whether it is new paper, engineering works, sheet piling or steel, all of that, that we source material wherever possible which has come from a secondary supply, that we understand what the environmental consequences are around the whole of our IT procurement. We all have responsibilities as public bodies to go even further on that to bring about drastic change.

Q140 Lord Howie of Troon: You suggested that there was considerable waste in the construction industry. As a civil engineer, I am wondering just how much goes straight to landfill.

Ms Parkes: Figures show that one-third of what goes onto sites comes straight off again, perhaps not immediately but ends up as waste that is not post-demolition waste, it is just because it has been overpurchased, overspecified or damaged. Again, this is us getting into the areas we think can have an impact, but what we are not directly charged with is working with the construction sector. We are drafting a construction sector plan and we have also been working with Government on the concept of site waste management plans which is, again, a voluntary approach at the moment, trying to get industry to take greater responsibility for what they are buying and what they are throwing away and being responsible about it. Defra have recently consulted on making those mandatory, so really it is trying to encourage above certain thresholds that contractors really do have to think much more about this because we do need to take action on every level.

Q141 Lord Howie of Troon: You do surprise me. I must say, I do not know if the figures are believable.

Ms Parkes: They are figures that we have obtained from elsewhere.

Q142 Lord Howie of Troon: I know the figures are there.

Ms Parkes: It is staggering if it is true and, even if it is not, a third is a lot. Even if it is only ten per cent that is still ten per cent too much wastage¹.

¹ Studies have been conducted to determine the waste of construction materials in various countries. Khairulzan Yahya and A. Halim Boussabine from the University of Liverpool reported some of these in their study "Eco-costing of construction waste" (*Management of Environmental Quality* Vol 17 no. 1 pp 6-19 2006) These studies identified that as much as 30 per cent (by weight) of materials delivered to construction sites leave as waste.

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Q143 Chairman: There is also work being done by the NAO on the sustainability of construction design which shows that the public sector has an appalling record. They were hard pushed to find any good examples of sustainable design in buildings that were constructed in the public estate up until about June last year.

Ms Parkes: Certainly we had a couple of examples of buildings that we have procured that are flagship buildings, but they are the exception rather than the rule and it is something we need to do more.

Q144 Baroness Sharp of Guildford: I wanted to come back because I think you are absolutely right that the role of consumers is a vital one here and one sees, for example, what I call “the plastic bag initiative” happening at the moment where quite a lot of change is taking place. I want to come to a point we had earlier on the packaging initiative because here, I believe I am right in saying, that, as a consumer, if we had the right to take packaging back and dump it on the supplier, if we were able to do that sort of thing, there is a great deal there. Take, for example, polystyrene peanuts. When I get a delivery of stuff in polystyrene peanuts, the only thing I can do with it is to put it into a black bag and send it off to landfill and yet that is an appalling thing to have to do, it could well be reused for packaging other things. Is the Packaging Directive working here?

Ms Parkes: It is certainly encouraging recycling, whether it is doing enough to encourage minimisation and reduction at source. It is very challenging to set targets and to legislate and to measure whether or not we are achieving waste reduction. People tend to shout about it a bit more now, particularly if there is an economic saving there, they are likely to do it, but also we are seeing it is part of people’s green credentials. Whilst there is that balance again between what actions we take that really impact on the environment and which ones are more totemic, so the plastic bag tax would be in itself not dealing with something that is a major source of environmental pollution, but if it does get people to change their behaviour and think about what they buy and what they throw away, then it can be a useful totemic measure in itself.

Q145 Earl of Selborne: You made a very fair case that the concept of individual producer responsibility is really a bit unrealistic when you think of, for instance, the WEEE Directive-type products coming from all over the world, you are not going to be able to trace them back to individual producers, so we end up with the interim solution of collective producer responsibility. Is that going to ultimately undermine the concept of trying to get producers to carry the responsibility?

Mr Fergusson: Yes. We said earlier that it does work reasonably well with cars for very good reasons: you have got a relatively limited number of identifiable brands and a very large piece of equipment that you can allocate back. I would say, though, if you take WEEE as a collective whole, then what we said before applies, but if one thinks of individual waste streams, computers, televisions, other major appliances, you do within a single stream have similar conditions where you do have most of the equipment manufactured by a recognisable number of brands. It seems to me that within that it ought to be possible in the course of time to move at least more towards a system where individual companies can be expected to take some responsibility for their own brand and that their reputation suffers if they fail to do that.

Ms Parkes: We do think that we need to move the debate away from just looking at waste legislation, there have been a lot of initiatives at the European level to look both at end of pipe and upstream with producers and particular materials and products. The Commission has recognised through its thematic strategy it needs to take stock of that, things need to settle down and, coming back to the very good points that have been made, industry needs to understand what the rules are as they are now, we do think that the big gains to be made now are looking at product legislation. There is a limit to what you can achieve from a waste perspective and this needs to be looked at globally or at least at European level from a product perspective.

Q146 Lord Howie of Troon: As was pointed out earlier on, this is a global matter. I am told there is a thing called the “United Nations Marrakech Process”. Can you tell me what that is, what it hopes to achieve and has it been in any way successful?

Ms Henton: I have to say we were rather intrigued by this point because we reckoned that if neither the Environment Agency nor IEEP could instantaneously identify what the Marrakech Process was, then maybe it was something that was carrying on in a bit of a vacuum. It is, we understand, a process that was signed in June 2003 in Marrakech and is looking at ways in which it can identify things like tools and policies that will move towards appropriate patterns of consumption, that it will develop production and consumption policies to improve products and services and so on and so forth, but it has now been around for four years and I am not entirely convinced that it is at the top of anybody’s agenda, certainly not our organisation’s.

Chairman: It would not form part of our travelling commitments, I think, to go to Marrakech, attractive though that policy may be!

Lord Howie of Troon: I am a good deal further forward than I was at the beginning of the day. Could I ask another question?

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Q147 Chairman: I think Mr Fergusson would like to come in.

Mr Fergusson: I just have a comment. I have already commented on—and I fully agree with that conclusion, I must say—the inherent difficulty of taking things forward at a global level, plus in this case you are compounding that by having this rather general and nebulous concept of sustainable consumption and production, so you are compounding two reasons to suggest this is not likely to be very effective or important in the short term. Therefore, I repeat the argument, it is much more promising to look at European and national level actions and much more concrete initiatives rather than a general approach to SDP.

Lord Howie of Troon: This sounds very much like the United Nations, Chairman. Could I ask another question?

Chairman: Briefly.

Q148 Lord Howie of Troon: Very briefly, you know me. We have two witnesses here from the Environment Agency, one dealing with environmental protection and the other dealing with waste. In the overall strategy of the Agency which of these two elements takes priority, the environment or dealing with waste?

Ms Parkes: Perhaps to explain, I sit within the Environment Protection Directorate and it is about achieving the right outcomes for the environment by working with industry. What is fair to say is that we target the activities that are the most polluting rather than necessarily just those that can lead to waste minimisation because we are interested in the whole life cycle impact of waste, so it is not a question of one or the other.

Q149 Lord Howie of Troon: It sometimes must be.

Ms Parkes: There is no conflict, it is just terminology. Waste is one aspect of the environment that we are looking to protect, we also look to protect the air, land and water from the consequences of pollution, so we have a range of roles and waste is one aspect of that.

Q150 Chairman: Very briefly on this question of the revision of the Waste Framework Directive. What do you think you would like to get out of that? I am not going to take an extended wish list and apple pie and all the rest of it, but what do you think realistically you would hope to get out of this revision?

Ms Parkes: First, we would not want to see change for the sake of change, as I alluded to earlier, some things like the definition of waste we think have stood the test of time. What we would like to see is greater clarity on the end of waste criteria and we would hope to see an endorsement of the approach that we have

been taking. In particular, the Commission has already issued guidance on the concept of by-products and that has been very well received by ourselves and industry and has allowed us to take further steps towards deregulating industrial by-products that could have a useful life. The other main area is that we do not want to see greater over-prescriptiveness because we do not want to see regulation as a barrier to more sustainable use of resources and sometimes there is a tendency for European legislation to get into the detail and we do believe that we need to keep it as an outcome-focused directive rather than very prescriptive. We think one of the initiatives there that is quite hopeful is the Waste Prevention Programme concept. Again, it does not need to be rigidly applied, but that is one that we think Defra would need to take forward with local and regional government and their responsibilities for the waste planning side. I should add that we are working very closely with Government on this and we sit on fora to advise Government to make sure that whatever is arrived at is practicable and delivers the right outcome for the environment.

Q151 Chairman: We wish you well. I think it has to be said that many of us in the past have worried that when regulations come out of Brussels, the enthusiasm of British civil servants to copper-bottom them to make them prescriptive, to do everything that you are saying they should not be, they very often are because they seem to be at times preoccupied with the worry that there might be a judicial review and they get the blame for being too vague, so we wish you well. Mr Fergusson, you wanted to say something?

Mr Fergusson: Just coming back on that point, obviously it is something we do quite a lot in our business and it tends to be somewhat of a Euro mythology sometimes to talk about copper-bottoming everything and there are often good reasons for putting extra things in actually which are not just about making it harder for people. I think in general terms I certainly agree that it should not be too prescriptive and perhaps one criticism is that historically there has been a bit too much focus on the waste hierarchy, a serious point which has been mentioned, which as a general principle works very well but if it is treated as an iron rule in every case it can lead you wrong, so we would like to see that as becoming one of a number of tools, such as the proximity principle and others that are applied. Another thing is inevitably the focus should move more towards the questions of waste prevention, resource efficiency and recovery and so forth. A third thing is we have just completed a piece of work on the statistics of waste and why they sometimes give a rather misleading picture because there are a lot of

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reasons why statistics from different countries turn out not to be at all comparable, so I think we would like to see a bit more evidence in the future on a better evidence base and the policy could be based on more realistic comparisons of what is really happening in different Member States.

Chairman: Thank you very much on that point. Perhaps you could share with us that statistical study that you have been doing because I think that would be helpful from our point of view because we are bombarded with evidence and not all of it is as clear as we would like it to be and, certainly, to date not as clearly lucid as the evidence you have given us which

has been extremely helpful. We are all talking piously about waste and we are now going off to create mountains of it over the next two and a half weeks or so. Could I wish everyone else a very pleasant Christmas and New Year. I will certainly see the Members back afterwards and thank you very much. If there is anything else that we need to get from you after the Christmas rush, we will drop you a line. If you think on reflection there is anything when you see the printed evidence you have given which you would like to clarify, then please feel free to do so, but we would appreciate it if you could send us these stats, that would be very helpful. Thank you very much.

Supplementary memorandum by the Environment Agency and WRAP

THE WASTE PROTOCOLS PROJECT

Creating Quality Protocols for commercial waste streams

The Waste Protocols Project aims to cut red tape and encourage the re-use of waste materials.

The project is reviewing a number of waste materials to see whether, when certain requirements are met, they can be re-used by business without the need for waste management controls.

Uncertainty over the point at which waste is fully recovered and ceases to be waste has meant that some materials have continued to be controlled under the EU Waste Framework Directive. Many of these materials are currently disposed to landfill.

The Waste Protocols Project was set up to provide certainty to business on the End of Waste, to support the drive to reduce the amount of materials being sent to landfill unnecessarily and to increase the use of waste as a resource.

A joint Environment Agency and WRAP (Waste & Resources Action Programme) initiative, the project is run in collaboration with industry and funded by Defra.

For each waste material, a Technical Advisory Group has been established and members include WRAP, the Environment Agency and industry. Meanwhile, an Advisory Board, with an independent chairman, has been set up for Trade Association representatives to provide guidance on what materials should be included and whether the project outputs are meeting business expectations.

What will be produced?

For each of the waste materials being reviewed, we aim to produce either:

- a Quality Protocol which clearly sets out the steps that must be taken for the waste to become a product or material that can be re-used by business without the need for waste management controls and can be safely marketed and sold as a product in its own right, whilst protecting human health and the environment and without undermining the objectives of the Waste Framework and Water Framework Directive, or
- a regulatory position statement, which clearly informs the business community of what regulatory obligations they must fulfil to use the processed waste material.

What waste materials are included?

We are looking at the following waste materials:

- | | |
|-----------------------------------|----------------------------|
| — Segregated biodegradable wastes | — Blast furnace slag (BFS) |
| — Wood | — Paper sludge ash (PSA) |
| — Waste cooking oil | — Uncontaminated topsoil |

- | | |
|--------------------------------|--------------------------------|
| — Flat glass | — Steel slag |
| — Tyre-derived rubber material | — Contaminated soils |
| — Pulverised fuel ash (PFA) | — Incinerator bottom ash (IBA) |
| — Non-packaging plastics | — Waste plasterboard |

What's been achieved so far?

<i>Material</i>	<i>Consultation</i>	<i>Publication</i>
Segregated biodegradable wastes (compost)		Draft Quality Protocol published (March 2007)
Segregated biodegradable wastes (anaerobic digestion)	Consultation closed Q2 2008.	
Wood		Regulatory position statement published (October 2007)
Waste cooking oil derived biodiesel	Consultation completed Q1 2008.	Draft Quality Protocol due for publication (July 2008)
Flat glass	Consultation completed Q1 2008.	Draft Quality Protocol due for publication (July 2008)
Tyre-derived rubber material	Consultation completed Q1 2008.	
Pulverised fuel ash (PFA)	TBC	
Non-packaging plastics	Consultation completed Q1 2008.	
Blast furnace slag (BFS)		Blast Furnace Slag has been deregulated and is now treated as a by-product (August 2007)
Paper sludge ash (PSA)	TBC	
Uncontaminated topsoil	TBC	
Steel slag	TBC	
Contaminated soils	TBC	
Incinerator bottom ash (IBA)	TBC	
Waste plasterboard (gypsum)	TBC	

What are the potential benefits?

Businesses tell us that materials that remain under waste regulatory control are difficult to recover and market. Markets are resistant to the use of waste materials. Once they lose the waste label and can be marketed as quality materials, new business opportunities can be exploited.

Early indications from the financial impact assessments, which were developed using market predictions from industry, suggest that over the next 10 years the first eleven Quality Protocols could see the following possible business and environmental benefits:

<i>Metric</i>	<i>First 11 Protocols</i>
Waste diverted from landfill	17m tonnes
Carbon savings (CO ₂)	1.5 m tonnes
Virgin raw material savings	15.5 m tonnes
Water conservation	No estimates
Hazardous material reduction	100,000 tonnes
Cost savings to business	£407m
Increased sales to business	£280m

The methodology to calculate these savings has followed Treasury Guidance and is being independently reviewed.

July 2008

TUESDAY 15 JANUARY 2008

Present	Crickhowell, L	O'Neill of Clackmannan, L (Chairman)
	Howie of Troon, L	Platt of Writtle, B
	Lewis of Newnham, L	Selborne, E
	Methuen, L	

Memorandum by BSI British Standards

BRITISH STANDARDS INSTITUTION—BACKGROUND

BSI British Standards is the UK's independent National Standards Body, incorporated by Royal Charter, responsible for preparing British Standards and related publications. It presents the UK view on standards in Europe (to CEN and CENELEC) and internationally (to ISO and IEC).

Standardisation is beneficial in a number of ways, including encouraging trade, reducing costs and enabling organisations to comply with regulation. BSI British Standards has an established tradition in managing complex stakeholder relationships, achieving consensus in these areas, and helping the stakeholders to achieve their desired outcomes.

The purpose of this response is to help the Sub-committee consider how standardisation can be used to help meet the goals of waste reduction. The response is divided into a number of categories, each one relating to the categories of questions originally asked. Standardisation presents stakeholders with a number of opportunities and an accessible route towards reducing the amount of waste produced.

RESPONSE

Business framework

An important step in encouraging organisations to change their behaviour is putting into place an appropriate standardisation framework. ISO 14001, a standard aimed at helping organisations put into place an effective Environmental Management System has now been in existence for over 10 years. ISO 14001 is an internationally agreed approach to managing all aspects of a business that relate to its impact on the environment, and the implementation of this has enabled companies and organisations to reduce this impact, whilst, as a direct result, reducing costs.

We have evidence of one organisation which was operating over a number of sites situated within a number of different local authorities and which decided to implement ISO 14001 across all its sites. Each local authority had its own system for dealing with waste. As a result of the implementation of ISO 14001, the organisation was able to manage and reduce its waste uniformly across all the different boroughs, implementing a single waste management solution without relying on the individual local authorities; this also had the effect of reducing local authority business rates. In addition, other organisations that have implemented ISO 14001 have reported a reduction in utility bills, as they have characterised and measured how they consume resources and thus have been able to identify where they can make efficiency savings.

A major barrier to the successful implementation of a waste reduction strategy for organisations with multiple sites is the fact that different local authorities have different ways of dealing with this issue. The introduction of a standardised waste management process that could be adopted by all boroughs would enable larger scale programmes to be put into place that are manageable and less complex than the present scenario.

Recommendation 1: Government should encourage the promotion and adoption of ISO 14001 as it promotes many outcomes that are deemed desirable, in a way that is transparent and transferable across different sectors and parts of the supply chain. Further to this, additional behaviours/methods to promote waste reduction should also be identified with a view to forming the basis for further standardised schemes.

Government procurement policy

Government at all levels is a significant procurer of goods and services, and any change in practice in this area is likely to have a considerable influence on how providers manage their businesses and processes. Government has been making statements encouraging more efficient procurement for some time. The publication of Sir Peter Gershon's 2004 report *Releasing Resources to the Front Line* led to the Treasury setting a target for £21.4 billion worth of efficiency savings by 2007–08.

To achieve this, public sector procurement professionals need a range of tools. Standards can be used in an unambiguous way to judge products and business processes that all concerned can understand. Many standards are already available, but where a gap is perceived, any organisation can work with BSI to produce a standard designed specifically to meet its requirements. They remove the need to start from scratch on each specification and can be built easily into contracts. Standards can help in overcoming differences in policies that arise when people engage in similar work but are isolated from each other in some way.

A public procurement strategy built upon the effective and targeted use of standards could not only help the public sector meet its efficiency saving targets, but it could be used to help minimise waste. This would involve including in the standard a requirement for dealing with waste in such a way that works towards meeting the targets for reducing the amount produced. If such a significant procurer as the public sector could require its suppliers to conform to an agreed standard, this would encourage the promulgation of good practice in this area and thus meet the required outcomes.

Recommendation 2: Government should develop and promote a public procurement strategy that enables public bodies to increase efficiency whilst reducing waste through the effective and targeted use of standards.

Much procurement, however, is supplied by overseas providers, and many UK producers supply abroad. It would be possible to set internationally agreed procurement strategies in the waste reduction area through the links BSI has with CEN and ISO, thus linking in the activities with other countries.

Better design and the use of materials

Designers need to be able to make the appropriate choice of material in minimising waste by selecting one that can, for example, be recycled. To make this choice in an informed way, they need to know if the material in question has the necessary physical properties and can be manipulated to perform the necessary function. This kind of information is not always readily available, although it is often part of a standard known as a specification. Where the information is yet to be available, well established standardisation processes can be used to come up with a relevant specification that is of use to the designer. BSI can arrange this information in a number of innovative formats to present this kind of information usefully to interested parties, such as designers. Material specification data can also be combined with information relating to relevant regulation to provide the designer with a comprehensive and useful guide. It is imperative that the appropriate information is placed with the key stakeholders if designers are to select materials appropriately and reduce waste.

An important goal will be to aid the designer in establishing the energy content of the proposed material before manufacture, as well as during the product lifecycle and disposal. Whilst it is not possible to follow a piece of raw material and know its energy history precisely, it is possible to estimate these quantities and the best methods for doing this can be established using the standardisation route. The first steps towards this are already being taken by BSI, in the form of a Publicly Available Specification (PAS) on measuring the embodied greenhouse gas emissions in products and services. This PAS is still being developed, but it is hoped that widespread adoption of the methods described within it will encourage people to measure and reduce the energy content of their materials.

Standards that currently exist for Life Cycle Assessment include ISO 14040 and ISO 14044. These standards provide a guide to the applications and the limitations of Life Cycle Assessment to a range of users and stakeholders, including those with a limited knowledge of the area. BSI is already engaged with the Waste & Resources Action Programme (WRAP), and other key stakeholders, to produce specifications and codes of practice in the management of waste in a number of circumstances. These include collection of glass and plastics, wood and paper recycling, and the reuse of materials such as tyre bales. The widespread adoption of such practices, and their further development, would aid the UK in reducing the amount of waste it produces.

Recommendation 3: Government and BSI should collaborate to identify where new standardisation efforts are required. This information to then be used to develop guides for designers to enable them to select an appropriate material, or range of materials, for the required application, and to keep energy use to a minimum.

Consumer behaviour

BSI has a long established practice of involving consumer and public interest experts (both individuals and representatives of relevant organisations) through its Consumer and Public Interest (CPI) Network. This forum allows the consumer and public interest view to be reflected in the formulation of standards, and those who belong to this network often participate actively in the standards-writing process, including participating in standards committees and working groups. These members of the CPI Network often also have relevant technical expertise in the areas of standardisation in which BSI is active, for example, there are a number of experts on sustainability.

In September 2006, BSI held a workshop for the Network entitled *Improving Sustainability for Consumers—What Role for Standards?* The purpose of this event was to establish the potential for new standards to help deliver a more sustainable future. The CPI representatives at the meeting came up with a number of suggestions where standards could be used to help members of the public make an informed choice in promoting sustainable behaviour. These came under the following broad categories:

- Consumer Behaviour;
- Energy Consumption; and
- Building Standards.

Some of the suggestions were relevant to the area of waste reduction, and this work can be explored further to develop good practice in informing the public.

Some relevant standards in this area already exist in the form of ISO 14020, ISO 14021, ISO 14024 and ISO 14025. These deal with environmental declarations and labels and are the first step towards ensuring the consumer can make an informed choice based on environmental information. While a number of presently used symbols are recognised by consumers, public understanding of what they mean is poor.¹

Recommendation 4: Government and BSI to collaborate in promoting initiatives to assist consumers in making informed choices, through proper understanding of environmental labelling and other schemes.

Skills

An important part of changing behaviour will require the adoption of certain standards. Successful adoption of standards often requires an appropriately skilled workforce to ensure their implementation. If the UK is to embed within itself the correct knowledge and behaviour to be able to reduce the amount of waste produced, then significant parts of the workforce need to be skilled in the knowledge that is contained within the standards and methods described above. This kind of training can take on a number of guises and BSI is actively involved in many of them. Consideration of the transfer of the knowledge contained within the standardisation efforts should not be left until after the documents are produced. Changes in behaviour, and a reduction in waste, will be seen much sooner, if training needs and suitable methods are defined at a reasonably early stage.

Recommendation 5: In addition to the standardisation requirements identified above, Government and BSI should consult suitable stakeholders about the most useful training regime for implementing desired changes. This would inform the format in which the information is presented, making the adoption of the changes more effective.

October 2007

¹ See July 2007 report by the Better Regulation Executive: *Warning: Too much information can harm.*

Examination of Witnesses

Witnesses: MR JOHN HOLBROW, Chairman of the Environment Committee, Federation of Small Businesses, MR MICHAEL GLASS, Chief Executive Officer, Process Industries Centre for Manufacturing Excellence, DR CLAIRE BARLOW, Senior Lecturer, Institute for Manufacturing, University of Cambridge and MR MARCUS LONG, Head of External Affairs, BSI British Standards, examined.

Q152 Chairman: Good morning; may I welcome you here this morning. Perhaps, you could introduce yourselves and we will start with Dr Barlow.

Dr Barlow: Claire Barlow from Cambridge University, Institute for Manufacturing. My field is materials processing.

Mr Glass: Michael Glass from a company called PICME, which is an acronym for Process Industries Centre for Manufacturing Excellence. My background is mainly the chemical industries. My organisation helps manufacturing companies improve their performance.

Mr Holbrow: John Holbrow; I am Chair of the Environment Committee of the Federation of Small Businesses. We have 210,000 members across all industry sectors, so we are not sector specific. As you can imagine, my main interest is small businesses.

Mr Long: My name is Marcus Long from BSI British Standards, the National Standards Body in the UK.

Q153 Chairman: Perhaps we can start off with the manufacturing area. A lot of criticism is directed to manufacturers building in waste, but how feasible is it for manufacturers to design out waste and what incentives or disincentives are there to do this compared to managing waste more effectively once it is created? Is it possible and are there ways in which we can eliminate waste beforehand rather than waiting to try to clear it up afterwards.

Dr Barlow: Can I start off by defining four sorts of waste—and this is not going to be a lecture. The first lot of waste in which I think you are most interested here is landfill; so the stuff that goes out the door and is of no use to anybody. Then there are other sorts of waste which might be going off to recycling or waste which is produced in the factory, which is immediately reused in the factory. Then the other hidden wastes—energy resource. All of these are important. Landfill is particularly important because it is an obvious waste; but even the recyclable materials, when they go out to recycling there is waste associated with the process so they have to be minimised as well. So if we are designing out waste we need to be looking not only at the process itself, the manufacturing process, but also thinking about what happens to the product in its lifetime and at the disposal stage. One can design for manufacturing, one can design for recycling; one can design for in life resource efficiency. They are not all compatible but there are things that can be done for all of those.

Mr Holbrow: From the small business angle it is feasible to design out waste but most small businesses are looking to survive for tomorrow, next week, next

year. Although they are very conscious of their need to contribute to waste reduction there is no real incentive for a small business to do it; and the other problem they have are all the new regulations which keep coming in connected with waste and other things. We think that government should be raising awareness to the small business community to make them aware of what they should be doing and what advantages there are to do it. Some of the help from some of the other agencies like Envirowise, for instance, or the Environment Agency Net.Regis site produce lots of information, but we think that government could be doing more to raise awareness.

Mr Long: At BSI we have worked on a number of standards to help people design, to bring sustainability more into products and processes. I will quote some numbers at you. For example, BSI 8887 looks at the design for manufacture assembly, disassembly and end of life processing for products as well, and part of the ISO 14000 series, ISO 14062 looks at integrated environmental aspects into product design and development, and I think that Professor Martin Charter talked to this Committee in December about some of these things as well. But we are working on other things, so for example at the moment we are working with Defra and the Carbon Trust on something called PAS 2050, which is looking to measure the embodied greenhouse gases in products and services, and these kinds of measurement tools will hopefully help people understand the design element when they are looking at developing new products and services, and hopefully with more information they can better manage out waste with new types of products and services that are being developed.

Q154 Chairman: A lot of manufacturers would throw their hands up and say, “We do not know where to go.” Where would you advise people to go, any one of the four of you, with Mr Glass starting with this one?

Mr Glass: Advice on waste?

Q155 Chairman: Yes. Where to get advice from, how to go about it.

Mr Glass: I think there are already quite a few mechanisms, but as I see it first of all I deal with many manufacturing companies and I would say that the single biggest barrier to reducing waste or improving anything is the lack of awareness amongst the senior people in the business of the real potential for improvement. Many are carrying on doing things the way they have always done and have not been

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particularly receptive to learn. One can offer advice but it is of no value unless it is actually implemented and something is done with it, and we do not have a nation of implementers when it comes to business, I would say. It is true, of course, only for some and I would not like to generalise and give that impression of everyone, but I do think that is part of the problem. There are organisations like the Manufacturing Advisory Service, or sector specialist industry forums, where manufacturers can go for advice and support; there are various forms of training available; there are a multitude of different resource sources on the Internet. So getting that access to basic information is not difficult. Understanding how to apply it and actually doing it is the main issue and a lot of that is cultural.

Q156 Lord Crickhowell: I was surprised by Mr Holbrow's comments that there are no incentives for small businesses. Surely waste is waste of a resource and therefore waste of potential profit. I think of an example of not a small business but a well known manufacturer of steel bars in Wales, who used to cut a piece off the end of every bar in order to take the necessary samples and they sent some of their workforce over to Japan and amazingly discovered that the Japanese cut a tiny fraction off the end, and that made a difference of three per cent to their profit margin. Surely if waste is waste and profit margin there is a big incentive for even smaller businesses to eliminate waste?

Mr Holbrow: I think the problem is the perception amongst small businesses. As Michael was just saying, there is lots of information there, there are lots of things that people should do but the perception is amongst the owners of small businesses that there are so many other things they have to do that they do not necessarily see waste reduction as a way of increasing profits. I agree with you that it does but the problem is getting the message across and getting the education system there so that people see this.

Q157 Lord Methuen: I think that Mr Holbrow has to some extent covered my next question. How are small manufacturers working to reduce waste and how are they affected by their position within a supply chain? Would you care to add anything to what has already been said?

Mr Holbrow: I think the problem with the supply chain is that we have been working with local authorities, for instance, to see how small businesses can access the supply chains and supply local authorities, and when you see tenders coming out for £50, £60, £70 million worth of business it is not really applicable to small business and therefore there is no real incentive there for a small business to access the

local authority's supply chain. It is improving; we are doing a lot of work with them, and I think when that comes more into place there will be the incentive there for small businesses, but at the moment it is not there.

Q158 Lord Methuen: What can be done to assist small manufacturers to reduce waste? Can anything be done?

Mr Holbrow: I think, again, it is purely raising awareness, getting people to see, as your colleague was suggesting, that it will help their bottom line if they do reduce waste, but, again, there is the difficulty from the small business that the volume of waste that a small business produces is not really of interest to recyclers because there is not enough of it in one place. So waste clubs where people can, say, on a small industrial estate group together, that can help. If local authorities can be persuaded to allow small businesses the use of civic amenity sites for recycling, it may not help reduce waste but it will certainly help reuse and recycle waste. When you go along to a civic amenities site and are told that because you are a small business go away, that is not conducive to helping small businesses do recycling and reuse.

Q159 Lord Lewis of Newnham: What is the difference between the local authority's attitude towards what I will call commercial and domestic waste? They are separated out, they are charged differently; are you saying as well that they are handled differently?

Mr Holbrow: I do not think they are handled differently because lots of small businesses will not go to a civic amenity site to dispose of their waste because they are often told to go away. Some are being more helpful and the initiatives under the WEEE regulations to enable householders to take waste of electrical and electronic equipment to civic amenity sites is a great move forward and we are hoping that once that beds down and settles down one might be able to swing the argument then for other waste streams other than for waste electrical and electronic equipment.

Q160 Lord Lewis of Newnham: Can I be clear. You are saying that at the moment there are certain waste streams that are coming from small industrial companies, which are being refused by local authorities?

Mr Holbrow: Yes.

Q161 Lord Lewis of Newnham: Is this very extensive? This is news to me.

Mr Holbrow: All I can speak for is where we have had examples of this. There have been some examples in parts of Surrey; there have been some examples in

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parts of the Midlands; and some examples in parts of northeast England.

Q162 Lord Lewis of Newnham: So what happens to this waste?

Mr Holbrow: It either goes to commercial contractors if the volume is of sufficient interest, or it ends up in landfill. Those are the stark choices and more needs to be done to help small businesses dispose of their waste. They want to dispose of it properly, they want to get it to recycling, but the system is against them.

Lord Lewis of Newnham: Thank you very much, that is very important.

Q163 Lord Howie of Troon: I am told that there are existing programmes with names like Lean Manufacturing and the Six Sigma approach, which are intended to reduce waste. Could you explain what these are and how do they actually improve waste?

Mr Glass: I myself and most of my organisation spend much of our time doing exactly that with companies. The approach is basically good common sense and it starts with ensuring that there is proper measurement in place of manufacturing performance and all forms of waste, so not just material waste but downtime and other forms of loss and inefficiency. Having measured it, it is then about selecting the most important areas of loss to the business and going for a structured approach of problem solving, simplifying and defining processes, standardising certain things so that they are done repeatedly the best way. By working in that way things are often greatly improved. The example you heard earlier of taking the sample where the sample was much larger than necessary, because people had always taken a sample that size it had occurred to no one that it was too large, and it takes some sort of process to highlight that actually this is costing business a huge sum of money—it takes something to force people to rethink because people very readily take hold of a presumption, a paradigm and stick with it and fail to recognise the opportunities for improvement unless there is some sort of stimulus which causes people to think again. This is really why I was saying that much of the challenge I think in waste is cultural because unless you see that opportunity for change, unless you are willing to challenge the assumptions with which you have so far gone through life then you will never really change anything and you will never improve. We worked with a business, for example, where 14 per cent of the material going through the process ended up as waste. They fully expected that, because inherent in their process was that they were aiming to produce something that was ultra pure and therefore with impurities you have to throw away stuff, so some waste is inevitable. They had no way of gauging whether a 14 per cent loss was good or bad

and it was only because I came from other related industries and said, “That seems rather high to me; I have run processes a bit like that at much lower levels” that they, after some persistence, agreed to have a go at going through a structured process. The end result was to take it from 14 per cent down to four per cent. Many of the solutions would not be immediately foreseeable beforehand; some of it was actually to recognise that what they were throwing away had a commercial value. That had not occurred to them, and it had not occurred to them because they do not see it because of the lack of measurement within their processes. I could go into great detail but I do not think that would be appropriate, but I hope I have given an overall flavour. To drive improvement in manufacturing takes a bit of time. Very often people are very busy and the simplest thing to do is to carry on doing what they have always done, and to make improvement one has to make time, to stand back and to re-examine how things are done; to go through a thorough structured approach of mapping and measuring and challenging why things are done a certain way. It takes time and you need to involve the people who are intrinsically involved at different stages in the process. Often managers are totally unaware of some of the things that people close to the production process actually see and those close to the production process are not aware that the managers are not aware.

Q164 Lord Howie of Troon: This sounds to me what I used to know of as production engineering and in that sense the waste question is kind of incidental, although a good idea. When you say that the managers do not realise this I suppose that relates to what PICME says when it talks about a people-based approach.

Mr Glass: Yes.

Q165 Lord Howie of Troon: You talk to them and you convince them, do you? That is the idea?

Mr Glass: To convince them is generally by demonstrating what can be done. We have worked within the process industries, which is chemicals, pharmaceuticals, polymers and a bit of food industry and to convince some people they will only believe it when they see it, so one has a bit of a chicken and egg and one has to have the opportunity to give it a try first of all, but great strides can be made providing the process is properly supported. I think these days it would be fair to say that the majority of managers in manufacturing will have heard of Lean Manufacturing, will have heard of Six Sigma, but they will not necessarily truly understand how it applies to their specific environment. They can read books on it, they hear how Toyota makes cars better but they will struggle to see what that means for them

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in their particular circumstance, and they need a more practical form of guidance, support and implementation to actually make change, and often they are shocked at what comes out.

Q166 Lord Howie of Troon: You say that people can take ownership for the performance of their area. I do not fully understand that; can you tell me what that means?

Mr Glass: One example would be in a pharmaceutical environment, where I first visited one of their package lines I asked an operator about the graph that was beside their line and the lady said to me, "A manager puts it there; I do not know why he gets so excited about these things, but it means nothing to me." Later we facilitated a process of improvement on the line which trebled the output of the line, which has a resource efficiency implication because they are using the same energy but producing three times as much. They had fewer items scrapped as they went through it and during the process, as people understood much better the major impact they could have on the business and understood the business and what they were doing much, much better they wanted to measure things, they displayed what they were measuring and they owned that area. Later I was told a story by the same person of how a manager came along to stick up a graph on her notice board and she told him to get lost, that it was her board and that he should ask her first, and what was he putting up anyway because she already knows how her area is performing. That to me is ownership.

Q167 Lord Howie of Troon: Thank you. Did she get her P45?

Mr Glass: No, she got a clap on the back, which goes to show that some managers actually are supporting people out there, and if only everybody was like that.

Q168 Chairman: Dr Barlow?

Dr Barlow: Waste production is built into Lean and both Lean and Six Sigma would help a lot with waste reduction. But particularly for a small company it is very difficult to get to the stage of fully understanding Lean or Six Sigma, or Lean and Six Sigma, the two combined. There are training courses but they cost a lot, both in money and time. Even the first stages are useful and there are programmes which try to help companies to at least get on to the starting blocks in fact. I was searching on the Internet and for a couple of hundred pounds you can get a course which helps you to understand the beginnings. I sent some of my students on a waste awareness course, which does highlight many of the starting blocks and is a useful thing and at £100 it is something a company could send a person on. But thinking about the wastes which we come across in a company, there are things

which are easier to deal with than others. The packaging waste for a small company, there is not a lot that they can do because they have no impact on their supply chain; all they can do is to try to dispose of it in a sensible way. But reducing the defects is something on which they really can make improvements; so doing the equipment maintenance to make sure that what comes out is of specification standard. It does not take very much intelligence but it can take a bit of resource to see that that is necessary. Improving the process of efficiency is built into all of these programmes. But for small companies even things like office waste is quite an important part of the amount of waste that they produce, and a lot of them end up taking it home and so bringing the sorts of ideas that they have at home into their small company.

Q169 Lord Crickhowell: Can I ask a question about comparative international practices? I did refer in my previous intervention to the Japanese techniques. It happened in my time in government and I did a great deal with Japanese companies, and they very often had a system by which they set up small worker groups in their factories and gave very substantial rewards in encouraging people to come out with suggestions for improving product techniques and profitability, and it is sometimes extremely impressive to see that working in practice, how the person on the factory floor could come up with just the sort of ideas that we are putting forward. That was a very standard technique of Japanese manufacturing companies, sometimes giving almost bizarre rewards to the way in which they dealt. I came across some really rather extraordinary examples in the companies in the way in which people were rewarded for such work. How far are British companies adopting that kind of encouragement and incentive to their own employees to come up with the bright ideas, the suggestions and the solutions?

Mr Glass: That is very much at the heart of a modern approach to Lean Manufacturing, to do exactly that, but perhaps not simply through suggestion schemes. A great many companies have tried suggestion schemes and then have later allowed them to lapse. I myself once when going into a role inherited such a scheme and let it lapse because I was simply inundated with a huge register of ideas that needed much further development to be able to examine them and to sift through them and I did not have the time because it is a very time consuming process. What is required by business leaders is for people to take a further initiative in making the suggestion, and that is to get the agreement to get on and actually implement it, to do something with the ideas. Many of the ideas people can actively take forward themselves or help to bring a few other people

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together to do, but to begin with people need to learn a process for implementing improvement, and that is often where people struggle. I hope I have answered it; I would say that the majority of businesses have given that a go.

Q170 Chairman: One small point before we leave manufacturing. Mr Holbrow, you referred to waste clubs. Are you aware of sustainability clubs which have been set up specifically for small businesses to try and help them? Discussion groups you might say, and things like that.

Mr Holbrow: There are one or two around the country; I am not that familiar with them but the one or two that I am aware of do seem to do a good job, again on awareness raising and sharing of best practice, and of “This works in this company could that not work in other companies?” Also, within the FSB we are split up into regions and areas and often small businesses talk to each other at regional meetings; they may not be formal clubs but if there is a piece of information that will make life easier for one business they will quite readily share it with the next business.

Q171 Chairman: Would you say that the onus or the responsibility for this should be local authorities, RDAs or government?

Mr Holbrow: No, for it to work it has to be generated in the small business world, from the small businesses themselves; they have to see the benefit of it and the need for it. We have done a survey recently on the work that small businesses have done, for instance in the community, and that is another example where small businesses see their place in reducing waste, helping the community, et cetera, and it is all part of the same culture, which I believe is improving. I think it would be wrong for government to get involved with that and start legislating in those areas because I think there is a great chance it will be counterproductive.

Q172 Chairman: So you would say bottom up rather than top down?

Mr Holbrow: Absolutely.

Dr Barlow: I have been helping a company to set up such a network and it is proving to be very successful, but it is driven by the ambition by one person, and that is the way it has to be.

Q173 Lord Lewis of Newnham: If we can talk a little bit about standards. Mr Long, I think you referred to the ISO series a little while ago, the 14000. What exactly are the ISO 14000 international environmental standards; how widely is it applied and how has it helped companies to reduce waste?

Mr Long: As you say, the 14000 is a series of standards; there is something like 28 standards looking at a variety of different things, including auditing, labelling, design, greenhouse gas management, the most well known of which is ISO 14001. What ISO 14001 does is to help organisations create an environmental management system and it works on the principle of the plan, do, check, act system, which is effectively a virtual circle of looking at your organisation, ways in which you work and ways in which you can improve how you are doing things, with the view of improving your environmental performance. In terms of numbers, at the end of 2006 worldwide there were about 130,000 organisations who were certified to ISO 14001. Of course, that is just the organisations that have an external auditor to look at their systems for them and have said, “Yes, those are good enough to be certified.” What that does not tell us is how many other organisations are using that process of 14001, but have not actually gone through to certification as well. In the UK at the end of 2006 there were over 6000 organisations that had certified to ISO 14001 and it is about ten years old as a standard. To give a measure, relating to one of the previous questions there are something like 22,000 organisations in Japan that are certified, which is the most certified country in the world in terms of 14001. Also in relation to one of the other comments about small businesses and the support to small businesses, one of the things that British Standards developed was something called BS 8555, which is a six-stage process to help smaller organisations work towards developing an environmental management system. So I think it relates back to some of the earlier points about small businesses finding it difficult to find the time and the resource to do these things. By taking a staged process hopefully it enables smaller organisations through the use of BS 8555 to get to the same point as larger organisations might with the use of 14001. We have put together a number of case studies and talked to various organisations about what 14001 does for them, and it is really about being able to understand what you are doing, how you are doing it, why you are doing it and then to say, “How do we improve on that?” Maybe a more dramatic example we had from having looked at an organisation in America was that they looked at their four-day Thanksgiving holiday and they found that they were using an awful lot of machinery that was effectively there and idle. It sounds very simple but they actually cut their energy consumption by something like 61 per cent over that period because they just had a look. People were doing simple things. There is another organisation that introduced something called energy walks within their organisation where managers and staff would go

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round and they would look and they would say, “Why is that water disappearing down that pipe over there and why is that machine on standby?” and things like that; and I think it is a good example of the involvement of a whole load of different people within an organisation and it goes back to some of the questions earlier about involving both managers and people on the shop floor, or wherever that might be.

Q174 Lord Lewis of Newnham: Do I gather then that this is an international standard?

Mr Long: Yes.

Q175 Lord Lewis of Newnham: If so, who actually does the certification and what is the incentive for a firm to actually get itself involved in going through this? I can see that you have designed it for small firms by breaking it down but what is the advantage to a small firm to take one of these?

Mr Long: The advantage to any business taking them is that it will help them improve what they are doing, which will mean that they have a more sustainable operation. Vast numbers of the organisations that have actually gone through the process of using both 14001 and BS 8555 give them significant cost savings as well within their operation, and I think that that was raised earlier as an incentive for any organisation. If you can cut your waste, design it out of your processes you are going to help the bottom line in what you are actually doing there. To actually then go into certification, in the UK for example you have an organisation called UKAS, the UK Accreditation Service, and they actually have the responsibility for certifying certifiers so that you know you are actually being audited by a valid organisation. The advantages of being certified—it depends on the organisation, whether they want that certification or not. A lot of evidence shows that it can help people in terms of marketing, so that people understand who they are. We have an excellent example from an SME talking about what certification does to them and they said, “Nobody knows who I am as a small business, but when I tell them I work to certain standards they understand who I am because they understand the levels of quality that I am working to.” So people can use it from that point of view as well.

Q176 Lord Lewis of Newnham: But is this an international standard? Is it a standard that is exactly the same in Italy, the same as it is in the UK?

Mr Long: ISO stands for the International Standards Organisation. The way that ISO works is it is an international organisation based in Geneva that brings together all the national standards

bodies in the world; so it brings together BSI in the UK, AFNOR in France and DIN from Germany. It gets all of those national standards bodies to contribute to the thought process that goes into a standard. So in the UK, BSI as the national standards body will make sure that we consult widely over the introduction of the writing and publication of any new standard. We can proudly say that the roots of 14001 was actually BS 7750, so it started life as a British standard and ISO recognised its strengths, took the intellectual property in that standard from 7750 and developed that into 14001. But any standard that is produced by ISO BSI will make sure that the UK view is heard on that standard, and indeed we are actually chairing and secretariat of many ISO international committees to make sure that the UK is represented as we wish.

Q177 Lord Crickhowell: In your papers on standards you say that one of the difficulties of implementation is that local authorities’ practices differ right across the country—a major barrier to the successful implementation and waste reduction strategy for organisations with multiple standards, and so on. So you have a standard and you are finding it difficult because every local authority functions in a different way, and you identify this as a need for a major change here. Could you just comment on that before we leave it?

Mr Long: I think there is a great opportunity here. In fact just before the meeting started I was talking to someone from WRAP about this and saying that there is a whole load of good practice out there, and is there necessarily the best practice in any one part of the UK? I think there is huge potential there for the creation of a standard that would say what are the best methodologies for waste management by local authorities, because it does vary enormously. So people will implement one of these standards but when it comes to interface with other organisations it can often not be as good as it possibly could be. So I think there is a great potential there and we would be delighted to get involved in the creation of some kind of standard that would bring together best practice. The method in which we produce standards is that we bring in any intellect or passion in the particular area, whether it is within government business, representative bodies, consumer groups, local authorities, academia, wherever there is the intellect and the passion for a subject we bring that into the committee, the standards making process, and we produce the best practice out of that. So I think we are in an ideal position to be able to help out with that.

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Q178 Earl of Selborne: I was going to ask about how designers can be best informed on the choice of materials for minimising waste and in the BSI evidence the point is made that information on the necessary physical properties is information that is not always readily available, although it is often part of a standard known as a specification. The BSI goes on to say that it can arrange this information in a number of innovative formats to present this kind of information usefully to interested parties, such as the designers. I wonder if we could hear on how this information is standardised across different products and between different countries.

Mr Long: You highlight some of the gaps there. What we are talking about there is that a whole range of different products and services will actually have standards attached to them, so that that does enable businesses and organisations to actually design into their process and into their product the reduction of waste and more sustainable products. What we are trying to highlight there is that not all sectors have those particular opportunities, and we are talking about how the standardisation process can actually help people to do that. As I have just mentioned, standards are created by bringing together communities of expertise in an area. We create standards where there is the demand for it, be it from industry, be it as a lighter touch regulation tool as well, and we will bring together the right groups if there are gaps in what standards can actually do. And we will produce the right document for the right people, so we might want to take something right up to an international standard or we might want to produce it locally in the UK as a standard. But we will produce a performance based standard to help that out, and as a national standards body that is our role, to make sure that we bring together those groups. If I could give you a couple of examples about how we are trying to plug gaps in particular areas. In new areas like nanotechnology, for example, we have just published something like ten new standards in that area and previously there has been a lack of standardisation in that area. The first standard we produced was a standard merely about the vocabulary in that sector and is a good example of helping an industry, helping out a sector but not restricting it, so that you still have the innovation and the growth going on, and we are not restricting in any way; but it just helps the development there. Another example was the publication of BS 8901, which is a specification for sustainable event management, so people producing anything from festivals to concerts to the local village fete, and again is an example of an area that needed some help but there was nothing there that existed. So we put together a community that would help us design

and build that standard. So as an illustration, if there are gaps we can actually help put together something to help out that particular sector.

Q179 Earl of Selborne: You gave an example from the nanotechnology sector, which is by its nature an international sector—you have to be a big player to play in it. Is it practical to have British standards; do they not have to be international?

Mr Long: The international standards making community is very keen on making sure that resources are used efficiently. So whenever we start a work programme we will always go to the international standards making community and see if anybody else is doing anything, either nationally or indeed internationally through CEN and CENELEC in Europe and ISO on the worldwide stage. If anybody else is saying, “Yes, we are looking at that, we are thinking about doing that,” then we will clearly have a debate and say, “Who drives this work, should it be done nationally, should it be done internationally?” Nano is a good example of the vocabulary specification that I mentioned; ISO has now picked that up and said, “We would like to publish that not just as a BS document but actually as an international ISO standard now.” So the community works well to make sure that there is no replication going on and we will push stuff into the international arena if that is what the international arena demands.

Q180 Earl of Selborne: So whose job is it to select the areas in which standardisation might be appropriate? You talk in your written evidence that you are engaged with WRAP and other key stakeholders to produce specifications. Are you proactive or reactive in identifying the product area in which you need standardisation?

Mr Long: I will say both; we are both proactive and reactive. A lot of our work is about making sure that we engage with a wide range of stakeholder groups. For example, we have a group that manages consumer interests so we actually have some individual consumer representation; we also have consumer representative groups; we are listening to the consumer angle; we spend a lot of our time in this part of the world listening to what government wants to do; looking at government policy and saying, “Here you have standards that can actually stop the need for new legislation and new regulation.” We have very good contacts with trade associations across a massive range of different sectors and we are listening to what is going on; we understand what is going on in the community, in the economy and things like that. So we are listening to what is happening; but also we are receptive to people coming along to us and saying, “We would

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like you to create a standard to help us solve a particular issue,” hence why I answer it as both hopefully reactive and proactive in what we are doing.

Q181 Lord Howie of Troon: You have told us how BS has an input into the ISO business and I have no doubt that is very effective, since I have known BSI for some time. However, at the end the ISO might be different from the BS in a number of ways. How do you—or maybe it is not your job—how are people advised which one to use where they are not set?

Mr Long: If an ISO standard has been developed that covers the areas in which a BS had previously existed the BS would be withdrawn, so there is one standard for people to work to. If there are things that we need to do specifically in the UK we can build annexes into an international standard so that there are specifics, but the intention is always for an international standard.

Q182 Lord Howie of Troon: Sort of opt outs, as it were?

Mr Long: I would not go so far as to call them opt outs; they are more opt ins, I guess, in a way, in that they are actually a way of making sure that any peculiarities in the UK are dealt with, but it is something that we clearly try and minimise because international standardisation has massive economic benefits.

Q183 Baroness Platt of Writtle: How can standards be applied within public procurement to reduce waste? And following up something that you said earlier, how you try to have community input—I have had a lifetime in local government so I am very interested in this—how do you listen to them and find a group of people who are going to want to do that?

Mr Long: If I can take the one about public procurement? I think there are probably four ways that standards can aid more efficient public procurement. I think the first one is in the specification of products and services, that very simply the procurer can actually specify with the use of standards, what they are actually after. That then aids the businesses that are supplying them far better to understand what it is that is required out of that given service. That is a practise used extensively in America, that an awful lot of public procurement in America is dominated by the use of standards, far more so than here in the UK. I think the second one is that standards enable procurers to understand the quality levels to which suppliers will actually work. I gave the illustration of the small business earlier, saying nobody knows who I am but when I say I work to ISO 9001, ISO 14001 they have a real indication of who I actually am as an organisation, of how I work.

The third element is how standards can support innovative new areas as well. We have done a lot of work with the Home Office in terms of biometrics and by creating standards in an area that can aid public procurement again by the innovation being encapsulated in documents so that it enables more businesses to look at the tenders and things like that. So I think there are some benefits there. Also, standards have been used by procurement organisations to manage their own businesses better. So, for example, the NHS’s purchasing and supply agency actually worked to both ISO 9001 and ISO 14001 and they find that it helps them run their business more efficiently as well. So we would certainly welcome standards being used far more extensively in public procurement. Your second question about how we bring together communities, it really works very simply, that when we want to create a new standard or an organisation has come to us and proposed the creation of a new standard we will look extensively to find out where the communities of expertise are, and if we create a formal BS standard then what we will do is have periods of public consultation as well where we will publicise that a draft has been written of a standard, anyone can then have a look at that standard and feed comments back to us.

Q184 Baroness Platt of Writtle: How would they get it?

Mr Long: They can get that online from BSI; we can send them copies of those standards so that they have a look at the draft and see what is actually involved in the standard and comment through to it. But our intention is always to get the very key stakeholders right there at the outset of the creation; in fact even before a standard is created we want to make sure that we have the stakeholder groups so that they can tell us what they want in the standard, what they want it to produce, how they want people to benefit from the use of that standard. So we would work very hard at making sure we had the right communities. A number of the organisations here today are involved in the standards making process and we use them to help us get to wider and wider communities.

Q185 Baroness Platt of Writtle: What actions are being taken to promote these standards and is progress being made rapidly enough?

Mr Long: We can always do more to promote what standards can actually do. As was the DTI worked with BSI and UKAS and the CBI on a programme called the National Standardisation Strategic Framework, which is a programme to promote the benefits of standards, and that worked very successfully to push the benefits of standards into business, into government and into society groups as

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well. It was a three-year programme that came to an end; I would dearly love that programme to go on and on, and in the meantime we are still trying to use the case studies that we created, the material that we created to actually get to more and more organisations to show what they did. One part of that was a macroeconomic case study that actually looked at what the British standards' portfolio added to the UK economy and the answer came back from that study that the British standards' portfolio added something like two and a half billion pounds to UK GDP every year and had done so since 1948 by supporting innovation, by greater efficiency; and there is no doubt that that figure can grow more extensively the more organisations are aware of what standards can do for them.

Q186 Chairman: Would anyone else like to contribute?

Mr Holbrow: I agree with what has been said about standards, particularly on public procurement, but I think we have to be very careful that we do not create the barrier for small businesses with public procurement because they cannot necessarily easily meet the standards that are there. There is evidence that sometimes small businesses are eliminated from being able to tender for business because the standards are more geared to big business rather than small business. Going back on an earlier point, though, I certainly welcomed when BS 8555 was set up that that is looked upon by small businesses as being a good environmental standard, more so than

the 14000 series which is, shall we say, more structured, whereas BS 8555 does not require quite the structure and is a lot better for small businesses.

Q187 Earl of Selborne: Could I just follow up that sentiment from Mr Holbrow because we heard from Mr Long that in America there is a greater success in rolling out public procurement—it has a much greater impact than in the United Kingdom. Would your opposite numbers in the United States share your concern that small companies might be discriminated against—is this the case in America?

Mr Holbrow: I am not aware of what goes on in America, I am afraid, but I know amongst a lot of our members when we had a meeting the other day on this that there is a concept—we do not have the proof yet—that very stringent standards are barriers to procurement for SMEs. I do not know what it is in the States, I am sorry.

Chairman: Thank you very much; that is very helpful. If we have any other points that we want to raise with you we will get in touch, or if you feel from your point of view that there is something you would like to amplify then please do not hesitate to drop us a note and we would be very happy to receive it.

Baroness Platt of Writtle: My Lord Chairman, I wonder whether PICME might give us one or two extra examples. They only gave one and you did mention that you had others, perhaps.

Chairman: If you would submit them in writing, as we have other witnesses coming in, that would be helpful. Thank you for your attendance this morning.

**Supplementary memorandum by Dr Claire Barlow, Senior Lecturer, Institute for Manufacturing,
University of Cambridge**

MANUFACTURING

There is little incentive for manufacturers to design out waste: most (if they do anything) will take the reactive (short-sighted) route of just minimising landfill, waste water and energy costs.

Waste can arise at various stages:

Goods arriving at site

When goods arrive on site then waste may arise from the packaging or from defective or incorrectly specified goods. SMEs have little control over either of these.

Product Design

Major design houses and specialist firms provide “Eco-design” expertise, but at a cost which would be likely to be prohibitive for a small company. It is important that design should address the whole life-cycle of the product: for example, designing specifically to reduce waste in the manufacturing stage may result in increased waste at other stages in the product lifecycle.

Manufacturing processes

There are often simple things which can be done which improve efficiencies dramatically. We send students out into industry to do project work which very often involves exactly this—wastage reductions of 10 to 30 per cent are routinely achieved, with associated revenue gains. Much of what they suggest is really just common sense, though backed up by data-collection. Companies often don't manage this unaided because (even if they suspect that there are savings to be made) they don't have the time to:

- measure what is happening;
- analyse the data;
- define a strategy; and
- implement change.

Some processes are inherently less wasteful of energy or material than others. But changing a process normally has implications for capital investment in equipment, so there are huge barriers to radical change.

Quality

Off-specification goods constitute waste: at the least, re-work; at worst, discarding the product. Resource spent on improving quality control is well spent, but small companies running hard to maintain their position often fail to do this. Getting the manufacturing operation correctly set up initially is part of this (including having the right design), but huge improvements can often be achieved simply by ensuring that routine maintenance is carried out.

SMALL MANUFACTURERS

SMEs typically have little influence on the supply chain, up or down. They can rarely improve their market potential by being actively “green”.

An example of an initiative which seems to be doing exactly the right thing is Resource Saver.² Funded by EEDA, this aims to help companies reduce waste. It sends trained volunteers (often students) out into companies (particularly small businesses) to help them do this. Training consists of a sensible one-day course leading to a “Waste Awareness Certificate” put on by the Chartered Institute for Waste Management.³ The course is largely awareness-raising and common-sense, but includes very practical advice on how to make simple improvements together with persuasive examples of revenue savings. Lists of local recycling centres are provided. This course is open to anyone, and local businesses are encouraged to attend.

LEAN MANUFACTURING AND SIX SIGMA

The “Six Sigma” approach aims to improve quality. It involves detailed measurement and statistical analysis, followed by a comprehensive plan of action and a rolling programme of improvement. This obviously helps to reduce waste by reducing the fraction of off-specification goods produced. For small companies the full Six Sigma approach is usually inappropriate (and training is expensive). Information on courses is readily available on the web.

“Lean” embodies principles of waste reduction (encompassing material and energy as well as human capital and work efficiencies). “Just in time” manufacturing (part of the “lean” philosophy) helps to avoid waste by reducing the amount of stock lying around and subject to damage, and also avoids un-necessary production of unwanted goods. Full training in Lean manufacturing (again plenty of information is on-line) is expensive, but understanding of even the elements is helpful. A “light” version could be very helpful for many SMEs.

HOW WASTE REDUCTION CAN BE PRESENTED AS A BUSINESS OPPORTUNITY

Regional development authorities are in a good position to make an impact, with their knowledge of companies and businesses. They do need to actively go out to them, making it as easy and unthreatening as possible.⁴

For small businesses, mutual support and information-sharing is very important. Anything that can be done to encourage them to share best practice (which may include waste reduction) is valuable. Leaders in the SME community may have set up “clubs” to do this (eg a good local example in the Cambridge area is Ludo Chapman, MD of Grant Instruments, Shepreth).

² <http://www.resourcesaver.org.uk/>

³ <http://www.ciwm.co.uk/pm/389>

⁴ eg <http://www.resourcesaver.org.uk/> mentioned above.

Businesses should use children and family and community initiatives. Children are learning about waste, reuse and recycling at school: bring this awareness into the workplace, eg schoolchildren on “take your son/daughter to work” days.

Free SME attendance at courses such as “Waste awareness certificate” plus incentives such as local “green-listed” companies.

It’s not difficult to make savings, but people do have to be encouraged to stop and think a little.

Recyclers could be more pro-active at seeking out businesses as waste suppliers. For individual small businesses, volumes are often too small to be commercially interesting, so business parks should be targeted as a matter of course.

GAPS IN KNOWLEDGE THAT PREVENT BUSINESSES FROM REDUCING WASTE

The immediate reaction is often “It will cost more”, followed by “Don’t have time”.

Many are completely unaware of the range of materials which can be recycled. Even if they wish to make improvements, a common complaint is lack of time to seek out recyclers and find what they require.

Manufacturing and business practices are often inherited, or have developed in an ad hoc way. Small companies may not be aware that more resource-effective processes exist. However, finding out may be beyond their scope.

HOW COMPANIES CAN FIND OUT WHAT THEY NEED TO KNOW

The problem is not that there is a lack of information, rather that there is too much.

People either want to start (a) by telephoning someone, or (b) to be able to quickly find authoritative material on-line.

- (a) Do the RDAs have help-lines?
- (b) There are some very useful resources on-line, but there is also a great deal of rubbish. We need to have resource portals which are managed, so that they are prepared to filter information (and keep it up-to-date), to provide the quick answer (and where to go for the more detailed answer) for sets of waste-related questions.

January 2008

Supplementary Memorandum by Process Industries Centre for Manufacturing Excellence (PICME)

WASTE REDUCTION IN PROCESS INDUSTRIES

The Committee requested additional case studies from picme which illustrate the potential for waste reduction through the deployment of Lean Manufacturing and Six Sigma methodologies in tandem with cultural change (changes in people’s attitudes and behaviours).

PRODUCT CHANGEOVERS IN CHEMICAL, PHARMACEUTICAL AND POLYMER MANUFACTURE

With the major exception of basic bulk chemical/petrochemical manufacture, the majority of processing plants manufacture a range of product types and grades by running production campaigns and then cleaning down their process plant as part of their changeover to the next product. These changeovers can consume both considerable time (and hence lost capacity) and also considerable energy and materials for cleaning. In many instances water is not appropriate for this cleaning and organic solvents must be used (expensive to buy and dispose of).

Example 1

Picme has worked with many process manufacturers to address primarily the duration but also the cost/waste of these cleandowns/changeovers. Typically we have enabled manufacturers to reduce their downtime for changeovers by around 75 per cent. A secondary effect of this is that much less energy and cleaning medium (solvent or water/detergent) is used. The improvement process involves developing the best cleaning method and the tightest means of controlling this so that it is done consistently each time. Last year, working with a chemical company in the North East, cleaning solvent usage was reduced by about £100,000 per year.

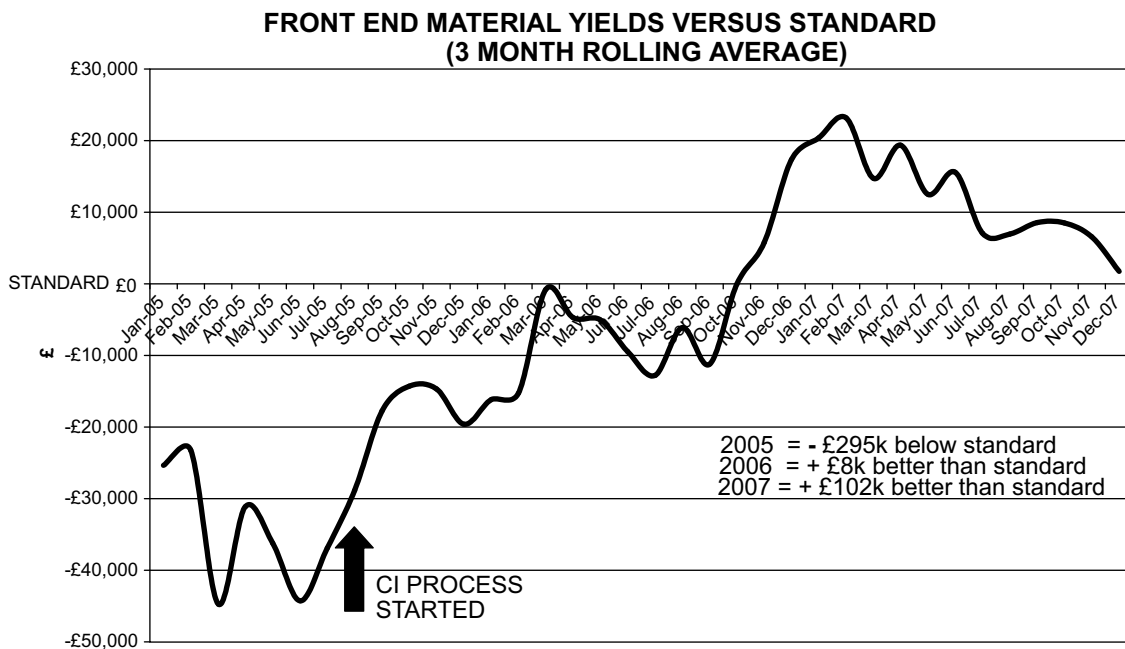
PROCESS YIELD IMPROVEMENT

Process yield is the efficiency with which raw materials are converted into saleable product. In chemistry it is not always possible to achieve 100 per cent conversion and there is considerable science underpinning plant and process design to achieve an economic conversion rate without incurring excessive capital cost of additional plant equipment for material recovery and recycle. However, sometimes design yields are not achieved, or can be bettered. Also, over time, plants may have to be adapted to produce new products for which there has been less process development.

Picme has helped process manufacturers improve their process yields by helping them combine the practical observations and knowledge of plant operators with the technical knowledge of process engineers and chemists. Often we help them devise and review trials of modified plant operation.

Example 2

Last year a chemical company in Greater Manchester reported that we had helped them improve their process yields from being £300,000 pa below the design efficiency to £100,000 pa above the design efficiency. This company had previously believed that achieving design efficiency, was an inspirational target and not something they could exceed. The graph below illustrates this. Worth noting is that efficiencies peaked in early 2007 and then started to decline. This was partly as a result of the introduction of having to produce new products in shorter campaigns. The plant is now improving its yields again.



This was achieved through revising operating practices, improving operator focus on conversion efficiency, implementing a couple of very minor changes to plant equipment and no capital expenditure. The above example played a big part in reversing the above company's five year slide in profitability (Far East competition).

Example 3

A large scale continuous flow bulk chemical plant (Europe's second largest facility for producing chlorinated solvents) learnt how to apply Lean Manufacturing and picme improvement techniques to the part of its plant designed to recover traces of organics from its effluent stream (Any organic effluent that goes beyond this stage is incinerated). The result was to increase organics recovery back into the processing plant by circa £120,000 value pa.

ENERGY IMPROVEMENT

Companies can learn about energy improvement through the deployment of common good energy management processes and energy efficient technology from the Carbon Trust. Many process industry businesses feel that they have now already integrated typical CT recommendations into their processes. However, they still have big energy improvement opportunities associated with the efficiency and productivity of their plant production process. The more quickly materials are produced the less time they spend being heated, moved or cooled. Increasing the output capacity of a plant's current assets will generally involve only marginal additional energy and the energy cost per tonne of saleable output can often be reduced considerably.

Picme has worked with many process manufacturers on capacity improvement without involving capital expenditure. A few published examples of achievements are:

- Rohm & Haas, Dewsbury output up 40 per cent;
- NPIL Pharma (was Avecia), Huddersfield up 100 per cent; and
- Johnson Matthey Catalysts, Billingham output up 29 per cent.

Some companies who have not required additional capacity, have specifically sought picme assistance because of the economic pressure of rising energy costs. The range of outcomes has been wide—£50,000 pa to £1 million pa.

SCRAP AND OTHER WASTES

Six Sigma methodology was originally developed to reduce manufacturing scrap rates, ie getting the product right first time more of the time thus eliminating recycle and scrap. Repeat product failures are usually investigated. From benchmarking we can see that half of the chemical industry now has a right first time rate of 98 per cent or better. The other half has, of course, a larger opportunity for improvement. Six sigma or similar and thorough, structured problem solving can virtually eliminate most such waste if pursued relentlessly.

Picme had been contracted by Defra to conduct a short study into the causes of waste generated by the chilled foods industry. The study found that certain wastes such as raw material packaging were difficult to avoid, as requirements such as hygiene and safe handling must be met. However, the industry produces a considerable quantity of in-process waste and scrapped output. Weaknesses in the industry's skills and deployment of continuous improvement practices were found to be a major contributor. Picme has worked within this industry and demonstrated that problems blamed on equipment design/technology barriers can be considerably improved through improving operating and management practices coupled with regular structured problem solving.

Why don't companies put more effort into waste elimination?

A question raised by the Committee was that it should surely be that manufacturers already have the financial value of waste reduction as a big incentive for waste elimination. This is often true. However, many companies are unable to see the potential scale of their improvement opportunity or their improvement efforts fall short through weaknesses in their approach. The majority of operating sites are also now very resource constrained (few people) and struggle to find time to learn the best ways to improve without external support.

The Manufacturing Advisory Service seeks to help manufacturers of all kinds improve and can often deliver good results but none have the expertise required to bring best practice into some parts of the process industry and many of their people simply do not understand chemical manufacture at all (it is very different from traditional manufacturing). This is the case for having sector specialist "industry forums" like picme who were created (with DTI and industry backing) to develop the expertise needed by certain sectors. In some regions MAS will employ picme, but in others the MAS contract holder views all industry forums as competitors and will not encourage industry to engage. Public sector funding policy should address this issue so that industry is encouraged to use the best support available. Picme has demonstrated the difference we can make by increasing the process industry engagement with an RDA's (ONE North East) manufacturing improvement support programme ten fold through collaborative working. The RDA commissioned an independent audit of this and the report concluded that the process industry strongly felt the need for sector specialist support and that our credibility with the industry was key.

March 2008

Memorandum by Envirowise

INTRODUCTION

This document sets out the experience and views of the managing contractors for the Envirowise programme. We have restricted our evidence to issues where we have relevant experience that we feel is key.

Envirowise is a UK wide programme designed to improve the efficiency of resource use, reduce waste production and reduce costs. It is primarily focused on helping business by providing information, guidance and advice that allows businesses to implement improved practices. In Scotland and Wales, Envirowise also can also offer support to Public Sector organisations.

Envirowise is open to all sizes of business and all sectors (except agriculture). It produces advice through a helpline, web site, events, publications and site visits. Last year, Envirowise had more than 550,000 unique visits to the web site, distributed about 85,000 publications and gave specific advice to over 5,500 callers to the helpline.

Companies using Envirowise to help with environmental improvements saved £297 million in 2006. These cost reductions came from, amongst other things, using 84,000 tonnes less raw material, 17 million m³ less water and reducing solid waste by almost 550,000 tonnes.

FUNDAMENTAL ISSUES

In much of the work of Envirowise, changing behaviour is key to improving the efficiency of resource use and the consequent reduction of waste. It is our view that few people understand how to use the “waste hierarchy” within their approaches to decision-making. In addition, very few people in business seem to appreciate the need to reduce resource use or that their purchasing decisions have an effect on the use of resources. Even people who do want to reduce resource use may not have information on how to do it.

The scale of waste production is a function of the amount of resource available to be wasted. Therefore, reducing resource use will reduce the scope of waste production, although it may not lead directly to reduced waste. We have found that when organisations gain an increased understanding of resource use, this usually leads to lower waste production. There is a body of evidence showing that, for example, measuring the use of water leads almost immediately to changes in behaviour and more efficient use of water.

We believe that sustainable approaches to waste reduction require a change in attitude. In particular, there needs to be a greater appreciation that the efficient use of resources is not only desirable but that the decisions of individuals can make important contributions to improving the efficiency of resource use.

In changing attitudes and behaviours over waste, we feel it is essential to move the debate from “outputs” to “inputs”. In energy and water, people and government talk about the resource being used—ie the input—but when it comes to materials, the terminology most often used is waste—the output. We would urge the Committee to consider the benefits of changing attitudes to help people to focus on resource use rather than simply waste reduction.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

Better design can play a very important role in the sustained reduction of waste. It is estimated that over 80 per cent of a product’s environmental impact across its lifespan is established or “built in” at the design stage. This impact comes from the types and quantities of materials used, the efficiency of the product during the “in-use” phase and end of life issues.

Envirowise works with product manufacturers and designers to help them appreciate the resource implications of their designs and has found a willingness to consider these issues. It appears that resource efficiency and waste has not, historically, been a priority issue for most designers. Designers often work to specifications that do not include any mention of resource use but rather focus on appearance and functionality.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

On the factors influencing the use of materials, we would point out that perceptions of customer expectations are often very important. However, we see less evidence that producer perceptions of customer requirements are tested. For example, in paper use, producers may think customers want a bright, white, glossy finish when the customer might view the content of a document as more important.

In housing, we have anecdotal evidence that customer expectations are given considerable weight in making decisions on overall design. For example, one house builder has pointed out that a modern, thermally efficient house should not need a central heating system but most customers expect such a system. If attitudes were different, the resources used to make, install, run and dispose of the central heating system could be avoided.

We have seen increasing consideration of sustainability in the selection of some materials. Printers and print buyers are increasingly considering the use of recycled paper and, more recently, the carbon footprint of their product. The glass and glazing industry takes the use of materials very seriously and are keen to balance the benefits of improved thermal efficiency with the impact of production.

Manufacturers and designers usually think in terms of improving products rather than improving the delivery of the outcome that their customers require. This tends to lead to a focus which requires the use of materials. There are some examples of business models that reduce material use by focusing on the outcome the customers require. For example, online bookstores have helped meet customers' needs for books with less reliance on buildings and large amounts of stock. Similarly, a modern mp3 music player uses far less material than the stereo systems of 30 years ago but often produce higher quality sound.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

We find that the end of life impacts of materials was not previously high on the agenda for product designers and engineers. However some designers are now starting to consider these issues, particularly for consumer products. This change in approach has been partially due to legislation and partially due to changes in consumer attitudes towards the amount of packaging waste created.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

New materials and new material development can offer more sustainable solutions for product designers, for example, the use of biodegradable packaging materials as opposed to EPS. However, most designers would not be aware of the types of new materials that are being developed. Many would not have links to material scientists or the academic institutions leading in this area.

Can better-designed products offset the increase in consumption?

Improvements in product design can almost certainly lead to reductions in material consumption, for example, through using lighter materials.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

As implied by our responses above, we feel that much of the policy framework focuses on the management of waste once it has been produced, rather than its reduction at source. The most recent waste strategies in Scotland, England and Wales have increased their focus on resource use but they remain primarily waste policies.

There appears to be limited incentive for the development of better, more sustainable products and processes. However, there have been successful stimulations of market improvements in the energy area through the labelling of energy efficient white goods. With sufficiently strong implementation, the analogous scheme for cars should also be successful.

An increasing focus on energy efficiency in the built environment has helped to drive the construction industry to focus on the energy their buildings will use. However, embedded energy and overall sustainability in construction are only considered by a few leading companies.

Recent legislation on producer responsibility has started to change attitudes in certain areas. For example, the Packaging Regulations have increased consideration of design for recycling and overall packaging use. The RoHS and WEEE Directives have also played a role. However, the implementation of regulations has not, in our opinion, always achieved the optimal outcome. For example, the aim of the Packaging Directive overall was to minimise packaging and increase recycling of what remained. However, when the regulations first came into effect, almost all of the calls that our helpline received were on how to recycle because compliance with the regulations required meeting recovery and recycling targets, net reduction. Over the last nine years, Envirowise have been able to stimulate more interest in optimising (which usually means reducing) packaging but this does not directly help compliance.

The Essential Requirements Regulations for packaging do help to reduce unnecessary packaging. However, they do not appear to be well known or regularly enforced. Increasing the knowledge of these regulations and the consistency of their enforcement could reduce unnecessary costs for industry and reduce material use.

We are concerned that the current implementation of the WEEE directive will also lead to a focus on how to meet recovery and recycling targets, rather than how to make the most sustainable use of the materials and components being recycled. Companies that design for more efficient recovery of components do not appear to benefit from doing so as they must pay the same recovery and recycling costs as everyone else. We know that officials in BERR are aware of this issue and hope to be able to improve implementation in future.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

We have seen few examples where sustainable design is central to business thinking. Envirowise runs design workshops and on-site visits with designers to help address this issue but the uptake of these services is small in comparison to the scope for businesses to benefit.

What other measures can promote a focus on waste reduction among businesses?

We believe that a change in attitude to resource use is essential to reduce waste in the longer term. Efficient use of resources needs to be a part of every business decision in the way that cost currently is. In this regard, a concerted and longer term marketing campaign to raise the profile of resource efficiency as a business issue would be worthwhile. Government needs to provide a clear, consistent message that efficient use of resources is important.

We feel that there is currently too much focus on waste. The waste hierarchy is a sensible approach to reducing and managing waste but could equally be applied to resources. The majority of environmental impact from most resources comes from their production and use, rather than their disposal. If waste policy were refocused on reducing material intensity, it could lead to a more efficient economy.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

We see a role for Government in both helping to define and set the messages about resource efficiency and in educating suppliers. Government procurement is key to the latter role. Actively encouraging resource efficiency and waste reduction in all Government procurement would help to set the norm for business.

November 2007

Memorandum by National Industrial Symbiosis Programme

INTRODUCTION

1. The National Industrial Symbiosis Programme (NISP) is an innovative business-led programme which delivers environmental, economic and social benefits across the UK. NISP's mission is to effect a long term cultural change in business to view all resources as an asset with a value which should not be wasted or discarded. NISP operates firmly within the business opportunity agenda, thus maximising on the benefits to business of industrial symbiosis.
2. By working across business sectors NISP members form partnerships to make maximum use of resources which would otherwise go to waste. NISP works at a local level through 12 regional offices, each having a Programme Advisory Group (PAG) drawn from local business. In England NISP is part of the BREW (Business Resource Efficiency and Waste) partnership managed by Defra and funded as part of the return of Landfill Tax to industry. Now in its third year of operation, NISP is delivered by International Synergies who also provide support internationally to Defra through the Sustainable Development Dialogues (SDD) in both China and Mexico. International Synergies has also undertaken Industrial Symbiosis work with the State of Illinois, Chicago and has recently been providing advice to the US Government.
3. Since its National launch in 2005 NISP has grown rapidly, and now has in excess of 8,500 industry members drawn from across the UK. NISP's holistic approach enables it to actively deal with all resources including water, energy, materials, logistics, assets, expertise etc. and by working successfully across the entire resource hierarchy NISP has demonstrated successfully that business opportunity can be realised through greater resource efficiency.
4. NISP remains the first and only Industrial Symbiosis (IS) initiative in the world to be operated on a national scale and its innovative and highly successful approach for effective synergy facilitation and industrial eco-innovation has attracted considerable attention, both in the UK and overseas. Cited as an exemplar programme by the European Commissions' Environmental Technologies Action Programme (ETAP), NISP has also received considerable interest for potential replication across Europe, the United States of America, China, Mexico, India, Brazil and Australia.
5. NISP has cost effectively delivered a wide range of outputs that significantly contribute towards a number of key government policy agendas. Apart from extensive environmental outputs, benefits have been generated in the areas of productivity, employment, regeneration and private sector investment. NISP is a positive net contributor to the Treasury (a result of additional tax paid by companies enjoying higher profits, new solutions creating business start-ups, and by taxes paid by those people whose jobs have been saved/created by the programme.) whilst also continuing to contribute to the balance of payments whereby imported virgin materials are replaced by UK supplied by-products.
6. Through its common sense industrial symbiosis approach to the better management and sustainable use of natural resources NISP has, between April 2005 and March 2007, already delivered:
 - engagement with over 8,500 industry members;
 - generated more than £99 million in additional industry sales;
 - saved over 5.4 million tonnes of virgin raw materials;
 - reduced industrial water use by over 2.5 million tonnes; and
 - diverted over 1.8 million tonnes of waste from landfill.
7. The programme has also delivered:
 - actual costs saving to industry of over £71 million;
 - secured £66 million private capital investment in reprocessing & recycling facilities; and
 - reduced over 2 million tonnes of CO₂.
8. A feature of the Programme to date has been its ability to deliver proportionally more output for each unit input of funding. From an input of £9 million BREW funding over the first 24 months NISP has not only exceeded delivery on all contracted metrics and helped create over 1,360 jobs, but has also:
 - delivered a total economic value added (TEVA) of £117 million;
 - a net fiscal impact of over £10.3 million; and
 - net economic gross value added of £53 million to UK PLC.

9. In the current year 2007–8 NISP once again is confident of exceeding all targets. Due to the programme's impressive results and positive impact, NISP's terminology, commercial approach, business engagement model and efficacy are increasingly being emulated by other programmes in the UK.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

10. Due to the potentially long time involved between the conceptualisation of new designs and the creation of waste, NISP actively demonstrates that significantly greater and immediate benefits can be achieved by looking at process optimisation within the production cycle. Such improvements can and do provide both economic and environmental benefits by enabling the consideration of resource recovery of previously "wasted" resources. Such recovered material resources can then be used instead of virgin sources.

11. However material considerations are not the only "waste resources" and further consideration within "better design" should be given to cover all potential resources inc energy, water etc.

12. NISP is actively involved in supporting companies in overcoming barriers to resource recovery and efficiency. The programme works in partnership with the Resource Efficiency Knowledge Transfer Network (RE-KTN) to enable the programme to stimulate both technology and process innovation within the UK knowledge base. A key aspect of the programme is the identification of significant amounts of products which could be diverted from the waste stream if a technological solution can be identified. A recent evaluation of NISP's completed synergies to date identified that over 70 per cent involved some form of process of technology innovation. 50 per cent of synergies completed to date involved the introduction of best practice and knowledge already being used in other industry sectors as a means of overcoming a barrier to waste minimisation and resource efficiency.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

13. The Programme sees that businesses are increasingly aware of the end of life impacts of their products and processes and are keen to engage with NISP to find novel solutions in this area. Increasingly companies are identifying with both the economic and environmental benefits of reincorporating material wastes back into their products and processes as part of closed loop systems. Often however consideration for most companies is driven more by regulatory than economic drives (ELV, Batteries directive etc). Some forward thinking companies and sectors are also increasingly starting to consider the integration of full life cycle impacts of their products.

14. NISP is actively stimulating such thinking within its growing membership and through numerous case study examples can demonstrate the resulting verified output benefits delivered as a result.

Are there any other gaps in knowledge and how are they being addressed?

15. NISP believes that there exists a significant gap in knowledge and understanding by companies across the UK about resource recovery potential. Such a knowledge gap also extends to technology advancements and process innovations that could enable potentially significant economic and environmental benefits to be achieved by their businesses. However, though engagement with programmes such as NISP, industry is increasingly becoming aware of the gains that can be achieved, often for very little process change or initial investment.

16. NISP can also demonstrate that as industry is stimulated to make better use of recovered materials through commercial innovation and process improvement/optimisation, they can reduce their dependency on and overall consumption of key virgin resources.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes?

17. The increase in the Landfill Tax escalator and other legislative changes such as the two new rules which apply to non hazardous waste from October 30 2007, ie that liquid wastes are banned from landfill and that waste must be treated before it can be landfilled, have begun to change the way that waste is viewed. It is sufficient, at the moment, for business to separate out one material such as cardboard only and fulfil the pre-treatment requirements provided that a reasonable amount of the sorted or separated materials are not sent to landfill. Many small businesses do not have access to services that can segregate or take such materials unless a Local Authority provides a segregated trade waste service.

18. The Waste Strategy 2007 began the process of considering waste as a resource. It would be a considerable help if waste was always seen and referred to as a resource unless no other possible use can be made of the material.

19. Sustainable procurement requirements by the public sector could be a considerable stimulus/driver for the development of further sustainable products.

How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

20. Small businesses often lack knowledge and awareness of the legislation and their Duty of Care. An earlier survey by the BREW Centre for Local Authorities was recently supported by a NetRegs survey that showed that the majority of SMEs have a low level of awareness of their environmental impact and of their responsibilities and obligations.

21. NISP partnership with the Environment Agency has proven very successful and mutually beneficial not only to both NISP and the EA but also the industries to which both organisations interact. NISP have often found that clarification is needed of the legislation and have sometimes found that different interpretations have been made in different regions.

What other measures can promote a focus on waste reduction among businesses?

22. Working within the rapidly increasing membership base, NISP member businesses are continually exposed to new opportunities for synergistic collaboration. Such engagement is forecast to deliver significant output and NISP has projected super-proportionate benefits over the 2008–11 funding period of over 15 million tonnes of landfill diversion and 10 million tonnes of virgin materials saved.

23. The business advisory services of, for example, the EA, RDAs, Business Link and trade associations, should be encouraged to both support and signpost businesses to appropriate environmental support as a core pillar of their business development advocacy. Resource efficiency and waste minimisation will only become a core activity if it is recognised as a commercial imperative and business opportunity as much as it is a social and environmental concern.

What lessons can business learn from international experience?

24. NISP is the world leader in utilising industrial symbiosis to help businesses realise resource efficiency and reduce waste. Cited as an exemplar programme to the EU, NISP practitioners work closely with member businesses to identify surplus resources which might otherwise be wasted (materials, energy and water) and to match them with businesses who can benefit from these. NISP has also received considerable interest for potential replication across Europe, the United States of America, China, Mexico, India, Brazil and Australia. NISP's holistic approach is also being advocated as part of the UK's Sustainable Development Dialogues (SDD) in both China and Mexico.

25. The separation of municipal from business waste is not the usual model found on the continent and certainly at a Local Authority level, NISP is aware that LA officers found visits to overseas operation of innovative waste treatments in Germany and Switzerland particularly useful in informing and supporting decisions on facilities to investigate for their authorities in the UK.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

26. The Government has announced that it will be setting a target for business waste reduction.

27. More businesses are opening their doors to issues around environmental performance and resource efficiency. However, the Annual Small Business Survey carried out for the DTI's Small Business Service in 2005 showed that over half the businesses surveyed want government support but struggle to find out what is available. A recent NetRegs survey showed that most SMEs felt that good environmental practice was important but there was a fairly low level of awareness of legislation and that the smaller a business is, the lower its level of environmental awareness and the less likely it is to take action to address its environmental impact. This is the sector that, therefore, also has the most problems with waste disposal and pollution. The SME sector is most likely to approach Local Authorities as their first port of call for assistance. Various surveys have found that between 60—74 per cent of SMEs contact their Local Authority as a first port of call.

28. The recent letter from Defra to Chief Executives of Local Authorities drawing their attention to their obligations under Section 45(1)(b) of the EPA for commercial waste collection, brings some clarity but there remains some confusion over any potential impacts on LATS which requires clearer guidance.

29. Clarification has been issued on the subject of waste from schools, universities, hospitals and nursing homes which is to be considered as household waste in the future and not commercial waste. Some LAs have treated waste from these sources as commercial waste in the past and charged for the service or ensured that private companies collect and charge for the service.

30. The division between municipal and business waste has complicated the task of waste reduction and waste reuse, and hampered the message of resource efficiency. Purely household waste is estimated to comprise no more than 10 per cent of the waste stream to landfill. Whilst it is a particularly mixed and difficult area with a high biodegradable content—and therefore high methane generating content—attention must also address the wider business waste issue and the economic as well as the environmental impact of the waste of valuable resources.

31. Government and public bodies can play a key part in not only waste reduction but can also be a major driver to resource reuse through their procurement role. It is estimated that Local Authorities alone already spend:

- £42 billion on external contracts;
- £12 billion (17%) on constructing and maintaining buildings and roads; and
- £3 billion (7%) on waste.

32. Construction materials, fittings and furniture can be chosen with whole life cycle impacts in mind and can drive the reuse and resource efficiency agenda by ensuring that, for instance, recycled aggregates are used in the foundations of buildings.

33. There is more that needs to be done to address the whole of the waste hierarchy and there is still more work needed on the clarification of protocols and the legislation on what is to be seen as a waste.

34. In addition to this there needs to be a shift towards whole life systems thinking, the interconnectivity of resource use by single organisation and throughout the life time of the materials and the framework that industrial ecology provides.

35. Under new government guidance, the RDAs are to be given a larger role in regional planning (Regional Spatial Strategies) as well as their existing responsibility for Regional Economic Strategies. They are also a key player in the guidance and signposting to be given to SMEs. By working with organisations such as NISP and the BREW Centre for Local Authorities they can also play a role in Regional Material Resource Strategies to ensure that the data NISP and the BREW Centre have is made available in a useable form, and built into Regional Spatial Strategies to ensure that adequate infrastructure is in place for the business community.

36. If the RDAs are to have a wider role with the abolition of Regional Assemblies there has to be closer working with LAs who are responsible for Local Development Frameworks and who operate or have an obligation for trade waste services. Accountability to Government for any increased role has to be clear.

How does government policy link up with European strategies and action plans?

37. NISP has already been cited as the Commissions' ETAP exemplar programme for potential replication across Europe. The Government's policy and NISP's activities are complimentary to both the EU thematic strategy on natural resources and the Directive of the European Parliament and Council on Waste. Similarly the actions are aligned with both the Sustainable Consumption and Production and Sustainable Industry Policies as they relate to UK business, and a continued drive to improve resource efficiency.

38. NISP is committed to working closely with Government to "unlock" the challenges and opportunities associated with delivering existing resource efficiency and waste minimisation through sustainable consumption and production frameworks. Restructuring to deliver sustainable development through resource efficiency requires a new model, one that is more holistic and ecological where the productive economy is concerned. The analogy of materials, nutrients and energy flowing through natural ecosystems, with those moving through so-called "industrial ecosystems", is central to this new model.

39. However, lasting and substantive progress must look beyond any pre-occupation with short-term market manipulation measures to ensuring that life-cycle and industrial symbiosis thinking are sufficiently integrated within policy formulation. Consequently, together with full-life-cycle or "cradle to grave" thinking, we would also strongly recommend the important role that industrial symbiosis will increasingly need to play in the more sustainable management of natural resources.

What lessons can be learnt from other countries—within the EU and globally?

40. NISP remains the first and only industrial symbiosis (IS) initiative in the world to be operated on a national scale and its novel yet highly successful approach for effective synergy facilitation has attracted considerable international attention. Praised across the world, NISP has already been cited as the EU Commissions' ETAP exemplar programme with real potential for replication across Europe, whilst also being ranked 1st by the UK Government in its recent league table of Business Resource Efficiency funded programmes. Defra and DfID, together with counterparts from China, India, Brazil, Mexico and South Africa have expressed interest in including both IS and NISP as part of Sustainable Development Dialogues being developed.

41. Due to the hugely successful results, the programme, its approach and terminology are therefore increasingly being emulated by other programmes in the market, both in the UK and internationally. NISP has also provided support and information to the US Environmental Protection Agency (US EPA) and recently visited the White House to promote Industrial Ecology.

42. In 2006 NISP hosted the third International Industrial Symbiosis Research Symposium with international delegates from many countries. This provided an opportunity to share research on Industrial Ecology and documentation was provided by Yale University in a report published this year.

SKILLS*To what extent are considerations of sustainable waste reduction part of broader industrial training courses?*

43. It is appreciated that there were many training courses available for companies in the fields of waste management, energy efficiency, logistics, process optimisation etc., both from National Vocational Qualifications (NVQs) or more formal CPD guided professional training schemes provided by the various professional institutions and organisations. However the consideration of sustainability is typically predicated from environmental implications and often the economics and commercial benefits are not illustrated nor clearly understood.

44. What such (environmental) sustainability training courses have in common is the focus on looking internally within the company or organisation at its activities and acting in isolation. Very little applied work has been undertaken for companies working in collaboration across a range of business resource efficiency issues. Similarly, courses associated with industrial ecology (an emerging field which seeks to remodel linear industrial systems so that they more closely resemble the more efficient, "closed-loop" workings of biological ecosystems) are typically confined to academia.

45. The significance of industrial ecology or industrial symbiosis training to individual companies, sectors, regions and nationally can be found in the benefits arising out of NISP. It is the belief of the NISP team that we have only just begun to scratch the surface of resource efficiency possibilities by this new approach. By formal training it is hoped that this type of thinking can penetrate UK industry much more quickly and bring about the above benefits to a wider range of companies and communities.

46. Provision of specific industrial symbiosis training is currently being developed (being accredited by CIWM) and is already aligned with the West Midlands RES and skill agenda for resource efficiency.
47. NISP is actively developing partnerships with universities, particularly at post graduate level. In particular at the University of Surrey Centre for Environmental Strategy, NISP is providing two Engineering Doctorate placements. PhDs are also underway in association with NISP at Boston University, USA, Swansea Business School, and Surrey and Aberdeen Universities.
48. Similarly, with NISP's active collaboration with the Environment Agency (specifically NetRegs) the programme is also working to meet the demands of industry for greater understanding of regulatory frameworks.

November 2007

Memorandum by Oakdene Hollins Ltd and the Centre for Remanufacture and Re-use

Oakdene Hollins is a sustainable technology and waste economics consultancy, which works for business and government in the area of innovation, sustainability and resource management. We have co-ordinated DTI (now BERR)-funded collaborative research programmes such as the Sustainable Technologies Initiative, which focus on waste reduction, and currently co-ordinate the Towards Zero Emissions theme of the Technology Programme operated by the Technology Strategy Board. The Centre for Remanufacture and Reuse promotes these service-orientated strategies where it is environmentally beneficial.

BETTER DESIGN AND THE USE OF MATERIALS

Design appears often to be trapped in the “front end” of new product creation without reference to the “back end” of end of life management. What is lacking is some over-arching strategic concern that connects the “front” and the “back” and seeks to minimise life cycle impacts. Exemplar companies achieve this through a strong senior commitment to sustainability goals—Interface, Milliken, Patagonia immediately come to mind (“Sustainable design comes from sustainable companies”). Therefore it seems that a narrow focus on “better design” or on designers will not be as fruitful as a focus on gaining senior management commitment, and translating this through areas such as marketing (especially) and finance. Initial product conceptualisation and the product brief may be more important than “better design” when many of the product attributes have already been determined. The literature on green product design (Charter et al) I believe will generally support this supposition.

At present much of better design and new materials are not achieving the absolute decoupling of resource use. A good example is the sustainable use of lightweight materials in automotive and aerospace, which Cranfield and ourselves have jointly reported on recently on behalf of the Resource Efficiency Knowledge Transfer Network. Despite the lightweighting of many components within cars, the absolute weight of cars has been increasing, due largely to the subordination of environmental goals to criteria felt by the end-system integrator (ie the car manufacturer) to be more important to the buying public (CD players, air conditioning, electric windows, crash bars etc).

BUSINESS FRAMEWORK

We have an unease with current initiatives on sustainable design. Although carried out by expert practitioners and by organisations well respected in delivering resource efficiency advice, the penetration and uptake of such initiatives is far below that necessary to make a significant impact. The Centre for Remanufacture and Reuse is considering carrying out its own scoping work on how sustainable design is best facilitated and supported, so we are extremely interested in the outcome of this enquiry. We would support a radical re-think of business support mechanisms in this area.

GOVERNMENT POLICY

The objectives of many EU Directives on the environment, particularly those with extended producer responsibility measures—the End of Life Vehicle (ELV) Directive, the WEEE Directive, the Batteries Directive—are disappointing with respect to encouraging more sustainable products. Often their objectives are expressed as minimum recycling rates. Hence large consumption of resources is permissible if associated with high recycling rates. However—and the Batteries Directive is a good example of this—high recycling rates come with a high cost of carbon and other impacts due to the collection and processing infrastructure required to deliver this recycling. Better objectives would perhaps be to set absolute limits (per person) of pollutants to

be emitted uncontrolled into the biosphere eg XXXX grammes of Nickel per person per year. This would give greater flexibility to enact the Directive by decoupling resource use via use of rechargeable batteries, use of non-chemical energy stores (Bayliss wind up radios and lamps, for example).

CONSUMER BEHAVIOUR

We have already commented on the need for engagement of marketing departments and over-arching senior commitment/company culture.

Generally, the most sustainable behaviour is through the displacement of primary purchase of goods, as shown in the carbon impacts appendices of the Waste Strategy (NB this may not be the case for energy-using products). The most usual way to achieve this is by making things last longer. However there is a lack of emphasis in product durability in today's consumer culture. The clothes industry is an important exemplar of this. Despite recent discussions of "slow fashion", fashion cycles are getting shorter and fashion is getting "faster". On the other hand, there is also more interest in using cascaded ownership (eBay, freecycle) for clothes to a greater extent among younger people, which has sustainability benefits if primary manufacture is displaced. Clothing is excellent area in which to examine the principles of sustainable design, to look at innovative models of ownership and design for end of life management.

October 2007

Memorandum by the Waste & Resources Action Programme (WRAP)

WRAP welcomes the opportunity to comment on the Waste Reduction inquiry.

INTRODUCTION

1. The Waste & Resources Action Programme (WRAP) is a not-for-profit UK company providing recycling and resource efficiency programmes for Defra, the Scottish Executive, the Welsh Assembly and the Northern Ireland Assembly. The organisation was formed in 2000 to implement a number of the actions set out in the Government White Paper *Waste Strategy 2000*.⁵
2. WRAP works in partnership to encourage and enable businesses and consumers to be more efficient in their use of materials, reduce wastes and to recycle more things more often. This helps to divert waste from landfill, reduce carbon emissions and improve our environment.
3. WRAP operates at the top end of the waste hierarchy, which gives priority to reducing waste at source, reusing products and recycling materials. One of the major programmes within our current business plan aims to address waste reduction issues as they arise in the food sector. WRAP introduced the Courtauld Commitment in July 2005 as a means of securing the commitment of major retailers to concrete actions to address packaging waste reduction. Thirteen of the largest grocery retailers are signed up to actions that, with WRAP, will help to design out packaging waste growth by 2008 and to deliver absolute reductions in packaging waste by March 2010. And more recently, 14 major food manufacturers have joined the Courtauld Commitment.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

4. WRAP believes that better design and appropriate materials selection have a central role to play in minimising waste. Since 2005, we have worked with the retail as well as food and drink manufacturing sectors under the auspices of the Courtauld Commitment to develop waste saving solutions that involve and benefit the whole supply chain and consumers. These solutions include developing new and innovative packaging materials, technologies and formats; reducing the weight of packaging, increasing the use of refill and self-dispensing systems, collaborating on packaging design guidance, and increasing the amount of recycled content packaging used by the industry.

⁵ Department of the Environment, Transport and the Regions (2000), *Waste Strategy 2000 for England and Wales*, Parts 1 & 2, Cm 4693-1&2, London: Stationery Office.

5. For example, WRAP has worked with manufacturers, brand owners and retailers to develop a range of innovative lightweight glass food and drink containers that resulted in 36,500 tonnes of glass savings within the first 12 months following the project. Another of our projects has resulted in the development of a new pack sealing technology, the Integrity Seal, which reduces the amount of packaging material by a 10% and increases the products' shelf life as the controlled atmosphere within the pack that helps to preserve the food more effectively.

6. The Design Council⁶ has undertaken research that highlights the fact that up to 80% of the resources and energy required to manufacture a product are determined at the design stage. This highlights the important role design has in ensuring an efficient use of resources.

7. There are many barriers that can be encountered in translating and applying knowledge in this area. Many designers remain focused on the functionality and aesthetics of a product and are largely unaware of resource implications and environmental impacts of their designs. Some industries also suffer from a fundamental skills gap. For example, in the food industry it is estimated that one in four food technologist posts remain vacant and one in five packaging technology posts remain vacant.

8. WRAP has been working with the design community for some time to help designers of food and grocery packaging to optimise the use of material in their designs. Recently we have published an *Evolving Guide to Packaging Design*⁷ and also provide concept rooms, market, consumer and technical research, international best practice and a range of other tools and resources for designers and specifiers alike, on-line.⁸ The aim is to help overcome the barriers to creating more resource efficient packaging.

9. WRAP is also working with the construction sector and its clients to reduce waste in construction projects. It has been estimated that the design of the structure and of the delivery approach can account for over 10 times the cost of disposing on construction waste.⁹ Materials choice and standardisation are key issues in designing out waste in building projects, whilst materials mass balance approaches are critical in civil engineering projects in ensuring that materials from site are re-incorporated back to avoid surpluses.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

10. Choosing the most appropriate materials from which products and packaging are made is a fundamental part of product and packaging design. Many factors affect the decisions that are made on the materials that can be used, including:

- Physical, chemical, functional and structural properties (eg durability, ability to contain acidic liquids, etc);
- How easy it is to machine the material;
- Barrier properties (eg provision of oxygen or grease barrier in food packaging);
- Consumer preferences;
- Recyclability and recycled content (eg Ribena, for example, has just introduced 100% recycled PET bottles);
- Whether materials are certified as food grade or covered by European regulations for materials that come into contact with food; and
- Sustainable/ethical sourcing.

11. Historically, sustainability has not been high on the list of factors which designers take into account. Work by the Design Council, Envirowise, WRAP and others has been trying to raise this issue higher on the agenda, particularly in retail and construction which between them account for 40% of the waste produced in the UK. There is some evidence of change as highlighted below.

12. Consumer research also suggests that the ability of the material to be recycled in the UK is increasingly important for consumers and this is the beginning to input on designers working in retail.

⁶ <http://www.designcouncil.org.uk/en/>

⁷ http://www.wrap.org.uk/retail/the_guide_to_evolutionary_packaging_design/index.html

⁸ To access the mentioned tools, please go to www.wrap.org.uk/retail

⁹ Envirowise; WRAP (2007) *Benefits of Construction Resource Efficiency* <http://www.envirowise.gov.uk/media/attachments/202895/BRE-Construction-resource-efficiency.pdf>

13. WRAP's manufacturing and construction teams work to encourage businesses to use recycled or reclaimed materials instead of virgin materials. For example, WRAP's construction team has worked with Marks & Spencer to secure a commitment to use 20 – 30% recycled or reclaimed construction materials in its new store builds.
14. WRAP is currently working with the British Retail Consortium (BRC) and the retail sector to ensure that clear and unambiguous information is provided to consumers to tell them whether packaging is or is not widely recyclable. A number of options are currently being consumer tested, and its hoped this will overcome the issues surrounding the provision of clear recycling messages to the consumer.
15. WRAP's research found that most consumers are confused about the wide range of new materials emerging with "biodegradable", "home compostable", "compostable" and "degradable" labels, all being introduced in the UK as bags, pots, trays, films or bottles, albeit in relatively small quantities at present.
16. Consequently, we believe that clear labelling and guidelines for materials is vital along with a better understanding of the full environmental benefits of the new materials. WRAP and other stakeholders are working with the Composting Association to provide a certification service for home compostable packaging, and provide guidance on "compostable" claims that such items carry.
17. WRAP held a roundtable¹⁰ with stakeholders, to discuss the responsible introduction of new compostable and biodegradable packaging materials, which contributed to raising awareness among food retailers of the need to be cautious when introducing these materials (as they can contaminate conventional recycling and composting streams); and the importance of providing clear information to consumers to avoid any confusion over how to dispose of these materials.
18. More recently, there has been a growing interest in understanding and communicating the carbon footprint of products, with a number of retailers and brand-owners working with the Carbon Trust and the British Standards Institution (BSI) to develop a standard approach to carbon foot-printing and carbon labelling. Alliance Boots, Innocent Drinks and Walkers Crisps already display a prototype carbon label on their packaging. This interest in carbon, mirrored in wider society and in government policy, is likely to lead to a much greater focus on the carbon intensity of products and packaging alike. This may push manufacturers and retailers towards the use of less carbon intensive materials like wood and some plastics; and away from more carbon intensive materials like steel, aluminium and glass.
19. In construction terms, materials and product choice is undertaken within the design phases and can be influenced by the clients brief. WRAP has been reviewing the impact of materials use in terms of the impact of waste arising on site and the quick win opportunities within the design that will help reduce impact. Key elements in resource efficient materials can be the use of off-site methods and the ability, where demolition is required, to re-incorporate materials into the newbuild phase.
20. WRAP has reviewed the potential for offsite manufacture and produced eight case studies detailing the potential for waste reduction across a variety of systems and methods.¹¹
21. A step by step approach has also been developed in conjunction with the demolition sector that allows the potential for recovery and reuse of materials from the demolition phase, ie closed loop recycling, by combining the Quality and Demolition Protocols with Site Waste Management Plans.¹²

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

22. Availability is taken into account to some extent through the proxy measure of material cost. Generally though thinking about end of life has tended to be dominated by complying with regulation rather than the end of life impacts.
23. There are signs that this is changing with a focus on carbon emissions associated with different materials. There is also increasing interest in incorporating recycled content and in "closed loop" thinking which can lead to carbon and raw material savings, for example, recycling glass containers back into containers. For more information on the carbon benefits of "closed loop" systems for glass see the glass export report.¹³

¹⁰ WRAP (2007) *Biopolymer Packaging in UK Grocery Market* http://www.wrap.org.uk/downloads/Biopolymer_briefing_final_6th_Sep.6b84b12c.pdf

¹¹ For more information on the case studies and the report go to http://www.wrap.org.uk/construction/construction_waste_minimisation_and_management/offsite.html

¹² WRAP (2007) *Efficient Use of Materials in Regeneration—A Step by Step Guide* http://www.wrap.org.uk/construction/construction_waste_minimisation_and_management/mre_guide.html and WRAP (2005) *The Quality Protocol for The Production of Aggregates from Inert Waste* http://www.aggregain.org.uk/quality/quality_protocols/

¹³ WRAP (2007) *Assessment of the International Trading Markets for Recycled Container Glass and their Environmental Implications* http://www.wrap.org.uk/downloads/MSG007_Final_v2_no_fibre_glass.fd667985.pdf

24. Complete focus on carbon only can distort thinking on material use if other factors aren't taken into consideration. For example, whilst glass containers are heavy and more carbon intensive in manufacture and distribution they can be more readily recycled or reused (eg in doorstep milk deliveries).

25. WRAP has been working with the design community over three years and recognises the importance of introducing end-of-life analysis, as well as other tools that can lead to the right informed decisions being made when it comes to the materials used in packaging. To this end, WRAP has created a Guide to Evolving Packaging Design, which can be found on our website (see above) and is encouraging designers to use it. Envirowise and the Design Council have been working on wider sustainable design for some years and have shown the cost and environmental benefits this can bring.

What impact does the development of new materials have on design?

26. WRAP believes that, although there have been dramatic improvements in sustainable design, there is still a need to educate the design community on the role that all materials, including new ones, can play in resource efficiency and sustainable design. Very few product designers have a detailed knowledge of materials science, and sometimes find it difficult to judge the sustainability of new materials. The complexity of the impact of new materials can be difficult for designers to assess, for example what are the benefits of new biodegradable materials? WRAP and the Green Alliance organised a conference to discuss this issue¹⁴ and WRAP has produced a position statement to try to highlight key issues.¹⁵

27. In construction terms processing of construction and demolition wastes such as recycled aggregates are often perceived as “new” products depending on the applications for which they are being considered. WRAP has worked with the aggregate producers and regulatory bodies to develop a quality protocol¹⁶ for recycled aggregates that provides certainty in use for various applications and confidence to clients that, where fit for purpose (as with any material or product) they can be specified. The AggRegain website (www.aggregain.org.uk), provides a specifiers' tool to help in specification and materials choice for recycled aggregates use.¹⁷

How much interaction is there between material scientists and designers?

28. WRAP has both material scientists and packaging designers in its Retail and Manufacturing teams. Consequently, the information and tools WRAP produces uses the combined knowledge of both of these. However, such interaction is unusual, and there is a lot more scope for both groups to work together.

Can better-designed products offset the increase in consumption?

29. The life span or durability of a product has a major impact on the ongoing consumption of that product. So a well-designed and durable product (or one that has not been designed with built in obsolescence) is more likely to support more sustainable consumption patterns. Products can also be designed to be upgradable (eg personal computers) rather than disposable. Some companies are beginning to introduce so-called “product/service systems” where products are leased instead of sold and the manufacturer of the product remains responsible for the maintenance of the leased product (eg photocopiers, floor coverings). This new business model creates an incentive for the manufacturer / leaser to design and build a durable, reliable and high quality product that requires very little maintenance. There is a well researched scientific literature that supports the view that better design reduces resource use. WRAP can supply further references if this would help.

Are there any other gaps in knowledge and how are they being addressed?

30. As mentioned in our responses above, very few designers have a reasonable working knowledge of materials science, reuse and recyclability. Whilst the government-sponsored Knowledge Transfer Networks attempt to provide information on materials to a wider audience, their ability to attract designers has been limited to date. Other government organisations such as Envirowise have also been active at addressing the knowledge gap. Perhaps the key gap is to ensure that designers have a brief that includes minimising resource use from their customers. This may provide designers with additional incentives. This approach can provide interesting results as illustrated at WRAP's Concept Room.¹⁸ A more active engagement with the design community—perhaps through organisations like the Design Business Association—could help to better inform designers.

¹⁴ <http://www.wrap.org.uk/retail/materials/biodegradable.html>

¹⁵ WRAP (2007) *Biopolymer Packaging in UK Grocery Markets* http://www.wrap.org.uk/downloads/Biopolymer_briefing_final_6th_Sep.588c2276.pdf

¹⁶ http://www.aggregain.org.uk/quality/quality_protocols/

¹⁷ <http://www.aggregain.org.uk/specifier/index.html>

¹⁸ www.wrap.org.uk/retail/tools_for_change/concept_room

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

31. There has been a gradual positive shift regarding the support and incentives of sustainable products and processes in the policy framework. There are many examples that show this shift in current legislation. However, a stronger legislative emphasis should be placed on waste reduction in order to see greater and more rapid changes.

32. Following the emphasis that the 2006 Northern Irish Waste Management Strategy placed on waste reduction, the Waste Strategy for England 2007 (WS 2007) adds to this by placing a greater focus on the issue than it did previously.

33. The WS 2007 pays special attention to the waste materials with the greatest scope for improving environmental outcomes, such as paper, food and garden waste, aluminium, glass, plastics, wood, and textiles. Not only this, but a number of business sectors are identified as the target sectors for reducing waste. Among them are the retail sector, the food industry and the construction industry.

34. Furthermore, the WS 2007 identifies various actions that emphasise the importance of product design when it comes to waste reduction. Some examples are the lightweighting of glass containers, and the increase of recycled plastic and recycled content of certain plastic containers.

35. Additionally, Defra is planning to launch its new Products and Materials Unit, which will lead in the areas of product design and product policy.

36. Defra's targets regarding waste reduction are consistent across ministerial departments, which shows a very positive commitment from the Government on this issue. For example, the WS 2007 proposes a possible target of halving the amount of construction, demolition and excavation waste going to landfill by 2012 as a result of waste reduction, reuse and recycling. This target has also been included in the BERR draft Sustainable Construction strategy currently out for consultation.¹⁹

37. Within this regulatory framework, WRAP has been working with the UK's top 12 grocery retailers and many major brands since their signing of the Courtauld Commitment, developing both a range of actions and long-term initiatives that would enable the retailers to embed household waste reduction in their corporate strategies.

38. Although the current system is producing good results, if signatories are not deemed to have delivered to their full capacity, this approach could be reinforced by the threat of legislative action, as is the case in Scotland.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

39. At the moment, there are not enough initiatives that link eco-design and sustainable design to mainstream business management. This has two implications; for business this means that it is not exposed to the latest thinking in—and benefits of—sustainable design, and for sustainable designers a lack of exposure to the business community means that they very often aren't equipped with the entrepreneurial skills necessary to bring their designs to market. There are some organisations and fora that are trying to rectify this situation. For example, the Centre for Sustainable Design (www.cfsd.org.uk) and the Sustainable Design Forum sponsored by BERR.

What other measures can promote a focus on waste reduction among businesses?

40. WRAP would encourage the introduction of a variable Value Added Tax (VAT), with a lower VAT for products that are more sustainable. This would contribute to making sustainable products more cost-effective, as well as more attractive to the consumer.

¹⁹ <http://www.dti.gov.uk/sectors/construction/sustainability/page13691.html>

41. WRAP would also suggest that Enhanced Capital Allowances (ECAs) should be made available to the waste management industry to improve the investment case for new waste treatment technologies (as long as such incentives are designed to reinforce the waste hierarchy). This would allow the waste management industry to invest in new infrastructure that meets the needs of all types and sizes of food and drink companies, as well as to take account of the needs of the municipal waste stream. Enhanced capital allowances could also be deployed to encourage the development of a sustainable products industry.

42. In construction, the implementation of Site Waste Management Plans (SWMPs) as a regulatory requirement will provide a level playing across construction projects above a pre-determined value. Coupled with the landfill tax escalator for disposal of inert and non-inert wastes (currently £2/24 respectively) the cost of waste compared to the benefits of waste reduction and improving recovery and recycling will become increasingly visible to both contractors and their clients as part of overall project costs. WRAP has used the SWMP as framework to help embed good and best practices that will enable both cost and environmental benefits to be realised.²⁰ However, there is significant work required in getting the message across to constructors and clients in order to ensure requirements are set to develop SWMPs early enough within project design in order to maximise the opportunities to reduce waste.

What lessons can business learn from international experience?

43. WRAP has created a web-based searchable database and image back, with more than 200 successful and innovative retail packaging formats and product designs from all around the world. This database is continuously updated with innovative packaging designs identified through global intelligence and market research agencies. We also have a large list of case studies which provide information and advice on the best-practice solutions. All of these resources are available through the WRAP website at www.wrap.org.uk/retail.

44. We would be happy to provide evidence of international and national best practice packaging design and the broader work we are doing to encourage and support a more sustainable retail and food and drink manufacturing sector.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

45. Defra published the Waste Strategy for England in May 2007, which places greater emphasis on waste reduction. The Government's role should be to encourage positive changes by setting and communicating clear waste reduction targets—but not necessarily prescribing the ways in which industry achieves these targets. This provides business and industry with flexibility and does not stifle innovation.

46. Where government departments, agencies or delivery bodies identify market failures they should determine the most appropriate interventions, whilst not creating anti-competitive situations that go against the principles of the European Single Market. These interventions could include R&D to overcome technical barriers to waste minimisation or targeted grant aid to trial new technologies or solutions.

How does Government policy link up with European strategies and action plans?

47. The UK Government and European Union (EU) policies on waste prevention are very much connected.

48. The EU Member States revised the Waste Framework Directive on the 28 June 2007. This revision reinforced waste reduction as the top priority and, therefore, as being at the top of the waste hierarchy. However, concrete waste prevention policies were agreed to be the responsibility of the EU Member States. Therefore, the Waste Strategy for England fits in with the broader European waste agenda.

49. However, in order to achieve greater results, a deeper commitment from the national and European layers of Government would be welcome.

²⁰ http://www.wrap.org.uk/construction/construction_waste_minimisation_and_management/onsite/agp_waste_minman.html

What lessons can be learnt from other countries—within the EU and globally?

50. Other EU Member States have used a variety of policy instruments to reduce waste, including the development of voluntary industry agreements and covenants in the Netherlands, encouraging the development of product/service/leasing systems in Denmark (see comments above). Some countries have passed legislation or policies that simply ban wasteful products or encourage industry agreements that achieve the same goal.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

51. WRAP considers that encouraging change is part of the process of optimising packaging and reducing household food waste successfully. Furthermore, changing the packaging is an opportunity to add value to the product, and to strengthen the bond between the consumer and the brand; also, the new packaging could advertise its positive environmental impact, point out that the brand is taking corporate responsibility seriously, make reuse of packaging a positive experience by offering the consumer an enhanced experience, and build the consumer's view into the design process.

52. For example, WRAP worked with Coors Brewers Ltd on a new lightweight version of the 300ml Grolsch bottle. Apart from reducing the bottle's weight by 13 per cent, the new design retained the classic bottle profile, with no detrimental effect on brand image or bottle strength. The new bottle proved so successful that Coors Brewers Ltd have further lightweighted their 300ml Grolsch and Coors Fine Light bottles, saving an additional 4,000 tonnes each year.

53. WRAP realises that consumer behaviour is the key when it comes to waste reduction, not only where packaging is concerned, but also with regard to food waste. Our recent research suggests that households throw away between £250 and £400 of potentially edible food each year. This is estimated to be 6.7 million tonnes of household food waste produced every year in the UK, most of which ends up in landfill.

54. WRAP is committed to working with our stakeholders and partners to reduce consumer food waste by 100,000 tonnes by March 2008. We are currently working on a new campaign that aims to tackle food waste. In a few days, WRAP will launch a new consumer-facing food waste campaign²¹ which will develop new approaches to help consumers to get the most out of their food. This will include both communication and technical solutions.

What role do marketing strategies play in influencing more sustainable design?

55. Marketing has a central role in promoting sustainable design. In February 2007, WRAP carried out trials in Tesco aimed at reducing the number of two-for-one offers. Tesco introduced a new scheme which encouraged the buyer to choose five ingredients while only paying for four. This initiative was very popular with customers as they felt the promotion was more about Tesco helping them to fulfil the ingredients for a meal rather than selling them a second unit of the same product, which they might end up wasting.

SKILLS

How is sustainable design integrated into the design syllabus?

56. Although there are some exceptions, most education programmes in design do not place enough importance on sustainable design. This needs to be at the core of all design, material science and engineering courses, underpinning every module, rather than being treated as a separate, often optional, module. Some good examples of sustainable design included in academic courses include the MSc in Sustainable Design at Cranfield University, modules on sustainable design at Sheffield Hallam, the Centre for Sustainable Design and the Royal College of Art.

²¹ See <http://www.lovefoodhatewaste.com/> for more information on the Love Food Hate Waste campaign.

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

57. In the case of the construction sector, sustainability is not currently a consistent element in construction training courses. Basic training for on-site operatives are delivered through simple “toolbox” talks and WRAP has developed a number of these to help promote the implementation of SWMPs. WRAP has also worked jointly with Envirowise to deliver regional training on introduction to, and developing good practice in, SWMPs.²² These training events are recognised by the Construction Industry Training Board (CITB).

58. WRAP has also supported the Chartered Institute of Waste Management in the development of the Waste Awareness Certificate for site operatives.²³

59. WRAP recognises however that further work with both clients and contractors is required in order to raise awareness and improve the overall knowledge (and benefits) of materials resource efficiency.

29 October 2007

Examination of Witnesses

Witnesses: DR MARTIN GIBSON, Director, Envirowise, DR LIZ GOODWIN, Chief Executive, WRAP, MR PETER LAYBOURN, Director, NISP, and MR NICHOLAS MORLEY, Director of Sustainable Innovation, Oakdene Hollins Ltd and the Centre for Remanufacture and Re-use, examined.

Q188 Chairman: Good morning. Could I perhaps ask you to introduce yourselves starting with Mr Laybourn?

Mr Laybourn: Good morning. Thank you for the invitation to give evidence. Would it be possible to do a very brief introduction?

Q189 Chairman: I do not think that is necessary. You have provided us with written evidence. We would expect you to bring out what you have to say in the responses. We are a little bit pushed for time and if we give everybody that opportunity it takes up about 15 minutes before we get started. I am sorry.

Mr Laybourn: My name is Peter Laybourn, Director of the National Industrial Symbiosis Programme, which is a cross-sector business-led programme with about 10,000 member companies in its network.

Dr Goodwin: My name is Liz Goodwin. I am Chief Executive of WRAP, the Waste & Resources Action Programme. We work with individuals, businesses and local authorities to reduce waste and recycle more.

Dr Gibson: My name is Martin Gibson. I am Director of Envirowise, which is a government programme to help businesses reduce the production of waste in the first place.

Mr Morley: My name is Nick Morley. I am Director of Sustainable Innovation at a company called Oakdene Hollins Ltd. We are a waste economics and sustainable innovation company and we also run the Centre for Remanufacturing and Reuse.

Q190 Chairman: The cynic might say that maybe there is a bit of waste in the advice given on waste management. There seems to be the danger of overlap. How do you avoid that? Where you have a common interest between groups like yours how do you introduce clients to the other person who might

be able to help? Do you work closely together? Is there a degree of overlap? How do you avoid overlapping too much and then generating your own waste as it were?

Dr Goodwin: I think we have all got very clear remits, but we do work very closely together. In the case of both NISP and Envirowise, we have regular liaison meetings and where we identify specific areas where we are working on the same subject we work very closely together. For example, with Envirowise we are both working with the construction sector and with the retail sector and we are currently developing a joint business plan for 2008, which means that those programmes will be delivered as a single joint programme and that means that businesses will get a seamless approach when they come to see one of us and will be able to interact with both organisations.

Dr Gibson: With NISP, for example, we have joint projects in the south-west and in the north-east. We also make sure that when our advisers are on the ground they do signpost to other organisations where necessary. It is very much our feeling that it should not matter who the company comes to or which body the company comes to, they should get the right advice and we pass them on as necessary and as appropriate.

Mr Laybourn: We do in fact have very similar objectives but our approaches are very complementary and very different. I do believe it is a bit of an urban myth that there is an overlap here; we certainly have not found it. We are working very closely with Envirowise particularly at the regional level and we support WRAP in their excellent work on waste protocols with the Environment Agency.

Q191 Chairman: We are not trying to promulgate myths here, we are trying to kill them! How do manufacturers learn about your activities? How

²² http://www.wrap.org.uk/construction/construction_waste_minimisation_and_management/swmps.html

²³ <http://www.wasteawareness.org/>

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successful have you been? What proportion of manufacturing enterprises do you reach and touch in your activities jointly or individually?

Dr Gibson: I think Envirowise probably has the widest remit for contacting the businesses. We are available for use by any business in the UK, not just manufacturing. We target sectors where we think we can help the business by giving them advice so they can reduce resource use, save money and improve the environment. We do a lot of work with the industry organisations such as the Engineering Employers Federation, the Federation of Small Business and the like to get to businesses where they would normally look for advice, but we do also run marketing programmes nationwide to help draw people into the programme and then we pass them on to other programmes as necessary. Within specific sectors where we have worked for a long time we expect to be known by 40 to 50 per cent of our target market, which are all businesses over 20. Businesses smaller than that are welcome to come to us and they will get support, but we do not necessarily target them as strongly.

Q192 Chairman: What about the other members, SMEs in particular?

Dr Goodwin: Our work with the SMEs is generally focused around the SMEs in the recycling and reprocessing sector, we tend to focus on those organisations and we work with them over a number of years, from their business plan development and through their growth stage.

Mr Morley: The Centre tends to use a mixture. A lot of remanufacturing companies are SMEs and therefore we work with them. In terms of our own organisation's relationship with other bodies, we sit slightly back and behind what we might call programmes that are relating to delivering things on the ground, although we do that ourselves. We tend to be doing a lot of support work for organisations like Envirowise in the remanufacturing and reuse area; that is our remit and role if you like. Yes, there are a lot of SMEs in the remanufacturing sector, which is very much a hidden sector and it is not often brought out in the general resource efficiency and recycling area.

Mr Laybourn: The growth of our membership to approximately 10,000 since 2005 has largely been achieved by networking and business-to-business recommendations. We also work closely with some of the professional bodies such as IEMA and CIWM.

Q193 Lord Methuen: Mr Morley, you are talking about recycling and reuse. What sort of things are your members reprocessing?

Mr Morley: The remanufacturing industry may either be carried out by original equipment manufacturers, so it can be the person who made the equipment in the first place and a good example of that would be Rolls-Royce who remanufacture aero engines. They perhaps would not call it remanufacturing, but your aero engine goes through a number of rebuild steps both in domestic and defence terms. A very good example is Caterpillar who make earth moving equipment and also own Perkins who make diesel engines. Another model of remanufacturing is where it is carried out by small independent companies. A good example would be toner cartridges and inkjet cartridges for your printer where typically that is not carried out by Hewlett Packard or Canon or Epson but rather by small independent companies perhaps working under own-label agreements.

Q194 Chairman: Do you think you get much positive support and assistance from the Hewlett Packards of this world in your recycling?

Mr Morley: Are you talking here about remanufacturing, reuse?

Q195 Chairman: Yes, that is what I am talking about.

Mr Morley: My understanding is Hewlett Packard support recycling because obviously one can see that there is an obvious risk of cannibalising your own sales with remanufactured product. If you solely manufacture products you want people to buy a new Hewlett Packard inkjet cartridge. Some original equipment manufacturers engage with remanufacturing and either carry it out themselves or contract it out to independents and are quite pro it. Other original equipment manufacturers are very anti it because they see it cannibalising sales and definitely do not want it, and there is a bit of a war going on where they do not want to see it happen.

Chairman: There was a programme on *You and Yours* during the recess that drew attention to the fact that Hewlett Packard would always be as happy for you to buy a new photocopier or computer printer rather than actually buying some of their ink because it was cheaper to get it in that form. I am led to believe the European Commission is having an inquiry into what some would regard as rip-offs. I have just put in a cartridge that was recycled, but every time I switch the thing on I have to press a button to shut out something from Hewlett Packard telling me to realign and it is just a real nuisance. It seemed to me to be a punishment for being a recycler rather than a purchaser of Hewlett Packard's equipment.

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Q196 Lord Crickhowell: What more could be done to increase awareness of waste reduction as a business opportunity?

Dr Goodwin: I think a lot can be done right from the basic level of more case studies. As we all work with organisations we produce a lot of case studies. To really embed change you actually need to look at other ways of getting the message to a very wide audience and because that audience is so broad that can be quite a challenge. In particular we work with some of the major retailers and major construction sector clients. We then rely on them to drive through the supply chain to raise the awareness with all the SMEs that they engage with as part of their supply chain and we find that is a very effective way of getting that message across.

Dr Gibson: I think another way of doing it is to change some of the language used. We are here talking about waste reduction, but the benefit to business comes from reducing resource use. In the previous session I noticed Mr Glass was talking about the fact that many companies can benefit by reducing resource use, but if you look at waste, it tends to be done at an operational level far removed from management whereas resources tend to be a management issue. If we want to engage in the sort of cultural change and the sort of change in behaviour needed to reduce resource wastage then we need to make it more of a management issue. I would say perhaps we need to stop talking about waste and start talking about resource inefficiency. There are a lot of successful single issue marketing campaigns. We have noticed that businesses are taking on the idea of footprinting, particularly with respect to carbon and that is working very positively at the moment, with senior management aware as well as operational staff, but there is a danger there that they can be too narrow. So carbon footprinting can often stop at direct energy use whereas the largest carbon footprint for most companies is in the resources that they are using, the materials. We need to expand that so they understand that material use is very important and there are benefits to reducing it. In the waste area, recycling is an area where we have a very simple good message and people are increasing their recycling, but again the benefits to the business and environmentally come from reducing resource use in the first place. So if we can move them on now from recycling to making sure that they use everything efficiently then that would be an excellent idea. Let me just use the example of paper. A lot of companies are now recycling paper, but if you look in their recycling bins, they have only printed on one side, whereas if they had printed on two sides they could almost half the amount of paper they use in the first place. That is the sort of thinking we need to bring across.

Mr Morley: We have just completed a study for Defra looking at some quick wins in resource efficiency, low cost and no cost improvements and how they can be done. One of the outputs of that study is that the companies that make the most use of business support services to reduce waste are those companies that are already performing well. It is the well-performing businesses that take advantage of waste reduction opportunities. I think there is the interesting question of how you reach the laggards and the less well-performing businesses. I think there may be opportunities through benchmarking, through maybe trying different routes into those businesses perhaps with the finance sector, for example, because often they perceive themselves as performing quite well when in fact they are laggards in terms of overall business resource efficiency.

Mr Laybourn: I think I can give a very good example there, which is the NISP programme presenting itself as a business opportunity programme. This year we diverted something like 2 million tonnes away from landfill at a cost of 17p a tonne. I think it is also about working, as I mentioned, with the professional bodies. The Business Links who are under the remit of the Regional Development Agencies, have an important job to do for the future to get this business case across. I would also like to put in a word for the BREW Centre for Local Authorities who can distribute best practice out of the local authority in a very effective and efficient manner.

Q197 Lord Crickhowell: I suppose it is inevitable that when we start posing this question you come up with some proposals which suggest that the Government should do more in one way or another by providing incentives. I notice that WRAP says that a variable value added tax with a lower VAT for products that are more sustainable would be a good idea. I think you might have some difficulty in getting it past the European Community. I am not at all clear how such a system could be anything but complex because presumably you have to start by having some pretty clear definitions of what are more sustainable before you start taxing people at different levels in a way that would be deemed acceptable. Is this really a serious proposal?

Dr Goodwin: I think it is an option. You would then start to work with people like BSI to define some of those standards and specifications. Another option we have been talking to the retailers about through the Courtauld Commitment is to specify recycled content in packaging. The retail sector is a huge market and a huge pool of recycled materials can go back into the economy through simple things like specifying 50 per cent recycled content on all their plastic packaging. That would provide an enormous market for plastics.

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Q198 Lord Crickhowell: Let us pursue this a little because you have put it forward as a specific proposal. Have you actually worked out a workable scheme for a variable VAT which would be taken seriously by any Treasury team or Chancellor of the Exchequer?

Dr Goodwin: No, we have not.

Q199 Lord Crickhowell: It seems to me that if we are going to put forward a proposal like that, which would be a pretty significant sort of proposal, it has got to be realistic, has it not?

Dr Goodwin: Yes, it has. It is something we have talked to colleagues in Defra about and something we have talked to businesses we work with about, on whether or not that sort of approach might work. We certainly have not worked it out in any detail.

Q200 Lord Crickhowell: Some of us are slaving away at the moment on the major Bill going through the House on global warming and we are coming, in our last day on the Committee Stage, to a number of amendments dealing with waste. When you talk about strengthening the policy framework with legislation, are there any particular things we should be looking at in that as we look at the Climate Change Bill or any other measures?

Dr Goodwin: The Climate Change Bill has obviously got the provisions in it for pilot schemes for incentive charging and WRAP supports that as a principle and as a potential way forward. There is evidence from overseas that incentive charging can provide a huge stimulus to increased recycling. The important thing is that we have got to see whether that learning from overseas can be translated into a UK environment and hence the idea of actually running some pilots to see whether that learning can be implemented in the UK, I think, is a good way forward.

Mr Morley: VAT is charged at a lower rate in micro-generation. That is an example of where they have looked at differential rates of charging VAT in order to encourage the uptake of what is seen as more sustainable products.

Mr Laybourn: I think we are being encouraged by Defra to focus on some of those waste streams that have got very high embedded energy. We have a very comprehensive database to support that sort of approach.

Q201 Lord Crickhowell: How should sustainable design be promoted to business? Are there currently difficulties in that respect?

Dr Gibson: Envirowise has a programme to help companies with improving their design particularly in the areas of electronics and packaging because that is where there is the greatest uptake at the moment and indeed we work with WRAP on packaging as

well. There are a number of barriers to improved design, one of them being cultural in that designers are looking to design a product and they look a lot at the functionality and the appeal of the product rather than embedding in the efficient use of resources and how it is disposed. We have noticed that when we have worked with designers they are very open to taking on new ideas about the more efficient use of resources and how things will be affected when they are disposed of and perhaps how they are reused. I think it is mainly about education and embedding into design practice consideration of environmental issues more.

Q202 Lord Lewis of Newnham: Can I first of all say that I am most impressed by your remarks about using resource management because I think the word waste has a negative side associated with it whereas you are talking about a very much more positive term in that particular way. It also means that one can include things that perhaps one would conventionally regard as waste. To me waste is very often and very much a material sort of solid thing whereas in your definition we would include things like energy or even manpower and things of this particular sort, which I think is a very important part of the whole of this particular problem. If we turn to a specific point, which has been the packaging problem because this has been one where legislation has been in place for quite a period of time, the Courtauld Commitment has been very successful in encouraging manufacturers to reduce packaging. What motivates companies to join this commitment and how can these conditions be replicated for other sections of the waste streams? It does strike me that in this we have a certain degree of a success story. Can we apply it to other areas?

Dr Goodwin: Yes, I think we can. I think there are probably three reasons why the retailers and now some of their brands are signing up to the Courtauld Agreement. The first was that their own research was telling them that their consumers were concerned about packaging and they wanted them to do something about it; they were getting bombarded with consumer feedback. Secondly, they realised that there was some cost-saving potential for them as a business because they would use less packaging themselves and there was obviously the scarcity of resources, increasing raw materials and energy prices associated with that. Thirdly, they saw it as a way to provide an innovation spurt into their business and in the way they thought about their whole supply chain and the way they managed getting the materials from the manufacturer to the householder. I think they felt that they probably wanted to make sure that the Government did not intervene and put in more legislation, so they felt they needed to be seen to be

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doing something as well. That was probably in the back of their mind as well. The growing awareness that there has been more generally about the environment in accordance with climate change has just increased that pressure. We have seen this momentum building in terms of the retailers coming out with their own commitments and setting themselves targets and almost trying to leapfrog each other in terms of how they are stretching those targets and we are starting to see some real progress. All the signs are that we will achieve the first target, which is this year, for packaging as a result of that commitment. In terms of applicability to other sectors, yes I think it definitely is applicable. We are currently working on some plans with the construction sector. We have already got an agreement for plasterboard as one tiny part of that construction sector, but we are looking more broadly at the construction sector as well. I am sure there are other areas where it could equally be applicable, maybe electricals and maybe even in some of the energy areas as well.

Dr Gibson: We are working with the Food and Drink Federation to apply the Federation House Commitment on water use and reducing water use and companies will sign up to that. We think one of the key successes behind the Courtauld Commitment approach that WRAP has taken is following up with support and advice to the companies after they have signed up and that is critical. Some of you may remember there was the Making a Corporate Commitment campaign about ten years ago on energy, which was an excellent idea, but there was perhaps a lack of follow-up after it. The implementation was not as great as it might have been. Hopefully this time it will be better.

Dr Goodwin: It was very noticeable in WRAP, when we got the first key signatories to the commitment, the amount of resource required from the organisation to back that up. We needed technical expertise to provide information and advice to those companies. We got a deluge of requests for support and we had to gear up to actually be able to support that need.

Q203 Lord Lewis of Newnham: This seems a very important point to me, that you must have the support structure. This is fine, but you mentioned electronics and things of this nature. Where would you envisage the responsibility for such a support system would come from?

Dr Goodwin: Good question! It would depend on who was tasked with doing that job. If WRAP was tasked with that task then we would have to build the expertise. That is what we did with the retail sector, we built that expertise before the Courtauld Commitment. We did not have a team sitting there

with expertise on packaging and expertise around waste minimisation issues to do with packaging. I think a lot of the retailers have lost those skills and knowledge in their own design teams and they are now looking to us to see whether they can fill those gaps using our expertise. Whoever is given the task would need to build that expertise.

Dr Gibson: We feel very strongly that government programmes are there to help market failures, so raise awareness, show companies the benefits, but it is very important that there is a point at which the private sector takes over and private consultancies take over. Once the infrastructure and the understanding in business is in place that there is actually a commercial market --- That is part of what we believe that government programmes are there to do, to stimulate the industry to provide the services that business needs.

Lord Lewis of Newnham: I also like the point that Dr Goodwin made, which I think was that one of the most important incentives with that was that the Government was just there and possibly going to do something if you did not.

Q204 Lord Methuen: Have you been successful in getting SMEs to join the Courtauld Commitment?

Dr Goodwin: We do not target SMEs, we have just targeted large companies and then the impact of that gets fed through the supply chain. For example, we work with Tesco and Tesco then goes out to its supply chain.

Q205 Chairman: I get the impression that what you are doing is you are getting the message through. Someone referred to the laggards. What do we do with the laggards? Do we hope that they wither on the vine of their own wastefulness or do you introduce regulations with all the political difficulties that that creates for Government?

Dr Gibson: Our belief is that the laggards will disappear over time. We are already seeing quite a bit of evidence that major businesses are now embedding good environmental and even sustainability practice into their day-to-day activity. It will become part of the way that we do business in this country and hopefully around the world very much in the way that safety has changed over the decades to become part of what you expect today. Hopefully that will be one way that the laggards will go, but I agree with Nick Morley that there is probably more targeting we can do to help some who might not be laggards with a bit of help.

Q206 Chairman: John Maynard Keates did say that "In the long run, we're all dead"! That takes rather longer than the planet or ourselves—we wish!

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Mr Laybourn: We tend to attract the more proactive companies and the fitter companies in the programme, but as the network grows so quickly, like Martin said, we do believe that the laggards will fall behind and be shown up by the examples of these other companies. Long-term engagement with companies does bear more results. I can give you the example of UK Coal where we had a short intervention, but we kept behind them and they are now doing some marvellous things. That long-term engagement with a company is very important indeed.

Lord Crickhowell: Have you any thoughts about what is one of the central areas of waste among retail organisations and that is that they have to market their products? They usually market their products by sending out vast quantities of paper, usually in quadruplicate or worse, which pour through my door. Usually once you have ordered a product you then get not just one repeat offer to come again but probably four or five because they widen the network. I throw away daily a quantity of paper of a simply staggering scale. Do your organisations have any thoughts or ideas about how this dilemma is met? Naturally organisations want to send out catalogues to persuade people to buy. The network of catalogues somehow grows in a way that I have never quite understood so that you then get four or five coming from different sources and they go on, again and again and again, even if you never buy their product. I should have thought, compared with the packaging, this must be one of the largest areas of unwanted and sometimes extremely irritating waste that the ordinary customer has to deal with and the householder is now being threatened with possible charging by local authorities and others to dispose of the waste over which they have no control at all about input. Do your organisations have any thoughts? Is this problem being addressed at all?

Q207 Baroness Platt of Writtle: I wonder if I can just come in and add to that. These catalogues are in fact also leading to built-in obsolescence; it is leading to even more waste.

Dr Gibson: The second point is quite difficult. I think the Direct Marketing Association is looking at best practice and members of that hopefully will take on board the idea of not sending you things if you ask for them not to be sent to you. I am not in favour of regulation because I think it would be a very difficult thing to police in this area, but I feel—and this is not from my organisation’s viewpoint—that if you return post then there should be an obligation on those having it returned to listen to you and not send it to you again.

Q208 Earl of Selborne: In the earlier session you might have heard us discuss Government procurement policy and I think we would all recognise that such a significant procurer as the public sector could make a very great impact on waste minimisation and promulgating good practice, but our earlier witnesses said we were not doing a particularly good job compared to the United States and others. What do you think could be done to improve public procurement to encourage waste reduction?

Dr Goodwin: I think there is a lot that they could do in terms of influencing the sustainability of products that are on the market through specifying what they want to see as well as in terms of using their purchasing power in other ways. For example, with the massive amount that the public sector buys in terms of the construction sector they can specify how projects are carried out, so they can specify the extent to which waste management plans are used, good waste management practices, waste minimisation practices onsite, they can specify recycled content and they can specify other things around the design of the construction build. I think the public sector has a huge role to play.

Q209 Earl of Selborne: I think we all agree that they could, but evidently they do not or we do not. What is going wrong?

Dr Goodwin: We are seeing some progress. One of the areas where we have been quite successful is in persuading people to specify recycled content and that is a potential model that could be used elsewhere. We have certainly got good support in Scotland for specifying recycled content. We are starting to see the public sector starting to specify and that is great. That requires again the sort of approach of having a high level commitment and then a massive amount of support for the people doing the task to help them do it and to show that it does not cost them any more.

Dr Gibson: Our feeling is that Government policy on procurement is very good, but the management of the implementation is not up to the policy in many areas yet and so perhaps there needs to be more emphasis on how the policies are implemented. At the moment there is also a lack of expertise in the procurement profession and that is improving, but anything that could be done to speed up understanding of environmental issues in the procurement industry would be a good thing to our mind, eg what procurers can expect the outcome to be from good procurement. There are things like the “quick wins” for public procurement which we think is a good step in the right direction. However, it is quite a cumbersome list at the moment and it is particularly cumbersome for new products to get onto. Perhaps that could be looked at to make it easier for new

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products to go on to that. We could help people to understand the idea of purchasing for the whole life cost or the whole life value when they are purchasing. People say that they are doing it, but we still see lots of evidence of people buying on lowest purchase price which does not necessarily give you the best resource use over the life of the thing that you are purchasing. One thing that we would also suggest is that by being over-prescriptive in procurement you can often stifle innovation. We believe it is quite important to follow the best practice we have seen in businesses where they specify the outcome they want rather than telling them how it needs to be done. Any procurement practice that can say: "This is what we want delivered. Can we see how you would suggest delivering it?" would usually help innovation and hopefully help resource efficiency.

Q210 Earl of Selborne: If you are going to specify for outcome rather than product and process do you see any danger of discrimination against one particular sector or supplier? We heard from the Federation of Small Businesses that they might be concerned that the increased use of standardisation might discriminate against the small supplier.

Dr Goodwin: I would have thought specifying for outcome actually would be less of a problem rather than specifying the specifics about the individual material that is used.

Dr Gibson: I would agree with that entirely. It would hopefully benefit. In general we find that smaller companies can be more reactive and react more quickly and can be more innovative than larger ones that have more complex decision-making processes. I would see that there would be a benefit for those smaller but fast moving companies.

Mr Laybourn: I think the Government could do a lot in the use phase of the procurement. For example, we are currently doing some work with the MoD and with the National Health Service and collecting data on materials and uses of their energy and assets, et cetera. I think a lot could be done there and it would probably save the MoD and the NHS millions of pounds a year.

Q211 Chairman: What are the most common gaps in knowledge that prevent businesses from reducing waste?

Mr Morley: I think one of the greatest barriers that you have is that of internal budgets of companies, this perennial problem that if a purchasing department saves money for itself on its purchasing budget they are not penalised for the knock-on effects of perhaps the wastefulness or the lack of resource efficiency of the products because that is operations' or production's problem and not on their budget. That is on my wish-list of things that one would like

to have, ie internal departments of companies or organisations that talk to one another and really seriously address the whole life costing techniques and regard the cost for the organisation as a whole and not simply perhaps what they were tasked with and rewarded for.

Dr Gibson: Let me give an example of that. Almost a decade ago I visited an oil rig manufacturer and I was speaking to one of the welders who said that they had been given new welding rods that were cheaper and when you struck the weld it worked the first time but when you went to do the other side of the weld it did not work so you threw away more than half a welding rod. They were cheaper, the purchaser had probably got the brownie points for that, but in the whole life terms it was not successful.

Mr Morley: Whole life costing is a key lesson to bring in to an organisation.

Q212 Chairman: This is one of these kind of questions that really there is not an answer to. At the moment there is a tremendous encouragement for scientific research to discover new, more efficient ways of doing things better and then there are these great areas, the dark side of the moon so to speak. Which of the two should be given higher priority, should it be the promotion of further research or actually the sharing of the experience so far, or do you say both?

Dr Goodwin: I would definitely say both. There are some fantastic gains to be made out of some very simple things that an awful lot of businesses have not looked at yet. I agree that it is this lack of understanding of the whole resource as a strategic issue for the business. They see it as an end of pipe cost of disposal and it is a bill that they get every month or whatever. I also think knowledge is not the only barrier, there are some other barriers. There is the commercial risk associated with making some process changes and so sometimes we need to think of ways of helping the businesses go through that risk management process to make that change and to make the actual savings overall.

Mr Laybourn: We do think that there is a lack of knowledge in the advancement of technology and on process innovation and what we are trying to do to address it is that we have embedded innovation and technology managers in each of our regional delivery teams. We are getting more direct contact between the companies themselves and our research establishments. Something like 20 per cent of the synergies that we have achieved to date have involved the implementation of new R&D within the year, which I think is quite exceptional.

Q213 Lord Lewis of Newnham: We have heard previously that one of the problems here is very often the fact that waste is not considered in the primary

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line of costing and that really in many manufacturing situations you are interested in the price of the product at the end rather than what happens to the product afterwards and the various factors involved in it in that sense. If I understand it correctly, what you are saying is this is in part a management problem, it is not holistically looking at the whole situation that is isolating it into individual divisions which are then operating within their particular remit. Is this true of other countries as well or is this a unique experience? Is there something different in Japan or in America?

Dr Goodwin: I think it is something that all companies and all countries go through. I started work in the chemical industry and it was about the time when we were starting to understand the full cost of waste. You started to look at the cost of lost raw materials as well as the actual cost of the waste. SMEs are now learning that as well. That parallel can be seen in other countries.

Q214 Lord Lewis of Newnham: Do things with multinationals become very much more effective? I was involved at one stage with ICI and we ran into an interesting problem there where we discovered that part of their costing was throwing away large vast amounts of organic solvent. They then began to recover the organic solvent. Not only did they reduce a pollution problem with solvents but they were actually making money because they were able to reuse it. That idea in fact had come primarily from a visit to Dupont in the States, that is where the whole situation arose in that way.

Dr Goodwin: I started working for ICI and because it was an international company, some of those learnings got transferred to Third World countries as well, so you can get learning across other countries.

Mr Laybourn: With this business opportunity industrial symbiosis approach the UK have got the world lead. We are currently helping China, Mexico and the USA implement these types of programmes. The business opportunity approach is being copied out of the UK into other countries.

Dr Gibson: On the question about management and communication and multinationals, we see everyday that very few businesses do things as well as they could, so that is a management and communication issue. Every business would love to learn more and to be able to do it more quickly. I think there is still a lot to be done and a lot of gains to be had by increasing our management expertise, increasing the knowledge of the relevance of these issues to individual businesses and of the benefits that they can have. On the multinationals specifically, I was talking to one about three years ago that ran its own programme based on the idea of “if only that company itself knew what it knew”, where different sites had expertise that

was difficult to spread and I think that is true of the economy as a whole. Individuals in sites will have best practice perhaps and getting that spread more widely is a difficult behavioural change, culture change and marketing task.

Q215 Lord Methuen: What are the key waste streams or sectors that most urgently require a waste reduction approach rather than a recycling approach?

Dr Gibson: We have had a discussion within our team about where we feel this is most likely to be focused. First of all, I would start with construction where it has been estimated that about 13 per cent of materials purchased for construction goes straight to a site and into the waste skip. We would like to see those used 100 per cent and that would reduce a lot of unnecessary material use and the wastage from it. We have also found that in a lot of the processing industries, such as plastics for example, within the site they often will recycle product that is not right and it will go right back up to the start of the process and that is not always recognised as waste because it never leaves the factory site. A lot of processing industries probably have that mentality and if they can think about getting it right first time then that would help. We would say, as I mentioned earlier, that paper is possibly a good one to move on to next, certainly business paper where recycling has now gained a good foothold, but how can we get people to make sure they use all the paper before they recycle it? The spirit of the Waste Electrical and Electrical Equipment Directive was to reduce the use of materials and to increase the reuse of materials in the first instance, which is leading to higher recycling. What we would like to see is more electronics and electrical companies upgrading their equipment and remanufacturing, as Mr Morley was talking about earlier.

Q216 Lord Methuen: Where do vehicle tyres come into this?

Mr Morley: There is a very large gain if one re-treads or remanufactures vehicle tyres over mechanically recycling. Obviously one can no longer landfill tyres, that is now forbidden. There are interventions already in the HGV sector where vehicle tyres are re-treaded and remanufactured regularly, up to seven or eight times through what are called tyre management programmes. The idea, which WRAP are funding and we ourselves as a consultancy are working on, is to look at moving that into the light commercial vehicle area, so moving it to lighter vans, your Waitrose delivery van, that type of thing and then the ultimate goal would be to move that into consumers, but there is consumer resistance because of a perception about remoulds and re-treads having a

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slightly defective performance. The re-treaders would argue that is a false perception. It was perhaps historically formed many years ago and should be removed. That is what is happening on re-treads. From our own point of view, you have to take the difference between what is manufactured in the UK, in which case you would be looking in areas like retail, construction and food as key areas, or are you concerned about all products at end of life because obviously a lot of the products at end of life are not manufactured in the UK and if your main concern is end of life waste reduction then you have to come at that from a consumption point of view and say what are we consuming and how can we intervene in those ways. That brings you into some of the interventions that Defra tried to bring together in road mapping from a consumption perspective rather than from a production perspective.

Dr Goodwin: I would agree with both construction and manufacturing, retail and food and drink. Just in terms of food, we estimate that around 20 per cent of

the UK's carbon emissions comes from the production, distribution, storage and transport of food and then we waste a third of it. That is obviously an important area. There is also wastage in the supply chain as well.

Mr Laybourn: I think that in any area where you can substitute for virgin resources you often get a double-whammy and virgin resources are often coming from high energy intensive mining industries and are invariably imported into the UK. Where we can substitute for virgin raw materials I think it is a good thing to do.

Chairman: Thank you very much. We have had two good sessions this morning. If you have something that you would like to leave with us or if there is any additional information that you would like to pass on to us, please feel free to do so. We will reserve the right to come back to you if we think there is anything we would like you to expand on. Thank you very much.

TUESDAY 22 JANUARY 2008

Present	Crickhowell, L Howie of Troon, L Lewis of Newnham, L Methuen, L O'Neill of Clackmannan, L (Chairman)	Platt of Writtle, B Selborne, E Sharp of Guildford, B Sutherland of Houndwood, L
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Memorandum by the Environmental Industries Commission (EIC)

EIC was launched in 1995 to give the UK's environmental technology and services industry a strong and effective voice with Government.

With over 330 Member companies EIC has grown to be the largest trade association in Europe for the environmental technology and services (ETS) industry. It enjoys the support of leading politicians from all three major parties, as well as industrialists, trade union leaders, environmentalists and academics.

EIC's Waste Resources Management Working Group represents over 80 companies involved in sustainable waste management and have a unique expertise of working with business on waste reduction.

INTRODUCTION

There can be no doubt that the opportunities for resource efficiency are huge. There are many examples of UK and international businesses who have profited from reducing waste, as well as helping the environment.

In 2003 a study from the Environment Agency *The Benefits of Greener Business* concluded that £2-£3 billion is lost each year by manufactured industry in wasted natural resources—equivalent to about 7 per cent of total manufacturing industry profit.

Furthermore, there is an extensive policy framework in place to promote sustainable production including legislation, fiscal measures and advice and support.

Yet, despite this, the opportunities for major improvements in resource efficiency have been taken up by relatively few companies.

Resource efficiency offers the opportunity for Government to promote greater productivity in business and reduce the burdens on the environment at the same time. Rather than resting on its laurels, therefore, it is time for the Government to review and invigorate its policy framework to encourage resource efficiency.

EIC would like to take this opportunity to respond to each of the areas of the area the Committee is focusing its inquiry on.

BETTER DESIGN AND THE USE OF MATERIALS

Design and the use of materials

It has long been recognised that if we are to reconcile the goals of a strong economy and living within environmental limits we must make more with less—in other words we must be much more efficient in the way we use resources to produce goods and services.

The increasing demand for greener products means that some issues have to be considered by designers as part of the specification of the product.

EIC believes that greater awareness of what should be included in design specifications could drive this forward in advance of improvements in professional qualifications.

Sustainability and the use of materials

Availability, cost, fitness for purpose and aesthetic considerations will influence material choice above many environmental issues. This makes the selection of products and materials a complex decision making process, often requiring compromise to achieve the best overall results. For example, an environmentally preferred material may cost more or be difficult to obtain; whereas a less “green” material might have excellent workability and fire resistance qualities.

Sustainability is becoming increasingly important in material selection but the absence of consistent and robust standards for evaluating and reporting environmental impact means that each supplier is providing its own plethora of green wash. This leads to confusion in the market place and many specifiers profess to be overwhelmed by the complexity of sustainability in practice. This in turn encourages a “do nothing” approach, or an over-emphasis on single issues that are relatively simple to quantify eg recycled content.

New materials and design

New materials will tend to be untested and have even less information than more established materials. R&D in terms of new materials should follow the route of: feasibility, short term testing, longer term testing, certification and development of standards that ensure the material can be specified by designers at minimal risk. In addition, the designer will need to understand the technical applicability of new materials, along with all the sustainability data requirements, including whole life costs and social impacts.

Can better designed products offset the increase in consumption?

There is no simple answer in isolation of how the products will be specified, distributed, installed, maintained and removed/disposed of. For example, the drive to have demonstrably “greener” products may lead to an increase in consumption as people actively replace less fashionable products within their predicted service life. This is what has happened in the window replacement industry where the actual life (eg eight years) of windows can be significantly less than its design life (eg 40 years). This particular sector is driven by the need to sell the latest windows, sometimes only resulting in small increases in thermal efficiency; which might not offset the resources and embodied energy used to make them.

Therefore, EIC believe that decisions made by all those in the supply chain should be considered when improving the design of certain products.

Gaps in knowledge

Some data gaps have already been indicated. There is a general lack of easily accessible data relating to the life cycle impacts and whole life costs of most products and materials. This means we are seeing a distorted picture of where the priorities lie in terms of business and government intervention. Without understanding the overall environmental impacts it is impossible to fully quantify the benefits derived from more efficient use of materials. Even where this data is known it is complex and difficult to adapt in line with changing circumstances, eg design life versus actual life. Therefore, the data needs to be translatable via consistent labelling and/or decision making tools. Even once this has been achieved, there will still be variables that cannot be fully accounted for once the product is sold eg the distance travelled, or the mode of travel the consumer uses to collect the product.

BUSINESS FRAMEWORK

Current policy framework

The current policy framework is fragmented, confusing and occasionally contradictory. This disincentivises businesses who need clear direction, possibly through regulation.

A clear, demanding and long term government policy framework should be agreed and stuck to. This will encourage investment in the resources and technologies needed to drive waste reduction.

The forward thinking being demonstrated by many large companies needs to be understood and embraced by the policy makers. An integrated approach between these stakeholders will add value and provide exemplars for others in similar business sectors to follow.

At the other end of the spectrum, some businesses will only change when it becomes too expensive or illegal to do otherwise. Minimum levels of compliance need to be determined and built into financial scenarios and/or legislation.

Waste reduction in action

There is a misconception that waste reduction will come naturally through better design and a bit of encouragement. This is unlikely to be the case as the waste being generated is an accumulation of actions up and down the supply chain. There are many uncertainties that should be clarified for each waste generating activity. These include:

- amount and type of waste produced (benchmarking in a consistent and long term programme to measure success of interventions);
- cause of waste and where in the supply chain intervention is needed;
- costs and benefits of waste reduction actions (who has the cost and who gets the benefit in the supply chain); and
- overall environmental benefits of interventions, highlighting any perverse effects eg improving recyclability leads to increasing energy use.

Obviously this is not a quick and easy process, and it would need a significant amount of resource and commitment to collect the required information and to maintain continuous improvements, perhaps towards a specific waste reduction target. A good example of waste reporting in the construction sector can be found at www.smartwaste.co.uk under “benchmarking”. This data has been accumulated for the last 10 years with increasing numbers of construction companies inputting data onto a self updating website to further improve the benchmarks. Over time it will be possible to measure the success of waste reduction strategies in the construction sector using these national averages.

What lessons can business learn from international experience?

Products and materials are often traded internationally. The legislative requirements vary on an international basis, along with key data requirements such as life cycle assessment. Whilst this can help transfer experience from one country to another, it can also be frustrating if additional work needs to be carried out to comply with standards/data requirements that are inconsistently applied (even within the EU).

Standardised terminology, data reporting, environmental standards would provide a more even playing field and promote further investment in environmental improvements. For example, in terms of recycled content; the manufacturer will be more/less likely to invest in primary feedstock replacement dependent upon the importance and reporting of recycled content of the national markets they are seeking to supply.

GOVERNMENT POLICY

Government support role

The single most important Government policy in this area is the Landfill Tax which provides a direct signal of the cost of waste back to waste producers. The announcements of steep rises in this are a welcome step forward.

Government can set clear and consistent policy with targets that can be measured in terms of waste reduction. The Waste Strategy for England 2007 could have made the case for waste reduction far stronger through targets at national and sectoral levels, including for commercial and industrial waste. Waste reduction is still the poor cousin to recycling/recycled content due to these issues being over-emphasised in the past.

Government as a client and major specifier/procurer can lead the way in waste reduction. This means working out the best way to set standards for others to follow. Where obstacles or confusion arise, this should be flagged as an issue that needs to be resolved, ie obstacles or confusion are preventing action being taken by the Government then they are also likely to be preventing action by everyone else.

Progress in this area is patchy. For example since 2002 there has been a commitment that major new public buildings will meet the BREEM excellent rating. This includes a range of environmental impacts—including waste. A recent National Audit Office found just 9 per cent in 2005/06 met the standard.

Government funded support is extensive in this area, to the point of having “too many cooks”, some of which are attempting to attract the attention of the same businesses. This causes confusion in terms of where to access the best support.

EU and global lessons

There is little evidence of comprehensive waste reduction strategies around the world. Where countries have advanced beyond simple recycling/recycled content strategies, they seem to bypass waste reduction in favour of a more holistic approach to sustainable materials management underpinned by life cycle assessment.

CONSUMER BEHAVIOUR

Product design and consumption patterns and behaviour

A reversal of the throwaway society should be a key objective in product design. It is a fairly inescapable conclusion that to reduce waste and conserve resource, we need products that last longer. There may be some exceptions to this rule, usually in terms of energy or water using products where improvements in operational efficiency outweigh the environmental costs of producing new products. Products can be designed to last longer through improved durability, quality and ease of repair/maintenance. Businesses could move towards leasing of products and more servicing of the products they supply to provide other sources of income.

Marketing strategies and sustainable design

Marketing strategies can raise expectations that cannot be met. This is because businesses want to sell more products, even if this strategy is contrary to the sustainable use of materials. If products are designed to last longer, this could form the basis of a marketing strategy consistent with sustainable design. In other cases, there is a tendency to exaggerate the environmental benefits of certain products. This is made possible through the absence of consistent reporting ie the consumer needs to be able to judge one product against another to make their purchasing decision.

Gaps in knowledge

Consistent reporting and labelling on all sustainability aspects relating to products and materials. It should be clearer which products/materials offer the best whole life cycle costs and the point at which other environmental impacts, such as operational energy, outweigh the use of energy and resources embedded in new and improved products. Prior to this point, consumers should be encouraged to keep existing products until they need to be replaced.

SKILLS

How is sustainable design integrated into the design syllabus?

Most designers give little consideration to the use of materials/design to maximise the efficient use of materials. This is a failing of higher educational courses linked to design. Ideally, mandatory modules on sustainable use of materials would be embedded into each of these courses to enable future designers to be more aware of their responsibilities. This should include choosing materials, designing out waste in the product, its packaging, installation, maintenance, and designing in recyclability at end of life. For example, designed to be disassembled for easier repair and reuse.

Sustainable waste reduction and broader industrial training courses

Waste reduction does not feature in the main. This is because it is not a quick and easy fix, thus requiring some knowledge of the business sector before training can be given. The level of knowledge in terms of waste reduction is very poor so it is inevitable that there are very few people able to train others in how to implement it.

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Memorandum by EEF, the Manufacturers' Organisation

INTRODUCTION

1. EEF is the representative voice of manufacturing, engineering and technology-based businesses with a membership of 6,000 companies employing around 800,000 people. Comprising 11 regional EEF Associations, the Engineering Construction Industries Association (ECIA) and UK Steel, EEF is one of the leading providers of business services in employment relations and employment law, health, safety and environment, manufacturing performance, education, training and skills.
2. Industry has a significant role to play in waste prevention and using waste as a resource wherever possible. Manufacturers are not only producers of waste, but will be providing the solutions to many of the challenges that are faced in reducing waste.
3. UK manufacturers already take responsibility for the environmental impact of their products. However, the international aspect of supply chains needs to be taken into account when developing policies. UK companies compete with developing economies where environmental standards are not always implemented with the same degree of enforcement, and may even be absent altogether. EEF believes that using voluntary agreements or supply chain pressures to facilitate change sends out the right signal to these markets.
4. In addition, retailers and consumers need to be educated about the environmental impact of products. Encouraging more sustainable product and process design can only address the issues to a certain degree as long as consumers continue to drive unsustainable consumption patterns.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

5. Designing products that use less material overall and/or include less harmful substances plays an important role in reducing the amount or hazardousness of waste produced.
6. However, waste minimisation initiatives should always be considered against the backdrop of the wider sustainable consumption and production (SCP) agenda and look at impacts across the life-cycle of products and services, from design and production through to consumption and end-of-life management. Understanding the product life-cycle ensures that improvements at one point in the life-cycle do not create problems in others. For example, using one material over another might mean less waste is generated at the end of life, because it is easier to recycle, but it might use more energy during its lifetime. Only by evaluating the new end product is it possible to determine whether the result is a more or less sustainable option.
7. It is important that government keeps overall sustainability objectives in sight during the development of policy. Traditional regulation is less effective at this. The Restriction on Hazardous Substances (RoHS) Regulations, for example, have led to companies having to undertake complicated and costly assessments of their products, with little, if any, benefit to the environment. A voluntary sectoral or supply chain approach is a more welcome creative approach towards greater engagement with business.
8. To avoid negative unintended consequences, it is crucial that the evidence base is robust before decisions are finalised. Life Cycle Analysis (LCA) helps us to understand the environmental impacts of goods and services through all stages of a product's life. However, methodologies with regards to the use and interpretation of LCAs still vary greatly and different approaches can lead to different results. Moreover, LCAs will always be based on assumptions rather than irrefutable data, are costly to undertake and might lock industry into long term options, with little, if any, benefits to the environment. In light of this, and until an acceptable common European approach has been found, some flexibility needs to remain, with decisions based on life-cycle thinking, rather than strict assessments.
9. In the UK, the Market Transformation Programme¹ (MTP) is tasked with building up the evidence base that underpins development of sustainable product policy and the programme should be given adequate time and resources to achieve its full potential. Output from the research should be peer reviewed and communicated to industry in a simple and easy to understand manner, so that any changes to businesses processes, if necessary, can be adequately planned for.

¹ <http://www.mtprog.com/>

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

10. There is a raft of factors that influence the use of materials, including availability and costs of the material, the particular skills set of the designer and customer demand. Key drivers here are market expectations with regards to aesthetics and engineering demands of a product.

11. Another driver is existing regulatory requirements. For example a particular type of material used for packaging might have less environmental impact compared to the use of another material. However the end product might not comply with food hygiene laws.

12. There is also the issue of the service demand of the product. For example with regards to standards for recyclates, where it is important that reliable quality standards exist. These would guarantee that the secondary material meets or exceed the standard of the material it replaces and does not have a detrimental effects on its engineering properties.

13. Similarly, many manufactured goods are built to Product Standards. These often specify materials to be used and as such present a barrier to using suitable alternatives.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

14. Our members take their responsibility for the environmental impacts of their products seriously, including availability and end of life impacts of raw materials, and, where possible, strive to re-engineer processes and use resources more efficiently, and thereby reduce their costs.

15. However, UK manufacturers currently absorb the majority of the costs of decoupling waste from economic growth, which they find difficult to pass on to their retailers and consumers. This can lead to the unfortunate situation where manufacturers become less competitive as a result.

16. Consumers and retailers make the ultimate choice between imported products, (which may be cheaper, partly as a result of not having to internalise the costs of improving the environmental profile of their products), and domestic producers (which are subjected to internalising the cost of environmental improvement). Any effort to improve performance at the “front-of-pipe” therefore needs to be supported by efforts to educate retailers and consumers on the environmental impacts of products. This would then incentivise product designers and engineers to do more.

17. Businesses are continuing to expand their use of recycled materials where possible, thereby replacing virgin materials. However, the current regulatory framework presents a barrier to greater resource efficiency, where a material cannot be reused simply because it is classified as a “waste”, due to strict interpretation of EU law. The Environment Agency/WRAP waste protocols² are going some way to address this problem. However a more consistent approach across the EU will help more low risk materials to be used as a resource, and the UK Government should continue to lobby EU institutions on this during the ongoing revisions of the EU Waste Framework Directive.

Can better designed products offset the increase in consumption?

18. EEF agrees that there is a role for better designed products to help offset increases in consumption. The overall aim of more sustainable consumption and production is to decouple economic growth from environmental degradation. This means making more with less. A life cycle approach to sustainability, however, will not always result in less waste by volume. A manufacturer, for example, might reduce costs by increasing resource efficiency, but then may well increase sales and produce more, including more waste. What is important is that the environmental impacts of the end product have been minimised as much as possible, whilst retaining the functionality of the product.

19. However, this needs to be coupled with sustained efforts to educate consumers and retailers so that they can make an informed choice and, more importantly, take responsibility for their actions. Promotion of more sustainable products including those that are more durable, easy to repair or remanufacture will go some way to offset the increase in consumption.

² <http://www.environment-agency.gov.uk/subjects/waste/1019330/1334884/?lang=—e>

Are there any other gaps in knowledge and how are they being addressed?

20. Government is addressing this through its work on developing the SCP evidence base, including the Market Transformation Programme. We have not seen much output from this programme and would be keen to see how it is developing.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

21. EEF believes that the current policy, regulatory and legal framework does not yet provide enough support and incentives to encourage the development of better, more sustainable products and processes. In its recently published *Waste Strategy 2007*, the Government stated its commitment to focus efforts on waste prevention, however little additional support or incentives were introduced.

22. Currently, there is a plethora of government sponsored organisations delivering help and advice to business to identify ways of minimising waste under the Business Resource and Efficiency (BREW) Programme. This service is invaluable, but to the business community it appears somewhat confusing, particularly where remits appear to overlap. There is a need for a more strategic approach to this, linked with wider sustainability objectives. In addition, outputs from the different schemes must be closely monitored to ensure they deliver the desired outcomes in a cost-effective way.

23. Many companies, in particular SMEs, have little time and lack the resources to address these issues on their own, which suggests that programmes need to be proactive and take the message directly to business. EEF is keen to facilitate such action.

24. Also, as more of our membership has become aware of waste and its issues there is a growing need for more in-depth technical knowledge specific to certain waste or materials. We would like to see the government programmes reflect this shift in their delivery of services.

25. We hope that the current work by BERR on simplifying business support³ to make it more coherent and accessible to business will help to overcome many of these problems.

26. However, Government must ensure that the programmes are adequately funded, and continue its commitment to return revenue received from landfill tax back to business to fund this valuable work. EEF was disappointed to see no explicit mention of the future of the BREW funding in the recently published PBR and CSR07. We believe that the carrot and stick approach of using taxation to send a price signal to business and using the funds raised to help companies to change their practices is the most effective approach to behaviour change. We are therefore disappointed by the Government's decision to remove the ring-fencing of the tax.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

27. Given estimates by Envirowise that 80 per cent of the cost of a product over its life-cycle is in-built at the design phase and that manufacturing companies can save up to 1 per cent of the turnover by implementing waste minimisation initiatives, it is no surprise that companies are increasingly focusing their attention in this area.

28. There is scope for encouraging more companies to address this issue, in particular SMEs. However, given that many companies have little time and lack the resources for this, government programmes need to be more proactive and take the messages directly to business. As mentioned above, government organisations use the argument of potential cost savings from waste minimisation initiatives, but these figures do not always take into account the "hidden" costs, for example the administrative costs or man-hours, of implementing such measures. This can lead to scepticism and provide a barrier to greater uptake by business.

³ <http://www.berr.gov.uk/bbf/small-business/streamlining-government/bssp/page38586.html>

29. “Lean manufacturing” is about achieving maximum production output with minimum waste and is a widely used concept in the manufacturing sector. It advocates using less of everything—time, effort, workshop space, tools and raw materials, and therefore has a direct impact on the design of processes and products. This initiative would benefit from further resources to help encourage increased implementation. EEF is working with the Manufacturing Advisory Service (MAS) in the South East and London to better integrate environmental considerations with lean manufacturing and we would welcome the opportunity to work more closely with Government on this issue.

What other measures can promote a focus on waste reduction among businesses?

30. Supply chain driven initiatives are an effective incentive to engage businesses on waste reduction. Sectoral sustainability strategies, sectoral agreements and Corporate Social Responsibility are already used by businesses to achieve environmental improvements up and down supply chains. These initiatives need further resources to encourage greater uptake in the UK and by international players.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

31. The Government’s role is to set the policy framework that provides the right climate for businesses to play their part in delivering the necessary change and make the required investment for the future, whilst thriving in a competitive environment. Taxation and regulation have not proven to be effective in encouraging greater waste reduction. Instead more measures that positively encourage companies to change should be introduced.

32. EEF welcomes the proposal in the Waste Strategy for material or sector-based agreements to engage business on waste reduction and resource efficiency. Government must ensure that these are adequately resourced and should continue its commitment to use all of the additional landfill tax receipts to fund business support in this area. As mentioned above, we are disappointed that there was no commitment to this in the latest PBR or CSR07.

33. In addition to removing the barriers to greater waste reduction mentioned above, Government must show leadership by fully implementing its Sustainable Procurement Action Plan⁴ and use its own purchasing power to drive change. This would send an important signal to the market and increase demand for more sustainable products.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

34. At the moment the consumer lacks the right information and has little choice about the environmental footprint of their purchased products. Driven by economic pressures, consumers tend to focus on convenience and short-term benefits. The example of energy efficient light bulbs illustrates this well. Even though they will save the consumer money in the long run, the high up-front costs act as a disincentive. Similarly, in many cases it is cheaper and easier to replace whole equipment than it is to repair it.

35. Improving the design of the product to make it more environmentally friendly, whilst retaining its functionality, will help to effect change in consumption patterns. However, to change consumer behaviour this needs to be coupled with sustained efforts to educate consumers about the environmental impacts of their activities and the benefits of more sustainable consumption patterns.

CONCLUSION

36. EEF welcomes this opportunity to contribute the views of the manufacturing sector to such an important and timely inquiry. The manufacturing sector is a key stakeholder in the broad debate concerning waste minimisation and resource efficiency. Manufacturers are not just producers of waste, but will be providing the solutions to many of the challenges which we face.

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⁴ <http://www.sustainable-development.gov.uk/publications/pdf/SustainableProcurementActionPlan.pdf>

Examination of Witnesses

Witnesses: MR JONATHAN DAVIES, Chair, Waste Working Group, Environmental Industries Commission, MR GARETH STACE, Head of Environmental Affairs, EEF The Manufacturers' Organisation, MR MERLIN HYMAN, Director, Environmental Industries Commission, and PROFESSOR MIKE GREGORY, Head, Institute for Manufacturing, University of Cambridge, examined.

Q217 Chairman: Good morning, gentlemen. Can I welcome you to the Committee? Perhaps you could start by introducing yourselves.

Professor Gregory: Mike Gregory. I look after the manufacturing management division of the University Engineering Department at Cambridge.

Mr Stace: I am Gareth Stace. I am head of environment at EEF, The Manufacturers' Organisation.

Mr Davies: Jonathan Davies. I am Resource Management Director at Enviro Consulting and I am here as the chairman of the EIC waste and resources management group.

Mr Hyman: Merlin Hyman, director of EIC, the Environmental Industries Commission. We represent over 330 companies involved in environmental technology and services providing solutions to environmental problems.

Q218 Chairman: As you are aware, we are dealing with waste and we have been trying to find definitions of it. We are getting to a point where we are concerned as much about resource efficiency as anything else. It seems self-evident to us that efficient, successful businesses are resource efficient as well but we find also that this blinding truth seems to have evaded businesses, small business perhaps more, but businesses across the board are still insufficiently aware of the significance of resource efficiency. What is your experience? Would this be borne out by yourselves? Have you any ideas why this should be the case?

Mr Stace: Awareness is still very low in terms of the issue of resource efficiency. In terms of SMEs, it is possibly even lower than other companies. We notice that something like 42 per cent of SMEs do not have recycling ever on their board agendas so if it is not on the agenda they are not talking about it and they are not doing anything. The larger companies have more resources and they are doing good work in terms of resource efficiency and are seeing the benefits of that in terms of saving money. The information is out there but it is very confusing and I think that is the problem. If you are a small organisation, a small company, where do you go to get the right information for what you are trying to do or your production process? That is the barrier. You might know what you need to do, but sometimes you do not know how to action it and achieve it.

Q219 Chairman: Our function is to produce a report for government. Is it just government getting the message across? Is it getting them to exhort or should

there be a bit of the stick as well as the carrot, the only problem being that if governments pick up the stick it is called regulation and this is anathema to at least business organisations. Professor Gregory, as someone who observes business and advises rather than gets your hands dirty, if I may say so, perhaps you could start.

Professor Gregory: The point is getting air time with the senior people in small companies. They are extremely busy. If it is not on their list of top three jobs today, they are probably not going to get round to it. The stick is a bit worrying because then they will be even more frightened of engaging with people who know about these things, fearing policemen and so on. It seems to me that if you can plug into the day to day business of the companies you have a chance. There are already some very good support mechanisms. I am thinking of things like the Manufacturing Advisory Service. It seems to me the trick is to try and get these issues absolutely welded in to the kind of service that is already provided by established bodies rather than saying, "We have another great idea for you to worry about." The other people that really drive the attention of people, particularly in small companies, is the supply chain. Somehow, if you can identify which are the key supply chains and work through from the top end of those, then you have a chance. You will have seen something in the *FT* a couple of days ago about major companies, retailers, forcing the issue down the supply chain. It seems to me that could be for other supply chains as well.

Q220 Chairman: Is that the experience of any of the other bodies?

Mr Davies: I would certainly echo my colleagues. I am based in Shrewsbury and there are a couple of fairly large manufacturing organisations there, one which makes structural pressings in the motor industry. We went to talk to them and they are well connected through supply chain pressure in the motor industry so although ISO 14001 is very important that is embodied within the motor industry's own requirements. An example which was given to me by the chairman there at the time was that they have three pressing machines, two of which sort automatically the offcuts of the materials, but for the other they have to be collected by hand. Their profitability at that time, a couple of years ago, was dependent on how they managed those waste offcuts. They were well aware partly through the supply chain—they manufacture in aluminium, stainless steel, galvanised and so forth—that if those were

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jumbled together they had to be disposed of at cost, but if they were recovered they could be sold at a profit. Their awareness seemed to come through the supply chain more than regulation itself.

Mr Hyman: On your point about sticks and carrots, a key point here is that even where there are clear financial savings to be made businesses will obviously weigh up the opportunity cost. There are other things that they could do with their limited resources. Although this is a valuable and good thing to do, there are other things they could use their resources for more effectively. That comes back to the drivers to make people engage. One fairly blunt driver but an effective one nonetheless is the landfill tax. The increase in the landfill tax has been a very good thing and that has an impact. There is a potential stick for bigger companies. The pollution prevention and control regulations require in theory resource efficiency. That regulation tends to still focus on what comes out at the end of the pipe rather than the process but I know the Environment Agency are heading in that direction. That could happen quicker. Indeed, there is something called the Eco Management and Audit Scheme, EMAS, which Europe promoted which has never really taken off. When that originally came up, it was proposed to be a mandatory scheme so that all big companies would have to do eco management and audit and identify this. That got chucked as too regulatory. There is a number of potential measures that would make companies think about this. We were talking about supply chains. One very important supply chain of course is the public sector. Public sector procurement is a potential major driver in this area and has a pretty patchy record, as a polite way of putting it, as to how it is applied.

Q221 Lord Lewis of Newnham: There was about ten years ago quite an effort made in waste minimisation programmes. These were the “in” words that were being used within the waste industry. I thought at that particular stage there was quite a degree of success with the SMEs in recognising the sorts of problems. There were breakfast groups, if I remember correctly, that used to meet to discuss this. There seemed to be a degree of success but it seems to have evaporated as a procedure now, or is that still being used?

Mr Davies: I spoke to one of my colleagues, Keith Webster, in anticipation of such a question because he ran those very programmes. The answer appears to be that if you were able to take assistance to those companies at no charge then they were glad to accept it, but as soon as the support fell away—we tried every different means of recompense, a share of reduced wastage and all of these things—but effectively people were not willing to make those

changes for their own sake. The reasons for that are several. Firstly, the difficulty with SMEs is there is a lack of internal resource to drive those changes through. That same lack of internal resource may mean that they cannot manage an external programme either, so if somebody comes in, the SME may say, “That is all very well. You are going to do it for us but I have to find the time to manage it”, there is also frequently a belief that “I do not really need you because I can do it all myself.” However you cannot do it if you do not have the time so it does not happen. Lastly, to make really significant changes which perhaps need new infrastructure will take longer to get a payback than two years, which is typically the requirement. All of this is a great pity because many of the changes require no significant investment. They just require a different approach. One of the support mechanisms that has been mentioned already is NISP, the National Industrial Symbiosis Programme, working together with Envirowise and WRAP providing information. The key difference perhaps is that NISP goes out to businesses and is required to make those changes happen. It is perhaps early days but I live in hope that that will return us to those days of ten years ago.

Mr Stace: In terms of the programmes where we are now, we have heard of Envirowise, WRAP and NISP and the others. What we found with our members is that historically a few years ago they used the services offered by these government funded organisations. They have not quite worked. The people who come in to do the audits do not really understand the process and so the report really is the idea that they are telling them the time on their own watch. They know those issues. What has changed with these organisations recently is that they are better understanding those sectors and they are sending in more specialists, helping them achieve what they are setting out to do. We are working very closely with Envirowise, the Carbon Trust and NISP and the Manufacturers’ Advisory Service to effect that change.

Q222 Lord Crickhowell: Can I go back to supply chains? There is a good deal of evidence we are getting about the complexity of supply chains and the EEF and your evidence referred to the international aspect of supply chains, some of them coming from countries where the standards dealing with these matters are perhaps less effective than they are here. What advice would you have about how you affect supply chains? How does an individual company hope to influence a complex and international supply chain?

Mr Stace: It is a very difficult situation because that supply chain can be very long and you could be a very small part of that. Another barrier to realising resource efficiency within your own process in your

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part of that supply chain is the customer requirements. Often what we find with our members is their customer is saying, "We want this product and we want it made in this way." You have to follow that criterion. It is very difficult for these companies to change their process because of the customer requirements. The customer requirements are king, so if they can even see resource efficiency opportunities they might not be able to effect that change. That is what we are finding.

Q223 Lord Howie of Troon: Mr Stace, you hinted rather than stated that sometimes the people operating these programmes come into a firm and they are not really competent to do it. What is the point in the programme if the people operating it are not up to the job?

Mr Stace: That is what often happened in the past, although not always. I think these organisations are now working with organisations such as ours to understand what our members really need. This has changed from just jumping in as a one day audit, walking round and not really understanding what they are looking at and not tackling the big issues. The lighting and the dripping taps are not the big issues. That is where we are moving with organisations such as Envirowise, looking at resource efficiency within their process and looking at the big wins that might not be easy wins but they are wins that need to be tackled.

Q224 Lord Howie of Troon: When I used to publish engineering magazines at one time and we were investigated by people who were aiming to improve our efficiency, the chap who came in had a nervous breakdown and left the profession.

Mr Stace: The wins are often not where you think they are going to be. Can I give you an example? I was at a galvaniser's last Thursday and we went round the site and they were telling me what they were doing. It was only when he was driving me back to the train station that he mentioned that they dip the steel into a hot bath of zinc and get lots of fumes. Under the Environmental Protection Act since 1990, they had to collect those fumes with extractors. Those extractors are very energy intensive and a very significant part of their electricity usage. The fumes come from the flux that they use before they dip the item into the molten zinc bath. They have discovered that they can use low fume flux and they do not need extractors now. There are no fumes that come off so they do not need extractors and their energy usage has gone down significantly, but not in terms of an efficient motor or something. It is something else.

Professor Gregory: I want to come back briefly on the international supply chain matter because I think that is best seen as a set of opportunities and threats.

Perhaps it is a carrot and stick. If you can plug yourself into a supply chain, very few companies can influence but if you understand what its demands and characteristics are you might be able to plug yourself into some serious, international business. That is quite a big incentive and might be rather more fun for a small company than worrying about shaving a penny off its waste, so I think there is a positive incentive there. The downside of course is, if you are not aware of what is happening, you are probably going to lose the business anyway.

Q225 Baroness Sharp of Guildford: In relation to the public sector, you talked about the public sector as purchasers and the effect that they can have as purchasers but for many SMEs presumably the public sector and in this sense the local authority is the waste disposal authority. Has there been any link-up there, that they have been putting pressure on SMEs to reduce their waste? Do either they or the local RDA help them at all in these processes? Secondly, what if anything differentiates companies that are excellent at reducing waste. Do strategies such as lean manufacturing or the six sigma approach play a very significant part in helping companies reduce waste?

Mr Davies: In answer to your first question about pressure on SMEs to reduce waste, although the local authority is the waste disposal authority, they may collect commercial waste if they are requested to do so but many companies contract with the private sector to remove their waste independently. I will not name names but the major waste management companies will all run waste reduction programmes, much as the electricity companies do with leaflets. It is not in their immediate interest but apparently they will run programmes to indicate how efficiencies can be obtained. It comes back to the same problem. If you are an SME you are trying to run on 20 different fronts at the same time and this is just one of many where you maybe could make a saving.

Q226 Baroness Sharp of Guildford: Where I come from, Guildford in Surrey is the main waste disposal authority although they have a long term contract and SITA does it all, but there is a lot of pressure to minimise waste.

Mr Davies: Yes. The landfill tax itself and the announced increase which will take it to £48 a tonne has been a tremendous success. It is a blunt instrument but it is a really good start. That means that when you add on the cost of landfill as well it will take us to well over £60—probably £70—a tonne. At the moment the problem is we have a considerable increase in construction costs but at least it puts it into the realm of alternative treatment methods. This means that SITA and the other companies are now

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beginning to look at the prospect of providing merchant waste management facilities which for example use biodegradable waste as a biofuel. That is going further down the pipe than waste reduction. It is producing a resource of a sort. More directly, those extra costs are making people aware of the direct cost of the waste management. What I hope is that, once they start to look at the waste management costs, they will realise then that the real cost is in the materials that they have bought and then thrown away, which is probably 10 times the cost of the disposal of it. On the differentiation, it is size really. The large companies may have dedicated staff to examine this. They are probably also registered on a variety of EMAS schemes. They probably have a corporate social responsibility report and so forth. All of these draw attention to what they are doing and are a driver to improve them.

Q227 Lord Sutherland of Houndwood: As you will be aware from all that we have said and asked about, in addition to waste at the end of the process we are very interested in production processes. I wonder if you have advice to give us on the ways in which production processes might be altered to improve the waste reduction outcome?

Professor Gregory: The two parts to this are existing and new processes. If you have existing processes, it is much more difficult to mess about with them. The earlier point about lean is very appropriate here. It works well within factories and it comes from the Japanese worrying about waste rather than efficiency. It tends to be operational and those thought processes can perhaps be extended either end up to the design and outside the factory as well. There is a worry that lean approaches are just seen as operational and not changing the rules of the game. The other bit is new processes. That is a whole new world and depends on the individual technologies that people here are better placed to speak about than I.

Mr Stace: In terms of changing that process, the question is almost what are the regulatory barriers to stopping companies making that change in their process. Fundamentally at European level what we see is the definition of “waste” and the issue of by-products and end of waste criteria. Our members—I am thinking in terms of our steel manufacturing members—produce a lot of steel slags from blast furnaces that, without further processing, can be used as good quality aggregates. Theoretically these could be thought of as waste. What we want to see is better use of by-products within the Waste Framework Directive but also beyond that we also have steel slags which do need further processes in order to become aggregates at the very high specification standards. We have worked with the Environment

Agency and WRAP in developing waste protocols for steel slags. These are not considered waste now; they are brought out of waste. They might not have been waste in the first place and they are now a commodity of intrinsic value, both to the person who created those waste materials and the person using them as a resource in their process.

Q228 Lord Sutherland of Houndwood: This brings us to one of the key points. Who decides what is waste and what is not? Is the legal definition one of those barriers in regulation that you find? If so, are there representations you want to make?

Mr Hyman: Looking at the environmental industry over many years, probably the single greatest regulatory barrier—most of the environment industry is driven by high environmental standards through regulation, fiscal instruments and the like—has been the definition of waste. Similarly with EEF, we sit on the advisory panel of the Waste Protocol Project. It is amazing how it affects almost every part of the environment industry which is usually about taking something that perhaps there was not a great deal of use for and finding some beneficial use for it. Contaminated land would be a good example which is a huge producer where one can process contaminated soils on the site which can save millions of tonnes of waste. More than half of the hazardous wastes in the country at the last count were contaminated soils. There are technologies to treat those on site and those have been made very difficult by that regulatory regime. There are lots of processes trying to resolve that. The Waste Protocol is an important part of that but certainly any representations urging greater attention and a head of steam towards that would be very valuable.

Q229 Lord Lewis of Newnham: Who defines what is waste?

Mr Hyman: The legal definition of waste is in the 1979 EU Waste Framework Directive.

Q230 Lord Lewis of Newnham: That is ambiguous.

Mr Hyman: That has never been clarified by case law. The problem about the case law is that it always says that it depends on the specific circumstances, so it never provides enough certainty for anyone to make business plans and that is where the problem has been.

Q231 Lord Sutherland of Houndwood: On a related point, do any of your organisations or organisations of which you know keep an eye on unintended consequences, because clearly the definitions cause unintended consequences and you suddenly find it worth trucking loads of material across the country

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at considerable cost to the environment? Do your organisations feel a responsibility?

Mr Hyman: Where they affect our members, absolutely. The initial Directive was made for sensible reasons about protecting the public. No one thought through the complex consequences that this would have where, for example, if you took it to its logical conclusion, shoe banks collected by Scouts for recycling would be impossible. The recycled paper you use would be waste until you actually started writing on it. You would need a waste transfer permit to buy it from a shop. Those kinds of consequences, as you say, were not thought through. There is a considerable amount of effort going in to trying to produce a more rational regulatory approach to the reuse of by-products or materials or waste.

Mr Davies: It sounds like a very detailed point that will have major ramifications; the common position which will probably be negotiated away further but that has been agreed so far on the Waste Framework Directive refers to materials being recoverable or recovered if there is a market for them. We are making representations to say that that should read, “If there is a potential market for them” because you can get into a nasty little loop where there is not a market because the material did not previously exist and, because there is not a market, it continues to be waste and therefore there will not be a market. You see the complexity and you think that does seem to be a very nit picking point but it is on those sorts of details that these things turn. As Merlin says, the original definition was based on COPA, a British definition, which was material which has been disposed—this has since been translated into “discarded”—for environmental protection reasons and has since then become separated from environmental contamination with discards. You can discard this bottle and it would not degrade. It would just sit there as a bottle, but it is waste and therefore you cannot use it again unless it has gone through a recovery protocol.

Q232 Lord Howie of Troon: As a civil engineer, I was surprised at an earlier meeting of the Committee to be told that on construction sites 30 per cent of the material is waste. Is that what seems to be a fairly high figure credible?

Mr Davies: As the civil engineer here, I will answer that. The work that gave that figure was house building sites. You will be aware that the practice varies very considerably across construction sites. I have been on sites where, looking back, there was probably a considerable amount of waste. Nowadays aggregates tend to come in individual bags, for example, or they are kept in silos and everything is very well controlled but things used to be loose tipped and, at the end of the day, they would be spread out

and so forth. That was high quality material just being wasted through lack of care and perhaps lack of space. I am sure the figure was correct for the study that was done.

Q233 Earl of Selborne: On that subject, perhaps my memory plays tricks on me but I thought our evidence told us it was a higher figure than 30 per cent. I will look it up later. What I wanted to return to was the question of the plethora of organisations which seek to help businesses deliver and improve waste efficiency. We have had evidence from the Waste and Resources Action Programme, WRAP, which was set up after the government White Paper reported in 2000 to implement a number of actions set out in the White Paper. You referred to the National Industrial Symbiosis Programme. We have also heard from NISP. It was Mr Stace I think who said that business did not need advice so much on the leaking taps but on the big wins that need to be identified. What needs to be done to the structure of these different programmes to be able to deliver a more effective service to industry or is it an effective service?

Mr Stace: There is an overlap. There are potentially too many government funded organisations offering sometimes very similar services. However, we like them. There are certain ones that we think are doing very good work and we continue to work with them. What businesses need is long term certainty. At the moment they are building up relationships with people like Envirowise, NISP, the Carbon Trust and WRAP. With the BREW money coming from the landfill tax, the hypothecation now being used, the landfill tax is being used to fund the BREW family has ended or appears to have ended and we have very little understanding of what is going to happen in the future. There was no talk about it in the pre-Budget statement, in the Comprehensive Spending Review last year and at the moment we understand that BREW funded organisations still do not know if they are going to get funding for next year. Do our members really invest the time and effort into these organisations or do they invest their efforts somewhere else because the organisations they are working for might not carry on? We are very disappointed with the Government’s actions and policy here. If the Government wants this to happen, they really need to invest in it.

Q234 Earl of Selborne: What you are looking for is long term continuity of funding and an assurance that it will be in place in a few years’ time?

Mr Stace: Yes.

Q235 Earl of Selborne: Which funding stream would you expect to fund it?

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Mr Stace: The landfill tax money is a very good example. We talked about carrots and sticks before. The landfill tax is a stick. It is a blunt instrument and potentially does not really reduce waste going to landfill. It is seen as an added cost that is unavoidable but the monies, if they are recycled directly back to the companies that are paying that tax, can do a lot of good. What we hear at the moment is that the landfill tax monies could go to fund flooding, fly-tipping and blue tongue. They are very good causes but the money is coming from somewhere else and we would like to see direct recycling back to the organisations who are paying the landfill tax into positive measures to help them increase their resource efficiency.

Q236 Lord Crickhowell: How do you think UK industry compares with industry in other countries? Are there countries which are making a notable success of it which we should look to as an example?
Mr Stace: We have very limited international data here. Our understanding from our members is that the UK is comparable or slightly better than other European countries, France, Germany or Italy, but they are all showing a downward trend in terms of reducing waste. What helps us along is ISO 14001 and the requirement for continuous improvement but that is not legislation. It is very difficult to find the data from international sources.

Q237 Lord Crickhowell: We have been told that Japanese businesses decided to invest in sustainable products and processes after the Government had developed recycling laws and reassured businesses that they would continue to implement sustainable procurement strategies. You have already spoken of one aspect of lack of certainty about long term policy. Would it not be worth having a look at some other examples outside Europe like the Japanese experience in this field? I am slightly surprised when you say you do not have more knowledge about what is going on elsewhere. It seems to be only based on Europe. Surely there is a lot of the rest of the world that we might learn from?

Mr Davies: Yes. I would echo the comment about Japan. I have researched this amongst colleagues. The main point I want to raise is that one of my colleagues was a commissioner on the Commission for Environmental Markets and Economic Performance and one of their recommendations is that we understand better what other countries are doing worldwide in this respect. It would appear that there is not a current understanding of this topic.

Q238 Lord Crickhowell: I happen to have had quite a lot of experience of dealing with Japanese companies when I was in government and with

parties over here and visiting them in Japan. I will not repeat the examples that I referred to in our evidence last week but, quite apart from any long term government measures, they always seem to me to have had a very high emphasis on getting their costs down, using their employees in little circles in the business to come up with suggestions and so on in a way which is rather unusual in British business. It is surprising to me, as there is profitability at the end of all this. One of the big incentives that the Japanese had in eliminating waste was to always have a high priority in increasing their profit margins. I repeat the comment I made to the representative of small businesses last week. It seemed to me rather odd that there was not more recognition that eliminating waste at every stage probably means improving your profit margins.

Mr Davies: I absolutely agree with you. It is odd.

Q239 Lord Crickhowell: Why is it not happening more in British industry than it appears to be in places like Japan?

Mr Stace: In terms of talks with our members, we have not come across those examples but it is certainly something that we will be following up after this meeting.

Chairman: If you follow it up fairly quickly, we would be interested in receiving the reflections of your members on this.

Q240 Baroness Platt of Writtle: Following Lord Crickhowell's question, there are Japanese firms in this country. Are they exercising that sort of thing and are we learning from them?

Mr Stace: I have no examples from our members that that is taking place but it is certainly something I would be looking to follow up.

Q241 Lord Crickhowell: I am astonished. I could take you to a number of companies in South Wales which I used to visit when I was Secretary of State that had this as a priority. They are competing with other British companies alongside them. It seems extraordinary to me that there is not more knowledge about it than you are indicating.

Q242 Baroness Platt of Writtle: It is quite interesting to look at what is happening in Europe because they have to cope with the same Waste Disposal Directive that we have. Two countries that have been mentioned to me as being prime examples are the Netherlands and Switzerland. Do you know anything about their practices? Switzerland is of course outside the EU.

Mr Davies: Indeed. I do not know about those two. As a company we have direct contact with the Netherlands. I was going to comment on the

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Japanese issue. Quite some time ago now I went around the Cowley factory or what was then Rover which at the time had an alliance with Honda. It is now the Mini factory for BMW. At that time they were very vigorously taking forward what they called the zero waste policy. It was evidently well embedded in all of their practices. If that was then, I would be surprised if things have gone backwards.

Mr Hyman: I was going to mention one scheme which perhaps links more into the product. One of the government policy areas and one of the areas that makes companies always wake up if you like, perhaps a little more exciting than the process, is the product at the end of it and the potential for reducing responsibility type requirements, whether that is the WEEE or end of life vehicles or packaging. Product requirements can have an influence on the process as well as what happens as to the efficiency of the product. In Japan there is a scheme called the top runner scheme which the European Union has recently looked at emulating through something like a lead markets initiative. The standards for a particular product are set at, or at a higher level than, the most efficient product on the market at the moment. All companies sign up to delivering that within a certain period of time, so it is a constant ratcheting up. I had a presentation from someone from the Japanese department responsible for business to a European Commission experts' meeting who completed his evidence by saying, "Please, Europe, do not adopt this scheme because it is producing lots of business efficiencies and a competitive advantage for Japan." That is certainly one example but there is more focused on the process than on the product at the end of it and we are trying to use that to work back through the lifecycle.

Q243 Baroness Platt of Writtle: What waste reduction skills can design and engineering graduates bring to industry?

Professor Gregory: There is a huge opportunity here. The design and engineering graduates are extremely enthusiastic about this for all the reasons we would expect. There is a huge amount of untapped energy there which I think can be released through all sorts of networks and the things they do naturally. Institutionally it seems to me there are far more opportunities for projects, factory based projects, but also university based projects. They could be orchestrated much more effectively so that the lessons from those things are drawn back and available centrally. There are also things that could be done at the institutional level, the engineering institutions for example, who could make a study of appropriate parts of this agenda an integral part of the curriculum. That could also be tackled at the level of the engineering professors' conference, I think, so

at multiple levels, capturing enthusiasm. They are very good at spreading enthusiasm and awareness. They can help practically in factories and business environments. Projects are not just about learning. They can solve real problems very cheaply for companies and at the far end we might even find that young engineers and designers can become the trainers. We have heard already that there is still a need to get people aware and it is not such a bad thing. The older, senior people in a company quite like to hear from youngsters. Sometimes it is more comfortable than hearing from their colleagues.

Q244 Baroness Platt of Writtle: How can industry motivate and support academia to educate graduates about waste reduction in a practical way? You have just given one example. Do other people have examples or not? [No response] That sounds like a dead duck. Are designers sufficiently educated about the technical applicability of new materials, because there are a lot of new materials that are going into aircraft particularly at the moment, are there not?

Professor Gregory: My sense is that a lot of good work has been done on this but how do you join these things up? It is a problem with the whole domain. Which system level are you working at and how do you get the knowledge flying across it. There is a role there for some collecting of the very excellent activities that are going on. At the detail level things are going on but designers and others are not generally given a sufficiently systemic view of the work they do so that they see its broader context as well as the particular function or product that they are designing.

Q245 Lord Methuen: Can I ask Mr Hyman a specific question from his paper under consumer behaviour? You make the comment: "There may be some exceptions to this rule, usually in terms of energy or water using products, where improvements in operational efficiency outweigh the environmental costs of producing the product." What did you mean by this and can you give examples?

Mr Hyman: What we are referring to there is at what stage is something sufficiently a more efficient material resource and energy efficient that it is worth recycling the old one and buying a new one. It does puzzle consumers a little bit that they see advertised a shiny new fridge with a triple A or quadruple A rating. Should they get rid of their old fridge and buy a new one? Which is better? I do not think there is much understanding or guidance or help out there for consumers in making that kind of decision.

Q246 Baroness Sharp of Guildford: In terms of lifecycle analysis as distinct from a one off choice?

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Mr Hyman: Yes.

Mr Davies: The triple A rating produces an immediate response of “Oh, that must be good”, but if you buy a computer printer it will say the printer is £65 and the cost of the print is six pence a sheet. Or you can buy one for £100 and it is four pence a sheet. You have some figures on which you can make an assessment whereas the triple A washing machine does not tell you how much a year it is going to cost you. If there were a benchmark—it would have to be defined of course—which would say that typically this costs so much, you can quickly see that it is worth paying more because over five years this will save more money.

Q247 Lord Lewis of Newnham: This does bring us to a point which is related in part to the point that Baroness Platt has been asking about. If you take material selection, it is one of the important features in starting. You do a lifecycle analysis. We have heard, in the absence of consistent standards for evaluation and reporting environmental impacts, that you can get some very different sorts of results. In your remarks, Mr Stace, you do make the point that for example using one material over another might mean less waste is generated at the end of life. It is easier to recycle but it may in fact produce more energy during its lifetime’s production. It does seem to me that we have an interesting factor here. The whole concept over waste is at the moment based on weight and the amount of waste you produce is weighed. There is an argument even in terms of volume as far as this is concerned and I think in our next group of people we will see that in the case of aluminium this is producing a rather peculiar effect on disposal of aluminium to sites. There is another factor that is now coming in from climate change and that is energy and energy consumption. Where are we going to when we talk about sustainability here? What should be our guideline here? Is it going to be the amount of waste we are putting into a landfill site? Is it the amount of energy over the total cycle and the energy required in recycling and factors like this? It does seem to me we are now coming to a sort of crossroads where one set of interests are not necessarily compatible with another set of interests.

Mr Stace: It is almost a revolution in terms of companies understanding what waste is. Waste, to me, was solid waste but waste in terms of energy and bringing everything round to tonnes of carbon is again a whole new way of thinking. My earlier example was of the low fume flux. There is energy and real solid waste there. It is really looking across the whole of that supply chain, what you are doing within that supply chain and where is the result at the end. Our members might be making, say, high strength steels for lightweight motor vehicles but they

might be, at the end of that life, a bit more difficult to recycle than conventional steels. One lifecycle analysis will show up one result and another one might show up another result. It is an emerging minefield for our members on the ground, doing the day to day business in understanding what is best for them to do and what should they be measuring now or in the future. It brings us back to that long term certainty. Where should their focus be? I think they need to understand that.

Q248 Baroness Platt of Writtle: It needs to be lifecycle, does it not? It has to be production, energy used during the time it is used and then waste. It is a complete lifecycle, is it not?

Mr Stace: Lifecycle is a subjective process as well. It is not an exact science. Until there is a European agreed standard on lifecycle analysis, we might have conflicting views or results of what companies should be doing for the best.

Q249 Lord Lewis of Newnham: May I be very brutal and say that my view for instance at the moment on landfill is that they use weight rather than volume because it is easier to measure. It is a much more tangible situation. Volume in many instances can be very susceptible to packing so application does play an important role and measurement does play an important role. Although I think carbon content—based on carbon content and equivalence to carbon content—could be a very important way of dealing with it, it seems to me to be fraught with great difficulties in application.

Mr Davies: I absolutely agree with you. You may be familiar with the Aldersgate Group which has produced a report calling for consistency in corporate carbon accounting. That obviously links through to lifecycle assessment and the critical thing is drawing the boundary in the right place so that you have tracked everything down to the offset energy and so forth and that, when you have recovered materials, the energy and carbon thereby saved is also taken into account. Once you have done that—there are a number of tools and they need to be made consistent—this is calling for a consistent approach. There is a Defra method which is quite highly regarded. That would be a sensible place to start, I would suggest, but if you have that you really draw everything into this common currency of carbon accounting. Once you have that the next stage, dare I say, would be carbon pricing. Then we would really know what we are costing. On that basis, we can change the whole economy. We will not do that tomorrow but we do need to do it pretty quickly, I would suggest.

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Q250 Earl of Selborne: We heard from BSI last week. They say that they are engaged with WRAP and other key stakeholders in producing specifications and codes of practice in the management of waste, wood, paper recycling, glass, plastics and the like. Are you aware of opportunities that you have to help write such specifications and does this move into the international field?

Mr Davies: Our linkage is through the waste protocols which feed into the standards. The Waste Protocol effectively is a standard for recovered material so BSI are linking into the same system.

Mr Hyman: A number of our members participate in a wide range of BSI standards. They are almost all these days I think done on an international basis. The standards industry is perhaps responding but it is a slow and often complex process.

Q251 Baroness Platt of Writtle: Do manufacturers take part in the decision making of BSI?

Mr Hyman: They certainly have the opportunity to do so.

Mr Stace: I agree with Jonathan that the Waste Protocol has a real input into developing standards and the standards being set within the waste protocols system.

Chairman: Thank you very much, gentlemen. As we say to everyone, if there is anything else you would like to send us, we would be very happy to receive and consider it. We might well return to you once we have had a look at the printed copy of the evidence. If there are any issues that we think we would like to pursue with you, we may well be in touch. We are very happy to receive your evidence today and it has been very helpful. Thank you very much.

Memorandum by the Aluminium Federation and Aluminium Packaging Recycling Organisation

ALUMINIUM: A TRULY SUSTAINABLE MATERIAL

Although a relatively “young” material only discovered in 1807 and produced commercially since 1886, it is impossible to imagine life without aluminium. Think of any aspect of daily life and aluminium is most likely to feature in it.

“The life cycle of aluminium is a never-ending story.”

The Government’s Waste Strategy published in 2007 identified aluminium as a “Key Material”. The Waste Strategy complimented the Climate Change Bill with a focus on carbon reduction, seeking to maximise the recycling of materials which have the potential to contribute to a significant reduction in carbon emissions.

This is welcomed by the aluminium industry.

SOME KEY FACTS AND FIGURES

- Bauxite, the ore from which aluminium is made, is available in abundance. It is estimated that at present consumption there remains 300 years of commercially available bauxite deposits in the world;
- Current global output of primary (new) aluminium is 35 million tonnes annually. Global production of recycled aluminium was 16.4 million tonnes in 2006;
- 60 per cent of the world’s primary aluminium is produced using clean, renewable, hydroelectric power;
- Currently demand for primary aluminium outstrips production and immense capital investment is being made in primary production plants around the world. With this investment will come new jobs, new technologies, new products, innovation and new possibilities for mankind;
- 75 per cent of all aluminium ever produced is still in use today, equivalent to 540 million tonnes. This percentage will increase year on year;
- “Recycling is the cornerstone of aluminium’s sustainability”;
- Used aluminium is almost 100 per cent recyclable—using only five per cent of the original power required to produce it, to recycle it;

- If we recycled all the aluminium currently stored in use around the world, from cans to cars, from foil trays to aeroplanes, from wine bottle tops to buildings, it would be equivalent to 15 years primary output;
- Recycling from end-of-life aluminium products, currently saves close to 80 million tonnes of greenhouse gas emissions per year worldwide;
- Projections show that global recycled aluminium supply from end-of-life scrap will double by 2020 from today's level of 6.8 million tonnes to around 14 million tonnes;
- Aluminium is a strategic material and can be regarded as “stored energy”. Over 60 per cent of the aluminium produced is produced from renewable hydroelectric power;
- Aluminium is truly a material of today and of the future;
- Aluminium is a truly “sustainable” material, being cost-effective, strong, lightweight (one-third the weight of steel), corrosion resistant, flexible in design, and fully recyclable;
- The UK aluminium industry has invested heavily to encourage the recycling of aluminium used in applications from packaging to cars;
- The current UK recycling rates for the three major aluminium market sectors are: packaging 32.5 per cent, building 92–98 per cent, and Transport/Automotive 95 per cent;
- 96 per cent of the aluminium used in the old Wembley Stadium (over 400 tonnes) was recovered and recycled during the demolition process. Aluminium is featured extensively in the new Wembley Stadium for roofing (including the retractable roof), window frames, curtain walling and exterior cladding;
- In the UK we use around 143,000 tonnes of aluminium packaging each year. The largest part of this is drinks cans, at around 90,000 tonnes. aluminium foil trays and lids, etc make up around 25,000 tonnes;
- Although aluminium packaging represents less than one per cent of the domestic waste stream in the UK, it contributes around 25 per cent of the value from the sale of recyclables. At around £750 per tonne, aluminium subsidises the cost of collecting other packaging materials;
- Figures published by Defra show that 46,719 tonnes of aluminium packaging were collected for recycling in 2006, a 17 per cent increase on the previous year. This equates to a recycling rate of 32.5 per cent for all aluminium packaging. Based on these figures, the recycling rate for aluminium drinks cans is estimated to be 48 per cent and foil 10 per cent;
- The recycling rate in the European Union for aluminium drinks cans was 52 per cent in 2005;
- Every tonne of aluminium drinks cans recycled saves 10 tonnes of CO₂ equivalent;
- However, in spite of our best efforts, over 90,000 tonnes of aluminium packaging in the UK (worth around £80 million) is still going to landfill.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

Aluminium product manufacturers have been at the cutting edge of design optimisation. This is evidenced in the widespread use of aluminium in the transportation, packaging and building industries.

Recycling is probably the most effective way of reducing waste. It is therefore essential that products are designed with recycling in mind.

Aluminium is the perfect material for recycling as it can be recycled again and again without any loss of quality. Up to 95 per cent of the energy used in primary production is saved and 97 per cent of greenhouse gas emissions are prevented.

The aluminium drinks can is 100 per cent recyclable and can be recycled back into a new can with no loss of quality.

The aluminium industry is committed to maximising recycling performance because it makes good commercial and environmental sense.

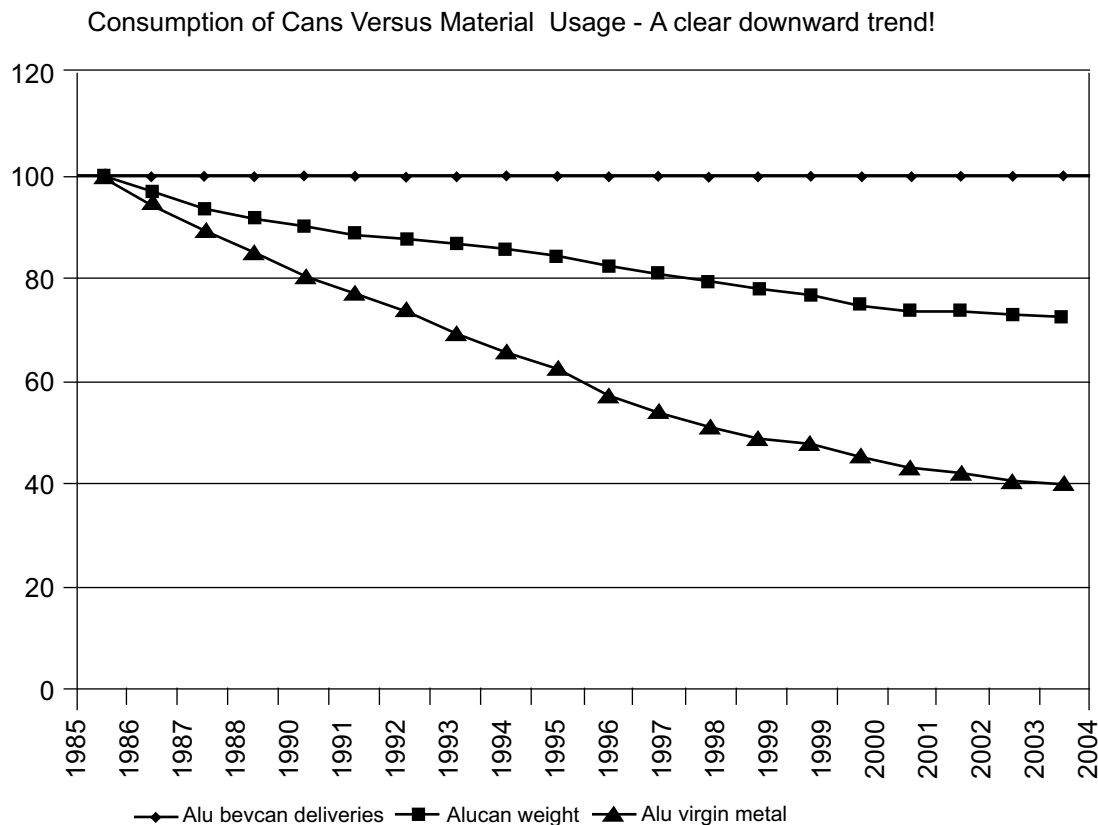
Resource efficiency is also an important way of reducing waste.

Reductions in the gauge of aluminium car bodies and aluminium packaging are good examples of light-weighting and energy saving, driven by the aluminium industry.

The aluminium industry works very closely with the international aerospace industry. Over 70 per cent of the structure of the Airbus A380, the biggest passenger airliner ever built, is aluminium.

The gauge of flexible aluminium packaging foil has been reduced by 33 per cent in the last 15 years from 12 microns to 8 microns and the weight of the aluminium drink can has been reduced by 28 per cent in 20 years from 18.6g in 1985 to 12.7g in 2003. Clearly this has led to a significant reduction in the amount of aluminium required.

There is always room for improvement and the education and research and development communities can play a significant role in leading design optimisation.



What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

Traditionally the main influence on the use of any material has been applicability, ie mechanical and other physical properties, and cost. Until relatively recently cost beyond the factory gate was not considered.

Today increasingly, however, the life cycle costs of materials are being considered.

Sustainability is progressively influencing the choice of material for a particular application. Supermarkets are increasingly looking at the environmental performance of the products and packaging materials they sell. Equally consumers are beginning to take an interest in the “sustainability” of the products they buy.

Sustainability is a very complex issue involving a whole series of different issues, including resource efficiency, production techniques, energy consumption, carbon emissions, recycling etc. It can be very misleading to look at a single issue in isolation. It is very easy for the wrong decisions to be made based upon incomplete information. We believe that it is essential that standards are delivered and adhered to, to allow materials to be properly compared. The work currently being undertaken by The Carbon Trust and the British Standards Institute (BSI) to develop a protocol for the measurement of carbon footprints provides an excellent example. We would encourage Government to ensure that these standards are adopted by industry.

The average life of an aluminium-bodied car is 30–40 years, compared to 10–12 years for a car with steel bodywork. An aluminium car will have a significant recyclable value at the end of its life.

Aluminium recycling saves energy and reduces carbon emissions—20 times more efficient than landfill.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

The automotive industry leads the way in this area, demanding to know that any material specified for a particular application will be readily available in the long term at a commercially viable price. Equally, the automotive industry will be driven (no pun intended) to show that their choice of a particular material has minimal environmental and energy-related impact. The End of Life Vehicles Directive will significantly influence this situation.

A number of highly efficient processes are used to collect and separate aluminium from vehicles.

The use of aluminium in automotive manufacture by companies such as Jaguar and Audi is increasing year-on-year by an average of 4 per cent.

More should be done to educate designers and engineers.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

The aluminium industry provides detailed innovative technical advice to the international automotive and aerospace industries and to architects and engineers.

The aluminium foil container manufacturers have worked closely with microwave oven manufacturers to overcome technical problems.

In the aluminium industry, more interaction between material scientists, designers and engineers is needed.

Can better designed products offset the increase in consumption?

There is no doubt that better product design can contribute to offsetting the increase in consumption. A good example is the large range of customised drinks can sizes designed to meet consumer needs more precisely whilst helping to avoid waste.

Aluminium beverage can key facts (1985–2004):

- number of cans sold and the related litrage increased by factor 6.3;
- the weight of the can has been reduced by almost 30 per cent;
- the recycling rate has increased from nil to 48 per cent; and
- requirement of virgin aluminium only increased by a factor of 2.5.

Weight reduction is a crucial part of automotive design, in which aluminium has a leading role to play.

Are there any other gaps in knowledge and how are they being addressed?

The UK aluminium industry is a world leader in recycling technology and technical advances are ongoing through research and development. Novelis' recycling plant at Warrington is a state-of-the-art operation producing 1,000 tonnes of metal every week from drinks cans, foil, aerosol cans, etc.

Members of the Aluminium Alloy Manufacturing and Recycling Association use state-of-the-art technology—F E Mottram's de-lacquering plant; Mil-Ver Metals' furnaces, etc.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

The successful collection of packaging materials for recycling is influenced by the Packaging Waste Regulations and the Landfill Directive. Unfortunately the Landfill Directive does not encourage Local Authorities to collect lightweight non-biodegradable packaging like aluminium.

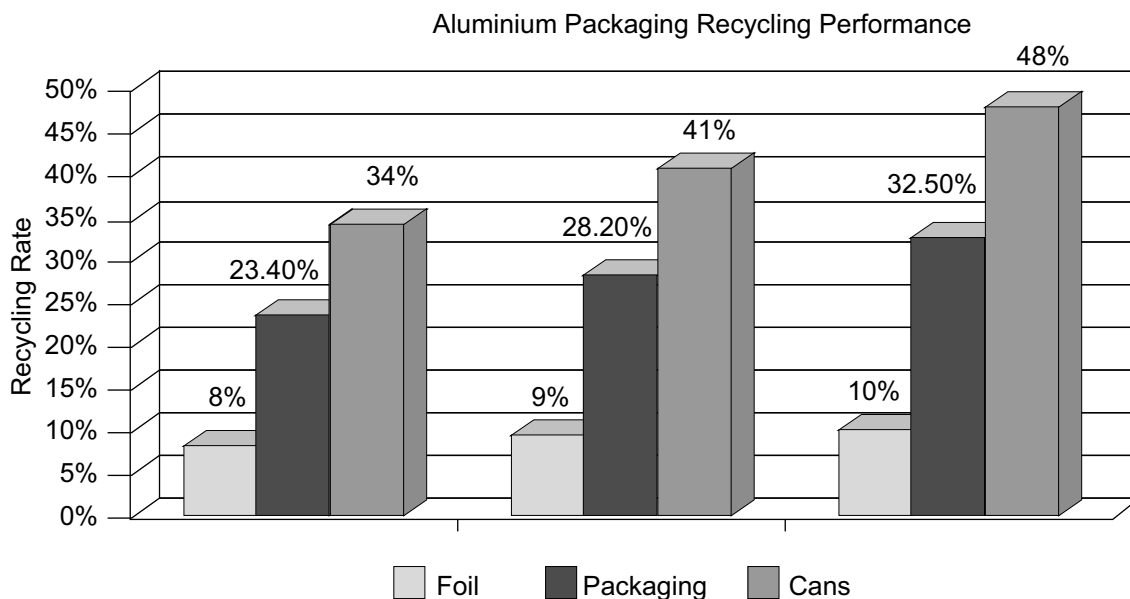
With 99 per cent of used aluminium packaging arising in the domestic waste stream as small consumer items such as drinks cans and foil trays, or even smaller pack components such as chocolate foil, dairy lidding and the barrier layer in drinks cartons, the industry is almost totally dependant upon Local Authority-run collection programmes.

For Local Authorities the collection of light-weight aluminium packaging is not a priority because their targets are weight-based with strong incentives to divert biodegradable waste. Aluminium is the only packaging material which has been almost totally dependant upon recovering material from the domestic waste stream to achieve its targets.

Despite this, aluminium has an excellent record of achievement with a recycling rate for all aluminium packaging of 32.5 per cent in 2006 and an estimated rate of 48 per cent for aluminium drinks cans. With the exception of glass, aluminium's recycling performance cannot be compared on a "like for like" basis with other packaging materials as their achievement is heavily reliant on cheap and easy to access material from the commercial sector.

Much more needs to be done to reduce the regulatory burden on British industry.

Whilst the UK's aluminium industry can demonstrate an impressive performance in areas such as environment, labour relations, and health and safety, increasing regulatory burden not matched in less developed parts of the world, means that UK manufacturing is in steady decline, as production shifts inexorably eastwards.



How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

Increasingly consumers and industry are becoming concerned about helping to combat climate change. There is no doubt that recycling, saving energy and reducing our carbon impact are all positive steps which will contribute to achieving a more sustainable future. The UK aluminium industry is at the forefront of all these sustainability initiatives. We are continually promoting sustainable design to our customers.

Companies such as Innoval Technology and Novelis Automotive are involved in innovation projects in the transport sector. The most significant project has been the use of aluminium sheet as an alternative to steel for the mass production of cars, using conventional pressing and joining technologies.

More than 70 per cent of aluminium castings are used in the automotive sector. Examples of aluminium castings produced from recycled alloys include engine cylinder heads, engine blocks, pistons and gearboxes.

What other measures can promote a focus on waste reduction among businesses?

Historically the majority of the aluminium drink cans collected for recycling in the UK have been collected through kerbside and bring systems. It has proved more difficult to establish viable systems to encourage the collection of aluminium drinks cans consumed "away from home". Many of these cans are consumed in the work place.

It is estimated that around 30 per cent of the cans sold in the UK are consumed "away from home", equating to an estimated 30,000 tonnes.

We are optimistic that the new Waste Strategy for England and Wales, the increasing cost of landfill and the Pre-treatment of Waste Regulations, should encourage businesses to establish recycling systems. In addition, working with key partners, the aluminium industry is currently developing a number of significant initiatives with the objective of developing sustainable collection systems to service this key area of opportunity.

The intrinsic value of aluminium encourages a high level of recyclability and, therefore, waste reduction.

What lessons can business learn from international experience?

The aluminium industry is a global industry dominated by multinational companies, committed to sharing best practice, including waste reduction.

The Aluminium Federation works closely with organisations such as the International Aluminium Institute, the European Aluminium Association and the Organisation of European Refiners and Remelters, to achieve that major objective.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

The UK has around 400 Local Authorities who are responsible for the collection of waste and recyclables, which in effect, this has resulted in 400 different collection systems. This, coupled with the lack of incentives for Local Authorities to collect lightweight packaging (see Business Framework, above) makes the maximisation of recycling rates for aluminium packaging very difficult. Currently, two-thirds of valuable aluminium packaging is being lost to landfill.

We believe that Government, working with industry, needs to take a stronger lead and do more to encourage the development of a properly integrated collection system for recyclables, operated by Local Authorities. As was highlighted in the Waste Strategy, we would support the development of carbon-based recycling targets for Local Authorities.

The Waste and Resources Action Programme (WRAP) is funded by Government to lead much of its work in the areas of waste reduction. Whilst WRAP has provided a significant amount of support, practical and financial, to the plastic and glass sectors, to date the metals sector has had no direct support. The aluminium industry has expressed its disappointment directly to WRAP, Defra and BERR on a number of occasions. There is no doubt that as a “key material”, the support of WRAP could make a valuable contribution supporting the Industry’s programmes to maximise recycling performance.

How does Government policy link up with European strategies and action plans?

Two good examples of European legislation in force affecting the UK aluminium industry are the European Packaging Waste Directive and the End of Life Vehicles Directive.

In general terms, government policy does link up with European legislation and strategies.

What lessons can be learnt from other countries—within the EU and globally?

To encourage the recycling of aluminium packaging, a number of different recycling mechanisms are used worldwide. They are designed for local market conditions.

The aluminium industry has a worldwide network of specialist recycling organisations who regularly share best practice and are in regular dialogue with national governments. The Aluminium Packaging Recycling Organisation (Alupro) represents the aluminium packaging manufacturers, the converters and the recyclers in the UK. The Aluminium Alloy Manufacturing and Recycling Association (AAMRA) represents the aluminium secondary refiners and remelters in the UK (both Alupro and AAMRA are Member Associations of the Aluminium Federation).

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

The development of a range of different can sizes, as described above.

In the 1990's technical advances by the UK aluminium industry produced a "stay-on" tab for drinks cans which replaced the traditional ring-pulls, further eliminating waste.

What role do marketing strategies play in influencing more sustainable design?

The "Power of Aluminium" Awards, sponsored by ALFED's Aluminium Extruders Association, is an excellent example of the marketing and promotion of aluminium extrusions in building and transport applications.

The "Aluminium Imagination" Awards influenced architects to feature aluminium in iconic buildings such as the Media Centre at Lords Cricket Ground, the Selfridges department store in Birmingham, and the new Wembley Stadium.

Major investment, marketing and promotion by the UK Aluminium Industry increased the recycling rate for aluminium drinks cans from nil in 1985 to an estimated 48 per cent in 2006.

The Aluminium Packaging Recycling Organisation (Alupro) has developed and implemented three consumer campaigns designed to encourage consumers to recycling aluminium packaging. Trees have been planted in the UK and Africa for every tonne of aluminium packaging recycled. The "Trees For Africa" campaigns have involved 2,000 schools and over 300 Local Authorities in the UK—more than 100,000 trees have been planted. The campaign contributed to a 17 per cent increase in the volumes of aluminium packaging collected for recycling in 2006 compared to 2007. Currently, Alupro are working in Malawi with the charity Ripple Africa planting fruit trees and developing sustainable businesses with local communities.

Are there any gaps in knowledge in this area?

The aluminium industry will continue to invest in this area, but government funding would be very helpful. Such funding should be channelled through the major industry organisations, such as the Aluminium Federation and the Aluminium Packaging Recycling Organisation.

SKILLS

How is sustainable design integrated into the design syllabus?

The Aluminium Federation has an ongoing lecture programme at many UK universities, using the European "TALAT" (Training in Aluminium Application Technologies) teaching material on CD-ROM. With increased financial resources, ALFED could do much more in this area.

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

Most of the major aluminium organisations in the UK are involved in education and training programmes, from primary schools through to universities and professional institutes, such as the Institute of Materials, Minerals and Mining.

January 2008

Memorandum by Chemistry Innovation Knowledge Transfer Network and the Chemical Industries Association

INTRODUCTION

1. Chemistry Innovation is a publicly funded Knowledge Transfer Network (KTN) set up in 2006 to drive innovation performance across the UK chemistry-using industries. We facilitate innovation and knowledge transfer by providing unique networking opportunities that help to connect companies, universities, funding bodies, national, regional and devolved administrations and enable them to focus on a common agenda. The

thrust of our activity is to provide the focus and stimulus to support product and process innovation that will deliver growth and sustainability through a coherent national strategy.

2. Chemistry Innovation is currently engaged in a portfolio of collaborative projects valued at over £40 million, representing a mix of industrial projects, CASE awards, TSB/EPSRC and EU funded projects, involving 150 organisations. We have formed strategic relationships with other national/European organisations involved in the delivery of innovation services to ensure a coherent approach with industry/academia in defining and funding the delivery of innovation projects. Evidence here is limited to our relevant experience and is focused on the chemistry-using industries which, with chemistry an underpinning science, covers sectors as diverse as pharmaceuticals, food and drink, materials and transport. One of Chemistry Innovation's core activities is to promote Sustainable Technologies and help UK industry become more innovative in their approach. It is imperative to describe the benefits of sustainability thinking to business. One of the best ways to accomplish this is with powerful examples and demonstrator projects.

3. The UK Chemical Industries Association (CIA) is the premier trade/employers' organisation in the UK chemical industry. It has a membership of 150 companies, many of which are international, operating from over 200 sites in the UK.

4. The chemical industry in the UK contributes over £5 billion annually to the country's balance of payments from a gross output of £50 billion. It accounts for 1.5 per cent of UK GDP, 11 per cent of manufacturing's gross value added, and employs nearly 200,000 highly skilled people directly as well as supporting several hundred thousand related jobs throughout the economy nationwide. The industry is global both in terms of markets and ownership, with over 65 per cent of CIA's membership being foreign "headquartered". Any significant imbalance in business operating environment between the UK and other locations can lead to the loss of UK output, trade and investment opportunities.

5. Responsible Care[®] is a self-imposed commitment by chemical companies worldwide under the auspices of the International Council of Chemical Associations (ICCA). It is designed to help companies continuously improve the health, safety and environmental performance of their operations and products. In the UK, where the Responsible Care[®] initiative has been in operation since 1989, compliance with the Guiding Principles of Responsible Care[®] and self-assessment of responsible care management systems, is mandatory for all CIA members. The CIA publishes information concerning the environmental, health and safety performance of its member companies on an annual basis in the Responsible Care[®] Indicators of Performance. In its new guiding principles and goals for sustainable development,⁵ launched on 6 July 2004, the Association has committed, by 2010, to achieve a 25 per cent overall reduction in hazardous waste, a 20 per cent reduction in water use, and 11 per cent improvement in energy efficiency; together with a significant reduction in our environmental burden.

BETTER DESIGN AND THE USE OF MATERIALS

6. It is important that products are designed for disassembly and ease of recycling as we seek to protect our rapidly diminishing resources. Much is known of the impact of oil scarcity however many other vital materials are in dwindling supply. Many elemental metals are being exhausted by new technologies and will vanish forever without efficient recycling.⁶ For example, indium metal is being used in increasing amounts in LCD flatscreen televisions, pushing up the price of the metal which is utilised for solar cell manufacture. The earth's supply of indium predicted to run out as quickly as 15 years time. Natural resources such as rubber and clean water are also increasingly stretched.

Innovations in chemistry have a huge part to play in reducing waste in downstream sectors. The construction industry is an example of a sector where increased use of sustainable materials and design for ease of dismantling and separation could have a huge impact in reducing waste. New chemical technologies will be needed to achieve this such as new adhesives and high-performance insulating materials from sustainable sources.

7. Product developers are increasingly seeking to incorporate renewable materials into their goods but more research is needed into how the same product benefits can be delivered without a loss of competitiveness. For example personal care products may require substantial changes to base formulations to incorporate new materials. This is distinct from the increasing use of "natural" products, of which little is sometimes known of their health effects. Design and engineering graduates could have a profound effect on waste reduction and management in industry. This requires both adequate training, and commitment from industry. Resources such as the Ecodesign Pilot, developed by the Technical University of Vienna, provide both a framework for

⁵ More details of this programme, including guiding principles and a goals brochure, can be downloaded from http://www.cia.org.uk/newsite/downloads/Sustainable_Development_Brochure.pdf

⁶ *Earth's natural wealth: an audit* New Scientist 23 May 2007, issue 2605, pp 34–41.

sustainable design, and many examples of its application in practice.⁷ Another example is the BASF ecohouse.⁸

8. Chemistry Innovation is working closely with Bioscience for Business KTN on use of renewable feedstocks and with Resource Efficiency KTN on issues such as new catalysts for water treatment and methods to convert “waste” to feedstocks. Chemistry is a vital underpinning technology with huge scope for new innovations that address resource and sustainability issues. Chemistry Innovation launched an online Sustainable Technologies Roadmap in 2007 which provides a look into the future of the chemical and chemistry-using industries.⁹ It asks what industry needs to do to produce solutions that will help customers and society to be more sustainable, and what technologies can help. It will provide key decision makers in industry, academia and the UK Government with a clear picture of the challenges, opportunities, gaps and actions that need to be taken. Importantly it contains a wide variety of case studies exemplifying innovative solutions to sustainability issues.¹⁰ Cross sector communication of success stories provides stimulus for innovation in tackling such problems.

9. Recycling waste, or “cradle to cradle” thinking, can turn waste streams into important feedstocks for industry. This can be done in two ways; taking a waste stream from one process or industry and making it a feedstock for another, or by reusing materials within a single process or industry. An example of the first would be the development of integrated biorefineries producing fuel and platform chemicals based on agricultural, commercial and domestic organic waste. An example of the second would be the recycling of tertiary packaging materials within the retail sector. In the big supermarkets, virtually all of the plastic over wrap used when palletising product for delivery to the supermarkets is recycled and reused. The barrier to the wider adoption of both processes is the variability of the waste streams, and the risk of contamination. We have yet to devise processes that can reliably produce raw materials of the required quality from the general waste streams. This is made more complicated by the tendency to increase the complexity of materials used in industry in order to gain other benefits in performance and environmental impact. For example, modern window glass is frequently coated to give additional benefits such as self-cleaning properties or control of solar gain. From the point of view of recycling this is a contaminated material which is extremely difficult and costly to clean up.

10. In the chemical industry itself there is both a long tradition of designing out waste through novel processing, and great potential for further development. The concepts of “atom efficiency” and “E-Factor”, measures of how much of all the raw materials that are used in a manufacturing process end up in the final product, has been very influential.¹¹ In-process waste minimisation has been practised in the chemical and related industries for more than two decades and a lot has been achieved already so that at least in the chemical sector most processes are optimised with respect to waste generation. The main driver for this was economics—it made business sense to do so.

11. Methods such as Lean Manufacturing, Six Sigma and similar approaches (such as Design for Manufacture—“easy to make” and Poke Yoke—“inadvertent mistake proof”) have had a powerful influence in recent years. However, they are largely concerned with optimising an existing product and/or process. The larger opportunity is in redesigning a product and process completely to provide the user requirements in a different way. This “deep innovation” can reduce environmental impact by a much bigger factor. Lean manufacturing and six sigma have a proven track record in reducing waste, but they are not sufficient in their own right. It is more important to ensure that companies continue to strive to achieve the objectives rather than to seek to prescribe the perfect tool for achieving them.

12. Some sub-sectors have been better at process optimisation than others so there is still significant potential for improvement. However, it is not clear where and how the improvements can be made (ie are there any “low hanging fruit”?). The best way to reduce waste from a chemical process is to consider the amount that will be produced at the earliest possible stage in the design and development of the process. Unfortunately, the timescale for developing and proving novel processing techniques demands a lot of resources in time and personnel. In addition this period of rapid legislation changes and review make it a difficult area for manufacturers to commit to with any confidence.

13. The pharmaceutical industry is particularly active at the moment in reducing waste in the manufacture of pharmaceutical preparations because of increasing costs of raw materials, waste disposal, and protection for workers. They are particularly keen to increase the atom efficiency, and also to design out toxic and hazardous materials, whose management adds so much to their cost base. A strong interest in industrial biotechnology in the pharmaceutical, consumer chemical and specialty chemical sectors comes from the potential to reduce

⁷ www.ecodesign.at

⁸ http://www.basf.co.uk/en/uk/house/?id=0_..jjBny.bw24Sd

⁹ <http://www.chemistryinnovation.co.uk/roadmap/sustainable/roadmap.asp>

¹⁰ <http://www.chemistryinnovation.co.uk/roadmap/sustainable/casestudies.asp?id=64>

¹¹ Roger A Sheldon, *Green Chem*, 2007, 9, 1273–1283.

waste and improve efficiency as much as from the opportunity to produce novel materials. Chemistry Innovation is supporting BERR's Industrial Biotechnology Innovation Growth Team which is seeking to address issues surrounding adoption of biotechnology by the chemical industry.

14. For much of fine chemicals manufacture reducing solvent use is where big gains can be made. Use of ionic liquids (which aren't volatile), supercritical fluids (highly compressed gases that can be recycled), process intensification (use of flow chemistry over batch) and solvent free processes all have the potential to greatly reduce waste. The sustainable chemical technologies roadmap developed by Chemistry Innovation has many examples of recently emerged and emerging technologies that have the potential to substantially reduce waste in a wide variety of sectors.

15. It is probably of greatest importance to re-think manufacturing processes on a life cycle basis and not looking just at processes themselves but feedstocks and products (ie can we start from different feedstocks, including using waste; can products be re-designed; do we need these particular products, etc etc). Shared responsibilities up and down supply chains should be encouraged (programmes such as the Chemical Industries Association's Responsible Care for example) and supported with simple to use tools for identifying "hot-spots" in a supply chain where shared action should be targeted with all members of the supply chain sharing the benefits of the improvements.

16. The key problem is that the ISO approved methods for life cycle analysis are too slow, too complex and too costly for practical use in industry. As a result, a large number of "cutdown" methods have been developed but not standardised. For an organisation wanting to set out to use sustainable design to reduce environmental impact, it is an extremely confusing world. We urgently need internationally agreed methods for simple life-cycle analysis suitable for use in the early stages of design and product development when multiple concepts are being evaluated. Similarly, we need more data in the public domain on the environmental impact of different materials. This is particularly true for new materials designed to improve sustainability. Defra has funded some work to enable high quality data on bio-derived materials to be made available to designers and manufacturers. Chemistry Innovation is involved in two projects, one European and one UK-based supported by EPSRC and the Carbon Trust, addressing life cycle analysis issues.

BUSINESS FRAMEWORK

17. If a waste reduction strategy made commercial sense, we can assume that the smart company would want to follow it. The barriers to them so doing include:

- (a) Awareness—the benefits of resource efficiency are still not known to many companies, particularly the large number of SMEs. The stories, backed up by evidence, need to be told and retold;
- (b) Cost of analysis—for many companies the cost of finding out whether there are financial gains for using resource efficiency is a substantial barrier, particularly if you have no previous successful experiences. Again this is particularly true for SMEs;
- (c) Lack of resources—many companies are so thinly staffed that they lack the resources to undertake resource efficiency projects;
- (d) Lack of skills—even with external support, many companies lack the skills to undertake resource efficiency studies, or to implement their findings;
- (e) Lack of fit with the capital investment cycle—in many industry sectors capital investment follows a natural cycle. Ideas for resource efficiency need to either offer immediate and substantial benefits with low capital investment, or need to fit into a plan to refurbish, replace or extend capital equipment. With very long investment cycles in many industries, resource efficiency opportunities often occur when there is no real prospect of making the capital investment required.

If the company has carried out a proper analysis and the strategy does not make commercial sense, then they cannot be expected to follow it. Government has a role to shift the balance if it wishes companies to follow waste reduction strategies in areas which are not commercially viable. They can do this by regulation, or by fiscal policy which charges companies for their environmental impact. The chemical industry is global, and has to compete with lower cost producers in the Far East and Eastern Europe. Generally, capital projects which implement waste reduction technologies do not meet the investment criteria applied to capacity expansion and new products, and in many cases are implemented for CSR reasons rather than economics.

18. There are examples where UK industry is at the leading edge of waste reduction, and examples where it lags significantly. Different countries have different regulatory environments, and this has a profound effect on the type of waste that industry focuses on. Regulatory environment, sector size and strength, relative costs of waste management, sector history, and whether the leading players are national or international all have an effect on waste management strategy in the sector.

19. Customers, regulations and standards can also be barriers to following a waste reduction strategy, particularly with respect to recycling. Customers may have specifications which explicitly or implicitly block the use of recycled material in a product. For example, it has been reported that the specification for vinyl flooring for government buildings means that recycled PVC cannot be used in these products. Such specifications may not have any scientific logic behind them, but can be incredibly difficult to change. International or national standards and regulation can have the same effect. The UK's wide interpretation of the definition of waste is posing a barrier to sustainable waste and resource management. The result of the interpretation in the UK is resulting in sites, whose by-product reuse or management has until recently (~2005) been regulated as part of their general Pollution Prevention and Control permit, and subject to Best Available Techniques (BAT) and Best Practicable Environmental Option (BPEO) considerations, being drawn into additional waste-specific regulation and its associated regulatory impact.

20. It is directing sites towards discontinuing previously agreed strategies to manage their process by-products sustainably (for example by burning in combined heat and power plant in place of virgin fossil fuel) towards sending such by-products, often over long distances, to the limited commercial incinerators available or to landfill (if technically feasible) and buying in commercial (mainly fossil based) fuels in their place to power their boilers.

In the following example, the UK Competent Authorities concluded that the material is waste:

“An installation produces an intermediate (which is used to make products) and methanol as part of a chemical process. The installation was designed with the specific intention to use the entirety of the methanol produced from this process as a fuel on site. The methanol stream does not require further processing prior to its use as a fuel. The process of manufacture and fuel combustion is regulated under, and complies with IPPC requirements (all necessary measures are taken to achieve a high level of protection for the environment as a whole). The methanol is an output of production and, although it is not the primary motivation for the design of the manufacturing process, it is an output which is intended and which has an identified and certain end-use. In this case, the end-use is on-site use as a fuel.”

Materials produced as by-products of one industrial process that can be used by other industrial processes as raw materials may still be classified as waste for many years to come. This will mean that the twin goals of efficient use of resources and improved industrial competitiveness will remain unrealised.

The chemical industry, along with a number of other sectors, has consistently lobbied for a more pragmatic interpretation of the definition of waste. The Chemical Industries Association are currently following closely the revision of the Waste Framework Directive and support the proposed Common Position text, which introduces a definition of by-product. We hope that this will help clarify the distinction between waste and product and therefore maximise efficient use of resources.

21. The use of weight targets to encourage recycling and waste minimisation do not always make sense, as for some waste it is volume that matters more than the weight (eg low density materials). It should also be noted that it is volume that matters in landfills, not weight. Also, some of the weight targets (eg in the WEEE Directive) are set at a ridiculously low level that they may have more of a negative than positive environmental impact, when transportation and processing are taken into account (ie economies of scale matter).

22. Weight targets do not take into account the full life cycle, and can have perverse or unintended consequences. For example, there has been a drive to reduce the weight of packaging, particularly for consumer goods. One solution to this problem has been to increase the sophistication and complexity of packaging materials, so that the same degree of protection can be afforded to the product, but at a much lower weight. This clearly reduces the amount of material which has to be manufactured and transported, but also makes it significantly more complicated to recycle materials. It is much easier to recycle a thick single polymer packaging film than it is to recycle a thin and light weight foil which may have used separate layers of polymers to achieve the same level of protection and performance. For the best decision making there is no substitute for considering the full life cycle, but this remains difficult and costly to do in practice. In summary, targets should be set depending on the material and product, maybe using a combination of measures (weight, volume, toxicity etc) rather than introducing a blanket approach for all.

23. Suppliers can influence manufacturers by demonstrating that using more sustainable materials, or using materials more sustainably, will improve their business. This might be through cutting their costs, being able to improve product functionality and performance, helping them meet regulatory obligations at minimum effort or minimum cost, or by enhancing customer profile. This requires very active interaction between customer and supplier. In some sectors, such as automotive with its Tier 1 and Tier 2 suppliers, supply chains are very closely linked together. In other sectors where materials may be used in a very wide range of applications, the supply chains have been less closely linked and there has been less involvement by suppliers

in innovations of the customer. At the moment, for sectors like chemicals, it mostly happens when a customer has a driver to be more sustainable. For example, recently Ford in Europe wanted to reduce the waste generated by metal cutting machinery in the production of engines. Part of the problem were the lubricants and cutting oil used in the process, and by working closely with their lubricant supplier the supplier was able to develop a vegetable oil based lubricant which had both superior performance and superior environmental impact. As a result, Ford was able to realise significant savings in their engine plants. It is generally easier for a manufacturer to influence their suppliers than the other way round. REACH may encourage much closer interactions and exchange of information along supply chains, and could lead to opportunities for more sustainable use of chemicals. The application of mutual responsibility influences both parties to act in a more sustainable way such as shared responsibility for waste collection and recovery. Producers also have a large part to play educating consumers. The Chemical Industries Association's Responsible Care product stewardship is a voluntary industry programme that works on this aspect, trying to understand how customers use products and work with them to develop new products, which help them. For example: the development of a fabric treatment system to allow a downstream customer to complete several fabric finishing operations in one step, leading to significant water savings. Another successful example is the Voluntary Emissions Control Action programme (VECAP) established by the brominated flame retardant sector. Through VECAP, manufacturers and users of brominated flame retardants are working together to establish and share best practices on their handling to minimise emissions to the environment. In carpets manufacture for example, it resulted in a significant reduction in emissions along with substantial cost savings.

February 2008

Memorandum by British Glass Manufacturers' Confederation

1. INTRODUCTION

1.1 British Glass is both a trade federation and materials organisation, which promotes glass as the first choice material in all sectors which for ease of convenience divides generally into the following: container, flat, special (includes technical and scientific), decorative and fibre applications. Its main activities involve representing the industry at European, national and local level on a wide range of topical legislative issues, for instance, waste, packaging and social policy. It acts as the industry's voice on health and safety, HR and environmental issues as well as technical standards and specifications likely to affect its members.

2. BETTER DESIGN AND THE USE OF MATERIALS

2.1 The UK has made great strides over the years in reducing waste. There is however concern that when companies look at waste reduction because of the way waste is measured, companies automatically focus on heavy packaging. Whilst this may seem "common sense", what it results in is a higher use of materials that are not as environmentally friendly. With the introduction of initiatives such as the Courtauld Commitment, many retailers are now focusing solely on weight and not sustainability. Glass is a heavy material which can be recycled indefinitely with high recycled content, Plastic in particular PET, is lighter in weight and seen by many as being an alternative which at present can not be recycled in the UK.

2.2 British Glass and its members have for some time now been working with WRAP and the supply chain to lightweight containers produced in the UK. The projects have resulted in discussions regarding bulk importing of products to be filled in the UK as well as highlighting some of the constraints associated with using glass containers.

3. BUSINESS FRAMEWORK

3.1 The Courtauld Commitment and the targets signed up to by retailers are becoming a main decision tool regarding container types. Weight is driving waste reduction rather than other causes of waste such as unnecessary or over-packaging.

3.2 Sustainability is becoming a major decision tool for companies however as with any business it has to be economical to do so. The Glass Container Industry has the capacity to use more recycled glass to reduce the amount of waste. However the amount they are able to use is reducing due to the recycled glass (cullet) not being fit for purpose. The reason for this is due to the increase in Local Authorities collecting materials mixed and sending them to Material Recycling Facilities.

4. GOVERNMENT POLICY

4.1 Over packaging and food waste tend to be the main issues with regards to waste reduction. Suppliers unnecessarily wrapping a coconut in shrink wrap is a prime example of unnecessary or over-packaging, and where possible some form of deterrent should be in place, set by Government and possibly policed by LACORS.

5. CONSUMER BEHAVIOUR

5.1 Consumers are becoming more and more aware of waste and over-packaging, however they are of the opinion that they do not have a choice.

5.2 It is believed that offers such as “buy one get one free” which appeal to consumers add to the issue of waste arising, as most people tend not to use them within the sell by period.

6. SKILLS

6.1 Material Science with more emphasis on packaging and sustainable design should be integrated into the design syllabus. Sustainability is a growing concern that as previously mentioned is becoming a driver in decision making.

October 2007

Examination of Witnesses

Witnesses: MR RICK HINDLEY, Chief Executive Officer, Alupro, DR MICHAEL PITTS, Priorities Manager, Chemistry Innovation Knowledge Transfer Network, MR WILL SAVAGE, Secretary General, Aluminium Federation Ltd, and MR DAVID WORKMAN, Director General, British Glass Manufacturers' Confederation, examined.

Q252 Chairman: We are very pleased that you could come this morning, gentlemen. Dr Pitts, perhaps you could start off by introducing yourself and we will work along the table and take it from there.

Dr Pitts: I am Michael Pitts. I work for the Chemistry Innovation Knowledge Transfer Network, which is one of the ways that the Government delivers its technology strategy. I look after sustainable technologies within that.

Mr Workman: I am David Workman. I am the Director General of the British Glass Manufacturers Confederation and for my sins I am also President of the European Glass Manufacturers Association. The industry is in essence now container glass, flat glass and fibreglass. Unfortunately most other areas of glass manufacture have offshored over the last few years.

Mr Hindley: My name is Rick Hindley. I am Executive Director of the Aluminium Packaging Recycling Organisation, Alupro. We are a specialist industry organisation which is focused on the recycling of aluminium packaging and we are funded by the major aluminium producers, their converter customers such as foil converters and one of the can manufacturers, but we also have a group that represents the recyclers and exporters of aluminium packaging for recycling.

Mr Savage: Good morning. My name is Will Savage. I am Secretary General of the Aluminium Federation. We represent the whole of the life-cycle of aluminium in the United Kingdom. We have over

200 members. Thank you for inviting me along this morning.

Q253 Lord Howie of Troon: What is the potential for manufacturers to design out waste or minimise waste through new or novel processing techniques?

Mr Workman: In terms of glass, we are almost at the point of being able to utilise all known technology. There is not an awful lot we can do in the process. We are as lean as we can possibly be at the moment. There are a lot of WRAP funded projects going on in the container area to take the weight out of bottles and jars and that has really been the emphasis of the industry in terms of waste minimisation. In the flat glass area the biggest emphasis has been on innovation and leading-edge technology for coatings for different types of glass to the benefit of the environment generally.

Mr Hindley: From the aluminium packaging perspective, our industry has been heavily involved for a long time in reducing the thickness and the weight of packaging. If I take two specific examples, the aluminium drinks can, which is obviously the largest part of the packaging fraction, the weight of that can has reduced by around 28 per cent in the last 20 years and it is continuing to do so and that is done for environmental reasons but also for commercial reasons. Within the foil tray sector the actual gauge of an aluminium foil container has reduced from 12 microns to eight microns in the last 15 years, which is around 33 per cent, but you do get to a point where

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taking the gauge down any further has an effect which perhaps you do not want, which is actually increasing the amount of food waste, for example, through damage, in transit etc. It is an evolving process, but there does come a point when it makes no commercial or environmental sense to go any further.

Q254 Lord Howie of Troon: Have you any views on the use of glass as a construction material?

Mr Workman: Yes, we do. As you can see when you look out your windows, the skylines of most of the major cities around the world now are glass and the reason that glass is used is that there are properties now within glass that allow buildings to retain heat in the winter and reflect heat in the summer. I suppose the best example of that is the Gherkin in the City where I understand they hardly ever need to turn the heat on in the winter and hardly ever need to turn the air-conditioning on in the summer. This is the result of technological advance mainly to do with gases between various layers of glass and also on coatings on glass. The innovation in the last ten to 20 years has been phenomenal in that area and has been largely led by what used to be a British company, Pilkington.

Q255 Lord Howie of Troon: I know it well. What you are saying is that the use of glass as a construction material can lead to great savings in energy and things of that sort?

Mr Workman: We believe that if glass were used to its full potential across Europe the EU could meet 25 per cent of its 2020 CO₂ target, just through the proper use of glass in existing and new build.

Q256 Earl of Selborne: Is that retrofit?

Mr Workman: It would be retrofit on existing build, yes.

Q257 Lord Howie of Troon: On buildings like the GLA Headquarters near Tower Bridge the architect made substantial claims about the energy savings. Are these energy savings monitored in any way and are they actually delivered?

Mr Workman: I do not have any written evidence to suggest that they are, but I could probably provide you with that evidence through Pilkington.

Lord Howie of Troon: I do not know if it would help us very much but I would like to know!

Q258 Chairman: If we can bring a little light into your life, Lord Howie, then all to the good!

Mr Savage: We can define waste in a number of ways. If we talk about energy, the primary aluminium sector globally has reduced its energy consumption per tonne of primary aluminium by something like 40 per cent since 1955, which has been a significant

reduction, and continues to strive to find ways to do that. In the manufacturing side of aluminium the intrinsic value of the material has indeed had a major role in making companies look at waste reduction in their production cycle.

Q259 Baroness Sharp of Guildford: How successful have manufacturing initiatives such as “lean manufacturing” and the “six sigma” approach been in reducing waste within industry?

Dr Pitts: We think these initiatives have had a huge influence and they certainly have a proven track record. As you know, “six sigma” aims to reduce defects to less than 3.4 per million opportunities and “lean manufacturing”, which essentially is just-in-time manufacturing, certainly reduces the likelihood of waste. I am told the UK is starting to lead in new areas for tackling these kinds of issues such as design for manufacture where you make it very easy to make and something called “pokey-yokey”, which is making something inadvertently mistake proof. Our feeling as a Knowledge Transfer Network, however, is that all of these optimise existing processes and the real step change and plant closing technologies lie in deep innovation and that is something that we try to encourage companies to look at.

Q260 Baroness Sharp of Guildford: The evidence we have just received on the whole indicated that it was actually easier to design down waste in a situation when it was new process innovation. Equally, it does appear on occasions that the improvement and the management of waste are easier once created rather than at reducing it in the first place. People recognise that it is there when they have created it and then they think about ways of reducing it. What sort of incentives are there to encourage manufacturers to reduce the creation of waste and are they meeting the business needs of both large and small companies?

Mr Workman: As with any industry, profit is the main driver. The average plant five years ago had a waste cost—this is non-glass waste—of about £120,000 a year. In many cases that has been reduced very significantly. We have one major flat glass manufacturer who over the last five years has reduced waste per employee by a factor of five. There is another manufacturer which my Lord Chairman has been closely associated with over the years who has halved the amount of waste per tonne of product produced in the last five years. The drivers have been commercial as well as environmental but they have had significant benefits. Most major plants now are either operating to, or are likely to become accredited to, ISO 14001, which is the environmental system which we tend to use in our industry, and that is bringing huge benefits.

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Q261 Baroness Sharp of Guildford: Something like ISO 14001 is actually a very effective incentive; it is a sort of voluntary agreement. How important is other regulation? Clearly EU regulation has had a big impact here as well.

Mr Workman: I think EU legislation has had more of an effect on us in terms of post-consumer waste rather than waste within factories. I think the waste within factories has basically been brought down. If you look at glass waste, the efficiencies within the factories now are running at 90-95 per cent, so there is very little glass waste that comes from the process and that waste, if we do create it, goes straight back into the furnace again. Post-consumer waste is a completely different issue and that is almost entirely driven by EU legislation. We could spend hours talking about that one, but that is the main driver.

Q262 Baroness Sharp of Guildford: We are focusing here specifically on waste from manufacturers.

Mr Savage: I would concur with that, my Lord Chairman. In terms of aluminium, the End-of-Life Vehicle regulations will have a major effect on the reduction of waste post-manufacturing.

Q263 Chairman: Mr Workman, you mentioned my old parliamentary constituency hosted, and still hosts, Owens-Illinois, the major bottle producers. I would imagine your own European position would enable you to tell us how the British glass industry fares in comparison to international comparators because this is something that we are having a little bit of difficulty getting evidence on at the moment, the performance of British manufacturing in relation to our competitors. What has been your experience, either the European one or comparing a company like Owens-Illinois? I know it is an American one and it has a plant in Harlow.

Mr Workman: This is a bit of a moving feast. The major international companies are very reluctant to give us that sort of information. I am trying to ascertain that information now purely on the basis of energy costs around the world because we tend to find the cost structures vary. If you look at productivity in terms of output per man, the UK and particularly the company you referred to will be very high up on the global ladder. Certainly in flat glass we have one of the most productive sites operating in the UK anywhere in the world. Productivity levels generally are very high in the UK. They have had to become that way because of the increases in costs that we have had to absorb over recent years.

Q264 Chairman: On waste and energy, at the moment you have not been able to compile satisfactory statistics?

Mr Workman: Where the continentals, particularly in Europe, benefit is that their post-consumer recycling rates are higher than they are in the UK and there are significant energy and CO₂ savings for putting recycled glass into the furnace rather than virgin batch. In Germany and the Netherlands overall glass recycling rates are 90 per cent plus. In the UK we should hit our 60 per cent level this year, but getting hold of what we call cullet, which is post-consumer waste, is becoming a very real issue for us. In fact, some of our manufacturers have to import it from Europe because they cannot get hold of it from the UK.

Q265 Baroness Platt of Writtle: In days gone by you got tuppence back on a bottle or a can. Why has that gone? Should it come back?

Mr Workman: Every time I come to the House of Commons or the House of Lords this is the most frequently asked question that I get from Members. The answer is that the infrastructure has changed in the UK. When I was a young lad and I first started out selling in glass almost every town had its own dairy, its own brewery, its own soft drinks company and they used to fill and distribute locally. In today's world, if you take almost any product, like Budweiser or Stella beer, they are only filled in one or two plants in the country, so to build return containers from Aberdeen to London on Budweiser you are looking at huge environmental and commercial costs involved in doing that.

Q266 Baroness Platt of Writtle: What about if the local authority did it instead of it going straight back to the factory because the good local authorities are doing recycling in a big way?

Mr Workman: If you are looking at a deposit on packaging that is a slightly different issue than a deposit on a piece of packaging that you take back to the retailer, which is what I certainly remember happened when I was younger. If you get into deposits on packaging then you are getting into the areas of tax, which is something I know that one or two of our continental cousins have looked at and even implemented, but we are not there yet in the UK.

Mr Hindley: Just picking up on your point about being paid for cans, that still does happen. We have a highly successful Cash for Cans programme where charities and individuals etc collect aluminium cans and they are paid at the intrinsic value of just around a penny each.

Q267 Baroness Platt of Writtle: That is not very well known, is it?

Mr Hindley: Sadly, it started in the mid-1980s and at that time a penny a can was quite attractive to collectors, but with the way things have developed in the UK it is not quite as attractive and in the meantime

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local authorities have developed kerbside collection programmes which are a more convenient option. It still does exist. It is not of the scale that it used to be, but we still do get probably 15 per cent of all the aluminium cans collected in the UK coming through Cash for Cans programmes.

Q268 Baroness Platt of Writtle: That is a very small percentage when you think that aluminium is infinitely recyclable.

Mr Hindley: Absolutely. We currently recycle 48 per cent of all of the aluminium cans that are sold in the UK and the vast majority is now coming through kerbside collections by local authorities. The big untapped market is actually from what we call the away from home area where cans are consumed when people are at work or in leisure centres or indeed “on the go”, that is about 30,000 tonnes and that is the big untapped market. Some of the things that we have been talking about today will have an impact on encouraging businesses to set up programmes to collect the cans which their workforce use.

Q269 Lord Methuen: Let us go back to this subject of cullet. In your paper you say about the cullet not being fit for purpose. When we go to our recycling place we have one container for clear glass, brown glass and green glass. I have heard it said that once they leave there they all get tipped into the same lorry and muddled up. Is this the cause of the problem?

Mr Workman: It is a major issue. The good news is that the overall recycling rate for glass has improved year on year on year over the last ten years, but what is in decline is the amount of glass that is coming back to the glass industry for re-melt and the reason for that is that some local authorities are collecting segregated colours and segregating glass but then the companies who operate the collection systems are then mixing them. The worst examples we have got are the wastes that come out of the MRF, it is pretty terrible. If you talk to any material stream they would say they experience exactly the same problem. The only way that this waste can actually be used is either for it to go into landfill or into aggregates for roads. The CO₂ saving for that is zero compared to the CO₂ saving for re-melt which is very significant.

Q270 Chairman: I did not quite catch that word that you said.

Mr Workman: It is the Materials Recycling Facility, the sorting centre in effect.

Mr Hindley: From an aluminium point of view, the quality of the material that is collected through post-consumer schemes is a real concern to us. The industry has invested millions in Europe’s only dedicated can-to-can facility in Warrington which is run by Novelis and cost £28 million. Much of the material collected in

the UK currently through local authority schemes goes to the sorting centres, MRFs, and has to be sorted again before it can be processed through the recycling plant and there are a couple of reasons for that. One is that we do not have sufficient sorting capacity in the UK for all the material that has been collected, so the plants we have are running at over the capacity they were designed for. Secondly, with the way the contracts are set up between the local authority and the waste management company there is no incentive for the waste management company to produce a clean quality product at the end because they make their money out of the tonnage that goes through the front door of the plant. So we have an inherent problem in the way our system has developed which is causing contaminated material and makes it very difficult to recycle.

Q271 Lord Crickhowell: I still do not quite understand why the performance on the Continent and Germany is so much better than ours. If it is largely because the local authorities are making a bit of a mess of this --- I find it quite extraordinary that they should collect bottles of separate colours and then mix them up again. What action should be taken to eliminate this obvious nonsense and get us up to the same performance as our European competitors?

Mr Workman: What we have to remember is that the waste legislation, particularly the packaging waste legislation in this country was enacted well before the words climate change dropped off everybody’s lips. It was designed clearly to get waste out of landfill. When you meet with local authorities they say, “Yes, we fully understand your problem, but we’ve got targets to meet. We’ve got political masters at local level who again are anxious to avoid tax on landfill.” Their primary objective is to avoid landfill at all costs. What happens to the waste after that seems to me to be immaterial to them. What needs to change in my view—it is something that was talked about with the last set of witnesses—is that there needs to be some sort of CO₂ element put into our Waste Strategy in future. If climate change is as big an issue as we are being led to believe it is, waste itself has the potential to save an awful lot of CO₂, particularly in aluminium and in glass because we both have materials which are in theory 100 per cent recyclable.

Q272 Lord Crickhowell: Waste is only partly addressed rather at the tail end and in specimen trials. We are reaching the final stage of the Climate Change Bill in this House tomorrow when we have got a debate on waste as it happens. This is an issue that you think needs to be pursued and in the field of climate change and the legislation that follows from that?

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Mr Workman: Yes. It has a knock-on effect in terms of our ability to achieve our targets under our Climate Change Agreements. It could have a tremendous knock-on effect in terms of the Emissions Trading System that is coming because we are relying in our forecasts for the future on getting an increased amount of glass back for recycling, not less. There is about a 20 per cent difference in energy usage by melting returned glass as opposed to melting virgin raw material. So there are some bigger issues here that might well affect the future viability of the glass industry in the UK.

Q273 Lord Crickhowell: I might ask you for an email brief by tomorrow afternoon on that!

Dr Pitts: I would like to follow up with two points on that. The first one is the difference between us and our European colleagues. For quite a while I lived in Austria and the culture is very different on recycling. There are four different types of recycling bins on the streets everywhere, outside houses; they are very accessible. If you go to Vienna airport and a lot of other airports throughout Europe you will probably have noticed the four different types of colour coded bins for recycling things such as aluminium cans and glass bottles. There is a big difference, as you have heard, in the public attitude and culture. Coming back to the point about resource efficiency, there is a link between climate change and the use of any resource because any resource has some associated—as it is sometimes referred to—“rucksack” with it. You probably know that for every kilogram of aluminium that is processed you need 6 kilograms of bauxite. In other metals it is much, much higher. We are rapidly running out of many of the most important minerals. As a chemist, in 80 to 100 years’ time a significant proportion of the Periodic Table will not be available to us unless we start to do a better job of capturing and reusing our resource.

Q274 Earl of Selborne: Are you confident that this is a robust method of accounting for the carbon or is there still some work to be done to get a standard procedure?

Mr Hindley: I think we are making good progress. As everybody is probably aware, British Standards and the Carbon Trust have recently published a draft standard which is part of a process. We responded to that and we welcome the creation of a standard because I think comparing carbon as with life-cycle analysis is fraught with danger because there are so many different ways it can be done. We are totally supportive of a standard being developed and that standard should become, in our opinion, a European if not a worldwide standard.

Q275 Earl of Selborne: But we are not there yet, are we?

Mr Hindley: No. Work is progressing and we are involved in dialogue on that.

Q276 Lord Lewis of Newnham: Is there not a subsidiary problem there? Let us make the assumption that you have got a reliable carbon standard that you can apply. It does mean that if you are concerned with substances such as landfill or incineration or something like that you are going to have to have a pretty complete analysis of the material you are actually putting into the landfill. You have got to know what the mixture is so that you can allocate these figures to it and that puts another dimension into the whole disposal procedure either by incineration or by landfill.

Dr Pitts: This is a huge issue and one of the main issues that we are tackling as a KTN, it is understanding how you measure environmental impact in all its forms up and down supply chains. There are life-cycle analysis standards out there and they are tied to the ISO 14041 standard. We are involved in projects within the European Union to further life-cycle analysis. As in most cases, you have the academics wanting to make it more complicated and more rigorous, therefore more expensive and more time-consuming, and you have the industry saying let us make it simpler and easier to measure this. It is a huge issue up and down the supply chains being able to understand where the hotspots are, a shared responsibility from people who are taking these things out of the ground to the people who are putting it back into the ground at the end in landfill or in burners. Everyone has their part to play. In some cases the consumer is the one who has the largest part of the impact; in other cases it is right at the top end in mining or it could be in the manufacturing. We need to understand where they are and have a shared responsibility in how we tackle this. The big companies do very well at working with their suppliers now. Some of them are working very hard to educate them and gain the shared benefits from that.

Q277 Lord Methuen: What new sustainable technologies are being developed within your sectors which might help reduce waste?

Dr Pitts: On behalf of the chemistry using industry, we see chemistry as one of the enabling technologies for solving a lot of the issues, it is underpinning technology. We have many examples on our ‘roadmap’. We have a sustainable technologies roadmap on the Chemistry Innovation website which lists many different examples in different sectors where sustainable technology or green design principles have been applied. One of the most important considerations when manufacturing a product or running a process is to think about it on a life-cycle

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basis, think about the feedstocks you are using including what we call “waste” and redesigning the product or process, as it allows one of three Rs at the end-of-life:- to reuse it, recycle it or remanufacture. A good example now is with LCD TVs. There has been a huge boom in them lately which of course means now there is a huge pile of Cathode-ray tube televisions lying around. Within the LCD TVs there are extremely important metals such as indium, which is predicted to run out within 15 years, which is a bit of a shame as indium is an important component for modern solar cells. Also within them, because they need backlighting, are mercury lamps, but because they are toxic they are sealed in inside units so they are very hard to get to, which means for recyclers it is not economical to get these out and recover the mercury within them. One of the ways the chemical industry is tackling this is with organic LED displays. I was pleased to read only at the weekend in Stephen Fry’s column that designers are embracing organic LEDs in new mobile phones. Mobile phone manufacturers are often the leaders in technology innovation nowadays, and are starting to incorporate organic LED displays and use them as true objects of beauty, which I think is roughly paraphrasing what Stephen Fry had to say. Within our own industry, solvent use is a huge problem. We spend a lot of money and a lot of energy making very pure solvents, from non-renewable feedstocks in a lot of cases, and at the end of the process burning them, which is not economical and not useful. There are strong drivers to change this, such as the volatile organic compounds legislation. There are a lot of sustainable technologies around such as ionic liquids, supercritical fluids, solvent-free processes and process intensification and they are the kind of things you will see coming on-stream in the chemicals industry in years to come.

Q278 Lord Lewis of Newnham: Do you not think you are going to be open to legislation? Many of the things you are talking about are not specific; you have alternatives available to you. If you look at many of the instances you have been mentioning here, all right, you may have indium there and it may be a desirable, but there are other ways of dealing with this particular problem. It does strike me that at some stage or other somebody is going to have to sit back and assess what is going to be the long-term priority here and legislate accordingly.

Dr Pitts: Absolutely. We are going to run out of important minerals and once an element has gone, it is gone, and irreplaceable. We will be increasingly mining our own landfill sites in the future.

Mr Savage: My Lord Chairman, the question was about sustainable technologies. I just wanted to highlight a very interesting development that has come out of the USA in terms of recycling more

aluminium and this is the introduction of de-lacquering plants. Traditionally the aluminium bottle tops of beer bottles have been put to landfill because they are relatively small, a large surface area to smallish volume and they have a plastic component which is part of the seal. There is a very interesting technology now which is being introduced which actually allows for the plastic component of the bottle top, the seal, to be burnt off in the process, providing the heat for the recycling of the aluminium bottle tops. These sorts of technologies are very interesting and should be promoted to our industry.

Q279 Lord Methuen: Something that has fascinated me is that we are now being asked to recycle our drinks cartons, these tetra packs. I understand that some of them have an aluminium lining. What is the energy balance of recovering the aluminium because presumably you have got to separate the aluminium from the paper of the carton by burning or have you got some other more sophisticated process?

Mr Hindley: I do not have a great understanding of this. You are quite right, all cartons have a very thin aluminium lining which is a barrier there and that is very, very thin, it is sprayed on. The carton industry is now encouraging people to collect cartons for recycling. Sadly there is not a plant in the UK that can do it. There used to be one up in Scotland which is now closed. The material that is collected in the UK is actually sent to Sweden for reprocessing. The aluminium is not recovered because I understand it is not commercially viable to do so. So the aluminium—and I do not know the process in detail—is removed, landfilled and then the board is then pulped and goes back into the paper processing facility. This is a perfect example of materials which are either composites or laminates so contain a number of different materials that are inherently difficult to recycle. Obviously we sell aluminium into that product, but there are examples of where very simple packaging formats involving metals are potentially going to be substituted by composites and the reason for that has been the desire of retailers, driven through organisations like WRAP, to minimise the weight of their packaging, which is a laudable thing to do, but the weight of packaging is only one element that should be taken into account when considering sustainability. If you are moving from something which is infinitely recyclable, a metal, to something which is a laminate, which is very difficult to recycle, you are having a positive environmental impact potentially by reducing the weight but creating more of a problem by moving into something which is very difficult and energy intensive to recycle. Another example of that can be seen from an aluminium point of view in the aluminium foil container which is used for takeaway meals or, increasingly by supermarkets,

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for chilled meals. There has been a move away from aluminium into something which is called CPET, which is a form of plastic, because again it is lighter weight. The reality is that the foil container is infinitely recyclable whereas the CPET container is very difficult to recycle. So again something that has been driven by the desire to reduce weight is actually perhaps not having an overall positive impact on the environment. We are very cautious about the approach that has been taken and very keen that a whole series of environmental factors should be taken into account by retailers and others before decisions are made.

Mr Workman: We are probably more vulnerable than any other packaging material in this regard because we are the heaviest, but we are seeing a move now by the retail trade in the UK to replace glass with all sorts of other types of materials. Glass is 100 per cent infinitely recyclable, not just once, it can be recycled time and time and time again and the infrastructure exists in the UK to handle it. We have been doing it since 1977 and very successfully. You have solved one problem but you then potentially create another one, and this has been an initiative that is being led by the retailers at the moment.

Mr Savage: On my point about the aluminium content in plastic containers, yes, a lot of it is lost through oxidation, it is a metallurgical fact in incinerators, but there is work being done now to look at the aluminium and other metallic content of fly ash in incinerators and the intrinsic value of aluminium is forcing that situation.

Lord Crickhowell: Let us move on to challenges that inhibit businesses within the aluminium, glass and chemicals sectors from implementing waste reduction strategies. We have already touched on some of them in the answers we have had to previous questions. I want to pick up one particular one and that was the reference to food packaging being infinitely recyclable, but it is not being recycled. The evidence I have in front of me is that 90,000 tonnes of aluminium packaging is going to landfill. Alupro tell us in the evidence that one of the problems is that we have 400 local authorities all with different policies and we have got back to the weight issue again. I deal with the household rubbish and I put all my bottles in one container and all my paper in the other and quite large quantities of this aluminium goes into the general rubbish bin because nobody is interested in it.

Baroness Platt of Writtle: Ours is collected with the bottles.

Q280 Lord Crickhowell: That is very nice for you, but very few local authorities are like that. What are we to do about this because this is a slightly absurd position? What ought we to be recommending in this instance?

Mr Hindley: Aluminium has obviously been identified as a key material in the Government's Waste Strategy which was announced last year, and quite rightly, because of the huge environmental benefits of recycling. The challenge we have is that aluminium packaging arises almost exclusively in the domestic waste stream; it is very thinly spread, there are no big chunks of it. We are almost totally dependent on local authorities to collect it. We have already talked this morning about the fact that local authorities are driven by the Landfill Directive which is focused on the reduction of biodegradable waste going to landfill by weight and they have penalties of £150 a tonne for missing their target. Aluminium, although very high value, is not high in their priorities. We only represent less than one per cent of the domestic waste stream and so we are not a priority. The vast majority of local authorities who operate kerbside collection programmes now do collect aluminium as part of that and in fact I think around 50 per cent of them collect aluminium foil as well.

Q281 Baroness Platt of Writtle: Our local authority also separate steel from aluminium.

Mr Hindley: At the sorting centres that is normally done through a magnet and that is obviously important to the recycling process. In answer to your question, we would like to see an incentive which focuses local authorities on collecting light weight packaging like aluminium where there are big carbon benefits. Going back to a point that was made earlier, we would certainly welcome and look forward to working with the Government on developing some carbon based target for local authorities which incentivised the collection of packaging. We did note that that was in the Waste Strategy, but we have not yet seen any evidence of any thinking behind it.

Q282 Lord Crickhowell: We have already talked about one aspect of the UK legislation which is causing wrong effects. What about financial problems? Is there any UK legislation affecting the financial competitiveness of the British industry compared with its competitors overseas?

Mr Workman: I would go back to a comment I made earlier on about the costs of manufacture being significantly reduced if you can gather enough cullet or waste glass to put back into the furnace. Otherwise, you are relying on virgin raw materials, which are expensive, and you are using a lot more energy. There will be a competitive element to that. One of the things that we have been lobbying on for years and years and years now is the way in which the Waste Strategy in this country has been implemented, which allows local authorities, sometimes neighbouring local authorities, to pursue completely different strategies. One can understand that London and the Outer

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Hebrides might want to have slightly different strategies. Even within London you get some local authorities who collect some materials and other local authorities will collect others, they use different coloured bins, they have a completely different attitude towards recycling and that is one of the reasons why the public have not taken to it in the UK in the way that they might have done in some countries on the Continent where there is much more uniformity of approach.

Q283 Baroness Platt of Writtle: How, if at all, can producers influence manufacturers to use their materials or chemicals in a sustainable way?

Dr Pitts: We covered some of these points earlier. A simpler way of communicating life-cycle thinking and identifying hotspots along supply chains is extremely important. This notion of responsibility and in some cases shared responsibility among supply chains is very important. Our colleagues at the Chemical Industries Association have gone some way towards this with their Responsible Care Programme. REACH legislation is something that is affecting all European businesses now and this may cause supply chains to start working together on not only the cost of registering substances but how they innovate to discover new ways to provide the product or service avoiding using chemicals that are now effectively banned. This is where the Knowledge Transfer Network comes in. One of the things we try to do is understand where cross-sectoral learning is to be had. I think the auto industry can teach us a lot about these kind of things. There are very close working relationships between Tier 1 and Tier 2 suppliers in the auto industry as I understand it. Again, coming back to earlier points this morning, the Japanese are well ahead of this in the auto industry, they set the benchmarks now for how these things are done.

Lord Lewis of Newnham: We have nobody here from the plastics industry and yet we are being told constantly that plastics are becoming a major problem. You are transferring aluminium to plastics because of the weight problem, which is quite serious. I think it is a point we have got to address in this report. It does seem to me that in the plastics industry we have an equal problem and that is “sealactivity” of the plastics themselves. If plastics could be separated into PVC and polyethylene and things like this then there is a much greater possibility of recycling, but at the moment where you mix them, as with your bottles, the best thing to do as far as I am concerned is burn the stuff.

Q284 Baroness Platt of Writtle: The glass industry, the aluminium industry and the chemical industry have organisations where you bring manufacturers together. How can we encourage co-operation between all businesses within a product’s life-cycle to share information and use materials more sustainably?

Dr Pitts: I will try and represent plastics. With green design principles, you need to start to understand the impact different plastics can have and look at the life-cycle; which ones are easier to recycle than others. This kind of thinking is starting to predominate. Materials UK, another organisation that represents part of the chemical industry, specifically materials and plastics, is working very hard to educate designers as to which are the best ones, plastics or materials, to use for a different purpose with the thought of being able to reuse or recycle it at the end as well. The weight-based targets we have heard about do cause a problem in this. Of the seven different types, only the very high density plastics are recycled, types one and two. The weight-based target discourages low density plastic recycling. We possibly need targets based on the environmental impact, toxicity or volume.

Mr Workman: The work that WRAP has undertaken with the glass industry has actually brought brand owners, retailers and the glass industry together for the first time. It is fundamentally important from our point of view that, despite the WRAP cutback in funding, those projects continue because they are beginning to make some difference in terms of waste.

Mr Hindley: One of the problems we face in the metals industry. We have been identified as a key material, that is aluminium, but to date WRAP has had no brief on metals and so the support that the glass industry has had and the plastics industry has had has not been replicated with metals. There are a number of different areas where we could really benefit from support. Despite our voicing our concerns to Defra and BERR it does not appear that anything has happened. A key opportunity for us would be to work with WRAP and obtain Government support through WRAP to solve some of the issues that we face.

Chairman: I think we have got your message! I am sure we will take that and other points up. If you wish to submit anything in addition, we would be very pleased to have it. Thank you very much for your very fulsome and remarkably concise answers given that each of you had something different to add to most of the questions. We got through an awful lot very quickly. Thank you very much for your co-operation.

TUESDAY 29 JANUARY 2008

Present	Bhattacharyya, L Crickhowell, L Howie of Troon, L Lewis of Newnham, L	May of Oxford, L O'Neill of Clackmannan, L (Chairman) Platt of Writtle, B Sharp of Guildford, B
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Memorandum by Hewlett-Packard

WASTE REDUCTION, ECO-DESIGN AND SUSTAINABLE PROCUREMENT

INTRODUCTION

1. Hewlett-Packard (HP) is pleased to have the opportunity to make a submission to the House of Lords Science and Technology Committee Inquiry into waste reduction and welcomes the Committee's interest in this important area of environmental policy.
2. HP believes that sustainable development is not an option but an imperative. Environmental responsibility is an integral part of our offering and we are willing and able to differentiate ourselves in the market through our environmental responsibility programmes.
3. Our biggest environmental impact is through our products. As a result, HP developed its Design for Environment program over 10 years ago with the goal of reducing the environmental impact of products and services. In addition to meeting safety and regulatory requirements, our objective is to design products that use fewer materials, are more energy efficient, easier to recycle and therefore create less waste, while maximising overall value for our customers.
4. This commitment to environmental best practice leaves HP well-placed to respond to the questions raised by the Committee in relation to waste reduction. However, we recognise that this is a broad and complex issue. As a result we have focused our submission on two areas—sustainable procurement and individual producer responsibility—where we believe that the public sector has the power to make a lasting impact by incentivising manufacturers to reduce waste in their products and production processes.

EXECUTIVE SUMMARY

Sustainable Public Procurement

5. With a procurement budget of £1.5 billion, the UK public sector has the power to drive the market for more sustainable products and services. HP strongly believes the Government should reflect its commitment to environmental sustainability and waste reduction in its approach to public procurement.
6. By adopting this approach, the Government would provide an economic incentive for producers to develop products and practices with a lower environmental impact and provide market recognition for innovators such as HP.

Individual Producer Responsibility

7. The principle of individual producer responsibility—where producers are responsible for the take-back and disposal of their own products at the end-of-life—is recognised as an important tool in encouraging the consideration of end-of-life management at the stage of product design.
8. Individual Producer Responsibility provides a competitive incentive for producers to design their products so that they are easier and therefore cheaper to recycle.
9. Collective producer responsibility—where all producers are jointly responsible for the recycling of all products, including the products sold in the future—does not provide an incentive to a producer to design products to be easier to recycle.

10. Within the EU, 10 Member States (Bulgaria, Denmark, Finland, France, Greece, Latvia, Portugal, Slovenia, Spain, UK) have failed either to transpose or implement the Individual Producer Responsibility provisions (Article 8.2) of the Waste Electrical and Electronic Equipment Directive (WEEE Directive).
11. As a result the incentive to encourage producers to focus on design for recycling is absent. This jeopardises the attainment of the Directive's objectives.

Business Framework: *Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is this framework communicated to businesses and what is the level of awareness and understanding among businesses?*

12. The European WEEE (Waste from Electrical and Electronic Equipment) Directive aims to stop the growing volume of electrical and electronic waste disposed of in landfill sites, by making manufacturers responsible for financing the recycling of end-of-life equipment.
13. Article 8.2 of the WEEE Directive establishes individual producer responsibility for the recycling of products put on the market after 13 August 2005. Individual Producer Responsibility (IPR) is a policy tool that provides incentives to producers for taking responsibility of the entire lifecycle of his/her own products, including end of life. Making each producer responsible for financing the end-of-life costs of their own-branded products enables end-of-life costs to be fed back to the individual producer. By modifications to the product design, the producer can directly influence the end of life cost.
14. Therefore individual producer responsibility is recognised as an important tool in encouraging producers to have regard to the end-of-life management of their products at the stage of product design. Individual Producer Responsibility provides a competitive incentive for producers to design their products so that they are easier and therefore cheaper to recycle.
15. Analysis has shown that 10 Member States (Bulgaria, Denmark, Finland, France, Greece, Latvia, Portugal, Slovenia, Spain, UK) have omitted the requirements of Article 8.2 in transposing the WEEE Directive into their national law. Instead, the legislation in these countries makes producers jointly responsible for the recycling of future products, making it impossible to implement individual producer responsibility. Another four Member States (Austria, Germany, Hungary, Poland) have only partially transposed the requirements of Article 8.2.
16. Without Individual Producer Responsibility these incentives for design improvements are lost. Producers are not rewarded for making their producers easier to recycle as the end of life costs are related to market share of sales rather than the costs of end of life management of producer's products.
17. The EC Treaty obliges each Member State to implement the WEEE Directive in such a way as to give full effect, in legislation and in practice, to the wording, object and purpose of the WEEE Directive and not to put in place any measure that would jeopardise the attainment of the Directive's objectives. It is therefore crucial that the EU institutions and the Member States ensure that individual producer responsibility of Article 8.2 is correctly transposed and implemented in national legislation.

The WEEE Directive states that:

“The establishment, by this Directive, of producer responsibility is one of the means of encouraging the design and production of electrical and electronic equipment which take into full account and facilitate their repair, possible upgrading, reuse, disassembly, and recycling.”

2002/95/EC: Recital 12

“In order to give maximum effect to the concept of producer responsibility, each producer should be responsible for financing the management of the waste from his own products.”

2002/95/EC: Recital 20

Business Framework: *How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?*

18. As one of the world's largest IT companies, HP's greatest impact on the environment is through our products. HP is committed to providing products and services that are environmentally sound throughout their life cycles. Environmental impacts occur at every stage of the product life cycle: from product design, through manufacturing and transport, to use by customers and, finally, disposal at the end of a product's life.
19. Managing these impacts is a complex challenge as well as an opportunity. We apply design expertise to create innovative products and services with reduced environmental impact. This aligns with our customers' expectations of high performance, low cost and minimum environmental impact, and provides HP a potential

source of competitive advantage. For example, flat panel displays, notebooks, multi-function handhelds and all-in-one printers use less material and are more energy-efficient than the desktop PCs and individual scan, fax, copy and print devices they replace for many customers. These newer products help reduce energy consumption, CO₂ emissions and space used in transport, all of which result in lower environmental impact. HP ensures environmental design does not compromise other product requirements such as quality, reliability and price.

HP's ENVIRONMENTAL INITIATIVES

Design for the Environment (DfE)

- HP was a pioneer in developing a DfE program in 1992. Our DfE priorities are: energy efficiency, design for ease of recycling, and materials innovation.
- Many HP products carry Eco-labels, such as ENERGY STAR, Blue Angel, Taiwan Green Mark, TCO, Canada Environmental Choice, China Energy Conservation Program, IT-Eco Declaration and PC Green Label.
- 61 business PCs, notebooks, workstations and monitors registered with the U.S. EPA's Electronic Products Environmental Assessment Tool (EPEAT) for public sector green procurement, including the industry's first Gold-level notebook.
- Environmental product stewards are integrated into product design and R&D teams throughout HP to identify, prioritise and recommend environmental design innovations.

Materials Reduction and Innovation

- Materials reduction helps HP reduce costs, decrease a product's environmental footprint, meet customer demands for smaller/more efficient products, and reduce recycling/disposal costs.
- The DeskJet 3740 is one of a series of printers developed on a single platform and sharing common parts. This platform is projected to reduce materials use by more than 26,000 pounds over four years.
- Several years ago, we removed polyvinyl chloride (PVC) from the case plastics of HP products, and we eliminated the use of two brominated flame retardants (BFR's), PBB and PBDE, and removed the remaining BFR's from the plastic housings of the majority of our products. HP eliminated all BFRs—including tetrabromobisphenol-A from external case parts of new HP brand products introduced after 31 December 2006.
- HP Office Recycled brand paper contains 30 per cent post-consumer recycled paper fibre. In 2005, HP launched 100 per cent post-consumer office recycled paper in Europe.

Packaging

- HP packaging innovations reduce materials used and increase the percent of recycled content. HP eliminates the use of heavy metals in packaging materials, and reduces the weight of packaging materials to decrease fuel consumption in transport.
- Using high-density polyethylene for some camera packaging reduced unused space by 25 per cent, increased quantity shipped per pallet by 50 per cent and cut packaging materials use in half.
- HP uses up to 85 per cent post-consumer recycled content in external HP LaserJet print cartridge packaging and up to 100 per cent post-consumer recycled content in external HP inkjet print cartridge packaging.

Design for Reuse and Recycling

- HP designs products that are easier to disassemble and recycle. Features include: modular design so components can be removed, upgraded, replaced and sorted for recycling; eliminating glues/adhesives by using snap-in features; reducing the number and types of materials used; using single plastic polymers; using moulded-in colours and finishes instead of paint, coatings or plating.
- Many HP DeskJet printers are designed without paint, plating and flame retardants, and use a snap-fit design and limited number of screws, for easy disassembly and recycling.
- The average number of parts in monochrome HP LaserJet print cartridges has been reduced by more than half and the average number of plastic resins by more than two-thirds.

- In 2005, more than 7.8 million pounds (3,500 tonnes) of plastics were recovered and recycled into material that has been used to make new HP products as well as plastic trays, clothes hangers, shoe soles and wire spools. A new application using recycled cartridge plastics to make roof tiles was introduced in the European market in 2005.
- HP's DfR standards integrate clear design guidelines and checklists into every product's design process to assess and improve a product's recyclability. This allows HP to develop products that are easier to recycle.

Next Steps

- Continue to provide customers with the best value and experiences through quality, environmentally-responsible products, Research and develop new and innovative ways to "close the loop".
- Having recycled approximately half of billion kilograms (one billion pounds) of electronics since 1987, HP has set a new goal for another half billion kilograms by the end of 2010.
- Work with policy makers to transpose and implement Individual Producer Responsibility.

Government Policy: *What is and should be the role of the Government in addressing the issue of waste?*

20. Government has two roles in addressing the issue of waste. The first is the standard regulatory one, already highlighted in relation to the WEEE Directive. Here it is the Government's responsibility to transpose or set regulations which encourage the reduction of waste.

21. However, the Government also has the opportunity to use the power of the £1.25 billion public sector procurement budget to drive the market for more sustainable products. By reflecting its environmental priorities in its purchasing, the Government could provide a powerful economic incentive for producers to develop products and practices with a lower environmental impact.

22. Through our experience in this area, including our membership of the Government's Sustainable Procurement Taskforce, HP has developed four principles which we believe should guide the Government's approach to sustainable procurement.

Best practice

- HP has worked with governments and international bodies to develop workable environmental standards which can be used as the basis of sustainable procurement policies. It is important that the UK Government does not seek to "reinvent the wheel" when developing its preferred approach but instead seeks to adopt best practice from existing schemes operating elsewhere.
- There are numerous environmental labelling schemes in the global marketplace for IT products and for consumer products in general, such as Energy Star or Blue Angel. However, many of these schemes have different environmental criteria and measurement methodologies. This means that, in order to obtain accreditation from the different labels, the products of global companies, such as HP, have to go through rigorous testing procedures several times in order to meet the criteria for the differing national and regional standards. HP therefore supports the general harmonisation of the various labelling schemes for IT products, particularly in relation to the criteria and the testing methodologies.

"Best Value" vs "Total Cost of Ownership"

- While HP believes it is vital that environmental and sustainability factors become an important element of the public procurement process, we recognise that value for money principles will continue to be a priority for procurement officials.
- It is therefore important that sustainable procurement guidelines are based on "total cost of ownership" measures in terms of costs, energy usage, reliability and recyclability at end of life rather than simple "headline" costs. Procurement decision-makers must be encouraged to prioritise long-term environmental and efficiency criteria ahead of short-term cost saving.

Implementation

- In order for any procurement guidelines to be effective they must be rigorously enforced. At present, even mandatory environmental procurement criteria, such as the Market Transformation Programme’s “Quick Wins” are not consistently applied by public sector procurement decision makers who are driven by stringent efficiency targets to overlook environmental criteria and prioritise lowest upfront costs.

Dialogue with manufacturers

- HP believes that dialogue with IT manufacturers is essential to ensure that the Government has a clear understanding of market dynamics in particular sectors and that the sustainable procurement programme has realistic goals and expectations.
- HP believes that a formalised structure should be developed which ensures accurate and timely industry input into the Government’s sustainable procurement programme and has offered support to government ministers and officials in driving forward this recommendation.

Government Policy: *What lessons can be learnt from other countries—within the EU and globally?**Sustainable Procurement*

23. HP has, for some time, been in discussions with both the Department for Environment, Food and Rural Affairs and the Environment Agency about potential criteria for sustainable procurement policies. Both of these organisations have shown particular interest in the IT ECO declaration programme which was set up by IT manufacturers in response to increasing interest from public bodies in the Nordic region about the environmental attributes of products. HP was instrumental in the development of the resulting programme which allows participating manufacturers to communicate environmental information in a set format whilst self-verifying the data.

24. HP has also participated in the development and implementation of sustainable procurement guidelines by many of its major customers (including governments) across the globe. In the United States HP has recently worked with a range of environmental stakeholders including NGOs and the Environmental Protection Agency on the development of the Electronic Products Environmental Assessment Tool (EPEAT). The resulting programme helps inform procurement officials about the environmental attributes of personal computing devices based on a “total cost of ownership” assessment. In the United States, the success of the EPA EPEAT is a best practice example of how procurement officials can purchase IT products with their environmental attributes in mind.

25. Industry-led self-declaration systems, such as the IT ECO declaration, tend to be more workable than externally imposed standards, which risk being arbitrary and unfairly benefit one supplier over another. HP would therefore encourage the Government to build upon existing systems of self-declaration and continue to consult with industry to ensure that sustainable procurement criteria are realistic, effective and workable.

Individual Producer Responsibility

26. IPR systems have and continue to exist across the world in Japan, the Netherlands (until 2002), Maine, and Washington State. These systems provide incentives for producers to improve the design of their products.

27. HP is currently working with other producers, academics and technical specialists to identify, explore and develop practical solutions to IPR. In Japan the IPR system¹ has led to the following benefits:

- Use of Design for Environment assessment tools including end-of-life phase;
- Marking of materials and locations for ease of dismantling;
- Unification of materials (plastics, magnetic alloys);
- Reduction of the number of components and screws;
- Standardisation of screws;
- Use of recycled plastics in new components;
- Development of recycling technologies;

¹ Source: Naoko Tojo (2006) EPR program for EEE in Japan: *Brand Separation?* Presentation to INSEAD WEEE Directive Series, 30 November 2006.

- Separation of various types of plastics;
- Tools for ease of manual dismantling;
- Communication between recyclers and designers.

28. Without IPR, the WEEE directive is failing one of its main objectives to establish an incentive for producers to design products for easier recycling. The first step is to ensure that Article 8.2 is properly transposed by Member States.

CONCLUSION

29. HP fully supports the Committee's decision to explore the issue of waste reduction. We strongly believe that minimising waste is a vital part of sustainable development which is why this has been a priority for HP for over 15 years.

30. While this is a complex issue, we believe that the most effective mechanisms for change are those that provide powerful economic incentives for businesses to adapt their products and processes. By integrating the principle of individual producer responsibility into the regulatory framework and using the power of public sector procurement, the Government is uniquely placed to achieve this and drive the market for more sustainable products.

31. In a number of global markets there are examples of both IPR and sustainable public procurement in operation. We would strongly encourage government to examine these examples of best practice and build on them rather than attempting to "reinvent the wheel" which would risk increasing the regulatory burden on businesses operating internationally.

32. In producing and taking forward its recommendations we would urge the Committee to continue its dialogue with the business community and consider ways in which the public and private sector can work collaboratively to address issues of waste reduction and environmental sustainability.

November 2007

Memorandum by Philips Consumer Electronics (PCE)

GENERAL REMARKS

The evidence given here refers to electrical and electronic products. For other product categories the evidence is not necessarily identical.

In the considerations below, there is focus on waste. Issues are however discussed against the background of the total life cycle of products which includes the production, transport and use phase as well. In the "life cycle hierarchy" waste often has a subordinate position.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

Design for materials reduction and materials substitution (for materials with a lower environmental impact) are important Ecodesign strategies. These strategies result mostly in waste reduction as well. Best knowledge and know-how in this field are with producers, however most of this is proprietary.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

Application of materials is in the first instance determined by maximising value creation. Value includes functionality value, economic value but also immaterial value (convenience, health and safety, etc) and emotional value (quality feel, "green", feel good etc). Sustainability aspects of materials play an important role in last named two categories of value, but do not dominate in the total package of design decisions to be made.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

For companies seriously involved in Ecodesign (like Philips) availability and end-of-life impacts of raw materials play an important role in design decisions. These are balanced however with other life cycle aspects of electronic products like energy consumption of products in the production or the use phase. This means that in some cases one aspect (one “impact category”) has to be sacrificed for others.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

The availability of new materials and new components has a big impact on the life cycle impact of products including waste aspects. Examples are for instance LED lighting, LCD TVs and monitors etc.

Can better designed products offset the increase in consumption?

In principle yes (materials reduction), in practice often no. The weight reduction of portable phones has been more than offset by the increase by the numbers sold. For LCD TV which has a lower weight than the traditional CRT TV, the effect has been largely offset by the fact that bigger screen sizes are being bought.

Are there any other gaps in knowledge and how are they being addressed?

Knowledge in the field is chiefly based on empirics, although can be consolidated into some general principles and design rules. Real fundamental research in this field is lacking, because the field is new and for new research projects, universities have to rely on external sponsors (which are mostly interested in applied rather than in fundamental research).

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

The current policy, regulatory and legal framework only partly supports the development of more sustainable products and processes. European Directives (from which Member States’ legislation is derived) focus on special fields (like just waste) lack, therefore, life-cycle focus. Moreover emphasis is strongly on environment and proper balancing between value creation and environmental load is lacking. This lack of the right perspective has made communication to business cumbersome. Moreover there are justified doubts whether the implementation of the Directives lead to maximum environmental gain at the minimum cost. There is much to be improved in this field both in terms of content and of communication.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

In proactive companies sustainable design has got an appropriate position in functionality value creation processes. There are however no public initiatives to encourage industry-wide real sustainability thinking in design processes. An European Directive aiming to do so (EuP) is being felt by industry as partly counter-productive. A scientific analysis (by the EcoDesign Department at Delft University of Technology) of EuP confirms this idea.

What other measures can promote a focus on waste reduction among businesses?

Waste reduction in production processes has a natural driver: waste costs. Waste reduction of products sold to the market and subsequently discarded by users is much more complicated. In the reasons to discard products, a lot of issues ranging from changes in personal life, increased functionality ambitions and just wanting to have something new, play a much bigger role than specific “design for waste reduction” by producers. As already said this design for waste reduction is subject to the overarching goal to optimising functionality value.

What lessons can business learn from international experience?

After a backlog in the last century, the UK has caught up well in Ecodesign. At least in Europe it is now up to par. The best country where valuable lessons can be learned is Japan—it is to be realised that also there is a lot of the Applied Ecodesign know-how and knowledge inside companies (proprietary aspects).

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

Governments in the European Union (including the UK) are addressing the electronic waste issue through transpositions of the WEEE and EuP Directives. However from the Directives it has been recognised by the European Union that at least the WEEE Directive contains serious flaws. This is because this Directive is based on principles and ideas of 1995. The implementation started 10 years later due to the fact that approval procedures took so long. In the meanwhile knowledge and insight have increased substantially. The Directive has therefore been put up for Review. Through a project with the United Nations University, guidance has been provided how WEEE could be more effective and more simple to implement so that the environmental gain/cost ratio will be substantially higher. The Report has been submitted to the Commission but is not yet public.

Future policies of Member States should be based on the Review decisions of the Commission and on more information in general provided by the report.

What lessons can be learnt from other countries—within the EU and globally?

Positive elements as regards electronic waste can be learned from Japan (as regards overall strategy, however expensive), China (as regards selected issues), Switzerland (has the best take back and recycling system for electronic waste from an environmental perspective, expensive as well), the Netherlands (has the most ecoefficient system, however environmentally not the top) and Belgium (has the best collection system via strong contacts with municipalities) and Germany (has the most competitive recycling industry).

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

Consumers go for value. In Western Europe “value” means:

- roughly one third of prospective buyers choose items for nice design, “green”, and quality;
- for one third innovative, new, original and having a lot of features is the top priority;
- whereas the remaining third go primarily for low price.

In this order the impact of product design and green design decreases.

What role do marketing strategies play in influencing more sustainable design?

Marketing strategies play a crucial role in promoting more sustainable product. When sustainability is well positioned in the value proposition to the consumers it can strongly enhance the business. However there should be a fit with the the segment of the market which the company is addressing. If for instance price buyers are the chief target group, marketing on basis of a sustainability platform can be very counter-productive.

Are there any gaps in knowledge in this area?

There are a lot of gaps in the knowledge of how to involve consumers better in sustainability. The traditional idea that green or sustainability is always positive is based on superficial inquiries in which most consumers give “politically correct” answers. When digging deeper, or as current buying behaviour shows, it turns out that consumers are much more selfish and not as green as supposed to be.

SKILLS

How is sustainable design integrated into the design syllabus?

Sustainable design is a crossfunctional activity. Universities and schools have therefore substantial difficulties in integrating sustainability into their teaching curricula, this is also reflected in books and syllabi about design in more general. Books which are specifically geared towards sustainable design are scarce and show generally more attention to the conceptual and the support tool side than to practical examples how this can be done.

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

For industrial training courses the same holds—mutatis mutandis—as for universities, see above.

November 2007

Examination of Witnesses

Witnesses: DR KIRSTIE MCINTYRE, Head of Takeback Compliance, Hewlett-Packard and a Member of APSRG, MR ANDREW CLACK, Environmental Affairs & Corporate Social Responsibility Adviser, Panasonic UK Ltd, PROFESSOR AB STEVELS, Environmental Adviser, Philips Consumer Electronics, and MR PETER EVANS, Senior Manager Environment, Sony UK Ltd, examined

Q285 Chairman: Perhaps I could ask you to introduce yourselves.

Mr Clack: My name is Andrew Clack. I am responsible for environmental policy issues within Panasonic UK, with particular focus on implementation of the WEEE Directive. In that regard I am also representing the company on the managing board of REPIC, which is the largest, by-obligation WEEE compliance scheme in the UK.

Mr Evans: Good morning. Peter Evans from Sony. I am responsible for product environmental issues within the UK for the Sony organisation.

Dr McIntyre: Good morning. My name is Kirstie McIntyre. I work for Hewlett Packard. I am responsible for take-back compliance for HP on a pan-European basis. In particular, I look after WEEE packaging, and batteries (when it comes), for the UK and Ireland, and then I have wider European responsibilities as well.

Professor Stevels: My name is Ab Stevels. I have been working for 40 years at Philips Electronics. In the last 13 years of this period, I have been working in the field of the environment on three subjects: eco-design; management of eco in industrial organisations; and take-back and recycling and systems. Currently I am a part-time professor at Delft University of Technology. I am working in that capacity now for 12 years and continuing.

Q286 Chairman: Thank you very much. We are going to start off this morning with the general topic of waste in the product life-cycle. We recognise that manufacturers can reduce waste in a variety of ways, such as using less material per product (whilst maintaining the product lifespan), making a product last longer, using recycled material or creating less waste during the production. Within the electrical and electronics sector, where in a product's life-cycle do materials have the greatest environmental impact?

Dr McIntyre: From the IT perspective, we find the biggest environmental impact sits somewhere different from where it sits with some other electronic products. It is quite difficult to group all electronic products together. When you think of everything from toys through to the very large servers that we make that run air-traffic control systems, for example, they are very different beasts. We find, quite interestingly, that a lot of the environmental impact within the IT sector—particularly when we look at computers, laptops, printers—is in the use phase rather than in materials selection, and that is why we have been concentrating very much within our design for environment programmes on energy efficiency within our products. We do that across our product range but we also work on materials and dematerialisation and other things. I just wanted to demonstrate that not all electronic products are the same and so we see different peaks of environmental impact at different points of the product life-cycle.

Mr Evans: To follow on from Kirstie, that is probably even more the case in consumer electronics. The work we have done indicates that 70 to 75 per cent (depending on the product) of environmental impact is, again, in the use phase. But, if you look at materials, our understanding of the materials is that the major impact of materials is their exploration and their generation, of getting to the raw materials that we use within the components of our products.

Q287 Chairman: Are the environmental impacts determined by factors within your own company, such as cost, marketing, design or production, or are they dictated by decisions which are taken by your customers or by the businesses to which you sell your products? Yes, Mr Stevels.

Professor Stevels: Thank you, my Lord Chairman. In the first instance, the environmental impact of products is being determined by their functionality

29 January 2008

Dr Kirstie McIntyre, Mr Andrew Clack, Professor Ab Stevels
and Mr Peter Evans

which you want to realise. In order to realise this functionality, you need certain physics or chemistry, and they do, to a large extent, predetermine the environmental impact of a certain device. On top of that, there is a part which you can properly influence by eco-design, for instance. But, as a matter of fact, you cannot go beyond the laws of physics, even if you are very motivated by environmental issues. To give you an idea: for most electronic products—it depends a bit on the device—70 to 80 per cent is fixed by your functionality decisions; some 20 to 30 per cent is the room in which you have to manoeuvre with your eco-design procedures.

Q288 Chairman: Let us say that in your labs someone develops a capability for switching off equipment early rather than letting it run all night. For example, adolescents using computers seem to assume that they switch themselves off and, by and large, they do not and printers do not. Would senior management really be concerned about adapting a bright idea like that if it was going to add additional cost to the product in a highly competitive market where price is as important as functionality? Do you feel confident that your organisations are sufficiently sensitive to their environmental responsibilities to take account of technical changes, even though it might initially appear to be less attractive in a commercial way?

Professor Stevels: My Lord Chairman, generally speaking the answer is yes. It depends on the type of consumer you are addressing. If you look to Western Europe, one-third of the customers or interested people are so-called “price buyers”, at least for consumer electronics. There is only one thing which is dominant and that is low price. On the other side, you have also one-third who are “quality buyers”. These quality buyers are prepared to pay more, either for convenience or for fun, but also for the environment. This is particularly the group to cater to. There is a third group that we call, within consumer electronics, the “tech buyers”. These are people interested in the latest technology, new features and things like that. What you see generally developing today in the industry is a differentiation in product. If you have a certain functionality, a certain product, let us say a 28” or 32” or 41” TV, big companies bring on the market three products: one catering to the quality buyers; one catering to the feature buyers; and one catering to the price buyers. That is a strategy you see today developing among the big brands.

Q289 Lord Crickhowell: Picking up the point on functionality, in the decades, as it is now, I am sorry to say, since I used to spend quite a lot of time visiting Panasonic and Sony, in Japan in their development

and research laboratories, as well as their factories in South Wales, I saw of course a dramatic scaling-down of size. If you look back to the early eighties, when I first had my job, most electronic devices were large and heavy and the bits inside them were. One went through a fascinating process in which one saw the newer, lighter, smaller products emerging, and very often not being put straight on the market because they did not want to introduce them immediately as they had just got an earlier product accepted and marketable. That was an interesting marketing phase. The question I suppose I have is: accepting the laws of physics, which are immutable, nonetheless we have seen a dramatic scaling down and miniaturisation over the period. Is that simply economics? Has the waste element played any part? What are the factors that have led to an extraordinary scaling-down and the fact that you are using not only smaller but much lighter equipment and quite different products. Is there any element that affects our inquiry in that process?

Mr Evans: I agree entirely with you: the technology has moved on considerably, but for manufacturers there is not just the waste issue, there is also the issue related to operating temperatures and the way we use the product in total. There is the big benefit with lower operating temperatures that items such as reliability and usefulness do extend. Making it lighter, less power consuming, does in itself make it more reliable as well, so a huge aspect of reliability comes into it in making it lighter and smaller.

Professor Stevels: I would say that technology is an important driver. Particularly IC technology (integrated circuit technology) software has enabled us to come to important reductions in the energy consumption of products and, also, in materials used in products, so exploring the possibilities of technology to support eco-design efforts is a very important issue. This is not just about a designer dreaming behind his or her desk, staring out of the window, wanting to do something nice to the environment; this is also about systematically exploring the opportunities of technology and, of course, adding creativity in using that. That is very important but dependent on functionality. There have been big achievements, for instance, for audio equipment. For TVs it is a bit more difficult because you have to stick to a certain size, but even TVs at a given size have become lighter, less energy consuming, than they used to be 10 years or 20 years ago.

Dr McIntyre: To give you an example of what we see from a materials perspective: I have been running a series of consumer charity take-back events here in the UK. In particular, we have been working with Hertfordshire County Council over the last month. I have had two over the last weekends and they have

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been very, very successful events. We put advertisements in the local papers and we invite the public in these areas to bring along any brand of old IT. If we can refurbish it we will, and we will donate it to charity—a local charity of the Council's choice—and if we cannot refurbish it then we will recycle it. We are very happy to do this. It is good PR for HP and it is good for our environmental credentials: we put it into our reports and it hits a lot of buttons from that. But what comes back is teaching us an awful lot about how long people keep their products. We understand our business customers. We have a direct relationship with our business customers. We know how long they keep equipment; they come back and buy it from us. But when a consumer walks into a high street store and purchases a PC or a printer, we never see them again. We do not know who they are. Unless they fill in a warranty card and send it to us—which is very unusual these days—we never know who they are. These events have been very useful in teaching us about the materials' value that we see from old IT products. Something like a Spectrum ZX-82 is worth more money on recycling than it is on any of the newer PCs because of the amount of gold that is in the connectors. The economics have driven us to use increasingly smaller and smaller amounts of gold to make these connectors, and, as Peter said, with lower operating temperatures and higher reliability we do not have to make the connectors quite as robust as they used to be, because we are not trying to withstand that type of operating temperature any more. It has been a very interesting exercise to do these events. We were in Hemel Hempstead on Sunday and we collected over 20 tonnes of old IT from the general public. People are very keen to do these sorts of things, especially when you put a bit of a sweetener, like "charity donation" with it.

Q290 Lord Lewis of Newnham: Are these HP events?
Dr McIntyre: Yes, these are HP events. We run them together with the local authority.

Q291 Lord Lewis of Newnham: I mean, do you only recycle or deal with—
Dr McIntyre: No, we will deal with any brand. Just IT, though. We try to avoid the other bits and pieces. We do not know so much about them. They are not our area of expertise, I am afraid.

Q292 Lord Bhattacharyya: Your major market in the future is going to be China. It is already moving in that direction. I know from your headquarters that that is where you are going to concentrate. You have just said you have three product differentiations based on costs. Your volumes are going to be at the lower end. That is where your volume market is. You

have just said that you are concentrating on the top end, using all the energy saving, all the high technology. What will happen to the lower end?

Mr Clack: I do not accept that there is a disconnect between energy efficiency and cost efficiency. Certainly as far as Panasonic is concerned, while it has a tiered approach to the product, the technologies behind them are basically the same, and it is a matter of consumer choice as to the direction they go. But there is certainly no clear distinction we make between cost efficiency and environmental performance and efficiency at all. Referring back to an observation made by my Lord Chairman at the outset, I think it is true for all of our companies that environmental performance and sustainability is right up at the top of the agendas of all the companies, but it goes hand in hand with cost efficiency.

Professor Stevels: I would like to make the comment that there is a high correlation between overall improvement and cost reduction that is contrary to what a lot of people perceive. That was a bit triggered by the question by my Lord Chairman saying, "if it costs more". The practice is that, in my period at Philips Electronics, 75 per cent of the environmental projects have been very profitable. You can feel that immediately because there is a direct connection between less energy and less money. Less materials is less money too. Less packaging volume or less packaging materials is less cost. Simplifying your product architecture so that products can be easily disassembled is directly related to lower assembly costs. There are many examples. A lot of these examples are in a book I have written about eco-design and recycling. I have already sent a CD of the book to the secretariat. I would like to leave this book here, so that if you would like to read in more detail about the things we point out here in a couple of seconds or minutes you can find it all there. This is one of the important subjects: how does the environment relate with business? There is a much more positive correlation than a lot of people, those in the scientific community but also consumers and people like you, think.

Q293 Lord Bhattacharyya: In the end, you are not going to satisfy us; it is the consumer you have to satisfy. If you look at most consumer electronic products coming out of Korea, Japan and various other places, there is distinct desire for the newer countries because of the cost issues, et cetera, and penetration issues in the new markets. Do you design that or is it just a superficial reduction in the way you do develop a product?

Professor Stevels: I have two answers. All environmental standards, all design practices of a company like Philips are global, which means the

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environmental standards, the environmental practices, the eco-design principles are the same all round the world, irrespective of whether you are in Europe or in the United States or in China or in India or in Korea or wherever you are. That is important to realise. The second thing is that in the so-called creative part, the pre-development of new product generation, environment is on a par with other things, so you have an environmental brainstorm, a mechanical brainstorm, an electrical brainstorm, a software brainstorm and whatever brainstorm, and these things are all consolidated in one meeting into a product concept, as we want to design to the development. That is a point to notice. Maybe in connection with what I said before: the budget of the department I was having was paid by the business community and, in the 12 years I was in that department, I never had business problems. First of all, when I started, I had to build up the credibility. After that time, we got either enough or even plenty of money.

Q294 Lord Lewis of Newnham: You say there are a whole variety of contributory factors that go in towards it. How do you prioritise the contribution that each is making? Is it done purely on a financial basis?

Professor Stevels: No. For that purpose we use the so-called “eco-design matrix” which is consisting of two sides. On the vertical axis you have option one or proposal one, proposal two, idea three, whatever—a long list of ideas—ideas, for instance, coming out of the environmental brainstorm are listed as so-called “green options”. On the horizontal axis you have: environmental benefit, business benefit, consumer benefit, societal benefit. That is one part, the benefit part. The second part is the feasibility part: the technical feasibility (Is it easy or difficult?), the financial feasibility (Do you have to invest? Yes or no), and things like that. Each idea is ranked in, let us say, a qualitative form, because you have to do it a bit quickly if you have a lot of ideas, and then you say, “Well, the ideas with a lot of pluses scored best” and that gives you priority. Of course you would say: “And what would you do in case you had both pluses and minuses?” Well, practice shows that you have a lot of ideas where you have a lot of pluses, and this is already giving you a full agenda—so, so far, we are not up to the stage that you say, “Well, we have these really conflicting things, where one benefit is imposed on the other.” Maybe in the electronics industry we are lucky that we are in this situation. Maybe as eco-design progresses, this will be getting more difficult, but, also, on the other hand, technology developments will help us to stay in the plus and to have a lot of pluses.

Q295 Lord Lewis of Newnham: Thank you very much indeed. That is extremely useful. Perhaps I could turn on to a point which has in fact been touched on by Lord Bhattacharyya. What incentives are there for manufacturers in the electronics industry to design out waste in a more effective manner, as it were? Do you think this is easier for the larger companies than it is for the SMEs, the companies of this particular nature?

Dr McIntyre: To be honest with you, there are not enough incentives. The laws that come through, particularly if you look at things like the WEEE Directive and other such laws—Producer Responsibility—they create a lowest common denominator, which is good, because it drags all of the laggards up to a good level, but it does not reward the innovators. An innovator could be a very large company, like our own, or it could be an SME, but a law creates that lowest common denominator factor; it does not reward those innovators, however large or small they are. I think it comes back to your point earlier: How do we get consumers to buy these products? With consumers and also a lot of public procurement—so you have very small buyers and very large buyers—we find at the moment there is an overemphasis and over prioritisation on lowest cost and people do not look at the cost of running that product throughout its lifetime. We call that “total cost of ownership”. We are looking very much at trying to educate, in particular, those big consumers, those big buyers—public procurement, for example, the £1.5 billion that is spent by the UK Government on procuring IT in a year. That then rewards the people who innovate, it rewards the people who make the changes, and it justifies for us to spend more money on R&D. I think that is true whether you are an SME or whether you are a very large company. If you have the right product that you are selling in, and you can persuade the consumer or the customer to buy it, and you are able to show you can offset those costs throughout the product life-cycle. I think people are getting better at it. Energy bills are increasing, people are becoming more concerned that, “If I buy this piece of electronic equipment, how much energy will it use throughout its life-cycle?” It is not possible to buy less than an A-rated fridge these days.

Q296 Lord Lewis of Newnham: You have touched on a point which I think is very important, and that is that there are occasions when some of the legislation that appears from the European Union appears to be at a distinct difference from the application of, say, the WEEE Directive. I think of the Hazardous Waste proposals, which in fact make the disposal of WEEEs a very much more difficult operation than it would have been in the past. What about things like the

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Energy Using Products?—which is I think another Directive which comes from the EU. Also, REACH is now beginning to make an imposition on you, inasmuch as they are now concerned with not only the initial effect but the articles themselves have to be classified in some way or other. Have you found there is competition, as it were, between certain aspects of legislation and the WEEE Directive directly?

Dr McIntyre: It is difficult to talk parallels between those three pieces of legislation that you have mentioned because they look at different parts of the product and the way the product behaves. WEEE is very much towards the end-of-life area, although of course there is a part of WEEE which does talk about design and the fact that it should be encouraging manufacturers to design out waste and to make their products easier to recycle. We are very keen on seeing those pieces pulled through on that piece of legislation. The Energy Using Products Directive looks very much at the energy that the product uses throughout its life-cycle and is trying to generate some standards so that consumers are able to compare products within the range that they want to buy. REACH is about showing that manufacturers have control over their supply chain and the materials they are using within their supply chain. They are all aiming towards the same thing, which is improving environmental impact, but it is quite difficult to pull parallels between them.

Q297 Lord Lewis of Newnham: But it may influence how you deal with the actual WEEE Directive which is the end-of-product.

Mr Evans: The issue we have is that those three pieces of legislation are all piecemeal. There is nothing that links them. In fact, you will get many cases when they are in contradiction to one another. If you take, particularly, hazardous materials, mercury in backlights of PCs, for example, by eliminating the mercury in backlights we have had to increase the power consumption of the product to make the backlights as bright as they were previously. There are unintended consequences of reducing hazardous materials. I also think there is something we need to do in terms of a holistic approach towards it. The reality is if we have a society where we just repair and keep products, then we never improve the overall energy efficiency of the products that are in place. Certainly in Sony's case, if you consider the first Walkmans that were introduced in 1985, they ran on two AA batteries for an hour and a half. The modern equivalent, which is an MP3 player, will run for 80 hours on one single charge. It weighs about one-tenth of the weight, and so, therefore, do the raw materials going in. If we had just kept our Walkmans and kept on using those, then the environmental impact would have been significantly different. There is this

disconnect between waste, between design, and energy use. I do not know if there is anything we can do very simply to bring those three together.

Professor Stevels: Although these three Directives and pieces of legislation are completely different, there is one commonality: it takes a long time before they are really introduced to the real world. That means in all three cases we have to deal with legislation which is based on the insights of, for instance, 1995, as in the case of the WEEE, but we have to implement it in 2007. In between, the world has been changing a lot in this field. We have new technology, we have new insights. I have written a 650 page book about the developments in EcoDesign and recycling in this period¹. All of this has not been taken into account in 1995. The basic problem and the common problem for all these three pieces of legislation is that we are now faced with real outdated, old-fashioned legislation, and therefore it would be very wise if this legislation was being split in two parts: one is what I would call the basic part and the other is the execution part. What is missing in all these three pieces of legislation is, particularly, this execution part. That means that, apart from operational problems, outdated insights, you get also big differences between Member States. The other commonality of this legislation is it has not created a common market. It has created just the opposite: it has created a fragmented market. These are the kinds of recommendations we have done in this area. The United Nations University Review report—I have been the scientific adviser for this project—that you separate between the basics, the principles and the execution, allow flexibility in the execution to keep it in line with the latest developments, and also differentiate according to product type. If you are going to recycle a television set: the requirements, efficiency costs, a way of organising, will be different to scoring the optimum result, compared to, for instance, computers or printers.

Q298 Lord May of Oxford: So far, we have been talking in fairly general terms and, as I understood it, you have said that the impetus of technological advance has, indeed, produced all sorts of improvements. I am interested in whether you could give us some specific examples—and you have already given us one, perhaps, of your “bring your old computer” days—where the companies have implemented practices which reduce waste that were deliberately implemented for that purpose and have achieved their aim.

¹ Stevels, A *Adventures on EcoDesign of Electronic Products, 1993–2007*, Delft University of Technology, Design for Sustainability Program Publication #17. ISBN 978-90-5155-039-9.

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Dr McIntyre: I can give you an example which we are just about to launch tomorrow, so we are a little bit ahead of schedule, I am talking about it today. In particular we are looking at recycled plastic content in our products. The majority of a lot of our products is made out of different types of plastics. We have been looking very much at trying to close the loop, so when we get our own products back—and that is why I am very interested in these take-back days—we understand what we are getting back from the customers and then linking that into putting those materials back into our new products. We have a family of scanners which you would buy to use at home—you could buy them through a high street store—and they have up to 80 per cent post-consumer plastic in them. That is one set of products that we have done that with. The launch we are making tomorrow is about our ink cartridges. We have prioritised the top 10 most popular ink cartridges and we are increasing the recycled plastic content in those ink cartridges. Depending on which cartridge it is, we achieve somewhere between 70 and 100 per cent recycled plastic content in those ink cartridges. We use a variety of plastics from our own waste that we get back because we have our own closed-loop recycling process for cartridges—which is a voluntary system because cartridges are not in the scope of the WEEE Directive—and we use also old plastic bottles. Last year, we used 2.5 million kilos of old plastic bottles to make new cartridges and next year we have made a commitment that we will double that amount. Having started with the top 10 most popular cartridges, we will extend that out across our cartridge range and then into other products as well.

Q299 Lord May of Oxford: Coming back to the answer you gave to Lord Lewis about your box, where you ticked things under different categories, that is an example of something that clearly delivers an environmental and social benefit. What were the cost implications? Did you also tick positively the cost box?

Dr McIntyre: Yes. We are a business, at the end of the day, and I am afraid in most cases it has to tick that box as well. As I said earlier, one of the things we would like to see, and about which we were looking very much to start educating our consumers and our business customers, is this total cost of ownership. Particularly with public procurement, best value has been prioritised over total cost of ownership for a very long time. We see this changing very, very gradually across Europe—some countries are better at it than others with the prioritisation that they put. Where we can show customers that the cost, if you spread it over the lifetime of the product, is better than just looking at the upfront cost of that, we are then able to invest in more R&D. In terms of the

finances, in terms of the economics, it makes more sense. We can invest more money upfront into making more of these innovative changes that drive through. As my colleagues have also said, the reality is that we start with the premium products but then it flows down through towards all of the “low end products”. With a lot of it, we make commitments across the product board.

Q300 Lord May of Oxford: I found rather unconvincing, I have to tell you, the idea that you had your range of boxes—one was cost and one was social benefit and economic benefit—and you said that they are usually all ticked plus, because my fairly long and varied experience on three continents in various contexts is that more commonly than not there is a tension between a good thing you want to do, particularly social environmental good, and the cost.

Professor Stevels: I would like to repeat that our experience shows that this is not true for a lot of cases in the electronics industry. Maybe the plus in one case is a much bigger one than in the other one, but it is still close. Particularly for recycled material, there is a consistent plus along the whole horizontal line, with one exception, and that was an experience we had at Philips already in 1995. Then we were using some 20 per cent of recycled plastic in the houses of our TVs, which is a lot of material, and there we stumbled and we got stuck—which we are still today—because of the structure of the industry. What you want to have if you apply such big amounts is a continuous stream of constant quality and high volume, and, since 1995, we have still the situation today that it is impossible if you say, “We want to have 10,000 tonnes per year of recycled high impact polystyrene”—which is our so called “chief” construction material, which means 92 per cent of the plastics in Philips consumer electronics products consists of that material. If you want to get that from the market, from recyclists, you cannot get it. It means that the structure of industry is hampering you there in making progress. It is not the cost idea, not the eco-design matrix, not, let us say, management—nothing else—it is the structure of the industry, the structure of the market. Of course, for smaller demands for specific purposes, you can use the recycled plastic, but if it becomes really to mass applications you have a problem.

Q301 Lord May of Oxford: Could I specifically ask Mr Clack, who has a specific corporate social responsibility: my experience is that there are often tensions there between what will enhance the league ranking in corporate social responsibility and some of the other considerations. I wonder what contributions you find between the CSR panel and the broader aim of reducing waste.

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Mr Clack: I can obviously only answer for Panasonic, but I suspect it is the same for all the companies represented here. Corporate social responsibility has risen right up the agenda for our company. That is driven by expectations in the wider stakeholder community, companies like us and I am sure my colleagues' companies are now very open in setting specific targets for what they will achieve. We are much more transparent, I guess, than we probably were in the past, and we engage with a range of stakeholders to improve our position. I do not particularly see, from my involvement, any great tensions there at all. As I said earlier, there is certainly no connection between not investing in energy efficiency and environmental performance and cost performance. The two are quite clearly linked. We have seen, by investing in those areas, benefits right throughout the supply chain in our overall corporate social responsibility profile as a company.

Mr Evans: I would like to raise an extra point to what Kirstie and Andrew have said about materials and wastage. One of the things in which we have been particularly successful is reducing packaging around products, and certainly packaging in terms of components coming in. Wherever we have a major production facility, we try to attract the major suppliers close to that location and therefore we can use a lot of reusable, high quality packaging which is purposely designed for that. It gives us particular benefits, not just in that the packaging is not disposed of on a regular basis but also in that it protects the parts we get supplied to a much better degree. One of the areas on which we have concentrated very much is particularly in reducing the packaging around the components coming into our facilities and it has been a significant improvement.

Q302 Baroness Sharp of Guildford: We have talked quite a lot about the recycling of plastics. If I am right in understanding what you have said, that, for the main material, if you take a television set—the surround of a television set and so forth, which is the plastic surround—you cannot use recycled plastic for that. Am I right?

Mr Evans: No, you can. But the problem we have is that the materials available from the recycling stream are not in high enough quantities to make it viable for us to use. We are trying at this moment to clarify a stream of plastic that is useable. Obviously when we make a mould, that mould is designed for a specific plastic requirement and specific plastic properties—melt-flow index, and all that sort of thing. We have found that we cannot get a big enough supply to make it effective for us to change. We can get 10 or 15 tonnes, but when you talk, as Ab said, of a minimum of 1,000 to 1,200 tonnes to make it reasonable for us to change a mould to accept recycled material. We

have in the past used significant volumes of materials, and certainly on previous models have used a significant amount of PET from plastic bottles, but, unfortunately, the newer trend of televisions, which are the flat panel TVs, tend to require a different quality of plastic, and therefore we have had to move away, back to high impact polystyrene—we cannot source the material to the volumes we require to meet that demand.

Q303 Baroness Sharp of Guildford: Do you expect that in time you will be able to do this?

Mr Evans: We are certainly working with a number of recyclers to do that.

Dr McIntyre: We have been able to do it with our cartridges. We sell millions and millions of them. The reason why we have been able to do it with our cartridges, in particular, is because we have set up our own cartridge recycling service. Some of the problems with the WEEE Directive, for example, is that the WEEE Directive gives producers/manufacturers collective responsibility, so what comes back is a selection of everybody's equipment. Of course, we all use slightly different plastics—and I hope in the future we will stop doing that, as a whole bunch of manufacturers, but of course there are competitive elements to this and so we use slightly different types of plastics and we mark them in different ways—and, therefore, when you get this mixed selection, mixed bag of products back, it is very difficult, as my colleagues have said, to pull out enough to feed into a manufacturing process to really make a difference. Where we see we have been able to set up our own recycling process, irrespective of what the law says—in fact, we do it on a voluntary basis—we are able to generate enough raw material to feed through into our mainstream manufacturing processes. These are not cartridges which will be sold in a specific green box to say, “This is a special recycled content cartridge”; it will be just sold as a normal cartridge. We would like to do that with more of our products. Therefore, we would like the law to recognise the setting up of these individual systems, these bespoke systems for each manufacturer. Those sorts of things should be rewarded and recognised in law and brought very much through to the fore.

Q304 Baroness Sharp of Guildford: You are recycling the plastic in the cartridges, as distinct from just refilling them with toner and therefore reusing them.

Dr McIntyre: That is right. We recycle the plastic.

Q305 Baroness Sharp of Guildford: Can you recycle the recycled plastic?

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Dr McIntyre: You do get into problems eventually. Plastic is made of long polymer chains. Every time it goes through a recycling process, the chains get a bit chopped up, and so, like with paper, you end up with what is called “down-cycling”: first of all, you get nice office paper, then it is turned into newspaper and eventually it becomes loo roll. Plastic works in a very similar situation: you cannot keep recycling it over and over and over again, but you should be able to get at least two or three good uses out of it before it gets to a point where you cannot mix it further.

Q306 Chairman: I am not really clear on what incentive there is for me, as a consumer of your ink cartridge, to buy a replacement Hewlett Packard cartridge if I hand over an empty one. What is there in it for me, as a consumer, to do that?

Dr McIntyre: We make it easy for you, to be honest with you. In these cartridges in particular, our top 10 most popular cartridges, we put a bag into the box, so that when you buy the new cartridge you have a postage paid bag—

Chairman: I am sorry, I mean how much financially. The fact is if I go and buy a replacement for my Hewlett Packard cartridge, it will cost me anything between £25 and £30 to buy it with your brand. If I buy something which does the job but is not Hewlett Packard I can get it for £15. Why should I pay £10 to £15 to enable you to recycle it, apparently to get some benefit from it which I do not as a consumer seem able to discern?

Lord May of Oxford: So that you can feel responsible.

Q307 Lord Bhattacharyya: Corporate social responsibility.

Dr McIntyre: I would first point out that not all of our cartridges cost £25. For the printer that I use at home they are £7, the original cartridges, so it depends what printers you are buying. We do not refill cartridges ourselves. We do not sell HP refilled cartridges. The reason we do not do that is we cannot guarantee the quality. We cannot guarantee that you will get exactly the same quality out of that cartridge as you do if you buy a new one, a virgin one, so we do not do it ourselves. We are working on those issues, but we cannot guarantee the quality, and we believe our brand should be consistent with very high quality: “works first time, every time”.

Q308 Chairman: Surely this is a shortcoming in vertical integration. Maybe you would be better giving it to people who can do it first time.

Dr McIntyre: There are lots of people who do do refilling. We do not stop people from doing refilling. We do not stop our consumers from buying those.

Q309 Chairman: You make it inconvenient, when we are trying to use the refilled cartridges in our Hewlett Packard machines.

Dr McIntyre: One of the biggest issues, from an environmental perspective, when we talk about recycling of cartridges is that we cannot recycle third party refilled cartridges, because they do not use the same ink formulations that we do and therefore the chemical makeup is different and you get into all sorts of problems. It gets into a much more technical level of detail than I am able to talk about.

Chairman: I listened to the *You and Yours* programme over Christmas on this. I am not going to take up the time of the Committee on this, but I am putting my money on the European Commission, for once, to sort out what seems to be something which is on the edge of anti-competitive practices. I put it no more strongly than that. It does not sit very easily alongside your CSR or environmental obligations when you are not really looking at this from the point of view of the consumer who is sufficiently concerned to want to recycle cartridges.

Q310 Lord May of Oxford: But it helps tick all the boxes.

Dr McIntyre: Perhaps I could just come back on that one. It is not possible to recycle a refilled cartridge. Once that cartridge has been refilled once, it has to go to landfill. It is not possible to recycle the plastic out of that cartridge. However, with a virgin cartridge, we can recycle it again and again and again. There is a difference. It is an exceedingly complicated thing to try to explain to a consumer. We do not stop people refilling their cartridges, and therefore you make the choice: you buy a brand new one every time, you get the old one recycled, we make it into new cartridges and you get consistent, reliable, high quality print out of it every time, or you buy a refill cartridge. You make your own decisions with it.

Q311 Chairman: Your name is Kirstie McIntyre. I suspect you are Scottish in some way. People like myself—although I have an Irish name, I am a Scot—tend to go by price at least part of the time!

Dr McIntyre: This brings us full circle around to our other issues.

Lord Lewis of Newnham: Is this not the fundamental point—I think it was implicit in what Lord May was saying: at the end of the day it is the cost that is the bottom line? It has been shown not only with this but repeatedly with many green products that if the green product is at the same or a lower price, it is an attractive proposition. If it is more expensive, it rarely takes off.

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Q312 Baroness Sharp of Guildford: If the issue is the chemical formulation of the toner, do we not want to standardise the chemical formulation of the toner?

Dr McIntyre: Then we do desperately come into anti-competitive issues and about setting up monopolies for those chemical manufacturers who make ink. That really is commercial confidentiality stuff that we get into there, which is very difficult. You bring it around: it does come back to price. That is why—and I have said it before—particularly with public procurement, you come into this total cost of ownership and not just buying on that upfront price. Then you are enabling all of us to put forward the green products, to put forward our innovation, and for those products to be able to be ranked equally amongst other products that at the outset look cheaper but in the long term take more to run.

Lord Crickhowell: I have one question I would like to ask about that, but, for the second week running, I have been diverted by the Chairman's obsession about refilled cartridges!

Chairman: I just felt I had to raise it.

Q313 Lord Crickhowell: I want to make only one point about that, in a week where I have received an invitation from the Tate Gallery who have a scheme in which the Tate will get rewarded. You said you did encourage the return and you put a bag in for posting it and all that. I confess I am rather idle about that. I think you could make it much easier for people to return your cartridges and make it much more evident in your selling package. Most of us, when we come to get a cartridge because the damn printer has stopped working, want to get it in. You get it out of the almost impossible wrap you put it in now, which takes about ten minutes to open, and the last thing you really want to do is to struggle with bags and all, you want to get on with your print job. I should have thought you ought to have systems of collecting these things in the shops which sell them. When I go into PC World and pay these very large sums, why do you not have great collecting bins outside for the old cartridges? Why do you not get on with it and do it in a way that is easier? However, that is not my main point.

Dr McIntyre: Some people might find that more challenging than just putting it in a bag and posting it.

Q314 Lord Crickhowell: I do not think you are very good at doing that particular job. However, to come back to the point, the important point, for the second week running, is the impossibility of getting large quantities of recycled equipment. We heard that last week from the bottle manufacturers and

others. One of the difficulties has been that the local authorities, based, as Professor Stevels said, on out-of-date waste Directives, with 400 different policies, have an incentive based on weight, and they are not producing enough glass for the glass manufacturers, we were told, and we heard again and again that, in terms of plastic, the local authorities are not producing plastic for the industry to recycle. I have two questions. When you talk about industry getting you large quantities, if there really is this market that you would say is there why are the manufacturers not building up in order to meet that demand? Is it a problem of the local authorities failing to make it easier for them to dump the waste or not encouraging us to get it out of the kitchen waste or whatever it is? There is a real flaw, we were told last week, in waste collection arrangements. Is this something that worries you or interests you?

Dr McIntyre: The comment you are talking about was made by Professor Stevels.

Professor Stevels: If you look to the take-back systems, my criticism on the WEEE is the fact that in the Directive as we have now a lot of attention is being paid to treatment; a little attention is being paid to collection; and no attention is being paid to the reuse of secondary materials at all. This is a very difficult situation. There is more. If you have take-back systems, then you have one reality of life to face—also in this country: everything which has value disappears before it reaches proper recycling. It means that, for instance, due to the increase of metal prices over the last years, the number of washing machines being returned has become lower. Instead of increasing, as you would expect—if the systems are getting more mature, that you would get more, and if the public is being informed, that you would get more—the contrary happens, the volume drops, and that is simply because washing machines today have a positive end-of-life value which means that they disappear through all kinds of informal channels. There are the issues of illegal exports—which at least for the Netherlands are substantial—and then the whole waste issue has become counterproductive because in this way it ends up in third world countries where proper treatment is not available. And there is the issue that for certain countries in the third world you have so-called “active buyers”, people knocking at the door of retailers, knocking at the door of recyclers, saying, “Sir or Madam, what do you have? I want to buy it all” and they take it to—you name it—the type of countries which have a lack of raw materials. In that sense, the position of the official recyclers has been weakened substantially in the last years. I even dare to say that who is cheating the system best, is today reaping a lot of rewards. This is very serious. Today this is one of the important reasons why, for

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instance, verifying material streams which can be reused at a high level are not available.

Q315 Baroness Platt of Writtle: What research and development is needed to bring about more “closed-loop” material cycles? Is this research better placed in industry laboratories or public research institutions or maybe working together?

Professor Stevels: My answer would be together. For instance, in the Netherlands we have run a very successful co-operation programme between Philips Electronics and Delft University of Technology on the recycling of electronics. You see the results and the fruits of that from the scientific perspective in this book, and, in practice, you see it back in the take-back and recycling system in the Netherlands—where, I dare to say, it is one of the best in Europe today, best in terms of environmental gain versus cost ratio.

Mr Evans: I think there is a major issue that we need to address here to move forward. If you look at Japan, which has probably the highest rate of reuse of materials, they have specifically taken four product streams and concentrated on those four product streams which are about 80 per cent of the total. They get a less broad range of materials for those, so they get a higher recycling rate, because the materials are not as widespread. We could improve significantly by reducing the spread. We have things like plastics coming from heart rate monitors which all go into the same sort of mix and, therefore, do degrade the materials we get out. If we specifically concentrated on large streams, we could get a much more refined material that we could better use in industry.

Mr Clack: In Japan the focus, as Peter said, is on the four categories: TV, refrigerators, washing machines, and air conditioners. It is very focused and the manufacturers work well, in competing groups, and the achievement levels are significantly better than that being achieved in Europe.

Q316 Lord Crickhowell: We are on to the questions I was going to ask about international comparisons and the lessons we can learn. Last week we heard that the Germans are much better at dealing with the glass bottle situation than here. You have now given an example of Japan. Are there any other countries that you would pick out, with particular policies which we might be picking off and looking at?

Dr McIntyre: There is a large study going on at the moment with several universities from across the world which the manufacturers are also sponsoring as well. It is being done by INSEAD University, which is a big management university in France, in the USA—MIT and Yale and Lund University from Sweden. Together we have created a research

consortia to look at recycling systems in other countries. We are looking at electronic products. There is no “cut/paste” for Europe; there is no immediate solution that is a perfect fit for Europe. We need to look at everything out there and take the best bits and create a European solution for us which will drive us towards a single market for WEEE. We are looking at the first set of deliverables for that in March this year so we should not be far off coming forward with some recommendations which would then slot into the revision of the WEEE directive which is coming this year, hopefully, with the Commission.

Q317 Baroness Platt of Writtle: That might be helpful to us if that is coming out in March.

Dr McIntyre: It will be, yes. We can, of course, submit it.

Q318 Lord Crickhowell: That is very helpful and I see that as international companies you have got to think international right across the field. I just want to bring us back to this country. One of you earlier said that you use plastic bottles and that there is an inadequate supply of plastic bottles. The Japanese have set up a good scheme for bringing back raw products from recycling them but, as we heard last week from the bottle industry and the aluminium industry, there is a grave shortage of supply because of the set-up we have in waste collection from the consumer. The aluminium people believe that if it was not all based on weight but on a more up-to-date directive they would get the aluminium, which is an almost totally recyclable-for-ever product. There are huge quantities of plastic bottles and other equipment used by the ordinary domestic householder which are not effectively being recycled in this country to give you the volumes that you said earlier you need and cannot get. I still would like to try and get a comment from you as to what, if anything, your industry thinks about recycling, not in the rest of the world or third world countries but what is happening here in this country which would make it more likely that you could get the volumes that you say you want but cannot get.

Mr Evans: One of the major issues we have is the economics. If the economics were right then we would get more recycling. The reality is that the capital investment in being able to get this material from a raw material state back into a useful state probably is not correct at the moment. Certainly with metals it is changing significantly and I think the arguments now are such that many metals could be reprocessed. That is where to me the bottleneck is at this moment. The collection could well be done by local authorities. It is the bit in the middle, the reprocessing industry, that is not at this moment

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putting in the capital investment to generate the materials that we would like to use.

Q319 Lord Crickhowell: But if you are providing demand why are they not doing it?

Mr Evans: I do not know. My background is in the manufacturing plant in South Wales and we went to many plastics recyclers when we were doing the exercise with PET and we were getting PET bottles from Spain because there was no source in the UK where we could get the volumes. We could get ten, 15 tonnes but we could not get the 500-plus tonnes in a load that we needed, so it is there where the bottleneck tends to be and I do not have an answer as to how we solve that.

Q320 Lord Bhattacharyya: But you could. You mentioned earlier on the reason why it is expensive, because of tooling, but you could use soft tools. If you say it is low volumes you could use soft tools.

Mr Evans: Sorry, no, we are talking about high volumes.

Q321 Lord Bhattacharyya: No, no. You said that the reason why we cannot use recycling in this country is because we do not have enough volume.

Mr Evans: Yes.

Q322 Lord Bhattacharyya: And that is because you wanted tooling that you cannot amortise. In very low volumes you can have soft tools.

Mr Evans: But we are not talking about low volumes; we are talking about high volumes. The number of TV sets we produce in our plants is well over a million a year, of which probably there are about 10 variations, so we are talking about, at a minimum, toolings that need to last for something in the region of half a million presses.

Q323 Lord Bhattacharyya: You do not understand what I am trying to say. What I am saying is that if you have low volumes of plastic to be recycled then you could have other techniques of using those low volumes for manufacture.

Mr Evans: Not to give us the surface finish that the customer requires to be able to accept the product. We have tried and failed.

Q324 Lord Bhattacharyya: We do it in cars, we do it in aerospace.

Mr Evans: The only way we could have done it, and we did try it, was to paint everything with a significant amount of paint, whereas we are now using self-finishing.

Q325 Lord Bhattacharyya: In-mould painting is very common but what I am trying to say is that there are technologies available for that to happen.

Professor Stevels: Maybe I could say a little bit about performance and best practice among the different Member States. In this United Nations University report on the WEEE directive I have already mentioned that there are a lot of data for each individual Member State in a lot of categories, whether it is collection, recycle rates, the capabilities and capacities of the recycling industry, reuse of materials, everything. It is a 350-page document with an annex of another 350 pages, and for each item you can find in that report exactly where the UK is positioned. As far as collection is concerned, there is also one important point and that is the role of consumers. On Saturday morning I am in a volunteer group cleaning up the park in the town—I live nearby. It is incredible what you find there, and aluminium cans form a major part of that. That is, as I say, one of the issues. Consumers like the environment but they go for convenience. Also, a lot of the smaller electronic items are simply thrown into household waste and that is not the idea of WEEE but it is the reality of life.

Q326 Lord Howie of Troon: We have mentioned WEEE quite often this morning and it is clearly very important to your companies. We are told that the transposition of the directive into British law is incomplete, and I think that is true of several other countries. We are also told that it is virtually impossible to implement individual producer responsibility even though it has sometimes been in statutes. Can you tell me something about these problems?

Dr McIntyre: It is true. BERR is absolutely right. We have had an incomplete transposition for the UK and it is true for other countries as well. It is also right that there have been no practical implementations of individual producer responsibility across Europe, but we have seen them in other countries. We have been talking about Japan. There they have implemented individual producer responsibility and that is where each manufacturer, rather than recycling this mixed bag of electronic products, only recycles its own brand of products, and there you get the pull through. We were talking before about why are we not getting enough materials. There are plenty of materials being collected by local authorities but they are mixed and the economics of unmixing them renders them economically impossible to do anything with later on. We certainly believe at Hewlett Packard that individual producer responsibility is one of the answers to unmixing this bag of mixed materials that we get and enabling us to create closed loop solutions which feed the materials that we use

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originally in our products into making new products at end of life. I referred to the research that we will send to you in March. This group is looking at those best practices from across the world and trying to generate a European practical implementation, but I have to admit we are not there yet and I do not have the answer. I cannot even begin to lay out what it would look like. It is complicated and it requires a lot of elements to be put into place. We certainly believe, and other manufacturers and the NGOs, such as Greenpeace and those sorts of people agree with us, that this is the way forward, but it may not, as my colleagues have said, cover the complete range of electronics. We may have to be selective about which particular product types we are looking at to implement these systems. They do not fit for everything. Also, we are not saying that these things have to be mandatory for every manufacturer. They do not necessarily fit every manufacturer, but for those manufacturers who do want to implement these systems we believe that the law should allow us to jump in there and get on and develop our systems, which currently UK law does not enable us to do.

Q327 Lord Bhattacharyya: You are always going to the law. As the Chairman said, you should as a producer give incentives to the customer in the end to allow that, and unless you do that you will never get it. You will always resort to the law.

Dr McIntyre: We did that with cartridges and I am afraid the Chairman did not like the example I gave of cartridges. Cartridges is an entirely voluntary programme that we did.

Q328 Lord Bhattacharyya: No, there was no financial incentive. The incentive was there to put it in a box; that was it. You should give them financial incentives. It is done in other areas. In aerospace, in defence and many other areas there are incentives for that to happen. The fact is you want to have your cake and eat it as well.

Dr McIntyre: If you think about a deposit system, like you used to be able to do with lemonade bottles, where you went back and you got your 10p back on your lemonade bottle, we are not able to do that with cartridges in Europe because it is considered that you are forcing the customer to buy your cartridges back again and so what you are doing is creating a bundling effect which then becomes anti-competitive, and so we step into other laws, which is the difficulty in that situation, but I agree with you: there are ways that we could make it easier but we then step into other problems around that.

Q329 Lord Lewis of Newnham: In your paper you refer to the fact that there are four Member States—Austria, Germany, Hungary and Poland, which have

partially transposed this requirement. What have they done?

Dr McIntyre: They have put it in law but there is no practical solution to it. It is by law possible to do it but we cannot practically do it because the system is not set up. It is a bit early to be looking at WEEE and saying where are the eco-design principles from WEEE because of this individual producer responsibility? In the UK we did not implement until July last year and it is a little bit early to be trying to draw conclusions, but what we would like and a lot of manufacturers would like is for the door to be open and for us to generate that practical solution that we can implement on a countrywide and regional basis.

Mr Clack: I just want to make a comment about Japan. Japan is clearly a very different market in terms of electronic take-back from Europe. It is one homogeneous market for a start, and clearly Europe is not; there are 27 different interpretations of the WEEE directive in Europe. Also, as we discussed earlier, there are only four product categories covered by take back arrangements in Japan. That makes it far simpler, and equally a lot of the material in Japan comes back through the retail network and manufacturers have a much stronger tie to the retailers in Japan than they do in Europe. I think I am right in saying that something like 80 per cent of the material that comes back at end of life comes back through retailers in Japan and maybe 20 per cent through municipalities. I think it is totally the reverse in Europe.

Q330 Lord Howie of Troon: Would you like to see IPR implemented in this country? Would that be a good thing?

Mr Clack: I think ultimately producers would like to be responsible for their own waste and not for somebody else's. I am more than happy for Panasonic to look after its own. Clearly there are issues over orphan waste which has no real ownership, but it does need to be, as Kirstie alluded to, by sector or product grouping rather than universal. Panasonic certainly has some IPR arrangements for computers in the UK anyway, so for some products it works but for others we cannot see a practical way of making it work.

Q331 Lord Howie of Troon: If it were implemented in this country would it have any impact on your global activities which are quite substantial?

Dr McIntyre: Yes, because Europe is such an important market for us and the UK is one of the biggest markets we have in Europe. If we had IPR in the UK we would then be looking to push it into other European countries. That would then create a whole market for us and it would drive the rest of our global operations.

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Q332 Lord Howie of Troon: Then why is the Government so slow?

Dr McIntyre: It went into the “too difficult” box, I think, and I think that is true not just of the UK but also of many other national governments. WEEE is a complicated law. There are many different stakeholders in WEEE and the IPR was the straw that broke the camel’s back in a lot of cases and they put it to one side, but what we are asking for is that it comes back onto the table and gives manufacturers the option of going down that route should they choose to.

Lord Howie of Troon: You would like to see the smack of firm government, as we used to call it.

Q333 Chairman: In the United States, where your headquarters are based, you have varying rules and regulations and legislation in different states.

Dr McIntyre: Yes.

Q334 Chairman: If California were to do this—does it do it, because it has an awful lot of recycling and other regulations?—it would not be dissimilar to the impact of the United Kingdom doing it.

Dr McIntyre: It would, yes, because, of course, California is one of the bigger markets in the US. In fact, there are two states I currently know of which have implemented an IPR-style system with their WEEE-type legislation coming along, and those are Maine and Washington, but they are very small states. They are the progressive New England states. California does have an electronics recycling law but they have looked at it very much from a collective responsibility perspective rather than individual perspective and they have gone for very specific product types. They have followed a Japanese style and looked at PCs and televisions and a couple of other things which I cannot remember off the top of my head.

Q335 Lord Lewis of Newnham: Surely your point is essentially the point that Lord Crickhowell was making, and I think also Mr Clack. At the moment we have local authorities, each of them being virtually individual, each of them having their own particular prejudice as to how they are going to collect, whereas in Japan, from what you are saying, it is done in a totally different way with a more centralised approach. 80 per cent, I think you said, was done on a centralised basis and only 20 per cent on a local basis. I think our real problem is in the way we are collecting our waste, and as far as plastic is concerned it is just impossible when you have mixed it all together with the eight or nine different varieties of plastic which makes it virtually impossible to do a simple recycling without doing a separation, and that

is horrendously expensive, I think was the point Mr Evans was making.

Professor Stevels: I disagree that Japan is a good example of successful IPR. One of the reasons is that it is costing the consumer there, for instance, 3,000 yen for a TV to be recycled, which is more than twice as much as it is here in Europe, so even if you score a better environmental gain in that country the environmental gain over cost ratio in Japan is disappointingly low. Secondly, and this is for you, Lord Bhattacharyya, the difference between the car and aeroplane industries and the electronics industry is that cars and aeroplanes have a net material value at the end of their life. For electronics products, including the logistic and treatment costs, 90 per cent have a so-called structural cost deficit which you cannot remediate by good eco-design. For computers you are close to zero. For TVs and audio equipment you are far away. This is one of the reasons why you are hearing from HP a different story than from the Philips of this world, because Philips is in that respect in one cost corner and HP is in another. The cost deficit is huge and comparable to the margins which you have on this product. For all the parties in the chain the big problem is who is going to pay for that deficit, and that is, frankly, to a large extent, preventing the smooth functioning of these systems. Everybody agrees on the goal: maximum environmental gain at the lowest cost, but there the agreement stops because the next question is who is footing the bill, because the structural deficit is there for 90 per cent of the products whether you like it or not and whether you love the environment, yes or no.

Q336 Lord Bhattacharyya: And therefore you will never do any recycling at all because that is a huge deficit for you?

Professor Stevels: Talking about voluntary recycling, yes.

Q337 Lord Bhattacharyya: BERR is trying to review IPR with the EU Commission this year. You have spoken a lot about IPR. What would you like the Government to do and what input are you going to give to the Government while they are doing this? Since you say the United Kingdom is the most important aspect of the EU, if we can come up with proper IPR then the others will follow.

Professor Stevels: What I would like to do for any government is that you create laws allowing systems to be set up which have maximum environmental gain at minimum cost. That is for me the guiding principle.

Q338 Lord Bhattacharyya: It is a sort of menopause of legislative injunction.

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Professor Stevels: There are also tangible measures to be taken. These are in the recommendation report which the European Commission is currently studying. The next step is, do you personally believe that IPR will help to realise this goal? My answer is for 90 per cent of the products no, and particularly for those products which are glass dominated and plastic dominated, which are generally speaking consumer electronics for telecom and IT equipment, this is a different story.

Q339 Lord Bhattacharyya: So therefore you think that they will come up with all voluntary ideas and you people will use your corporate social responsibility in delivering that? What is the penalty?

Professor Stevels: It is clearly seen by companies like Philips, like Sony, like Panasonic, that there is a broad societal agreement that products should be taken back and recycled, so there is no discussion about that. There is one important problem and that is that on a company basis you are talking about £100 million per year for Philips alone. On a European basis you are talking about £2 billion as a financial problem. This has to be solved in, let me say, in a balanced way. Saying, as was the old idea in 1995, "Oh, just do a little bit of eco-design and then everything will be okay", is simply out of reality. We have to get rid of that idea and be more creative about how we can solve this problem in a balanced way.

Q340 Baroness Platt of Writtle: How effective has the implementation of IPR in Japan been at encouraging communication between designers and recyclers, and, as you have obviously gathered this morning, how can the United Kingdom encourage such communication because we are here to find out what will work for the UK?

Mr Evans: The issue in Japan has been that the producers have established the recyclers themselves and the recycling companies are the electronics companies themselves, purely and simply because they are the material stream producers, so the TV companies have set up TV recycling facilities because all they are responsible for is that, and I think that has helped the communication in those terms. Sony, Panasonic, Hitachi are all responsible for certain areas and have their own facilities. The reason it will not work in the UK is because there is so much mixed material coming back that it just does not make sense that someone like Sony, which does not produce all the types of equipment, should be responsible for recycling all of the separate materials. If there is a more reduced material stream, if we can get producers involved in that and take responsibility for setting up their own recycling facilities, that would help the communication between the recyclers and the companies themselves.

Dr McIntyre: I think it comes back to part of the question that was asked earlier about what can we do to make this better. Some of it comes down to the incentives within law, and at the moment the way the WEEE law is set up in the UK and in many countries it really is a very end-of-pipe type solution. It is just looking at "Let us get electronics out of landfill sites". That is a very worthy aim in its own right but it does not solve any of this closed loop recycling, increasing recycling rates and getting those old materials into new products that we have been talking about today. How do we help the Government to generate a UK solution? As I have said, some of us manufacturers are working with universities and with the NGOs to come up with a practical solution which we hope will work for Europe. It is a bit of a slow burn, unfortunately, as these things tend to be. We have to be a bit more patient than we would like to be on these things. In addition to that BERR recently set up their WEEE Advisory Board, of which I am a member, and there are many stakeholders on that group and one of our particular subject areas to look at this year is individual producer responsibility and how we implement that for the UK.

Q341 Chairman: Can I ask, and I think Mr Evans and Mr Clack might wish to come in here, do your companies in other parts of the world offer, say, a £10 or \$20 reduction if you hand back your old Sony or your old Panasonic and get a new one?

Mr Evans: Absolutely not. There are no incentive schemes for any consumer electronic products that I am aware of. However, in the United States we do have a free take-back and our slogan in the United States is, "We made it; we'll take it".

Q342 Baroness Platt of Writtle: Would that come up against this anti-competitive law you have talked about on several occasions?

Dr McIntyre: Yes. We do the same thing in the US but we cannot offer that system in Europe because of the competition laws.

Q343 Lord Lewis of Newnham: I want to get rid of, say, a refrigerator or a television set. If I have to do this I go to my local authority who then charge me £25 to have it picked up and taken away. What happens to it when it goes away? Is it just put into a major pile or is there some mechanism whereby, since they now have selected these different things, they can recycle them in a more effective manner?

Dr McIntyre: Yes. The way it works in the UK is that manufacturers like ourselves join compliance schemes to comply with the WEEE directive, and those compliance schemes make arrangements with local authorities. Various compliance schemes have different arrangements with different authorities and

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what they do is work out what is best for both, but, of course, different sites have different capacity requirements. You would like to put maybe ten different containers in there; they only have room for three, so you have to work around those sorts of restrictions, and they will look for what is best for the value of the members. There are also increasing environmental standards. There are at least four separate containers. Fridges will be in one container because they are required to be de-gassed. You will have televisions and monitors in another container because they are required to be treated separately and distinctly from everything else. You will have light bulbs in another one, and then you will have a mixed bag of pretty much everything else. There are white goods as well, which tend to go into the metals fraction because they have a much higher metals content than the range of products that we make.

Q344 Lord May of Oxford: How significant would it be if public procurement imposed more stringent environmental standards on things they purchase?

Mr Clack: Depending on product stream, I guess that certainly for the IT technologies it would have a significant impact.

Dr McIntyre: Huge, yes.

Mr Clack: It would probably be less so in consumer electronics because of the nature of public procurement, but generally it is very effective.

Dr McIntyre: What we have been finding up until now is that over the last couple of years public green standards, or whatever you like to call them, in public procurement are now really beginning to put pressure on our sales people. Up until recently it has been very much a tick-box type of exercise. They ask the questions, we answer the questions, the box is ticked and we move on. Now what we are finding is that the questions are getting increasingly difficult to answer, which is good and we welcome that, because, as I said before, what legislation creates is a lowest common denominator. What the market needs to create is the rewards for the innovators, whether they are large companies or small companies. Public procurement is a massive market for us and if it is recognised within public procurement that “We are making efforts and therefore we will buy your products over these other products because you have raised standards within public procurement”, that suits us very well indeed. We think that is exactly the way it should work.

Q345 Lord May of Oxford: An alternative way of achieving the same sort of end, provided there was enough social change to be concerned about it, would be to have a fairly stringently enforced set of eco-labels, as it were, and that would then go beyond public procurement. On the other hand, again, it is

my impression that the attempt to put labels on food about nutrition and give red, orange, green and so on has met with quite a lot of resistance from the industry because it is one more thing to deal with. How do you feel about eco-labels?

Dr McIntyre: Eco-labels serve their purpose very well, but the problem is that there is a proliferation of eco-labels across Europe. I think in Europe we deal with something in the region of 50 different eco-labels.

Q346 Lord May of Oxford: Would it get across the uncompetitive laws to have a common eco-label?

Dr McIntyre: It would be very nice and that is why in our submission we referred to self-declaration. In the Nordic region, particularly within the IT sector, we have worked very much with the Nordic governments in generating what is called the IT Eco Declaration. What that does is take the best of breed of all of the eco-labels and puts them all together with a set of general customer frequently-asked questions, because we find the same questions come up again and again from public procurement. It all goes in one document and you can then self-certify your product against that document. The advantage of self-certification over going through third party verification or an eco-label in that way is that it does not affect your time to market. If there was one eco-label standard for Europe and there was one third party verification body you can imagine the backlog that could be created if a lot of us came to market with new products all in the same time frame, which we quite frequently do, such as before Christmas and at other times of the year when we know our customers have budgets to spend, and so what that does is that it gets around that and then the manufacturers pay for a spot-check audit. You do not know when it is going to happen to you but you put money into a fund and they can turn up at any point and say, “You have got a self-declaration for this product. Demonstrate it to us now”.

Q347 Chairman: Can you send us a note on that?

Dr McIntyre: I could, certainly.

Q348 Chairman: You have gone through it quite lucidly but I think it would be helpful to get that.

Dr McIntyre: Yes. It has been exceedingly powerful with public procurement in the Nordic region.

Mr Evans: Eco-labels have some merit but in reality it is very difficult to compare apples and pears. Eco-labelling will focus on a particular issue and in many instances it will be power consumption or energy efficiency, but in terms of energy efficiency what is energy efficiency? Is it the lowest power consumption or is it the best use of the power because you are using

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extra facilities? We have always opposed the eco-labelling or the A-G labelling of televisions because there are so many different functions. You have got 100 Hz, you have got 50 Hz, you have got stereo quality sound, you have got various other functions that have an impact on energy consumption, and the issue we have is that to be able to compare all those and contrast them and make a reasonable level that says, "This is accurate", is very difficult. Also, keeping pace with the technology as we issue new products is very difficult.

Q349 Lord May of Oxford: There is a delicate line between those valid considerations and the fact that people simply worry about the message that is conveyed. If you go back to the food industry, the red/orange/green theme, the basic problem is that you worry because you do not want people seeing red on anything but you transpose that into a technical discussion of the meaning and so I hear what you say and it has validity, but—

Mr Evans: The research done by EST has shown that the extreme opposite of that. Currently with items such as televisions, the consumer is not concerned about energy efficiency whatsoever and that is one of the key issues we need to address.

Q350 Lord May of Oxford: That is a real problem.

Mr Evans: It is a real problem. It is not just the function of being able to watch television; it is a piece of furniture, it is something to be proud of. It is a bit like an "Intel inside" label.

Mr Clack: In all the time of my involvement with Panasonic I can hardly remember one customer query about energy efficiency.

Q351 Chairman: Do you think that is a consequence of the inadequacy of the metering system we have in the UK for our electrical consumption? There are things that you can buy apparently—you guys probably make them—that can tell you how much you are consuming and so you can say to your children, "When you are playing with whatever it is you are playing with that is the amount of electricity you are using. Would you mind switching it off?". What you are telling us at the moment is true and I do not doubt it is true but in the future people might become more sensitive to consumption.

Mr Evans: If you take an analogy with cars, if you look at the A-G label for cars I do not believe it has had any impact on the buying decision of whether you buy an A or a G car. If someone wants to buy a 4 x 4, just because it has a G label is not stopping them buying a 4 x 4, and I think the same argument is there with televisions.

Q352 Lord Lewis of Newnham: We will do that by taxation.

Mr Evans: Yes.

Q353 Baroness Platt of Writtle: Could a third party facilitate communication between Government and manufacturers to encourage sustainable procurement? You have talked about voluntary organisations and I think they are rather a good idea but what other forms of dialogue may be needed to improve Government and local government procurement?

Dr McIntyre: It is a very difficult question. Certainly when you look at some of the Government's initiatives, for example, that the Office of Government Commerce is making with their Quick Wins, they send them out for consultation and we have all commented on them where appropriate. It comes into the IT sector more than it does with consumer electronics. We are more than happy to contribute to those sorts of things and help Government but at the end of the day what has to happen is that best value must not be prioritised over total cost of ownership. We were saying before that consumers are not interested in energy costs. Certainly our business customers are exceedingly interested in energy costs, particularly when they are buying a service for a new data centre, for example, and the Government needs to start thinking in that same way. They need to start linking the people who make the purchase decision with the people who pay the energy bills. What we are seeing with our private commercial customers is that those links are being made very carefully. The IT manager is talking to the facilities manager when he is specifying new servers, new printers, new IT, but what we are seeing in Government is that those links are not quite there yet. They are better in central government than they are in local government but they have some way to go before those linkages are made. We are quite happy to put the technical data forward to demonstrate why these linkages should be made. 50 per cent of the power that goes into a data centre is used by air conditioning and cooling, not by the equipment doing the piece of work itself. Therefore, if you are smart with your specification of the equipment you can cut down on the power and cooling that goes into that data centre.

Q354 Chairman: In the banking centre of Edinburgh where I come from more electricity is consumed in the summer than in the winter because in the clean rooms the air conditioning requirements are higher in the summer than they are in the winter.

Dr McIntyre: We had a City of London customer who came to us very recently saying, "I would like to buy some new servers but I cannot pull any more power off the grid where I am at the moment". The power capacity of the cables feeding some of the

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areas of the City of London are at capacity and they cannot fit any more equipment in there, and so they came to us and said, “Help us to get smarter with our use of energy”.

Chairman: We had better not go down that route at the moment. Some of us will have to declare interests and things like that. You have been extremely frank and fulsome in your replies. It may be that when you see the printed copies of the evidence there are things you would like to add to what you have said and we would be happy to receive them, and I suspect that when we go through the evidence there will be gaps that we would like to fill. This has been extremely

helpful, so can I thank you all, in particular Professor Stevels, who I had not appreciated came from the Netherlands this morning or last night for this meeting. At one stage we were thinking of going to Japan. At other stages we were thinking of going to the States and we are going to do a bit in the Low Countries, but although I do not think we agreed with everything you said we are here to try and get the evidence as well as having an argument, which with some things can be good fun. May I just thank you very much for your help this morning. It has been quite a long session for the four of you and we are very grateful.

Supplementary memorandum by Hewlett-Packard

INTRODUCTION

The first section of this paper provides an overview of the complex printer cartridge market in the UK, focusing on the policies and practices of Hewlett-Packard (HP). Its objective is to provide an insight into the current status of the market and address some of the common misconceptions about the relationship between Original Equipment Manufacturers (OEMs, companies such as HP, Epson, Canon and Lexmark) and the remanufacturing community.

The second section is intended to provide a brief overview of the current IT Eco Declaration system. Further information about the IT Eco Declaration and HP’s role in its development is available on request.

THE UK PRINTER CARTRIDGE MARKET

About HP

HP is the largest IT and technology services company in the world with over one billion customers, a presence in at least 170 countries and last financial year generated revenues of over \$104 billion. HP has a sizable UK operation which is a microcosm of the global business conducting every service from product design and software development through to manufacturing, sales and marketing. Approximately 10,000 people work for the company in offices across eight sites in England, Scotland and Northern Ireland.

HP and printer cartridges

HP is the worldwide market leader in imaging and printing. There are two types of printers which dominate the consumer and commercial markets—inkjet and LaserJet. The consumer market is mainly served by inkjet printers and commercial customers tend to use LaserJet technology. The technologies of these printing systems are quite different. Inkjet cartridges use liquid ink which is sprayed onto the paper while laser printers fuse a powder called toner onto the paper.

The life of an empty printer cartridge can be extended in a number of different ways. It can be reused—either through a process known as remanufacturing, in which it is re-engineered, where parts are replaced, cleaned and refilled, or simply through replenishing the ink or toner. A cartridge can also be recycled by allowing the use of its materials in the manufacture of other products, including HP print cartridges. HP recycles printer cartridges as part of its lifecycle approach to reducing environmental impacts.

HP supports the right of customers to choose and of remanufacturers and refillers to compete in the printing supplies marketplace. Our operations do not in any way preclude the remanufacturing or refilling of HP cartridges, nor do we seek to inhibit the activities of this industry.

The printer cartridge market

According to ETIRA, the European Toner and Inkjet Remanufacturers Association, remanufactured monochrome toner cartridges have a 27 per cent market share, and remanufactured inkjet cartridges currently have 15 per cent market share across Europe. They predict potential growth to 40 per cent in the next few years.²

According to research from the sector's leading independent market research organisation InfoTrends, the European inkjet printer cartridge aftermarket (remanufacturers and refillers) will see continuing growth in its market share both in terms of units and revenue, moving from sales of 55 million units in 2005 to an expected 67 million units by 2010.³

Customer choice

HP's priority in developing products is to meet the needs of consumers by delivering quality and reliability across a wide range of applications and price points. We design our printers, print cartridges and paper to work together as an effective and integrated system with enhanced features and functionality which set it apart from its competitors. This approach offers the performance and value customers expect from HP and is the result of a €1 billion annual investment in R&D in our printing business.

Independent testing consistently reveals that HP's focus on performance results in unsurpassed quality and reliability for consumers. According to research from leading European testing house Innovationstechnik, original HP cartridges print 34 per cent more pages than compatible alternatives and 69 per cent more pages than refilled cartridges.⁴ In 2006, a further study by QualityLogic, another independent research organisation, showed that on average 70 per cent of refilled inkjet cartridges and 80 per cent of remanufactured toner cartridges had some form of reliability problem compared to just 2 per cent of HP originals.⁵

As consumers increasingly demand photo-printing technology in their homes, fade resistance has also become a benchmark of print quality. Again independent research indicates that HP original supplies outperform their aftermarket counterparts. A study conducted by Wilhelm Imaging Research in 2006 showed that photos printed with refilled cartridges fade significantly in less than two months while photos printed using original HP inkjet cartridges in HP printers and using HP paper would take 73 years for noticeable fading to occur.⁶

While these results demonstrate HP's commitment to quality and reliability we believe customer choice is essential and therefore support the right of the remanufacturing industry to offer products to consumers less concerned by these factors. We compete in this market on the grounds of superior print quality, reliability, functionality and overall value.

Misconceptions regarding cartridge remanufacturing

Despite all the evidence of growth in the aftermarket for printer cartridges, a number of misconceptions about the role of OEMs, such as HP, in constraining the remanufacturing industry remain:

1. Smart technology

In response to consumer demand for more information about their printing system, a so-called "smart technology" capability (whereby the print cartridge and printers are linked and can exchange information using an electronic chip) is available in many OEM cartridges. Smart technology was developed to enable consumers to identify when cartridges are not installed properly, alerts them when the cartridge is running low and instructs them about how to recycle the cartridge at the end of its life.

Some remanufacturers claim that the introduction of smart technology is a deliberate move by OEMs to hamper remanufacturing. In fact the role of smart technology is to enable the printer and cartridge to work in tandem to manage overall print quality, calculate cartridge ink and toner levels and administer other advance printing functions.

² www.etira.org

³ InfoTrends *European Inkjet Supplies Overview 2005–2010*, March 2007.

⁴ Based on average results of 16 European brands tested in 2006–07 by Innovationstechnik GmbH. Test commissioned by HP. Testing performed on HP 45A, HP 78A, HP 56 and HP 57 Inkjet Print Cartridges. Individual results may vary. See the Innovationstechnik report at www.hp.com/uk/inktest for details.

⁵ *The QualityLogic Reliability Comparison Study*, September 2005 was performed by QualityLogic, Inc. and commissioned by HP. QualityLogic, Inc. is one of the world's largest, most qualified independent quality assurance organisations, providing testing services to every major printer manufacturer. Full report available on request.

⁶ For more details of the testing methodology, visit www.wilhelm-research.com

Neither smart technologies, nor related firmware, preclude cartridge reuse by remanufacturers and refillers. Customers who choose to use remanufactured cartridges may not experience all HP smart printing features or the same level of print quality that an original cartridge offers.

It is possible for a cartridge remanufacturer to also invest in the technology to either re-set or replace the smart chip. However, this is a matter for those businesses and ultimately customer choice.

2. Increasing number of printer and cartridge models

Over the past decade, with the rise of digital technologies, customers have found more and more ways to use printers. Consequently, HP has advanced its printing technologies and developed a broad portfolio of products to match the varying needs of increasing numbers of customers. While some remanufacturers suggest that the rapid technological innovation is intended to stifle their business, HP strongly believes that offering a wide array of products and features helps ensure customers are able to choose a product that best fits their needs. In our view, any attempts to hamper innovation amongst OEMs to protect the interests of the remanufacturing industry, which already benefits from our investment in R&D without incurring any of the costs, would impinge competition and reduce consumer choice.

3. Cartridge materials and construction

Contrary to the belief that HP designs its print technology to impede remanufacturing, these decisions are driven to make our products more aligned with customer requirements and our manufacturing processes more efficient. In fact, a number of innovations in cartridge design have assisted in their remanufacture. In recent years, as a result of our Design for the Environment Programme, the number of components in HP cartridges has reduced substantially. While the reduction of the number of components is aimed at cost and environmental performance, a side effect is that cartridges have become easier to disassemble for remanufacturers.

4. Supply of empty cartridges

Sections of the after-market have levelled the accusation that OEMs have made a concerted effort to restrict the flow of empty cartridges, so as to make it more difficult for remanufacturers to conduct their business. This was never the case and it is generally accepted within the industry that there is an excess of empty cartridges in the UK and even the European market now, due to the efforts of remanufacturers to collect such cartridges. At this time, European cartridge brokers export empty cartridges to other parts of the world—a result of this excess supply.

Environmental responsibility

One of the most important misconceptions about remanufactured and refilled cartridges is that they are, by definition, better for the environment than OEM products. HP sees environmental responsibility as an integral part of our product offering and we are willing and able to differentiate ourselves in the market through our environmental responsibility programmes.

HP developed its Design for Environment initiative 15 years ago with the goal of reducing the environmental impact of products and services. As part of this programme we work with product designers, research and development teams and customers to identify, prioritise and recommend environmental design innovations. Product Stewards are then appointed to each new product to ensure compliance with regulations, maximise energy efficiency, minimise material usage and maximise recyclability.

In 1987 HP was a pioneer in developing a convenient and free method for customers to recycle our LaserJet printer supplies—Planet Partners. Today, this recycling program has expanded to include inkjet printer supplies and is now available in each region throughout the world. The programme has taken back more than 118 million kilos of printer supplies over its 20 years of operation. Our recycling strategy is expanding rapidly across all areas of the business and in 2007 we announced an ambitious new company-wide target to recycle one billion kilograms of electronics by 2010.

As a result of this scheme 100 per cent of the materials in returned HP LaserJet print cartridges and 76 per cent of inkjet cartridges are recycled or recovered for energy with the remainder managed in an environmentally responsible manner. No cartridge returned to HP through the Planet Partners Programme goes to landfill. In contrast, 35 per cent of the total number of cartridges collected by the remanufacturing industry are unsuitable for remanufacturing and, while these could be broken down into constituent parts and recycled, a “vast majority” end in landfill.⁷

HP commissioned First Environment Inc to carry out a life cycle assessment (LCA) comparing the environmental impact of an HP LaserJet cartridge and an equivalent remanufactured cartridge.⁸ The LCA examines and refutes assumptions that reused cartridges are “better” for the environment than original print cartridges. The LCA found:

- “No definitive statement can be made about the environmental preferability of one product over another”; and
- more than 80 per cent of the environmental impacts from a cartridge—HP or remanufactured—can occur after production, during other stages of the life cycle such as use and end of life.

Conclusion

HP has always supported customer choice and the right of the remanufacturing industry to compete in the printer cartridge market and we continue to see a role for remanufacturers in providing a choice to consumers who do not require such consistent quality, reliability or ease of use. Our activities do not preclude the remanufacturing or refilling of HP cartridges, nor do we seek to inhibit the industry in any way. This is borne out by the economics of the market which demonstrate that the aftermarket is continuing to grow—a trend industry analysts indicate is set to continue for the foreseeable future.

Throughout our global operations, HP’s practices are driven by customer demands for continuous product development and the consistently high quality, reliability and value for money they expect from our product range. We invest billions of pounds in R&D to design print cartridges and develop ink and toner formulations that optimise performance for our customers and will continue to compete in this market on the grounds of superior printing quality, reliability, functionality and overall value for our customers.

OVERVIEW OF THE IT ECO-DECLARATION

The IT Eco Declaration for IT hardware products has its origins in the early 1990s, when customers, largely from the Swedish public sector, began to request information about the environmental properties of the IT equipment they purchased.

As demand for this information grew so did the number of competing environmental eco labels. This made compliance slow and very expensive and confused customers rather than informed them as there were multiple eco labels with different standards.

To address this issue the Swedish IT & Telecom Association established an industry forum in 1996. As part of this forum, HP was instrumental in the development of the resulting programme which allows participating manufacturers to communicate environmental information in a set format whilst self-verifying the data.

The self-declaration system combines elements from numerous ecolabels along with frequently asked questions from customers. Where a relevant standard exists, the IT ECO declaration programme includes a set of operating principles to ensure that each manufacturer measures in the same way and presents results in the same format. This ensures that purchasers of IT products can compare products on a like-for-like basis. The scheme also includes a spot check system to guarantee that all manufacturers accurately communicate environmental information.

Since its development the IT ECO Declaration system has become the most widely used product environmental information tool for electronics in Europe. It has been adopted by the IT industry in Denmark, Norway, and Finland. In 2004 the US Environmental Protection Agency incorporated much of it into its system for helping environmentally-minded purchasers select IT equipment, known as the Electronic Product Environmental Assessment Tool or EPEAT. In 2005, ECMA International set up a project group to harmonise its TR/70 standard with the Eco Declaration, which in June 2006 became the international standard ECMA-370.

⁷ MTP Briefing Note: *Waste Considerations Relating to Printer Cartridges*—http://www.mtprog.com/ApprovedBriefingNotes/PDF/MTP_BNICT23_2007September20.pdf

⁸ LCA study available on request.

In March 2007 HP announced its participation in a new IT Eco Declaration for Printer Supplies, including printer cartridges. As part of this process more than 30 self-declared environmental characteristics including the weight of the cartridge, whether the printing supply contains hazardous substances, the availability of a Material Safety Data Sheet and whether the manufacturer offers a recycling programme for the product, are disclosed by manufacturers in a standardised and comparable format.

To satisfy the declaration, member companies must sign a contract with Swedish IT-Fretagen, verify compliance statements on request, immediately correct any discovered errors and pay a small annual fee. Non-compliance can and does result in exclusion from the system.

February 2008

TUESDAY 5 FEBRUARY 2008

Present	Bhattacharyya, L Crickhowell, L Dixon-Smith, L Ford, B Howie of Troon, L	Lewis of Newnham, L May of Oxford, L Methuen, L O'Neill of Clackmannan, L (Chairman) Selborne, E
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Memorandum by the Design Council

EXECUTIVE SUMMARY

In the ecosystem of innovation we cannot think about waste as something that is associated with the left-over or end-life of a product. A more holistic approach is needed. The role of design here should be to look at the entire life-cycle of products and services and to identify ways of embedding sustainability from the outset. The role of design should be to unlock innovation and connect science and technology to the market place. As such sustainable design should be seen as a business opportunity in a low-carbon economy.

A key new set of design skills is needed to address sustainability, but as yet there is little demand for these skills in UK industry. Experience from other countries such as Germany, Denmark and Sweden suggests that if a critical mass of designers are equipped with knowledge about product life-cycles, the impact of materials' choices and manufacturing processes on product development and consumer behaviour the impact on waste reduction would be considerable.

Over the coming years the demand for design that aids sustainable development will rise as regulations become more stringent, consumers become more discerning and businesses require specialist design input. A UK design industry with the skills and confidence to deliver sustainable solutions could become a world leader in this field, collaborating internationally and opening up access to new global markets. To achieve this, a whole-industry response will be required along with effective education and training.

Following some discussion of the issues, we will set out a number of recommendations that we believe will minimise the creation of waste. These are:

- greater support for design-led innovation that will enable SMEs to embed sustainability in all their products and services;
- more emphasis on sustainability in design education as part of a nationally co-ordinated skills programme;
- greater collaboration between design, science, technology and business higher education institutions;
- greater emphasis on “service design” in the development of products and services; and
- greater public engagement to familiarise ordinary people with value of design.

1. INTRODUCTION

The Design Council welcomes this opportunity to respond to the House of Lords Science and Technology Committee Inquiry into waste reduction.

Design Council research shows that companies that invest in design out-perform in practically every measure of business performance including market share, growth, productivity, share price and competitiveness. For example, the Design Council's Design Index (2005) demonstrates that over a 10-year period, design-intensive companies outperformed the FTSE by more than 200 per cent. Our studies also demonstrate the link between design expenditure and economic performance. The Design Council's *Value of Design Factfinder (2005–06)* found that for every £100 a design-alert business spends on design, turnover is increased by £225. Yet, remarkably, 45 per cent of all UK companies are failing to invest in design and only 16 per cent believe that design is critical to success.

On the subject of improving economic, social and environmental sustainability, design has the potential to make a positive contribution, in supporting businesses to create environmentally sound and desirable alternatives to existing services and products and in enabling changes in patterns of materials use, production and consumption, and in product disassembly and recycling.

Major design-led companies like Electrolux, Unilever and Nike are already using design to address sustainability, and car manufacturer Toyota has advanced a sustainable automotive design model. By investing significant resource in the design programme behind hybrid cars like the Prius, it is building an internal knowledge base about sustainable design that should serve it well in this emerging market.

Our research shows that the most environmentally aware businesses are already seeking design solutions that respond to consumer demand for greener products, but that they are beginning to find that UK designers don't always have the relevant expertise. In response to this, we believe that sustainability should be at the heart of the design curriculum.

2. THE ROLE OF DESIGN IN WASTE REDUCTION

With 80 per cent of the environmental impact of today's products, services and infrastructures being determined at the design stage,¹ influencing the key design decisions that designers make can bring about extensive change in the amount of waste produced in a product life-cycle. The EU has passed a directive, the *Eco-Design of Energy Using Products Directive (EUP)*, to help designers deal with the problems of waste at the design phase. Further legislation that reinforces these principles should be considered, though there are many measures that designers and businesses can take in the existing legislative framework in order to reduce the environmental impact of their activities.

Designing to last

Companies can strive to build more durable products to ensure they last longer. As an example, the furniture company Vitsoe has become a market leader with a product designed to last a lifetime. The 606 Universal Shelving System's stated aim is to "help people live better with less that lasts longer." Its highly flexible modularity allows owners to install and extend their shelving easily themselves. For a nominal fee Vitsoe also offers a service dismantling and rebuilding its system for relocations.

Also, designing product components for easy removal and replacement encourages people to repair parts rather than replacing the whole object when it breaks down.

The Aeron ergonomic chair shows how successful these principles can be. It has 66 per cent recycled parts and 100 per cent of its aluminium parts are recycled, making it about 95 per cent less destructive to materials, energy, water and air. All its plastic parts are labelled with International Standards Organisation (ISO) recycling symbols and the chair is easy to disassemble, with 94 per cent recyclable parts. Repair is simple and the chair has a 10 year life-span—about double that of an ordinary office chair. It has been a worldwide success and has been recognised as a design classic by the Museum of Modern Art in New York.

Add value by reducing waste

In a time of increasing energy and waste disposal prices, product re-designs and rationalised production processes can not only reduce environmental impacts but can also bring economic savings. For example, American grocery retailer Walmart reduced packaging for just one toy line and made annual savings of more than \$2.4 million, as well as saving more than 3,800 trees and more than 1,000 barrels of oil.² Retail packaging, whose function is often to increase shelf visibility, accounts for about 20 per cent of all waste put out by households.³

Design to recycle and remanufacture

At the moment, when waste is reused, it is often downgraded. Cars are routinely melted down without separating out useful metals such as copper, meaning these become unusable in the resulting alloy.

¹ *How to do Ecodesign: A guide for environmentally friendly and economically sound design*, German Federal Environment Agency (ed), 2000.

² www.walmartfacts.com/FactSheets/1292007_Sustainability.pdf

³ Defra, *Waste Strategy for England*, 2007.

Xerox, as well as saving resource by making multi-functional products that scan, copy, fax and print, also remanufacture their old products. They estimate that this results in their products having up to seven lives. Evidence suggests remanufacture can be twice as profitable as manufacture, but few companies currently use it.⁴

From products to services

Home appliance manufacturer Electrolux is experimenting how design can transform their core business offering. In a pilot service, they provided free washing machines to customers, enabling customers a pay-per-use model that has worked out as more profitable in the long term for the manufacturer. In this sense they are selling a washing service, rather than a product. Customers are furthermore likely to run their machines less often, thus also bringing about a significant saving in water and energy. Since Electrolux retains ownership of the machine, they also have greater incentive to build it to last. The United Nations Environment Programme claims that in addition “the company has the potential to take a role in the end-of-life of the washing machine by remanufacturing or recycling its materials”.⁵

3. USER-CENTRED AND SERVICE DESIGN

Britain is at the forefront of a new “service design” industry, and this new discipline is evolving as a powerful new tool for both business and sustainable development. It can use social and economic innovation to help reduce and improve on wasteful processes and can speed up the transition to sustainability. By putting people at the heart of the design process, it explores new ways of carrying out familiar, every-day activities to create personalised user-centred services.

The Design Council has recently worked with regional development agency One North East to pilot a set of community projects that aim to improve aspects of daily life through the successful application of “service design” principles. Service design case studies from this initiative included projects that aimed to reduce home energy use in an economically deprived part of Northumberland; and one that aimed to exploit the capacity of cars on the road in order to reduce overall car journeys in a remote part of the North East. We would be happy to provide further information on these products in order to examine the role of service design more closely.

4. RECOMMENDATIONS

Greater support for embedding sustainability within business and business support programmes

Caught up in adapting to new conditions and legislation, many businesses currently see environmental factors as barriers to growth rather than opportunities for innovation. They tend to be unaware that design can address complex strategic issues and allow perceived lack of time or resource as a barrier to invest in this research. Design is frequently seen as an add-on and an expense rather than an important part of improving profitability. However, it is also true that companies that wish to, currently have difficulty sourcing sustainable design skills.

For instance, Designing Demand, the Design Council design-led innovation service for SMEs, is working to embed sustainable practice at its heart. The programme will target a total of 6,500 businesses by 2010. A mentoring scheme, as part of this programme, is delivered by a roster of expert “design associates”, within a flexible framework, developed by the Design Council, that allows associates to advise businesses according to their needs. Sustainability is a cross-cutting theme and design associates are there to help raise awareness and signpost businesses to other resources around complex sustainability issues.

More emphasis on sustainability in design education as part of a nationally co-ordinated skills programme

Presently, there are only a small number of undergraduate and postgraduate design courses with sustainable design elements and few design companies, agencies and freelancers show an active commitment to sustainability principles. However this is by no means typical of the sector as a whole. The reality is that most designers do not yet recognise the strategic role they could play in tackling the problem and teaching about the application of sustainability principles is still under-developed in design education. Also, our research into design skills has found that designers still do not rate sustainability as a priority, claiming it is because their clients do not ask for it.

⁴ Caspar Gray interview with Rolf Steinhilper, 2006.

⁵ United Nations Environment Programme, *Product—Service Systems and Sustainability—Opportunities for Sustainable Solutions*, updated, 2005.

The UK Design Industry Skills Development Plan, “*High-level skills for higher value*”, jointly published by the Design Council and Creative and Cultural Skills Sector Skills Council, recommends a “360 degree” approach to skills development: improving the teaching and content of design courses in schools and higher education as well as improving professional practice and embedding sustainability element across education.

Greater support for collaboration between design, science, technology and business HEIs

Design should play a greater role in connecting our research base to the market place.

There is currently not enough interaction between scientists and designers. We commend the work of organisations like MADE (Materials and Design Exchange) was established to address that issue. MADE is part of the Materials Knowledge Transfer Network (KTN) supported by the Government, forging a link between designers and other sectors of the KTN that are concerned with metals, plastics, textiles and the full range of modern materials. The core partners of MADE are the Institute of Materials, Minerals and Mining (IOM3), The Royal College of Art (RCA), the Design Council, the Institution of Engineering Designers (IED) and the Engineering Employers Federation (EEF South). Speedy implementation of Lord Sainsbury’s Review of Science and Innovation Policy, *Race to the Top*, is also needed to ensure that there are greater connections between design, science, technology and business in our universities.

Greater emphasis on a “service design” approach from business

Looking at the life-cycle of products and services requires a user-centred approach that engages all stakeholder groups in dialogues and encourages their active participation in the design process. However, the relatively new discipline of service design, which allows a designer to identify the brief through examining a situation in its entirety is still not widely recognised by business as an effective tool for innovation.

“Shared visions act as forces of innovation. Designers can imagine some situational condition that does not yet exist, but describe it in such a way that it appears to be a desirable new version of the real world”.⁶ The design process here can prototype new ideas and rapidly test them with target user groups. In each instance, service design’s strength is the capacity to rapidly and cheaply work through iterations of solutions practically with the participation of all relevant interest groups. This means that a service design approach can help businesses test new ideas and propositions before they are taken to market.

Greater public engagement to raise awareness among the general public about the value of sustainable development and design’s role in it

There is a greater need to raise public awareness about how design can influence consumption habits and waste impacts. By raising awareness, consumer choice is better informed. Public engagement programmes like Designs of the Time (Dott07) reach a broad cross section of society, and play an important role in developing this awareness. The Design Council will continue to uphold a strong focus on sustainability within its Designs of the Time programme. This should in turn result in the creation of more consistent demand for well-designed and better performing products and services that create less waste.

APPENDIX

5. DEFINITIONS

In the context of this submission we have used the following definitions, as described in the Cox Review into Creativity in Business and Design Council’s Added Value Research:

“Creativity”: the generation of new ideas—either new ways of looking at existing problems, or of seeing new opportunities, perhaps by exploiting emerging technologies or changes in markets.

“Innovation”: the successful exploitation of new ideas. It is the process that carries them through to new products, new services, new ways of running the business or even new ways of doing business.

“Design”: links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. Design may be described as creativity deployed to a specific end.

“Added value”: the term describes how a business adds value to what they offer, over and above providing the core product or service that is at the heart of what the business does. For example, Apple added value by offering i-tunes to add to their i-pod range, ie the value of the product is

⁶ John Thakara, Programme Director, Dott07.

significantly higher with the i-tunes service that goes with it, and both of these were designed together from the outset.

“Sustainable development”: is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”⁷

“Design”: is what links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. Design may be described as creativity deployed to a specific end.

“Design for sustainable change”: is neither an add-on, nor an elite area of design. Design for sustainable development is the process by which all designers can improve the social, economic and environmental impact of their work.

For further information please visit:

www.designfactfinder.co.uk

www.designingdemand.org.uk

www.ukdesignskills.com

www.dott07.com

November 2007

Memorandum by the Ecodesign Centre Wales

Following a sustained programme of activity over a number of years in Wales Ecodesign Centre Wales (EDC) was established in September 2006 as part of the Welsh Assembly Government’s commitment to sustainable development⁸ (SD) and through funding from the Materials Action Programme (MAP).⁹

EDC MISSION

EDC actively inspires and leads the Welsh Assembly Government, public sector organisations and higher education to enable effective ecodesign in Welsh Industry. We facilitate the open sharing of knowledge and experience with fresh thinking and integrity.

EDC advocate a joined up multi-stakeholder approach and focuses on building capacity and capabilities in industry, public sector organisations and higher education so that effective ecodesign can happen in Wales. Our message is: Ecodesign = good design = good business practice.

Central to the activities of EDC is the delivery of an ecodesign initiative that promotes creative approaches to resource efficiency through four core elements;

- industry: enabling ecodesign;
- education: embedding ecodesign;
- research: international best-practice; and
- communication: positioning and promoting ecodesign.

EDC RESPONSE

This response is primarily based on the experiences of the EDC team of engaging with business, in particular small and medium sized enterprises (SMEs), over a diverse range of sectors (including electronics and electrical equipment, design, general manufacturing, food and drink, fashion and textiles, consumer products) over the past number of years. The response also includes the experiences of the EDC team of engaging with other key stakeholders including higher education, government policy makers and NGOs.

Note: Throughout this response the terms “ecodesign” and “sustainable design” are used interchangeably. EDC view them as similar concepts depending on the context.

⁷ *Our Common Future*, the Brundtland Commission report, 1987

⁸ Ecodesign is a key assistive measure in meeting the statutory obligations in relation to Sustainable Development (SD) through designing out waste and reducing our carbon footprint.

⁹ EDC staff are employees of University of Wales Institute, Cardiff (UWIC) who manage and administer the funding.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste?

Design can play a significant role, as part of a multi-stakeholder approach, in minimising the creation of waste through facilitating changes in business, consumer and government culture including:

- designing waste out, ie taking a life cycle approach where all materials and components employed can be reused and recycled (ie closing the loop);
- influencing key stakeholders to view waste as a resource to be tapped into (eg through targeted campaigns, better pooling of recyclate suppliers through NISP, incentives to encourage the testing and specification of post consumer recyclate etc);
- using design as a strategic process to introduce holistic life cycle thinking through all aspects of business operations;
- employing design as a tool to communicate the benefits of taking a triple bottom line, eg branding could have a key role to play here; and
- design specifications are often the primary link in value chains. The management and sustainability of a design specification can influence more sustainable behaviour in many companies including second and third tier suppliers.

Are there any barriers to how knowledge in this area can best be translated and applied?

Barriers include:

- the need for all of the key stakeholders to make this connection, ie be open-minded on the value of design;
- lack of leadership, ie designers can lead the way but all stakeholders need to take responsibility and accountability from government through to the consumer;
- lack of “joined-up” thinking, ie not building upon existing strengths and encouraging growth and innovation in competitive, added value sectors;
- lack of government intervention/support to help prove the case;
- a lack of, and poor communication of, best practice examples, ie more results are required to prove the case, particularly for SMEs, and these messages need to reach the appropriate target audience;
- there is a lack of clear mechanisms for communicating and transferring the required competencies through the value chain. Some new regulatory approaches may improve this eg REACH. Also, some companies are taking a proactive approach to this.¹⁰

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

Factors that influence the use of materials are wide and varied ranging from aesthetics through to performance and cost. Sustainability is not a key consideration at the moment although more and more businesses are beginning to take certain aspects of sustainability into consideration such as ease of material recycling. This is more common practice with larger businesses (ie companies such as Panasonic, Herman Miller). Drivers include legislation, consumer demand and supply chain considerations.

New regulations such as REACH will potentially have a positive influence on material selection. This is if the required level of transparency and sharing of safety data is achieved.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

Generally for SMEs this is not viewed as a priority at the moment. Some large businesses would take this into account as part of their environmental and social responsibility or because of legislative drivers (eg WEEE directive).

There are too few examples proving the application of sustainable materials in products and therefore too many perceived risks of using unproven materials.

¹⁰ See <http://www.nokia.com/A4211227> (an isolated example many other companies do similar)

There is poor access to knowledge on end-of-life impacts of specific materials. LCAs and R&D are extremely costly limiting further the data available for SMEs.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

New material development offers exciting opportunities for design. Generally there is not enough interaction between scientists and designers.

There are some negative impacts of new material development on sustainability such as compatibility and recyclability. These are difficult issues to communicate, hindered by the fact that there can also be a lack of independent data available.

Can better designed products offset the increase in consumption?

Better designed products have a key role to play but in the long-term we need to facilitate a wider cultural change across society in terms of needs and wants and in terms of what we view as resource, ie functional products instead of fashionable products.

Products (including materials) should bear their true life cycle costs.

“Better design” generally perpetuates consumption through creating cycles of dissatisfaction eg latest model and latest functionality. It is a subjective topic and we would need to define “better design” ie is durable better? And if it costs more, is that socially acceptable?

For some products a reorganisation of the business model may be required eg through functional sales or product service systems. It is important to note that product service systems are not automatically more sustainable.

Are there any other gaps in knowledge and how are they being addressed?

Crucially up to 99 per cent of businesses in the UK are SMEs. Transferring the knowledge and experiences of the larger businesses and other stakeholders (eg research centres, NGOs, academia, support services, consultants etc) is crucial if we are to move towards a culture where all stakeholders view waste as a resource. We need to create appropriate platforms for this to happen. It will take time and requires careful planning but yet the approach needs to be flexible to account for the diverse range of needs and situations (there is no “silver bullet”). As of yet this has not been addressed in any great depth. EDC are currently working on an initiative to explore ways how these platforms can be created through a unique capacity building approach. This includes a demonstration project with four growth SMEs in the manufacturing, electronics and food and drink sectors to gain a clear understanding of how ecodesign can be embedded in their business strategy. This includes gaining an understanding of both the quantitative and qualitative indicators.

There are a small number of resources that offer the opportunity for designers to select more sustainable materials—these need to be better resourced, validated and marketed.¹¹

Higher Education (HE) institutions are a key component of long-term capacity building for ecodesign. There are significant gaps in the HE curriculum.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

The current framework does not provide clear incentives.

There are not clear channels of communication to businesses. The current models do not appear to be reaching the right audience. Communication needs to be substantially improved especially in relation to targeting SMEs.

Businesses view the framework as a threat and not as an opportunity to innovate, develop and grow in a sustainable way.

¹¹ see <http://www.ecospecifier.org/> <http://www.materialconnexion.com/pa1.asp>

Most SMEs sit outside the relevant regulatory framework but have a large cumulative impact. eg their individual tonnage waste output is under policy thresholds. Because of this they require different drivers, such as government procurement, and often these are not communicated or considered when developing policy interventions.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

While environmental performance is gaining more of a focus sustainable design (or ecodesign) is still not central to the vast majority of businesses.

EDC run an initiative to encourage ecodesign which is beginning to gain an understanding of the real needs of SMEs and other stakeholders (www.edcw.org).

Other UK organisations that have run initiatives in the past seven years include Design Wales (Ecodesign Initiative 2005–06—EDC evolved from this), Centre for Sustainable Design (Ecodesign Training for Manufacturing, Use and End-of-life for SMEs), University of Sheffield—Environmental Business Network. Organisations such as Design Wales and Envirowise also provide support to business through specialist advisors.

What other measures can promote a focus on waste reduction among businesses?

Incentives such as industry awards, certification, accreditation.

Access to training and development tools.

Targetted forums, networks and information sharing platforms.

Peer-recognition and support.

Partnerships between large companies and SMEs.

Coaching and mentoring.

Links to higher education.

What lessons can business learn from international experience?

Ecodesign or sustainable design = good design = good business practice.

Ecodesign or sustainable design is not an isolated or add-on activity. It's central to your business strategy.

Change takes time, needs leadership and requires a joined up, multi-stakeholder approach.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

Government needs to take a lead role along with working with key stakeholders to create platforms for moving forward.

One of the potential opportunities the Government has to influence change is through its own procurement process. There is emerging empirical evidence of the effectiveness of procurement as a market transformation tool.¹²

Government needs to drive sustainability and resource efficiency agenda across policy regimes such as regional development and innovation.

Government needs to lead the way by driving resource efficiency within the government estate.

Many of the products consumed in the UK are imported and this places a different scope on the problem. The Government needs to build on international co-operation to drive resource efficiency through global supply chains. Aspects of this issue in particular should be addressed through the Marrakech Process.

¹² See <http://www.iclei-europe.org/index.php?id=procurement>

How does Government policy link up with European strategies and action plans?

Any link up with strategy or action plans needs to be matched with timely implementation of subsequent policy mechanisms. Recent confusion and delays over specific legislation sends out a confusing message to industry.

What lessons can be learnt from other countries—within the EU and globally?

EDC undertook a comprehensive international best practice study in 2005 (when some of the team ran an earlier ecodesign initiative for Design Wales) on what Government could do to stimulate ecodesign in Wales. Key lessons from this include:

- take a long-term multi-stakeholder approach;
- need to embed ecodesign in education, government strategies and the wider business and environment support network;
- an initiative is a useful start point. This initiative requires:
 - a clear vision and timescale;
 - demonstration phase;
 - strong engagement with industry and design community; and
 - post initiative support mechanisms.
- use appropriate tools and methodologies for SMEs; and
- focus on supply and demand side activities.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

Product design taking into account consumer lifestyles can effect change.

Design has always been effecting change in consumer behaviour. The intention needs to change.

There are some recent examples where product design is being used to translate issues such as energy consumption into simple feedback loops for users. This is helping to visualise the invisible aspects of unsustainable consumption.¹³

What role do marketing strategies play in influencing more sustainable design?

Marketing is crucial because it can have a major influence on product design and strategy by responding to, and creating, market demands.

Marketing can also act as the communication mechanism to inform and education consumers of environmental benefits. This can be achieved through direct company communications and also through campaigns and ecolabeling initiatives.

The Chartered Institute of Marketing are taking up the sustainability issue and offering advice to its members.¹⁴

Are there any gaps in knowledge in this area?

There is very little knowledge on how to change consumer behaviour.

Environmental policy has been unsuccessful in changing behaviour and bringing about transformations (social or technical). The policy agenda needs to take into account market, government and system failures.

There is a growing body of research on sustainable consumption but it is still largely academic and complex. This makes it difficult to transfer into policy or strategy. Examples of research areas include Sustainable consumption, consumer values and lifestyles.

There appears to be confusion over what sustainable consumption is and conflicts on approaches—ie technology oriented strategies can lead to the rebound effects (where efficiency gains lead to over-consumption).

¹³ See <http://www.diykyoto.com/> <http://www.tii.se/groups/power>

¹⁴ see <http://www.cim.co.uk/cim/ser/html/knoTopic.cfm?objectID=F64FBC16-620E-4E20-9A8E37B29C5E8A62>

SKILLS

How is sustainable design integrated into the design syllabus?

Currently this is quite ad-hoc. It is not currently common practice to have sustainable design embedded in mainstream design syllabus.

EDC view the provision of ecodesign support to HE institutions as a key component of long-term capacity building for ecodesign. An immediate priority for EDC is to put the foundations in place for embedding of ecodesign and life-cycle thinking in mainstream design degree courses across the four Welsh universities offering design education. This is to ensure that in the medium to long-term all design graduates in Wales are “literate” in the issues of sustainability and ecodesign;

- the design curriculum is over-crowded and HE institutions struggle to integrate sustainable design modules. The key is to have teaching resources that complement and enhance existing curricula;
- the message we are receiving from HE is that “sustainability should simply be part of how they teach design” and not as separate and de-contextualised modules;
- often the delivery of sustainable design modules is dependant on individual experts. There is a need to build capacity across all levels of staff and allow for ownership, knowledge management and skills retention;
- creating more fruitful linkages with industry projects is required to help students (and lecturers) see the theory in practice; and
- there is a need to build capacity in training provision for design and technology teachers in the post-16 environment.

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

Most waste reduction industrial based training is self taught in response to a direct business challenge.

More formal training for SMEs has been predominantly delivered by business support organisations undertaking on-site waste audits or encouraging employees to attend short courses/seminars.

Trade associations disseminate relevant information via newsletters and seminars to all member organisations. This enables industry champions to obtain timely, although tailored, information.

Lecturers undertake self-directed learning or attend forums and events targeting educators.

22 October 2007

Memorandum by Social Environmental Enterprise and Design Foundation

JOINING THE DOTS

1. ROLE OF DESIGN

1.1 Up to now, where design thinking has been applied to the problem of waste, it has tended to be in the realm of product and packaging design. This misses some vital areas of activity. Advanced design thinking has begun to look at systems and services as raw materials, and it is this approach that we believe needs to be introduced into mainstream design activity on waste.

1.2 Dealing with waste is not just about mitigating the effect of the stuff that is in the waste stream. It is about asking why it is in the waste stream in the first place and stepping back to see how waste is perpetuated not just by the objects themselves, but by what surrounds them. In fact, while looking at products and the way they are designed is important, doing so without considering the infrastructure that supports them and the behaviour of the people who use them is meaningless.

1.3 Imagine a car that fulfils all the criteria of sustainable design best practice. It has a hybrid engine and can run on bio-fuels. Its parts have been subject to Life Cycle Analysis to ensure minimum overall impact and are made from recycled materials that can be disassembled quickly for easy repair and upgrades, replacement and recycling. The owner’s manual provides all the details of how to dispose of the vehicle and of defunct parts responsibly—beyond the legal requirements for disposing of automobiles.

1.4 The problem is, this does very little to alter the behaviour that creates waste—and even runs the risk of increasing it. The owner, feeling that their car is virtuously green, may drive it more frequently. Very likely too, for all the good intentions of the car manual, the owner may not find it easy to implement the

recommendations for disposal of the vehicle at the end of its lifecycle if the infrastructure is not in place. Ultimately, coupled with an increase in consumption in society overall, the waste reduction gains envisaged by the car's designers could, in practice, quite easily be non-existent.

1.5 Design can help at a strategic level by redefining problems. In this case, the focus of the problem might be not how to make the car itself less wasteful, but instead how to get people from one place to another with the efficiency and convenience of a car, without the waste.

1.6 The company Streetcar has reframed this question and thereby exploited its economic potential. Streetcar is a flexible car-hire service that affords people the mobility of a private vehicle without the associated inefficiency and costs. This revised business model reduces waste further upstream by reducing car ownership and, ultimately, therefore, the number of cars that will be disposed of.

1.7 Designers Braungart and McDonough have taken this to the next level in the development of a car for Ford. Model U's portfolio of leading edge sustainability measures includes a new business model whereby the customer buys not the car but the services for the car—tax, insurance, petrol and costs—for a given number of miles. At the end of this distance the car returns to the manufacturer, enabling the up-cycling of all components. Says designer William McDonough, "The vision behind Model U is entirely positive. Instead of focusing on minimising environmental harm, which is what most approaches to sustainable mobility do, Model U starts to find ways to be recreational and regenerative—to have fun and create environmental benefits at the same time."¹⁵

1.8 This type of joined-up design thinking can help redefine many problems that currently plague the waste agenda. The emblematic waste issue of plastic bags, for example has hitherto been addressed by either capping their free distribution or substituting the plastic for more "environmentally friendly" materials. But Defra research shows that 80 per cent of plastic bags are reused in the home, and the unforeseen consequence of taxing plastic bags in Ireland was a 300–500 per cent increase in the sale of plastic refuse bags and bin liners.¹⁶ Focusing on what at first appears to be the problem often just shifts it somewhere else.

1.9 Like all issues, plastic bags are a part of a complex web of inter-connecting systems that will be more efficiently examined in relation to each other than in isolation. A designer might find, through observing the behaviour of shoppers, that the real problem is not the bag at all, but, more broadly, how people get their shopping home. This kind of analysis also expands the realm of possible stakeholders (eg the planning authority, local waste authority, public transport provider etc) to consider who else might contribute to the solution.

1.10 Advanced design thinking increasingly recognises the need to address relationships rather than deal with isolated products. It examines the connections between things, the infrastructure that supports them and the people who use both. This seems far from design's traditional role of creating objects, but actually relies on similar techniques of visualisation, prototyping and observing user behaviour. Finally, it promotes the adoption of new behaviour by making it desirable.

1.11 This kind of approach is already being used successfully in services and social planning, where UK designers are among the frontrunners in applying design methods to encourage behaviour change, solving problems of systems and services rather than just producing more "stuff".¹⁷

2. ROLE OF BUSINESS

Redesigning products

2.1 It is important to distinguish between SMEs and big businesses in their capacity to react to the waste agenda. SMEs rarely have the human or economic resource to invest in developing new solutions. Rather, buried in supply chains and, all too often, in fire-fighting mode, they can only react to the demands of clients, legislation, and increasing costs of energy and waste management.

2.2 Conversely, big businesses, more resourceful and on the frontline of the market pulse, are equipped to deal with and anticipate change. With their sights on the longer-term movement of the market they are able to invest in research and development to identify and prepare for future trends.

2.3 Many of these bigger businesses are already addressing their waste issues through measures such as product or packaging redesigns and some are already making vast savings from doing so. Walmart reduced packaging for just one toy line and made annual savings of more than \$2.4 million, as well as saving more than

¹⁵ <http://www.mbdc.com/features/>

¹⁶ National Retail Consortium.

¹⁷ <http://www.ideo.com/portfolio/>, <http://www.designcouncil.info/mt/RED/about/>

3,800 trees and more than 1,000 barrels of oil.¹⁸ Measures such as these, however, are still an afterthought that works at the end of the waste stream, meaning that they do little to change the way these businesses operate and, in the broad scheme of things, also do little to reduce overall waste volumes. It's a bit like dieting to mitigate the effects of a high-fat diet when what's really needed is a permanent change to more healthy eating habits.

2.4 Current legislation frequently appears stuck in this mindset too. It can force businesses to reduce waste, but there is an assumption on all sides that the necessary measures are a burden that must be kept to a minimum and complied with to the letter and no more. There is still widespread fear that a green agenda implies an austerity that will be harmful to economies. For businesses to truly focus on waste reduction and see it as an area for serious innovation and investment, they must come to understand that it can confer a genuine competitive advantage. "Necessity is the mother of invention" and there is a historical link between crisis and innovation. Would the industrial revolution have been as accelerated without the abolition of the slave trade, greatly feared as an economic catastrophe at the time?

2.5 Design, used strategically rather than just as a means of making small fixes, is a powerful tool for the kind of innovation now required and a potentially enormous source of economic opportunity. Beyond product and packaging, we have identified two main strategic approaches by which design can help business take on the waste challenge and turn it into opportunity.

Revenue from waste

2.6 "Waste is just resource in the wrong place"¹⁹ and Greenworks, a company that collects and re-purposes used office furniture, is one of numerous examples of how businesses are seizing the opportunities this implies. If businesses used creative thinking to view their own waste as a new resource, they might easily uncover new revenue streams, new efficiencies and even new business models. This is what Andrew Zolli terms a business "Twofer":²⁰ it has the twin benefits of reducing waste and generating new income.

2.7 There was a time when the use of waste as resource was commonplace and common sense. The fortunes of Huddersfield, for example, were partly built on the recycling techniques of Shoddy, a process that turned used cotton into a felt-like fabric for duffle coats and the like. The cheapness of foreign clothing and textile markets have led to the downfall of such techniques in the UK and the word Shoddy has become imbued with connotations of cheapness, inferior material and poor workmanship.²¹

2.8 The current associations of "recycling", "reconditioning", or "salvage", means that the products of these processes are viewed as niche, austere and appeal only to a narrow band of "ethical" consumers. Quality design would give them an extra business boost, turning waste streams into glamorous and sought-after mainstream furniture and clothing. What is needed is a pool of high-end designers prepared to see the opportunity and challenge the assumptions of their own industries.

Challenge the product paradigm

2.9 There is a still more effective way for businesses to deal with waste reduction: adopt a business model that produces less waste.

2.10 According to the sustainable design network, Sus|pro-net, "Companies should switch their focus to [offering] a mix of tangible products and intangible services, designed and combined to jointly fulfill a user's needs."²²

2.11 Businesses that sell products measure their success in turnover of units. A service model removes this dependency, but can be equally if not more successful. Electrolux has been piloting a project to test this thinking: instead of selling washing machines (product), they supply the machine free. Each wash is then paid for through the electricity bill. The problem is redefined as one of fulfilling a user need—clean clothes (service). Over the lifetime of the machine, this is likely to generate a higher turnover than just selling a machine. Since Electrolux retains ownership of the machine, they also have greater incentive to design it to be easily repaired and to last longer. In addition, the company is involved in the end-of-life of the machine and can remanufacture it or recycle its materials.²³ There is an added benefit in user behaviour change, since paying per wash will likely make customers wash less, with a consequent saving of water and washing powder.

¹⁸ www.walmartfacts.com/FactSheets/1292007_Sustainability.pdf

¹⁹ Colin Crooks, MD, Greenworks.

²⁰ Andrew Zolli, *Business 3.0*, Fast Company magazine, Issue 113, March 2007.

²¹ shoddy *adj* 1. poorly or carelessly made or done 2. made of inferior material 3. dishonest or disgraceful noun cloth made using a yarn composed of a mixture of old unraveled woolen cloth and new wool—*Encarta*®World English Dictionary.

²² *Sustainable Product—Service Systems*, www.suspronet.org, 2004

²³ United Nations Environment Programme, *Product—Service Systems and Sustainability—Opportunities for Sustainable Solutions*, updated 2005.

2.12 The United Nations Environment Programme believes a further advantage of service design is that it requires integrated working of stakeholders, the real key to unlocking environmental benefits.²⁴ Britain already has a very strong service industry and also has pioneering service designers, putting it in an excellent position to generate new sustainable service models.

Design in business

2.13 The sustainability agenda is triggering a revolutionary moment in business. As happened in the information revolution, new and more nimble businesses better suited to the fast-changing conditions of the market, will seize opportunities and could supplant larger, slower moving competitors. Existing businesses are going to have to think on their feet and design will be an invaluable tool to help them do so.

2.14 Waste is one of many sustainability issues, most of them interdependent, that companies now urgently need to address. Exploring the solutions will require a major shift in the way businesses are using design. They will need to involve design in strategic decision-making processes to ensure all the core functions of a business, not only those engaged with CSR, are working together to drive innovation. Design briefs, which often come from the marketing department, should be co-created by various teams including the designers themselves. CSR, likewise, can no longer be treated as a bolt-on. Integrating designers into the CSR process will help create new relationships with the supply chain.

2.15 Marks & Spencers leads this approach with “Plan A” in which everyone in the organisation is driving towards many seemingly impossible targets. This integrated approach will allow departments traditionally operating in silos to collaborate and share knowledge, and will surely lead to some innovative and surprising solutions. Designers can not only participate in, but help co-ordinate this type of approach by mapping how individuals and departments are interconnected.

What role do marketing strategies play in influencing more sustainable design?

2.16 Many companies are just jumping on the green bandwagon without a deep change in their behaviour and marketing is often seen as the means by which they are able to produce spin about their performance. But consumers have ready access to information and are more and more interested in finding it. False marketing can harm a company as fast as responsible marketing can build it.

2.17 Green communication group Better Thinking describe a history of consumption in which competitive advantage used to be based on product, then on brand. “The next step” says the company’s director Mike Betts “is that businesses will be valued on their behaviour and will have to provide transparency in order to maintain customer loyalty.” As in the Industrial and Information revolutions, “those companies that are able to shift to ecologically innovative capitalism and meet the needs of consumers will be reaping huge rewards.”²⁵

2.18 The real role of marketing strategies in influencing more sustainable design lies in the correct and well-placed dissemination of information to the consumer, increasing transparency and integrity of the company it represents.

3. EDUCATION

3.1 The structure of design education goes back to post-war Britain when designers with specific skill-sets were needed to create quality products that could be manufactured in the UK and contribute to economic recovery. Design is still taught within the constricts of this narrow and silo structure even though present day complexities require a broader understanding of the interdependent systems that govern our lifestyles.

3.2 For many years British design has enjoyed a world-class reputation for quality, and around the world design colleges are evolving to respond to new global circumstances. If we are to retain our leadership status in this field, British design education must urgently adapt to encompass the social and environmental imperatives as well the economic ones to which it has historically responded.

3.3 While in recent months sustainability awareness has clearly increased dramatically, there is still only a tiny proportion of college graduate work that demonstrates an interest in such matters. This indicates that while there is a mass of information available for designers wishing to work sustainably, universities are taking insufficient steps to ensure this agenda becomes fully embedded in the curriculum. With over 50,000 designers in higher education, this lack of awareness of their future professional responsibility is a grave omission.

²⁴ *Ibid.*

²⁵ *Op cit.* footnote 6, Andrew Zolli.

3.4 Education about sustainable materials and processes, particularly processes associated with waste, must be firmly established as a baseline for all design students. There are 185,500 designers currently practicing in the UK. Every decision they make is multiplied, thousands if not millions of times over, creating effects on a massive scale.

4. ROLE OF GOVERNMENT

Legislation and beyond

4.1 As we said in the business section, government legislation on waste is frequently seen as a burden on business. However, there are numerous areas in which a change in the law would hurt nobody and benefit everybody. For example, standardisation of the type of plastic used in packaging would facilitate much more efficient recycling. One might further ban the use of black plastic since it is very hard for MRF (material recycling facilities) machinery to identify this as plastic and thereby separate it out.

4.2 This kind of anomaly indicates a systemic problem in the current approach to waste: in numerous ways, it's not joined up. Recycling programmes are being rolled out around the country, but their activity is still being severely hobbled by unnecessary inefficiencies at the other end of the waste stream—such as that of plastic.

4.3 The lack of joined-up thinking creates problems at every level. The UK sends over 70 per cent of its waste to landfill, making it one of the worst offenders in Europe (the figure in the Netherlands is less than 10 per cent). This might indicate that there are important lessons to be learned from abroad. However, this assumption ignores the fact that numerous waste initiatives in the UK are successful. It's just that they are small-scale and local and there is little traffic in ideas between them. We are not yet even learning from our own successes—certainly not in a sufficiently structured way.

4.4 Former local councillor Stuart Singleton-White, talking about the problems of waste minimisation in Peterborough, indicates the current failings: “. . . the root of these problems lies in the disconnect between those local politicians and members of the community, coupled with very poor communications skills for both the politicians themselves and from the PR teams of the respective council: a clear lack of creativity here often results in exciting opportunities being lost and failing to excite: cases failing to be made and policies developed in isolation.”²⁶

4.5 Tower Hamlets Community Recycling Consortium recently achieved a huge success in introducing door-to-door recycling for residents of high-rise estates—something that has traditionally been a stumbling block. Involving locals from the start and making education a key pillar of the rollout, they hugely exceeded participation projections of 35 per cent. Actual take-up was 65 per cent—higher than ordinary kerbside collections.²⁷

4.6 For this kind of success to realise all its potential capital, central co-ordination is required. Local schemes, rather than being seen simply as the way things are done, should be seen as pilot operations. Where a scheme is shown to be a success, it should supplant less successful operations elsewhere.

4.7 This points to a clear role for government beyond legislation. Government needs to create a hub to facilitate the joining up of all the different things that are happening, organising information to make it as accessible as possible to people who want to make changes and facilitating conversations and collaborations between different stakeholders from the various sectors of society. This kind of mapping and facilitation is, to a large extent, the province of design.

5. CONCLUSION

5.1 The Sustainable Development Commission paper *I Will If You Will* describes a gridlock on sustainability issues between the three key sectors in society: government, business and ordinary people.²⁸ Each is wary of the other and each is reluctant to make a move without the assurance that the other will follow. Waste issues clearly hinge on all these groups in numerous ways and it is this complex system of relationships that a product-design focused approach to waste misses. To return to the example of the supermarket plastic bag, its network of relationships takes in government waste targets, consumer behaviour beyond the shopping trip (since the bags are reused), and the interests of a number of businesses. A creative design approach to the problem would co-ordinate the needs of all these groups to come up with a really effective and, perhaps

²⁶ Jonathan Porritt's blog <http://www.jonathonporritt.com/pages/>

²⁷ http://www.lcn.org.uk/media/press_releases/improve_recycling/

²⁸ Sustainable Development Commission, *I Will if You Will*, 2005 <http://www.sd-commission.org.uk/publications.php?id=367>

counter-intuitive solution. In the end, it might turn out that the solution lay somewhere utterly surprising, for instance, in a system integrating supermarket trolleys and public transport, eliminating the need for bags at all.

5.2 Design methods such as visualisation, prototyping and the staging of real-world scenarios provide quick and relatively cheap ways of approaching these kinds of problems. Results of these investigations are frequently unpredictable because they base themselves on the observation of people's behaviour rather than simply listening to what they say. There is frequently a disconnect between the two things. People say they do one thing when they actually do another. Participants in a Phillips design focus group uniformly stated a preference for a black and yellow radio. However, offered a complimentary radio upon leaving, everyone chose a plain black one. Getting to the bottom of people's behaviour and reacting to it appropriately is something a designer is exceptionally well equipped to do.

5.3 Waste is an overwhelmingly social problem and design's great strength in approaching it would be a focus on end users, whether from business, government, the general populace or all three. A user-centred approach engages all interest groups and encourages their active participation in the design process. For organisations of any sort whose primary objective is to engage communities, there can be few more effective methods of tackling the problem head on.

Further information

The Social Environmental Enterprise + Design is a not-for-profit alliance combining design with other disciplines to develop new solutions for more sustainable lifestyles.

There are three underlying purposes of the organisation:

- *New ways of working*—to investigate ways of using design with other disciplines to create new business opportunities through solving social and environmental challenges that resist conventional solutions.
- *Leadership*—to provide leadership to the design community by demonstrating the different ways in which they can use their skills to contribute to the improvement of the environment and society.
- *Education*—to embed these principles in designers through schools, universities and continuous professional development.

Through our actions we will help businesses harness the power of design to reach their own specific citizenship targets. Our aim is to foster new enterprises that are turning social and environmental problems into economic opportunities through design.

We are entering a new green economy, one in which design can play a vital role in co-ordinating the inter-dependent needs of society, public services and business and in doing so, identify real opportunities for business benefit. There are many non-design organisations that are tackling social or environmental issues, but they rarely consider design as an appropriate tool for innovative problem solving. Similarly, among design organisations, there are none to our knowledge that are thinking about sustainability in a way that goes beyond the realm of the product and its consequences. "Sustainability is surely as much about creating communities and jobs to enhance life as it is about reuse and recycling."²⁹

Social Environmental Enterprise + Design is ready to trial projects to push the boundaries of what design can achieve with regard to waste to create a suite of examples, tools and strategies that will co-ordinate the needs of business, government and people. In doing so, it will create new business opportunities and put British design at the forefront of the sustainability agenda.

We believe there is a need for an information hub to bring together all the disparate efforts and information in this field. Users of all types—designer, industry, local authorities or organisations—should be able to log in to a central portal and website and be redirected to the relevant information they need to support their sustainability requirements. This will go some way fulfilling a general need to map, measure and celebrate existing information and work through the collation of stories and strategies.

October 2007

²⁹ *Design Week Magazine*, Volume 22/Number 40, 4 October, 2007.

Examination of Witnesses

Witnesses: MRS LESLEY MORRIS, Head of Skills, Design Council, DR FRANK O'CONNOR, Director, Ecodesign Centre Wales, DR TRACY BHAMRA, Reader in Sustainable Design & Research Co-ordinator, Department of Design & Technology, Loughborough University, and MS CLARE BRASS, Founder, SEED Foundation, examined.

Q355 Chairman: Good morning. Thank you very much for coming. I wonder if we could, perhaps, start off with, Dr Bhamra, introducing yourself and then just working your way along the line, as it were.

Dr Bhamra: I am Tracy Bhamra, I am a Reader in Sustainable Design in the Department of Design and Technology at Loughborough University.

Ms Brass: I am Clare Brass, from the SEED Foundation—Social Environmental Enterprise and Design.

Mrs Morris: Hi, I am Lesley Morris, I am Head of Design Skills at the Design Council, which really means that I work with all of the education and skills development training through the education system and professional development.

Dr O'Connor: Chairman, I am Frank O'Connor, Director of Ecodesign Centre, Wales, a Welsh Assembly Government funded organisation based in Cardiff, Wales.

Q356 Chairman: Thank you. We would like to start this morning with the area of designers' education and attitude. To what extent do designers consider the "cradle to cradle" concept and waste reduction when developing new products? Do you often get the feeling that: "If only somebody had thought about this they would never have done it this way", when you are trying to get rid of something? Who would like to start on this one?

Dr Bhamra: It is probably true to say that there is a bit of an ad hoc approach, at the moment, to cradle to cradle. There are some examples of designers thinking about issues of, maybe, recycling or, maybe energy consumption, but I would not say it was a general approach that most designers adopt. There are examples of companies who, maybe, try and encourage their designers to do that, but they are few and far between. The same with design consultancy; there will be examples where people are thinking about it, but there is no structured approach to encourage all designers to consider cradle to cradle.

Ms Brass: Our consideration about cradle to cradle thinking is that it is very beautiful and a very healthy approach to design, but unless you have the infrastructure in place that can allow cradle to cradle thinking to actually become a reality it is very difficult for designers to impose cradle to cradle thinking, especially if they are locked into a client-designer relationship where the clients are unlikely to be asking for it.

Mrs Morris: Some evidence on that front is that we have just been doing some work looking at the skills that professional designers need, and it is very

interesting that when we asked them about particular issues and trends for the future, sustainability in any shape or form was just not one of their priorities. Most of them reflected that, in a sense, if their clients do not ask for that to be addressed then they do not provide it, because they are working, obviously, mostly, as consultants. Obviously, there are designers working in big businesses, and if those businesses are driving that agenda then they will be much more equipped and much more prepared to address the issues, but a lot of designers are working, as I say, as consultants, and there needs to be that whole shift in terms of what they are being asked to do, what they know about and what they can provide. That links back into the whole education system.

Dr O'Connor: We tend to focus purely on small businesses because up to 99 per cent of businesses in the UK are small businesses, and basically from a small business perspective it is very difficult to implement cradle to cradle. The infrastructure has been mentioned already; the key thing is you can design a product from a cradle to cradle perspective but if the end-of-life recovery, recyclability and collection facilities are not there then it is not necessarily going to have the impact one would like. At the moment, from an evidence point of view, we are working with a small business in Wales looking at how cradle to cradle could be feasible from a full life cycle perspective. So we will have evidence this year on that. The key thing here is that for small businesses, from a resource point of view and a cost point of view, it is not feasible at the moment to undertake a full cradle to cradle analysis, and a lot of small businesses would also not have the design capabilities.

Q357 Lord Howie of Troon: I am a civil and structural engineer and I am wondering, when we talk about designers, just who we are talking about. As an engineer, design means something to me very specific. On the other hand, there are designers who are essentially stylists, and somewhere in-between there are industrial designers who are engineers. Just who are we talking about when we use the word "design" in this context?

Dr O'Connor: I would say we are talking predominantly about industrial product designers in this context; designers who control the industrial aspects of a product development. So that would be designers doing graduate programmes in BA or BSc product or industrial design.

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Mrs Morris: When I was talking about designers I think it is a wider group, for sure. It would cover the sort of designers that I think the Design Council has a connection with, ranging right through from fashion and textile through to digital and communication as well as product industrial design and all of the three-dimensional areas of design. There is the need to have a very broad view of the types of designers that are contributing to all of the products and services that are made. Yes, of course, there are engineering designers, on one hand, and there are, as I say, branding and communication designers on the other hand. I think they all have a part to play in this debate.

Ms Brass: I would like to say that your question flags up a very important issue—a very critical issue—to do with design education, and that is that we are still considering and training our designers in silos. We are still training designers in very specific fields, and the complexity of the issues that we are required to address now means that designers should be exposed to other areas of design and, indeed, to other professional capacities while they are still studying. It is a critical issue.

Dr Bhamra: I agree that it is product and industrial design, mostly, but also engineering design. It is a wide discipline and designers need to start broadening their horizons in order to address these issues.

Lord Howie of Troon: It is a word which is very slightly used, especially in the press. That is not a question.

Q358 Lord Lewis of Newnham: In the text that we have, I was very interested to see that in point of fact you imply that designers are a speciality group, as it were, which are not necessarily the same as the manufacturers, and that there is interaction between those two. Very often these are relatively small groups of people who can, perhaps, influence in some way or other the manufacturing process. How far do manufacturers specify the type of design that they want, in making a request? It is very clear from what you are saying that the whole problem of this concept of cradle to cradle analysis is falling down because of the interface between these two groups of people. What can we do to rectify that, because, ideally, of course, this must be a major factor for any future policy?

Mrs Morris: One of the issues here is about how early in any research and development process, for whatever product is being developed, designers are involved. There are lots of cases now where it is becoming earlier but it is still often not at a very early stage. So there is a lot of work that is done, perhaps, by manufacturers and by the science and technologists, who are looking at what a product

might be, and the designer is only brought in at a fairly late stage to actually look at the interface, to create the actual end product. That is where, certainly, there is a missed opportunity in terms of bringing designers in at a much, much earlier stage to end up with the right use of materials, the right type of product and the right way to actually get those design ideas in at an earlier stage. We are doing some work at the moment with some universities, looking at how designers can really help, at a very early stage of research, in the application of the technology and the research; really, even thinking about: “What sort of product service should this be? Is it necessary? Is it going to fulfil a purpose and be what customers want”, as well as thinking about: “What should it do and what should it be made from?”

Dr O'Connor: The point you have raised is very important and it goes back, particularly, to business strategy. Design is not just an add-on process; it needs to be part of the overall business strategy for any organisation. What we are looking at, in terms of trying to inspire businesses to consider environmental and social issues in parallel with economic issues, is the overall brand and business strategy. That is the key to moving forward. If businesses can be inspired to do that (build into business strategy) and they can get results that demonstrate it is economically viable as well—it has got to be economically viable in terms of waste reduction and environmental issues—it should become part of their business activities on a day-to-day basis. That is crucial.

Q359 Chairman: Mrs Morris, you raised the question of materials. This is something on which we would be interested to hear the views of the panel. Can material producers influence manufacturers of products to use their materials in a sustainable way, or even substitute one material for another? What sort of awareness are you conscious of, of that sort of approach?

Mrs Morris: You are right, I think there is a real gap in knowledge here between designers and, perhaps, the scientists and technologists who are developing materials. That is part of the issue here. It links to what Clare was saying, I think, a little bit about education silos. It is very difficult for students to actually cross over different subject areas, different boundaries to work with different types of subject areas and professionals to find out about this sort of area. They might know about particular materials within their own programme, if they are product and industrial designers, but there is a whole load of development work, obviously, going on in other engineering faculties and in other science areas which they might not come across at all. There is a real opportunity here to try and find ways to break down

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some of that and connect students and tutors at that stage so that they have greater interaction and are aware of things that are happening. Then I think there is obviously an area within the profession that needs to be addressed, and a part of the Materials KTN at the moment, but there is a huge job to be done to get professional designers to be aware of resources like that that are available. We have to be quite clever about how we get that information and those messages out.

Ms Brass: I would like to add to that that there is also a great value in exposing students and professionals of other professions to design expertise. Designers can add a different approach rather than, for example, a scientist, and can complete a picture which a scientist may not necessarily have. It is as much to do with the people who are at the receiving end of that scientific development.

Dr Bhamra: Also, I think it is the confidence of the designer to use new materials. They will use the material that they think and know will work in the way they would want it to. Being introduced to new materials is fine, but they need the confidence to know it will perform in the way it should. Unfortunately, the way information is presented to them at the moment does not give them the confidence that, actually, it will perform in the way that they want, so they will probably be safe and stick with what they know.

Dr O'Connor: Can I add one point to that? It is important, obviously, to have a partnership approach, or a team approach, and people have to work to their strengths. That is why it has to be a life-cycle partnership approach. Designers have a role, as do manufacturers and suppliers and other stakeholders—but people have to work to their strengths. That is really important.

Q360 *Lord May of Oxford:* We have had quite a bit of written evidence that suggests that not much emphasis has been placed on sustainable design and waste reduction in the education of designers, which seems to me understandable because for many of the clients the emphasis is not on having things sustainable. I am reminded of the myth, perhaps, that after World War Two more emphasis was put on designing stockings that wore out quickly than on developing nylon in the first place—something made immortal in the Alec Guinness movie. My question is: how are these topics of sustainable design and waste reduction actually taught to young designers, at school and university, and how do you think it could be improved?

Dr Bhamra: With everything to do with sustainable design, again, it is quite an ad hoc process; it always seems to be down to individual members of staff with an enthusiasm and interest for the subject to

introduce it. So at A Level there are examples of students being taught issues of sustainable design. Practical Action run a scheme called the sustainable design award for A Level students to try and encourage them to think about sustainability, and that has been very successful. Unfortunately, the funding for this scheme has now finished so it is now down to individual members of staff within schools to introduce it, if they have an interest. At degree level there are examples of specialist degrees in sustainable design, but unfortunately they do not tend to be particularly popular with students (there are very small numbers on those courses), and there are examples of degree courses running modules on sustainable design and trying to integrate it throughout the design course. At Loughborough that is the approach we take.

Q361 *Lord May of Oxford:* Given what some—and I, for one—would perceive as a problem of certain client/designer tension, do you think it would be better to make more of an effort to integrate the concept of sustainable design into all aspects rather than have it as a specialist thing or a module that people can opt out of?

Ms Brass: Absolutely. Currently, design sustainability is still being treated as an add-on (it is an extra thing that you can study) but it should be an underlying necessity of every design student, so that every designer who is going to come out of college will be able to use what they know to reduce the environmental impact in their professional life. Currently, it is still being treated as an add-on, and it is not particularly popular with students.

Mrs Morris: There are two things there. One is what we were talking about, about integrating subjects, because I think that is one way of having something which is cross-curricular. If you have projects in the schools area, certainly, that cut right across different subject areas then it is much easier to address some of these things. There are some projects like that around. We have just done one called the Ecodesign Challenge, in a programme we did in the North East. It was for any subject area, and it did get groups of students together working in that way. However, there is very little that really goes on like that. The other issue is about what knowledge and understanding teachers and tutors have. I do think there is some work to be done to train the trainers, to be honest. Not everybody is up to a level of understanding or expertise, in terms of what really is this issue, how do you teach it, what is the best way of integrating it? There are pockets of brilliant examples, I am sure, all round the country in schools and universities, but it is not common place at all.

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Q362 Lord May of Oxford: Could we rephrase this by saying, to a certain extent, you are saying that the older generation, who are the transmitters of the cannon, come from a time when this was not part of the cannon?

Ms Brass: Absolutely.

Mrs Morris: That is true, and I think there is different understanding and perception, is there not, of the terminology? What is sustainable design? What is eco-design? We are still at a stage of trying to unpick some of that.

Dr O'Connor: Can I just give an example? In Wales we have taken the unique approach—it is the first of its kind internationally—where we have got all of the universities, in one region or country, who offer design education working together to integrate the principles of ecodesign, sustainable design and social design into mainstream design education. The four universities are working together to embed ecodesign so that all undergraduates in Wales over the next five to ten years will be literate in the principles. Some of our work in Wales, in terms of capacity-building, is focusing on training the trainer, eg in this case getting the skills across to the staff and ensuring that they have the right knowledge. Capacity-building is not just about human resources but it is about organisational development. This model is working in Wales—okay it is still at the demonstration phase—but it is something we can look at expanding because only a true working partnership can get maximum results.

Q363 Lord Bhattacharyya: Design is a very wide subject, so there is no point in having a database for all aspects from fashion design to complex electronic design. I know, for example, in mechanical design I have British Standards and I have ISO standards, and all these databases are available—and, similarly, with electronics. Do you think databases such as those, from the point of view of environmental sustainability and being eco-friendly, would be useful for designers?

Dr O'Connor: It would be useful for designers. Going back, if you look at the population in terms of businesses in the UK, a lot of these are small companies, and design agencies are small agencies as well (I am talking about outside London now, on a regional basis). So there are a lot of databases out there and lots of useful tools and techniques, but what we have found from our work is that small businesses do not find those appropriate for their needs. There is no “one size fits all”; it is about trying to tailor these databases and these tools and techniques to the needs of individual companies, which is actually a massive, huge challenge. At the moment, we are working with four small businesses in Wales, in a demonstration phase, to see what tools

and techniques could be applied to a range of sectors—food and drink, manufacturing, electronics and low carbon. There are databases there; they are not comprehensive, and, going back to cradle to cradle, there are companies out there offering cradle to cradle support and expertise in getting material information to the suppliers, but it is either very costly or it is not comprehensive enough, or not appropriate for the main target audiences, and these are key things to consider. One of our current programmes is trying to understand what is appropriate for a small business. Going back to what I said earlier on, you have got to inspire the business, you have to have management buy-in and it has to be part of the business strategy. Then you can seriously start engaging with these issues.

Q364 Lord Bhattacharyya: Does that mean that bigger companies do a better job in this area?

Dr O'Connor: They have got more resources and have more capacity. They do not necessarily all do a better job but they may have resources on board where they can assign the cost of a team—personnel, etc—to it. I guess a lot of the larger companies, such as the Philips', the Panasonics and the Sonys of this world, would be doing quite a good job in terms of developing flagship, eco-led products. For small businesses it can be much more difficult for them to be competitive. Again, there is no one definitive answer to that, but generally small businesses would find it more difficult to go down this route, unless they have support, eg government funded business support. On that point, what we have tried to do is get large companies to support small companies on the journey to transfer the knowledge across—we call it commercial support partnerships. For example, Panasonic (Cardiff) are working with us to transfer their knowledge and expertise to a small business in Wales in the electronic sector. Again, it has to be a two-way relationship for it to last over time but there is a lot of information that can be gleaned from large companies, and somehow we need to filter that down to small businesses so we can remain competitive in a global environment.

Q365 Lord Bhattacharyya: Coming back to Lord May's question, supposing now you want to teach design at an undergraduate level. As design is a very wide subject, from fashion design to industrial, how would you actually develop a curriculum for that to be taught? If I am a mechanical engineer I will learn design from the point of view of function and cost. Similarly, people who work in electronics. The whole area of sustainability only comes in, or eco-friendly, if there is a hazard. The other thing is, when it comes to recycling, there is also a very big problem regarding the cost of recycling, et cetera, so very few

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designers pay attention to that. How would you actually create a culture among designers for that to be progressed through when they start working?

Dr Bhamra: One of the best ways of doing it is introducing it as part of good design from the start, for all their design projects; it is encouraging them to see that design is not going to work unless you consider this along with cost and quality—the kind of things they would be doing anyway. That is what we are trying to introduce with our undergraduates through all their project work from the first year; that this is something that is not an optional extra—it is not a thing you add on at the end—you actually think about it from the outset. Then they can use their creativity to come up with interesting solutions which are not just the same design made from recycled material, which is not going to address the whole issue of sustainability. That is what we are trying to encourage, so that it is something they learn from the outset. At the moment it is still going to be taught in, as Clare said, silos, in the industrial design and product design courses, and maybe people will do it in fashion as well, so there is not the overlap between them, but it is being introduced in that way.

Ms Brass: I would like to clarify that it is true that design is a very broad issue and covers lots of different subjects, but design is a strategic subject and it boils down to a very simple set of processes which can be applied across all design fields. So if we add sustainability to the mix of that strategic process then you can really apply it across any form of design and across any kind of course, even if the subject of each course might be completely different.

Q366 Lord Howie of Troon: Does sustainable design actually need somebody called “a designer” and trained as such? Could not an engineer design a bridge sustainably or a motorcar, or even an architect design a building sustainably?

Ms Brass: I would say everyone who is in some way involved in the creative and engineering or designing professions has a responsibility. We are not saying at all that design is responsible for saving the world and can do it single-handedly—everyone has to add their expertise.

Lord Howie of Troon: I have heard that line.

Q367 Lord Crickhowell: Mrs Morris talked about small initiatives here and there, and good initiatives and a need to try and get the act together. Then Dr O'Connor made a pretty bold statement about what his organisation is doing in Wales. I always like, as a former Secretary of State, to think that Wales is leading the way. Your mission statement is even bolder, if I may say so. “EDC actively inspires and leads the Welsh Assembly Government, public sector organisations and higher education to enable

effective ecodesign in Welsh industry. We facilitate the open sharing of knowledge and experience with fresh thinking and integrity.” I know something about the universities in Wales—I was President of Cardiff which has now got over 20,000 members. My experience of the universities is that it is not always easy to get them all to work together—even the organisations within the universities. What does your organisation actually consist of at the moment? You were only set up in 2006. How far have you got? I see you are all employees of the University of Wales Institute at Cardiff. I am not trying to belittle what you are attempting to do—it sounds rather good—but I am trying to see if there are lessons for England, and how far you have gone. Are there lessons that we can learn wider than you have gone so far? Can you tell us a little more about your organisation and how you are setting about this?

Dr O'Connor: Okay. We are quite a new organisation, as you have just said. The key thing, if I focus initially on the education side, as we have been discussing education quite a lot, is there are only four universities, at the moment, in Wales which offer education from a product and industrial design perspective. We have been building relationships with them over a period of 13 years, so although the organisation was only set up in 2006 I and some of my colleagues have been working on building relationships for much longer. It is all about building meaningful relationships and trust. You are right; it is very, very difficult to get universities to work together. That is why, I think, we are quite pleased to have the four universities sitting round a table, working together and sharing their knowledge and experience in moving this agenda forward. The vision we have set out in the mission is quite ambitious, and we are looking at 10 to 15 years down the line before we can actually see the fruits of some of our activities, but in terms of education there are lots of lessons we can learn—if you work together. What I would like to do is invite anyone here today around the table, if you have an opportunity, to come and visit us and look at what we are doing. I really feel strongly there are a lot of lessons to be learned, so we would obviously invite you openly to do that. Getting the universities to work together is a massive challenge; we have taken the first steps, we are already 12 months into capacity-building and we are working with the staff in terms of developing their resources, etc. We are working as a shared resource, which is the four universities, so a wide-based resource. We are feeding the lessons learnt from the educators and the other activities of the centre back to the universities.

Q368 Lord Crickhowell: Are the universities inputting something? It is not just the Assembly financing a small unit; this is something in which there is an input of people.

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Dr O'Connor: It is not about us, to be honest. Yes we are putting the platforms together and we have expertise within the team. The way we see it, the key people to move this forward are not us but the universities themselves—it is the staff and the students. Where our priority lies is in putting platforms together to get people to openly share their knowledge and experience. If you openly share knowledge and experience you can move forward really quickly. The key thing is building trust. Trust is not just about integrity and intent, it is about getting results. As we get results over time, which we have, the trust moves up. Although we are part of the University of Wales Institute, Cardiff, we have moved to a separate location, with a separate identity, to allow the universities to feel more comfortable to work together. That has been a hugely positive step forward. We are now into the next phase of training. So there are lessons to be learned there. This is a demonstration phase for the first two years, so initially we are trying to show things on a small scale. If it works on a small scale we would like to look at how that can be mainstreamed. With businesses, again, we are not, unfortunately, tackling all the industrial situations in Wales, we are working with four companies and these companies have been selected by us, following a competitive process, including working with Cardiff University, to identify businesses with design capacity and growth potential. That is not just about waste reduction, it is not just about quantifiable issues; it is also qualitative, it is about investment in staff, in innovation and in training and development. We are trying to put a platform in place to move forward. So there are lessons and, as I said, I would love people, if they have the time, to obviously come and see some of the work.

Q369 Earl of Selborne: I would like to go back to sustainable design. You told us that it remains, alas, at the moment, something of an add-on and not embedded within mainstream design, and you have set out some of the initiatives which are in-hand to improve skills amongst designers in this respect. I wondered to what extent there would be opportunities to increase incentives within companies. For example, in Japan, we have been told, legislation has been introduced which requires certain industries to “design for the environment”, and that involves altering designs and production processes to minimise the impact on the environment. Does this have any application in the United Kingdom? Is there an opportunity to force progress within companies by legislation?

Dr Bhamra: Obviously, there is legislation coming in; the EUP Directive will encourage people to think about that from an electronic products point of view,

and therefore that will encourage companies to ask their designers to think about these issues. It is difficult to give a definite answer because we have got the WEEE Directive, which you would hope would mean you see lots of changes in the design of electronic products for recycling, and I suspect that is not happening, having looked at some recently. So people are finding ways to meet the legislation without doing anything radical in terms of changing the design of the product. Legislation means that companies, at least, think about the subject of sustainability; so that could be one way forward, as long as it is looked at as a comprehensive approach to changing and improving design rather than just doing the minimum to meet the legislation.

Q370 Earl of Selborne: Have you looked at the End-of-Life-Vehicles Directive? Does that have any possibility of delivering something?

Dr Bhamra: The interesting thing is that most cars meet the End-of-Life Vehicles Directive without very much change to their design, and because the recycling of a vehicle is often done through a shredding process and separation, the technology developments have come in the separation of the waste to try and get high yields in recycling rather than huge changes in design of the product. That is always a fear: that people will try and meet the legislation by introducing a bit of technology at the end of the product's life to extract the material rather than thinking about: “Let's go back to the starting point and change the design to make it better at the start”. Unfortunately, I think it is the way that companies will cost things. They do not cost the whole life of the product when they design it; they design to the manufacturing cost and then worry about the end-of-life costs if there is some legislation there. So it is not looked at comprehensively at the start of the design process.

Q371 Earl of Selborne: Can you give us any example, then, of either national or European Directives which have, indeed, promoted sustainable development?

Dr Bhamra: My hope is that the EUP Directive will do that because it has a comprehensive list of areas that companies need to consider when designing. We are not exactly clear how it is going to manifest itself, but in theory this should work, because they are covering not just end-of-life issues but energy consumption at the use stage of the product, which is something that has often been missed out of legislation.

Q372 Earl of Selborne: Are you aware of whether the Japanese legislation has been more effective than the EU legislation in this respect?

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Dr Bhamra: I could not comment specifically on that. Looking at the products coming from Japan I am not seeing any huge differences to the kind of products that are being sold here. Therefore, I would suspect, maybe not to the degree we would want.

Q373 Lord Lewis of Newnham: If I can turn to this particular problem over legislation, after all the WEEE Directive had within it an IPR feature which has been virtually dropped. If this had been implemented would this have been a feature that would have concentrated the mind of the industry, which would then have come back at the designer, using the analogy that you have already given us, as to the way these things progress? There is, of course, the Packaging Directive, which has been in operation now for quite a number of years, but I am alarmed whenever I see the Packaging Directive; it does not seem to have influenced the volume of packaging to any large extent. That may reflect the ease with which you can actually deal with packaging as a recovery process, but I would have hoped that it would also have influenced the amount of materials that were actually involved in it; we are still getting large boxes with small containers in the middle of them, and things of this nature. What is your view on IPR and things of this particular nature? Is this going to be a way that we can actually influence sustainability?

Mrs Morris: I think you have put your finger on it; it has absolutely got to be business driven. This has got to be something that if there is a niche to be developed, if there is profit to be made, if there is a focus, obviously, for whatever type of business it is, to actually make a successful business out of addressing these issues, legislation would then have to obviously work with that and follow, but if that happens then I think there is far more chance that any of the design work that goes on within that business is going to be directed in that way. If it is legislation it has to be business-focused, business-orientated, and allow that then to drive the design brief, the design requirements; everything to do with it, whether it is packaging or any other aspect of design across the business.

Dr O'Connor: On the legislation side, although the WEEE Directive, maybe, has not achieved what people like us would have liked it to achieve, in the short term, I would still argue it has raised awareness of issues, and that is a positive step forward. There is a new piece of legislation called the REACH (Chemicals) Directive, and it is quite a complicated piece of legislation. Again, I think there are some interesting possibilities with that, going back to the cradle to cradle discussion earlier on; they can, maybe, force suppliers to look in more detail at the materials. Yes, the Packaging Directive has been frustrating—I am the same as you, it is frustrating

when you go into a shop and there is still all this packaging. Legislation is only part of the overall jigsaw; businesses have to be inspired to go down this route, and legislation can be seen to be a reason, perhaps: “We have to comply for the sake of compliance”, whereas what we need is for businesses to look at opportunities to innovate.

Q374 Lord Bhattacharyya: One of the great difficulties in relation to legislation is when you said that it has just got to satisfy business; you would never have legislation, then, that any business would follow, because compliance only works where a business has problems of liability. The reason why, for example, the whole business of emissions started, in California, was because there were huge liability aspects. Businesses will never do anything unless there is a cost attached to it; if they do not follow it they are going to be in trouble. Most legislation in this area, that I have seen, is not of that nature; so it is based on the goodwill of the designer and the business. You have to find ways, and how do you find ways, so that the legislation is tight enough for them to follow, and if not there is a huge liability?

Ms Brass: We have quite a lot of legislation in place, and I agree that legislation is the stick part of the equation and we need a few more carrots for business. The market is changing and we are entering into a new, greener economy and sustainability is a market opportunity, and designers can help businesses exploit the future of the market and understand new future scenarios and help businesses move into this new market and be prepared for it.

Q375 Lord Bhattacharyya: Do you think the Government could do anything about it by forcing, when it comes to public supply and public demand, for this to be a part of the specification of the product?

Ms Brass: Yes.

Mrs Morris: Yes, there is undoubtedly a public awareness campaign, if you like, that has to be part of this. If you look at the whole supply chain, obviously, consumers and customers, who are the public, will be driving businesses and, therefore, the designers. So there is definitely something that could be done on that side. I think it is shifting. As Clare said, there is a change in attitude and interest in this whole area, but it has a heck of a way to go yet.

Q376 Lord Howie of Troon: There seems to be some disagreement about the potential for small and medium enterprises to adopt sustainable design approaches. Some people tell us that SMEs are able to change quickly, and others, especially the SEED Foundation, say that they can only react to the demands of the client, legislation and the increasing

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cost of energy and waste management. I wonder if you could clarify my mind on this area of disagreement. Which is the more appropriate view?

Mrs Morris: I think it depends on what we mean by SMEs. The question, as I read it here and I think Clare was talking about it, is that SMEs are design businesses which are providing that service. Obviously, then, there is a huge, massive number of SMEs who are the clients, if you like, the businesses that, potentially, are using design and sometimes not using design. Where we are talking about a whole range of different types of industry-sector SMEs, there often is scope for them to move very swiftly and be very innovative. If you are talking about the design businesses, it is back to the discussion we have just been having about how much can they lead as opposed to providing a service that is driven by the SMEs that they are working for. There are two sides.

Ms Brass: I would also like to clarify what we wrote in our paper, which is that it is true that SMEs are able to sometimes move very quickly and have more flexibility, but what we are talking about here is the need to drive change. My point in the paper is that we cannot expect SMEs to be driving that change. It is very important that SMEs are encouraged to change but their approach is going to be one of compliance and, possibly, they will be able to innovate some changes in their own businesses. Big businesses have a much wider reach because they can also broach different kinds of communities, whereas SMEs are very isolated in their activities. It is a little bit like expecting the leaves of the trees to do everything: the leaves are very important; the leaves are the life support system of a tree but unless you have the tree in place then the leaves are very ineffective.

Q377 Lord Howie of Troon: The roots matter too!

Ms Brass: The roots matter too. If you focus on the SMEs you are just focusing on the leaves. The SMEs are important but they are part of an equation and we need to develop the other side of the equation as well.

Q378 Lord Howie of Troon: I can quite see the possibilities for innovation and things of that nature where the SME is a design consultant. That is a quite separate thing from the SME as the user of design processes amongst others. You mentioned the fact that big organisations are better placed. How do you think innovations and improvements which big businesses make can be transferred into the smaller ones?

Ms Brass: Through the supply chains, as a very direct example. SMEs will react to their clients' demands, and if their clients are demanding different rules in the procurement then the SMEs will react to that and they will find ways of achieving those standards. It is

big businesses sending out those messages that is really important.

Dr Bhamra: Also, big businesses can be involved in the training and education process of designers, if they are doing them successfully. There are good case studies out there. Designers need inspiration to see that, actually, their job is not worthless; they can do this and make a difference. If they can share their findings with the smaller businesses then that is useful.

Q379 Lord Bhattacharyya: SMEs are much more able to innovate because they have not got the hang-ups of a big company. If you look at the majority of the products that have come into the market, innovative products have come out of SMEs. Let me give an example: Dyson. Now it is a big company but when it started it was a small and medium sized company that engineered and produced a product which was eco-friendly from the point of view of the environment. It is a very successful organisation. There are numerous products like that.

Dr Bhamra: I agree that SMEs are a good place to innovate, but they do not have the skills and expertise in sustainability. There are a few examples where SMEs have done this but that will be down to an individual who is committed and wants to do this. On a general day-to-day basis, they are often short of staff and do not have the designers with specialist knowledge, so they may have a designer who is also doing other roles. Getting that into the SME and giving them the skills in order to make these changes in sustainable design is the challenge. Yes, I think they can do it but it is down to resources.

Dr O'Connor: I slightly disagree in a way because I think—okay, they are not all the same—there are a lot of innovative SMEs out there. If you take a particular sector, for example, like food and drink (I go back to Wales, which is where I know best) there are loads of small businesses in Wales innovating in terms of packaging and in terms of new products in the food and drink sector. Likewise in fashion and textiles, micro-sized companies like Howies leading the way. That is not a large company. The key thing is it depends on the culture of the company, location and the sector in which they operate. I think I would have to agree that if you have management buy-in, if the leader of that company has strong leadership then you can make a massive difference, but you cannot generalise by grouping SMEs into “innovative” and “not innovative”; I think there are lots of SMEs that can be innovative. If you go back to what we said earlier on, eco-design, or sustainable design, is actually good design and good business practice. This is interesting. I would say there are loads of examples of small businesses just in Wales alone who are very, very innovative and who adapt to change, and who

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do adopt good design practices and good business practice.

Lord Bhattacharyya: There are examples in the food sector. I know that in the food sector some of the innovative products that they have developed are mainly from very small companies. The shelves of all the supermarkets are full of products which are done by SMEs; they are not all big companies.

Q380 Lord Methuen: What role does the Design Council, along with the Chartered Society of Designers, the Royal Society for the Encouragement of Arts Manufactures and Commerce and the Institute of Engineering Designers, play in overseeing and regulating the work of designers?

Mrs Morris: It is an interesting question because, as I am sure most of you know, the Design Council has been around for about 60 years now but until, obviously, the recent shift in departments we were funded by the DTI, now by DIUS, and our role has been principally to work with businesses. So it has been principally about driving up the demand for design; raising awareness, understanding and really helping businesses to understand where design fits into their success and their growth. There has been a sort of education aspect to that, obviously, but I think there is a ramping-up, if you like, of the need to work with the supply side of design as well as demand. Otherwise we will have a mismatch. Interestingly, I think, sustainable design is one of those areas where, in some cases, businesses are demanding more than designers can supply, because they have not got that knowledge. I think the Design Council has started to step into that area a little bit more and say that we do need to work with the profession—with designers and with design education. We have teamed up with the Sector Skills Council to look at what the skills development needs are, and we have produced a plan for that. Interestingly, probably, at the moment, that role is not fully recognised or supported by government, in fact, because, as I say, we are mainly driving up the demand side. So I do think there is an increasing role for the Design Council to play in this to promote certain areas of skills development, promote professional development, to make sure that we have a supply side that stays in a world-leading position, which it has had in the past, and make sure that it can provide enough designers to work with businesses in the most effective way.

Q381 Chairman: In the course of design education we do not hear very much about designers as entrepreneurs. If one could take the analogy of, let us say, an advertising agency where a business goes and gets a particular service from a particular body or company, you talk about design consultants but

they seem to be shrinking violets. There may be people who work in well-lit studios at the back of beyond, but nobody seems to know very much about them as businesses. There is not an equivalent of, let us say, Saatchi, in the design business that is a household name, yet in many respects they fulfil a business function which is just as important. Do you people just want to train designers or do you want the trained designers who are actually business people as well?

Mrs Morris: Absolutely. One of the skills gaps that has very clearly been identified is designers' ability to really understand businesses, really speak their clients' languages, really work at that level of effective professional practice, where, as I say, business skills are part of it. I think that is being addressed; it is something that has been recognised, but there are still issues around the entrepreneurial side; if you grow a business how do you maintain that growth? How do you really make sure that you have leadership skills within the profession? How do you do succession planning? Those sorts of areas are things that small design businesses are not very good at, at the moment. The other side of this, I think, is that it is a huge culture change, going right back to school, in terms of it is still the case, in some areas, that you do Art & Design if you are not academic enough to do other subjects. There is still a bit of a preconception that (I think our engineers and architects are different to that) if you go into design consultancy then you are seen to be a little bit arty and a little bit "fluffy". This is something we have to address at school level, right the way through. We have to make a real effort, I think, to shift that understanding and perception and to acknowledge the role that designers have right across the board; to make sure that the profession, if you like, is supported as a career profession, right the way through, so that there is information available. We have to address this skills development issue.

Q382 Lord May of Oxford: You can draw some comfort in the fact that there is a fascinating study out of York University of what are the subjects, carefully controlled by the body of exams, at A Levels that are easiest to get good marks in and hardest. Quite significantly, the ones that are hardest are sciences and languages, and the ones that are easiest are anything like design and art. They are real subjects, all of them, but with the distinction of whether there are right answers and wrong answers, and that provides a powerful incentive for kids to move to the softer options, so that they get better grades for university. You can derive some comfort from that, for the wrong reason.

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Mrs Morris: Absolutely.

Q383 Lord Lewis of Newnham: Perhaps I would not use the term “softer option” but that is another discussion. Could I just say, one significant difference between the two choices you make for comparison—engineering and architecture—is that both of these have a very strong outside organisation—in engineering you have the institutes; in architecture you have the RIBA—who can actually tell a university what it will and will not teach. You do not have that position.

Mrs Morris: No, and interestingly this is a debate we have been having very recently with the Sector Skills Council about should there be a licence to practise for designers? Should there be regulations and those sorts of similar situations, as you say, to some of the other professions? The truth, at the moment, when we have done all the research and consultation that we have just gone through, is that the industry (as you know, the Sector Skills Council are very much listening to industry in order to think about what development there should be) and designers are very clearly saying they do not want that; they do not want to be over-regulated and they certainly do not want a licence to practise. You may well argue that there comes a point at which things may shift; they may need to shift, but right at the moment, now, what we are doing is working with the sector itself to actually develop some of the issues, to think about the skills, to think about professional practice and definitely support, if you like, the ramping-up of that. It may well lead, in future, towards something that is more regulated.

Q384 Lord Bhattacharyya: Following on from Lord May, it comes to a definition of what you mean by “designers”. The majority of designs that you see today are done by engineers, scientists and architects, or whatever you may call them. So the design that you are talking about is, basically, industrial design. The whole aspect of design is a sub-subject of engineering or any of the other professions, which are highly regulated because of liability, whereas in your case you are talking about design in a very loose sense. I think, therefore, it is very difficult to do any regulation when it comes to design in your area, because you are very loose.

Mrs Morris: It is, you are absolutely right, but it is a huge sector and it is growing. It does cover, obviously, as you said, product and industrial, but right the way through to digital, media, games, communications in all its aspects, interface, design, and now, increasingly, things like service design. You may well be right that because of that huge diversity alone it may be that it is impossible to regulate, and at the moment nobody is attempting to do that; what

we are trying to do is say: “This is a very important business resource, it is underused, it is a profession that is world-renowned in this country”, and what we have to do is make sure that we have professional designers who are operating at the best of that ability. Sustainability, along with some of these other issues around business understanding, knowledge, entrepreneurship and so on, just need to be paid attention to, to make sure that we have those designers who are doing that.

Q385 Lord Howie of Troon: I am under the impression that the RSA have some kind of award for industrial design. I seem to remember that Ted Happold won it a few years ago. What is it called?

Mrs Morris: They have an award called the Royal Designer for Industry—RDIs.

Q386 Lord Howie of Troon: That is it. That must be quite helpful.

Mrs Morris: Yes, it is, absolutely. That is a group of very well-respected, very experienced designers.

Q387 Lord Howie of Troon: They are quite widespread.

Mrs Morris: Absolutely, yes.

Ms Brass: May I go back, for one moment, to the question of entrepreneurial skills of designers? We believe that it is very important that designers are trained more deliberately in entrepreneurial skills. Design is a subject which is about solving problems, and it is about people. We believe that part of the problem that we have today is just because designers are locked into a system with their clients where they have very little power. We think that training designers to have more entrepreneurial skills would enable them to break out of the private sector and work with the third sector and the public sector, and apply their problem-solving skills to solving social and environmental problems. That is dependent on them being more versed in business skills and entrepreneurial skills.

Q388 Lord Lewis of Newnham: Could I ask a question which really touches on your article, Ms Brass, about the position over providing services rather than selling products. I think you are suggesting, for instance, that now it is becoming a feature that you can lease out, instead of selling, the actual product. I think you used two examples that immediately come to mind: one was the Electrolux situation, and the other one the position of a motorcar. I think these are two factors you discuss in your actual text. How successful are these? In a sense, this is like an IPR being actually brought directly on to the scene, is it not? How far are these actually being successful? The motorcar situation, of

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course, is rather complex; there have always been hire cars but this is a slightly different variant on this, if I understand it correctly.

Ms Brass: It is a variant, and I believe that the Ford project is still in the early stages of development. The Electrolux project was a pilot programme which has now finished, and we spoke to Electrolux yesterday to find out where they are intending to take this project. Currently, they were not able to tell us whether this was going to become a marketable opportunity. There are other cases of service design which have been very successful. I would like to mention, for example, Streetcar. There are two things that design does, and one is identifying what is the real problem. So the problem, in terms of transport, is getting people from one place to another in a convenient and comfortable way. Streetcar is a service which allows people in cities to find a car close by which they can get into, drive to where they are going and leave it in the street. It is a fast-growing, very successful business. It has been helped by the creation of a very successful service; through making it very pleasant and easy to use it has got a fantastic interface, which has been designed by a group of service designers. That interface issue, and how you make that service available, how you make your customers aware of that service and you make it a great service to use, is what will make the difference between it being a success and a failure. There are examples of this beginning to work. There are very few still, but there are starting to be examples of where you do not necessarily need a product.

Q389 Lord Lewis of Newnham: Are there any fiscal instruments that you would suggest, or would act to encourage, to businesses at this particular time?

Ms Brass: I am afraid, having been trained as a designer, I am not very well versed in the fiscal aspects, so I would not know. Is there anyone that does know?

Dr O'Connor: There are examples of lots of companies who have been looking at leasehold products for a number of years—Xerox is an example, in photocopiers. That has been a very successful business model. In fact, a lot of companies in that sector have then managed to bring the products back, refurbish them and resell them at the same sale price as the original product price. That is an excellent business model. You have companies like Interface, floor tiles, exploring this route as a business model. At the moment we are looking at one small company in Wales trying to understand how they can do it with office furniture—the company is called “Orangebox”—and trying to understand how they can take office furniture back again. There are a lot of complicated

issues. One of the key things, again—and this goes back to the business model—if you bring the product back, eg you lease 500 products, you need to do something with the resource. There needs to be a recycling and recovery infrastructure. There are quite a lot of issues that need to be addressed to make this a successful business model.

Q390 Lord Lewis of Newnham: We had before us, last week, people who were concerned with the recycling of commodities of this particular sort, and they pointed out to us that some of these things they cannot recycle because it is against the law. In fact, they have been classified as waste and once they have been classified as waste they are no longer eligible to go through the recycling process. This seems to me to be counter to what we were suggesting here, but there must be other examples.

Dr O'Connor: There are lots of examples. It goes back to design: if you can design a product in such a way, from the initial design stage, to be suitable for taking back and for recycling, refurbishing, et cetera,—chose the right materials and the right process, etc.—then it is very, very feasible. What I am saying is the design side is not the challenge, in many ways; it is the overall infrastructure stuff which is the challenge—making sure that the public/private sector/social sector all work in partnership to ensure it happens. If you have individual customers buying one product each, and if they are spread all over the UK, it is quite complicated, but if you have a business-to-business model, where you are selling 500,000 products at a time, it is a bit more feasible. It does require a change of culture within the organisation. You can build up a relationship with your clients and you can, obviously, increase your resource efficiency. There are massive benefits for doing it, but you have to demonstrate examples of where it can happen. We have an example, at the moment, where we are trying to understand a very small business—can it operate with the social sector, with the private sector and with the public sector?

Lord May of Oxford: A quick comment: one of the other things we heard the other day, in that context, was from the IT people, that they cannot offer a service whereby you bring back the cartridge because that would be anti-competitive, but from what you are saying and what I hear, it would be possible for them to offer a service whereby you leased the service of cartridge supply with your Hewlett Packard things, and maybe we should return to that. It would not work very well for the home market but for businesses it may be a way of getting round this EU regulation (which if I were Hewlett Packard I would ignore anyhow).

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Q391 Lord Lewis of Newnham: If I can just point out, there is now, in the WEEE regulation situation, a new phenomena arising, as far as I am concerned, and that simply is that there is a recycling process which is opening, I believe, in Gloucestershire, in which they actually differentiate between what they consider to be commercial and what they consider to be domestic. They are rather interested more in the commercial side because in the commercial side they can guarantee quantity and they can guarantee a unique type of quality, whereas on the domestic side it is a mixed bag of things. So the whole concept of recycling between the two is a very different approach.

Dr O'Connor: It is.

Mrs Morris: I think this whole area of service is quite interesting as well. There was a project that was part of the DOTT¹ scheme that we ran in the North-East where designers were working with a local community, and in this particular project with one street, very low cost houses which needed insulating. They worked with the local energy provider and they devised a scheme whereby the energy provider put in insulation and then the reduction in the bills basically paid for it. That is a scheme that is just a service that that particular business decided as an energy provider to provide, and it was a win-win situation. Customers did not pay any more, but they got their houses insulated, their energy consumption was less and over a period of time they would then pay less.

Lord Bhattacharyya: It also depends on how long a product lasts. You get reconditioned engines and reconditioned starters. There are many aircraft that have reconditioned engines, et cetera. It also depends on the cost of buying the new one and at the same time the sustainability of that particular design, how long it lasts. Consumer products do not last very long, they change very quickly.

Q392 Lord Crickhowell: The Ecodesign Centre Wales has told us that the "Government needs to build on international co-operation to drive resource efficiency through global supply chains. Aspects of this issue in particular should be addressed through the Marrakech Process." However, the Environment Agency did not seem to be very familiar with this process and said that it certainly was not top of their agenda. What should the Government do to exert pressure on global supply chains and encourage sustainable design internationally?

Dr O'Connor: If they are serious about tackling climate change and sustainable consumption reduction we have to do something on a national perspective. We should also look at how we can raise capacity and the recycling infrastructure in countries

where we are exporting electronic waste to. Defra is the leading task force on sustainable products so obviously there is activity within the UK on that in terms of the international stage. We do not live in isolation in the UK. The key thing is it is an international global market and we have to understand more and more how we can work in partnership. There are a lot of good things happening in the UK through organisations such as Defra, but we have a long way to go. We are keen to understand how we can do that, and provide any necessary support.

Dr Bhamra: As the UK is leading the Marrakech Process Sustainable Products Task Force it should use that opportunity to really show and demonstrate how sustainable products can change the market, how by using design you can make things differently. They can push that through encouraging the other countries who are involved in this to look at improving sustainable consumption and production internationally, but obviously it needs some investment in research, development and the training of designers in order to do that. It is not going to happen without that.

Q393 Chairman: There was one small point that we did not cover and that was the question of labelling, the creation of a standardised "waste label" or an "environmental label". We know that the Forestry Stewardship Council puts its symbol on certain furniture products and the like. How significant do you think labelling could be in raising awareness and perhaps even banging the drum for intelligent design?

Dr O'Connor: It needs to be international labelling because at the moment there are lots and lots of labels out there to do with eco products, sustainable products, packaging, et cetera, all over the world and it is quite confusing from the consumer perspective. Even though I have got a passion for and knowledge of the subject I still would be quite confused between all the labels. So I think labelling could have a role but somehow it needs to be internationalised.

Q394 Chairman: Should the best be the enemy of the good? We do live in the United Kingdom, we are part of the EU, but it could kick off in Britain, surely. If we keep saying we will wait until we get some intergalactic standard it could take a long time.

Mrs Morris: We were talking earlier about a public awareness aspect to this, some sort of campaign. I think the opportunity is to link it to good design.

Ms Brass: Labelling is about giving consumers information, but I think there are other ways of giving consumers information. It is about companies having to be transparent about the products and the origin of their products and how their products are made and where they are going to be going. We could

¹ Designs of the Time <http://www.dott07.com/go/lowcarblane>

5 February 2008

Mrs Lesley Morris, Dr Frank O'Connor, Dr Tracy Bhamra
and Ms Clare Brass

go well beyond a simple labeling scheme. I think we live in a world of labels and information and it can be very, very confusing. So I think we need to look at other ways of providing transparent information to consumers about products and companies. I think that is also a very important potentially legislative issue.

Dr Bhamra: Labels are a good way forward but they can be confusing for consumers, so before we add another one let us sort out what we think we mean by good design.

Chairman: I am not the oldest member of this Committee, but I can just about remember utility design in the post-War period. We could perhaps

Google it and find out. In the context of this morning's discussion I kept thinking about that sort of thing. I am too young to really remember it. I have a vague recollection! Some of these grey beards around here will probably be able to provide me with graphic information. You have been very fulsome in your responses this morning. You have taken longer than we had anticipated, but we are very grateful. If there is anything else you feel that you would like to add afterwards, please feel free to send it to us. Equally, we may be in touch with you when we look at the evidence if there is something that we would like to take up with you again. Thank you very much for your time this morning.

Memorandum by The RED Initiative, De Montfort University

SUMMARY

1. This submission discusses the various needs and requirements of product-, commercial interior- and industrial design consultancies in developing their practice of eco-design.
2. The evidence focuses on the existing business practise of small UK design consultancies with regard to sustainability, and highlights current industry opinions about legislation, levels of eco-design implementation, and the barriers cited of why eco-design strategies are not currently integral to every-design design practise.
3. Designers learn from project work and evolving experience. Whilst there are numerous academic publications in the field of eco-design, these are invariably not accessed by designers, who adopt a "hands on" practical approach in learning and skills development.
4. The research concluded that SME design consultancies feel they are small fry in ability to implement eco-design and waste-minimalisation strategies, due to their clients—often large organisations—enforcing time and cost restrictions on the small enterprises they outsource design work to.
5. Design consultancies often state that the only way to ensure that design for environment strategies are enforced is through more concise, practical legislation, that can integrated into the design process.
6. In the current UK design sectors, designers state they lack information—be it knowledge about environmentally-preferable materials, eco-design strategies or general business support initiatives.
7. The evidence concludes with a need for a higher level of innovation within the design industry. Rather than slowly making incremental changes in developing products and services that are marginally less environmentally-less damaging, designers need assistance in becoming better at innovation. The innovation of new products and service systems has the potential to change consumer behaviour and move more quickly towards a sustainable society.

BACKGROUND

8. De Montfort University's Faculty of Art and Design is distinguished in producing industry-relevant design education. Engaging with the industry that the faculty feeds is fundamental to achieving this capability. A strong component of this collaboration is **dmudesign**—a design consultancy based within the University that also works in supporting and developing the design and manufacturing industry within the East Midlands region.

9. Beginning with *Improving Business by Design in 2003*, **dmudesign** has been charged with enabling SMEs to develop their businesses through innovative product design by both Leicestershire Economic Partnership and the East Midlands Development Agency. The focus throughout all programmes has been identifying opportunities for innovation within the East Midlands' design and manufacturing sector.

10. Our most recent programme, *The Resource Efficient Design (RED) Initiative* assists businesses in minimising the negative environmental impact of their products as well as identifying opportunities for innovation that can have a significant impact on resource efficiency. The key focus of The RED Initiative is to demonstrate the opportunities that resource-efficient design can deliver for businesses.

11. The RED Initiative works with the commercial interior design and industrial design sectors. 93 per cent of product and industrial design consultancies in the UK are SMEs, of which 82 per cent have less than 10 employees. 98 per cent of interior and exhibition design companies in the UK are SMEs of which 94 per cent have less than 10 employees. Collectively, the UK's design consultancies have a large influence over the environmental impact of products in the UK and with 16 per cent of SME design consultancies having overseas clients, this impact stretches worldwide.

12. The following evidence outlines the experiences of **dmudesign** programmes in relation to eco-design practice in SME design consultancies in the East Midlands.

Can better designed products offset the increase in consumption?

Yes

13. It is widely recognised amongst eco-design practitioners that over 80 per cent of all product-related environmental impacts are determined during the design phase. In any given product this can include environmental damage in sourcing materials, emissions and waste in production and wasted energy in use, in addition to the environmental impacts of disposal.

14. Eco-design can assist in waste reduction through minimising the use of materials or selecting alternative materials, however, design has a pivotal and potentially more critical role to play in changing consumption patterns. In order to achieve a sustainable society it is critical that alternative lifestyle solutions are designed, developed and adopted.

15. The various levels of eco-design implementation can be broadly grouped into two levels: development and innovation. The development of existing products can lead to a reduction in their impact. The innovation of products and services has the potential to adapt consumer behaviour and move more quickly towards an environmental and social equilibrium.

How can better product design be used to effect a change in consumption patterns and behaviour?

16. The role of the designer differs from the engineer in the focus on human interface. "Human-factors" is a core skill of the design discipline. The designer is therefore well placed to understand, interpret and influence the consumption patterns and lifestyles of consumers.

17. A simple example of an innovative environmentally-preferable solution is the eco-kettle. The designers recognised that the major environmental impact throughout the life-cycle of a kettle is the excessive energy use due to users over-filling the product. The solution: a kettle that boils the required amount of water and reserves the remaining water for subsequent uses. The Department of Environment, Food and Rural Affairs say that "If everyone boiled only the water they needed instead of 'filling' the kettle every time, we could save enough electricity to run practically all the street lighting in the UK".³⁰

18. An example of "forward thinking" by eco-innovators can be found in transportation. As opposed to the minimal reductions that can be made through reducing materials in production (such as the SMART car) or reducing the energy in use (for example the Toyota Prius), a significantly greater environmental benefit can be gained from vehicle sharing schemes. One such scheme is the UCR Intellishare project³¹ where users select vehicles that suit their needs for each individual transportation requirement only when they are needed.

What role can better design play in minimising the creation of waste?

19. At a more superficial level designers can develop products with waste minimisation in mind. Where affecting consumption patterns is not possible, designers can use various strategies to minimise the creation of waste.

20. There are various strategies for waste reduction including:

- (i) design for disassembly;
- (ii) light weighting;

³⁰ <http://www.nigelsecostore.com/acatalog/eco-kettle.html>

³¹ <http://world.honda.com/ICVS/about/intellishare/inte.html>

- (iii) design for durability;
- (iv) recyclability;
- (v) reusability; and
- (vi) life cycle/Cradle to Cradle design.

21. The initial reaction to minimising waste is often to focus on the end of a product's life cycle; however, the major impacts of a product may be elsewhere.

22. In energy-using products the highest environmental impact is typically the use stage. In this case efforts should be focused on energy reduction in use. An interesting example of this is Procter and Gamble's latest campaign, initiated in conjunction with *Forum for the Future*, that encourages their washing product users to turn their washing machines from 40 to 30 degrees.

Eco-design practice within industrial and commercial interior design consultancies

23. The RED Initiative supports the concept that the most effective way to progress design towards sustainability is to focus on the opportunities for innovation. Unfortunately the present focus of most organisations is on incremental improvement and redesign of existing products. There was found to be limited understanding of the opportunities that eco-design can bring for both design consultants and their clients.

THE USE OF MATERIALS

Challenges facing designers in adopting eco-design in everyday design practice.

Material selection

24. The experience of The RED Initiative is that the main eco-design strategy that designers focus on is materials selection. This is supported by their clients who, where eco-design issues are considered, are reported to focus their requests for consideration of material selection.

25. Material selection amongst designers is normally experience-based. The majority of products will be designed in relation to their predecessors or similar products.

26. Designers indicated that the main barrier to selection of environmentally-preferable materials is a perceived additional cost. This is combined with a lack of confidence in the quality and performance of eco-materials, as they are often perceived as inferior alternatives.

Materials availability

27. The RED Initiative has experienced limited application of alternative materials (such as biopolymers and smart materials) by SME designers due to the potential limited availability in sourcing such materials. However, designers often mention materials featuring a high recycled content when considering eco-design alternatives.

28. One area in which material scarcity is regularly considered is when selecting Forestry Stewardship Council (FSC)-approved wood based products. The labelling scheme is well-known and commercial interiors designers often specify FSC-approved woods.

29. In most cases however, the selection of environmentally-preferable materials based on material availability is limited, with the majority of enquiries based on the selection of materials that have the appearance of "environmental friendliness".

End of life impacts of raw materials

30. Information on the potential end-of-life routes for products is not well understood by designers. This reflects the disparate recycling systems that products may face both within the UK and abroad. Apart from reuse, opportunities for product disassembly or even recycling of many products are limited. This lack of coherent systems restricts the potential for development of products in relation to end of life strategies.

31. There is potential for the development of more sophisticated and consistent recycling systems as legislation such as Waste Electronic and Electrical Equipment regulations (WEEE) bring a larger quantity of materials together.

What impact does the development of new materials have on design?

32. The development of new materials has limited impact on “everyday design” due to the need for materials to be proved and costs and supply chain issues to be reduced and resolved.
33. With limited time and money for product development, designers indicate that they are rarely given the opportunity to experiment with alternative materials. Where they do try alternative materials it is likely to be in conjunction with a manufacturer, who will be more knowledgeable about the behaviour of that material in production.
34. In general, designers are more interested in which of the conventional, readily available materials are the least damaging. Constraints of time and demands on producing workable outcomes with limited testing often prevent even this level of alternative materials selection.
35. Where designers are looking to select an alternative material, they often remark that they find it difficult to select alternatives due to the lack of information about environmental benefits. Designers want a “quick fix” solution due to limited time for a full study of the material options. Providing information that simplistically ranks materials can be misleading, as environmental superiority is often situation specific. Further understanding and time to consider the overall lifecycle impacts of materials is required.

DEMAND (BUSINESS FRAMEWORK)

How central is sustainable design to business thinking?

36. Amongst SME design consultancies, their directors and their staff, there is a general desire to respond to environmental concerns in their business practice, and in the design and production of products. Unfortunately this desire is not met by a tangible/financial demand. Eco-design practice is limited, with most small organisations rarely including eco-design considerations.
37. Even (as is often the case) when SME design consultancies and manufacturers produce work for larger organisations, there is little to no legal requirement for eco-design considerations.
38. Currently, resource-efficient design is viewed as a specialist or retrospective discipline. Enterprises of all sizes tend to only actively apply strategies of eco-design when they perceive that there are benefits to be gained from “green marketing” resulting from the applied eco-design.
39. However, a perceived fear of being left behind other enterprises who may already be implementing approaches is starting to alert businesses to the need to take action. According to Paaru Chauhan-Pancholi from retail design consultancy Briggs Hillier Design LTD, SMEs can not afford to lose clients if they can not prove their knowledge about sustainability issues.
40. Where businesses genuinely do wish to implement sustainable design strategies into their everyday business practice, they are often ill-informed about the methodology of establishing such strategies and find it difficult to identify good starting points for eco-innovation.

What initiatives are in place to encourage this and are they meeting business needs?

41. There are number of national government-funded environmental support programmes made available to businesses, such as The Carbon Trust, Business Link and Envirowise, as well as a host of regional development agency-funded local organisations open to SMEs—for example The RED Initiative, The BEST Network, and Carbon Action Yorkshire.
42. When consulting with SME design groups about the value of both local government programmes and national environmental-support programmes in assisting businesses in improving their environmental performance, it was discovered that SMEs found regional business-support units more accessible and effective in conveying practical advice. Design SMEs particularly found programmes such as The RED Initiative to be of high value, due to the programme offering services specifically focused on the design industry, allowing support tailored to the precise needs of the SME to be communicated to businesses.³² However, most design SMEs still feel that more engagement is needed between businesses and environmental- and business support organisations.

³² Paaru Chauhan-Pancholi from Briggs Hillier Design LTD stated she valued local, sector-specific business support programmes more highly over national, general environmental advice bureaus because the local programmes are accessible, and easy to develop good relationship with.

43. It is the view of many SMEs that the Design Council is currently very London-centric and should be more proactive in disseminating information, training and research conclusions into the design industry. According to Associate Director Kate Shepard from retail design and branding agency Checkland Kindleysides,

“The Design Council should play a larger and more significant part in informing design businesses about legislation and incorporating sustainability into SMEs’ every day practise”.

44. The Design Council-run programme “*Design of The Times*” (DOTT) and “Designing Demand” is already attempting to fulfil this need, although here there is less of a focus on eco design. Instead the project appears to consider general sustainability and cultural innovation issues, rather than directly engaging with design groups to assist them in employing practical eco-design techniques.

Does the current policy, regulatory and legal framework support incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

45. There are national organisations such as the Design Business Association (DBA) and The British Design Innovation (BDI) offering services to design businesses such as information on legislation, legal advice and training packages. However, research carried out by The Design Council concluded that “architects are more than twice as likely as designers to be doing job-related training” and “the proportion of people engaged in job related training is far lower among designers than for all other similar occupational groups”.³³ There is therefore a need to communicate with design consultancies and in-house designers the need and benefits of continual training and skills development of employees, and to create stronger links between design businesses and organisations offering training services.

46. Other creative industries such as architecture and engineering have governing bodies such as the Royal Institute of British Architects (RIBA) and the Institution of Mechanical Engineers (ImechE) that oversee and regulate practitioners. These bodies offer an accreditation service where the members become Chartered or professionally qualified to work in the sector, and which is recognised by both the industry and their clients. In contrast, the governing body for the design industry is the Design Council; however, this is not seen by designers or the larger organisations that they produce work for as being regulatory or having any real control in implementing legislation. Similarly, The Chartered Society of Designers, Royal Society of Arts and the Institute of Engineering Designers are less well recognised in the industry than RIBA, for example.

47. There is therefore a need for a more recognised regulatory body in the design industry, to ensure strategies such as eco-design are successfully implemented in businesses.

48. The Design Skills Advisory Panel document, *Higher Skills For Higher Value*, written by the Sector Skills Council, Creative and Cultural Skills and the Design Council highlights an urgent need for more continual professional development in the design industry with regard to sustainability in design. It proposes that this should be a priority for the National Design Academy proposal in its report; however, progress on this recommendation has yet to come into fruition.

DESIGN INDUSTRY NEEDS

What are the gaps in knowledge and how are they being addressed?

49. There is a need to provide in-depth support in Resource Efficient Design throughout the design cycle, where actual environmentally-considered, commercial products are generated. In addition, resource efficient design must be mainstreamed into the various sectors of the design industry whilst providing a step change in skills and accelerated development of environmental products and services.

50. At present, design consultancies and manufacturers’ in-house designers have little awareness of eco-design approaches. The current perception of most designers is that products and services can be designed from an environmental approach simply by using eco-preferable materials. There is very little understanding of what life-cycle design methodology entails, nor how to apply it.

51. SME Designers often state they have little time to research traditional academic sources on subjects such as eco-design strategies; instead they invariably prefer to adopt practical, “hands-on” approaches to design.

52. Designers learn from experience, and so often an effective way of learning new skills and applying new approaches to design is through establishing exploratory design projects that allow true innovation and creativity, and that are not bound by the needs and demands of a client. For example, Creative id*a ltd are in

³³ The Design Council, 2007. *Training and skills: The business of design*. <http://www.design-council.org.uk/en/About-Design/Research/The-Business-of-Design2/Training-and-skills/>

the process of generating a showcase sustainable point of sale stand, to develop their designers' understanding and capabilities in the field of eco-design and to demonstrate to their clients the opportunities of eco-innovation within a commercial environment.

53. With regard to environmentally-preferable materials for use within 3D design, designers for the most part know of few specific examples of such materials, and also have little understanding about what different factors make one material more environmentally-preferable than another. There is therefore a need for more communication between materials scientists, materials suppliers and designers, and collaboration on development "showcase" projects where new materials can be utilised.

Impact of legislation

54. Legislation such as WEEE and Packaging (Essential Requirements) Regulations rarely influence the design practice of designers in consultancies. The legislation is normally dealt with in a reactive way making it of limited use in influencing designers' mentalities to waste minimisation. An example of the types of barriers faced can be seen in the WEEE legislation. The WEEE Directive will cause an inherent cost to manufacturers but this will generally be accepted as an unavoidable, additional cost. It does not encourage designers to find alternative materials or design solutions.

55. Soft requirements that are often included in regulations, such as "...packaging shall be manufactured that the packaging volume and weight be limited . . ." ³⁴ have limited effect on moving the industry.

56. In light of this difficulty, "The Government wants the European Commission to reform the Packaging (Essential Requirements) Regulations, saying criteria such as 'consumer acceptance' make the laws difficult to enforce . . ." ³⁵

57. Some retail design consultancies are trying to establish take-back systems but these need to be joined-up with the retailers and should ideally be driven by their customers.

The need for legislation

58. There are requests from certain sectors to legislate against specific materials and practices. For example, the retail design industry, a highly competitive, high turnover, highly wasteful sector sees legislation as the necessary driving force for their industry to change its current practice.

59. However, The RED Initiative has seen that there are opportunities for the industry to develop towards more sustainable solutions, in a more productive and rewarding way.

60. For example, Sheridan and Co—an established retail design consultancy—are producing a showcase, eco-design concept solution, to market the opportunities for resource efficient design. They are exploring alternative materials as well as innovation in the design. DIAM UK (part of a larger international organisation) has been trying to develop a system to return their display units for recycling and appropriate disposal.

61. When asking SMEs their opinions about the effectiveness of current and new legislation from an environmental improvement perspective, Paaru Chauhan-Pancholi from Briggs Hillier Design replied:—

"There is a need for more legislation to force design groups and their clients to apply eco-design strategies, as the issues and need for sustainability, plus the methods and technologies to deal with the problems are already in existence. However, the Government needs to bear in mind the practicalities of implementing eco-design legislation in businesses, such as the cost implications, and availability and communications about eco-materials and systems in the supply chain".

62. Any new legislation should ensure that resource efficient design (eco-design) is a mainstream, normal, accepted principle in every day design practice, not just a specialist or retrospective application.

63. Existing legislation is of limited value. Encouraging solutions to definable problems does not stimulate the creativity that designers can bring in providing innovative, radical solutions. For example, defining a requirement for materials reduction does not encourage the use of alternative materials. Demanding use of biodegradable materials, for example, may restrict the development of a more durable, reusable solution.

64. Need to stimulate demand amongst consumers, demonstrate the opportunities to businesses, support SMEs, legislate where possible to abolish the worst and encourage development of eco-designed products.

³⁴ Packaging Essential Requirement Legislation.

³⁵ *Packaging News*, 1 September 2007, <http://www.packagingnews.co.uk/news/736868/pack-minimisation-laws-reformed/>

65. Legislation needs to include systems considerations, for example, the requirements on designers to improve recyclability must be met by improved recycling systems. A momentum is needed in the demonstration of functional and saleable materials' properties in order for them to be taken up by the design industry.

CONCLUSIONS

66. The ideal scenario is for eco-design to be incorporated as a natural part of the everyday design process. To designers, good design should mean that eco-design considerations are an integral factor.

67. Designers are not typically in control of what they design. Generally designers operate in very small businesses that sell skills to large corporations, who generally undervalue design.

68. The creative capability of the UK's design industry is not lacking, nor is its desire to reduce the environmental impact of product and retail design. As an industry dominated by small businesses, its ability to drive change in this area is limited as it relies heavily on clients for day to day turnover of business. Conversely, SME design consultancies have an invaluable capacity for innovation. Organisations that contract designers must recognise the value of design in order to produce design solutions that are exceptional in all aspects, including their environmental impact.

69. A level of momentum should be expected from the design industry as it must demonstrate the opportunities to clients. Some design consultancies are taking the lead and differentiating themselves. Some designers have remarked on the need for designers to be proactive in demonstrating the potential of eco-design.

70. "Try to promote the advantages of eco design to our clients and focus their minds on the advantages it can bring to their business."³⁶

71. Design in the UK is at risk from the development of the cheaper overseas market.³⁷ Value added services are an opportunity for UK consultancies to maintain a cutting edge.

"... Accepting that resource-efficient design or eco-design is becoming part of the design & manufacturing landscape, design consultancies have to be proactive and include it as part of their package of research, design & development services—not least because it is adding value to their own consultancy work as well as to that of their clients. Only a short-termist could argue otherwise."³⁸

72. There is a need to enable SMEs to keep abreast of environmental requirements and industry trends. Larger organisations have the time to invest in developing their knowledge and strategies in this area. However the overwhelming trend to outsource design means that these skills are not developed within the design function of the product development process. Environmental considerations in relation to products or environments tend to stay within company policy and corporate and social responsibility (CSR) reports, rather than being implemented as the design function.³⁸

73. It is important that the value of the SME design industry is recognised and supported in developing invaluable eco-design skills and knowledge.

October 2007

Memorandum by Vitsoe

A PHILOSOPHY FOR PRODUCTION

Vitsoe was founded in 1959 to realise the furniture designs of Dieter Rams. The proposition was to create furniture that would last as long as possible. Accordingly, built-in obsolescence would be avoided by making the furniture discreet and adaptable while not pandering to fashion.

The intention was to encourage customers to start by buying less; to add to, rearrange and repair when needed so that a commitment would build between customer and company, to their mutual benefit.

³⁶ Anonymous. Retail and Point of Sale designer.

³⁷ "Two thirds of . . . designers (64 per cent) have seen the intensity of competition for UK work increase over the past three years and around the same proportion (67 per cent) expect it to increase further in the next three years." In the UK, almost everyone faces competition from other UK designers for domestic projects (97 per cent), but the 78 per cent of designers reporting overseas competition for the same work say that it's from designers in Asia (56 per cent)—in particular India (38 per cent) and China (26 per cent)—and Western Europe (30 per cent). <http://www.designcouncil.org.uk/en/About-Design/Research/The-Business-of-Design2/Competition2>

³⁸ Nicki Theokritoff, UK furniture designer.

Importantly, the customer would take the furniture with them when they moved and thereby ensure continual reuse.

In 1995 Vitsoe corporate seat transferred to Britain. Today 97 per cent of its production is in the UK. The company employs directly a staff of 42 but indirectly a larger number via key suppliers. 30 per cent—and rising—of turnover is exported. Vitsoe's entire sales comprise a shelving system (for which it is best known) and a chair programme, which were designed in 1960 and 1962 respectively. Vitsoe is profitable, privately owned and Dieter Rams continues to work with the company (celebrating its 50th anniversary in 2009).

Today, at any one time, up to 50 per cent of Vitsoe customers are existing customers who are adding to, rearranging or reinstalling their furniture which might have been bought as far back as 1960. The inevitable impact of their furniture on the world's environment has been minimised by being useful for as long as possible.

END OF LIFE?

It is almost unheard of for Vitsoe's furniture to be thrown away. In January 2008 a customer related how the 20-year-old shelves they had recently inherited—after hard commercial use—were reinstalled in their private home. Two metal shelves were left over; they had been bent and damaged during the removal process; disposal was reluctantly contemplated. Instead they were posted on eBay. After competitive bidding from a number of parties they sold for £70. Their original cost in June 1988 was £64. Reuse in favour of disposal at increased value. This is not a unique anecdote for the company.

KEY INGREDIENT

Arguably the most important ingredient in Vitsoe's long-term success is the creation and constant nurturing of trust between customer and company. It is the antithesis of returning to a shop in the almost certain knowledge that it will not have that much-needed replacement cup and saucer because "we have discontinued that line and now offer this new one".

LESSONS FROM NATURE

Charles Darwin's succinct definition of evolution was "descent with modification".

Nature does not hold annual trade exhibitions where it displays rafts of new products, many of which will disappear without trace almost immediately. Moreover, nature has no waste: all cycles are closed. Whereas man used to operate within closed cycles, during the 19th and 20th centuries the cycles became open and created waste. Therefore the lessons are in nature: allow a species to evolve continuously via small, apparently insignificant, improvements and then reuse every last molecule at end of life. Vitsoe tries to behave in this way.

Theory into reality: what does Vitsoe do differently?

- Vitsoe's purpose is to allow more people to live better, with less, that lasts longer;
- Vitsoe tries not be distracted by novelty or passing fashions (the customer is not always right);
- Vitsoe concentrates on reuse; recycling is what you do when you fail to reuse;
- Vitsoe puts the entire emphasis on being a business that provides a service rather than just a product (the product is good but, it is hoped, the service is better);
- Vitsoe ensures that customers know it will exist for them in the long term; therefore the customer can make a commitment for the future provision of both product and service;
- Vitsoe does not take part in trade exhibitions which increasingly seek to portray furniture as fashion and thereby exacerbate the problem of waste creation while seeking to satisfy short-term financial goals;
- Vitsoe is not run primarily for profit; every offer letter to new employees states this on page one; profit is the result of providing real and lasting satisfaction to its customers;
- Vitsoe does not accept short-term gain at the expense of long-term loss;
- previous evidence (15 January 2008, Q211) pointed at the problem of internal budgeting disguising the true cost of actions. There is no internal budgeting at Vitsoe but genuine individual responsibility for cost decisions. Vitsoe's new financial controller is finding it strange that the entire business is cost-conscious already: whole-life costing is understood throughout the company;

- previous evidence (15 January 2008, Q169) has shown that the burden of suggestion schemes falls on others to implement. There is no suggestion scheme at Vitsø: everyone is allowed to talk to their colleagues and to implement evolutionary improvements;
- Vitsø's approach is, at first glance, not cheap; but when spread over only a few years it rapidly becomes cheaper for the customer and the company, as well as being of great benefit to society.

Better design and use of materials;

- Vitsø's products are designed as true systems (the principle behind the long-lived Routemaster bus, also a product of post-war thinking) with high-quality specification and finishes to ensure flexibility, variability, adaptability, durability and therefore longevity;
- all of Vitsø's products are simple to construct, repair and dismantle; the use of plastic is minimised; most products comprise recyclable aluminium and steel, and compostable wood that is assembled with mechanical joints (ie not bonded or welded) to permit repair and end-of-life dismantling;
- the appearance of Vitsø's products is self-effacing and the range of finishes is deliberately small; Vitsø intentionally restricts the amount of choice offered (*"The Paradox of Choice"* by Barry Schwartz points out the debilitating effects of too much choice for society);
- Vitsø produces next to no waste (even waste from the office kitchen is composted); aluminium-extrusion offcuts go to recyclers as does waste cardboard at the end of its multiple-use life;
- wooden stillages are used to transport all of its high-value aluminium parts between suppliers; some of these stillages have been in continuous use for 15 years;
- when suppliers deliver components, reused cardboard packaging and stillages are returned on otherwise empty vehicles for reuse; waste and costs are reduced;
- Vitsø's demands for innovative packaging solutions are often ahead of developments in the market; for example compostable starch packaging (in use at Vitsø for 10 years) is still greatly undervalued in the UK;
- where possible, Vitsø delivers its high-value cabinets in reusable, repairable, heavy-duty "tautliner" bags (designed by Vitsø with a specialist supplier); the investment was off-puttingly great but the rewards were rapidly even greater than anticipated;
- Vitsø's behaviour has increasingly been able to infect its suppliers: some have improved their processes to reduce waste while almost all have improved the quality of their products;
- incoming packaging from suppliers is reused as outgoing packaging for customers;
- no waste whatsoever is left on customers' sites when Vitsø has installed a shelving system; all packaging is returned for reuse;
- over the last 18 months Vitsø's internal processes have been migrated to the web and have become almost paperless; customers can order complicated shelving systems without having to use or receive any paper;

Consumer behaviour via product attachment

Ruth Mugge at the Faculty of Industrial Design and Engineering, Delft University of Technology in the Netherlands published a paper in 2007 on the topic of product attachment—the strength of the emotional bond a consumer experiences to a specific product. She wrote:

"This definition implies that a strong relationship or tie exists between the individual on the one hand and the object on the other. If people feel strongly attached to a product, they are also more likely to handle the product with care, to repair it when it breaks down, and to postpone its replacement as long as possible. Product attachment may thus increase a product's lifetime.

"From the viewpoint of sustainability, it can be valuable for designers to influence the degree of attachment people experience to their products. Nowadays, people dispose of products although they still function properly, for example, because these products look old-fashioned. Extending the psychological life span of durables could be instrumental to reduce the demand for scarce resources

and the rate of solid waste disposal. Up to now, the role of the product and its design in stimulating the degree of attachment experienced toward this object remains quite obscure.

“As the product is under the designer’s direct control, understanding these issues is valuable for designers. Accordingly, this research contributes by establishing the role of the product for bringing about product attachment, and by proposing several design strategies to strengthen the emotional bond between a person and his/her product.”

She describes what Vitsoe has been doing for almost 50 years. For example:

- Vitsoe recruits the highest quality staff in all areas of the business; almost all members of staff have one or two degrees. High quality staff can communicate the ethos of the business with conviction to customers, suppliers and new colleagues alike;
- Vitsoe’s staff always point out to customers that they can buy less today because they can return later to add more; accordingly Vitsoe’s staff do not earn commission because that rewards short-term thinking; rather they build a trusting relationship with the customer for the future;
- Vitsoe’s customers can return for spare parts, ask for their furniture to be repaired or even reupholster an entire chair in their own home after decades of use;
- a high proportion of Vitsoe’s customers return to ask for planning advice when moving home or office; the charges for dismantling and reinstalling aim to cover costs only because of the importance of ensuring long-term customer loyalty;
- ever more customers say that they will buy Vitsoe’s furniture because they can reuse it, rearrange it and take it with them; they understand that they are making a genuine life-long investment. Often they say: “Why didn’t I know about you 10 years ago? You would have saved me time, stress and money”;
- a sense of well-being pervades Vitsoe’s staff because the ethos of the company chimes increasingly with its employees (aged 23 to beyond retirement);
- as reported by Imperial College’s Tanaka Business School in June 2007, Vitsoe is a highly innovative company: the innovation is all in the area of how to use technology and the web to bring Vitsoe to the attention of a much wider audience; how to allow that audience to understand, plan, buy and install its shelving system; and how to form long-term relationships with those customers so that they may infect each other with the passion of understanding Vitsoe.

BUSINESS FRAMEWORK

It is difficult to know whether or not the chicken preceded the egg: did society—and the media’s—obsession with novelty come before its inexorable shortening of financial horizons? Has society’s demand for short-term financial gain turned its consumers into increasingly dissatisfied neophiliacs where the next purchase promises the gratification that the previous one did not give?

Currently Vitsoe’s business can only function in a private arena. As Anita Roddick of The Body Shop discovered, exposure of values that will be of a wider good to society—of which waste reduction is key—are incompatible with the goals of existing financial markets that are driven solely for short-term financial gain. Until there are ways of measuring corporate success in non-financial terms, businesses such as Vitsoe will continue to be off-radar—The Dow Jones Sustainability index and the FTSE4Good index underperform the market; Goldman Sachs has made a recent attempt to capture the complex interaction between social responsibility and financial performance with the creation of a model called GS SUSTAIN, however, businesses that are paying the true cost of their existence will always “underperform” businesses that are able to offload their true costs on others.

It must be noted that employees in financial markets are motivated almost entirely by bonuses related to short-term financial performance and thereby rewarded for short-term thinking. For those who are not rewarded by bonuses, there is credit available in the next post. Meanwhile the real cost of most consumer products has, in real terms, plummeted thereby ensuring that no value is attached to most products allowing them to become disposable (repair being unavailable or uneconomic). Vitsoe’s furniture has value in the eye of the consumer, even when damaged.

Every new customer for Vitsoe is another customer who might consume and dispose of less during their lifetime. Many observers are perplexed by Vitsoe’s desire to sell less to more customers and to encourage them to live with their products for longer, but The Stern Review of 2006 says: “The world does not need to choose between averting climate change and promoting growth and development.”

GOVERNMENT POLICY

Obsolescence must be penalised. Repair must be rewarded. Reuse must become the norm (children learned to be thrifty by collecting and returning their Corona bottles). What happened to the battery-powered milk float delivering milk in reusable glass bottles—with recyclable aluminium caps—and collecting the empties? Thrift and saving have come to be frowned upon—they must be rewarded.

Vitsoe has not received any incentives, tax breaks, grants, loans or otherwise for its desire to cover its true costs and to make and support products for the long term. Approaches to Business Links, the London Development Authority and Envirowise have all been met with more bureaucracy than would be worth tolerating. The latter failed to respond to Vitsoe's requests for packaging assistance.

New materials that are better from an environmental point of view can be very expensive initially and could be supported by government via tax on materials with negative environmental impacts and/or subsidies for those with positive impact.

Labelling schemes based upon the full lifecycle and environmental impacts of products and services, though complex, would allow customers to make more informed choices and minimise companies talking about sustainability—often, tellingly, via their PR departments—but actually doing very little. In addition, information about the predicted lifespan of a product would allow customers to make a decision based upon cost per year rather than directly comparing initial costs.

Vitsoe is not being groomed for a trade sale or stock-market flotation, the yardstick against which the success of almost all entrepreneurs is measured. The company is currently investigating how to change its ownership structure to include its employees and thereby aid succession and its adherence to long-term values. The relative complexity and increased bureaucracy of employee benefit trusts is a deterrent for Vitsoe; government support for models nearer to that of the John Lewis Partnership would be preferred.

Vitsoe urges government to reward longevity and not to be distracted by, for example, rewarding more recycling. In the USA the increasingly important LEED (Leadership in Energy and Environmental Design) standard does not, seemingly, recognise longevity. In essence a superficially green and recyclable product can be thrown away tomorrow and still achieve LEED qualification today.

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Memorandum by Jonathan Chapman

1. The UK disposes of considerable, and increasing, volumes of domestic electronic products (DEPs) each year—the majority of which still perform their tasks perfectly, in a utilitarian sense. In an emotive sense, however, these unwanted products bear an immaterial form of defect manifest within the relational space occupied by both subject and object (user and product). In this way, it is clear that the “design for durability” paradigm has important implications beyond its conventional interpretation, in which product longevity is considered solely in terms of an object's physical endurance—whether cherished or discarded. In this sense, it can be seen that durability is just as much about desire, love and attachment, as it is fractured polymers, worn gaskets or blown circuitry. It therefore appears clear that there is little point designing physical durability into consumer goods, if consumers lack the desire to keep them.
2. It may be argued that the unsustainable consumption and waste of natural resources is a legacy of modern times, born largely from the inappropriate marriage of excessive material durability with fleeting product life spans. Landfill sites and waste management facilities throughout the UK are overloaded with fully functioning DEPs—toasters that still toast and freezers that still freeze. In many cases, waste of this nature can be seen as nothing more than a symptom of a failed relationship between the user and the product. This is because consumer desire is unstable; it continually evolves and adapts, whilst the DEPs deployed to both mediate and satisfy those desires remain relatively frozen in time. It is this incapacity for evolution and growth that renders most DEPs incapable of both establishing and sustaining relationships with users. The waste this inconsistency generates is substantial, coming at increasing cost to manufacturers facing the policy-driven demands of the European Union (EU) Waste Electrical and Electronic Equipment (WEEE) Directive and, perhaps more importantly, the natural world. We must therefore begin to consider the emergent paradigm of emotionally durable design alongside more established notions of physical durability and material endurance.
3. Despite growth as a territory of enquiry, thus far, the creative methodologies addressing design for durability have attended almost exclusively to the cosmetic, bodily survival of manufactured objects. Indeed, at present, products designed for take-back are generally geared toward economical disassembly, recycling and reuse, rather than prolonged lifespans. Though these end-of-pipe methodologies are essential, it may also be stated that, through focusing solely on waste management strategies (such as the design and production of recyclable waste, biodegradable waste and disassemble-able waste, for example), deeper strategic possibilities

are overlooked. In this way, it may be argued that sustainable design methodologies are symptom-focused; addressing the after effects—rather than the causes—of the inefficient model of design, production and consumption we face today.

4. In the case of most DEPs, longer lifespans are environmentally beneficial, as the majority of energy consumed occurs pre-use, during the resource extraction and manufacturing phases. This is particularly true of digital products—such as mobile phones, PDAs, digital cameras and MP3 players—that require low levels of energy to operate (largely due to their frictionless action, achieved through a lack of moving parts), but actually require relatively high levels of energy to produce. However, there are exceptions to this rule. DEPs that consume substantial amounts of energy during the use phase, when more energy efficient alternatives are commercially available, may well become counterproductive over extended periods of time (exceeding 8–10 years); products that typify this classification include washing machines and fridge freezers.

5. Though the need for longer lasting DEPs is widely recognised and supported, practical working methods, design frameworks and tools that enable the commercial implementation of such artefacts, are scarce. This may be described as a consequence of the apparently intangible, ethereal nature of considerations pertaining to psychological function, which cause confusion for the practicing designer tasked with the design and development of greater emotional longevity in DEPs. As a result, the positive impact(s) of academic studies in this area has thus far failed to penetrate the working practices and methodologies of design—arguably, the one place where new models of sustainable design knowledge and understanding are most urgently needed. It is essential therefore that practical methodological information is generated, that enables product designers to engage more effectively with complex issues of emotional durability through design; presenting a more expansive, holistic approach to design for durability, and more broadly, the lived-experience of sustainability.

6. From my research, in which an empirical study (2006) examined the attachment behaviours of 2,154 respondents with their DEPs, the following six-point experiential framework has been distilled; providing product designers with distinct conceptual pathways through which to initiate engagement with salient issues of emotional durability and design; the six-point experiential framework (and supporting annotations) is as follows:

- (a) *Narrative*: users share a unique personal history with the object. This often relates to when, how and from whom the object was acquired;
- (b) *Detachment*: feel no emotional connection to the object, have low expectations and thus perceive it in a favorable way due to a lack of emotional demand or expectation (this also suggests that attachment may actually be counterproductive, as it elevates the level of expectation within the user to a point that is often unattainable);
- (c) *Surface*: the object is physically ageing well, and developing a tangible character through time, use and sometimes misuse;
- (d) *Attachment*: feel a strong emotional connection to the object, due to the service it provides, the information it contains and the meaning it conveys;
- (e) *Fiction*: are delighted or even enchanted by the object as it is not yet fully understood or known by the user; these are often recently purchased objects that are still being explored and discovered by the user; and
- (f) *Consciousness*: the object is perceived as autonomous and in possession of its own free will; it is quirky, often temperamental and interaction is an acquired skill that can be fully acquired only with practice.

7. By designing DEPs that consumers wish to keep for longer, these products are transformed into conversation pieces—linking consumers to producers, though an ongoing and sustained dialogue of service, upgrade and repair. If appropriately managed, it is proposed that fostering and maintaining such relationships with customers, presents a significant part of the solution to issues of sustainability and design; enabling business to continue generating revenue whilst reducing the frequency of need for further costly manufacturing, resource extraction, energy consumption, atmospheric pollution and waste.

8. Form has a vital role to play in achieving the function of sustainability. Function has a more ethereal quality than is commonly recognised—it could be said that function exists on a linear scale, in which at one end you have task-oriented function where objects perform and fulfil their tasks well (which is a sustainable characteristic), and at the other end of the scale, you have a more sociological/existential function where objects are effective in mediating the particular values and beliefs of the individual user. Both modes of functionality are largely dependent on the designer, and are central to the success or failure of an object in social, economic and environmental terms, as when objects succeed within both modes of functionality through design, replacement motives are quelled, and things generally, are valued, cherished and kept.

9. Amidst the industry-wide movement to achieve compliance with environmental legislation such as the EU WEEE Directive, the root causes of the ecological crisis we face are overlooked; meanwhile the inefficient consumer machine surges wastefully forth, but now it does so with recycled materials instead of virgin ones. By neglecting to better understand the motivational drivers underpinning the consumption and waste of DEPs, design resigns itself to an end-of-pipe problem-solving agency, rather than the central pioneer of positive social, economic and environmental change that it potentially could be.

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Examination of Witnesses

Witnesses: MISS HOLLY MCCAIN, The RED Initiative, De Montfort University, MISS LIZZIE DUTTON, The RED Initiative, De Montfort University, MR MARK ADAMS, Managing Director, Vitsoe, and DR JONATHAN CHAPMAN, Senior Lecturer in 3D Design, University of Brighton, examined.

Q395 Chairman: Good afternoon. I think you were in for the last session so you will have seen the way we operate. We will try and get through things a little more quickly because at one o'clock people's tummies start rumbling or they have other excuses to leave. Perhaps you could introduce yourselves.

Dr Chapman: I am Jonathan Chapman. I am a Senior Lecturer at the University of Brighton.

Mr Adams: Mark Adams. I am the Managing Director of Vitsoe, a furniture company. We are that elusive SME that you were looking for in the previous session!

Miss Dutton: I am Lizzie Dutton from De Montfort University's RED Initiative, an East Midlands Development Agency-funded business support programme.

Miss McCain: My name is Holly McCain. I am also from De Montfort University's Resource Efficient Design Initiative. We work with SMEs on a government funded programme.

Q396 Lord Crickhowell: One approach to reduce waste involves making products more durable and encouraging consumers to keep them for longer, thus buying less. However, this does not present an obvious benefit for most manufacturers. Should designers do more to encourage this process? On the other hand, we had written evidence from the Ecodesign Centre Wales that better design generally perpetuates consumption through creating cycles of dissatisfaction, eg latest model and latest functionality, so there was a conflict there. When I was a minister I used to visit Panasonic and Sony's electronics teams in Japan and one saw an interesting example there. I went successive years and you would often see the latest product which you realised was going to replace entirely the previous product. The company very often held up the introduction for longer than you would have expected. The small video camera was held up for a couple of years because they did not want to destroy the market that they had just created for the large video camera and the investment that they had put in it. On the one hand, yes, manufacturing for the duration is the right thing to do. The old types of refrigerator that you

bought before the War and one found still in one's kitchen 30 years later had obvious advantages over a modern product which perhaps only lasts a couple of years. Would you comment on the general issue of durability versus the obvious opposite?

Dr Chapman: Firstly, I think the evidence put forward by the Ecodesign Centre Wales reinforces the idea of longer lasting objects because it identifies really well the problem, which is that at present and for the last century the conventional model of design, production and consumption has been newer, sell more, waste quicker, buy more and so on. I think it is only very recently that we have begun to see that this is considerably far from sustainable and that is why we are sitting here having this discussion. To question that model of capitalist activity in which the quantity of products bought and sold equates to the quality of life and wellbeing, that is societal wellbeing in addition to ecological wellbeing, is fundamentally flawed. To then consider how design can play a role in looking at alternative ways of designing, producing, selling and using a product is incredibly valid. Product life extension is one way of reducing the consumption of resources—the consumption of energy through manufacturing, shipping and distribution—but indeed does imply an equivalent reduction in turnover. A lot of research, including that of the likes of Walter Stahel, who I am sure a lot of you are aware of, the Swiss industrial analyst and Director of the Product Life Institute in Geneva, looks at the “service economy” which does indeed engage with the design of products, but it uses the product more as a means to develop links with consumers so that economic models of servicing and upgrade and repair can be fostered over greater periods of time. So you may indeed sell less units but you generate further turnover over the extended lifespan of an object through service points, repair points and upgrade points. I think another additional value to the longer life option is of course that brand loyalty is more likely to be fostered because in allowing people to be satisfied with what they own you also generate subliminal affection for a given brand.

Mr Adams: At Vitsoe we are just coming up to 50 years old and 100 per cent of our turnover is made up of two products essentially designed in 1960 and

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1962. We have fierce loyalty amongst our customers for the product and that therefore engenders the future loyalty, the fact that they come back, that they want to add to the product, that we will repair it, that they will take it with them when they move house and that is the entire foundation of our business. The innovation in our business is in keeping the product absolutely up-to-date, in ensuring that the service we offer is arguably more important than the product we offer to ensure that that future loyalty remains.

Q397 Lord Howie of Troon: What is this product?

Mr Adams: What we are best known for is a shelving system and display storage that you use in your home or office, et cetera, and then there is a complete programme of chairs that works with that.

Q398 Lord Crickhowell: Do you not have to distinguish between two different sorts of product? I still like the idea that I was using my mother-in-law's fridge 40 years after it was bought. We had the IT sector in here last week pointing out that the newer products are using far less energy, that they are being increasingly designed so that they can be brought in and recycled and that there are products where the whole pace of technology and development is such that it may be to quite an advantage in that they are very cheap, recyclable and becoming cheaper in energy use terms. It may be that you do not want your printer or whatever it is to cost a lot and last a very long time. Do you have to make a distinction is the question I am asking?

Mr Adams: You certainly do, of course.

Miss McCain: Having a fridge that lasts ten to 20 years might not be the best sustainable option. Maybe having a more modern version of a fridge that lasts ten years and then replacing it for a much more energy efficient one might be a more sustainable option even though you are possibly producing more waste. It is looking at the whole life cycle and working out whether waste or energy efficiency is more important and looking at the whole life of it. Just assuming that products need to last a lifetime might not be the best solution.

Dr Chapman: I think it comes back to a more fundamental question about how do you know when you have reached sustainable design? When does it start and when does it stop? Without getting into the etymology of the term, I think it is also possible that we have kind of an unhealthy perception of what sustainability is. It is often seen as some kind of utopia or aspiration where you can look at any given product and it is faultless, it is without any criticism. If you look at degrees of sustainability you start to realise that the notion of 100 per cent sustainability—apart from something like, perhaps, an igloo—is quite difficult to achieve. So when you talk to people

like Gillette and Electrolux about sustainability it is much healthier to go in and say, “How sustainable is what you currently do with this specific product, for that specific market, and how can we look at making it more sustainable?” I think that is probably a healthier way of looking at it. Product life extension is one part of that discussion. However, there are several parts which represent the aggregate package and when you add it together that is sustainable design.

Q399 Lord Howie of Troon: De Montfort University's paper told us that the design industry needs to be better regulated. Can you tell us how or if it is regulated at the moment and what the problems are? How could regulation be improved?

Miss Dutton: If we look at some of the regulations that are not impacting on the design industry at the moment, the WEEE legislation and the packaging regulations and up and coming regulations which are not necessarily directly designated towards product designers but more looking at the product systems themselves, in our research with SMEs we found that the design industry did feel that they wanted more guidance and support. The Design Council has been researching whether that needs to come through regulation or through skills and training and they are doing some work on how SMEs can pick up on that. There is a difficulty in that legislation has to focus on specific outcomes and directions in design development that may not be appropriate for a lot of product design development situations and does not foster innovation. So there has to be a balance between regulation in order to support product designers in making decisions and choosing certain paths and training so that, as was mentioned in the last question, designers can have a greater influence on understanding the whole life cycle of a product and look at alternative solutions.

Q400 Lord Howie of Troon: I am still a bit confused. Is there any regulation of the profession?

Miss Dutton: Of product designers themselves? No.

Q401 Lord Howie of Troon: You think there ought to be some, do you not?

Miss McCain: It works both ways. There needs to be clearer legislation that needs to be communicated to designers better. There is legislation that says you have to consider the life cycle, but that is not necessarily very stringent or moderated at the moment. We found that a lot of businesses were quite confused about what legislation there is at the moment and what they have to do.

Q402 Lord Howie of Troon: What you have asked for is a more recognised regulatory body.

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Miss McCain: It was specifically in terms of implementing eco-design within businesses and looking at how to apply eco-design strategies within businesses rather than a whole regulatory body for the whole design industry.

Q403 Lord Lewis of Newnham: Does that not presume there is a right or a wrong answer to that particular question? It seems to me that with some issues we are dealing with here you have really got to balance one set of factors off against another. You get other factors coming in such as purely the prejudice of whether you like the look of the thing or not.

Miss Dutton: That is the complexity of the situation, balancing between giving designers the opportunity to look at alternative solutions and the issues for each particular product design case and giving them guidance and regulation that says in this set of scenarios this is going to be the way that we all move forward in one direction. Sometimes that is a better solution because it forces everyone's hand together in one direction.

Q404 Lord Howie of Troon: I am a civil engineer and I am regulated by the Institute of Civil Engineers, the Institute of Structural Engineers, the Royal Academy of Engineers and the Engineering Council. This is quite easy to bear by the way because this regulation is not heavy. Are you thinking of something along the line of these institutions with control over the qualifications, ethical behaviour and professional behaviour of the design industry?

Miss Dutton: There will be an opportunity for that. I think the Design Council's research more recently has found that the skills and training would be a more appropriate way to move forward on that issue, but that has to be balanced with the regulation.

Q405 Lord Methuen: How should businesses be educated to understand how waste reduction could confer a genuine competitive advantage?

Dr Chapman: I see it as being something that comes from the root of education.² Obviously a business is something made up of people, and the skills and visions of the people within it, just as this group here is made up of skills and visions of people. I think it is really essential, therefore, that the people who are graduating from further and higher education institutions in the UK are skilled up and qualified so that when they are injected into companies, regardless of size, they can start to equip that institution with the knowledge and the expertise to

enable positive change. There is a second point there, which is something that came up in the earlier session, about entrepreneurialism and the way in which, at best, design is an entrepreneurial opportunist enterprise, which is a lot of what is being paid for by the client. Sometimes we call them clients, but as people decide to invest in design a lot of what they are investing in is an entrepreneurial, opportunist, unique and external perspective that can create new scenarios and new potential for situations. I would argue that the earlier discussion about some sort of regulatory system would need to be very carefully managed if put in place. One thing I know about entrepreneurs is that they do not thrive in overly-regulated environments particularly well.

Mr Adams: I think, if I may, that is my cue because my general tenor would be to look at the carrot side of it rather than the stick from the point of view of the entrepreneur. For example, in direct answer to your question about education, a very good way of educating the businesses is to increase the cost of waste because that then directly forces inward looking up, what should we do about it. That is education in itself. Equally, we should be pointing out to businesses what we have been able to do. Vitsoe, for example, in terms of getting ourselves to a business where we produce virtually no waste, has found that there are cost savings everywhere. There is a lot of investment, there is a lot of effort that has to go into it, but eventually the cost savings come through. We have been very surprised by the extent to which the cost savings have outweighed what we thought they were going to be. We had to find that out for ourselves. There was nobody "educating" us in that.

Q406 Lord Methuen: So it needs to come from the top down.

Mr Adams: It certainly does.

Q407 Lord Methuen: Would legislation obligating companies to design out waste be an effective strategy and what would need to be included in such legislation?

Mr Adams: I would still urge the carrot rather than the stick. Legislation implies a stick.

Dr Chapman: WEEE legislation keeps coming up. One thing that it really does is it brings certain conversations to the table, particularly at boardroom level, which I actually do not think would have come about otherwise. Conversations to do with selling less do not sit well in those contexts. WEEE legislation creates leverage, but it also brings about a new paradigm that was not there before, which gives design an opportunity to reinvent itself and also

² The EU-funded project on design education in sustainability (DEEDS), consists of five partners, including Brighton University—led by the Dean, Anne Boddington—and aims to implement new educational models and tools for embedding sustainability within the design curricula.

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reinvent the way we do things, and the way we think about processes such as consumption and waste.³

Q408 Lord May of Oxford: I resist the temptation to embark on a disquisition about carrots and sticks because of course the free market is a great tool where it works, but it demonstrably does not deliver pharmaceutical products for tropical diseases in developing countries and so on. So a different take on this inherent tension that is often there between producing environmentally-friendly products, which is ultimately what we are talking about, and selling lots of stuff, to what extent do you think one could help resolve that in a manner that is more carrot than stick by moving away from selling a product as such to selling services in the sense of the manufacturer essentially retaining ownership of the product? How do you think that would work? Do you think it would work? What is the experience of that?

Mr Adams: It is the transition we are actively looking at at Vitsoe with long-lived furniture. We have, arguably, been accruing very little of the benefit of selling long-lived furniture because a lot of people look at us and say, "Aren't you just doing yourselves out of business because you sell furniture to last a long time, you support it, you encourage its re-use, its repair, et cetera, et cetera?"

Q409 Lord May of Oxford: One should have said that to Chippendale!

Mr Adams: Yes. Ever increasingly, in order to make something in this country and be able to sell it at an economic price and run a business the service element has to be ever greater. So we are looking now at how we move that precisely to selling the use of the product. There are lots of complications around it. Arguably, we could have a better business model by just selling the use of the product rather than the product.

Miss McCain: I think there needs to be a competitive advantage there for these types of service schemes to work. The example I would use is power tools. Traditionally power tools are not really used very often, you probably use them for a couple of hours each year maybe and so if you wanted a sander you would hire it rather than purchase it. Nowadays, due to the advent of production in the Far East, consumer products are a lot cheaper and affordable for consumers. It is often the case with power tools that you could actually go out and buy one for more or less the same price as it would be to hire one. There has to be a cost advantage of using the hire schemes which I think could work as long as it was implemented correctly.

Miss Dutton: We find that business-to-business hire schemes are a lot more successful. The total cost of ownership has become a bigger part of the business model's rationale. So that service is a little bit easier to control.

Q410 Lord May of Oxford: Given that there is merit in this in appropriate circumstances and coming back to what we might call the stick-carrot interface, are there things you can think of that the UK might be doing to incentivise more activity of this kind?

Dr Chapman: Rather than a penal process or system, I think there should be awards, or at least recognition given when certain products, certain design teams and certain brands, which essentially are all part of the same thing, meet new standards and push the edges of sustainability outwards. That is the sort of thing that should be encouraged. Legislation doubtlessly needs to exist and does exist. In terms of designers operating within a consultancy environment, I would question how many practising designers know or understand the implications of the WEEE Directive, for example. That is not to say these people are not intelligent, conversant and knowledgeable people, it is just that legislation often fails to penetrate to that level. So I think alternative incentives need to be put in place for those people, who essentially are the people who influence, through formulating the ecological impacts of products in an extraordinary way. I mentioned entrepreneurialism earlier on. Sometimes I think the incentive provided by the potential of being recognised for hitting new standards is enough to bring the sustainable agenda into the design studio. I think you should start to ask the question, "How do you measure success in a creative environment? Is it about the salary?" It is partly that, but I do not think it is really about that alone. New incentives that start to provide opportunities for people to excel and succeed in their creative careers I think would help to bring the agenda to the fore, and re-frame sustainability as a component of good design.

Miss McCain: Speaking as someone with a consultancy background, as a member of a design team you often feel undervalued in that a lot of the strategic decisions are made by top level directors and there is little consultation with the actual design team about how to put eco-design strategies in place. Obviously the designers feel undervalued and that they do not have an opinion. I do not know whether there is a need for more training or more engagement with design teams as opposed to the managing directors.

Mr Adams: As we heard in the previous session, virtually the entire assumption is that design is an outsourced bolt-on extra to the client business and yet where it works absolutely best, whether we are

³ The six-point experimental framework provided within the evidence I supplied, defines a territory of enquiry, that enables this through design.

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looking at waste, sustainability or design, is where that function is integrated within the business. There has been far too much of a trend for the cleaving of the two. I would say that would be an area the Committee should consider, in just what way you could get that back together because the power comes from the client, not from the designer. As Lord Foster said many years ago when being congratulated on his latest modern building, "Don't congratulate me, congratulate the clients who have got the courage to commission me." So it has to come from that side.

Q411 Lord Howie of Troon: Do you believe he actually meant it?

Mr Adams: No comment!

Q412 Chairman: There is this sense in which a lot of companies, particularly SMEs, are too small to have a design function within their business. Really what we are talking about here is, if we are talking about small businesses that do not have the capability or the resource to invest in design, when they use intelligent design. Too often we get the impression that it is an after-thought, not at the pre-planning stage.

Mr Adams: We are that small business and it is utterly endemic in our business. You cannot separate it out. If anybody came to our business and asked how much we spend on design, we cannot separate it out because all of the people in the business are utterly aware of the benefit and are employing it in their day-to-day use. It is just not seen as something we add on late in our business.

Q413 Chairman: I do not really have a mental picture of the chairs you produce. Your company has been producing these items for 50 years. They last an eternity from what you are telling us. Has the design changed much in the 50 years?

Mr Adams: Yes, it is constantly evolving technically and it is often at a very small level and where production techniques are evolving so that we can use much more up-to-date ways of making things. The drawers, for example, have gone through however many iterations over those years and yet the external appearance is virtually identical. The critical bit is the compatibility. The backwards-forwards compatibility is there. You can still come back today and add the latest bit to something you have owned for 40 years and it will still fit even though the bit you add on today is up-to-date. It is constantly looking at that backwards and forwards compatibility. It is a very difficult design discipline and therefore everybody in our business understands that in every decision we take.

Q414 Lord Lewis of Newnham: I do not want to embarrass you, but how far would you say that was typical? I have a rather odd feeling you are in front of us because you are a special case.

Mr Adams: I would guess so, yes.

Q415 Lord Lewis of Newnham: If what you were saying were applicable to the majority of industry I do not think we would have any problems, but I think you are unique. I completely agree with what you are saying, but I do not see that as being the practical approach that many industries have.

Mr Adams: No. I think the point increasingly being levelled at our business is that you should be pointing out to more people how it can actually be done and so possibly that is why we are here.

Q416 Lord Lewis of Newnham: Who is "they" should be doing this?

Mr Adams: Other businesses.

Q417 Lord Lewis of Newnham: You said they should be pointing this out. Who is going to do the pointing?

Mr Adams: Through whichever medium you can. For example, for a long, long time now the media has been obsessed with novelty. You can only get press coverage in magazines and newspapers if you are generating something new. We have been working with a number of magazines over the last four or five years to point out the benefit of them supporting what is the best rather than what is the newest, and we have had some success in getting columns now in magazines where they are drawing attention to products that have been around a long time, that have been supported, which might look a little bit "boring" but are actually the way many more of us should be living, rather than just being seduced by what is the latest and the flashiest and the newest but is probably going to be gone in 12 months' time.

Q418 Chairman: Let us move on to the question of "smart" materials. We know that materials can react in particular ways. It has now been suggested that if we were able to take advantage of the smart materials we could have them disassembling themselves and this in turn would perhaps help with waste reduction and recycling and what have you. To what extent do you think this approach is held back by a lack of new materials or technology? We seem to have the knowledge but we are not quite bringing all the bits together.

Mr Adams: At Vitsoe we use simple materials, steel, aluminium, wood, some glass fibre, but all mechanically assembled, not bonded or welded in any way, so that they can all be dismantled at any point during their life cycle for repair and then they can be easily dismantled at the end of the process. It

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is not a road we have gone down because we have tended to stick to a much simpler route.

Dr Chapman: The smart material aspect is an interesting one. For example, when a polymer is exposed to a certain frequency of sound or light it expands slightly which forces the chassis of a mobile phone to pop apart. You could argue that that is potentially very interesting; yet in some ways a mobile phone is a leased product in many cases. I am sure a lot of the phones we have in this room are leased or based on certain contractual arrangements, which lead to the exchange or return of products; in some ways this is very similar to Mark's model of the business relationship with customers. I think smart materials are something that should definitely be looked at. I think there is also a flipside to it in that the automated approach brought about by that could essentially reduce the need for a workforce, which in terms of economics might pose less of a cost to the manufacturer, but it could also, in the full big picture system, miss opportunities to generate employment through recycling and disassembling. I think that is just something that is important to recognise.

Miss Dutton: As far as I am aware in this area, whilst there are plenty of opportunities there, it is a systems problem first and foremost because the recycling systems have to be in place to use these smart materials. The system has to be in place for these products to be recycled at the end of life before the designers can take advantage of that system. It is a chicken and egg problem for designers and they have to understand how that is going to work before they can use it in their design.

Miss McCain: It is a very nice conceptual way of dealing with a recycling issue to do with waste, but there are so many practical stumbling blocks that we might come across with active disassembly. There are millions of different consumer industrial products, but the cost implications of having a system to make sure they all disassemble themselves at the same time and managing that system is going to make it impractical from the outset. Also, if you are going to go down this route there needs to be a lot more research into the practicalities of using these materials in terms of what stimuli triggers them to disassemble themselves. Could these products automatically disassemble themselves at an inopportune moment? You do not want your phone to fall apart when you are on holiday in bright sunlight, for example.

Miss Dutton: That would be a trust issue for the designers, to understand the materials and be happy to proceed before they have dealt with them.

Q419 Earl of Selborne: I would like to touch on recyclable materials and whether we are making effective use of recyclable materials. It is complicated.

It is different in many regions because of the existing contracts and the like. Do you think that consumers need better understanding as to how to dispose of recyclable products, how to put them back into the recycling chain, or are we wasting a lot of potentially recyclable materials at the moment?

Mr Adams: Unquestionably, we are wasting it. Does anybody know where to take their batteries, for example? I think there are enormous gaps. It is still very difficult even for those consumers who are really trying to achieve it to know what to do.

Q420 Earl of Selborne: What is the answer? What should we be recommending?

Mr Adams: I do not think that is my expertise.

Miss McCain: The problem with the concept of recycling is that it is dealing with waste after it has already been produced and it is just putting off the landfill by one stage. If you recycle materials into definables and new materials, they might be used in products but you might not be able to recycle those. It is just putting off the landfill by one stage in the product's life.

Miss Dutton: One area where we have had experience of the problems of recycling is more the businesses' and SMEs' recycling situation. We have had contact with the retail design industry who are keen to use recycled materials. They have a relatively high turnover of materials. They want a high visual finish for their materials. They are happy to work around different ways of producing that using recycled card and recycled polystyrene, but they are having issues with returning that material to recycling points and getting hold of recycled material and in the right quantities. If the businesses cannot do it then that needs to be resolved first and then the consumer is less of a priority, but businesses are demanding those materials in certain cases.

Dr Chapman: We need to provide information about where people in certain local communities can take products such as a toaster, if it is broken and it is irreparable, to be handed over to a team who then disassemble it and recycle it responsibly. It is important that people know where these places are because they do exist and they are quite commonplace across the UK. You can take a monitor along and it is placed with a pile of other monitors and I know that is still waste but at least it is being disassembled and recycled as responsibly as possible. Simply providing information will help but I do not think it will create a huge quantum leap from where we are today. The reason I can say that is because, for example, we can place on cigarette packets the fact that you will probably die if you smoke these and while that has reduced the number of smokers today, people still smoke.

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Q421 Lord Lewis of Newnham: We have been talking about the fact that in many instances we are concerned with the interaction between industry and various designs and that very often the industry is leading rather than following the design process. Public procurement is an area which of course should be very much more sensitive to the sustainability aspect of this particular problem. What impact is there on the designer when products are designed for government? Is there a different approach to government than industry?

Mr Adams: Not in our experience of having dealt with government as a customer. We have never been asked the question. We would very much welcome the question because I think we could answer it fairly thoroughly.

Q422 Lord Lewis of Newnham: So you are telling us that government does not really implement any concept of sustainability in its ordering process?

Mr Adams: Not in our experience. With a product which, for example, academic institutions use because they like the longevity of it, they like the reassurance they can come back in ten or 15 years' time and get spare parts for it, you would have thought that thinking would apply to government as well because there is this thinking long term in government, but we have never been asked the question and that seems surprising.

Miss Dutton: In terms of the products that were aimed at government or public procurement ends, we have some NHS products for which I have had limited success in finding out what the potential procurement policy of the NHS would be in terms of reducing the environmental impact. There was one company that was developing a product and it asked why it should do this and whether this was going to be a priority in the end when it is sold into the NHS. On the other hand, we had a company who were actively producing a product for local councils, it was a water reduction product. They had identified the opportunity and they were going to sell that whether they were being asked for it or not. They identified the opportunity in advance of being asked for it. They were not necessarily getting any information for that requirement.

Q423 Lord Crickhowell: I think Ms McCain gave a slightly dispiriting and not entirely accurate remark when you said that if you can recycle something once or twice it still gets into landfill eventually. There are certain products where that is simply not true. You can go on recycling aluminium ad infinitum. You can go on recycling glass ad infinitum if you get the right quantities and it is sorted properly. We heard very strong evidence earlier that the problem with the whole waste disposal thing is it is weight related and

there are no real incentives, it is not coming through in the right quantities and it is easier to send it off for disposal. So it is actually rather important that designers know which products can be recycled. Plastics, as we have heard, can be recycled quite a lot, although not into infinity. We had a very good example given of a great building going up—at least I hope it is a great building—in London in which because of the right sort of glass being used there is virtually no heating and no cooling expense because the glass keeps it cool during the day and hot during the night. Surely it is absolutely fundamentally important that designers understand what can be recycled. It may be that we do not have the other part of the equation right, the cost incentives for getting people to collect it in the right quantities and disposing of it, but surely it is vitally important. The Continent is so much better at doing it. Why do you dismiss the whole thing as being rather unimportant for designers?

Miss McCain: I think it is incredibly important for designers to know what can be recycled, where, how and what happens to that material when it is reprocessed. It is all about informing designers or designers knowing about the whole life cycle of the materials and the products and also, how much energy it is going to take to recycle or smelt down these metals or steels that could be recycled. It is about educating designers so they know about these issues and getting them to look at the whole life-cycle consequences. I am not saying we should just dismiss recycling as a crazy notion. You really have to look at it on a case by case basis and which materials can be downgraded, which of them have an infinite recyclable life and which of them cannot be recycled at all.

Q424 Lord Methuen: Dr Chapman, you are a lecturer in 3D design. That implies to me what the thing looks like, the ergonomics of it. I would be interested to know on what courses your students are, and to what extent do you take into account the technical content of the 3D block you are lecturing on?

Dr Chapman: I lecture on two programmes. The first is a BA (hons) 3D Design, which is a Bachelor of Arts. It has a sort of human factors experiential aspect as the focus of the design activity. I also teach on a BSc Product Design course which is a more scientific, engineering-focused approach to the creation of objects. Regardless of those distinctions, both programmes are essentially concerned with exploring the best way to create objects and experiences for users. Perhaps I can then unpack that a bit and say what sort of considerations there are. As you rightly said, there are issues such as ergonomics, material specification, optimisation for certain

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moulding processes, and it is quite a long list of considerations, but essentially the main concern we have is to say that a product is a way of delivering a service or an experience to an end user and it needs to do so in a way that is effective, that creates minimal ecological impact whilst creating optimal opportunities for economic growth. What you might have noticed is I have not mentioned sustainability because that is an underlying theme which we simply embed in everything we do. Similarly, I did not mention the fact that everything needs essentially to look good because one would assume that that is something that every designer will hold dear. We do not teach students what aesthetics are or what the necessary conditions for a PC to look stylish are, for example, because that is an evolving unstable notion which changes each month and it is also dependent on the individual design team and on the cultural context they are placing that object in. So we would never adopt that kind of “house style”, but what we will do is we will say that there are certain parameters that an effective designer needs to operate within and sustainability is something that permeates and actually, dare I say, pollutes each of those parameters, throughout all stages of the design process⁴.

⁴Nick Grant and I are developing an MA Sustainable Design at Brighton which places this agenda at the very forefront of creative enquiry.

Lord May of Oxford: We have talked a lot about design for recycling and so on. There was an interesting MORI poll where the public were asked what they thought was the most effective thing they can do for the environment in general and climate change in particular and they said recycling and yet when you ask experts that is way down the list. Much more important is reducing electricity use and not having waste in the first place. There is a tension there once again. Maybe your mother-in-law’s fridge was a good thing to get rid of as you then bought a more efficient one.

Lord Crickhowell: The present one is nothing like as good.

Lord May of Oxford: Maybe we should have focused a little bit more on design for the initial process of production, to get the waste out of that, rather than worrying quite so much about recycling.

Lord Lewis of Newnham: I think I would agree with that. To me energy is a “waste”.

Lord May of Oxford: And much more important than recycling.

Chairman: On that point of agreement, which I will take as comments and not questions, we are very grateful for your evidence today. If there is anything you would like to add to it we would be more than happy to receive it. We will reserve the right to get back to you if there is anything else we would like you to deal with. We are very grateful for the time you have taken. Thank you very much.

TUESDAY 26 FEBRUARY 2008

Present	Haskel, L Lewis of Newnham, L Methuen, L O'Neill of Clackmannan, L (Chairman)	Platt of Writtle, B Selborne, E of Sharp of Guildford, B
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Memorandum by Research Councils UK (RCUK)

1. Research Councils UK is a strategic partnership set up to champion the research supported by the seven UK Research Councils. RCUK was established in 2002 to enable the Councils to work together more effectively to enhance the overall impact and effectiveness of their research, training and innovation activities, contributing to the delivery of the Government's objectives for science and innovation.¹
2. This evidence is submitted by RCUK on behalf of the Engineering and Physical Sciences Research Council and the Economic and Social Research Council and represents their independent views. It does not include or necessarily reflect the views of the Science and Innovation Group in the Department for Innovation, Universities and Skills. The submission is made on behalf of the following Councils:
 - Engineering and Physical Sciences Research Council (EPSRC); and
 - Economic and Social Research Council (ESRC).
3. The ESRC Centre for Business Relationships, Accountability, Sustainability and Society (BRASS)² at Cardiff University, is planning to submit evidence for this Inquiry direct to the Committee.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

4. Design can play an important role in minimising waste through several parts of the design process. Design for manufacture can reduce the need for extensive machining or other material reduction processes; design for use can help ensure that minimum amounts of material are used; design for recycling and reuse can help to ensure that materials go back into the production cycle rather than into landfill. Knowledge of materials properties is important in facilitating all of these stages of the design process. The need for a holistic view across the areas identified is a barrier to this process; engineering, and other designers, need to have constant access to up-to-date information on materials properties and manufacturing processes. A further consideration is any additional cost to the customer accrued from the whole life of the product and the need to understand the extent to which end users are willing to meet these costs.
5. Research at the ESRC Centre for Business Relationships, Accountability, Sustainability and Society (BRASS)³ has highlighted the need for holistic "physical lifecycle" approaches to product management, in which product design, manufacture, forward logistics, reverse logistics and remanufacturing are all treated as integrated components of a total system. Such a change would require significant alterations in management practice and education.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

6. The factors that influence the use of materials will vary depending on the nature of the product or structure under consideration. For example: for items such as planes, trains or buildings, reliability and structural integrity are essential considerations and the process of certification, and of gaining the confidence of designers

¹ Further details are available at www.rcuk.ac.uk

² <http://www.brass.cf.ac.uk/>

³ <http://www.brass.cf.ac.uk/>

and the public, can be a lengthy process; in other areas more cosmetic factors such as texture and feel are important; in more utilitarian products, cost is a significant consideration.

7. Designers' knowledge base about materials that are available, and how to ensure that the design process can change to adapt to developments in cutting edge materials and manufacturing science, as well as questions of sustainability in terms of continuity of availability at reasonable price will continue to be an influencing factor in the considerations of which materials are commonly used.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

8. Continuity of supply continues to be an important consideration for designers (see above), but end of life impacts are becoming increasingly important, particularly where these are reinforced by legislation such as the Waste Electrical and Electronic Equipment (WEEE) Directive.⁴

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

9. Designers are always interested in new materials and the innovative products and looks that can arise as a consequence. However, over the whole life of a large project, the design process can take many years and work to a materials specification that is out-dated when the manufacturing process commences.

10. Interaction between materials scientists and designers could be improved and the Institute of Materials, Minerals and Mining (IoM3)⁵ has a series of initiatives, including with the Royal College Arts, to address this.

Can better designed products offset the increase in consumption?

11. Better designed products are intended to help sales, so, of themselves, may increase consumption and create new markets. However if the term "better designed products" refers specifically to products that minimise material use then they could offset the increase in consumption, although this is not always the case. For example, the weight of airframes and engines has been significantly reduced, but the overall weight of commercial aircraft has not changed markedly due to the increase in provision of in-flight entertainment systems and other facilities. Recent increases in fuel costs may, however, tend to counteract this tendency. Careful consideration needs to be given to whether the better designed products will themselves create or lead to new forms of consumption behaviour and/or practice and to potential "rebound effects" which may reinforce or undermine any impact on waste reduction.

Are there any other gaps in knowledge and how are they being addressed?

12. There are gaps in knowledge and understanding relating to how to recognise materials when an artefact is being disassembled, and how best these materials can be recycled or reused once they have been identified. Related to this are questions of who should bear any increased research and development costs; customer expectations and tolerance of these issues are important but not always clear.

13. The EPSRC-funded Network on Product Lifespans,⁶ led by Dr Tim Cooper at Sheffield Hallam University, aims to identify research and development requirements and promote collaboration relating to product durability and product life span. EPSRC has also funded networks and research proposals on the Sustainable Use of Materials.⁷ Research areas include sustainable use of materials in electrical and electronic products, and reuse and recycling of road vehicles.

⁴ http://www.netregs.gov.uk/netregs/275207/1631119/?version=1&lang=_e

⁵ <http://www.iom3.org/>

⁶ <http://extra.shu.ac.uk/productlife/>

⁷ <http://gow.epsrc.ac.uk/ViewGrant.aspx?GrantRef=EP/C013581/1>

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

14. Research at the ESRC Centre BRASS has examined business policies and practices in relation to waste. For example, a survey of 50 companies in Cardiff in 2003⁸ found that:

- many businesses were unaware of Duty of Care Regulations;
- little recycling was carried out due to lack of provisions and facilities from the council and lack of storage for recycling containers at the premises;
- monitoring of waste expenditure was not always common practice, especially with smaller businesses who would perhaps benefit most from this;
- the majority of small businesses (under 20 employees) had no Environmental Policy; and
- energy, waste, water, packaging, materials recycling or reuse was not a common occurrence and usually only one or two of these practices were carried out, if any.

15. The current framework does seem to incentivise the development of more sustainable products and processes; EPSRC has noted that it receives research proposals which cite this as a rationale for the funding of projects.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

16. Corporate and social responsibility is a consideration for some businesses. Some businesses are also starting to consider reuse and recyclability as an integral aspect of the design process (“design for recycling” and “through life management” thinking).

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

17. Research under ESRC’s Sustainable Technologies Programme at the University of Surrey⁹ concluded that achieving pro-environmental behaviour change demands a more sophisticated policy approach. A concerted strategy is needed to make behaviour change easy: ensuring that incentive structures and institutional rules favour pro-environmental behaviour; enabling access to pro-environmental choice; engaging people in initiatives to help themselves; and exemplifying the desired changes within Government’s own policies and practices.

18. The research found that governments influence and co-create the culture of consumption in a variety of ways. In some cases, this influence proceeds through specific interventions—such as the imposition of regulatory and fiscal structures. In other cases it proceeds through the absence of such interventions. Most often it is a combination of both. It also suggests that Government has a key role in facilitating external conditions that favour sustainable behaviour. Evidence suggests that “situational factors” such as absence of, or poor access to, convenient recycling infrastructure or appliances, lack of clear information, and so on, can hinder the pro-environmental or pro-social choice of even the most motivated individuals.

19. The research highlighted how the social context of environmentally significant behaviour is framed by a wide range of policy institutions; the regulatory framework; the structure of the market; planning law; product standards; trading standards; marketing standards; family law; distribution policy and so on. The detailed design of these institutions has enormous potential to drive or to hinder pro-environmental change.

20. Another key lesson from the research was the importance of community based social change. Individual behaviours are shaped and constrained by social norms and expectations. Negotiating change is best pursued at the level of groups and communities. Social support is particularly vital in breaking habits and in devising new social norms.

⁸ http://www.brass.cf.ac.uk/projects/Socio-Environmental_Impacts_of_Business--Commercial_and_Industrial_Waste_Survey_2003--Key_Findings.html

⁹ <http://www.sustainabletechnologies.ac.uk/> for further information on a range of related research projects, see reports at http://www.sustainabletechnologies.ac.uk/outputs_proj.htm or Programme summary report Catalysing Innovation for Sustainability at <http://www.sustainabletechnologies.ac.uk/final%20pdf/online%20version.pdf>

21. The research also highlighted the importance of the Government “practising what it preaches”, for a number of reasons. Firstly, public sector consumption constitutes a significant proportion of total consumption. Secondly, procurement practices can play a key role in stimulating markets for sustainable products and services. Thirdly, the process of changing behaviour across Whitehall provides invaluable lessons to policy-makers about what is involved. Finally, Government policies and practices send important signals to people about public priorities, and social and cultural preferences. Unfavourable or inconsistent policy signals can undermine the best efforts of Government to motivate sustainable consumption.

22. The Defra Waste and Resources Research Advisory Group¹⁰ includes EPSRC and ESRC representation. This Advisory Group was set up by Defra in 2004 to advise on implementation of the Defra Waste and Resources Evidence Programme and aims to provide strategic foresight in to the technical and policy challenges that lie ahead in the field of waste and resources management, and to take an overview of research funding activities across the waste-related area.

What lessons can be learnt from other countries—within the EU and globally?

23. A recent ESRC Report *Consumption: reducing, reusing and recycling*¹¹ summarises some key international efforts to become more resource efficient by significantly reducing waste or achieving higher rates of recycling or reuse. The author, Ben Shaw (Senior Research Fellow, Environment Group, Policy Studies Institute), argues that, despite recent improvements, the UK is still a long way behind the best performing countries and regions where taxation and household waste charges have been used to reduce landfill. However, he also notes that even the toughest penalties have not been enough to prevent a significant accumulation of waste and argues that waste reduction needs to be tackled higher up the chain of production and consumption: “Waste reduction must be a goal of UK environmental policy, and not tackled through waste policy alone”.¹²

24. The author also argues that although there are some inherent problems with “zero waste” as a concept (and as a policy objective), there are lessons to be learnt by critically considering the achievements of existing practice, wherever in the world that may be found. For example:

- we should set a *per capita* residual waste target to drive both recycling and prevention, backed up by variable charging of householders;
- we should be among the first countries to tackle consumption by making innovative and transformative producer responsibility agreements;
- we could be much more ambitious in our recycling targets;
- we should try harder on construction and demolition waste; and
- we should develop more “closed loop” systems for organic wastes, for instance by returning composted food waste to the land as fertiliser, rather than losing this valuable resource.

25. The report gives examples of zero waste initiatives which have been tried—from the high-tech, large-scale waste management systems of consumerist San Francisco, to the locally based, small-scale initiatives in the Philippines.

26. Further research supported by the ESRC *Waste of the World*,¹³ co-ordinated by the University of Sheffield, is examining newly emerging global economies in hazardous and non-hazardous wastes, examining both flows and trades in such wastes, and examining contrasting technologies of waste management in different parts of the world. For example, one project is examining experience in Denmark, where over 50 per cent of waste is incinerated, to see if any lessons can be learnt for the UK. Another project is looking at clothing recycling in the UK and India, contrasting different approaches such as the development of second-hand clothing markets and the mutilation and pulping of clothing material for re-weaving.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

27. Research at the University of Manchester, supported under ESRC’s Sustainable Technologies Programme,¹⁴ on sustainable domestic technologies in kitchens and bathrooms,¹⁵ has suggested that in order for design initiatives to be successful greater attention needs to be given to how the product/service will interact with embedded habits, routines and practices and the broader domains, for example the design and use of

¹⁰ <http://www.defra.gov.uk/environment/waste/wip/research/wrrag/index.htm>

¹¹ http://www.esrc.ac.uk/ESRCInfoCentre/Images/Consumption-%20reducing_reusing_and_recycling_tcm6-20192.pdf

¹² *Ibid*, page 11.

¹³ <http://www.thewasteoftheworld.org/>

¹⁴ <http://www.sustainabletechnologies.ac.uk/>

¹⁵ <http://www.sustainabletechnologies.ac.uk/final%20pdf/Project%20Innovation%20Briefs/Innovation%20Brief%205.pdf>

kitchens, bathrooms etc within which they occur, rather than focusing on individual technological solutions and seemingly voluntaristic action. The research notes that whilst household appliances are more efficient than ever (the electricity consumed by new refrigerators and freezers dropped by 35 per cent between 1994 and 2004), the amount of energy they consume has remained stable; the domestic sector has generally been unable to decouple resource intensity from patterns of domestic consumption. The research highlights that the key issue is not the efficiency of one technology or another, but the resource intensity of the practices and the expectations such technologies sustain. These practices and expectations were found to be malleable, with potential for them to involve less consumption, but this was largely a result of changing routines as a part of “normal life”, which may be stimulated, facilitated or impeded by physical environmental/technological factors, rather than as a result of conscious efforts to achieve more sustainable consumption by consumers.

28. See also response above to “Can better designed products offset the increase in consumption?”.

What role do marketing strategies play in influencing more sustainable design?

29. Research at the University of Leeds under ESRC’s Sustainable Technologies Programme¹⁶ suggests that marketing campaigns are working to reinforce or change attitudes in terms of increasing public concerns about environmental issues but that consumers are struggling to translate this into their purchasing of “greener” products or services. The research suggested that this may in part be explained by the increasingly complex decision-making processes and choices that consumers face which may often result in trade-offs between conflicting issues (for example there may be many environmental or ethical issues surrounding each choice) and can involve a complexity of information. It found that being an “ethical” consumer is double the work and that for “green” consumers for whom time is a scarce resource this can be an important constraint on their ability to act on their intentions. In terms of marketing strategies the research suggested that it is important to be aware of all the possible contact points between the product/service and consumers (eg media articles about products, in-store product information, etc) and the importance of presenting a coherent and transparent philosophy and messages across all of these contact points. The research suggests that consumers want more reliable information on the impacts of the products and companies. They also want to know which impacts to prioritise when comparing products. Consumers need clear direction through incentives and disincentives rather than just education.

30. The ESRC Centre BRASS has conducted research on a number of different aspects of waste reduction at the production stage and in consumption. In the recent ESRC Report *Consumption: reducing, reusing and recycling*,¹⁷ Professor Ken Peattie argues that a key tool in the development and implementation of consumption reduction policies is “social marketing” (SM), which involves using commercial marketing techniques to influence their behaviour for the benefit of society as a whole. Key features of social marketing approaches in this context include:

- SM campaigns can involve the de-marketing of a particular type of product or behaviour (eg littering) or the promotion of a particular type of product or consumer behaviour (eg engaging in recycling);
- like commercial marketing, SM is founded on research that seeks to understand the target market, the competition and the marketing context; and
- SM has its own marketing mix based on “propositions” not products: “accessibility” to information, solutions and alternatives; two-way communication rather than promotion; and “cost of involvement” rather than price.

31. Potential benefits of a Social Marketing approach include:

- instead of focusing on the message, SM focuses on the target audience’s point of view, taking account of any physical or emotional barriers that may prevent people from changing their behaviour; and
- the focus on the benefits of a greener lifestyle avoids sending ineffective guilt messages about environmental damage. This could help connect consumers with the idea of sustainability and encourage them to reduce their consumption.

¹⁶ <http://www.sustainabletechnologies.ac.uk/final%20pdf/Project%20Innovation%20Briefs/Innovation%20Brief%207.pdf>

¹⁷ http://www.esrc.ac.uk/ESRCInfoCentre/Images/Consumption-%20reducing_reusing_and_recycling_tcm6-20192.pdf

Are there any gaps in knowledge in this area?

32. Whilst we have made significant steps forward in understanding consumer attitudes, behaviour and practices, considerable challenges still remain in developing effective strategies and drawing together different approaches for achieving change which will be effective for different groups of consumer and in different contexts. The ESRC, Defra and Scottish Executive will shortly be launching a consultation to consider the possibility of establishing a joint research centre which would consider these issues further. Such a new research centre would complement existing research initiatives in the field. This includes the ESRC Group on Lifestyles, Values and Environment (RESOLVE)¹⁸ at the University of Surrey, which was funded as a part of the Research Councils Energy Programme, and the ESRC Centre BRASS.¹⁹

OTHER COMMENTS

The Committee would also be interested to hear about any other issues not already covered by this call for evidence that are relevant to the scope of the inquiry.

33. The notion of the “closed loop”—recycling resources so that, where possible, they go back to their original use is gaining ground. Examples, include turning plastic bottles back into plastic bottles, returning composted food waste to the land as fertiliser and designing manufacturing systems so that all processing aids, such as solvents, are cycled indefinitely within the factory or, better still, eliminated completely. Closed loop thinking is potentially useful as much current “recycling” is actually “downcycling”, involving only one or two further uses of the materials before they become waste.

34. Another ambitious approach is “cradle-to-cradle”, a vision of the future in which all resources circulate around one of two cycles—a biological cycle where things that come from the land are returned to the land but with all toxic, persistent and bioaccumulative materials removed and a technical cycle whereby non-renewable resources are not allowed to escape from economic productivity but are endlessly recycled. These notions are discussed further in an ESRC public policy seminar series briefing report on *Consumption: reducing, reusing and recycling*.²⁰

October 2007

Memorandum by the Technology Strategy Board

We are pleased to respond to the Committee’s call for evidence for the inquiry into Waste Reduction.

The role of the Technology Strategy Board (an executive NDPB) is to:

- promote and support research into, and development and exploitation of, science and technology for business benefit for economic growth and quality of life;
- deliver a programme of financial support to encourage business investment in, and use of, technology across all sectors in UK;
- provide leadership to government departments and agencies and work with RDAs, DAs and the Research Councils on technological developments and innovation of importance to UK business; and
- advise Government on areas where barriers exist to the exploitation of new technologies—and put forward recommendations for removing them.

The Technology Strategy Board supports research across the whole of the economy. It focuses on a number of Key Technology Areas which provide the framework for deciding where the Technology Strategy Board should invest funding and support activities. Focused on areas where the UK has capacity to develop and exploit the technology, and where there is global market potential, they consist of horizontal technologies which underpin many areas of the global economy and application areas which represent main market opportunities. The areas are:

Horizontal Technologies:

- Advanced Manufacturing.
- Advanced Materials.

¹⁸ <http://www.surrey.ac.uk/resolve/>

¹⁹ <http://www.brass.cf.ac.uk/>

²⁰ http://www.esrc.ac.uk/ESRCInfoCentre/Images/Consumption-%20reducing_reusing_and_recycling_tcm6-20192.pdf

- Bioscience.
- Electrical, Electronics and Photonics.
- Information and Communication Technologies.

Application Areas:

- Environmental Sustainability.
- Energy Generation and Transmission.
- Healthcare.
- Transport (focus on aerospace and automotive).
- Creative Industries.
- High Value Services.
- Built Environment.

The interventions used by the Technology Strategy Board include support for Collaborative Research & Development projects, Knowledge Transfer Networks and Innovation Platforms which are focused on major societal challenges and help to link research to public procurement opportunity.

In the specific area of resource efficiency and waste, the Technology Strategy Board is currently supporting collaborative R&D projects with funding of £36 million delivered through six calls held since November 2004:

- Waste management and minimisation (November 2004);
- Meeting the challenge of the Zero Emission Enterprise (April 2005);
- Contaminated land remediation technologies (November 2005);
- Design & Manufacture of Sustainable Products (November 2005);
- Energy Efficiency Technologies (including Building Design and Controls and Manufacturing Processes) (April 2006); and
- Zero Emission Enterprise 2 (Autumn 2006).

In addition to these calls, the Technology Strategy Board is supporting many other projects (650 collaborative R&D projects currently with funding of over £500 million) many of which also have some form of positive environmental impact. The advanced materials research also supports research on recycling.

With the exception of waste management & minimisation and contaminated land remediation technologies, the resource efficiency and waste reduction calls have focused on promoting innovations in the upper levels of the waste hierarchy. Two case studies can be found at Annex A.

BETTER DESIGN AND THE USE OF MATERIALS

A report by the European Environment Agency concluded that gains in technical efficiency are being offset by increases in consumption.²¹ This is not to say that better design cannot offset the increase in consumption but the trajectory is not yet right and technical and non-technical interventions will be necessary to achieve this. Benefits in efficiency may be offset, or even negated in what has been termed the “rebound effect”. Improved efficiency levels reduce the cost of goods or services, which are then consumed more intensively. Alternatively cost savings may be redeployed elsewhere in increased discretionary spending (for example a new flat screen television, or a holiday overseas). The extent of the Rebound Effect is controversial, but certainly the relationship between improved efficiency (through product design) and decrease in consumption is not linear.

The UK has good academic capability in the area of life-cycle assessment (LCA) and large multinational companies often also have expertise, although this may not be UK-based. Mid-sized and small companies generally do not have sufficient capability in LCA, which is perceived as being expensive and time-consuming. There is scope for best practice sharing and development of cheaper, quicker LCA-based tools that can be used early in the innovation process.

A database which allows designers to judge one material against another would be a useful introduction. We are aware that Materials UK has been exploring this. The problem is that data exist at a number of levels and that needed to make life-cycle relevant decisions is not validated. That leads through to the fact that, without valid comparisons, it is impossible to have a regulatory or standards framework that works.

²¹ Sustainable use and management of natural resources, EEA report No 9/2005. http://reports.eea.eu.int/eea_report_2005_9/en

BUSINESS FRAMEWORK

The Technology Strategy Board has supported initiatives to encourage business to design out waste as early in the process as possible, rather than introduce end of pipe solutions. Two initiatives in particular, “Meeting the challenge of the Zero Emission Enterprise” and support for collaborative R&D projects in the area of Design and Manufacture of Sustainable Products have looked at designing better processes and also designing better and more sustainable products.

“Meeting the challenge of the Zero Emission Enterprise” competition first held in April 2005 and again in November 2006, aim to encourage business and academic communities to focus more on the top of the waste hierarchy. The Zero Emission Enterprise was proposed as a “challenge” to encourage projects which offered integrated solutions to tackling the negative impacts produced by an enterprise. This could be achieved through encouraging better process design, the use of new or improved materials, and process optimisation, which includes better in-line recovery, separation and reuse of materials.

The projects supported are expected to deliver innovative solutions to the challenge of eliminating the amount of industrial and commercial waste (covering solid, liquid and gaseous waste streams) being generated as well as creating processes that are more resource efficient. Additional benefits from actions in this area would also likely include water savings, energy efficiency gains and reduced effluent and gaseous emissions.

Projects being supported include the replacement of old, energy intensive and wasteful process with a low energy, low waste, solvent free and cost-effective manufacturing process and a project looking to deliver solutions to the identified problems, spanning the full life cycle of a decorative paint, which address all the identified environmental impacts.

The Design and Manufacture of Sustainable Products call held in November 2005 offered a challenge to organisations to collaborate in the research and development of innovative, sustainable products. Falling product prices due to globalisation of production, high product churn rates due to fashion, shorter product development timescales and high rates of technological change are all having an impact. Technological solutions to overcome the challenges could include: materials substitution, lightweighting, de-materialisation and decarbonisation; design for efficiency during use; and design for disassembly and remanufacture, reuse and recycling; and novel approaches such as inspiration from nature (biomimetics) or combinations of innovative products with tailored services.

Innovative producers are responding to these challenges in part by adopting a sustainable design approach to new products and services. The best of these offer features, form and function as good as or better than conventional products, with more benign environmental impacts, and with positive effects on the producers’ costs and competitiveness.

Projects supported include:

Future Generation Plastics for Ultimate Sustainability (FuturePlas) project which is looking to reduce the amount of plastic used to make a component by 30 per cent, reduce component weight by 30 per cent (hence reduce energy use through life), and improve the recyclability of reinforced plastics (thereby diverting material from landfill). This will be achieved by developing the next generation of lightweight, high strength, recyclable polymers, reinforced with polymer fibres, to produce self-reinforced plastics.

REFLECT: Resistant Flooring from Ecological Technology. Interface, a world leader in sustainable business practice, and Queen Mary University of London are, propose to work with partners to develop further a patented ecological engineering material “Zelfo”, as a “closed loop” hard flooring system. The project will provide a sustainable option in the fast growing hard flooring market.

The Technology Strategy Board also supports a number of Knowledge Transfer Networks (KTNs) including the Resource Efficiency KTN focused on minimisation and recycling of industrial waste, the Integrated Pollution Management KTN focused on contaminated land and groundwater remediation and the Materials KTN. KTNs bring together people from businesses, universities, research, finance and technology organisations to stimulate innovation through knowledge exchange.

GOVERNMENT PROCUREMENT

Government procurement can be a powerful tool to create new markets, and pull through innovative technologies to serve these. Sustainable procurement policies exist, at national, regional and local levels, but need to be supported by demonstration activities which de-risk the process.

Innovation Platforms being taken forward by the Technology Strategy Board are designed to link research with procurement opportunity in areas where there are major societal challenges. We are currently supporting Innovation Platforms in areas including Low Impact Buildings and Low Carbon Vehicles.

An Innovation Platform creates the opportunity to bring together key partners (Government and business) to address a major societal challenge and to open up market opportunities to increase business investment in R&D and innovation. Drawing on Technology Strategy Board and other funding mechanisms, Innovation Platforms involve the integration of a range of technologies, combined with better co-ordination of policy and regulation, linked through to public procurement opportunities. Using a challenge-based approach where public procurement opportunities are made more visible over a longer period of time would give business greater confidence to invest in the research necessary and so pull through technologies to the market much quicker.

October 2007

Annex A

CASE STUDIES

Using thermal plasma technology to create a valuable product from hazardous waste

As work to recover energy from waste increases in the UK, an important issue for the industry is the development of sustainable methods for managing air pollution control (APC) residues. These are a hazardous waste generated by cleaning gaseous emissions to the levels required by regulation. Tetronics Ltd is leading a consortium to research the use of plasma technology in creating an integrated solution that produces an ecologically stable glass-ceramic product for use in the construction industry.

Air pollution control (APC) residues are a highly alkaline hazardous waste, containing volatile heavy metals, dioxins, furans and a high soluble salt content, that result from the commercial recovery of energy from waste (EfW). In the UK, the current APC disposal methods in use are likely to become commercially unsustainable, due to increasingly stringent environmental regulations. At the same time, new energy recovery capacity is expected to add to the 128,000 tonnes of APC residues currently produced in the UK each year, by an additional 40,000 tonnes every year for up to seven years.

Tetronics Ltd, a world leader in DC plasma technology, and Imperial College London have created a consortium to run a three-year collaborative project exploring the potential of applying plasma technology to the APC disposal challenge. Plasma technology is an advanced thermal conversion technology that delivers high destruction efficiencies to produce a stable vitrified slag with exceptional ecological performance characteristics. Costing £2.4 million, the project is part-funded by the Technology Strategy Board and was launched in late 2005.

Tetronics Ltd and Imperial College London, leading researchers in process development, waste reuse and materials science, are running the project in partnership with incinerator operators Onyx SELCHP and Grundon, environmental consultants Enviros, Hampshire County Council, and industrial symbiosis companies Akristos and Ballast Phoenix.

KEY BENEFITS

- reducing hazardous waste in the UK—APC residue currently totals 128,000 tonnes annually, with an expected increase of 40,000 tonnes per year over the next four to seven years;
- the creation of a proven, commercially viable waste management technology that allows treatment close to source with minimal environmental impact; and
- the development of an integrated process that transforms APC residues into a useful product, with the potential of saving 170,000 tonnes of virgin raw materials each year.

The current market value of APC residue landfill disposal is some £21 million per year, and with rising volumes and increasing levels of landfill tax this may reach £47 million per year within three to six years.

The team believes that a plasma-based technology addressing the environmental issues will take a significant percentage of this market, creating a major commercial opportunity alongside its environmental and social advantages. It also expects that applying plasma technology to APC management will significantly reduce reliance on landfill disposal and cut the use of raw materials in construction. In addition, the efficiency of the process minimises the scale of treatment plants, enabling economically viable local waste management.

RECYCLING CARBON FIBRE

Researchers working on the HIRECAR (High Value Composite Materials from Recycled Carbon Fibre) collaborative R&D project are finding ways to recycle carbon fibre composite materials for use in car manufacture and other applications.

Current annual worldwide carbon fibre consumption is 30,000 tonnes. The principal markets are aircraft, racing cars and sporting goods. At present there is no way to recycle carbon fibre materials—more than 100 tonnes of highly valuable material, either end-of-life goods or scrap from manufacture, goes into landfill every year in the UK alone. These materials can cost as much as £120 per kilo. The high stiffness and strength and low density of carbon fibre composites could be used in new designs to reduce the weight and increase the safety of family cars, resulting in significant reductions in emissions and fuel consumption.

A research project funded by the Technology Strategy Board is working on ways to extract the high value carbon fibre from end-of-life components and from manufacturing scrap, typically offcuts of woven “prepreg”—materials impregnated with epoxy resin which are typically used in military aircraft and racing cars.

The University of Nottingham is the lead partner in the project, which also involves: Advanced Composites Group, Dow Automotive, Ford Motor Company, Technical Fibre Products and Toho Tenax GmbH. The project started in March 2005 and runs for three years.

KEY BENEFITS

- reducing the environmental impact;
- new ways to restrict noise and fuel emissions; and
- finding sustainable solutions to problems that affect all major uses of carbon fibre.

OBJECTIVES

The aim of the project is to find ways to recycle scrap carbon fibre materials and convert them into useful materials. This will provide a sustainable lifecycle for carbon fibre for use in automotive applications and enable a step-change in design and performance of vehicle structures. It will help automotive manufacturers meet EU end-of-life directives for the next generation of vehicles. These state that 80 per cent of the materials used in a new car have to be genuinely recyclable. At present, this limits the amount of carbon fibre that can be used in vehicles—because there is no viable way to reuse it.

Use of carbon fibre in cars will reduce the weight of vehicles, and so lower fuel consumption. It will also increase car safety, because the carbon fibre materials are extremely strong and can absorb much higher levels of impact energy.

SOLUTIONS

The team has developed two methods for recovering the carbon fibre materials: The preferred route for end-of-life components is a fluidised bed technology where the fibres and resin are separated at high temperatures, energy is extracted from the polymer and the fibres are left in a clean condition, but with slightly reduced properties. The use of supercritical fluids on scrap new materials has been studied for the first time.

The project is looking at three ways of using the recycled carbon fibres: in bulk moulding compounds for smaller, non load-bearing components; as a sheet-moulding compound, where carbon fibre is rolled together with sheets of polymer; and as recycled materials in load bearing, 3D shell structures, such as the floorpan of the vehicle.

RESULTS

Recycled carbon fibres have been made into bulk and sheet moulding compound forms and have been successfully moulded into laboratory-scale samples. The team intends to characterise the issues around supercritical fluid type, temperature, pressure, and yield for the typical epoxy-based resins used in composite material manufacturing processes.

Memorandum by the Resource Efficiency Knowledge Transfer Network

SUMMARY

Many of the products, processes and systems that we now employ were developed before the importance of sustainability was fully recognised. By focusing on the first level of the Waste Hierarchy the Select Committee's inquiry will examine fundamental issues that can have significant medium to long term impact on sustainability.

Whilst it is important to strive to improve on current systems it is vital that we carry out a full re-assessment of what we do, how and why we do it. This type of analysis will help us to identify more sustainable systems. We must engage individuals and organisations and motivate them to make contributions.

To fully evaluate Eco-design (Design for Sustainability, DfS; Design for Environment, DfE) there are many inter-related factors that must be considered. If a true comparison between a new product, or process, and existing practise is to be made a recognised measurement system must be in place. The comparisons that are made today usually focus on a single factor or consider specific products. However in order to facilitate global communication and dissemination of best practices it is essential that international standards for eco-efficiency/sustainability indices are developed and adopted quickly. These systems must be practical and easy for businesses to take up and for the general public to comprehend. They will provide all stakeholders with the yardstick that will enable them to assess their situation and to take the appropriate decisions.

It is important that these measures are then used to promote step change in addition to incremental improvements.

The need for rapid improvement must be communicated to the whole community. Sustainability will not be achieved by a series of technical fixes but we can become more sustainable through a combination of social measures and by adopting technology that is more compatible with the bio-sphere.

BACKGROUND

We believe that it will take a concerted effort and a coherent strategy to adopt policies and to co-ordinate all of the elements of society to make effective and rapid movement to a more sustainable future. By tackling the issue of waste reduction at the design stage the inquiry will address issues that can have major impacts in the medium to long term. This should be done in parallel with other initiatives that focus on the more immediate "end of pipe" waste management/disposal issues. There must be a drive to improve all aspects of the efficient use of resources and to create conditions that foster continuous improvement.

Technology alone cannot provide the solution. The wellbeing of citizens must be integrated with programmes and innovations that give careful consideration to the global situation. We need to engage with the citizens and enable them to learn and develop their understanding of the need for more sustainable behaviour. This process must re-assess the balance between the relative burdens/costs of material use with the potential/cost of human resources. If we are to live more sustainably within the constraints of the biosphere we need to adapt and to learn how to do more with less material. If we do not there is a strong probability that conflicts will arise over access to resources.

The UK will be in the best position to build a sustainable economy and contribute to improving the global situation if it is in a position to develop and demonstrate processes and products that are eco-efficient (eg use fewer resources, generate less waste and are compatible with the environment).

To achieve the maximum benefit the application of a Waste Reduction strategy must be a component of an integrated sustainability programme (perhaps the term Resource Management would be more appropriate).

The Resource Efficiency Knowledge Transfer Network interacts with all of the stakeholders in the community and we have attempted to capture the "big picture". We fully agree with the importance that the Select Committee has attached to Waste Reduction as indicated by the title of our annual conference this year ("Designing out Waste—Gaining the Advantage"). We have tried to respond to the questions raised but the fact that these are often inter-related means that the answers are contained within the relevant headings and there may be some overlap and repetition.

BETTER DESIGN AND USE OF MATERIALS

It is important to remember that waste does not only occur as material (solids, liquids and gases) but also in the form of other resources such as energy, finance, human, land, opportunity, etc.

Although we should not get too bogged down in semantics it is preferable to consider materials that are not the main output of a process as “by-products” rather than wastes. These by-products become waste if they cannot be utilised effectively. An efficient process will minimise the resources utilised and the volume of wastes generated.

Many existing industrial processes have been developed and optimised over a number of years and so the scope for efficiency improvements in them is generally limited to incremental gains. Conventional process optimisation has tended to focus on local (factory unit) issues rather than encompassing “the bigger picture”. Approaches to waste management for example tend to be driven by expediency, dealing with waste arising, rather than seeking fundamental solutions that would eliminate or reduce waste generation. In the past the tendency has been for design to walk the tightrope between cost and function. As new legislation takes effect and the availability of disposal facilities declines the cost of the disposal option is increasing. This motivates business to take “cradle to grave” life cycle impacts into account. Key management information and decision making tools will be required together with a suitably qualified workforce to make businesses sustainable. The optimisation of existing processes should not be abandoned because there are still gains that can be made in the short to medium term. However step changes can only be achieved through the development of new technologies and/or approaches.

We believe that the sustainability aspects of a product or process must be considered at the design stage because this is where the most impact can be made—it has been estimated that 80 per cent of the overall product/process life cycle costs (financial, material, environmental) are determined at the design stage. Thus it is far more effective to design out waste at this stage rather than to treat it, retrospectively, at the end of pipe.

In the past products have been developed taking the following factors into account:

- specification/Performance;
- specific cost (per unit of performance);
- availability (price variability);
- Aesthetics (were these are relevant); and
- marketability (can the product be delivered profitably).

As environmental and waste management regulations have been developed and adopted these have started to impact on process costs and have become part of the equation (albeit from the view of complying with regulations rather than from a desire to be more sustainable).

The rather segmented or “silo” approach to our education and training systems has meant that it is rare to find individuals with all of the necessary skills. However with modern ICT systems it should be possible for project managers, designers, or design teams, to ensure that due consideration is given to sustainability. For the design process to be effective it is important that all of the players in the design team have an understanding of the principles of sustainability. Institutions such as the Royal Academy of Engineering and others (IMechE, ICE, IChemE, IOM³, etc) are supporting developments in this area and the concept of sustainability is being developed in Primary and Secondary education. It is important that these initiatives and programmes are endorsed and expanded so that sustainability is a concept that is understood by all and becomes a part of their approach to life.

The role played by design and materials is a bit similar to the chicken and egg situation. It is possible to conceive of a design for a chicken or, as Bessemer did in 1856, of an oxygen converter for molten pig iron, however it was not until the appropriate materials were available that the concept could be realised (nearly 100 years later). Thus the development of new technologies and materials are interdependent and essential for more sustainable designs.

What is vital now is for the design team to take sustainability into account during the development of products or processes.

The things that need to be considered include:

- the environmental impact of producing the input materials/components;
- the environmental impact of the process/product during “service life”; and
- the fate of the products/components at the “end of life”.

There are however problems in obtaining the appropriate information for selecting and evaluating a product or process on the basis of sustainability. There are various claims made about eco-efficient products. Some products have been classified according to single factor performance ratings (eg Energy Ratings for electrical goods, CO₂ emissions for automobiles) however these do not give the whole story. There are several agencies trying to develop appropriate standards based on the concept of Life Cycle Analysis (LCA) such as the UNEP/SETAC programme that is being supported by the EU.²²

At present these systems are complex and not straightforward for businesses or individuals to access. The EU is looking at ways of establishing appropriate measures and standards as part of their action plan for Sustainable Production and Consumption and Sustainable Industry Policy. The Japanese are working in this area with a NEDO (New Energy and Industrial Technology Development Organisation) grant funding a project for the International Development and Standardisation of Environmental Information Indices for Materials. The scope of this project is defined as:

“Coexistence of economic health and reduced environmental burden is essential to sustainable development of our societies. In order to reduce the environmental burden of industrial products in a free trade system, we must develop the international indices for disclosing environmental information of traded materials and standardize them internationally for buying and selling. In this project, Japan leads the international development and standardization of the indices and the open framework for the indices to construct a foundation for sustainable development”.²³

Until the appropriate measures and standards are in place the concept of Life Cycle Thinking and Integrated Product Policy are being developed.²⁴

In addition to the factors given above the designers must consider:

- design for minimising resource use (commensurate with performance);
- design for process/product efficiency;
- consider appropriate design life;
- design for environmental impact;
- Human/Social Considerations (Health and Safety);
- design for material compatibility (in use and for re-use);
- end-of-life considerations;
- design for re-manufacturing;
- design for repair;
- design for dismantling;
- Can recycled inputs be used? ;and
- Are substitute materials available?

The EU appears to be moving towards the concept that taxes on material consumption should be increased and those on employment should be decreased.

The question “Can better designed products offset the increase in consumption?” is really the wrong way to approach the problem. It implies that the trend for increased consumption is inevitable. Is this necessarily the case? Can continued growth be sustainable in itself, given the huge populations in developing nations such as China and India? The seminal work *Factor Four, Doubling Wealth, Halving Resource Use* (A Lovins, et al 1997 ISBN 0-13-046713-8) puts the case for a fourfold increase in resource productivity. This is now considered by many to be a minimum aspiration, and Factor X is frequently cited as a necessary objective to enable sustainable ‘one-planet’ living, since the developing nations aspire to the standards of living attained in “the West”.

We must also reflect on the meaning of the word consumption. This is not straightforward because the precise meaning can depend on the context in which it is used. In a social context the “Consumer Society” is associated with a throw-away culture. In financial or economic terms the definition has been given as:

“Using a product or service until it has no remaining value” or

“The using up of goods or services, either by consumers or in the production of other goods”

²² <http://www.unep.fr/pc/sustain/lcinitiative/home.htm> and the International Standards Organisation, with the ISO14040 series of LCA standards.

²³ <http://www.nedo.go.jp/english/archives/170927/attach.html>

²⁴ <http://www.europarl.europa.eu/sides/getDoc.do?language=EN&pubRef=-//EP//NONSGML+TA+P5-TA-2004-0349+0+DOC+PDF+V0//EN>

In terms of the environment the following definition has been proposed:

*“Consumption consists of human transformations of materials and energy. Consumption is environmentally important to the extent that it makes materials or energy less available for future use, moves dynamically stable biophysical systems toward a different state or, through its effects on those systems, threatens human health, welfare, or other things people value”.*²⁵

Without getting too tied down in definitions it is clear that in some cases a resource may undergo a significant change when it is utilised. For example hydrocarbon materials undergo a complete change in characteristics when they are used in combustion processes. Other items that are currently considered to be at the post-consumer stage do not even have zero value at the end of their design life. Many materials such as metals have significant “value” at the end of their service life—which is why the scrap metal industry has developed into a global business.

R Ayres *et al* have developed the concept of Exergy to help account for the “value” that may be present in materials and systems.²⁶

T Graedel and others have developed the concept of Industrial Ecology:²⁷

“Industrial Ecology is the means by which humanity can deliberately and rationally approach and maintain sustainability, given continued economic, cultural and technological evolution. The concept requires that an industrial system be viewed not in isolation from its surrounding systems, but in concert with them. It is a system view in which one seeks to optimise the total materials cycle from virgin material, to finished material, to component, to product, to obsolete product, and to ultimate disposal. Factors to be optimised include resources, energy and capital”.

The growth in consumption resulting from the development of new economic powers (eg China & India) will have implications for the biosphere (climate change concerns). If “consumption” patterns in these economies match the demand in the developed countries, in terms of specific consumptions rates (kg/person), this will lead to material shortages in the future. This could result in conflicts over access to resources; increased competition for access to “natural resource” is a factor considered in military future scenario planning, see “The DCDC Global Strategic Trends Programme 2006–36”.²⁸

Thus the urgency for improved design for resource efficiency and sustainability is important at the national and global level. It is important that international collaboration makes the best possible use of the resources that are available in this area of research and expertise. The UK has a well established academic base and world class companies so the aim should be to grow the knowledge base in this area to ensure that the UK can play a significant role in this field.

BUSINESS FRAMEWORK

In the past business may have considered environmental legislation as an imposition of cost on their operations. They are now more aware of their image and the public perception of them in terms of their environmental stewardship and Corporate Social Responsibility. In the past environmental legislation has been imposed on businesses by public agencies and business has not always felt fully engaged in the development of legislation. Regulation appears to have been introduced in a haphazard way without a clear overall strategy or emphasis on the most important factors/sectors.

Businesses are starting to consider their environmental performance and the potential liabilities. They are engaging with environmental authorities to develop workable legislation (such as the disposal of “end-of-life” products and materials). However, until suitably qualified engineers and managers with background knowledge of Sustainable Engineering come through the system, businesses will need the support of government programmes (such as the National Industrial Symbiosis Programme—NISP, Envirowise, WRAP and the Knowledge Transfer Networks).

The social, geographical, economic and demographic conditions in Japan are such that Japanese businesses have taken a leading role in the way global businesses can address sustainability issues. It is important that uniform international Eco-efficiency standards are developed and applied. They have accepted sustainability as a central part of their business strategy and a large home population helps them to develop new methods and practises.

²⁵ <http://www.iisd.ca/consume/stern.html>

²⁶ *Sustainable Metal Management and An Application of Exergy Accounting to Five Basic Metal Industries.*

²⁷ T E Graedel & B R Allenby—*Industry Ecology*—2003 ISBN 0-13-046713-8.

²⁸ <http://www.dcdc-strategictrends.org.uk/viewdoc.aspx?doc=1>

Businesses have to design products and processes that are compliant with the relevant national regulations. Clarity and uniformity are important and the regulators and business should work to get together to identify the areas where the biggest impacts on sustainability can be made. Rewards in terms of allowances or tax refunds should be considered as ways of promoting improvements in the eco-efficiency of a product or a process.

Business areas and industries that are dominated by large companies or multinationals are already responding to the “greening” of demand. As a result of WEEE, REACH and other legislation, manufacturers are taking a closer look at the materials used in the production of their products. The whole supply chain needs to be involved in the design process and the Government might wish to provide appropriate support for getting this message across to SMEs in the UK.

Even though products may be manufactured elsewhere British companies could play a significant role in developing “green” designs. For example a company based in Cambridge (Granta) has developed an international presence in the field of Material Selection and Intelligence.²⁹

GOVERNMENT POLICY

The Government has initiated educational programmes at different levels and provides business support programmes at the national and regional levels. It is important that these can be co-ordinated effectively so that the maximum benefits can be derived. Sustainability needs to be integrated as a core element of the education process.

The NISP programme is considered by ETAP to be an Eco-exemplar programme and other countries have consulted with them. Britain should learn from the experience and best practises in countries such as Japan, Germany, Holland, Sweden and Denmark.

Programmes that encourage businesses to co-operate to make the best use of facilities and by-products, like Envirowise and NISP provide support in these areas. The issues arising from the waste definitions are a problem because these can be barriers to the utilisation of by-products (bureaucratic regulations and administration costs). The Environment Agency’s move towards risk based management should be encouraged and businesses should work with the EA and other stakeholders to develop co-operative programmes that can improve sustainability.

The Technology Strategy Board can provide guidance on technological areas where the UK can compete in global markets. Through its collaborative research and Knowledge Transfer Networks it is providing support for more rapid and effective deployment of innovation.

Funding initiatives such as the Carbon Trust programme can be useful but these programmes must be sufficiently flexible to help to bring innovative technologies and processes to the market. If the UK is to develop the lead in new technologies there must be ways to support the demonstration of processes that are new and carry risk profiles that may not attract private finance. Collaboration between Regional Development Agencies and other programmes should be co-ordinated towards this goal. It is important that EU regulations that are supposed to prevent unfair competition do not inhibit projects that could make significant contributions to sustainable development.

The UK Government will have responded to the recent EU consultation which aims to develop coherent action plans for Sustainable Production and Consumption and Sustainable Industrial Policy. If EU funding can be used effectively it will allow UK projects to compete with those funded in Japan and the US. The policies and programmes in Japan would appear to be the most developed although there may be lessons that can be learnt in specific areas from other areas such as California, Japan, Germany, etc. There are several on-going projects in Europe under the UNEP Marrakech Task Force programme.³⁰

It is unlikely that better product design will have a significant impact on consumer behaviour without the appropriate information and education programmes. These products can appear to be too costly for widespread adoption. Some form of support and/or tax concessions might be necessary to kick-start “Lead Markets”. The Council for Science and Technology (CST) has recently conducted a review of technology areas where the UK may be in a position to compete on a global scale. Eco-design should be one such area since the design industry in the UK is considered to be being world class.

Research groups funded by the Research Councils like RESOLVE run by Professor Tim Jackson at the University of Surrey and the “Network of Product Lifespans” run by Dr Tim Cooper at Sheffield Hallam University are looking at the social aspects of sustainability.³¹

²⁹ <http://www.grantadesign.com>

³⁰ <http://www.uneptie.org/pc/sustain/10year/taskforce.htm>

³¹ <http://www.surrey.ac.uk/resolve/> Network on Product Life Spans.

Marketing strategies are clearly important. Modern advertising has tended to focus on developing sales volume. The constant development of new designs, pattern, models and gadgets has tended to fuel the “consumer” or “materialistic” behaviour. Can market strategies that focus on eco-efficiency and “de-materialisation” be made to be more effective? To do this they may need to sell service rather than products (a car that will run at certain efficiency levels for 250,000 miles for example sold at a price per mile). Rolls Royce strategy for selling aircraft engines is moving in this direction (selling power by the hour). Xerox are another well known example, providing a document copying servicing while retaining ownership of the copiers themselves, allowing units to be remanufactured at the end of their first life and subsequently sent back out into service as new multiple times; representing on each occasion a saving of 92 per cent by weight of material compared to being sent to landfill. The Research Council funded BRASS research group lead by Professor Ken Peattie (Centre for Business Relationships, Accountability, Sustainability and Society) was established to develop understanding and promote the vital issues of sustainability, accountability and social responsibility, through research into key business relationships.³²

SKILLS

Professional Institutions and organisations such as the Royal Academy of Engineers, have been active in promoting sustainable engineering and others such as, the Institute of Mechanical Engineers, Institute of Chemical Engineers, Institute of Civil Engineers, etc also have sustainability programmes. The Institute Materials, Minerals and Mining sponsor material based design courses and competitions for schools and university students.

It is important that the whole population should be mobilised so sustainability should be taught across the whole education system. Instilling awareness of sustainability at an early age would be an effective way of impacting on the behaviour of future generations.

The Design Council provide useful support for business and have published a guide to sustainable design which includes examples.³³

If international standards for eco-efficiency can be agreed then specific programmes for the rapid dissemination and utilisation of these throughout the UK business community would be vital. The Resource Efficiency KTN is actively supporting these developments through work with a UK—Japan workshop and the Brussels based Resource Efficiency Alliance.

Another source of useful information and an excellent centre for research and training comes from the Centre for Sustainable Design where Professor Martin Charter is based.³⁴

22 October 2007

³² <http://www.brass.cf.ac.uk/about.html>

³³ <http://www.design-council.org.uk/en/About-Design/Business-Essentials/Sustainability/>

³⁴ <http://www.cfsd.org.uk/>

Examination of Witnesses

Witnesses: DR PETER HEDGES, Head of Economy, Environment and Crime, the Engineering and Physical Sciences Research Council, DR JOHN WHITTALL, Lead Technologist, Sustainable Technologies, Technology Strategy Board, MR ARNOLD BLACK, Network Director, Resource Efficiency Knowledge Transfer Network, and MR JEREMY TAIT, Programme Manager, Market Transformation Programme, examined.

Q425 Chairman: Good morning. Welcome to this session. We are very pleased to have you here. We are grateful for the evidence you have given. Perhaps you could introduce yourselves and then we will take it from there.

Dr Whittall: Good morning. I am the Lead Technologist for Sustainable Technologies at the Technology Strategy Board. Within that area, we have the sub-area of resource efficiency, waste and pollution management.

Mr Tait: My name is Jeremy Tait. I work for a large environment consultancy called AEA Technology and I am the Programme Manager for Defra's Market Transformation Programme. Colleagues of mine at AEA also manage the Government's Envirowise Programme and other government environmental support programmes.

Dr Hedges: I am Dr Peter Hedges. I am Head of the programme of Economy, Environment and Crime at the Engineering and Physical Sciences Research Council (EPSRC). I am here also representing Research Councils UK.

Q426 Lord Lewis of Newnham: Mr Lord Chairman, this fascinates me. What is your connection with the environment and crime?

Dr Hedges: I manage a portfolio which covers manufacturing, sustainability, ageing and also crime and terrorism as well.

Q427 Baroness Sharp of Guildford: Forensic sciences.

Dr Hedges: Yes.

Q428 Lord Haskel: Which other organisation did you say you represent?

Dr Hedges: Research Councils UK. The memorandum that we provided represented the Economic and Social Research Council as well, so I will do my best to answer questions in their portfolio.

Mr Black: Good morning. My name is Arnold Black. I work for a small innovation company called C-Tech Innovation Ltd but, more importantly, I am Director of the Resource Efficiency Knowledge Transfer Network that we run on behalf of Technology Strategy Board. Our remit is to disseminate information on best practice, support R&D in the area of resource efficient processing and technologies—mainly to the SME sector.

Q429 Chairman: In the evidence we have received, EPSRC have commented that knowledge of the properties of materials was essential for the design of

various stages of a product's life including production, use, recycling and re-use. It also added that the "need for a holistic view across the areas identified is a barrier to this process; engineering, and other designers need to have constant access to up-to-date information on materials properties and manufacturing processes". How do your research agendas and work programmes address this barrier? How could research priorities be improved to co-ordinate these different aspects and this business of not really knowing what somebody else is doing, or being able to take advantage of the most up-to-date ideas and technologies?

Dr Hedges: For us—and this is based on the experience of managing research programmes in this area over a number of years—it is quite easy to fund a particular piece of innovation that focuses on, say, one area of technology or is relevant to one manufacturing process or to one company. If you take the example of our sustainable technologies initiative, which we co-funded with DTI (as was) and the Economic and Social Research Council, that was quite successful at funding an individual project which led to some kind of business advantage in a particular technology area. However, when we looked at the broader issue of how do you achieve resource efficiency in the long term, and certainly thinking towards, for example 2015 and the 60 per cent CO₂ emissions targets, we looked at the need to have a more holistic understanding of the whole resource and energy life-cycle. In order to do that effectively—as is always the case when you adopt a life cycle approach—it is: How do you identify boundary conditions and how can anybody who is involved in the design and decision-making process be aware of the optimised solution? The challenge is that the ultimate optimised solution may involve increased costs at one stage or another, therefore, how can you make that overall management decision? That requires designers, engineers, right the way through to marketing, sales and everybody involved in the decision to make or market a product, and that is the challenge. In commissioning some of our other research programmes and other approaches we have tried to have more of that multidisciplinary approach. In terms of seeing some of the questions and some of the other evidence sessions, clearly there is a large number of government stakeholders who have an interest and that is a further issue for us. It means ensuring that we manage those interactions well. As a group, for example, on this table, as organisations we do interact and we are aware, for example, of our priorities and policies.

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Q430 Chairman: Could I take that one stage further. What comes first here, the chicken or the egg? How should multidisciplinary research be commissioned? Should it be best organised through managed calls for proposals or by responding to individual requests for funding? Is there a preferred option in your mind or do you have to go with whatever comes along—either your perception of the requirement or other people’s perception of the need for money?

Mr Tait: There is an important aspect to this: once a priority environmental impact or a priority product or a priority material is identified, there are some good examples of how the whole supply chain involved in bringing about that impact or issue can be brought together. Furnished with the evidence for the size of the impact and the scope for improvement, that supply chain can work very well together, building consensus on what the priorities are to move forward. The sort of work that our team on the Market Transformation Programme has done, for example, focusing on televisions—which was a particular aspect on which your Lordships heard evidence in previous sessions—by bringing together the suppliers, the retailers, researchers involved in that process, you are able to build a picture of all the policies that are impacting on that and build consensus on how these different policies and different bodies can best be brought together to address the issues arising from, for example, digital television coming in and resulting in waste impacts into the waste stream (due to replacement of older technology). Once focused around a particular issue or theme, consensus building with the supply chain is very practical.

Q431 Chairman: On this particular issue of television, could you explain to us how you hope to influence the manufacturers who, by and large, are not located in the UK and in the first instance are not really dependent upon the UK market. What is in it for them to respond to your request?

Mr Tait: Absolutely, the UK is not the biggest consumer of these sorts of products. The sale of these consumer goods and appliances is very much a global market now. Indeed, the UK has been very successful in reaching out and influencing globally the setting of standards for televisions and, indeed, it brings together some of the biggest manufacturers of these products, to sit down with the engineers, with the people responsible for setting specifications, and get them to agree on performance standards and other aspects of impacts based on the evidence. Once Defra through its programmes has gathered the evidence of the future impacts of these products—and we are not just talking about now, we are talking about 15 or 20 years into the future we can forecast the total impacts—faced with this evidence, we do find that the

big manufacturers do listen and they are keen to respond. With computer equipment, for example, evidence from the UK has been extremely influential in setting global standards for these products. By bringing together internationally governments and institutes and agencies of government, it is certainly possible to influence these global supply chains.

Q432 Lord Haskel: This section we are discussing is product design and innovation. You have explained to us we bring the supply chain together and introduce improvements that way, but would you call that innovation? How do you encourage innovation? How do you get new supply chains set up, new people coming in, new ideas?

Mr Tait: Colleagues at the table here would speak more fully than I can on bringing totally new technologies forward. The type of innovation which our programme has some track record in influencing is the incremental improvement in efficiency and waste aspects of products. Government has this year been consulting on a set of standards for products that run to 2020, so we are telling business, “These are the performance standards that government expects the market to deliver for the next 15 years or so.” Once armed with this clarity, this understanding, business can make investment decisions to work up to those standards because they know that government at the UK and European level is determined to see these standards improved and regulation will follow to ensure that happens. They want to be ahead of the game.

Q433 Lord Methuen: It has been suggested that a database which allowed the comparison of the properties of materials would be a useful tool for designers. Is this idea practicable? What are the potential difficulties involved in developing such a database and who should create and maintain it?

Dr Whittall: My Lord Chairman, could I add something in response to the previous question?

Q434 Chairman: Certainly.

Dr Whittall: The Technology Strategy Board operates in that innovation space and the approach that we have had has been to run competitions which increasingly have been challenge based. For example, we have run two competitions aimed to deliver the zero-emissions enterprise. That does two things. It has a deliberately wide remit, so we are looking to be excited by the community and have innovative ideas coming forward, and it also encourages them—the mechanism is a collaborative research and development programme—to form consortia that will bring all the relevant competencies to bear to address that challenge.

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Q435 Chairman: Do you want to come back on that too?

Dr Hedges: I have made a note to come back to commissioning at some point if it is relevant rather than take any more time. I do not know if your Lordships are aware, but there is an activity called MADE connecting materials and design, which I found out from my colleague who is our Head of Materials Programme. This is the one initiative that is specifically addressing the question of how you provide information to designers on, for example, materials properties. This is funded through the Materials Knowledge Transfer Network, so I have to cede to my colleagues in the Technology Strategy Board because they are the main funders of this. Clearly initiatives are being made to try to fill this space. How well it will work and how extensively it will embed itself in the broader design and manufacturing community remains to be seen. I do not have any experience of it myself to know how well it is going but certainly more information could be provided for you on that specific initiative.

Q436 Lord Methuen: Are you likely to run into problems with intellectual property rights in developing such a thing?

Mr Black: The view we have on this is that it is very difficult to provide relevant information in a single database because it applies to different parts of the design supply chain. For example, it would be relatively simple to recover virgin material into virgin material. Once it has been used, if you have a closed-loop system whereby it is coming from a supplier who knows what went in it originally and it is being recycled, if you like, or re-used within the process, then they already have all the composition data. But the minute it starts becoming composited into an appliance or if it is being used in the packaging cycle, for example, then it has a very different requirement for what it would do possibly in the manufacturing cycle and it all tends to get a bit mixed up. There have been some commercial developments in that arena. There has been one that we know of successfully marketed internationally by Granta Materials, based in Cambridge, looking at a very limited number of things in a database for doing that. There are some new ISO standards for determining the collection and formatting and reservation of the type of information which are due to be published this year. In fact, the Institute of Materials, Minerals and Mining (IoM³), Dr Norman Swindells, we understand, will be presenting evidence to the Committee on that as well if you need more information. Our view would be that it would be of limited use and would be extremely difficult. IPR is probably not going to be a major issue, in that most of it would be material that would be downgraded rather than upgraded. It is

going from a very specialist function to a lower grade function, so it would be probably less of an issue.

Q437 Baroness Sharp of Guildford: How far is this work international?

Mr Black: I was privileged to go on a technology mission to Japan looking at electronic scrap recycling. It has to be said, as it often is with the Japanese, they are fairly ahead of the game. They have instigated it very much in a closed loop system, whereby Hitachi or Sony—I cannot remember which one—collect all their electronic scrap back at end-of-life, then recover the plastic from it and reformulate it by adding more elastomers to it or anti-ageing compounds. They can determine how long the plastic has been out and how long it has aged and they can then determine how much of the anti-ageing compounds that are in it are used up. They can re-compound it and bring it back again. But that is a pretty unique supply chain.

Q438 Baroness Sharp of Guildford: Dell are doing that with their computers here?

Mr Black: No. It would be very difficult here because we have a much more diverse supply chain, a very different mechanism for collection. We generally have a very unsegregated waste recovery chain which makes it very difficult to do that.

Q439 Earl of Selborne: Is that not one of the problems with IPR, that it is the system we are imposing it on which is the problem, rather than the idea of IPR. The WEEE Directive is a very broad-based Directive. Why not take various aspects of that Directive; for instance, televisions sets or computer and things of that sort? I believe there is a firm in Gloucestershire at the moment which is doing a lot of the work here and recovering a lot of the plastic and separating the plastic using a separation technique that has been developed in Germany.

Mr Black: Yes, there is. If you can segregate the component supplied at end-of-life, then it becomes much easier. With PCs and televisions, for example, and to some extent, increasingly, LCDs, it is quite common, simply because they are easily recognisable, they are fairly large, bulky items and people are prepared to take them back. When the WEEE Directive covers everything from singing Christmas cards all the way through to electronic toothbrushes, I am afraid these things are going to end up in the wheelie bins as municipal waste if we are not careful.

Lord Haskel: As it has been mentioned and for the sake of openness could I just say: I am the Honorary President of the Materials Knowledge Transfer Network.

Chairman: Thank you.

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Q440 Earl of Selborne: We have been told there are gaps in knowledge regarding the recognition of materials when a product is disassembled and the ways in which materials can best be recycled and reused. What role could the use of so-called “smart” materials and radio frequency identification tags play in aiding the disassembly and sorting of materials at the end of a product’s life?

Dr Hedges: I think it is going to vary a lot depending on the value of the material that you are wanting to tag and the nature of the product it is in. The example has already been quoted of, say, a PC. A PC box is relatively large and you can imagine that the components that are inside it are probably sufficiently valuable that it would make sense to put an RFID tag on, so that when it is extracted you can find it. The issue, when you drill down, for example, to a mobile phone, which is physically a lot smaller, is therefore the technology of what sort of tag you might use but, also, the value of the components and the cost of disassembly. I note that you took evidence from Nick Morley who I know is doing a lot of work on re-engineering. There is a big difference in the interest in re-engineering a Caterpillar earth mover, which is physically large and very expensive. The issue, coming back to the wider resource efficiency question that you then look at, is: Where are the volumes of resource which is going to waste? I suspect that, if that analysis were done, for a lot of these small products, which are in themselves not thrown away an awful lot relatively speaking but if you are throwing away a lot of them, the challenge then is for saying that from a policy point of view we need to recycle mobile phones, for example, because of the cost of materials and the energy intensity that goes into making a mobile phone, but you then have to think of the technical difficulties you have to get around. Ultimately, if the value of the material is sufficiently high, I am sure the industry will find a way of recovering it. With the rising prices of raw materials, it may well be that this becomes an industry driven issue.

Q441 Earl of Selborne: What about “smart” materials?

Dr Hedges: Ultimately the question is arguably: How smart is the material and what is it for? My knowledge of “smart” materials is generally linked to materials which can change their properties through some form of action. Increasingly you can see those being used for a variety of different applications. I can imagine it might be possible to do that kind of thing for, for example, the disassembly. There is talk about new soft “smart” materials for adhesives, for example, so that you glue your mobile phone together with the sort of adhesive that you can put into some kind of smart material disintegrator,

effectively, and therefore all the components fall apart. That is where it might work. But whether a reversible adhesive counts as a “smart” material or not, I am not sure.

Mr Black: Again, when we were in Japan looking at the electronics recovery gap, they were using advanced disassembly technologies in their labs anyway for mobile phones, for example. Again, coming back to the cost of the components, they were interested in separating them relatively quickly with minimal damage—so these are materials that deform under heat or microwave or, as you say, a “smart” glue. The big issue with them is that there needs to be a lot more R&D into their properties. There is a bit of consumer angst when they consider these things: If they carry them around, will they fall apart in their pocket if they walk too close to a satellite TV or something like that? There is a bit of resistance to them in the market-place which needs to be overcome. We, as the Resource Efficiency KTN, see a very significant way forward for active disassembly of materials rather than having to shred them up and then try to separate the metals from them, because that is probably about where we are at the moment. If you could disassemble them as easily as you assemble them, then you can reuse components. Xerox, for example, have a system whereby they claim that none of their photocopiers are ever brand new; they always have a very high recycled content in them and all they are doing really is changing the case in many instances. Particularly for something like mobile phones, which is about aesthetics rather than use, that might be a way forward; in other words, you just change the case, change the look, and the chip in it stays the same.

Q442 Lord Methuen: You went to Japan. Do things get recycled at the chip level? If a PC board has chips on it, to what extent are those recovered?

Mr Black: They were not recovering commercially at a chip level. They were being able to separate the high value chip components. Because of the life cycle of chips, some of them have a higher precious metal content than others. A ten-year old computer has more gold in it than a computer you would buy today; therefore the components out of that particular computer have a higher value. They were using it as a sorting mechanism. Because they could identify the age of the machine that was coming back to them—in many instances they were able to go back to serial number—they knew exactly what the component was and therefore they could recover it on value, but they were not recovering chips. However, there is significant interest in doing that because certainly the processing power capability of modern mobile phones, for example, could quite easily be used in burglar alarm systems and things

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like that as a second life. Even if it has gone beyond the capability of the phone technology, it still can be used for its radio uplink facilities for remote sensing in disabled accommodation and things like that.

Q443 Earl of Selborne: It sounds from Mr Black's evidence as if the Japanese are way ahead of us. Should we be doing more research on this?

Mr Black: I hesitate to suggest that they would be ahead of us as we are very much in the forefront for our RFID technology, I would say. I may be wrong—and colleagues here may be able to help me—but I would have thought we are probably a little bit behind the curve on active disassembly technology. I think there is a massive opportunity to do something in that area. There is not always a disadvantage in being second because you do not necessarily make the mistakes that the first adopter has made. There may be advantages in building on research that has already been done.

Q444 Earl of Selborne: Who should be doing the research?

Mr Black: I would defer to Peter here. It is really "blue sky" stuff at the moment, to be quite frank.

Dr Hedges: The answer is always, "Yes, of course there should be more research". I work for the Research Councils so of course I would say that. In terms of priorities for research, given that the money that would be available to fund research is limited, the question is: What priorities should you put on that research? From my own perspective, one of the questions for government is what the top priority from a resource point of view is. At the moment there is a strong emphasis on carbon. If you think that all resource streams come back to carbon in the end, you would probably focus your efforts on tackling those issues where there is the greatest carbon input into producing the product in the first place and I would imagine high value electronic goods must come up fairly highly there. Just on the basis that if you can avoid making a chip by recycling an old one, then that probably is going to produce a significant carbon saving. Equally, coming back to the broader resource stream point of view, it may well be that there are other areas but packaging is one of the areas we are looking at at the moment, where you are talking about very high volumes. The material itself is not necessarily particularly carbon intensive to generate but if the volumes are very high then the greatest carbon saving is from managing that supply chain. In terms of priority for research, I guess we have to focus on where the biggest resource advantage is. I suspect the answer is not that straightforward.

Q445 Lord Lewis of Newnham: One of you remarked on the fact that the ultimate aim of the WEEE Directive may well be that things end up in landfill. Of course one of the differences here is that in the WEEE area, probably more than any others, you have a hazardous waste component associated with it. Of course you cannot just dispose of hazardous waste in a normal landfill. You are in a difficult situation. How far does this govern the incentive towards designing materials? Are you trying to design hazardous waste out of these things? Very often it is the recognition of what is a hazardous waste in some of these things, if I understand it correctly. Does this play a part?

Mr Black: There is a significant element of what is called "manual de-pollution" in the WEEE collection schemes, so you are taking things like batteries out of them. That might be an area where our RFID tagging could be used; in other words, if you tag the battery and you have it on a conveyor belt, it will pick up the fact that they have missed picking up the battery when they have shredded it. ROHS legislation is taking a lot of the hazardous waste out before it even gets into components; lead free soldering, for example, and that technology—although it has to be said that that comes with ecological knock-on, in that lead-free solder needs a higher energy input to make the components and things like that, so it is by no means a black and white situation. Yes, the pollution content of the WEEE Directive will be a significant factor but, essentially, there is a step in all the separation technologies that requires manual intervention—basically, people picking these components off a conveyor belt.

Dr Hedges: In terms of our evidence, we talk very much about the social dimension. The WEEE regulations can say whatever they like, but most waste goes to landfill directly from someone's dustbin. If they choose to throw a mobile phone into their black sack, no one is going to be looking to see whether it is there and it will end up in landfill irrespective. There is an issue about a broader understanding of those issues and the value. If someone was paid to recycle their mobile phone, they would almost certainly recycle it. At the moment a lot of people do, and it is a voluntary scheme, but with a lot of the small, relatively low value electrical goods there is no particular incentive for anybody to do anything other than just throw it in the bin with everything else.

Q446 Baroness Sharp of Guildford: We have been talking about "smart" materials and tagged information. You were talking about Japan and innovation and our being second movers. The implication is that in innovation terms we are doing quite well in some of these things but, equally, if we

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look at our record in terms of recycling amongst the Europeans, it is not very good. Is there much innovation going on in Europe or is it that they are much better at implementing these things than us?

Mr Black: It is a very difficult question to answer. For example, for the WEEE Directive—which is possibly not the best example but it is the one I know the most about—they implemented their schemes far earlier, so therefore they have a lot of historical evidence that allows them to backtrack, if you like, in applying their legislation. We came to it fairly late. If you look at statistics that are produced by some of the other EU nations, there is an element that I find difficult to believe when I look at the statistics that we generate here, if that is the best way to put it. For example, if the WEEE legislation requires you to recycle four kilograms of electronic scrap per household or whatever it is, if you recycled one washing machine every ten years out of one household you would meet that criterion. It is not particularly arduous to meet it. Unfortunately, that four kilograms will be the concrete weight in the balance block; it will not be anything at all to do with material. It is a bit disingenuous to claim that we are getting 80 per cent recovery on something when perhaps the 20 per cent you want is the bit that you are not recovering.

Mr Tait: An example where the hazardous content for a product has hit the headlines recently—and I can show some influence that the UK is having at a global level in dealing with it—is the move towards compact fluorescent lamps (CFL lamps). For energy reasons CFLs have to contain a certain amount of mercury in order to function. The amount of mercury has historically varied a lot because of variable manufacturing approaches. The RoHS Directive has limited that to five milligrams per product now. Legislation being discussed now, regulation at the European level, the Eco-Design of Energy Using Products Directive, is looking to push that down further to perhaps three milligrams. Indeed, in the UK we have been participating in global initiatives to set standards for the mercury content of these lamps. The Energy Saving Trust in the UK is endorsing products that contain a very low level of mercury and, indeed, there is a technology push now with TSB and BERR interest as well to move towards LED technology which gets away from the CFL altogether and deals with the mercury problem. So we are looking at advancing those markets and working with supply chains.

Q447 Lord Lewis of Newnham: The surprising thing to me, of course, is that, although this is a very significant factor and I would be in agreement with these procedures, the biggest mercury pollutant at the moment is from crematoria.

Mr Tait: Yes, dental amalgams.

Q448 Lord Lewis of Newnham: As far as I can see nothing is happening over that issue.

Mr Tait: I would not aim to deal with the issue of dental amalgam! One of the criticisms perhaps that has been levelled at the use of CFLs replacing incandescent lamps is the mercury issue, but it has been shown through research now that the amount of mercury produced through the burning of coal, generating the electricity to power a normal lamp, actually exceeds the amount that might get into the environment through the alternative CFL over its lifetime. That sort of balance has therefore been dealt with. Dental amalgam I will leave to others to discuss.

Chairman: You must appreciate the preoccupations of this Committee with crematoria!

Q449 Lord Haskel: Perhaps we could move on to a business perspective. Of course the primary aim of business is the bottom line, but changes in production processes may incur costs or require long-term investments. We were told that standards are being set to 2020 to help long-term investment decisions, but how can waste reduction strategies be made compatible with the aims of a business? Quite often businesses have to make profits in the fairly short term as well. I wonder whether your various organisations have given any thought to that.

Dr Hedges: Perhaps I can kick off with an example. I apologise that this is an anecdotal example and it relates to carbon rather than waste *per se* but figures were quoted to me from BP that when they introduced their own internal carbon trading scheme it generated really quite significant bottom-line savings in terms of efficiency gains. That is just as an example of the fact that resource efficiency is usually very compatible with the aims of business. Obviously there is an issue of regulation and how that influences the business decision as to how much cost you put on a waste stream. In another example, I am aware of a relatively small fine chemicals company, which again I know through my strategic advisory team, that they choose to use their waste solvents for combined heat/power because it makes economic sense for them to do so and that is partly because of the costs of disposal but also because of the reduction to their energy bills. The contrast was made with, say, a large pharmaceutical company which can afford to put it all on a truck and send it away. “Triple bottom-line” is the buzz word people talk about but, ultimately, in design and manufacturing decisions cost is the first issue but very often waste reduction has a positive cost benefit and that is partly about just demonstrating that that is the case.

Dr Whittall: It is very difficult sometimes to get business to take a longer-term viewpoint. The Government can help by having clear signposts and

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regulation so the changing environment is apparent to them. The cost of the waste increase is also helpful in that respect but sometimes they need a little bit of a push to get over that pain. In some cases it is a case of mitigating the risk and, again, I would point to the value of collaborative projects to share expertise and share risk and make it just a little bit easier to get over those hurdles. There is also scope for demonstrating projects that show the potential of a particular technology to a wider audience and that is something in which the RDAs in particular are involved.

Q450 Lord Lewis of Newnham: You mentioned the cost of waste as a factor that is involved in this equation. Would you suggest that one potential solution would be to increase the amount of money for, say, landfill? After all, if you compare the landfill costs in this country with many in Europe, relatively speaking it is very much smaller. How does this influence the manufacturing operation in the Continent as opposed to this country?

Dr Whittall: I think it is going to be a combination of carrot and stick. Wherever we are starting from now, the pace of that change, the increase in the cost of waste is something that industry has to bear in the short-term. Landfill tax is ramping up at quite a rate at the moment. I would argue that is probably sufficient to stimulate some of those functions.

Q451 Lord Lewis of Newnham: We have a municipal figure and a domestic figure. There are two different scales here, so you are at liberty if you wish to tinker with one without necessarily affecting the other. How far does that apply in practice?

Dr Hedges: I do not know the figures, but I am sure that when the size of the landfill tax is discussed there is the question: If you are placing an undue burden on business, what will that mean for business? I do not know the proportion of UK businesses which ship a lot of waste direct to landfill and whether that is changing. An interesting question to ask, should you put it up, would be to what extent existing charges have influenced behaviour. Everyone talks about the construction industry but a lot of that comes down to the fact that materials' suppliers supply construction materials to a fixed size: if you are using a piece of wood, you can only cut it off once, and then the piece that you have left is too short which is why it ends up in a skip. Again, if you then say, "What is the best innovation in construction?" offsite manufacturing—making units and putting them straight into a house—is the best way of reducing construction waste.

Q452 Lord Lewis of Newnham: Many landfills are

now developing a separate style of approach, producing aggregates from landfill waste which they then sell on.

Dr Hedges: That is right.

Q453 Baroness Sharp of Guildford: Going to this question about business costs and so forth and the need to look long-term rather than short-term, I was wondering how far you look at public sector procurement here. I have been involved in Building Schools for the Future and there is quite some criticism of that programme, that, because of the need of local authorities at the end of the day to get what they term "best value for money", they look at short-term best value for money and not long-term best value for money.

Dr Hedges: Yes and that is always going to be an issue with any kind of government procurement. Cost is always going to be an element. Particularly with, say, innovation in buildings, the fixed cost of putting the building up is only a minor element of the total life-cycle cost of the building. Certainly building or making a school which is going to be highly energy efficient, for example, will have a significantly higher cost in the first instance but you can get a very easy to see payback in terms of increased energy efficiency and so on. The issue with a lot of public procurement is built infrastructure. As anybody who is familiar with the issues around the construction industry will know, the construction industry is not the most innovative but, equally, you can highlight lots of major recent procurement projects—Terminal 5, for example, which is on cost and on budget—that demonstrate that you can build buildings in the UK very successfully. It is an interesting question. If you said to the local authorities, "Yes, your best value is now going to be calculated on a 100-year timescale," that might change the dynamics of the mathematics but I suspect it is unlikely that local authorities will be told that in the near future. Equally, if from a local authority perspective it is okay—and I can declare an interest: I was until recently a local authority councillor—if you are talking to your electorate and saying, "Your council tax bill is going up because of planning for the next 100 years," I am not sure how well that would go down. It is always going to be a difficult issue.

Q454 Baroness Sharp of Guildford: There are also the guidelines they get from the Treasury.

Dr Hedges: In terms of building regulations: in the plans that communities and local government have, really challenging building regulations are the way to go. If the building regulations are sufficiently challenging, the industry will meet those challenges. Ultimately, customers might pay more for their

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buildings but if that is what they have to do that is what they will do.

Q455 Baroness Platt of Writtle: Getting back to Lord Haskel's original question of business needing to make a profit, this perhaps is rather far away from your area—the general impression in the media is: “We have a new thing—buy it. It is exciting. It is different.” I do not think in that situation the consumer is perhaps thinking about the energy. Amongst young people, it is one-upmanship very often. How does that fit in with all this?

Mr Black: The problem is that we do not generate a true cost of the item you are buying. There is no element of its disposal at end-of-life, for example. If we told my 25-year old that her new phone was going to cost her £30 when she threw it away, I think she might be disinclined to change it every seven months. This ties in with Lady Sharp's question: we do not look at full life-cycle analysis enough. We do not look at cradle to cradle, whereby you can repurpose things. There is a lot to be done in that area. When we are putting together collaborative research programmes now, we try to insist on the ESRC being involved. The ESRC are responsible for giving the psychological bit of the debate: “Can you alter consumers' perception within this project?” You can make something that is really clever or you can make something that is 100 per cent recyclable but unless you can persuade the public to buy it, the research is pretty useless. We look at encouraging that kind of thing. Coming back to the building aspect, someone mentioned to me quite an interesting matter that I had not thought of: we are recycling our Victorian schools into very posh apartment blocks and flats and things but, when you look at what we are building now, in 100 years' time will they be recycled into office and living space? I would doubt it. Perhaps we need to be thinking a bit more innovatively in that regard.

Q456 Lord Haskel: I think one of the biggest constraints on waste as far as business is concerned is the availability of landfill sites. The fact is they are filling up and people are not willing to open new ones. The logical way to deal with this is to design out the need for the landfill sites. The reaction of business, of course, is either to say, “Okay, we will just have to go and make it elsewhere” or to work with the designers to design it out. Witnesses from the design field have told us that their ability to design out waste is limited due to the constraints of product briefs that businesses provide. Is there anything that you feel you can do to help this along?

Dr Hedges: In terms of our approach to research, a lot of our design research is now funded through our innovative manufacturing research centres and those

centres have the opportunity of looking at the design of products in a more holistic way. Ultimately, yes, if a design brief is totally constrained, then, yes, the designer's ability to design out waste will be limited. In your ideal world, where company X's brief has as the starting point: “We will have a zero impact on the environment in our products and services” that will have an overarching impact on the brief that was generated in the first place. It will be written in and writ large. I suspect in order to get to the endpoint, if the endpoint is low environmental impact, there has to be a high level buy-in to that concept. But, ultimately, the Government's sustainable development strategy requires, by definition, economic growth, so it is environmentally sustainable economic growth. Economic growth implies new products and new services, so we are going to continue to be making new products and new services. The question is: how do you make them as environmentally sustainable as possible? I suspect that ultimately there is nothing which is totally environmentally sustainable because thermodynamics do not work like that.

Mr Tait: The big challenge is bringing together many different requirements, many different influences, from the market, from consumers, from environmental constraints, et cetera. The approach that has been proven to be quite successful with particular product groups has been to bring together the policy leads from the various government departments and agencies that influence that particular product, getting them together around a table, agreeing the initiatives that are influencing this particular issue, this particular product problem. Just the very fact of getting the people around a table together, talking about common aims and common challenges and making clear how the different policies are interacting out there in business, has meant there are some good examples of how this has brought about a much better end result. Bringing the Carbon Trust together with the Energy Saving Trust together with Defra and the Treasury, et cetera, there have been some very good results coming out of this and there is no doubt about what business is after out of this. From a conference that we ran a couple of years ago, one of the main conclusions that business was asking for was that they want this “long, loud and legal”. They want it to be absolutely clear that this is a long-term process; they want to be told about it clearly, in no uncertain terms; and they want to have it underpinned by a legal framework so they know exactly where they stand. This has underpinned the process and approach that has been developed by Defra through its Market Transformation Programme.

Q457 Lord Haskel: And the Climate Change Bill.

Mr Tait: Yes.

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Q458 Lord Lewis of Newnham: They want the rules of the game but you must know what the game involves before you can necessarily set the rules. One of the difficulties, if I understand it correctly, in this particular area is in point of fact that conditions are changing. We are not in a constant situation.

Mr Tait: Absolutely.

Q459 Lord Lewis of Newnham: There is a constant series of changes which may impact back on this. I can understand why industry says, “Tell us what you want, let us have the rules and then we will carry them out.” It makes it much easier for them. But, unfortunately, my feeling is that we are not in that static situation.

Mr Tait: Absolutely not. One of the aspects that business has found attractive, the sort of information that the Market Transformation Programme has made public, is, indeed, the Government’s forecast of where business sectors are heading in terms of the volumes, the technologies, the regulations and other initiatives that will influence it in the future. We have found that a very co-operative and valuable debate is stimulated once these issues are laid on the table in the public domain for business to start really chewing over. Lady Platt’s point about these products coming into the market very quickly puts all the more pressure on understanding where those markets are going in the future—writing down some volumes, some estimates, talking them over with business, so that we can understand together where that is taking us in terms of waste impacts.

Q460 Lord Lewis of Newnham: The MTP coordinates the work of its contractors to collect products, sales and information. How do you go about doing this? How far do the estimates of these sales influence future developments?

Mr Tait: The programme operates through making available to Defra expertise in many different product areas. We have an expert who focuses on refrigerators, another on air conditioning equipment, another on electric motors, for example. Across all of the priority domestic appliances and some commercial and indeed industrial products, those specialists work with the supply chains, with the businesses that provide these products, to establish the basic fact of how many products are out there in use now, what their efficiency levels might be and how they are used in practice, in order to work out in most cases the carbon emissions arising as a result of that product. These are then forecast into the future based on market trends and technology trends. We have a pretty good picture of how this particular product is impacting on carbon emissions in 15–20 years’ time. This is public information. There is a debate with stakeholders and businesses who supply these

products to make this information robust. Then we look very closely at what initiatives might reduce that, what is the potential for improvement, and what needs to be done to bring that improvement about. I should say this information is shared at a European and a global level. The evidence that is gathered is applied to influence the development of European Directives in this field and, indeed, will influence the Chinese Government in setting standards and the Australian Government in setting standards. The programme then works with stakeholders to stimulate change in the market-place, with the Energy Savings Trust, the Carbon Trust and DCLG. We worked with the Department of Culture, Media and Sport on the digital television issue, bringing the evidence into discussion, working out the impacts and stimulating the discussion and agreement amongst those stakeholders of the priorities to make an impact.

Q461 Baroness Platt of Writtle: SMEs often face specific difficulties when developing waste reduction strategies and may not have the necessary resources or staff to develop novel technologies. What research or work do you undertake to address the specific needs of SMEs?

Dr Whittall: Of course SMEs are involved across the patch in terms of the impacts of research and development programmes. More specifically, one of the recommendations of the Sainsbury Review was that the Technology Strategy Board leads the reinvigoration of the Small Business Research Initiative (or SBRI). We are still in the process of formulating our plans for that but it is likely that it will involve contracts or procurement against a particular objective, and that may be in advance of the current state of the art, so it is to try to improve performance through procurement. Another intervention that we have is Knowledge Transfer Partnerships, whereby typically a graduate is working on a project with a company. It can be from six months to three years, it is very flexible, and there is very high participation: 86 per cent of those schemes involve the participation of SMEs.

Dr Hedges: From our perspective, we see the SME sector—and it is very rash to make this kind of comment—very much into the kind of high-tech SMEs, some of which will be university spin-outs or other technology companies. They tend to engage with the research base quite well and we have a number of support schemes to engage them through research projects or through collaborations in our various research activities. We take quite a lot of interest in spin-out companies which have been generated from research that we have originally funded. The vast majority of SMEs are not in that sector at all. The issue in terms of engagement with

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the university research bases is then making them aware of the opportunities that exist, like knowledge transfer partnerships. We co-sponsor KTPs. We specifically enable or provide PhD studentships, where, effectively, a company is given a voucher to support a PhD studentship for the university of their choice and we distribute most of those centrally to large companies with which we have interactions. We use the knowledge transfer partnerships and the RDAs as agents for us, effectively, to distribute further of these to SMEs, and that is on the basis that KTPs and RDAs have much better links direct to SMEs than we do.

Q462 Baroness Platt of Writtle: The difficulty is that with SMEs they are small and perhaps under 40 employees. Keeping their head above water is their first priority.

Dr Hedges: It is.

Q463 Baroness Platt of Writtle: This would feel rather remote from their struggle for existence. I can quite see where there have been university spin-outs, that is a different kettle of fish, but it is, as you say, the vast majority.

Dr Hedges: Yes. That is why I think things like the KTP scheme are quite useful because that provides them with an additional member of staff to get state-of-the-art knowledge from a university company and it provides very good training for the placee, some of whom go on to have a post and others who go on and do other things. The KTP scheme was praised in the Sainsbury Review.

Dr Whittall: We are looking to double the number of KTPs over three years.

Mr Black: Clearly it is a key role for the Resource Efficiency KTN to engage with SME communities. That is essentially what we are there for. We provide the advice and support and we act as an honest broker, if you like. We have also been quite successful in getting a number of SMEs to collaborate together to address a problem. Unfortunately they tend to be very interested in what is hurting them now rather than the innovation of their business for tomorrow. As you say, they are very much driven by the cost issues of today. The way we tackle that is basically helping them through the National Industrial Symbiosis Programme (NISP) to solve their immediate problems and then, once you have established a working relationship with these guys, you can start ringing them up and saying, "Can I come and see you for a couple of hours and talk to you about something else?" We also deliver most of our information across the Internet through an interactive portal that is provided by the Technology Strategy Board within the programme. We find that is quite useful because, of course, they can access

information as and when they require it rather than during the working day and that sometimes has a significant advantage. We have started to use internet collaboration software called Interwise which, instead of you having to get a number of SMEs or a number of companies in a room together to explain best practice, they can sit at their desks, log on to an online session—a bit like your webcam now—and have a live Q and A session with that. We find, surprisingly, the SMEs take to that technology much more than the large companies because they have far less IT issues about using it; they just do it because they own all their computers and everything and they do not have to worry about placating an IT department. We are making quite large strides in that direction. It is true that unless you can prove you are going to save them money, they will not see you a second time. I tell all my team: "You've got to go and save them some money the very first time you talk to them."

Q464 Baroness Platt of Writtle: Do they receive any extra support when they have joined any of these things you are talking about?

Mr Black: Our programme is entirely free. It is funded out of the Technology Strategy Board. We do signpost them to the funding activities that are available to them, like grants for R&D which is run out of the RDA programme, whereby they can access funding, sometimes up to 75 per cent.

Q465 Baroness Platt of Writtle: Perhaps you could let us have information about that.

Mr Black: Yes. I will arrange to get that.

Q466 Lord Lewis of Newnham: That would be very valuable.

Mr Black: By the very nature of the fact that we are engaging them, we can assist them through the process. We can get them engaged into the larger collaborative projects that they possibly would not want to get involved with; for example, Framework Seven. We are starting to do a lot of EU Framework Seven proposals. Unfortunately the EU definition of a small to medium enterprise is 250 employees, which is somewhat larger than we typically see in the UK. Having said that, they are absolutely key to these programmes because, in many instances, they are the end user and a lot of these research programmes deliberately have to have an end-user community to sell the research on to, so they are quite useful to engage from that point of view. Funding is not great—it could be better, is the best way to describe it—but there is some out there. John will be able to tell you that with the public procurement side of things there is a drive now to awarding contracts to SMEs to do with innovative procurement rather than

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offering them a grant. Grants normally come with strings attached, and they do not like strings, so, if you can offer them real live work then they are more inclined to help actively. John, I do not know whether you would like me to expand on that.

Dr Whittall: That is one of the models for the SBRI on which we are still working.

Q467 Baroness Sharp of Guildford: Perhaps I could add a comment before coming on to the next question. I did a lot of work when I was at the Science Policy Research Unit on SMEs and one of the interesting features about the Continental model—in particular, perhaps Germany and Scandinavia—is the link between the SMEs and the local Chambers of Commerce. It is very important to try to get more people from universities, perhaps linking up with further education colleges, on to things like Rotary Clubs and so forth, where you are meeting people and you are talking to them. I think this informal social linkage is a very important part of what goes on. The next question is about government policy. There really does seem to be something of a lack of clarity as to who is responsible for promoting waste reduction. On the one hand you have Defra with its Waste Strategy; the Environment Agency is responsible for the management of waste; DIUS now supports the innovation and research side; and BERR promotes business interests. There is a very real question as to who is responsible for waste reduction as a whole and for encouraging joined-up thinking between the various bodies. In addition to these government departments there are of course the plethora of non-departmental public bodies of whom you yourselves are prime examples, who are all trying to do some of this work as well.

Dr Hedges: The first thing to say is that waste is not unusual. Lord Lewis mentioned my slightly curious job title. If you looked at any of the areas of my current responsibilities you could ask exactly the same question. Where is the joined-up government strategy on manufacturing? Where is the joined-up strategy on crime and terrorism? If you said, “Okay, we will have a single body that does everything to do with waste” that would have interfaces with a wide range of other bodies in other directions. I have a lot of sympathy with the question but the way certainly we try to address it is to ensure that we have as best and as effective links with as many other stakeholder organisations as we can. Particularly with the Environment Agency and with Defra. We have regular discussions with the Technology Strategy Board. Obviously we come under DIUS but in terms of the other public bodies. If you asked me to say who worries about waste, I would say it is Defra. Defra is the primary government owner. Most of the policy drivers come from there. Ultimately the

Environment Agency is an agency of Defra. If Defra has a clear waste strategy—and it published its strategy last year, as you have said—ultimately all the agencies that then work to Defra take that strategy as the primary direction that we then focus our own efforts around. We do talk. As an example, I was formerly on Defra’s Waste and Recycle Research Advisory Group—and it is not now me, it is one of my colleagues—and, equally, I am on the Advisory Board of WRAP, which is a formal relationship. That is the way we manage the relationships. I accept it would be nice if we had a single joined-up body that was responsible for it in its entirety, but I suspect if you had one it would have more of a problem interfacing with everybody else with whom it needed to interface in this situation.

Q468 Baroness Sharp of Guildford: Picking up a point that was made earlier: if business wants “long, loud and legal”, it does help to have a single voice.

Mr Black: Yes.

Q469 Baroness Sharp of Guildford: Picking up the point you have made about Defra being the lead department, what input in terms of funding and other support do your organisations receive both from Defra and from BERR?

Dr Hedges: In terms of Defra, we co-funded a project on landfill with Defra last year just as an example. We are also in negotiations with Defra on another project at the moment which is just going through peer review. In one case it was one of the projects that just came in which they agreed to co-fund and in another case it was one which we jointly commissioned with them. That is two specific projects in this space. The first on landfill was led by Professor William Powrie of Southampton.

Q470 Lord Lewis of Newnham: What aspect is he looking at?

Dr Hedges: He is specifically looking at landfill practice; for example, reducing run-off and so on from landfill. It is more about: If you have to do landfill, how do you do it best? rather than how we avoid things going into landfill in the first place. That is just as an example. In terms of Defra’s own waste R&D it covers a broad spectrum, including the social policy issues as well as the more technical side of things. We have regular meetings with Defra. Our Chief Executive is on the Science Advisory Board of Defra, so interactions are generally pretty positive.

Q471 Baroness Sharp of Guildford: Defra has had some considerable financial problems over the last year as a result of some agricultural escapades. Have any of your budgets been hit as a result of this?

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Dr Whittall: The Technology Strategy Board was one of the delivery partners for the BREW programme. For the last four years in the order of £35 million worth of collaborative R&D has been funded through the BREW programme which, going forward, will not be re-funded. There will be no additional funding.

Q472 Baroness Sharp of Guildford: You are not getting any new funding.

Dr Whittall: Exactly.

Mr Tait: The Market Transformation Programme is funded through Defra entirely and it benefited from BREW funding over the past three years. Its funds were £3.895 million this year from BREW plus £0.905 million from other DEFRA programmes and next year we are told it will be £2.75 million total.

Q473 Baroness Sharp of Guildford: In the Waste Strategy document it was claimed that a new products and materials unit would “catalyse actions across the supply chain, to improve the environmental performance of products through their life cycle”. Is this going ahead? What progress has there been on this unit?

Mr Tait: There is the preparation of a set of road maps that the Sustainable Products and Materials Division are leading on. There are 10 such road maps already in a fairly advanced draft state covering things as diverse as milk as a product, electric motors, televisions and plasterboard as a particular waste issue. Defra is currently preparing a report which is to be published in the spring which will lay out progress made and look at the options for taking these road maps further forward.

Mr Black: Coming back to the question on funding, we are not funded through BREW at all. We are funded through the Technology Strategy Board and ultimately through DIUS. However, we did have strategic collaboration with NISP who are funded by BREW to supply them with innovation managers. In

effect, we had one dedicated specialist in each of the English regions and we have just been advised that because of the accompanied funding cuts to NISP they will no longer be funding that programme, so we are losing six or seven specialists as we speak.

Q474 Baroness Sharp of Guildford: NISP, the National Industrial Symbiosis Programme, unlike the Carbon Trust or even the Energy Saving Trust, does not tell you what it is all about. It does seem to me to be a rather silly name to have adopted for a programme which is aimed at waste reduction. Perhaps you could not possibly comment, so I will leave it there.

Mr Black: I believe they have already given evidence, so perhaps it would have been appropriate to ask them when they were here.

Dr Hedges: In defence of the name, which was nothing to do with me, as a biologist I understand what symbiosis means and if you think about the future of resource efficiency certainly there are visions that adopting a more symbiotic relationship between businesses and between resource streams is ultimately the thing which we need to do. The whole point is that one business’s waste is another business’s resource. That is the nice thing about the name: it presents a vision for business which is much more the way that we need to go but I accept the point—

Q475 Baroness Sharp of Guildford: The average small-sized business—

Dr Hedges: The average small SME might not get that.

Chairman: There are a couple of areas we have not covered but our time constraints are such that if we need to get back to you we will on one or two other items. As far as you are concerned, if you think there is anything you would like to supplement your evidence with when you see it in writing, then we would be more than happy to receive it. Thank you very much for a very interesting session.

Supplementary memorandum by the Technology Strategy Board

Materials database (Q 435)

One of the recommendations of the Materials Innovation & Growth Team (2006) was the establishment of a lifecycle analysis database “Materials Property Validation Centre” or MPVC. This activity is being led by Materials UK, an organisation run on behalf of the materials community in the UK, and linked to the Materials Knowledge Transfer Network.

The MPVC is looking at three distinct types of material property:

- mechanical and functional performance;
- performance in use; and

- environmental impact.

For virgin materials there is a lot of data both in the public sector and commercially but this will exist in variety of formats and can be quite specific. It is not clear that this data has been fully mapped and indeed this would be a valuable activity the MPVC might perform. There are issues around the multiplicity of data that would need to be gathered in addition to this, that is the permutations of provenances, production methods, applications and end-of-life fates that would need to be described.

There may be some useful learning from the chemical industry which is getting to grips with sharing data under REACH legislation. If a comprehensive database is to be prepared, it may be more appropriate to do this on a European rather than UK basis (to share costs and ensure the widest range of materials is included).

For recycled materials, the lack of verified data and the need to develop standards for a range of materials form a major barrier to their wider use. The International Institute for Sustainability, which is planned as part of the Thames Gateway project, aims to collect data on recycled materials which may go some way to address this gap.

Smart Materials (Q 440)

Smart materials potentially have role to play in improving material recognition, and there are limited examples of these in use:

- shape memory alloys for fasteners; and
- debondable adhesives (the adhesive loses its function on application of an electric or other field).

the issues are:

- cost; and
- confidence in use—what happens if the reversion happens accidentally, or over a period of time during normal use? This poses a risk of damage to brand, potentially even of litigation. To mitigate this risk, companies may need to combine the use of smart materials with sensors and control systems which assure integrity. All of these add to the cost.

We expect first applications of smart materials to be in relatively complex but non-critical systems (ie a car dashboard rather than a wheel assembly) and also in components where a closed loop can be implemented so that the manufacturer gains the benefit of investment, as well as recovering the materials.

RFID sensors are used extensively at wholesale/retail level (at the pallet of goods level, or for high value items) but not for low value individual goods. The unit cost of the current (silicon-based) technology is around 10 cents. Normal technological development will help to reduce this somewhat, but not to the extent necessary to justify their use on individual low-value items. Plastic electronics—an area of UK strength—potentially could allow flexible, printable RFIDs at a cost an order of magnitude or more below the current level. However this is not currently feasible, and there would be issues such as robustness under reprocessing conditions to address.

All tagging approaches will add complexity to the system and the RFID also needs to be removed in the recycling step, or be compatible with it

CONSUMER ATTITUDES

First and foremost we should design better products that are also more sustainable, to give a stronger basis for differentiation for consumers to purchase.

As a general principle sustainable products should compete on technical performance. This has not always been the case—some early eco-detergent products were perceived as not being as effective as mainstream products; early compact fluorescent energy-efficient lights had problems in speed of response and light tone.

If performance is comparable, there may be scope for a marginal price premium. Historically, consumers have shown greater enthusiasm in surveys for sustainable products than in practice. There is some recent evidence a proportion of consumers are willing to bear higher costs for ethical peace of mind—for example sales of organic and Fair Trade certified goods—but these are still niche markets despite the dramatic growth they have enjoyed of late.

Generally consumers are apparently more motivated by the upfront cost of products, not the whole life cost. Energy efficient lightbulbs and rechargeable batteries come to mind as examples where lifetime costs are significantly lower than for the traditional product but still consumers have proved resistant to their adoption. The Design Council has run a project where use of energy efficient products was encouraged by a combination

of smart metering (to provide visibility) and a low cost financing (avoiding up-front costs); we will need similar initiatives to overcome consumer inertia in other areas.

Note that in an ideal world, sustainable products would be less expensive than normal products if the environmental impacts (waste, energy, water etc) were fairly costed and this cost efficiently passed on to the consumer.

SUSTAINABLE PROCUREMENT

Government procurement has great potential to create markets in the environmental sector with the public purse being responsible for up to £150 billion of goods and services. This approach was endorsed by the CEMEP report which stressed the potential of Forward Commitment Purchasing (ie to specification not currently met by current technology, within price limits).

We do not have data on how well plans for sustainable procurement are being rolled out but anecdotal evidence is that government purchasers are inherently risk averse. This presents the risk that radical innovation with potential for step-change potential for improvements in sustainability is discounted, and instead incremental changes in technology are preferred. The problem may reside in the culture of government procurement specialists, compounded by the fact that they may not have the technical expertise to make an assessment of the potential of new products.

The Technology Strategy Board could have a role to facilitate proof of concept/prototype studies to mitigate technical risk. There is also potential for knowledge transfer in the form of secondment of designers/technical specialists in to purchasing teams to understand the culture and encourage a more innovation-friendly approach.

March 2008

TUESDAY 4 MARCH 2008

Present	Haskel, L Howie of Troon, L Lewis of Newnham, L May of Oxford, L	Methuen, L O'Neill of Clackmannan, L (Chairman) Platt of Writtle, B Sharp of Guildford, B
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Memorandum by INCPEN

INTRODUCTION

INCPEN welcomes the Committee's Inquiry into sustainable approaches to waste reduction

Designing packaging to use an optimum amount of material to ensure that goods are delivered safely from point of production to point of consumption is of paramount importance for packaging manufacturers and manufacturers and retailers of packaged goods.

Packaging has been in the environmental spotlight for many years and the industry has responded both by using fewer resources to produce and distribute goods and also by making a significant contribution to increasing the amount of used packaging recovered and recycled.

We believe that companies in the packaging and product supply chain are ahead of many others in setting themselves objectives to reduce the environmental footprint of their own operations and those of consumers who use their products. INCPEN members have committed to cradle-to-cradle thinking to optimise their use of resources.

There are a number of drivers already in place, including two laws, which make companies improve their environmental footprint. We recommend that there is no need for further regulation but a packaging watchdog would help to address the areas where consumers have concerns about excessive packaging—see para 19.

We also recommend that Government should re-establish its excellent National Household Waste Analysis Programme, to which INCPEN contributed financially. It analysed the composition of household waste throughout the 1980s. Today there is no national database on quantities and composition of waste arisings for household, commercial or industrial waste. Figures tend to be extrapolated from sample surveys.

Waste reduction

1. Waste has been top of the environmental policy makers' agenda for well over 15 years, often with the focus on used packaging. The packaging chain has responded not only by funding recycling schemes but also by designing to reduce materials and energy throughout the supply chain.
2. Packaging in general already makes a positive contribution to sustainable consumption, distribution and production and the packaging chain continues to seek improvements.
3. From an environmental viewpoint the only "bad" packaging is at the extremes:
 - under-packaging is disastrous (because of damage to products and wastage); and
 - over-packaging is illegal (packaging is controlled via a number of regulations and voluntary codes of practice).
4. The packaging industry has in the last 20-30 years greatly reduced the amount of packaging needed to pack and protect a unit of goods. For example, washing up liquid bottles in the 1970s used two and a half times as much plastic as is used today.
5. Similarly in the 1970s:
 - drinks and soup cans used twice as much metal;
 - glass beer bottles used two and a half times as much glass;
 - yoghurt pots used two and half times as much plastic; and
 - carrier bags used twice as much plastic.

6. One major manufacturer estimates that in each of the last ten years its packaging has been reduced by between 5 per cent and 10 per cent.
7. In general, packaging prevents far more waste than it generates. Under-packaging is typically 10 times worse for the environment than the same amount of over-packaging. Research by Dr J M Kooijman showed that the resources used to produce packaging are typically only 10 per cent of that needed to produce, distribute and use the products.
8. In some areas packaging cannot be reduced further without increasing food spoilage and product damage. However, as new technology or new materials are developed, companies will seek opportunities to make further improvements to reduce material use for both environmental and commercial reasons.
9. The amount of packaging used in the UK has increased by less than 4 per cent since 1999 (8.5 to 8.8 million tonnes, in 2004—excluding wood). This increase is more than accounted for by the increase in population and demographic shift to more people living alone and has been kept down to this level because industry has continued to reduce the amount of material used per pack.

Packaging in a Market Economy

10. The UK Centre for Economic and Environmental Development (UK CEED) carried out a major study for INCPEN *Packaging in a Market Economy* that analysed the relationship between the functional, economic, social and environmental aspects of packaging for four very different products—fish, a computer monitor, a liquid detergent and a luxury cosmetic.
11. The study concluded that the desire to minimise costs optimises the use of packaging and that it would “defy economic logic for a company to pack a product purposely in excessive material”. However there were some “market failures” in each market sector that could lead to too much, or too little packaging being used.
12. These include:
 - the expense of setting up new production lines to accommodate wholly new packaging acts as a strong disincentive to alter packaging design in the short term, so short runs to test consumer demand may be inappropriately packed;
 - standardised secondary packaging works well where products are of uniform dimensions, but for products which vary in size and shape or for mixed loads of smaller densities, standardised packaging may be larger than the products require;
 - information on the performance of packaging in the distribution system often does not flow back to the producer;
 - emphasis on single environmental issues may lead to inappropriate packaging eg too much emphasis on recycling fails to take account of energy use and the relationship between packaging and product loss; and
 - large retailers have limited ability to check all in-coming goods individually. This can result in entire lorry loads being returned to the supplier, even if only minor product damage is observed. In response, packaging may be over-specified to satisfy other requirements of the chain, but may be justified by the manufacturer if the economic and environmental costs of returned loads are greater than the costs of extra packaging.
13. The study also concluded that while some incorrect packaging choices may be made, many criticisms of packaging are, in reality:
 - a criticism of the market system, and, by implication a criticism of the behaviour and lifestyles of consumers;
 - a failure to recognise the role packaging plays in providing consumer choice;
 - based only on consideration of environmental or end use criteria; and
 - in ignorance of the consequences of under-packaging, in terms of wastage of resources and environmental impact.
14. Broadly, the study concludes that the general public pays disproportionate attention to packaging as an environmental issue. This in turn leads to a serious over-estimation of the contribution of packaging to the waste stream and often to inaccurate assertions that products are packaged in a wasteful and excessive way.

Drivers to reduce packaging

15. As well as commercial considerations, there are other powerful drivers that influence manufacturers to minimise packaging:

- The Producer Responsibility (Packaging) Regulations;
- The Packaging (Essential Requirements) Regulations;
- The Responsible Packaging Code of Practice; and
- Best Practice Guides from Envirowise and INCPEN.

16. Packaging has grown less in the two European Member States (UK and France) that enforce the Essential Requirements Regulations than in the rest of the EU-15.

17. Despite these drivers, some products are excessively packaged, particularly items purchased over the internet for home delivery, and electronic and electrical goods, including toys, usually imported from the Far East. At least 35 per cent of packaging is on goods that are imported. These are designed for a global market and UK manufacturers have little influenced on how they are packaged. The Government needs to decide how to handle this issue.

18. Excessive packaging is the exception. Most products are packed in the minimum amount of material to meet the needs of transport, hygiene, storage display and use. But consumers are understandably irritated by any excessive use of packaging and often generalise from the particular.

19. To address goods that are excessively packaged in the UK, INCPEN would like the Government to establish a multi stakeholder forum. This could be set up jointly with industry, and include local government, NGO's and the supply chain. It could act as a watchdog for consumers concerns about packaging and provide consumers with reliable, consistent information about packaging, waste and sustainability. It could also be a sounding board for Trading Standards Officers on matters concerning enforcement of the Essential Requirements Regulations. And it could provide companies with technical advice on how to improve their packaging.

Packaging and food waste

20. Packaging helps limit the vast amounts of food waste being generated by:

- protecting products throughout the supply chain;
- extending the shelf life of food; and
- providing sensible portion sizes.

21. For example, before the introduction of Modified Atmosphere Packaging, up to 25 per cent of meat would become waste in the store. Today it is much lower. Similarly, a tiny piece of plastics wrapping weighing 1.5 grams extends the shelf life of a cucumber from three days to 14 days.

22. Eliminating packaging from fresh fruit and vegetables can lead to increased product waste. A study that compared apples sold loose with four in a shrink-wrapped tray showed that there was 27 per cent more waste of all sorts (bruised apple and used packaging) from orchard to home from those sold loose.

Recycling versus minimisation conflict

23. Often there is a conflict between the aim to increase recycling of used packaging and the aim to reduce total packaging.

24. To make packaging recyclable often requires the use of single materials, where the same job could be done as well, or better, with two or more thinner layers of different materials—often called laminates- with a resulting reduction in total resource use.

25. We need to be careful that the focus on recycling and using materials that are easiest to recycle does not override the good work that has been done over the past 20 years to reduce packaging by using laminates.

26. Use of lightweight laminates and other lightweight materials is one reason why the UK uses less packaging per person than most other large EU countries—171kg in 2004 compared with 188kg in Germany and 200kg in France.

27. Competition between materials has been one of the key drivers in helping companies innovate and optimise the use of energy and materials. Companies need the widest possible choice of materials.

28. Laminates may be more difficult to recycle but meeting the global aim of carbon reduction means that making packaging recyclable should not take precedence over resource (and carbon) reduction.

Used packaging

29. Data on waste arisings is not good. Much of it is either extrapolated from old surveys or is based on grossing up regional or local samples. We strongly recommend that Government should fund analysis of the quantities and composition of household, commercial and industrial waste arisings.

30. That's said, Defra advises that used packaging is 18 per cent of household waste and 3 per cent by weight and volume of waste sent to landfill.

31. Kitchen and garden waste accounts for 23 per cent of the weight of household dustbin waste, newsprint and magazines 16 per cent. The largest category of used packaging is paper and card at 6 per cent of household waste. White flint glass is 4 per cent, steel food cans 3 per cent, plastics film 2 per cent, and all other packaging is less than 2 per cent, including plastic food packaging 1.2 per cent, liquid food cartons 1.1 per cent and aluminium drinks cans 0.4 per cent.

32. The amount of used packaging sent to landfill appears to have decreased over the last 10 years. UK companies have contributed £700 million since 1998 to increase recycling of used packaging to nearly 60 per cent. That's 5.5 million tonnes, one million tonnes of which came from households.

INCPEN members commitment to cradle-to-cradle thinking

33. INCPEN members have committed to adopting cradle-to-cradle thinking in developing packaging and product supply chains that make a positive contribution to social, environmental and economic development.

34. This means design that considers the entire lifecycle of packaging in the context of the product and the supply chain with the aim of optimising materials, energy and water use, minimising waste of product and used packaging, and maximising recovery of value from waste—as energy, materials or compost.

35. This broader approach ensures that waste is not reduced at the expense of causing other environmental problems, such as increasing emission of climate change gases or water use. We currently have the knowledge and ability to manage waste safely. We do not know if we can control or manage the environmental effects of global climate change. We should therefore err on the side of caution and make reduction of climate change emissions the top priority.

October 2007

Examination of Witnesses

Witnesses: Ms JANE BICKERSTAFFE, Director, Industry Council for Packaging and the Environment, MR STEPHEN CARTER, Packaging Sustainability Director, Unilever, DR ROBERT CHILTON, Board Member, National Consumer Council, and DR FORBES McDougall, Environmental Manager, Proctor & Gamble, examined.

Q476 Chairman: Good morning, lady and gentlemen. May I start by welcoming you and thanking you for the written evidence you have provided us with so far. We are looking into this area of waste and in some respects we are as much concerned with designing waste out of the system as with how to deal with resource issues in other respects. Perhaps before we start you could introduce yourselves.

Dr McDougall: Good morning. My name is Forbes McDougall. I am an environmental engineer with Proctor & Gamble. I spent a number of years working in the Netherlands and Asia before joining Proctor & Gamble and have worked in a number of different roles in the company. I have worked on lifecycle assessment of waste management systems and I am currently responsible for the technical aspects of waste management at our manufacturing facilities globally.

Dr Chilton: Good morning. I am Bob Chilton. I am the Vice Chair of the National Consumer Council. For the avoidance of doubt that is the old National Consumer Council. The new one gets its powers in October. Relevant to this inquiry, I am also a board member of the Waste Resources Action Group.

Mr Carter: I am Steph Carter. I am Packaging Sustainability Director for Unilever. I work on a global basis rather than a UK basis because Unilever operates in 150 countries worldwide. My background is packaging technology so I am a packing technologist and previously I have been responsible for packaging, functional design and specification of the packs that Unilever puts in the market place.

Ms Bickerstaffe: I am Jane Bickerstaffe. I am Director of INCPEN, which is the Industry Council for Packaging and the Environment. We are a group of companies who operate throughout the supply chain, so we have got raw material suppliers and packaging

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manufacturers across all the different types of material and users of packaging, Proctor & Gamble and Unilever, for example, are both members, and retailers as well in membership. We were set up in 1974 to do research on social and environmental aspects of packaging.

Q477 Chairman: Thank you. I will ask this question and probably you will all want to dive in to answer it. We are aware that large manufacturers like yourselves consider waste reduction during the design, production, packaging and distribution stages of a product's life. You give consideration to that but to what extent do you have data that can enable you to make the appropriate management and technical decisions in that process? To what extent does it have a calculation and to what extent is it guesstimation?

Mr Carter: We are fortunate in terms of the development of technology, particularly from the motor industry and the aerospace industry. In Unilever we use a lot of computer-aided engineering, which is essentially computer programmes which can mimic what is not real. You input what material you are using and we can strength-test various shapes of packaging and components without ever making them. This technology is now surprisingly accurate; it is 95 per cent accurate, so in the design phase we interrogate each new piece of packaging we are planning to make. We assess its strength and if it is too strong we will remove material. If it is too weak we may switch material from one side of the pack to the other or change an angle slightly to strengthen it. At the same time we look at how efficiently that piece of packaging is made or moulded. If we can mould it more efficiently it saves us money because you get more components from the same amount of time on the machine, but also it saves a significant amount of energy. For example, our new deodorant roll-on pack which is being launched at the moment saves six million kilowatt hours of electricity in a year simply because it is 30 per cent faster to manufacture because we have used this technology.

Dr McDougall: If I take a step back from the actual pack or product design and move to the big picture, both ourselves and Unilever use the tool of lifecycle assessment when studying the environmental burdens associated with a product or a packaging, from the sourcing of raw materials through the manufacture, the distribution and the disposal phases. We have very detailed information on our major product streams, and we can understand and identify where the biggest energy impacts or the biggest disposal impacts are, or air emissions or water emissions at each stage of that lifecycle for each process, and that allows us within reason to be able to identify where we have to put the effort into the product. For example, with laundry powders, the

biggest single environmental burden is the energy used by the consumer in the home, heating the water and running the washing machine, so we try and develop powders that can operate at lower temperatures so you can save more power per wash. *Ms Bickerstaffe:* I would just like to add that I think because packaging has been so much in the environmental spotlight for so many years companies in this supply chain are probably ahead of many others in understanding how to integrate environmental considerations alongside the technical considerations that they put in place.

Q478 Lord Lewis of Newnham: We have had before us people from the aluminium industry and the plastics industry who emphasised, for instance, in the case of aluminium, that the recovery rate for the bulk of processes was very high, but one at which they were most inefficient was where it was involved with waste as a whole in that they think it went into landfill sites. That is where they were losing a lot of their aluminium, partly, of course, because it was so light. Do you actually consider in your design the requirements of the waste disposal site? I am thinking, for instance, of plastics. In many instances you see two types of plastic being mixed together which means that to a large extent you have effectively lost the potential of recycling that particular commodity. Plastic and aluminium were the two instances that were brought forward to us as being very inefficient from the point of view of recovery from the waste line.

Ms Bickerstaffe: I do think you are pointing out that from a manufacturing point of view in the supply chain you have to look at the big picture. The intention is to get goods through the supply chain with the minimum use of resources and there are different ways of doing that. Sometimes you might choose a single material and then look to recycle it at the end to reduce the overall environmental burden. At other times you might sensibly combine different materials, and one of the clever things in the UK is that we have had a fairly broad order of innovation in producing laminates, which are layers of different materials, so you reduce the amount of waste at the beginning; it is real waste reduction, but at the end, you are right, it is not so sensible to try and recycle it. What a manufacturer will do is look at the total picture and if that makes sense then they will go with that. It is interesting that the UK puts less packaging on the market than many other European countries, and we think one of the reasons for that is the use of laminate packaging.

Q479 Baroness Sharp of Guildford: My question picks up on that. I appreciate that you are doing all this engineering and are, for example, making plastic

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that you use on, say, yoghurt pots or ice cream thinner than it was, but nevertheless at the moment these are on the whole not recyclable and, given that they have a half life of 10,000 years or something like that in a waste tip, you feel rather for future archaeologists.

Ms Bickerstaffe: The things that go into landfill, and we do still landfill a significant amount in this country, you do not want to degrade because those are the ones that give off methane and can cause problems, so the fact that they are inert in the landfill site is a plus. The recyclability, as I say, is just one aspect of it. In a way, in this country we need to be careful that we do not try and run before we can walk. We have good systems in place for recycling our glass, our metals and our paper to some extent. Plastics is comparatively new for recycling and what most countries have done is focus on getting out the rigid plastics, the solid bottles, where you have got 40 or 50 grams of material, and that can be done with an environmental plus. With things like yoghurt pots, toothpaste tubes, frankly, there is as much contamination sometimes with residue in there as there is material and the logistics of getting it back, the environmental burden of cleaning it and reprocessing it, at the moment probably does not make sense. In future it may. At the moment it will either go to landfill where it is inert and will not cause a problem, or in an increasing number of areas it will go to an energy-from-waste plant and so we do get something back from it; we get the energy back.

Dr Chilton: If I may pick up on Lord Lewis's point, one of the key incentives on local authorities in respect of waste is to maximise tonnage. The problem with aluminium is that it is very light but it is very carbon-intensive, and so that is why the switch is increasingly to trying to reducing the carbon impact rather than the tonnage impact, although we are still in a transitional phase. Ideally, the more the consumer at the point of disposal can segregate the waste cleanly the less contamination you are getting on mixed waste. But, if you observe a number of local authorities, because of the tonnage objective, they have been going for mixed waste and although the recycling plants do have optical means of separating the two types of plastic it is inefficient to do that.

Q480 *Baroness Platt of Writtle:* But, of course, with aluminium, which is infinitely recyclable, certainly our local authority does it on a magnetic basis, the steel from the aluminium.

Dr Chilton: You can get it out if you have got the technology.

Mr Carter: In terms of material choice, as a packaging technologist there is one golden rule and that is: choose a material that does the job. Certain materials are not suitable for packaging certain kinds

of products and in many cases we have quite a limited number of optimal choices of material. It would be crazy to choose the wrong material because it was more recyclable.

Q481 *Chairman:* But, Mr Carter, that may be, with respect, okay for your industry and perhaps I have to ask the others, but where there are global supply chains, where you do not control the packaging of some of the items that go into the ultimate box, as it were, that must be a problem. The other one is, to what extent are you sensitive to consumer demands? Does the "40 to 30" on the washing machine, which is something that some of us have stumbled over and now know it saves us money, come from you or does it come from the consumer, do you think? Where do these sorts of pressures come from, the one you cannot control and the other who is setting the agenda?

Mr Carter: Ultimately we are a consumer-led business, so we will make products for the consumer to meet their wishes. One of the challenges we have, and I think it will be shared by my colleague from Proctor & Gamble, is that we need to educate the consumer in some ways because the general perception of packaging does not always match the technical reality.

Q482 *Lord May of Oxford:* In some ways this is a comment. The notion that being a consumer industry means you serve the wishes of the consumer is a bit tendentious, because you are trying to shape the consumer's wishes more often than not. SUVs would be a perfect example. Nobody wanted SUVs; they were shaped to evade the legislation on better fuel efficiency in the States, but the industry shaped consumer demand for a ludicrous car. What do you say to that?

Mr Carter: I agree that there is a risk that that can happen.

Q483 *Lord May of Oxford:* Risk of that happening? It is part of the business.

Mr Carter: Yes, but not in every instance in every business is that the case. Certainly the "Turn to 30" campaign that Proctor & Gamble have introduced is both designed by the consumer and meets Proctor & Gamble's sustainability objectives, just like Unilever's concentration of laundry detergent. Halving the size almost halves the amount of packaging, takes lorries off the road, and again there is a consumer desire for that to happen but also it meets our sustainability objectives because we want to reduce our footprint.

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Q484 Chairman: Just on this point, the laudable “40 to 30” in my mind is somewhat undermined by the fact that the little cubes of detergent that you then put in the washing come in packaging which seems to me horrendously overdone. I just wonder if my “40 to 30” move is merely compensating for the cost of the packaging that the damn bits of soap powder come in.

Dr McDougall: I will respond to that. Again, with this lifecycle approach, we took what we used to call the fluffy powders, which was when our laundry boxes were this size and concentrated them, and what we found across the industry was that consumers do not dose according to how dirty the clothes are, so that drove the move to the tablets. The reason the tablets are wrapped is to prevent, when you open your box, moisture getting into the tablet and breaking it down. The data that we have shows that the very tiny amount of foil wrap that goes round it is still beneficial when you compare it to the wastage that you would have with uncontrolled powder dosing.

Q485 Chairman: And the cardboard box?

Dr McDougall: The cardboard is recycled cardboard.

Q486 Chairman: If you can get the consumer to recycle it.

Dr McDougall: No, no. I mean a lot of the cardboard in the UK market contains a high percentage of recycled material.

Chairman: Sorry—that is one of my hobby-horses!

Q487 Lord Haskel: Having said all of this and having learnt what you have told us about CAD engineering and lifecycle assessment, how much weight does this carry in the final decision about whether you are going to market a product or not?

Dr McDougall: It is definitely involved in the decision. What you often see with this element of design is that certainly the computer-aided design helps optimise the amount of material that goes into that packaging or the product. If you optimise that you optimise the cost, so you are designing out excess material, and the same for the lifecycle: you understand where to focus. Although we are a big company we have limited resources on where to focus energy and R&D money, so these studies allow us to identify where we should put the focus or energy.

Q488 Lord Haskel: There are many other aspects that go into the final decision. How much weight does eliminating waste carry when the company makes the final decision about whether it is going to make and market a product or not?

Dr McDougall: With the rise of sustainability up the agenda globally, waste is higher up the agenda in the big multinational companies now than it has ever been.

Q489 Lord May of Oxford: I should begin narcissistically by declaring my interest as a Fellow of the Institute of Chemical Engineers. They have produced a list of ways to assess the amount of material used as part of their sustainability guides, things like what are the total raw materials used per kilogram of end product or what is the fraction of raw materials recycled within a company and so on? I wonder how widely these sorts of things are used in Unilever, Proctor & Gamble and more generally. If they are not used, why not? If they are used, what are the typical figures which emerge?

Dr McDougall: We do use a wide range of metrics. We manufacture over 100 different product lines, so 100 different brands, for example. Each of those brands will have a range of different multiples, whether it is small bottles, medium sized bottles or big bottles. We compile and publish data to cover the whole of our business. We have what we call a sustainability report, which is a separate report from our financial report. You ask for figures. For 2006/2007 we converted 95.72 per cent of all raw materials to final product, so it is more of a description of transition. Of that remaining piece 2.36 per cent was recycled, so overall a relatively small amount goes to waste because waste is money.

Mr Carter: Manufacturers of branded goods have to use these measures to sell to retailers like Wal-Mart in the USA, for example, and it is coming to the UK. Wal-Mart/ASDA have a scorecard where the grams of packaging per millilitre of contents is one of the key indicators that you need to declare to them, so everyone who sells through ASDA in the UK will be collecting data on this measure. Having said that, from a Unilever perspective we have a concern about using simple measures. One of our concerns with using a grams of packaging per ml of content measure is that it encourages large packs because large packs are much more efficient on a gram per packaging per ml of product basis. That then clashes with some of the other issues. If we introduce larger and larger food packs we create more and more food waste. We may also cause an obesity problem and that is not what a responsible food manufacturer should be doing. The demographics of the western world at the moment are moving to smaller and smaller households, so we are being driven in a direction where potentially our grams of packaging per ml of content is likely to be moving the wrong way, not because we do not want to reduce the amount of packaging but because other factors are influencing that. The other thing I would say about

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grams of packaging per ml of product is that it gives no credit for concentration of a formula, like a liquid detergent. If instead you use grams of packaging per consumer usage then you get full benefit for concentrating down the formulation inside. Unilever chooses to use some different measures like grams of packaging per consumer usage or grams of packaging per portion for its food packaging.

Q490 Chairman: Do you use the same criteria or metrics across all of your plants internationally or are there variations caused by externally imposed legislation? I am not talking about emissions but the kinds of things we have been talking about. If you have got a plant in Malaysia and a plant in the US, say, in California, and one in the UK, would they be operating to the same standards, or seeking to achieve the same standards; let us put it like that?

Dr McDougall: All our plants operate to the same environmental standards wherever they are in the world irrespective of the legislation in the country they are operating in. We work to the highest environmental standard. Plants manufacturing the same products will use the same metrics so we can identify the good performing plants and share their best practice and we can also identify the not so good performing plants and do something about them.

Q491 Chairman: Is it the same for Unilever?

Mr Carter: Yes, the same for us.

Q492 Lord May of Oxford: Very often improving the efficiency of material used is a win-win because it saves you money and it is more sustainable, but are there examples where there is a tension between the two, where improving the efficiency of material use is an additional cost and you have to weigh the costs to you against the benefit to the environment?

Mr Carter: There are not many examples that spring to mind. Usually, if we use less material it is at lower cost. Perhaps the one example I can give is in terms of comparing a solid plastic bottle with a much lighter weight laminate pouch.

Q493 Lord May of Oxford: Exactly. It is a different material that is involved.

Mr Carter: Yes. The pouch is much cheaper to buy because there is less material in it but the filling technology to fill these packaging items on a production line is more limited and slower for a pouch. Typically that manufacturer can fill bottles and cans at very high speeds whereas pouches are slower, so you can get into a situation where the packaging cost is lower but the filling cost because you have to run your production lines at much lower speed is higher, so there are instances potentially where what you have just described can occur.

Dr McDougall: There is also an opportunity where country-specific legislation around packaging can push you in one direction and not be the same or not be pushing in the same direction in another country, and when the European packaging legislation was rolled out across Europe it was implemented differently in every single country. In some countries the prices for different types of packaging on the market are different, so you could theoretically, if you were a producer in Germany, choose to have your packaging in one format that would save you money perhaps in Germany but it would not be an optimum material in another country as far as how much you pay is concerned.

Q494 Lord Howie of Troon: So you use different methods of packaging in different countries, do you?

Dr McDougall: No. As a global producer we cannot because of the complexity. We have to pick the best packaging for the product and we have to pay the different tariffs for packaging recovery across Europe.

Q495 Lord Methuen: It has been suggested that a higher level of taxation should be applied to the use of virgin raw materials. Do you think this would be effective in incentivising businesses to use raw materials more conservatively and efficiently?

Ms Bickerstaffe: I think that is a single issue approach again because though you use materials you also use energy to process and convert them, and just putting a tax on one part of an equation is always going to have unintended side effects. For example, corrugated boxes, and we all know they contain a very high proportion of recycled material already, in order to be sustainable need to include virgin fibres each time; otherwise they just turn into pulp and fall apart. If you impose a tax just on one part of that it does not seem like an efficient way of incentivising it. There are other things that push the choice rather than a tax.

Q496 Baroness Sharp of Guildford: Moving on to the Courtauld Commitment, this seems to have proved quite successful at reducing unnecessary packaging because it has encouraged retailers to work with the Government on a voluntary basis. What do you see as being the major achievements or limitations of that commitment and what further work needs to be done either with the Government or with retailers and consumers to reduce packaging waste further?

Ms Bickerstaffe: What the Courtauld Commitment has done is bring together a number of initiatives which were happening to some extent anyway. Lightweighting, because of all the commercial drivers, let alone the environmental ones, has been going on for years and years. It has been successful in

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pulling those together and probably has given a high profile to it because there has been a lot of publicity to support that. It has probably not though addressed the areas of consumer concerns about excessive packaging. We would argue that 97 per cent of stuff on the market is not excessively packaged. Sometimes it is not obvious to us as shoppers why it is packaged the way it is. To get goods through the supply chain we think the majority of packaging is there for a good purpose and is doing a good job, but all of us know things that irritate us. We pick up something that has more layers of material or is a huge box with a tiny product in it, and the Courtauld Commitment has not really addressed those concerns. Those are the things that we would like to see addressed because the consumer needs just one example of excessive packaging to jump from the particular and say all packaging is a waste of resources. It is a very bad image for the industry as a whole. How we tackle that is more difficult. You do not need something that is going to address 100 per cent of packaging. You need something that just identifies that 3 per cent, if you like, those exceptions, and does something about those, we think some sort of multi-stakeholder group that could do some work, see where those areas are—we could probably decide them in the room now; we know where these irritating areas are—and then help provide technical advice to the companies who are doing it so that they can make improvements.

Q497 Baroness Sharp of Guildford: It has been suggested that this has been relatively successful because in a sense the Government has got closer to you. It has become a facilitator rather than just a more distant regulator, so do you feel that the Government can provide a more positive role here in terms of getting you together—as you say, something like polystyrene peas or something like that are an incredibly irritating form of packaging when you get them—so that you can identify which are the things that irritate the consumers and work with that?

Ms Bickerstaffe: I think we do know but we need to make some careful decisions over what is packaging for luxury products, for example, and what is truly excessive. Luxury is always a subjective judgment. It would be silly to outlaw things that are gifts, but things that are genuinely excessive we do need to tackle. As I say, they are a tiny per cent; they are the exception. We do not need a sledgehammer to approach them. We need something that is much more simple. We already have a legal requirement that companies must not excessively package their products. It is called the Essential Requirements Regulation and it is enforced by trading standards officers. We think that some sort of stakeholder body

could help support them and act as a sounding board for them in this area.

Q498 Baroness Sharp of Guildford: How about laminate materials? There is now a way of recycling Tetrapaks but it is quite an expensive process, but there are other laminates which are more difficult, I gather, to recycle. Should the Government and industry address the potential conflict here between waste reduction and recyclability?

Ms Bickerstaffe: No, because I think companies sort that out for themselves. People do not make packaging just for itself. They are using the packaging, as Steph was saying, to get their goods from A to B in the most effective way and then get the materials that come out as waste at the end recovered in the most effective way. Sometimes laminates are the most effective, sometimes they will allow you to have far fewer lorries on the road delivering goods because they are such a tiny amount of material, so you have got your plus environmental points at that part of the supply chain. I know the public do not see that, but that is good for the environment. The fact that it cannot be recycled but you can recover energy from it does not detract from being able to use it.

Q499 Baroness Sharp of Guildford: What proportion of collected waste do you think now goes to energy recovery?

Ms Bickerstaffe: In the UK 11 per cent of municipal solid waste but the target is for 25 per cent of municipal solid waste by 2020, and it looks like we are on target for that.

Dr McDougall: I would like to add to and support Ms Bickerstaffe's point there. I think that we need to have a balance between recycling where it is economically and environmentally beneficial and not focus on all packaging material having to be recycled. There will be a balance in the spectrum of materials where at some point we will have to say, "No, these very small yoghurt pots", for example, "to collect and recycle them is really just not worth the effort. We will be much better burning them and taking the energy back". Again, it is this big picture piece, to make that decision.

Q500 Baroness Sharp of Guildford: From a consumer point of view there is a considerable resistance to incineration.

Dr McDougall: I do agree.

Q501 Baroness Sharp of Guildford: It is not a straightforward issue. If I look at what goes into my dustbin, it is very largely plastic packaging from the supermarket—meat packaging, the odd yoghurt pot and the like—which you know is not recyclable at the moment.

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Mr Carter: Can I just make a comment on the Courtauld Commitment? Certainly my corporation supports the Courtauld Commitment, but one of the areas that the Courtauld Commitment does not focus on is the transit packaging, the packaging that is there for distribution and shelf presentation. It focuses on what the consumer buys. That is an area that I think needs development, because we need to look at packaging as a whole system. You can get into a situation where you so lightweight the individual consumer package that you have to bolster the transit package, because it has no strength. The consumer package has no strength on its own. Again, it is important not to look at individual elements of the whole product chain in isolation; you need to make sure that you tie them together and find the optimum.

Q502 Lord Howie of Troon: Ms Bickerstaffe mentioned excessive packaging. Who decides when the packaging is excessive?

Ms Bickerstaffe: That is a very good question. It will always be subjective to some extent. Looking at the letters we get at INCPEN, people do not tend to criticise the regular weekly groceries. I think that people accept that those are fairly minimally packed. We get some little concerns about fresh produce—fruit and vegetables—and why can they not be loose. Take cucumbers for example. After three days, a cucumber really is not saleable. People do not pick it up because it has lost moisture; it looks dull compared to the ones next to it. You put 1.5 grammes of plastic wrapping on it and people say, “Why do I need that?” but if you do that, you will extend the shelf life to 14 days and you still have a saleable product. When you look at the energy and resources that you have invested in growing fruit and vegetables, we reckon that it is a justifiable use of material.

Q503 Lord Lewis of Newnham: Not coconuts?

Ms Bickerstaffe: No. I do not know anybody who has ever bought a coconut, wrapped or unwrapped—but it is the one that is always raised!

Q504 Baroness Platt of Writtle: INCPEN has suggested that a “packaging watchdog” should be established, involving industry, local government and non-governmental organisations, to address the problem of excess packaging. What role do you envisage such a watchdog playing? What resources would it need to do this, and how beneficial do you think it would be for consumers? Would it in some way perhaps duplicate some of the aims of the Courtauld Commitment?

Ms Bickerstaffe: We have suggested this because, in the early 1990s, before the Essential Requirement Regulations made it a law for companies to use a sensible amount of packaging, we ran a body like that, and it was effective. Consumers could write in to us; we were a multi-stakeholder group; we had local government people from the waste management side and the trading standards side; we had people in the supply chain; we had environmental groups and consumer groups. People could write in if they had concerns about packaging and we would then take those complaints up with the company concerned. If the response came back and we thought it was not justified, we thought that the packaging could be improved, we could offer technical advice to the companies to do that. If they came back and said, “We package it like this for X, Y and Z reasons” then we could pass that information back to the consumer. It worked as a very good conduit between the consumer and the supply chain, and it did lead to some real improvements. Probably something like that is not appropriate today because we have the legal requirement and trading standards police it, but we still think there is room for a body that could identify this difficult area of what is excessive and what needs improving; could offer technical advice—and there are sources of Government-funded advice like Envirowise and WRAP that they could be pointed at to support it. We think that it is such a high-profile thing for such a tiny problem that some body ought to be set up to address that specifically.

Q505 Baroness Platt of Writtle: You cannot do it yourselves as INCPEN?

Ms Bickerstaffe: As INCPEN we did fund it ourselves in the 1990s and we got criticism for that because it was 100 per cent industry-funded and we were accused of speaking for industry, even though I am quite convinced that we were not. Lord Clinton-Davis was the first chairman of it. He was completely impartial and not anybody’s spokesperson. I think that now it would have to be different. It would make it more transparent if it was part-funded by industry, part-funded by Government.

Q506 Baroness Platt of Writtle: Would large companies like Proctor & Gamble and Unilever be willing to play a role in such a forum?

Dr McDougall: We have been involved with INCPEN and the European body, EUROPEN, since formation. We have always been actively involved in this particular industry association.

Mr Carter: Yes, from my perspective also. One of the frustrations of corporations like Unilever and Proctor & Gamble is that we try very hard to comply with the essential requirements. We make great efforts, and sometimes we actually choose not to

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launch particular packs because we feel that they do not comply. It is very frustrating for us to see people we would regard as freeloaders taking advantage of the fact that they do not have the same standards as we do.

Q507 Lord Howie of Troon: Under the EU Directive on Packaging, I am told that large retailers have to buy Packaging Recovery Notes to meet their obligations. How successful have these notes been?

Ms Bickerstaffe: Could I first make the point that it is not just retailers who buy these Packaging Recovery Notes; our packaging recovery system obliges raw material suppliers, converters, brands and retailers all to contribute towards it. The system has been successful. The European Commission set down targets to meet recycling recovery targets by 2008. We are very likely to meet those targets. We have done it by spending just over £1 billion of industry funding since 1998, when the regulations came in. There has therefore been a significant financial contribution from industry, all parts of industry, to achieve this. We have got to the targets. The European Commission has now said that they think these levels of recycling are environmentally sensible. They think that the cost-benefit analysis they did on it in 2004 still stands. They are therefore recommending to all European countries that they do not move the targets further in the short term. In the UK we have a slightly different situation developing compared to other countries. We still have consumers saying that they would like to recycle more material; so we have to address that. We do have this issue of consumers thinking that there is too much packaging out there. It is really a switch now. We have come as far as 2008 under the EU rulings and we have achieved what we set out to do. Now we need to look at what additional issues we need to address.

Q508 Lord Howie of Troon: Have there been difficulties in implementing this system?

Ms Bickerstaffe: I suppose so, but the view that we took back in 1998 was to focus on getting the most resource-efficient packaging recovery system in place; so we focused predominantly on getting material out of the commercial/industrial waste streams, where it is cleaner and it is more homogenous, and so it is easier to get at and, financially and environmentally, sensible to go for. We have put less effort in on the household waste side. However, having said that, all the glass bottles and the metal cans tend to end up in the household waste stream; so we have had to have some focus on that. It is really what additional effort needs to go into that area now.

Mr Carter: I worked in the UK when the PRN system was introduced. I think that the whole packaging chain, from raw material manufacturers to retailers, really felt the pressure of gathering the data and putting the systems in place to gather the data. But that is all done now. Each corporation and retailer has data management systems that are efficient and they work. We put the pain and resource in in 1998 when the system was introduced, and now it is a system that everyone has learned to work with. I think that, relatively, it works very efficiently compared with many other countries in the world.

Q509 Lord Lewis of Newnham: This is not the question I was going to ask, but can I comment that I do think this business of recognising recycling from commercial bodies is very much more attractive to the bulk of recycling groups, because very often they are dealing with a single commodity all the time and so it does lead to it. What I am not clear about is the percentage of recycling that is commercial, as opposed to the amount of domestic. I have a feeling that it must be a large amount recycled commercially. The question I wanted to address myself to, however, is related to this. You have made the point, both Unilever and Proctor & Gamble, that you are governed by what is a world type of market, not by a local market. Here we are discussing the European implication. Have you found that in point of fact your directives from Europe are as strong or weaker than in other parts of the world? In other words, are there certain things or procedures you are carrying out which are not governed by the European Union but by other parts of the world, which have stricter types of environmental legislation?

Dr McDougall: Essentially what we see is that the most stringent legislation is being driven out of the EU, and that is across the board from operating/manufacturing sites to how we manage our residual packaging waste streams. To be honest, when you get into the nuts and bolts of much of that legislation, it is very similar in North America and Canada and in some of the countries with developed economies. Therefore our operating standards are very North American and Europe-centric, and we bring these operating standards into our Latin American operations and our Asian operations. We tend to have very well trained people in all these jobs, to make sure that we deliver the same quality at all our manufacturing facilities.

Q510 Baroness Platt of Writtle: You talked about a data system and that it is now in place and people can work with it. It works for large companies like Unilever and Proctor & Gamble, but I seriously wonder what it does to small firms who do not have the extra staff to do that kind of thing.

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Ms Bickerstaffe: It was definitely onerous at the beginning, collecting the data; but once the system is in place, even for small companies, it is then more of a turnover situation. I think that our system has delivered. We are ten years in operation now and we have got where we needed to be.

Q511 Baroness Platt of Writtle: How aware are consumers of the relative amounts of waste produced during the production, packaging, distribution and recycling stages of a product's life cycle, and what evidence is there to show that they are concerned about this?

Dr McDougall: With the greatest respect to our consumers, I think that their understanding of the whole life cycle is not very complete. They really do focus on what they see as the packaging or the waste from each product; they are very aware of this and very familiar with it—mothers in the kitchen who see it every day when putting the rubbish out, et cetera. They really do focus on the packaging as waste, rather than even the packaging playing a role in getting that product to them. I think that the quality of the product, the protection of the product, the anti-tampering—all the benefits that the packaging brings—even they are missed, let alone any of the environmental burdens caused at earlier stages in the product's manufacture. What we see with consumers, when they are questioned about their shopping habits and preferences, is that now lots of people say that they would pay more for green products or they would buy green products or environmentally friendly products; what we actually see in the marketplace is that it is a combination of the lowest price and the best performance that closes the deal. It is not necessarily across the board for every single product, but I would say that it is a fairly accurate generalisation.

Q512 Baroness Platt of Writtle: You talk about packaging, but of course there is the whole product itself anyway. This is what we are discussing. How it is produced, what they use in the life cycle, and then what happens at the end. Are they affected by that?

Dr McDougall: I do not think so. It really is product performance. If the product does not work, it gets bought once and then never again. It is a combination of product performance and price.

Mr Carter: There is a huge problem from our perspective as manufacturers about the level of understanding by the consumer. Recently there was an article published on the internet from Cadbury's, who were saying that 75 per cent of their consumers think that the biggest thing Cadbury can do to reduce the environmental impact of their product is to reduce their packaging. Actually, if you look at a Cadbury's chocolate bar, it is about 1 per cent of the

total carbon emissions through the life cycle of the chocolate. That is one of the problems we have. Consumers do not understand that packaging is responsible for about 3 per cent of the emissions of a shampoo: it is all the hot water that they heat to wash their hair. Asking them to turn the shower off while they lather their hair is far more effective than us trying to take 10 per cent weight out of the packaging.

Q513 Baroness Platt of Writtle: A lot of education has to be done before this could be part of the selling process, is what you are saying?

Mr Carter: Yes.

Q514 Chairman: The consumers' champion—Dr Chilton?

Dr Chilton: Thank you for the opportunity. I agree with much of what Forbes has said. The system is complex; consumers do not understand the whole delivery system and, when they get into the shop, they are overwhelmed with information and choice. Your typical supermarket has 26,000 products in it. To choose amongst those products, they may be thinking about Fairtrade issues, organic issues, recycling issues. In practice, most of us just deal with brand, price and convenience, even though if we were interrogated we would say, "Yes, these other things are important to me". What is the answer, therefore? Clearly one would never resist more information to consumers, but expecting that alone to achieve substantial behavioural change is extremely optimistic. They need to be able to choose between products that are sustainable, not between a sustainable product and an unsustainable product. I will give an example. We have had eco-labelling of fridges since 1995. The A-rated fridges represented 3 per cent of the purchase market. Only when poor-performing fridges were taken out of the market did we see a 50 per cent improvement in the market of energy-efficient fridges. In other words, a degree of choice editing. There is still choice in the market for consumers, but it is not a choice to choose unsustainable solutions to their consumer needs.

Q515 Lord May of Oxford: Of course much of what you say is true, but I would say that it is greatly oversimplified. Take the growth of the organic product market, which is a complicated issue because the organic food in some ways is grown in a more environmentally friendly way, which is a plus, but a lot of people are buying it because they think they get extra benefits, which they are not. That is an example of something which, I would say, for many of the motives of people who spend extra money to do this, falls in the general category of sympathy for the environment. They have used that to trump the other things. You say people go into the supermarket and

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they think this, this and this. If I am typical, most people go into the supermarket and they buy the sorts of things that they are in the habit of buying, and you just make step changes in habit. Organic farming is one. A real commitment—not just marginal things which are a mixture of profit advantage anyhow—to minimising packaging and thinking very seriously about it, properly marketed, engaging things like Greenpeace and Friends of the Earth, has a chance to step-change habits. We are not talking about that here. You seem to dismiss that as if it is not a factor, whereas in the sale of organic produce it is demonstrably a factor.

Dr Chilton: I think that we could end up violently agreeing with each other! This is a complex problem; there is no single, simple solution. It requires an alignment of incentives and behaviours. One of the key reports that the National Consumer Council has produced is *I Will if You Will*. It requires collective behaviour amongst consumers, so that you do not feel you are standing out by taking a step in this direction; you are not by-standing. It is also a partnership with providers: that they are responding to the collective messages of consumers and facilitating green choices. Clearly there are NGOs that provide some thought leadership and some navigation skills in this, to which consumers and packagers can be receptive.

Ms Bickerstaffe: One of the reasons that major companies belong to INCPEN is to support our education programme. We have had a schools education programme since 1988 and the level of interest in it in the last five years has soared enormously. At that level, children are wanting to understand the environment better and we can capitalise on that by explaining things more simply. People are confused about what is important environmentally and what is not. MORI does regular surveys saying to people, “What do you think is the most important single step you can take to improve your own environmental impact?” and they tend to put recycling at the top. Recycling helps but it is actually tiny compared to things like turning down the home thermostat, using your car less or buying a more efficient car. We did one bit of research that showed that if, rather than buying an SUV or a gas-guzzling car, you bought a regular family saloon car, the energy you would save in one year is equivalent to recycling all your glass bottles for 400 years.

Q516 Lord May of Oxford: There was a fascinating MORI poll which asked the people who were polled to rank ten actions that would save energy and then it asked climate change experts, and there is essentially no correlation.

Ms Bickerstaffe: That is something we need to help consumers understand.

Q517 Chairman: On the other hand, Ms Bickerstaffe, your education would probably have been one of the major informants or drivers in the rejection, certainly by junior consumers, of the amount of packaging that Cadbury’s have on the things that they eat; for example, Easter eggs. They have now bowed to that. With respect to your dismissal of the packaging in chocolate, where you get specific campaigns relating to things like Easter eggs, you cannot tell us that the packaging there is nothing other than a means of trying to persuade consumers to purchase one egg against another. Mr Carter, it was you who used the Cadbury example.

Mr Carter: One of the difficult areas that we get into is gift and luxury goods packaging. Easter eggs are bought as a gift. If you consider other things that are bought as a gift, in society there is an expectation that gifts are elaborately packaged; and, again, if you look at fine fragrances. One of the challenges we have as a society is in making gifts look minimalist. Certainly Cadbury’s are addressing this, because one of the things that they are trying to do at the moment is to make the chocolate thicker, so that they do not have to protect it as much; so that they do not have to have such an elaborate box.

Q518 Chairman: Do you think they will be doing it for the same price, or do you think the cost of chocolate will increase?

Mr Carter: Unfortunately, I do not know the commercial drivers of chocolate manufacture, so I cannot answer that question!

Chairman: Maybe we should ask them.

Lord Howie of Troon: This is all very reminiscent of the problems that politicians have in explaining politics to the voter!

Q519 Lord Lewis of Newnham: We have been concerned primarily with packaging. Can we talk a little bit about what is inside the package? We have been told that industry can only achieve a certain amount of reduction in waste and that the complexities of consumer behaviour—the throw-away society aspect—also needs to be addressed. How can consumers be encouraged to value durable products above cheap and disposable items?

Dr Chilton: Information is necessary but not sufficient. It is behavioural change. There are other examples. The Health Select Committee has examined how to persuade people to stop smoking or to eat better, et cetera? There is a whole series of behavioural approaches which help to shepherd people into making good choices, and provide them with information; but also collective behaviour and incentives to do so. You are probably looking at something that involves subsidy, regulation, taxation, information, and celebration of the good

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things that are going on, so that people feel that they are conforming. I was in a supermarket last night and I had to work quite hard to stop that plastic bag coming across the counter, because everybody else was getting plastic bags. I had to stand out. That should not be the case; it should have been the other way round. Interestingly, Waitrose are now dedicating some of their cash rows to non-plastic-bag people. They are starting to make it easier. I do not think that they have reached the point of processing you more quickly—that would be a wonderful incentive!—but building those sorts of practices right through the delivery chain. We do see, and have seen on certain issues in society, that people's behaviour progresses on a journey and will achieve the result that we all actually want.

Q520 Lord Lewis of Newnham: I am sure that is right. That is certainly an effort that has come out of the whole concept of recycling. If you look at the history of recycling over the last 20 years, from being a complete no-no to being now an acceptable part of society, I am sure that is absolutely so. INCPEN suggested that the Government should re-establish its National Household Waste Analysis Programme, which analysed the composition of various household waste. Why was this programme stopped, and how does the data collected by current sample surveys compare to that taken by the old programme?

Ms Bickerstaffe: The National Household Waste Analysis Programme operated from 1980 all the way through to the early 1990s. It was a systematic analysis that a large selection of local authorities did over different times of the year, because waste is also seasonal. I do not know why it was stopped. The Government at the time just decided that they no longer needed it. However, it was giving us really good data about what people actually throw away. It was a basis for being able to design good recycling systems as well because, once you understand what is in the waste stream, then you can manage it. There has never been the equivalent sort of analysis of commercial and industrial waste streams. Frankly, the data we have today has gone backwards from those days. We still do not have good data on industrial and commercial waste and we have less good data on household waste. We think that it is really important, when waste is such a high-profile political issue, that more resources are put into actually understanding it.

Q521 Lord Haskel: Would eco-labels work?

Dr Chilton: They will not do any harm but they will not work alone. One of the problems when you get a product now is absorbing all that information. It has to be simple; it has to be absorbable. That is why I

made the point earlier. It would be better to reduce the window of environmental impact of products so that when you go along you say, "All of that range is not doing the environment serious harm; therefore I will choose on the basis of other considerations".

Q522 Lord Lewis of Newnham: How about the position that we are finding ourselves in now over landfill, where biodegradable is becoming a feature that must be reduced within your landfill site? How are we going to assess how much biodegradable there is, unless we have the sort of surveys that we have been talking about?

Ms Bickerstaffe: We do need much better data. You are absolutely right. Hopefully that is something that the Government will look at.

Q523 Lord Lewis of Newnham: How are they going to do it? We are told it has to be 75 per cent of what is being put in—when was it?—five or six years ago.

Ms Bickerstaffe: I do not know how it is being measured but there are some formulae that have been put together, and local authorities have been allocated targets to reduce the amount of biodegradable. When you look at dustbin waste, household waste, the majority of the biodegradable fraction is the kitchen and garden waste and the newsprint. That is almost 60 per cent of what is there. Most local authorities are putting in place procedures for diverting those from landfill.

Q524 Lord Haskel: If eco-labelling would make a contribution, is there a technical or regulatory basis on which labelling would be fair and would be informative?

Dr McDougall: We would say that eco-labelling could be useful, but we have to be very careful that it does not become prohibitive with respect to innovation. If we say, for example, phosphates should not be included in washing powders—and the majority of washing powders in Europe now do not contain phosphates—can people not just put "phosphate-free" and get an eco-label? That is one issue. The second issue would be what if, five years down the line, a washing powder is developed that uses half the resources, half the energy to manufacturer, washes twice as well at half the temperature, but contains a small amount of phosphate? The innovation department, the R&D department, would not even go down that route of investigating those chemicals or those formulae if there was a restriction around what you can put on. From an industry point of view, therefore, eco-labels can be useful, but they have to be very carefully designed not to set a bar where people will reach the criteria and then not be able to go any further.

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Q525 Lord Lewis of Newnham: Ought we not to ask the question of why are phosphates banned?

Dr McDougall: Because of eutrophication of water.

Q526 Lord Lewis of Newnham: Utrification is a minor factor, but human effluent is far greater in phosphate than ever you will get from washing powders or things like that. It is a minor contributory factor to it.

Dr McDougall: Yes, but I think that this was driven from the Scandinavian countries chiefly.

Chairman: You were complaining about the lack of evidence that you have, but you have certainly been extremely frank and open with us this morning and we are very grateful. If afterwards you think that there is anything you would like to add, we would be very pleased to receive it. Equally, we will reserve the right to come back to you if there is anything that, on examination of the text, we think you could be a little more explicit on or where perhaps you did not do yourself justice. Thank you very much for coming this morning.

Memorandum by the Salvation Army Trading Co Ltd (SATCoL) and The Nonwovens Innovation and Research Institute (NIRI) based at University of Leeds

1. SATCoL is the trading arm of The Salvation Army in the UK and has been an active and innovative member of the textile recycling industry for the last 16 years. These comments will, therefore, be confined to this area although some of the concepts may be transferable to other materials and industries.

BACKGROUND

2. The textile recycling industry is operating in much the same way as it has for the last 20, 30, 40 years or more; (collect, sort, distribute, dispose). However, as with the rest of the waste industry they have, to use a medical analogy, been treating the symptoms rather than tackling the real cause of the disease.

3. SATCoL has been working with NIRI Ltd, a University of Leeds spin-out company and Oakdene Hollins Ltd for the last 2-3 years to try to identify the disease and the root cause. (Recycling of Low Grade Clothing Waste; Defra Contract Reference: WRT152, submitted October 2006 and the source of some of the data in this submission).

4. We noticed that, as a nation, we concentrate so much on waste that we miss the point that it is the original design that defines this waste. In short, we design most products with a cradle-to-grave approach, which often translates as a cradle-to-bin-approach.

5. We postulate that if products were designed with a cradle to cradle, rather than a cradle to grave, approach we would begin to create more “sustainable” garments providing other options for use at the end of life. In terms of the full life cycle these products could, therefore, have several “lives”. This would include: re-use, recycling back in to fibre and thence in to new clothing products, up-cycling (into more valuable products) and also, provide a means of extending the life of existing products before they are disposed of.

6. We believe that if this concept was embraced by product designers, materials scientists, engineers and the retail sector, and therefore, “handled” correctly, waste collection costs could also be reduced as the originator of the product would need to take a greater responsibility for their design and engineering decisions.

7. A consequence of this could be that retailers or manufacturers might be required to collect their own used products from customers prior to reprocessing and remanufacture. The end of life vehicle directive in the automotive industry is an example of change that has led to improved sustainability through revised product engineering and design practices.

8. To significantly improve environmental sustainability at the end of life of our clothes, better linkage between design, technical and retail decision-making is required. This will impact on raw material selection, fabric manufacturing, product design and assembly and retail specifications.

UNDERSTANDING TODAY'S SYMPTOMS

9. However, it is instructive to understand the symptoms and how we might approach them today as this will assist in developing a cure. Table 1 summarises the UK's buying and disposal routes for clothing.

Table 1

DISPOSAL ROUTES FOR CLOTHING		
	'000 tonnes	%
Sales (2003)	1,865	
Thrown in rubbish bin	1,165	63%
Collected for reuse and recycling	324	17%
Reused in UK	41	
Exported from UK	200	
Recycled in UK	62	3%
Unusable	21	

Source: Recycling of Low Grade Clothing Waste, DEFRA, WRT152, October 2006.

10. To highlight just two or three of the lines of this table.

- we dispose of over one million tonnes every year into our rubbish bins;
- we only collect about 17 per cent for recycling or reuse; and
- UK industry only turns 3 per cent of this into “new” products.

11. Simply put, each of us in the UK buys about £600 of clothes per annum and discards £400 worth!

12. Today our unwanted clothes are discarded and reclaimed in a variety of ways as outlined below but all have their challenges and do not address the root cause of the problem.

Reuse

13. The “value” stores today account for about 25 per cent of UK clothing sales and therefore, compete directly with the Charity Shops on price. This means that today only 50 per cent of a charity shops profits come from the sale of second hand clothing.

14. In addition these value products do not have the durability needed for secondary re-use. So this route will not treat the symptoms for much longer.

15. However, large quantities of clothes are exported for reuse to “developing” countries and sold at prices commensurate with that countries cost of living. However, as many of these nations now belong to the EU it is expected that their affluence will grow and the demand for second hand goods will be transferred firstly to the new “value” store products and then to more durable quality items. This means that today trading is being carried out in a potentially declining market—this of course may also eventually jeopardise the infra-structure for clothing collection in the UK.

Restyle

16. Several organisations have tried to commercialise the concept of adapting second-hand clothing into “new” items and many beautiful pieces of clothing have been produced. But due to economics (this is extremely labour intensive and only really works as a “cottage industry” with minimal overheads) less than 1 per cent of the available discarded items are used. It is, however, a very useful PR tool, but for practical purposes, commercially it really is another ineffective medicine!

Recycle

17. The textile recycling industry in the UK used to employ tens of thousands of workers, but today it has just a few hundred. Much is down to economics but decreasing availability of certain “raw” materials, such as wool and the increasing use of mixed man-made blends also play their part. In this industry, clothing is mechanically separated (pulling) and fibres are extracted from the fabrics to enable industrial products such as mattress padding, carpet backing, automotive sound insulation, furniture padding and wiper cloths to be made; but only 62,000 tonnes per annum is used in this way, hardly a drop in the ocean when you consider

the 1.2 million tonnes potentially available. Although garments are sorted to some extent prior to the pulling process, the result is a highly heterogeneous mixture of different fibre types and colours, which is of course a consequence of the original garment design and limitations in the pulling machinery.

18. Today there has been a serious decline in mature markets, and a decrease in suitable raw materials for the traditional markets mentioned above. Much of this is due to an increase in the consumption of synthetic fibres in value-clothing products, which enter the waste stream, difficulties in garment disassembly, and extremely limited technical innovation within the recycling industry.

19. Some initiatives have also been developed to enable the recycling of synthetic fibres such as polyester extracted from garments back in to fibre-form for producing new garments by polymer extrusion; however, this involves exporting raw materials over long-distances to access Far Eastern manufacturers.

CREATING NEW MARKETS

20. NIRI at the University of Leeds successfully developed laboratory samples from non-wearable low quality garments extracted from the current garment waste stream in six main areas—some of these provide potential for up-cycling of clothing waste into more lucrative market areas.

- non-structural composites;
- functional automotive components;
- building/construction boards;
- thermal insulation;
- hydroponics—growing media; and
- clothing.

21. There is, however, a lack of investment in this area, possibly due to deficiencies in our understanding of this complex subject but the momentum needs to be maintained. From this work it is quite clear that we need to treat our waste raw materials like virgin raw materials in terms of the engineering and design of new products.

SPECIFICATIONS AND FORMULATIONS

22. The main factors influencing the use/selection of virgin materials are:

- technical performance-cost quotient;
- technical specifications and the need to meet standards;
- compatibility with manufacturing processes;
- continuity and consistency of supply; and
- marketing.

23. Currently, in general terms, the selection of raw materials and the design of consumer products made from these raw materials (eg clothing) are centred on meeting the specific requirements in terms of appearance, technical performance and economics ie cost that determines fitness for purpose in use. Generally, there is little or no attention paid to the consequences of these decisions at the end of use. When virgin raw materials are considered for manufacture there are complex specifications and formulations that have to be met to meet product performance requirements. When dealing with waste fibre materials intended for relatively high value products, the same considerations should apply. At present, waste fibre materials tend to be poorly specified in quantitative terms but this can be addressed.

24. These are just some of the technical considerations:

- variation in fibre dimensions;
- physical properties of the fibre components including blends;
- contamination—unwanted chemicals, particles and debris;
- consistency of supply—volume, fibre blends, conformance to specifications; and
- history and traceability.

25. Owing to the heterogeneous mixture of collected second-hand clothing addressing these technical considerations is a challenge but is not intractable. To stimulate greater demand for recycled fibre raw materials we will need to upgrade our recycling processes and improve UK collection and sorting procedures so that we can apply similar specifications as for virgin raw materials.

26. For example we will need more complex sorting regimes based on fibre specifications rather than appearance.
27. This means we will:
 - need new mechanical processes;
 - have to develop manufacturing specifications at the initial design stage;
 - evolve smart labelling systems to aid automation of these processes but also to add traceability to a garment—enabling the source of the original raw material, processes used etc. to be identified. This is important to major retailers wishing to increase the amount of recycled fibre they use; and
 - provide process monitoring to ensure the genuineness of all methodologies employed.
28. But of course all of this is a short term stop gap.

REQUIRED INTERVENTIONS

29. We need to completely re-examine how we design and fabricate clothing by considering their primary, secondary and even tertiary uses. Earlier we indicated that one of the barriers to effective recycling is the difficulty in disassembling a garment to produce a homogeneous product for further industrial use. We need to consider alternative manufacturing methods, opportunities for making garments composed of a single fibre composition rather than a blend, different methods of garment construction and assembly—thus fuel a change from cradle to grave to cradle to cradle thinking.
30. There are of course numerous factors that influence the true resource management of textiles but nearly all are influenced by design decisions. To instigate more effective resource management we need to establish that recycled fibres, if extracted, processed and specified properly for use in new products, can be a valuable resource. From our work so far, we believe that performance products made from recycled fibres are on the horizon.

WAYS TO ADDRESS KNOWLEDGE GAPS

31. Establishing approaches for increasing the homogeneity of fibre composition (targeting 100 per cent mono-compositions) to simplify sorting and end of life fibre separation and recycling processes.
32. Development of cost-effective processes for separating and reprocessing of cotton-PET blend fabrics and other heterogeneous fibre blends containing two or more dissimilar polymers.
33. Development of methods to reduce the impact of colouration, fabric chemical finishes and coatings (eg water repellents and flame retardants) on the fibre separation, reprocessing and recycling processes for the constituent fibres.
34. Proof of concept studies on the use of recycled fibre or polymer components as feed stocks for industrial manufacturing processes eg fibre extrusion and textile processing.
35. New garment design techniques that consider both the cost-effective assembly of the garment prior to the point of sale and its disassembly at the end of life. This will need to consider alternative methods of garment construction and approaches to seaming and joining, stitch less joining methods, potential for induced failure of components at the end of life, automated rapid assembly and disassembly techniques.
36. Alternative techniques for constructing embroidered logos that facilitate rapid removal at the end of life by practical means.
37. Development of SMART labelling systems that ensure in-use and disposal protocols are communicated to maximise opportunities for disassembly, reuse and remanufacture at the end of life.

October 2007

Examination of Witnesses

Witnesses: MR MIKE BARRY, Head of Corporate Social Responsibility, Marks & Spencer; MR BRIAN MCCARTHY, Director, TechniTex Faraday Limited; MR PAUL OZANNE, National Recycling Co-ordinator, Salvation Army Trading Company Ltd; MR ALAN WHEELER, National Liaison Manager, Textile Recycling Association, examined.

Q527 Chairman: Good morning. Can I start off by asking you to what extent do product designers, materials scientists, engineers and the retail sector work together to consider the full life-cycle impacts of textiles? Are there barriers to co-operation between the disciplines? Perhaps I could ask this at the same time. How do you try within these processes to be less dependent upon virgin materials? Obviously these are considerations that affect the whole waste chain and resource efficiency.

Mr Wheeler: May I say thank you very much for inviting me here today, my Lord Chairman. I am Alan Wheeler from the Textile Recycling Association. I have thought about this. In my experience, or from the experience of the members of our trade association, I think that clothing is not recycled in the sense that people really understand. Most clothing that is not suitable for reuse in the first instance is not recycled back into clothes generally speaking, but is converted or put into lower-grade items, so wiping cloths, mattress fillings, blankets and that kind of thing. There does not seem to be much completion of the recycling loop, when it comes to sourcing fibres at the manufacturing stage. We also find that the quality of the clothing that is coming through to our members is on the decline, which makes it harder to reuse; also the complexity of the garments that we are seeing coming through is increasing. It does suggest that there is not much thought about how recyclable an item is at the end of its useful life. I think that the lack of understanding of the life-cycle impacts of garments is illustrated quite graphically by the EU Draft Textiles Products Background Report—a very catchy title!—which is a draft green public procurement policy document, and it makes no reference whatsoever to manufacturers or retailers procuring textiles using recycled fibres. I think that needs to be addressed.

Mr Ozanne: We have noticed few signs across the retail sector that there is an awareness of textile waste management issues. We have also noticed far more concern in the packaging and food waste area. However, I do feel that sustainability is an issue which is now more likely to be addressed because of its relative importance. For argument's sake, the recent M&S move to link up with Oxfam highlights very good issues. The barriers, as I see them? UK consumption is high and increasing and 90 per cent of the clothes we consume are imported; hence significant impacts occur outside the UK, over which there is little or no control. Secondly, the clothing supply chain is complex, global, and characterised by subcontractors—a lot of these from the developing

world—and the use of migrant workers, which poses traceability problems. The third barrier is the emergence of “fast fashion”, which at the moment makes up 20 per cent of the UK market. This has doubled in six years. This trend contributes significantly to the quantities of low-grade clothing, which are difficult to displace.

Q528 Chairman: I would just like to follow this up. It is the designers who design these, who source these. It is the companies that employ these people. I realise that you are at one end of the chain and Mr Wheeler is in another part, but are they not driven by cost considerations? They want to provide cheap clothes that can be thrown away. Is there something that could be done there to slow down the cycle of redundancy?

Mr Ozanne: I have to confess that, on a personal level, I do have some concern when my 30-year-old daughter buys five or six dresses from Matalan, wears them half a dozen times, and then throws them away without washing them—on the pretext that she is being environmentally careful! However, that material will be of low quality and therefore low value. If that is coupled with the amount of material we are able to recycle—I think it is about 3 per cent, 62,000 tonnes, that we are able to recycle as a nation—it will inevitably either drive the price of the reused clothing market down, or it will go to landfill.

Mr Wheeler: Can I just clarify that the 62,000 tonnes is approximately the amount that has actually gone to recycling, but we collect around 300,000 tonnes a year for reuse and recycling—which is still only about an eighth of what we are buying each year. There is still an awful lot of clothing and textiles out there that is not being collected for recycling or reuse.

Q529 Lord Lewis of Newnham: This term “fast fashion”, what does it mean? It is used quite often in these particular documents, and I am not clear what it does mean.

Mr Ozanne: I am not an expert but I think the type of fashion would be in certain cheap supermarkets, clothing chains. The garments are quick to produce; the turnover is very fast; and the length of time they are able to be worn is very short. Certainly not the uniform I am standing in here, I expect it to last ten years. Going back to my daughter's situation—and I hope she is not looking in!—she would not expect to wear a garment more than three or four times.

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Q530 Chairman: Mr Barry?

Mr Barry: Let me offer some views as a retailer. Traditionally, clothing retailing has been characterised by two seasons: there was a summer season or what we call spring, and an autumn collection for winter. What has happened now with fast fashion is that you see up to ten or 12 different seasons in a year. Rather than just selling the same clothing for six months, retailers will try to change it every month. To do that, you have to have a very fast turn-round on clothing production. You have to have it designed quickly; brought to the UK quickly; sold quickly; and people will hope that people will wear it for a month and then change again. That is not how the M&S model is built. The M&S model is built upon quality; but clearly there has been a huge increase in the UK market share for fast fashion over the last few years.

Q531 Lord Lewis of Newnham: In general, it is of a lower quality?

Mr Barry: I have to be hugely careful here. M&S has fought hard to preserve its quality requirements in the marketplace. I have heard voices in the outside world that have said that fast fashion can compromise quality, yes.

Q532 Baroness Sharp of Guildford: But am I not right that the real cost of quite a lot of textiles has fallen substantially over the course of the last 20 years, say, because of the advent of cheap textiles that are produced in, particularly, China?

Mr Barry: There has been a huge amount of price deflation in the marketplace; something like 25 per cent in the last four or five years. That brings benefits to UK plc and to UK consumers. We have to be very honest about that in terms of pressures upon inflation and in terms of access to decent clothing for the vast majority of the UK population; but it also drives an environmental challenge. I would like to pick up on the word that Paul used here. Traceability is the big problem when it comes to clothing. M&S is unique in the UK and one of the few in the world that can trace back beyond the primary factory that produces its clothing, to the dye-house, to the spinning mill and, increasingly, we are going back into the raw material field. Unlike food, where we can go back literally to the cow—the individual cow that has been used in a ready-meal we can trace right back—for clothing it is still new; so cotton is sourced as a commodity. There are huge environmental and social impacts in cotton production. Apart from Fairtrade and organic—we have bought a third of the world's supply of Fairtrade cotton but this is only 10 per cent of the cotton M&S uses; 90 per cent of the cotton that M&S uses is still bought as a commodity. We still cannot go back to the field and dictate standards. Not many people can go back to the actual dye-house and look

at how the environmental impacts of that are controlled. It is actually very difficult to start looking at the total social environment footprint and how you reduce it, until you get that basic traceability.

Mr McCarthy: The answer to your question is that there is insufficient interaction between these people. There are two initiatives that I would like to mention briefly, which hopefully will start to move this interaction a stage further. TechniTex is the textiles and clothing network within Materials KTN; and within the KTN there is the Materials and Design Exchange. One initiative we are putting together next month is a conference here in London on sustainability, which will feature the Defra road map on clothing sustainability. We are therefore actively trying to engage with our design academic colleagues within the London School of Fashion and the Royal College of Art. The second joint initiative we have made to encourage interaction between designers and the technologists is to have six so-called Spark Awards. These are cash grants which will enable interaction between academics and designers who are looking to embed technology into their fashion garments. Two initiatives which will hopefully start to get further interaction to take place.

Q533 Lord Methuen: I think that you have already covered to some degree Defra's consulting with stakeholders to develop a sustainable clothing road map. Would you like to amplify on that? You have mentioned it briefly.

Mr McCarthy: I did. I am participating in the next meeting at the end of this month, with the various stakeholders of the road map. There are a couple of points that I would like to make. I think that the consideration must include the use of textiles into other products. During a visit to Israel, for example, textile products are being recycled and introduced into pipes for use in industry. There are other streams, therefore, where this waste potentially should be looked at. The other thing that I think we should look at across different industrial sectors is the actual specification of the textile products. Are they over-specified in terms of the use of virgin product, where recycled material could actually be used? The final point I would make is that the study also needs to look at some fairly specialised applications. For example, there are military textiles which need to be recycled; there are medical garments from the NHS—quite considerable quantities of these; also, there is a major problem reflected in the use of personal protective equipment. These are additional factors which we hope to build into the Defra road map.

Mr Ozanne: I would like to support what my colleague has been saying. The Salvation Army Trading Company very much welcomes involvement in the road map. There are three points that we would like to raise. First, we do desperately need further research in

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the recycling of clothing when they can no longer be used as clothing. Secondly, we need a definition of what is actually waste as far as textiles are concerned. The Salvation Army is currently exporting a huge amount of clothing to Eastern Europe, which is classified as waste even though we know that the majority of it, possibly up to 80 per cent, will be re-worn. We would therefore like to see a redefinition of what comprises waste as far as textiles are concerned. The third thing we would like to see is further research into the production and design, so that they can be made more easily recyclable. We are looking at the composition of it, the way it is put together and can it be disassembled very quickly? However, there is a sort of Catch 22 situation. What do we need to do first? Create the new technological markets so that we know what we want, or create the raw materials that the new technology might need? The last thing is that we need to raise public awareness of the advantages of buying good-quality clothes—both for the environmental aspect and indeed the prudence of it. Good-quality clothes last a lot longer. It is a rich person who can afford fast-fashion clothing.

Mr Wheeler: I agree with everything that Paul Ozanne and Brian McCarthy have said. I have three points that I would like to see from the sustainable clothing road map. It seems inevitable that, if we are to meet the objectives of the Waste Strategy for England, more clothing will have to be collected. As I mentioned, we currently collect 300,000 tonnes of clothing and textiles each year. Obviously we need to look at how we will increase the amount that is collected. Before we can do that, however, we need to secure new markets. Currently the textile reclamation traders' buying price for reusable and recycling grades is very high, and many would say that it is too high. The market price at which they are able to sell their goods after collection and reprocessing is not sustainable in the long run and it is creating a big problem. If we were to increase the supply of all grades of textiles as we increase collection, it is likely to lead to a lowering of selling prices, which itself will create more problems. This is particularly the case if it is not to be accompanied by a lowering of the prices which the textile collectors have to pay when they source their goods. Also, the demand in the UK for recycling grades is currently very low; so we need to look at what alternatives are out there. Paul touched on that, and he also mentioned the fact that garments need to be designed with recycling in mind. I would just touch upon the definition of textiles and whether they are waste or not. Last year, we met with Dr Caroline Jackson, MEP and rapporteur, in Brussels and we managed to get textiles on Article 11 of the Waste Framework Directive. If that goes through, there would be a Europe-wide definition of what is and what is not considered waste and it would offer greater clarity. Unfortunately, I think the matter has now gone on to the back burner. I would like to see

textiles brought back to the forefront under Article 11. If we could get that, that would be fantastic.

Mr McCarthy: I have two very brief points. The first is that there are technology breakthroughs. Hyosung in Korea have recently announced the use of recycled nylon for use in ladies' lingerie. This is the first application in those areas. Also, taking up Paul's point, there are new markets, new demands, for waste synthetic fibre. There is a UK artificial sports surfaces manufacturer who is desperately trying to find good-grade recycled materials. There are developing markets in new areas, therefore.

Q534 Lord Haskel: I just want to go back to one point that Mr Barry raised about traceability. You were saying that Marks & Spencer is unique in that they can trace back the way the fabric has been processed, dyed, finished, et cetera. Does that mean that, as far as the chain of processing is concerned, we are going to have to leave it to commercial pressures, or the rising commodity prices, or just what the market will stand as far as sustainability is concerned, or are there some other steps that we could take to try and make the production process more sustainable?

Mr Barry: Given that most of the clothing sold in the UK, 95 per cent of it, is made outside the UK, it is very difficult for you to regulate or to legislate for, to drive business to have better traceability. We have seen in the last two or three years that there are the beginnings of competitive pressure in the marketplace to get better traceability. People like Nike are doing very good stuff; the sports shoes manufacturers are doing very good stuff; M&S is. The one-eyed man in the land of the blind—I will be quite honest about that. You are now seeing other clothing retailers responding to that and feeling that, competitively, they cannot not have a position; and you are beginning to see changes happening. I struggle to see how you would control it by anything other than voluntary measures, though, to be honest. You have such disparate supply chains involved, across 50 or 60 countries in the world, all with very different expectations. Having said all that, I want to be very careful that we do not get too UK-centric about this and too arrogant in the UK. Some of the very best innovations that we are now seeing in the world to do with clothing are coming out of the Koreas, the Chinas, the Indias, the United States. There are some fantastic new materials being developed there; so I do not want us to assume that, just because clothing is produced globally, there are any amount of problems overseas but not solutions as well.

Lord May of Oxford: I have a really unhelpful question/statement. I feel that there is a fundamental lack of contact with reality in this session we are having now; because almost everyone in Britain has more clothes than they need and we are talking with people who, by and large, are representative of

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industries that want to sell us even more clothes. At some point in the morning one might at least voice the feeling—with no ill-feeling towards anybody—that this is a ludicrous conversation we are having.

Chairman: I think that we have more clothes than we have time at the moment!

Q535 Baroness Sharp of Guildford: Can I pick up this technical issue? There are all kinds of new technical textiles that are being developed from a very wide range of materials, with technical fibres being produced from polymers, metals, ceramics, coatings, membranes and various composites. What advantages and limitations do these textiles have compared to traditional textiles, in terms of durability and waste reduction? How widespread is the use of these technical textiles? Do suppliers and retailers want to use them? Are they encouraged to use them?

Mr McCarthy: It is important to realise that technical textiles are textiles where the performance is more important than the aesthetics. That is the key thing. After this session I have a number of examples which I will pass on to the Committee. I think that it is important to try and realise the breadth of application of technical textiles. For example, by 2010 there will be approximately 35 kilos of textiles in every single car manufactured, and that is an increasing trend. Technical textiles are important because they provide multi-functionality and the applications are quite considerable. I have one example. Low & Bonar in Scotland have a very successful 24/7 business and they are reporting record profits this year. They are weaving aluminium and selling industrial, large quantities of aluminium to Holland for their large greenhouse, crop-growing operations. A very specialised agricultural textile use, therefore, in those specific areas. I have mentioned automotive textiles. The likes of Toyota are looking at using nano-engineered clays, to be incorporated directly into the polymer. Why? Because they have greater inherent flame-retardance and also are lighter. It is an element leading towards lightweighting. However, the diversity of technical textiles is considerable. I have brought one example along. It is rope technology, but it is basically yarn formation followed by braiding, and applications. This particular one is quite interesting because, manufactured in the UK, it is actually a transport textile. It is an aircraft load support harness. One of the areas the company is looking at is how it can reduce the weight. Because of fuel usage in aircraft, how can it reduce the weight but maintain the same safety, embedded strength characteristics? When this is exposed to light, it starts to degrade. They are therefore looking at the technology of how to reduce the weight of this component but still have the built-in safety element.

Q536 Baroness Sharp of Guildford: Do you think that there are technical barriers that need to be overcome in order to develop these technical textiles any further? What research is being undertaken to address these?

Mr McCarthy: There is significant research taking place in the UK. For example, in the area of medical textiles considerable efforts are being addressed to the growth of cell therapies, stem cells, using textile tissue scaffolds. There is significant research proposed now, this year, to be funded by the Technology Strategy Board. In other areas, there are significant developments in terms of integrating electronics into clothing. That raises new issues about standardisation; new issues about how these products can be recycled; and how the electronic element can be separated as it comes to end of life. However, there is considerable expertise in the UK addressing these particular areas.

Q537 Baroness Sharp of Guildford: You were saying that these tend to be specialist areas, higher-priced areas, and one sees it for example in the sports area, where there are a whole lot of special materials.

Mr McCarthy: The technology drivers are coming from the sportswear industry; they are coming from M&S; the Bagir suit with the integrated iPod controls. It is coming from the military; it is coming from medical devices; it is coming from sportswear. These are the key technology driver areas.

Q538 Lord Haskel: For the record, My Lord Chairman, I should say that I am the Honorary President of TechniTex. Moving on to the Salvation Army, however, it seems to be the only organisation that has been recycling textiles for a very long time. You said in your note to us that it was 30 or 40 years, and I think that is a matter of congratulation. However, you do say that the textile recycling industry has declined in recent years and that only a small proportion of the potentially available material is actually reused. You have told us a little about why you think this is so, but could you say how you think this might be changed and what more could be done?

Mr Ozanne: If we look at the history briefly, in the 1960s and 1970s there were thousands of people employed in the textile recycling industry. At that time about 90 per cent of the collections were recycled, mainly because people had worn them out. As the UK residents became more affluent, there came a shift from wearing clothes until their end of life to changing them from choice or fashion. Recently, this was further fuelled by the fact that we seem to be a borrow-to-spend nation. This has seen a shift from the practice of collecting clothes for recycling to collecting clothes because they are still in extremely good condition and they are valued to be re-worn. Therefore, their value far exceeds that which can be obtained for recycling grades. In practice, I would postulate that the reuse

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market is the only way at the moment to make clothing collections viable, because the other grades have little or no market value.

Mr Wheeler: Can I just clarify a few things? The Textile Recycling Association has been in existence since 1913 and a number of our members have been trading for pretty much that length of time. They are family-run businesses that have been handed down through the generations. The first example of textile recycling that we can trace in the UK is people collecting textiles for recycling in the 18th century for shoddy. The textile recycling industry has therefore been going on for a very long time. I also wanted to clarify that, yes, there has been a trend towards the decline in reprocessing in the UK, but actually the amount of clothing that is being collected for recycling is generally speaking on the increase slightly. It has risen a little, year on year, and certainly up until 2005 when we last looked at the data. The amount that is actually being collected is therefore on the increase, and I just wanted to clarify that. The other thing is that we did a survey of our members, as part of an EU-wide funded project in 2005. We looked at the state of the UK textile recycling industry and at the different barriers that were preventing us from expanding our collections, or that were presenting barriers to trading. At the time, our members estimated that about 55 per cent of clothing was still suitable for reuse; so the majority is still suitable for reuse rather than recycling—although it is on the decline, I would hasten to add. However, I would be very happy to make that information available to you: about the state of the UK industry and also the published EU project OUVERTES—the name of the European-funded project—which also identifies what barriers existed at that point in time. I have other suggestions as to why there are physical limitations as to the amount currently being collected in the UK and I will try to summarise them very briefly. The charity shops have a limited capacity. That is one of the three main points. There are 7,000 charity shops; they probably collect around 120,000 tonnes each year. If we are going to collect more, there is obviously a physical limit there. The number of textile banks could be increased, but there are problems there. We possibly need to look at the reinstatement of the FORT Agreement, the Forum on Recycled Textiles Agreement, which the industry did sign up to some years ago and which worked successfully for a number of years, but which has now fallen by the wayside. All signatories to this agreed to have one textile bank operator at each site and that reduces the environmental impact of collections. I am sure that you have been to supermarkets where you have seen several different operators operating at the same bank, and it does not make environmental sense for that to be happening. It would also help if there was a greater transparency in how the industry works. I think it is fair to say that if you ask a member of the

public what they think happens to their item of clothing once it is donated to a charity shop or through a textile bank, they probably think that either it is sold in the charity shop itself or, if it is not sold, it is transported by the charity, free of charge, and then handed out to the needy in developing countries. I am surmising there, but that is certainly how I used to see the industry. If we said to people, “The items of clothing are sold and it is good for business; good for the environment; good for employment in this country; good for employment in Africa, in Asia and Eastern Europe” many would be surprised but there are many things to be celebrated from it, and I think that greater transparency would help us to promote textile collection in this country.

Q539 Lord Haskel: The recycling industry, the shoddy business, in this country has always been a very low-quality business, of course. Where there is a real high-class, top-quality business is in Prato in Italy. The secret there, as I understand it, is the detailed sorting of the fabrics and the way the industry is organised. Do you see a possibility of upgrading the possibilities here in Britain to that quality, or should we just concentrate on sending our waste to Prato and leaving them to sort it and deal with it?

Mr Wheeler: The bottom line, as with anything, is that it has to pay. If we can make it pay, then it can be done in the UK. The businesses here are probably some of the best sorters in the world, but it has to be worth its while. Currently, with prices as they are, people are stopping sorting in the UK. A number of traders, including the Salvation Army/Kettering Textiles here, now export unsorted, and a number of our members are doing exactly the same—because it is just not financially viable at the moment. However, if it can be made to pay then, yes, I think that we could do it in this country. There are very good examples here in London where people are doing excellent sorting operations and employing hundreds of people. So it can be demonstrated, yes.

Mr Ozanne: I ought to make this point, in defence of the Salvation Army Trading Company. The first call on any of our clothing is humanitarian: the point of need in this country, through our 800 community units. Prisoners being released after a life term; we sent tonnes of clothing into Yorkshire and Gloucestershire last year. We make no bones of the fact, however, that once we are happy that we have met the humanitarian needs as best we can in this country, the clothes are then exported to Eastern Europe where mainly—a broad statement—they are bought by people who cannot afford new clothing. I would therefore agree with Alan that we need absolute transparency, to gain public confidence.

Baroness Platt of Writtle: It has been claimed that the availability of cheap, fashionable clothes fuels today’s throw-away culture and encourages consumers to buy

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cheap items, as we have heard earlier, and then dispose of them before the end of their life. Is it realistic to try to reduce consumption and, if so, how can consumer behaviour be changed? I am sure that this jacket is about 15 years old! But then I was brought up during the war and so I did not throw things away. How do we get back to that idea?

Q540 Chairman: Mr Barry, can you afford to get back to that idea?

Mr Barry: Can we take 60 million people on a journey to that? Let us be clear about this. M&S has made 100 commitments over the next five years to change environmentally and socially. To me, that is about softening the rough edges of our existing business model. Will Marks & Spencer and all retailers require a different kind of business model in ten, 15, 20 years' time, as Lord May was talking about? Quite probably, yes. However, to leap to that new model, you have to go through a series of steps that your business can cope with, your supply chain can cope with and, more to the point, that M&S's 16 million customers can cope with. You have asked a question about Oxfam, but let me tell you about what M&S has been doing today, because I think it is a pointer to the future. For several years now, M&S has been donating samples from its head office and rejects that customers bring back to us to Shelter and the Birth Defects Foundation, which would traditionally go to landfill but now we donate them. They are selling them to raise money for important causes. What we launched in January was a new thing. That is basically saying to 16 million M&S customers, "After you have bought a product from us, don't throw it away to landfill. Look at it as an opportunity to bring it to an Oxfam store so that they can sell it again, reuse it, extract an economic value from that to use in their vital development work overseas. In return, we will give you an incentive. We will give you a £5 voucher off your next £35 spend on clothing at M&S". It has been up and running for four weeks. I cannot share any detailed figures with you at this stage. We will be reporting on that formally some time later this summer. However, the response has been fantastic. Tens of thousands of M&S customers have bought into a different kind of model. Oxfam are seeing a significant uplift in their sales; we are seeing a significant diversion of clothing from landfill; and M&S has seen the benefit of more customers coming back to its stores rather than going to its competitors. It is a toe in the water. I am not going to sit here and say that it has revolutionised the whole approach to consumption in the UK, but it is an interesting model around what you can do. We have therefore given the consumer an incentive to change. You might have seen last week that we committed to starting to charge for previously free food carrier bags, on the basis that we have done the trial in Northern Ireland, where we are charging people about 5p for a previously free bag.

Usage has plummeted by 70 per cent. Again, customers have bought into it. Again, we have given them a stick—"5p? Don't want to pay that"—but we have given them a carrot; we give them a free bag for life before you introduce charging and then you make sure that the profits from it are ploughed back into their local community. How do we recycle? Every time you buy one of the hundreds of millions of items of clothing that M&S sells each year that comes on a hanger, you walk to the till and you buy it; you are left with a hanger. Do you take it home with you or do you throw it away? For several years now we have been encouraging people to recycle them; at the till point we take them back and reuse them or recycle them. We have had a real push and drive on that, prompting people at the till point, "Do you really need your hanger this time?" and we have seen a 30 per cent uplift in hanger recycling—an extra 20 or 30 million hangers this year that we recycle.

Q541 Baroness Platt of Writtle: I just say, "No, I don't want a hanger", which is easier.

Mr Barry: Yes, exactly. What I am saying is that, with the Oxfam model, the charging for carrier bags model, and now the hanger recycling model, there are different ways to start to engage consumers in change. It is a long, hard journey, but you have to start changing your business model.

Chairman: Lord Howie, do you want to come in on this?

Q542 Lord Howie of Troon: There is one question that I would like to ask—not about the clothing exchange but about your eco-factories. Could you tell us what they are, and so on?

Mr Barry: We have created three new eco-stores in Marks & Spencer in the UK, in Bournemouth, Galashiels and Pollok, to try new technologies to make our stores demonstrably more sustainable for the future. Our learning from those three stores is now being taken out to the hundreds of M&S normal stores. We have then taken that model into our supply chain. We are developing a model with an existing supplier in North Wales, a furniture supplier, Westbridge, and three suppliers in Sri Lanka and one supplier in China, to build radically different production units for producing clothing. They will have a significantly lower environmental impact in terms of carbon footprint and water use. Again, I want to be very clear with you. The clothing manufacturing unit is not the biggest part of the environmental impact of a piece of clothing. That is the cotton field that produced it or the dye-house that used the chemicals. However, if we can start to make those individual building blocks of our value chain more sustainable, let us look at how we do it. We have a conference in our head office on 11 April. We are going to bring all our other clothing suppliers in to share the

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results of the first 12 months of these eco-factories, to learn what they can start to take out to change. You have to change not just the manufacturing unit, where you have massive social issues to address as well as environmental ones, but the dye-house and the spinning mill—and it is the raw material production as well. It is a toe in the water; a beginning, but an important one.

Q543 Lord May of Oxford: In so far as some of the customers may want to be informed about the sustainability and recyclability of the textiles they purchase, at the moment, unless you have made a simple project of it yourself, you do not have the information. If you were to put that information on a label, do you think that it should be done voluntarily or that there should be some code of practice or, alternatively, do you think that it is just too complicated to even think of putting it on a label?

Mr Barry: Labelling has its strengths and weaknesses. 50 per cent of consumers do not register the price of a product they put in the basket, and price is by a long way the most important driver for your decision-making in a shop. The next thing you can ask somebody to look at is health. We will shift briefly to food. Everybody is now putting these traffic lights on food: the reds, greens and ambers to say whether it has too much fat, salt or sugar in it. We have done that now for a year on 800 of our 5,000 products. It has had no demonstrable impact on sales. It has not shifted behaviour. So I am not looking at the price on the product; I am not really registering health as an issue. The next thing down is the packaging. I heard the debate with the previous group of witnesses. Packaging is the problem for the consumers, left in their kitchen. It is not my problem: it is their problem. There is therefore, rightly, a huge push on us to make sure that we can reduce the amount of packaging we use. We started to put WRAP labels on all our packaging to say what to do with it, including, “Sorry, you’ve got to put that in the bin”. That takes you to the next level of decision-making. There are a lot of questions now about carbon labelling. Should you put a carbon label on products? Let me give you a clothing example of that. You could put a carbon label on this suit or on any item of clothing that M&S sells; but I know that 80 per cent of the carbon footprint of the clothing is associated with the wash cycle—what you do with it after I have sold it to you. If I can encourage you to wash it at 30°C rather than 40°C and above, there is much more impact on the carbon footprint than anything I can do back down the supply chain. We do not need a new carbon label for that, however. There is wash temperature advice. It has been there for 50 years and people are well used to it. It says, “You could wash it at 40 but I would like to encourage you to wash it at 30”; so there is already carbon labelling on a product that people understand. The fifth level is can I

put a label on this product to say, “No children made it. All the wool in it is from a sustainable source. No dodgy chemicals in it. Totally recyclable”? I think that you would drive the average consumer crazy at this stage. There are different ways of raising awareness of issues. You can use your website or information in store but for an on-product label it is very difficult. Let me finish off by explaining the cost of that. M&S sells 35,000 different product lines, virtually all of which are under its own label; we do not sell other people’s products, by and large. As soon as you start putting a label on a product that says, “This is its environmental and social footprint”, every time you shift the cotton field that produced the cotton or the apple farm that produced the apple—which you do frequently—you have to change the label.

Q544 Lord May of Oxford: In the interests of time, I myself thought it was a basically silly idea, and you are saying it is a silly idea.

Mr Barry: Yes.

Mr Wheeler: I just wanted to bring up an issue that Mike Barry raised about the carbon impact of textiles. There was some research that came out recently, published by the Institute for Manufacturing at Cambridge University, which actually looked at the environmental impacts of a cotton T-shirt and a viscose blouse. It is true to say that a significant majority of the carbon impact of the cotton T-shirt was during the use phase of the customers. When they looked at the viscose blouse, however, as a representative example of garments made from synthetic fibres, they found that the majority of the impact was still in the production phase. I just wanted to clarify that. I get the feeling that textile manufacturers and retailers have got hold of the cotton example; they have used that and they are purporting that to be the case across the entire range of fibres. This research shows that it is not the case—but that is just one example.

Mr Ozanne: A very quick point and somewhat of a warning, if I may. We have been in the industry a long time and we want to be in it for a long time to come. The textile reuse trade is viable at the moment; but if we are successful in collecting sufficient clothing and the markets for its reuse dry up, the whole thing will collapse and it will collapse extremely quickly. Therefore, there is a focus needed to find new markets, innovative markets, and ways of disassembling clothes so that they can be used as other things besides clothing.

Mr Wheeler: There was one other thing that I wanted to bring across; that is, as a means of finding new markets we need to close the recycling loop. One thing we could do is inform the public about how they can recycle their clothes and buy recycled clothes. A simple eco-label with, say, a percentage mark saying “So many per cent of this garment is made from

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recycled fibre”, is just one way in which this could be done. You have to start somewhere.

Mr McCarthy: The Defra road map reinforces the point made by Lord May, which is that we are sitting on a potential time bomb of garments that are in storage in the home environment. There are garments that have been stored in wardrobes, which potentially could be released at some stage. The second brief point is that I do hope this will be a generational issue. I am aware that at Wellington School in Trafford it is the

pupils who very much are the ones driving towards the recycling of products. I think that with the education of the consumer that Mike has mentioned, but also addressing education in the national curriculum, the message can be got across.

Chairman: I am very grateful to you, gentlemen. It has been a useful, helpful session. If there is an afterthought, let us know and, if we find that there is some gap in your evidence, we will be after you. Thank you very much.

Supplementary memorandum by Procter & Gamble

GUIDING PRINCIPLES FOR CONSUMER ENVIRONMENTAL INFORMATION AND ECOLABELS

We believe that all forms of consumer environmental information, regardless of approach, should be considered with the following principles:

- *Promote innovation.* Ecolabels or Environmental Claims that have criteria based on an evaluation of current products on the market, tend to reward current technologies.
Such Ecolabels/Claims may represent a barrier to future innovation if they do not holistically examine the product and contributions from all its life cycle phases and support/promote continuous innovation.
- Should define the desired direction for improvement, but not the means to get there.
- Deliver meaningful environmental improvements based on a holistic examination of the produce and contributions from all life cycle phases.
- *Transparency:* The criteria or basis for claims for Ecolabels should be clear and publicly available.
- *Non-discriminatory:* Ecolabel/claims must not favour local products without scientific justification, nor deny equivalent competitive opportunities to imports.
- *Truthful:* Environmental labels/claims must not be presented in a manner that overstates the environmental attribute or benefits, expressly or by implication.
- *Based on Sound Science:* All forms of ecolabels/claims must be supported by scientific evidence, using methods accepted across the scientific and technical community.
- *Substantiated:* There must be a reasonable and traceable basis for verifying the Ecolabel or environmental claim.
- *Not misleading to consumers:* The information provided must be non-trivial and relevant to both the consumer/stakeholder and to environmental protection.

March 2008

TUESDAY 11 MARCH 2008

Present	Crickhowell, L Haskel, L Howie of Troon, L Lewis of Newnham, L	Methuen, L O'Neill of Clackmannan, L (Chairman) Platt of Writtle, B Sharp of Guildford, B
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Memorandum by Green Alliance

INTRODUCTION

1. Green Alliance is an independent charity with a central role in the UK environment movement. We work closely with decision-makers in government and business, and with other environment groups, promoting policies for a better environment.
2. We welcome this important enquiry, and the opportunity to contribute to it. For too long our approach to waste has been “end-of-pipe”, characterised by a lack of ambition, too few instruments to drive change, and a focus on achieving least-cost compliance with European directives rather than addressing how we can make long-term, upstream changes. Green Alliance has been working on the latter for a number of years and has produced a number of reports on waste and resource policy, producer responsibility and product policy. Our most recent, *A Zero Waste UK*,¹ was published jointly with the Institute for Public Policy Research (IPPR) last year. All of our work in this area is available under our “Closing the Loop” project on our website, www.green-alliance.org.uk.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste?

3. A very large role. In nature everything is cycled to good effect; there is no such thing as an unusable by-product. Other than an inevitable degree of entropy, there is no reason that we should not mimic these systems to a much larger extent than we do presently. Unfortunately, we are content to let most resources pass through our economic system and out again very rapidly. This has been illuminated by a series of landfill tax-funded studies under the umbrella of the mass balance movement.² The overview report concluded:
4. “The results of the many studies suggest that after six months as little as 2 per cent of the input resources by mass are retained long-term within the economy and 98 per cent emerge as waste. Resource inefficiency reduces competitiveness, eats up resources, and creates waste management challenges.”³
5. In their book *Cradle to cradle: remaking the way we make things*, American architect William McDonough and German chemist Michael Braungart illustrate the differences between human economic activity and the way natural systems operate:

“Consider a community of ants. As part of their daily activities, they: safely and effectively handle their own wastes and those of other species; grow and harvest their own food while nurturing the ecosystem of which they are a part; construct houses, farms, dumps, cemeteries, living quarters and food-storage facilities from materials that can be truly recycled; create disinfectants and medicines that are healthy, safe and biodegradable; and maintain soil health for the entire planet. Individually we are much larger than ants, but collectively their biomass exceeds ours. . .they are a good example of a population whose density and productiveness are not a problem for the rest of the world because everything they make and use returns to the cradle-to-cradle cycles of nature”.⁴

¹ http://www.green-alliance.org.uk/grea_p.aspx?id=956

² See <http://www.massbalance.org/resource/massbalance>

³ The Mass Balance Movement, 2006, p3

⁴ William McDonough & Michael Braungart, 2002, *Cradle to Cradle*, p79

6. It should not be beyond the wit of man and woman in the 21st century to mimic the safe productivity of the ants. But products, materials and systems of consumption are not presently designed for recovery and recycling because there is insufficient economic incentive for this, and the environmental consequences have been largely and until very recently ignored. Virgin materials are cheap enough, and disposal cheap enough, to allow the economy to function with a low degree of extraction of value from resources before they are discarded. All the economic drivers have been on functionality, desirability and lower price, with the goal of fuelling ever-greater consumption and thus economic growth. The environment is still an “externality”, only factored into our conditioning of the free market where very specific problems and political imperatives can be identified. This is the thinking that has allowed “waste” to be seen as an “end-of-pipe” problem that needs a specific set of rather unglamorous policies to address it, rather than as a “design flaw” in our entire economic model.⁵

7. More recently, with political acknowledgement of the problem of waste, the price of disposal has started to rise, driven by a combination of the landfill tax and the effects of the Landfill Directive. This has encouraged greater recovery and recycling of some materials. Another important factor has been that these materials have then found a market in the emerging economies, mostly China, who are not yet generating their own secondary materials. This is making recycling more “economic” in terms of the relative price of disposal as against recycling, but it is clear that products and materials are not yet being designed to optimise this process. There is also a question mark over how long the emerging economies will want to recycle our waste.

Are there any barriers to how knowledge in this area can best be translated and applied?

8. The main barriers, as outlined above, are economic. Design for recycling, and environmental design have been talked about for more than 20 years, and the design community has it firmly on its agenda. The problem lies not with designers, who can turn their hand to anything, but with those who specify the products they are designing. Recovery and recyclability is not often a primary consideration. Dorothy Mackenzie, founder and director of the leading brand consultancy Dragon International, and a former board member at the Design Council, has first-hand experience of the barriers:

“Design is about solving problems and it will solve any problem it is given to solve. It is multi-dimensional but ultimately user-driven: the environment is not, even now, a strong enough dimension”.⁶

9. The barriers also arise from the division of responsibilities we have evolved in the UK in terms of dealing with waste products (which should really be viewed as by-products, en route to a new use). Even in the recently more favourable climate for recycling, in the UK we are still recycling less than 50 per cent of all wastes, an average of 27 per cent of household waste, and only 52 per cent of construction and demolition wastes, despite the last category being almost wholly recyclable. See table below for comparison with other European countries:

Municipal waste management in the European Union 2005 (most recent comparable statistics):

<i>Country</i>	<i>Waste per capita (kg)</i>	<i>Landfill (% of total)</i>	<i>Recycled/ composted/other (% of total)</i>	<i>Incineration (% of total)</i>
Netherlands	624	1.44	65.38	33.17
Germany	601 ^(e)	14.81	60.57	24.63
Austria	630 ^(e)	17.94	58.73	23.33
Belgium	464 ^(e)	9.27	57.33	33.41
Luxembourg	705 ^(e)	18.01	46.10	35.89
Sweden	482	4.77	45.02	50.21
Spain	597 ^(e)	53.10	41.04	5.86
Denmark	737	5.16	40.98	53.87
Ireland	740	60.00	40.00	0.00
Italy	542 ^(e)	54.61	33.95	11.44
Finland	468	60.26	30.56	9.19
France	543	36.10	30.02	33.89

⁵ Kate Krebs, executive director of America’s National Recycling Coalition, quoted in “The Truth about Recycling”, *The Economist*, 7 June 2007

⁶ Dorothy MacKenzie, personal communication, 10 October 2007

<i>Country</i>	<i>Waste per capita (kg)</i>	<i>Landfill (% of total)</i>	<i>Recycled/composted/other (% of total)</i>	<i>Incineration (% of total)</i>
UK	584 ^(e)	64.21	27.40	8.39
Portugal	446	62.33	15.70	21.97
Greece	438	86.76	13.24	0.00

(e) estimated values

Source: Eurostat

10. Without changed design of products and materials, as well as the systems for collecting and processing them, local authorities will always struggle to increase recycling rates for the domestic and commercial waste for which they are responsible. They are limited by what they are given—at the household level, usually mixed waste, comprising many materials in different combinations, contaminated by food and other biowastes such as nappies. They have to work out how best to collect this stuff, balancing costs of separate collections of recyclates with public willingness to separate, extra transport for separate streams, and acceptable frequencies of collection. They then have to buy the appropriate waste treatment for this mix, often signing up to long contracts under complicated private finance arrangements. They are dealing, in a difficult end-of-pipe way, with the consequences of consumption and have no power to change what they are expected to deal with.

11. Even for industrial waste, where there is a more direct relationship between the waste generator and the waste contractor, the limitation comes from available infrastructure. For landfill operators, landfill in the UK is still a profitable activity, so landfill is still offered. To be able to offer recycling options, the waste operator has to have, or have access to, the infrastructure for recycling, which depends on the waste sector and its financiers being willing to invest. More infrastructure is gradually coming on stream, but it is still limited and for some industrial waste producers there is no realistic option other than landfill. Investment in recycling infrastructure will only increase dramatically if some or all of the following conditions apply: the costs of landfill go up still further; the costs of virgin materials rise; regulation mandates greater use of recycled content or specifies design for recyclability. Under any or all of these conditions, design for recycling will take on a greater role, either as a matter of economic necessity, or because required by regulation.

12. So although public authorities agree that waste reduction through re-design is the ultimate goal, there are few instances of this in action.

What factors influence the use of materials?

13. As outlined above, a mixture of economics and functionality, combined with a strong dose of fashion. There is however, increasing talk of “closing the loop”—an aspiration to re-design products more in line with the cradle-to-cradle notion. In *A Zero Waste UK*, written by Green Alliance and published by the IPPR, we cite examples of closed-loop initiatives by companies and public authorities, and also comment:

“Closed-loop thinking is very important at a time of increased political attention to recycling, because much of what passes for recycling is actually “downcycling”, involving only one or two further uses of the materials, and only delaying the journey to landfill. Turning plastic cups into pencils is a small, but by no means insignificant, example of this”⁷

14. Green Alliance believes that one of the surest ways to promulgate the “closed loop” or “cradle to cradle” thesis is by imposing genuine producer responsibility on those providing goods and services.

15. In our 2005 report *Return to Sender: producer responsibility and product policy* we set out some of the shortcomings of current approaches to producer responsibility, which include EU-wide and individual country-driven measures aimed at reducing packaging, electronic waste, batteries and improving the recyclability of cars. We concluded that while such initiatives improved collection and recovery of materials, resulting in improved recycling rates, they had often managed to fragment and dilute responsibility through the involvement of third party organisations, and instances of genuine re-design of products were rare. The main point of producer responsibility seemed to be to shift end-of-life costs from public authorities to the private sector, but this should have higher aspirations, as noted by Jeff Cooper of the Environment Agency:

“Producer responsibility should reduce the environmental impact of waste management as producers change product design, substitute materials, extend product life and undertake other measures to reduce their costs in managing end-of-life products”.⁸

⁷ IPPR/Green Alliance, 2006, *A Zero Waste UK*, p12.

⁸ Jeff Cooper, producer responsibility policy manager, Environment Agency, writing in *UK Environment News*, page 1, issue 1, vol. 8, 2004

16. This has not yet comprehensively come to pass. In *Return to Sender* we sketched out some of the ways in which the old models of producer responsibility could live up to the aspirations of the emerging Integrated Product Policy (IPP) agenda:

What could producer responsibility mean for IPP?

At the simplest level, producer responsibility could mean requiring that producers understand the environmental impacts of their products and take steps, that they define, to reduce them. This is where the Commission has started on IPP with its pilot projects; it could be the thrust of any generic requirements under the Energy Using Products Directive, and it is broadly what ACCPE⁹ recommends. This approach begs several important questions: how to assess and trade off different environmental impacts, especially where supply chains cross international boundaries, and how to set priorities for action. If measures are voluntary there is a risk of inconsistency between them. Also the history of voluntary approaches on waste is littered with failed initiatives.

The next level might be to agree specific product standards for whole-life performance on, for instance, energy, water and resource efficiency, as well as impacts of final disposal. This could be done on a sectoral level to ensure consistency of approach. This is embodied in the European Environment Bureau¹⁰ approach. It does nothing, however, to address the total number of products, or their total impact.

A possible alternative approach to the first two is to set sector-specific targets for energy and resource use, and leave producers to decide how to distribute and trade what is available among their products. So some products might be much better than others, where this is easier to achieve, and some may disappear because they are too costly to change.

At the highest level, it could mean that producers have responsibility for the impacts of their products at all stages of their lifecycle, not just through the standards to which they are manufactured, but by conditioning their use and having responsibility for a closed-loop, zero-waste system. Again, these would need to be done on a sectoral level and would require unprecedented buy-in from industry. In a closed-loop, it may not matter how many products are in circulation, how much resource they use, or how long they last, provided materials are not lost from the system, and manufacturing, use and reprocessing, are driven by renewable energy.¹¹

In what way do considerations of sustainability feature in the selection of most commonly used materials?

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

17. There are few successful examples. The End of Life Vehicles Directive may be one of the few examples where recycling considerations have driven genuine re-design.¹² The aggregates levy has made recycled aggregate an economic choice in some circumstances. Otherwise, in the absence of economic or regulatory drivers (in which case material sustainability is not an issue, it is a natural or inevitable choice), it is only where there is a perceived consumer perception advantage that “sustainability” might feature in material selection. Compostable packaging (see answer to next question) is one example. There are also initiatives by retailers to procure and label more of their packaging as “recyclable” (or indeed label it as “not currently recyclable”) in response to emerging consumer demand.

What impact does the development of new materials have on design?

18. Compostable packaging is a good example of a new material introduced on environmental agenda but without adequate consideration of end-of-life processing. Compostable packaging (generally plastic-like materials from renewable feedstocks such as starch and cellulose that break down in either aerobic or anaerobic composting conditions) were launched by some retailers more than two years ago, despite unfavourable conditions for down-stream processing:

- Some were degradable on home compost heaps, but others not.
- Few local authorities were separately collecting food waste for composting.

⁹ The Government’s Advisory Committee on Consumer Products and the Environment (ACCPE), which issued three reports and was disbanded in 2005

¹⁰ The European Environment Bureau (EEB) is a pan-European, Brussels based coalition of NGOs

¹¹ Green Alliance, 2005, *Return to Sender: producer responsibility and product policy*, p17

¹² Is European end-of-life vehicle legislation living up to expectations? Assessing the impact of the ELV Directive on “green” innovation and vehicle recovery by Jason Gerrard and Milin Kandlikar, *Journal of Cleaner Production*, vol. 15, issue 1, 2007

- Few of the packages carried labels explaining how they should be treated at end of life. Putting them in green waste collection as a alternative to home composting is an option, but few consumers would have been aware of this.
- Compostable plastics mixed into conventional plastics collected for recycling (there is now a strong market for PET, for example) causes contamination of that stream.

19. It was thus possible for some to see compostable packaging as a gimmick, with marketing based on the renewability of the raw material, rather than presenting a genuinely “closed loop” material system. Since early 2006, Green Alliance has been working with compostable packaging producers, retailers, local authorities, composters and waste companies to work out how the potential environmental benefits of this packaging can be realised. This has focussed particularly on keeping the compostable plastic stream separate from the conventional plastic stream by encouraging distinct applications for each material, as well as good labelling and messaging to consumers.

The first results of our work (to be launched on 28 November 2007) are:

- A guide to which applications for compostable plastics are likely to be more suitable as well as available.
- Encouragement to compostable plastics producers to make all their products home compostable, not just compostable under municipal conditions.
- The design of a prominent label for “home compostable” (lead by the Composting Association).
- The development of strong messages for householders on how to deal with different materials (led by WRAP).

How much interaction is there between material scientists and designers?

20. This is an area that Green Alliance has not yet looked at in detail, but through our involvement in the Government’s Commission on Environmental Markets and Economic Performance (CEMEP) we have heard a strong message that UK is very strong in materials science. Unfortunately, this strength has not been directed towards environmental goals by strong economic or political incentives. The CEMEP report elaborates the reasons why environmental innovation is more difficult than other kinds of innovation and recommendation changes to both environment policy and innovation support to help correct this.¹³

Can better-designed products offset the increase in consumption?

21. The cradle-to-cradle thesis proposed two cycles: a biological cycle, where resources drawn from the land are returned to the land; and a “technical” cycle, where non-renewable resources essential for industrial activity are used, but are kept in circulation ad infinitum. Under such a system, “consumption” would be a very different beast to the one it is now, and would, as under the analogy with the ants, take place within planetary limits. It is clear that an enormous political and economic shift will have to take place to reach this kind of scenario.

22. It is equally clear that current patterns of consumption are unsustainable, as illustrated by WWF’s “one planet living” call—we are currently consuming resources in this country as if we had three. In this situation, a few slightly better-designed products are not going to make much of a dent.

Are there any other gaps in knowledge and how are they being addressed?

23. We are only just beginning to consider how to design for recycling, and until forceful economic or regulatory drivers are in place here in the UK, we will not refine our understanding of product life-cycles or develop world-class academic expertise to take us into a better material world.

¹³ <http://www.defra.gov.uk/environment/business/commission/index.htm>

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses? How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

What other measures can promote a focus on waste reduction among businesses? What lessons can business learn from international experience?

24. All these questions have been answered to some extent in the course of the narrative above.

25. One of the recent very welcome trends in business has been the major food retailers (and increasingly they sell much more than food) competing for the environmental agenda. This is important because of retailers' ability to condition supply chains with a degree of speed and certainty that Government could never match. Action by retailers could be one of the key engines of environmental innovation. The problem is the competitive element, which is hard for retailers to transcend, and which tends to militate against concerted, co-ordinated approaches (which might anyway come under suspicion from the Office of Fair Trading). The result, ironically, may be further inconsistency and confusion for consumers, when it is putatively consumers who are driving these initiatives. There are also several bodies trying to work with retailers (WRAP, Defra, the British Retail Consortium, IDG, INCPEN) further adding to the potential for proliferating initiatives. This situation further reinforces the need for a government-led framework for products and materials, developing product standards that cater for whole life impacts.

26. In terms of international experience, as far as we can see, only the Japanese have introduced serious measures to incentivise better design. However, we have not had the resources to analyse these in depth.

GOVERNMENT POLICY

What is and should be the role of government in addressing the issue of waste reduction? How does government policy link up with European strategies and action plans? What lessons can be learnt from other countries—within the EU and globally?

27. Government strategy needs to have a number of complimentary measures:

- Continues upwards pricing of waste disposal, through higher landfill tax and an incineration tax that ensures that recycling is always the economic option.
- Product levies that incentivise product re-design.
- Raw materials levies.
- Recycled content requirements as part of product standards.
- Producer responsibility that includes “cradle-to-cradle” eco-design requirements, covering the entire product life-cycle.
- Procurement policies that create lead markets for new materials and systems.

28. The UK Government's implementation of the EU Energy Using Products Directive will be a key test of the UK's commitment to the sustainable products agenda. The Directive enables the setting of standards for elements of design other than energy, and so is more comprehensive than its title suggests. It could be the first genuine driver of product re-design. The new packaging strategy is another key area.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour? What role do marketing strategies play in influencing more sustainable design? Are there any gaps in knowledge in this area?

29. Green consumption should not be the responsibility of the consumer. To imply that is to imply a choice—for every “green consumer” there may be a non-green consumer. This will not result in a changed world. We have been sold the myth of the “green consumer” for more than 20 years, and our economic model has not changed as a consequence. As noted above, retailers do respond to consumer aspirations in this area, but not necessarily in a consistent way.

30. Product re-design along the lines of the “cradle-to-cradle” aspiration should leave consumers with no choice but to be green. Ideally, they will neither notice nor mind. We do not allow people to buy things that would fail safety standards and thus potentially harm them—equally we should not allow the choice of buying products and services that, cumulatively, undermine the health of the planet. In this context, marketing has a limited role.

31. A recent problem arising from greater visibility of the issues is the almost exclusive focus in the consumer arena on carbon, and an obsession with “carbon footprinting”. Carbon is relatively easy to measure and is always bad (in the sense that all efforts are directed at having less of it) so it is perhaps not surprising that it has drawn all the attention. However, there are plenty of resource and “ecosystem service” considerations that carbon measurement does not help with, including:

- The way resources are cycled in the economy (a lightweight, unrecyclable plastic container may have lower carbon emissions during its lifetime, but if the material is not reclaimed it could result in use of more energy to do the same job next time: much depends on where the boundaries of life cycle analysis are drawn).
- Use of water (biofuels are reckoned to have a lower carbon footprint than oil-based, but can require more water to produce).
- Local pollution of water and air.
- Biodiversity.

32. All of this argues for a more rounded approach to changing our material world, one that does not take carbon as the only indicator.

SKILLS

How is sustainable design integrated into the design syllabus? To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

33. Sustainability should be included as a completely “normal” aspect of design. In the same way that “good” design at the moment has to address aspects like functionality and aesthetics, it should also address sustainability as a matter of course. Too often “sustainable” design is still being taught as a speciality subject rather than as integral to the core design syllabus.

34. However, as noted above, designers cannot make a difference in the absence of user-driven sustainable design specification. This does not mean that they should not develop the necessary skills, but they are more likely to develop the necessary expertise once the sustainable solution is the one consistently called for.

October 2007

Memorandum by the Sustainable Development Commission (SDC)

SUMMARY

The SDC welcomes the Committee’s inquiry into waste reduction and how products and production processes can be made more sustainable and therefore produce less waste. We believe this is an important area which has often been neglected by policy makers’ focus on immediate concerns with down-stream waste management.

The UK holds one of the poorest records in Europe on waste. We consider that current policies and action to reduce and manage waste are insufficient to achieve UK commitments towards greenhouse gas emissions reduction and sustainable use of resources necessary to achieve “one planet living”.

OVERARCHING RECOMMENDATIONS

- the Government’s Waste Strategy for England has an over-riding emphasis downstream and post-consumer, on recovery and recycling, rather than tackling the problem of waste further upstream in the supply chain;
- the Government needs to adopt a more aspirational approach to reducing waste by setting longer-term targets and introducing enablers to support a culture of zero waste;
- Government should use its significant spending power to bring forward products to the market with lower waste and resource impacts. The products that it purchases should, as a minimum, comply with the Quick Wins mandatory product standards. As stated in the *Waste Strategy for England*,

these standards should be further developed to include waste prevention criteria as well as recycled content;

- better co-ordination between government and retailers, along with stronger targets could achieve greater and more immediate reductions in resource use, packaging and food waste;
- long-lasting improvements in resource efficiency will require a mix of better product design, producer responsibility, recovery and investment in infrastructure; and
- the way in which waste is legally defined, measured and costed needs to be reviewed to allow a better understanding of how wastes can be seen as a useful resource, and to encourage more sustainable manufacture and production.

SDC'S INTEREST IN THE SUBJECT

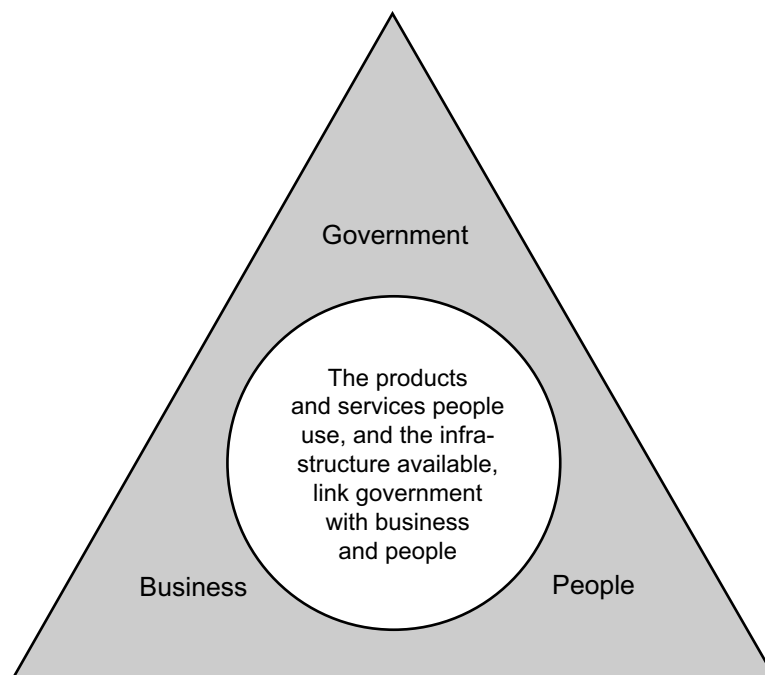
The SDC is the Government's independent watchdog on sustainable development. Through advocacy, advice and appraisal, we help put sustainable development at the heart of Government policy. Five areas of our work are relevant to the issue of waste reduction:

1. Behaviour change (*cf I will if you will: Towards Sustainable Consumption*).
2. Product roadmapping for sustainability (*cf You are What you Sell, Product Roadmapping: Driving Sustainability*).
3. Reducing waste in the food system (*cf Green, Healthy and Fair: a review of government's role in supporting sustainable supermarket food*).
4. Reducing waste in the construction system (*cf Stock Take: Delivering improvement in existing housing*).
5. Reducing waste in government's own operations (*cf Sustainable Development on the Government Estate*).

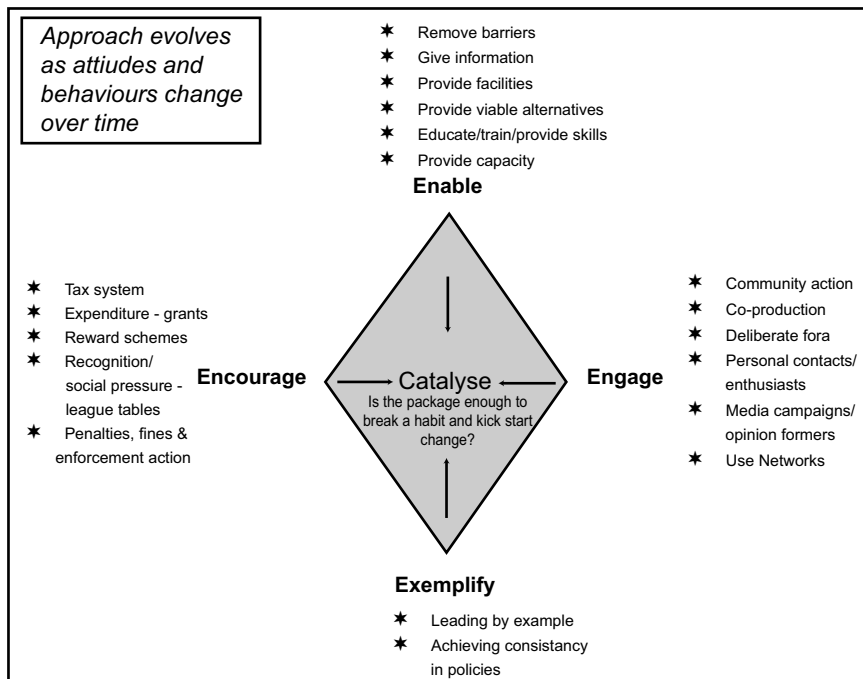
These are discussed further below.

1. Behaviour change

The Sustainable Consumption Roundtable report, *I will if you will*, advocates the triangle of change model of behaviour change¹. This requires business, Government and people to work together to catalyse behaviour change for sustainability.



Government's "4Es" model of behaviour changeⁱⁱ for sustainability identifies four key roles for Government to catalyse behaviour change:



Enabling change by removing barriers and providing the relevant facilities, information and education eg enabling change through the Market Transformation Programme, removing barriers to composting of food waste, educating consumers through WRAP's food waste campaign.

Engagement to start changing attitudes through involving people and businesses in deliberation, community actions and media eg the Courtauld Commitment, an agreement amongst retailers on waste, brokered by WRAP.

To exemplify own policies by leading by example and to achieve consistency in policies eg reducing waste in own operations and through public procurement, specifying to promote waste minimisation, giving suppliers freedom to innovate.

To encourage businesses and consumers through the tax system, reward schemes and penalties eg bottle deposit refund schemes (eg Norway, Denmark) and carrier bag taxes (eg Ireland), and current UK policies such as the Producer Responsibility (Packaging Waste).

The role of consumers

I will if you will, recognises the often limited extent to which consumers are able to drive change towards more sustainable consumption, including waste minimisation. For example, despite consumers' growing awareness and concern about waste issues, businesses often cite consumers' preference for packaged convenience products, as a driver towards the increasing amount of packaging and food waste. The lifecycle of products used in the home is also shortening, due to both increasing rapidity of obsolescence, but more intangibly, a greater turnover of goods due to fashion.

The absence of direct incentives and disincentives prompting individual responsibility about levels of waste produced and prompted by households has already caused market distortions. For example, the current system for managing waste lacks any powerful signals from consumers that feed back up to businesses to prompt waste reduction. This leads to situations where it could make business sense for producers and retailers to opt to reduce their own waste from transit packaging, at the expense of increasing consumer waste.

2. *Product Roadmapping for Sustainability*

The Government's Sustainable Development framework recognises the need to reconcile the twin objectives of "a strong, healthy and just society" while also "living within environmental limits"ⁱⁱⁱ. Within this framework SDC is highlighting the enormous and still largely untapped potential for products and their supply chains to connect these objectives and help address pressing environmental and social challenges, including waste reduction.

To assist such market transformation we introduced the concept of "product roadmapping" for sustainability in *I will if you will*, the report of the Sustainable Consumption Roundtable^{iv}. We developed the approach further in our report, *You are What You Sell*^v and attach a copy as part of this submission. This outlines practical steps that businesses and government can take to improve sustainability of products and services. Waste can take many forms, from energy, raw materials, water, food and other factors and can occur at all stages of supply chains from primary extraction/production, through production, distribution and disposal. Integral to this approach is a focus on minimising negative impacts, including waste, throughout the supply chain.

We highlight the increasing expectations that customers have towards the "stories" of the products they buy. This presents a number of opportunities for business to:

- save money by identifying resource efficiencies that also reduce waste;
- manage resource risks;
- improve the brand value and loyalty of customers and employees;
- grow and access new markets.

Bringing together the interests of businesses along the supply chain can identify innovative solutions to reducing waste and carbon. For example, A supply-chain analysis of their crisps identified how Walkers could save 9,200 tonnes of CO₂ and £1.2 million a year by changing how they bought potatoes^{vi}.

A key element of the roadmap approach is having a long term goal, or vision, or where action and policy interventions are designed to get to. Within such policy frameworks, businesses can invest and innovate. Government has a key role to play in developing such targets. SDC's experience is that such long term goals and strategies are often lacking. For example, the waste minimisation targets of the voluntary Courtauld Commitment, enshrined within the Government's Waste Strategy now look unambitious and lack urgency. A further role for Government which we highlight is to create the right "enabling" conditions, and incentives for businesses and consumers to act more sustainably. Government also needs to lead by example. The *Waste Strategy for England* emphasised the important role that reducing waste has in achieving SCP goals, and committed Government to show leadership through reducing its own waste, and using Government procurement to accelerate the development of products which use fewer natural resources and have a lower impact at end of life. We address the role for Government leadership further below.

3. *Reducing waste in the food system*

Our recent report, *Green, Healthy and Fair*^{vii} addresses Government's role in supporting sustainable supermarket food. We identify waste as one of six key priority areas for government and business action.

Packaging

For waste minimisation (and waste management) packaging is clearly a key issue. For example, we found that consumers are often faced with over-packaged supermarket products, and that up to 40 per cent of the packaging in an average shopping basket cannot be recycled.^{viii} Currently households generate 5.2 million tonnes of food-related packaging waste. Stakeholders in our research for the report^{ix} wanted to see retailers and producers doing more to reduce packaging and waste. At the same time, packaging needs to be "fit for purpose" and prevent food waste throughout the supply chain (through transportation, handling by retailers etc) and from the final consumer.

But we also found that the existing Government approach to packaging is currently unambitious and difficult to enforce. For example, though the voluntary Courtauld Commitment has been successful in getting businesses, primarily retailers, engaged with waste issues, its targets are unambitious and lack urgency. Furthermore, there is no indication of what action Government will take should retailers fail to meet even the targets.

We also identify that:

- Recycling provisions of the Packaging Directive have not put high enough costs on producers to force them to rethink product design.^x The cost of Packaging Recovery Notes (PRN) is minimal compared to other business costs.
- The Packaging (Essential Requirements) Regulations have failed to drive waste minimisation as they are “vague, self-monitored and poorly enforced”.^{xi} Local Trading Standards are insufficiently resourced to monitor for over-packaging, and the language of “consumer acceptance” in the regulations is problematic, as it can be used to argue that excessive packaging is justified.
- Implementation of the Producer Responsibility Obligations is too weak as the costs of monitoring compliance are a barrier to enforcement.^{xii} Targets are weight-based, and do not incentivise recycled content and reuse.^{xiii}

We specifically recommend:

- Defra Waste Strategy to be followed by a Packaging Strategy, developed with BERR, WRAP, manufacturers, producers and retailers to set out a clear ambition, and to identify policies and measures for:
 - reducing packaging waste at source, avoiding reliance upon downstream recovery and recycling;
 - encouraging efficient use of compostable packaging, including clarification of the role of compostable packaging, labelling, and the most environmentally preferable way to deal with it post-consumer;
 - ensuring the necessary long-term waste treatment infrastructure is in place; and
 - achieving progress towards closed loop recycling and materials systems in business.
- Defra and Devolved Administration Government Departments, the Environment Agency and SEPA to develop proposals for stronger and more effective implementation of Producer Responsibility Regulations and Packaging (Essential Requirements) Regulations, to ensure delivery. To include clarification of the ambition for packaging waste reduction and how these regulations can deliver.
- Defra to convene consumer groups to identify ways of improving sustainable management of waste, such as testing the “consumer acceptance” aspect of packaging in the Packaging (Essential Requirements) Regulations.
- BERR and DIUS to support innovation for designing out waste, through WRAP where appropriate eg an innovation platform and demonstration and venture capital support for innovative ideas that struggle to come to market.

Food waste

Food waste has been identified as making a significant contribution towards climate change impacts, through methane emissions in landfill, and more significantly through the “wasted” emissions and resource use impacts that food waste represents. 6.7 million tonnes of food waste are generated by UK households—equivalent to 15 million tonnes of CO₂.^{xiv} The monetary value of “edible” waste is calculated at £250–£400 a year per household.^{xv} Food retailers have a significant impact on food waste from products past their sell-by-date, and their price signals to consumers that encourage food waste, eg “buy one get one free” offers. Despite the significant scope to reduce the amount of food waste currently sent to landfill, food waste has been excluded from any specific targets in Courtauld or the Waste Strategy.

4. Reducing waste in the construction system

Construction waste, including from demolition, contributes 33 per cent of the total UK waste stream^{xvi}, four times the waste produced by all UK households. In addition 30 per cent of UK fly tipped waste is construction waste. SDC is encouraging BERR to set ambitious targets for reduction of construction, demolition and excavation waste in its Sustainable Construction Strategy, currently under development and due to be launched Summer 2008.

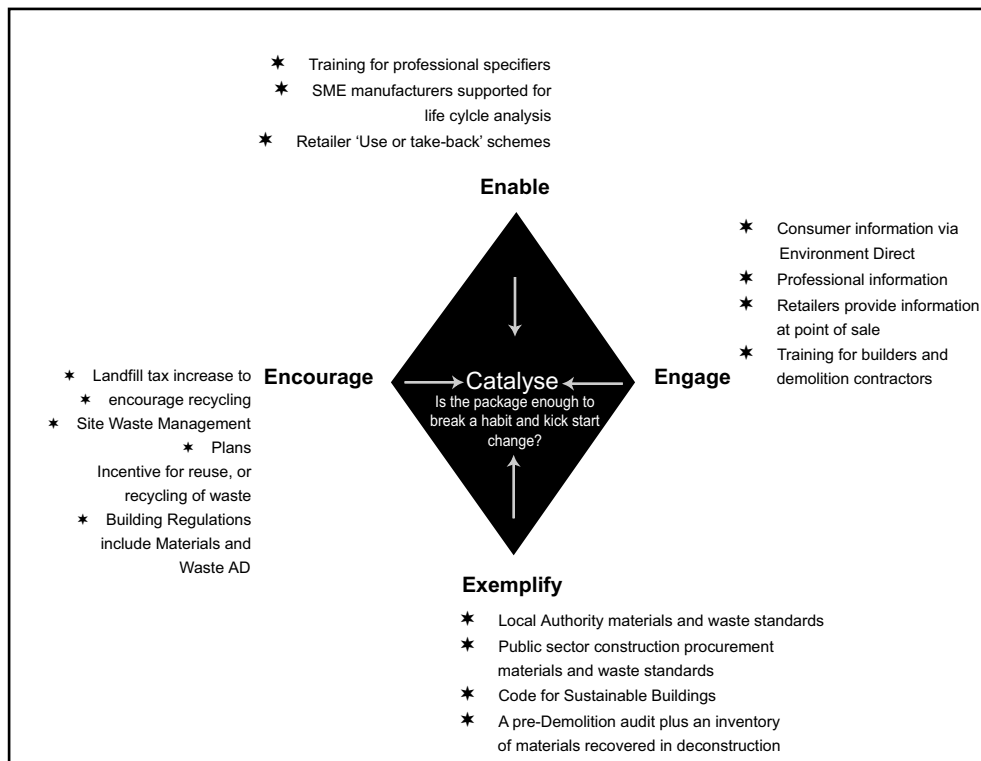
Construction is a fragmented industry, for example, many construction firms are small. We recognise that different measures and policies are necessary for different players. In 2006 SDC estimated that total cost savings of 50 per cent could be achieved on construction sites within a decade if our proposals are implemented.^{xvii} Use of construction materials in the UK is typically characterised by a linear process: extraction; manufacture; assembly; construction; maintenance and refurbishment; demolition; disposal. Sustainable consumption and production would promote a continuous “closed-loop” approach, which allows materials and components to be reclaimed, reused and recycled, reducing consumption of new resources and reducing waste.

While around 90 per cent of demolition waste is currently recycled in the UK, it is largely down-valued eg for hardcore, due to the lack of segregation. Our recommendations include providing demolition contractors with training on waste issues to enable separation of waste streams for reuse and recycling, and for the planning system to encourage deconstruction rather than demolition of buildings.

Construction waste constitutes 40–50 per cent of construction and demolition waste across Europe^{xviii}. Over-ordering, off cuts, damaged materials, packaging and other causes and can be reduced through better design and construction management practices. On many construction sites there is little awareness of construction and demolition waste issues, or the existing good practice that could be applied. Contractors are often paying significant costs for waste disposal and are not aware of the savings that could be made.

Public procurement can play an important role in specifying recycled materials, demolition recycling construction waste minimisation and waste reuse/recycling. However the costs of disposal are still not high enough to stimulate the recycled/reused materials markets. The costs of landfill, including landfill tax, remain low compared to more sustainable alternatives and waste disposal costs represent a relatively small proportion of business operation expenses.

The diamond model below summarises SDC’s key policy recommendations^{xix} for reducing environmental impacts of materials and construction waste. This shows the steps that need to be taken to deliver change.



5. *Leading by example: Reducing waste in Government's own operations*

The *Waste Strategy for England* emphasised the important role that reducing waste has in achieving SCP goals, and committed Government to show leadership through reducing its own waste, and using Government procurement to accelerate the development of products which use fewer natural resources and have a lower impact at end of life. Government has set itself the target for all departments to:

- reduce their waste arisings by 5 per cent by 2010 and by 25 per cent by 2020, relative to 2004–05 levels; and
- increase their recycling figures to 40 per cent of their waste arisings by 2010, and to 75 per cent by 2020.

In this year's annual report on *Sustainable Development on the Government Estate* (SDIG)^{xx}, the SDC reported that pan-government performance on reducing waste arisings and increasing recycling appears to be on target to meet the 2010 SOGE targets, with performance reported at 5.3 per cent and 38.5 per cent respectively. However, performance is variable across departments: some have reported excellent progress, whereas others are clearly not on track, and several are still not able to provide complete data for their whole estate.

In particular, MOD (which accounts for around half of waste from the government estate) does not have baseline data for 2004–05, so it is impossible to see the complete picture on pan-government performance on the waste arisings target; and two other “big five” departments reported incomplete coverage of their waste and recycling data. These factors will have a significant impact on overall performance. Where there are major data collection difficulties departments need to set out how they intend to resolve this. However, the excellent progress made by many departments should be recognised. 13 are already exceeding or are on track to meet the waste reduction target, and 15 are exceeding or are on track to meet the recycling target. Indeed, eight departments are very close to or are already achieving the 2020 targets for reducing waste arisings by 25 per cent, and four are at or near the 75 per cent recycling target.

Departments have shown that the targets in place, on the whole, are highly achievable. Government should consider revising the targets, in particular those for 2020, so that they remain challenging and deliver greater benefits over time. At the same time, those departments who are at a lower starting point need to learn from the good experience elsewhere, and Government should create opportunities for them to do so.

The SDIG report also recommended that Government should capitalise on its huge spending power. Government procurement is not just about purchasing the goods and services it currently needs. The way in which this money is spent, by central government and indeed the whole public sector, should support the delivery of government's aims on sustainable development, including resource efficiency. Indeed, the Government's *Sustainable Procurement Action Plan*^{xxi} (SPAP) set out a high level goal for the UK to become one of the EU leaders on sustainable procurement by 2009, to achieve a low carbon, more resource efficient public sector.

The SPAP placed a number of requirements on departments to bring about the shift towards sustainable procurement and support delivery of the SOGE operational targets. However, progress on sustainable procurement to date is disappointing. For example, only just over a half of the 123 contracts reported to the SDC contained sustainability clauses, including a tiny proportion of spend on catering; and compliance with the mandatory Quick Wins product standards is poor—nine of the 21 departments still do not include clauses regarding these standards in all of the appropriate contracts, even though they have been mandatory since 2003.

Government should use its significant spending power to bring forward products to the market with lower waste and resource impacts. The products that it purchases should, as a minimum, comply with the Quick Wins mandatory product standards. As stated in the *Waste Strategy for England*, these standards should be further developed to include waste prevention criteria as well as recycled content.

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Examination of Witnesses

Witnesses: Ms JULIE HILL, Associate, MISS HANNAH HISLOP, Policy Officer, Green Alliance, MR ANDREW LEE, Director, and Ms SUE DIBB, Team Leader for Sustainable Consumption and Business, Sustainable Development Commission, examined.

Q545 Chairman: Good morning. Perhaps, Ms Hill, you could introduce yourself and then the others can introduce themselves along the line, so we know who you are and where you are from.

Ms Hill: I am Julie Hill. I work for Green Alliance, which is an NGO, a pressure group or think tank. I was a director of Green Alliance for five years. I now work part-time for the Green Alliance as an associate, which means I act as expert lead on certain programmes, and I lead the waste and resources theme for Green Alliance. I have had probably 10 to 15 years experience of waste policy and for the last three years I have led a project called Closing the Loop.

Miss Hislop: I am Hannah Hislop. I am a policy officer at Green Alliance. I work with Julie on

Closing the Loop work. I project manage the work and I have been at Green Alliance for the last two and a half years.

Mr Lee: I am Andrew Lee. I am the Director of the Sustainable Development Commission, which is the Government's official adviser on sustainability. I head up the secretariat on the organisation—working for its little-known Chairman Jonathon Porritt!

Ms Dibb: I am Sue Dibb. I am the Team Leader for the SDC on its programme for sustainable consumption and business.

Q546 Chairman: You have made great play of the cradle-to-cradle approach, and it is an appealing strategy. The Green Alliance have suggested that we

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should emulate biological systems and create no waste at all. If you believe that a completely zero waste society is possible, how can this be achieved? How quickly could this be done and what might be the possible difficulties in getting there?

Ms Hill: There is a whole additional book in those questions, I fear. In brief, a goal of absolutely zero waste is probably physically and politically unattainable, but through drawing attention to this idea of cradle-to-cradle we are trying to promote a much more ecologically compatible way of dealing with resources and waste than the one we have at the moment, which is basically very linear: the extract, produce, consume, discard model. We feel that a large part of the route of getting there is wanting to organise society in that way. When we read *Cradle to cradle* we find a very beguiling, positive, creative, achievable sounding, business-backed recipe for a rather more interesting future, not a hair shirt, give-it-all-up, suffer under the burden of ever more incremental efficiencies kind of agenda. That appeals very much to us and we believe it would appeal to people at large. We are trying to make it appeal to politicians. Unless it does appeal as the vision for the future, I would imagine the transition that we need to make to get to that is not going to be within our grasp. It has to be something, as a way of organising society, which is bought into by business and politicians alike, and obviously a part of that is a degree of buy-in from the general public. I think we have good reason to be positive about public potential sympathy and enthusiasm for that kind of way of organising ourselves. Just looking at the *Daily Mail's* "ban the carrier bags" campaign would suggest that in popular culture there is an intuitive sense that disposability and the unnecessary waste that our linear society generates is not a desirable way to continue and we should do something about it. For the *Daily Mail* to take up a cause means it must have a populist route and therefore it is politically achievable at some level. We can go into carrier bags later, and of course it is the tip of a very large iceberg, but it says something about popular sentiment. I think the cradle-to-cradle strategy is achievable with, first and foremost, political will. If one had that political will and had business buy-in, I do not think human ingenuity or business ingenuity is any kind of constraint. Once businesses set their mind to do something and feel they have the right economic framework—which of course is the overall setting—they can achieve things very quickly. To use perhaps a rather clichéd example, if we can announce an intention to send people to the moon and achieve it within a decade then human ingenuity and technology are not limitations on this at all. We cannot put a timeframe on cradle-to-cradle or zero waste because we have not wanted it badly enough to try hard enough to know what is entailed. As I say,

my view is the limitations are political and about our willingness to adapt the marketplace to these concepts; they are not technological or about our innate creativity.

Q547 Chairman: You have quoted the *Daily Mail* and their plastic bags campaign, yet, if the Chancellor on Wednesday was to introduce penal taxation, the first people to squeal would be the *Daily Mail* and their readers. How do you see the range of fiscal, regulatory or even voluntary approaches which could be taken? Is it just the exhortation or is there to be a rather more specific approach to it? What kind of shots would you have in your locker as far as, let us say, fiscal or regulatory measures were concerned? To which would you say, "No more"—apart from plastic bags, which we have already covered?

Ms Hill: There probably needs to be a mix in the basket. I am going to ask my colleague Hannah to talk about some of those we have worked on as a starting point.

Miss Hislop: In terms of regulation, the principles we would want to see, as Julie described, are setting business long-term targets, dynamic standards that ratchet up over time, and giving business certainty about what is expected from them. In terms of particular legislation, one of the things that comes to the fore first of all is product standards. There are various ways in which we could organise these and there is some debate about which ways would work best. You could set particular standards for particular products on a whole range of criteria from energy, to resource use, to water use, et cetera, but that does not really take into account how many products we are using and how many products are in the system and, therefore, their total impact. Other ways could be setting sectoral targets for energy and water and resources, and businesses would trade and distribute those allowance amongst themselves. For some products, it would be very difficult to make them into the kind of environmentally sustainable products we want to see, so those might be phased out, but then with other products, it might be much easier to make them better, so they would come to the fore. We have also looked quite a lot into producer responsibility. I know you will probably ask some further questions later on, but perhaps I could make the broad point that we need producer responsibility that gives individual companies incentives to design products in a better way. The way the UK transposes EU producer responsibility legislation is very much in a collective way, so individual companies have very little incentive to redesign things for recyclability and recovery. It is very much a way of shifting the costs from the public sector on to the private sector. We want to see producer responsibility implemented in a way that affected the companies producing and designing the goods rather than just the companies

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dealing with their disposal. A third matter that the Green Alliance has been talking about quite a lot recently is the idea of product levies. We have just released a report which calls for a reform of VAT and it being replaced with an environmental goods tax. Gordon Brown has announced his intention is to talk to the EU Commission with President Sarkozy about reduced VAT for greener products, such as insulation, and we think the logical extension of that is looking at the environmental impact of all products and using a fiscal system to incentivise innovation and therefore better products. That is another thing we think could be in the mix. Also there is public procurement as well, but that is probably something that is better to leave to the SDC to talk about.

Mr Lee: Perhaps I could make some supplementary points to those that Green Alliance has made. The approach that we have mentioned in our evidence of product roadmapping gives you a whole way of looking at the whole life cycle of a product and deciding when different interventions are the most appropriate ones to use. We can come back and talk more about that, but the other thing is the scale of the potential. The important thing to realise here is that there is a vast potential for improvement. To take one of the examples we have mentioned, construction waste: this accounts for one third of the UK waste stream, four times as much as household waste. We know there is the potential to reduce by at least 50 per cent the waste of materials in construction on tangible evidence. In one of our reports we have quoted the example of WalMart. They looked at 225 of their toy products with the manufacturer and managed to design out basically nearly 500 container loads of waste packaging and save, effectively, 1,000 barrels of oil, which makes good business sense as well. On food waste: 6.7 million tonnes a year, which for households in the UK can be anything from £250 to £400 cost, so there is huge potential in the system. Can we get to zero waste? You can argue about that. Can we make huge improvements, order of magnitude improvements? Yes, we can. A lot of those make good business sense as well.

Q548 Lord Lewis of Newnham: My impression would be that you are saying that if you are concerned with zero waste it is really a cultural problem more than any other, and you have to change the culture within the system. I think this is the point you make within your documentation. Perhaps we could address the point that Mr Lee is talking about. In domestic waste you are concerned with about nine per cent of the total waste stream and yet there is a concentration of the public on domestic waste rather than on commercial waste, and yet commercial waste is the one that it is relatively easy to do something about. I am amazed that industry as a whole has not recognised this because the bottom

line is that they are spending money that they need no longer spend. How can we get this particular point through because it does seem to me that the concentration of the public at large on domestic waste is the wrong direction. We should in fact be concerned with the commercial waste side. In many instances, that is much easier to deal with: you have a singular type of waste stream rather than a complex waste stream you get in domestic ways. Why are we not addressing that problem in a very much more effective manner?

Ms Hill: When the Government first started looking at issues of reducing waste, the landfill tax was one of the first instruments discussed, to encourage diversion from landfill not just for municipal but also for business waste. It became quite quickly apparent that the level at which it was originally set was not influencing behaviour, because still, even with the tax, landfill was much cheaper than the alternatives. What counts is both the availability and, of course, the relative price of the alternatives. It seems to be true, even now, with the landfill tax escalator and with a large expectation from the Government embedded in the Waste Strategy that this would be the primary instrument bearing on commercial waste, that it is still not high enough to be stimulating consistent investment in alternatives. It appears to be not just about relative prices but about the degree of risk that businesses who would be doing that investment in recycling infrastructure feel they are carrying. We have not yet sent either the right price or regulatory signals. We have inherited from the Industrial Revolution a system where the raw materials have been cheap enough and the end disposal has been cheap enough to not worry about whether resources are reclaimed or recycled in the middle. We have only latterly began to worry about it because we see consequences to disposal—which is a different set of worries to worrying about resource use and resource reuse, and possibly ultimately pressure on resources, and also now, of course, a concern about carbon, where recycling resources clearly saves carbon. We are starting to worry about what is upstream, but we have traditionally only worried about the downstream element, and we still have not made it either expensive enough or regulated it out to change that system.

Q549 Lord Lewis of Newnham: You are saying it is a fiscal problem?

Ms Hill: It is a fiscal and regulatory problem. I spent most of last year on something called the Commission on Environmental Markets and Economic Performance, which Gordon Brown called into being and which was jointly chaired by the Secretaries of State for the Environment and Industry (when DTI still existed), which comprised some very high level business people and some very

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good academics, who spent a year chewing over why there was not environmental innovation and, indeed, why environmental innovation was different from any other kind of innovation. The answer is because environmental goods are generally not priced in the market-place, so you get little benefit for innovating for the environment in the absence of specific fiscal or regulatory measures. We still do not have those enough. That is what the business people said to government. It is not just what we say to government but the business community say to government, including the deputy general of the CBI. You cannot get a clearer voice than that that business would like more consistent signals to move towards environmental innovation.

Q550 Lord Howie of Troon: Speaking as a civil engineer—perhaps I could say that in relation to what I am going to ask you—you have mentioned a figure of one third waste in the construction industry, and we have had a similar figure before us once or twice and I have constantly queried it, where does it come from?

Mr Lee: Those figures come from the industry. In fact we were asked by government to produce a report looking at the UK housing stock—we called it “Stock Take” and we did it for the then ODPM, obviously now DCLG—to look at the potential in the construction industry, both on new-build and also on refurbishment of existing buildings. It comes from industry figures and also some examples. For instance, the Greenwich Millennium Village we know achieved a 15 per cent reduction in material use. Then there are specific products, of course, which are the focus of more detailed work. We have talked about product roadmapping and one of those roadmaps—maybe bizarrely, but very importantly—is about plasterboard, to look at some of these basic commodities that the building industry is using. Defra is undertaking that work now to look at what is the maximum recycled content you could put into some of these products. The figures are derived from industry, from BRE and people like that.

Q551 Lord Howie of Troon: Do you think you could let us have them?

Mr Lee: Of course. We could happily share the whole report of Stock Take. It is 200 pages, but it is all there.

Ms Hill: In countries where they banned the landfilling of construction and demolition waste, of course most of it gets recycled because there is not an alternative route. That is the kind of regulatory signal we are talking about..

Q552 Baroness Sharp of Guildford: You indicated in your opening remarks that you felt the consumer side was ready to be led, and you instanced, the *Daily Mail* campaign on plastic bags. You also indicated—

and I find this quite interesting—that you felt business is also ready to be led. Taking the triangular model—which I think comes from SDC—of the three partners here, business, consumers and Government, this would indicate that the politicians have possibly read it wrong and that a better and clearer lead is needed. The original question I had was whether it was the business sector that was dragging its feet. One hears the CBI so frequently saying, “Oh, there’s so much regulation. We don’t want more regulation. We don’t want more taxes,” and all the rest of it, but you are indicating that business is willing to move and that politicians are failing therefore to read the signals correctly and that therefore a much stronger push on the part of politicians in this direction could lead to considerable changes in behaviour in both the business and the consumer sector.

Ms Hill: I think that is entirely right. Obviously you have different kinds of businesses. Smaller businesses will always be hit harder and there is a leading cohort of progressive business. But they crave certainty. If they feel there is a political momentum towards environmental goals, they want to know exactly what those are. If the subject had never been raised then possibly “business as usual” is okay, but given that they are being told that the environment is important they want that translated into something they can bank against, because, at the end of the day, everything depends on whether you can get a financier to take a risk. So a fluctuating carbon price or a price of landfill that is not going up as high as the Waste Strategy suggested it would—because the base price is dropping underneath the tax, which is what has happened—or the inability of local authorities to commission recycling infrastructure because the PFI procurement process takes so long and embodies so much risk that nobody signs for two years, these are the kinds of things that thwart general objectives and they also do not add up to a coherent package of saying: “In 20 years, this is where we want to be”.

Ms Dibb: The work we have recently published *Green Healthy and Fair* was looking at supermarkets and a sustainable food system. In the research we did with supermarkets, they told us that they felt they were not getting clear messages from Government. They were not getting the longer term vision and they were not always getting the joined-up approach from different Government departments. They told us that was a barrier to them. As we know, many of the food retailers have been taking a leading position on some of these issues, including waste, making their own commitments to zero waste to landfill from their own operations, and we are very clear from the work we have done that there is an energy there and a desire from business to work much more closely with Government. We would agree that, on many of these issues, what seems to be slower in forthcoming is that Government leadership, in setting that longer-term

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vision and targets. As Julie has said, markets will respond to those longer-term targets and certainties, and that is where we are not getting them. For example the Courtauld commitment—which I am sure many of you will know is an industry/Government partnership—has voluntary targets but many of those targets are already being exceeded. In our view they are really unambitious and we need to see those as milestones. If we took a road mapping approach and said, “These are useful targets to be in 2008, but where do we want to be in 2010, 2015, 2020?” they are the kind of long-term signals that industry is saying it really wants Government to give it.

Q553 Lord Crickhowell: With regard to a zero-waste society, I am prompted to ask you whether non-renewable resources have to be kept in circulation *ad infinitum* and is this realistic. In your paper you make it clear that there are two parts to this. There is maximum recycling but you also talk about the need to extend the lifespan of goods and materials so that they can enter the waste stream less readily. There are some obstacles, as we have heard—which I will come back to—but are these realistic objectives? How far is a zero-waste society practicable?

Ms Hill: The *Cradle to cradle* thesis which McDonough and Braungart set out does have the twin cycles: renewable and therefore degradable—which goes back to nature, as it were—and the technical, non-renewable which you want to keep in circulation. Of course everything will depend on how easy it is to recover those sorts of materials from the products they are put into. Interestingly McDonough and Braungart do not like the idea of durability. Their suggestion in *Cradle to cradle* is that products are never owned by the people using them. They lease them and the materials continue to belong to the companies which generate them, who then are responsible for getting them back and extracting value from them at the end of their life. That is a kind of ultimate producer responsibility: the materials in the things we use never cease to belong to the person who has generated them. That, again, is a very beguiling concept but, in a globalised economy, we would have thought fairly hard to put into detailed operation, so it is not something we have translated into our advocacy. There probably is a role for greater “product service systems” as they are called, where you do not own the product, you lease it, or you lease what it provides—such as painting or the chemical use whatever—and then those things are reclaimed. In any case, however that is organised, the key to whether it is practical will be how easy it will be to recover materials, not necessarily at the end of their life but at the end of one use or at the end of subsequent uses. It is very difficult to say how practical or how costly that is from where we are now

because we design very little to be reclaimed. As we have said before, we treat recycling as almost a waste disposal technique or alternative to waste disposal, not as an economic goal. Materials recovery is not in itself an economic goal. If it were, and all the fiscal and regulatory framework to the economy was geared to that happening, then, of course, companies would find extremely ingenious ways, I am sure, of reclaiming materials. At the moment we have a situation in this country with aluminium, which is worth several hundred pounds a tonne on the resource market, where we manage to recover only about 50 per cent of what goes into drinks cans, despite having doorstep recycling schemes and other things. That is simply because we have not organised or wanted to get that material back. There is a market for it but there is a disjunction between feeding that market and the systems of recovery.

Q554 Lord Crickhowell: You rightly talk about the importance of pricing here. One of the difficulties we have is that our whole system at the moment is based on European regulation, which was really introduced long before all this became a priority. Basically it takes us to a weight-related situation for disposal. We have heard from the aluminium manufacturers that, yes, you can recycle aluminium to infinity almost, and you can go on using it again and again, but we do not have a package at the moment that makes it economic to encourage people, for example in the domestic waste stream, to take all these metal containers in which your food arrives and put them into a separate stream. It is simply not economic to do so. On the other hand, there are products where we can do it—and glass is an example—but you can only recycle paper a limited number of times before it stops being as good for the purpose. There are different problems for different products. This leads us to come back to the whole basis on which our waste collection system is based. We have a situation, we were told, where bottles are all nicely put in separate containers by you and me, but they are then thrown back into a single collection, where they cannot be used except for uneconomic road-making glass, because it is simply uneconomic for the people to do the job. Would you comment on these related problems, please.

Ms Hill: The problem is not designing systems for recovery. It is not just a question of designing the products. The products are one end. In the idealised cradle-to-cradle world products need to be simpler, easier to disassemble and without toxic substances, so that materials are almost automatically easier to use, but then, as you say, we have to get them back from where they are being used. Let us talk about domestic waste. Although it is disproportionate in tonnage terms it is more problematic waste because it is more diverse and more mixed and more

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contaminated. As Lord Lewis said, with a lot of commercial streams they are easier to separate. If the right drivers are in place, either fiscal or regulatory, that stuff is easier to get back, it is just that we do not have those drivers. But domestic waste does present genuine problems of what that material mix is. One route into that is to talk about discriminating applications and materials. Certain things are inevitably or invariably made of certain materials and, therefore, there is a logic to the way consumers use them and separate them or, if they are being mechanically sorted, there are consistent universal technologies for sorting them into their different component streams so that they are purer and less contaminated and in higher bulk and, therefore, the markets for those will be easier. At the moment there is a significant disjunction between the way we envisage the use of materials, particularly new materials, and how we think about their treatment at end-of-life and their recovery. If we have time, perhaps I could ask my colleague Hannah to talk a little bit about the compostable packaging work that we did, because this completely exemplifies the lack of a system designed with recycling and recovery in mind.

Miss Hislop: We ended up looking at compostable packaging. It sounds quite a strange thing to focus on but the supermarkets have come under such pressure from consumers to “green” their packaging. You have probably noticed that supermarkets, particularly for their organic ranges, their fresh produce ranges, are increasingly using compostable materials to package fruit and, for example, tomatoes. These are materials made from plants, from corn or from cellulose or similar. In an ideal world this would be in a closed loop, as *Cradle to cradle* envisaged. It would be a loop of organic materials being grown from the soil and then returned to the soil. The problem in reality is that the system has not been designed to accomplish that. The supermarkets have put them in place on their merits of appearing “green” to consumers and being made from renewable materials but, in terms of making sure these materials are composted, there are so many barriers that you almost do not know where to start. For example, very few local authorities have food waste collections—even though this is probably likely to increase in the future. The packaging itself is certified as compostable but that does not necessarily mean it will break down in the home compost heap. Your consumer might get this thing and think, “Oh, great, it is compostable” and put it on their compost heap, but six months later that tray is still sitting there. Equally, a bottle made out of cornstarch, for example, looks exactly like a plastic bottle, so it is very easy to put that bottle into the recycling bin and think you are doing your bit and then that is causing all sorts of downstream problems for recycling

people. There are lots of different issues in terms of the system rather than just the product. Green Alliance has been working with supermarkets and other people in the supply chain, from local authorities to waste companies, to join up some of these issues.

Q555 Lord Crickhowell: That is very interesting. You have concentrated on the design of the product and what you put into the product and extracting from the product, but I was concentrating a little with my question on the existing problems with products you can recycle. Glass is a very good example, because we are doing much worse than Europe in this context. It does come back very much to providing an economic cycle that makes it worthwhile to do separation and turn the product over. We have an acute problem with the glass industry in this country. They cannot get enough glass to recycle into bottle making, because it has all been turned into an uneconomic road-making material simply because there is not an incentive, because of the weight question and the pricing structure in this country, to separate bottles out. Similarly, there is this problem with aluminium. A very high proportion is recycled, but the stuff that is not recycled is this light material which it is not economic for anyone to pick up and do anything about. Could you come back a little and talk about that in the equation rather than supermarkets designing the material or not designing the material. That is one aspect, an important aspect, but it is not the one I was asking about.

Ms Hill: It is important because it does illustrate the problems of mixed collection and separating material sources, and much of this is about the tie-up between what local authorities can afford in terms of the way they collect and then what kind of sorting infrastructure they have and the markets available to them. Several things have happened. The squeeze on local authority funding and also worries about consumer reluctance to segregate lots of different streams have moved towards co-mingled collection of recyclates which are then difficult to sort mechanically. They tend to be more contaminated: there is more broken glass, the paper gets more contaminated, there is more food waste, which lowers the quality of the recyclates. We have been fortunate recently that the Chinese have been prepared to take fairly low-quality streams of all kinds of things. Glass is separate—and I will come back to glass—but a lot of the plastics they have been prepared to take. But that is ending. We were told yesterday by Recoup that the Chinese market for some of these more mixed, less high-quality streams may soon be cut off and then we will have these problems of what to do with that stream. With glass we have the problem that we import much more green glass than we use after it has been processed, so

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we have a difference between quantities of green glass and clear glass. WRAP are trying to redress that balance very successfully by persuading people either to import in clear glass or to import liquid in bulk and then bottle in clear glass rather than import in green glass. There is a lot of very good work on glass to try to purify, as it were, those streams and make them fit for market. It is not just about their physical characteristics; it is about what markets are available to reuse those materials. This is where we have fundamental problems and will hit really fundamental problems in this country when the Far East increases its own materials generation and reuse. They may get well ahead of us. They may develop really very good resource recovery systems and leave us with all the rather dirty, scrappy, mixed-up, confused stuff to deal with ourselves, and then it is going to get a lot more expensive.

Q556 Lord Haskel: You have told us that this whole thing is a matter of political will, that it is about waste reduction. You have just told us that we need to have some more rules and regulations as to how products are designed and that we have to have an idea of the whole life of the product and design these things into it. Do you think there is a role for regulation in the design process in order to encourage waste reduction? What sort of regulations would you introduce? How would you like to see them put in place? Are there any drawbacks?

Mr Lee: This is one of the areas we have been looking at in the Sustainable Development Commission and, also, internationally, as Julie says, because a lot of these supply chains are global. There is definitely a role for regulation in the design end, particularly in terms of product standards. In the report *I will if you will*, which looked at sustainable consumption, we took 18 different product areas and said, “What has driven the change in these things?” because there was a feeling at the time that it was consumers consuming differently that had driven the change. In no case was that the main issue, and very often the key switch point was regulation, particularly on product standards. An interesting example would be white goods—and it is interesting to talk about because of the interaction between these different things. There you had four things happening. First, you had labelling on energy efficiency of the product. There is a myth that somehow the labelling drove the change, so that everyone went and bought an A-rated fridge. No they did not. What happened was that that interacted with product standard regulation at EU level, which also interacted with the energy efficiency commitment in the UK, which made the energy suppliers, the manufacturers of the products and the retailers get together and say, “We don’t really want to be selling E-rated fridges. It doesn’t look very good

for our brand,” so you have quite a subtle interplay between these different things. Another example globally, out of the G8 process, would be this one watt initiative on standby. What is the point for goodness sake in going out to every citizen of the UK and nagging us all to switch the appliance off at the wall—especially if you have kids like I have—when you can design out the problem by getting standby to such a low level it is negligible anyway. Another interesting example, which we have highlighted in the product roadmap “You are what we sell”, was the Japanese initiative, the top-runner initiative, because that says, “Let’s look at where the best standards of best practice are currently in an industry sector in terms of products and then we will set the regulatory floor there. Then, as the sector leaders improve their performance we will ratchet up the regulatory floor.” It seems to me that is a very good way of doing it. They achieved 78 per cent improvement in energy efficiency of products doing that. It is saying to industry, “We are working with the grain of the market, we are basing our standards on what we know the best people are capable of doing through innovation, and we are also sending a clear signal that over time those standards will get ratcheted up.” You could use a similar analogy here about the Code for Sustainable Buildings, which is a voluntary standard, and Building Regulations, which should be coming up behind. Those are good examples, I think. If you can get right upstream in the design phase, you can design out some of the problems, but you have to do that on an international basis, certainly working through the EU, and often globally, because of where the supply is coming from.

Ms Dibb: If you have developed standards, they might be applied in a regulatory way, but they can also be applied in other ways. For example, if you think about the vehicle efficiency standards that now exist, they are being used around vehicle road tax and they are also being used in relation to the congestion charge. It is having the standards. They can also be used in procurement, for example. We have been looking at government procurement: they have the potential that procurement in the public sector can be based on these kinds of standards. Or even within business: business can use those standards when it is putting specifications on its suppliers. People have said to us, “How do you design these things out?” Designers can design whatever, and there is a lot of great innovation in this country. Designers are coming out of college who want to design for sustainability and they are not being given the opportunity. One of the barriers to that is the retailers, for example. There is great potential for them to set specifications back upstream that will drive innovation and they can use those standards. Therefore standards can be used both in a voluntary setting as well as a regulatory setting.

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Q557 Lord Crickhowell: Of course, what you say in an ideal world is wonderful, but how then do you deal with the other side of the argument, where people say that too much regulation stifles innovation; where small businesses say there is so much innovation around that they just do not know where they are? As Lord Lewis pointed out, many businesses would adopt these things, if they had the time and the energy to scrutinise exactly what it is they do, because they could save money. For instance, do you have a phone line so that small businesses can phone up and be told in very simple terms exactly what to do? Small businesses will say, “This is much too complicated for us and we do not have much influence either up the production line or down the supply chain.” How are we going to deal with that?

Ms Dibb: In two ways I think. One is that you have to take a supply chain approach to this. Players in a supply chain can act together. That is what we are advocating in the product roadmapping approach, that you need to work with your suppliers back up the supply chain. To answer your more specific point about how to help small businesses: Government does have a number of business support initiatives around this. It has been rather fragmented. It has initiatives such as the Carbon Trust, Envirowise, WRAP, and there is a simplification process going on at the moment that is likely then to use Business Link—which a lot of small businesses are already linked into—as being the means through which small business can access that support. One of the things we would like to say is that we are not convinced at this stage that there is sufficient support, particularly for small businesses, and there is a feeling within Government that if there is an economic win for a business that the cost should be borne by the business. Why should public money be spent in subsidising a saving within business? I think that is a legitimate argument up to a point, but for smaller businesses which do not have the in-house resources and expertise and time, there are particular barriers that need to be addressed in helping them. When the Government rolls out this scheme, we would like to ensure that it does so in a more integrated way—it is not just about water here, carbon there, energy over here, but it is about what a business can do in its whole business to address these issues—and to ensure that there is sufficient support to get over those initial hurdles, to the point where businesses can see that they are making money out of it. Then the ball starts rolling with them and they can take that further.

Ms Hill: The Government sold to business the concept of the escalator on the landfill tax on the basis that that money would be recycled to business. One of the means of doing that was meant to be the BREW programme which has just had all its funding cuts. There is no longer an element of recycling landfill tax money to business through that route.

The Commission on Environmental Markets said that kind of support needed to be increased and hypothecating a tax like the landfill tax is potentially a very logical way of doing that. The Treasury have moved away from that kind of idea and we think that is a shame.

Q558 Lord Lewis of Newnham: I think hypothecation is your problem with the Treasury!
Mr Lee: Indeed.

Q559 Lord Lewis of Newnham: Could I refer to the economic penalties, such as landfill taxes. They have been very effective. You have a very interesting table in your report, at page 18, which reflects the amount of landfill dependent upon the country involved. There is a vast variation within that particular scheme. Is there any correlation between the charging that is made in various countries and the amount of recycling or landfill that is going on in that country? I know there are other factors, such as availability of landfill sites and things of this particular nature, but it does also strike me that when you talk about these factors, even for this country, they are very variable. As you move around the country, you get very large differences in the figures involved in it. How far does this reflect the problem, which I think is a very important one, that we do not have a centralised policy on things like landfill and recycling? This is left to local authorities, who very often act in their own particular way and change from one section to another section, and you have a unitary authority which differs from a local authority. Where the responsibility lies in this particular problem seems to me to be an important factor. I think you do say that if you were to increase the tax by five pounds a year, in theory you could get to a much better equilibrium situation scenario, but how far are landfill taxes really a restriction?

Ms Hill: An incentive, do you mean, to divert from landfill.

Q560 Lord Lewis of Newnham: Yes.

Ms Hill: They are. When we published *A Zero Waste UK* we asked for a five pound escalator and we got an eight pound escalator in the budget—which was a surprise. I think it indicates that for the Treasury this is a relatively easy tax to put on: there is not a large number of losers—people to complain—it is seen to be an environmental tax. Until a couple of weeks ago, there was an argument about recycling the revenue, which has now disappeared, but it is a relatively easy green tax. It is having an effect, as far as I can see, on the waste industry and the people I talk to; in the sense that they know landfill is not the long-term future, not just because of UK policy but because that is the way most of Europe thinks, to be fair, that landfill is just not the right thing to be doing in the

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future. But what counts is whether they can invest in alternative infrastructure. The reasons they have not been investing as fast as was envisaged by Defra and the Treasury are multiple. One is that the relative costs of that infrastructure is still quite high. The landfill tax has not bitten as much as it might have done if the base price of landfill had continued to rise, but it has not. In some areas, because there is quite a lot of landfill available or permitted void available, the base price has dropped, so the overall price of landfill is not as high as it might have been. The risks of investing in alternative infrastructure are quite high. There is a relatively small number of what are considered by bankers to be genuinely proven technologies. While people may reel out a list of things you can do to waste other than landfill, the numbers that are considered bankable are really quite small. On top of that, if you are talking about municipal waste, you have complexities of the PFI procurement process offer for local authorities, and then you have the planning nightmare, which is a very hard one for anyone to solve. Municipally owned alternative infrastructure has been slow, very slow, coming on stream and the National Audit Office has looked at this. Privately-owned, what are called “merchant facilities”, built by waste companies on their own books for industrial waste we keep being told will come on stream in reaction to the higher landfill tax, but not many people have seen much yet. That must still represent the perceived degree of risk and the lack of perceived political drive, to be honest. It is a bit like the fuel tax argument: a higher fuel tax or vehicle excise duty in the absence of a complete package to drive things, is potentially seen as a revenue raising, easy green tax hit, rather than the roadmap (to use Andrew’s terminology) to a revised economic system.

Q561 Lord Lewis of Newnham: How do you view the variation in the country?

Ms Hill: It tends to depend on how much permitted void exists in different areas—which can be a mixture of history and geology. It depends what a local authority strategy is. They, of course, have complete freedom to design their alternative strategies. They are driven by the Landfill Directive on Biodegradable Waste; the local authority performance targets on recycling overall; the available money; their demographics, in terms of whether they are urban or rural; whether they have ethnic populations which culturally tend to be more difficult to communicate these messages to. There is a huge mix. For local authorities the situation is extraordinarily complex. We began to feel very sorry for the average local authority trying to deal with these problems, as set against our vision of a resource reclamation society, because nobody seems to have that responsibility for creating a resource reclamation society other than

these poor local authorities who do not have the tools to develop it.

Q562 Baroness Platt of Writtle: Could the Local Government Association not put over some best practice?

Ms Hill: Yes, they work very hard on it. The difficulty is the lack of a national coherent strategy, which of course means taking power from local authorities, which politically is in completely a separate direction from where most political parties are now going. They are all talking about localism, but the difficulty here is that localism tends to translate into fragmentation and inaction in some cases. Some local authorities do tremendously well, but everyone will struggle with the mix, in the end, between the way in which we deal with municipal waste, which, as we have said, is less than 10 per cent of the waste streams, and that tie-up with commercial industrial streams. We have separated the two institutionally, down the middle, and we have found no tools to bring them together. We have landed the smallest sector with the most complex problems and we have hardly looked or touched the commercial sector with any policy or fiscal instruments other than landfill tax at all. That is why the mix of policy here is just not working.

Q563 Lord Lewis of Newnham: It is also complicated by the fact that the majority of agreements into which they enter are for a period of about 20 or 25 years, which means that they are burning their boats in every sense of the words.

Ms Hill: Yes.

Ms Dibb: Just to add to that, because you make a very good point, it does not work for business either, that variability of different collections in different local authorities. The supermarkets we spoke to told us that it was a real problem. They were trying to design materials and packaging for consumers to dispose of which could potentially be more recyclable, yet, as every local authority has a different scheme, it really does not work for them. They are saying that there needs to be a priority materials strategy nationally.

Q564 Baroness Sharp of Guildford: One of the things I note from that table in the Green Alliance paper is that those countries which have the lowest use of landfill and the highest recycling rates also have the highest rates of incineration. In your *Cradle to cradle* strategy, I take it that incineration does not really come in. As the Green Alliance, you would like to see zero waste, total re-use and recycling and so forth, as distinct from putting incineration into that.

Ms Hill: We do not rule out using some waste streams as fuel, where that extracts better value in environmental terms than recycling—and I use “in environmental terms” very carefully. Work that was done for Defra tended to show, almost invariably,

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that recycling most materials yields carbon benefits over energy from waste. The trouble with debate on energy from waste is that it has now been taken from the materials resource recovery end of the debate into the energy security debate, so there is a drive to say, “We have an energy security problem, let’s see whether energy from waste (incineration with energy recovery) can help solve that.” It seems to us very unlikely that it does—partly because energy security, if we are worried about gas, would not be touched at all by energy from waste, because gas is largely about heat and energy from waste is largely about electricity, and, if we are worried about electricity, there are much more promising renewable sources of electricity. To go back to the construction example, if all renovation and new-build had photovoltaic panels on their roofs, I am sure you could generate a lot more electricity than doing it from energy from waste, and it would be embedded and therefore much more efficient in its distribution. I have not done those figures, but as a strategy I would imagine it is better. Our view is that where materials have a value in terms of their recycling—an environmental value: there is a resource benefit, a carbon benefit from recycling—it is a waste to burn them. However, there may be some situations where transporting things long distances or the markets or the nature of the material means that combustion could be a good option. I think it has to be looked at in those terms—not just from the idea that energy from waste is a better form of disposal than landfill, therefore it ticks a few boxes. That is how I fear the policy develops.

Q565 Chairman: What does the Danish version of the Green Alliance think of this? Looking at these figures, they have about the highest levels of incineration. Is this a British view, that we have been more successful in handing out incineration, getting rid of it?

Ms Hill: No, it is historic. The UK has a large level of landfill, principally because of geology. We have done a lot of extraction of aggregates and clay which leaves convenient holes in the ground to fill up. To a lot of other European countries that option has not been available or they have just not seen it as the right thing to do. They have thought of incineration as the cleaner, better option. Historically, particularly in Denmark, a lot of incineration was put in place with district heating, so the waste heat was used very close to where these plants were. They have a positive image of incineration, about generating energy and a positive use of waste. Our version of incineration tended to be without any energy recovery at all and without adequate pollution control, so that incinerators left a negative legacy rather than a positive one. That is not to say that modern incineration or different kinds of thermal technology could not have a positive contribution but I do not

think looking at the relative figures in Europe teaches us anything, to be honest. I do not think they tell us anything about the right mix for the UK. They are very much a product of history. Just because countries on that table have high levels of incineration, it does not mean that they want to maintain that.

Q566 Chairman: That is what I was getting to.

Ms Hill: Some of them tax incineration as a way of promoting recycling. Many realise the carbon benefits of recycling outweigh thermal treatment of some waste streams. Those figures do not represent a snapshot of how the world should be at all; they reflect a very dynamic mix of history and policy. The most salient thing really is that most of those countries are aiming much higher with recycling than the UK.

Mr Lee: In Denmark, for example, the whole energy system is completely decentralised. That has been achieved over the last 30 to 40 years.

Q567 Chairman: What about the electricity they import from Germany and Sweden?

Mr Lee: Yes, but if you draw a map of Denmark and you look at the distribution of domestic power generation it is very, very decentralised. It is almost the opposite of the UK. We looked at this when we looked at Ofgem and the regulation, so there is that link with energy from waste. The SDC has just been asked to advise the Scottish Government on exactly that issue. We produced a report on that which we would be very happy to share with you. We came to the conclusion that energy from waste does have a place in a sustainable waste management stream but it is a small place and it is at the end, when you cannot do anything else, and it is using these techniques like gasification or pyrolysis. It is not a way of developing a big source of energy and, therefore, you do not want to create the perverse incentive that you are generating waste to feed the energy from waste plants.

Q568 Lord Lewis of Newnham: The energy security problem is coming very much more to the forefront of people’s thinking, I am afraid. You do not have to agree to it but that seems to me to be the general trend. I am sure Mr Lee is right in saying this is going to become a problem for the future.

Mr Lee: Yes, I think that is true, but then you need to look, in this order really, at: reduction of energy demand; expansion of renewables in the UK—there are huge opportunities; capturing wasted heat in the system; and carbon capture and storage. In terms of the priority on energy security, that is where I would say the priorities are.

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Q569 Lord Lewis of Newnham: I wish I was as optimistic as you are. After all, we do have a set of regulations which are operative for new-build as far as heat and energy is concerned.

Mr Lee: Yes.

Q570 Lord Lewis of Newnham: On an inspection, something like one third of them failed, but nothing is done about it.

Mr Lee: I agree.

Q571 Lord Lewis of Newnham: Not a thing is done about it. Until you start putting teeth into that side, I am afraid it is just a load of wishful thinking.

Mr Lee: I agree.

Q572 Lord Haskel: I wonder if I could come to the consumer. You have told us that the consumer is well disposed towards waste reduction but also in one of the papers you say that the myth of the green consumer has been perpetrated for more than 20 years. Of course consumers often buy their products on the basis of cost, convenience, habit or fashion. Do you think, bearing in mind our previous discussion about regulation, that retailers should only be able to supply environmentally friendly products? Then you take the role of the consumer out of the equation and eliminate this matter of choice. Do you think that is realistic? Who should be responsible for choosing what the product should be?

Ms Dibb: SDC has done a considerable amount of work looking at the role of the consumer in terms of changing markets. As we said earlier, *I will if you will* really exposed the myth of the green consumer being able to change the whole of markets. And we are interested in the whole of the market. We are not interested in a green niche that can afford to pay the extra for a premium-priced product. We are interested in all consumers, whatever their income levels, being able to have access to affordable more sustainable products. In order to do that it is important to look at the choice that consumers have. We coined the phrase “choice-editing” in the earlier work that we did. Some people think that means not giving consumers a choice at all. That is not what we mean. We are talking about shifting the frame of choice; that is taking the least sustainable off the market, but within the products available consumers will still have choices. It is not about no choice. Of course it is what retailers do all the time: there are thousands of different ranges of products out there but retailers only stock a few. If you go to Tesco you will probably only find two or three brands of baked beans, you will not find the full range. Choice-editing is something retailers do all the time. We are encouraging retailers to choice-edit for sustainability. It is already happening. To take the white goods example: you cannot now buy the least

energy-efficient white goods. In fact, they are thinking of having to renew the standards because they are getting so much more efficient, so having A+ or A++. We really need to recalibrate that. There are other areas where this is happening as well. You may have heard that B&Q and Wyevale Garden Centres have decided they do not want to sell patio heaters any more. They think patio heaters are at the end of the spectrum of “no-no products” with which, as responsible retailers, they no longer want to be associated—the choice is that of putting a jumper on if one wants to sit outside in the cold weather, for example. Sainsbury’s only stock Fairtrade bananas now; Marks and Spencer only stock free range eggs. These are all examples of choice-editing that are happening now. In terms of who should be responsible, clearly retailers have a very important role here, but we are also talking about maybe procurement standards. In setting standards for procurement, you can set them in a range which says, “No, we do not want you to supply us with the least sustainable.”

Mr Lee: The Government should be doing that now with this system called “Quick wins on procurement”. Unfortunately, although government departments are doing quite well on generating less waste and recycling more—and that is probably because the targets are too flaccid and the targets need to be ramped up—there is nothing like enough being done on the procurement side to drive that sort of behaviour change all the way down the supply chain. You are talking about £180 billion worth of expenditure in the public sector which could be driving these changes and helping these choices to become available for other people too. Some of these quick wins—about which light bulbs you should use or which white goods you should use or which IT you should use—in government departments are still far from being implemented. There are some serious problems in terms of leading by example.

Q573 Lord Methuen: How can sustainability of individual products be communicated to customers in a clear and meaningful manner? Would you perhaps use the traffic light system as the Food Standards Agency is suggesting for food?

Miss Hislop: At the moment we think that consumers trying to be ethical face a very difficult time. There is a whole plethora of labels at the moment out there. In a world where the choice-editing that the SDC has talked about has actually happened, there is less of a role for labels saying “this product is sustainable” because consumers can be assured that they do not have to make these complicated decisions and they do not have to weigh up all these separate things. In that sense in a cradle-to-cradle world there would be less of a role for all these different labels. To give a particular example,

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we now have a carbon label for Walkers crisps, and that is an incredibly useful process. It allows Walkers to identify all the cost savings and energy resource savings the whole way down their supply chain. The end result for the consumer is something that is fairly meaningless. What are they supposed to do—buy a different flavour of crisps, buy a different brand of crisps? It is not at all clear what is expected of them. In a world where these unsustainable choices are choice-edited out there is less of a role for labels. In terms of post-use products, there may be more of a role for very clear labels in terms of communicating to the consumer what to do with the product, when it has reached the end of life. Taking the example I gave earlier of compostable packaging, there is very much a need for very clear labels saying what you do with this product, which bin you put it in, et cetera. There is definitely more of a role for labels there.

Ms Dibb: I think using traffic lights has been an interesting example of where you can take information that is on the back of a pack that very few people use or understand, about the grams of fat for example, and turn it into something that people can use because it is interpreted. You can use the red, amber and green to help guide you to make your choices. What is interesting about it is that alongside that—and there is some confusion in the marketplace at the moment because there are different schemes and we would very much like to see one, simple colour-coded scheme—the Food Standards Agency is working with companies to reduce levels of salt. It has set targets and now it is working on saturated fat. What we say about labels is that they may have a role but you do not start with the label. You are not going to change consumer behaviour just by putting labels on products. There may be a point at which it is useful to communicate that information to consumers, but it must be information that they can understand and use. We would agree that the current carbon label may indicate that a company is taking carbon in its supply chain seriously, but it is actually pretty useless to the consumer.

Q574 Baroness Platt of Writtle: You mention Walkers crisps. If you go into a supermarket, you are thinking: eat less fat, do not eat too much salt, keep the sugar down. The labels are going to be contradictory. Which way do you go if you are taking a responsible point of view?

Ms Dibb: You highlight a real problem that many consumers face: how to reconcile, on the one hand, health, with other issues around the environment on the other. In our recent report *Green Healthy and Fair*, that was very much what we were saying. You cannot expect consumers to weight up these issues.

Q575 Baroness Platt of Writtle: Why try?

Ms Dibb: Yes, but the onus should not be on us as individuals in the supermarket to try to make those choices. What we are saying in our report to Government is: set out a vision. We were looking at the food system but you can do it with any system that we are talking about here. What does the sustainable system look like, where are the synergies for example between health and the environment, and there are real synergies. If you can work that out, then you can communicate it to customers. We think that there is some work to be done to look at the way that standards could be better aligned. For example, we looked at the Fairtrade standard. It does not have many environmental standards. There are some environmental standards that do not major on some of the Fairtrade side. We do think that there is a role for some of those standards schemes to broaden their approach, but ultimately, yes, we think there is a role for Government here. It is coming back to the vision. It is asking: what is the vision, what does the sustainable food system look like, how can we get there and what is the role of labelling in helping to communicate that down the supply chain?

Ms Hill: What I meant by the myth of the green consumer is the myth that the green consumer can change the world or the green consumers will change the world on their own. While it is great for consumers to have that choice and attempt to make that reconciliation, we cannot guarantee that those aggregate choices will take the supply chain in a different direction. As you have said, the value of the labels is often in the process that a company has to go through to get the knowledge to put on the label. One of the things that has had the most impact that we have seen is Sainsbury's deciding to label its packaging as to whether it is commonly recyclable or not. Of course those people who produce packaging for Sainsbury's do not really want it to carry a label that says, "Sorry, not yet recyclable". They will be thinking very hard about how to provide something that is recyclable. That is an example where the consumer end is not the end in itself, but the notion of labelling is a means to an end, which is to get the supply chain to concentrate on what it is actually doing to a productive end.

Ms Dibb: You could argue that the red traffic light on food is a very strong driver for the producer to try to get that into an amber.

Q576 Chairman: I sometimes get the impression that if you were having traffic lights on organic food you would only have green because it is supposed to be good, but it is usually more expensive, and the amount of goodness at issue is really open to debate and it is the retailers who are driving it because they know they can charge more for so-called organic

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foods. There may not be any justification for doing so.

Mr Lee: A good example of a different way of doing it, and perhaps the most famous example on sustainability labelling now, is FSC (Forest Stewardship Council) timber. When that standard was envisaged, it was partly envisaged as a signal to the consumer: you buy the FSC plank for your shelf not the non-FSC. That did not work at all because people said, “We do not get it. It will be more expensive” and all the rest of it. Instead it has turned into a supply chain driver so that now B&Q and other people are saying that that is all you can buy; you can have a green shelf, a red shelf, a thick shelf, a thin shelf but it is going to be FSC timber, to get round this precise issue that somehow there is a stitch up going on behind the scenes here and this is about the retailer getting a bigger creaming from the sustainable product. That is quite a good model. It is the driving down in the supply chain but at the point of sale what you get is sustainably produced timber, and you can check that by the FSC kitemark.

Q577 Baroness Platt of Writtle: Some evidence has suggested that consumption could be reduced by encouraging more product services, which you mentioned earlier, where products such as cars or washing machines are leased out temporarily as a service and then returned to the manufacturers to re-use or recycle. Do you think consumers in the UK are prepared to embrace more of these service models and how successful could they be in reducing net waste?

Ms Hill: As we were saying earlier, the cradle-to-cradle provision is one of ultimate producer responsibility and a service model—that you never actually own resources. The realism of that is hard to judge. That is far removed from the way we shop and own and consume; you have to get right into the psychology of consumption about what it is that people like about shopping and having a product around them to know whether that would be a viable answer. There have been several studies showing that, particularly with things where you are handling products that are best stewarded by other people, like solvents or paint and some systems to do with furniture, that could be a very good way of reducing environmental impact overall. Whether consumers would embrace them, first of all depends on them being on offer, which they are largely not, because there is no economic incentive in the marketplace for companies to offer that kind of change to the way they do business. If there was, presumably they would have done it by now. By definition, there cannot be the big market incentive. Consumers do not tend to set a marketplace in an untested way, do they? There has to be something available for them to take up before it becomes clear that it is a runner.

Nobody has really put these things into the arena to test them, but I suspect that they are not a panacea and they would not solve all the problems. It would be one way of reducing a certain level of impacts for very particular products. An overall model of producer responsibility, of needing to take stuff back at the end of life, for a whole range of products could work just as well. I do not know whether you want us to say a little more about user responsibility.

Q578 Lord Methuen: Could I comment on that because what you have described was the IBM business model of the Sixties. In fact they got done by the anti-trust people because they would not sell their computers and they leased them to you. I worked for Rolls-Royce at the time. The benefit from Rolls-Royce’s point of view was that they always got the latest model. From IBM’s point of view, they had worked out their cash flow and these machines then went out to India, from the developed countries to the less developed countries, and so the business model has been used in the past.

Mr Lee: There is an example right now of how this could play out and it is to do with energy services and the energy companies. We are working with Defra right now in the SDC to look at exactly the issue you have raised, which is: will consumers accept this sort of services model. This is what we are trying to test with the energy companies and with Government and with consumer groups. People have been talking for years about energy companies coming to you to sell you the service of a warm home and enough power rather than just selling units of energy. I know everybody has talked about this but it has never happened. The next phase, the new Energy Bill, would bring in this new supplier obligation, which provides, if you like, a mechanism for doing this. We are trying to explore just this, whether or not we can start to make that shift. If you can get that right, then the energy company has a vested interest in making sure you have the latest and most efficient appliances in your house, that your metering is accurate, all of these things, because they then are able to sell less energy and they can make more profit. This is what they tried in California. It worked quite well up to a point; it probably went too far because the lights went off, but it is an interesting model. Although you cannot just transfer the Californian model straight across to the UK, I do not see any reasons at all inherently, culturally if you like, why people here should not get that energy services model because it is just simpler and it makes your life easier.

Q579 Baroness Platt of Writtle: Consumers will only opt for service systems if they offer value for money. You have suggested one or two examples where they will. What economic inference might be needed to support businesses in establishing such schemes and

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how might consumers be encouraged to use them? You are going to be setting up a new fashion, are you not?

Mr Lee: Yes. It will depend on the example. If you take the one I was using, it is partly about things like the carbon price, because that makes it more expensive for the power companies to generate more supply; it is partly about this energy efficiency commitment; it is partly about quite arcane things like how long you enter into a contract with your energy company.

Q580 Baroness Platt of Writtle: We have an example of cars or washing machines.

Mr Lee: Yes.

Q581 Lord Lewis of Newnham: Surely one of the problems you would have in the system you are favouring is this. When I buy my electricity I pay very much more for my first initial units than I do for my subsequent units. It strikes me that if you are interested in energy conservation, it would be much better to invert that so that you get the first lot relatively low and then as soon as you start using it over and above that, you start to pay more and more and more and it escalates.

Mr Lee: Yes, block tariff.

Chairman: That is not quite where we need to go, although it is a fascinating subject.

Lord Howie of Troon: In passing, I quite like the idea of using glass on road surfaces and also rubber tyres. I do not regard it as uneconomic.

Lord Crickhowell: It is for glass manufacturers.

Q582 Lord Howie of Troon: We will not pursue that. I was going to ask you about the Government's activities in getting the various groups together and so on but that has been largely answered by earlier questions. What I want to ask you about really is: to what extent has the Government been able to get the various Government departments to act together to work all in the same direction or is it the usual confusion?

Mr Lee: It is tempting to say it is the usual confusion. It is extremely difficult to make this work. This was a key finding from our work on supermarkets. What Government was saying to us is, "Oh, well, we let the market decide. We do not interfere with Tesco". What actually happens is that lots of different departments have a foothold in the way supermarkets operate and have conflicting and overlapping policies: is it Fairtrade or is it food miles and so on. It is a huge challenge to get those departments to work effectively together, but there are some examples. One that we have not mentioned today yet is called Mobility 2020 which was BERR and has the potential to produce this partnership now which says, "Let us look at cars. Let us look at how

we design them for the future. Let us look at how we optimise that design to provide the travel service people want and lower CO₂ emissions", so there are some examples. It is like everything else; getting this cross-sectoral work between departments is extremely hard. That is why we think products are quite a good way of doing this; it is so tangible that it sort of forces you to look at the issue and then you can pick out which parts of the industry you need to work with and which consumer groups. You can bring round the table with a very tangible outcome: how are we going to get this product from where it is now to being much more sustainable? There are pockets of good practice but it is very challenging. It is against the culture, as you know, of Whitehall departments to work in this way.

Q583 Lord Howie of Troon: Much of what has been said earlier in the morning convinces me of something of which I have been well aware, namely that Government is extremely difficult and that the politicians are sometimes unfairly blamed for what goes wrong. Going on from that, what do you think of the Government's Waste Strategy, which was produced last year?

Ms Hill: It was better than we expected, to be honest; a very valuable link between waste and carbon, which came to the fore really only after David Miliband came into Defra and started paying attention to where the main contributions to reducing UK carbon emissions might come from. He realised that contributions from the waste sector were really very significant, and therefore the Waste Strategy that was nearing completion should look hard at the carbon implications of waste handling. That is when work was done and was quoted showing that in 83 per cent of the cases looked at, recycling has a carbon advantage over alternative treatment. Those connections began genuinely to be made that we are going to be looking at a resource constrained world where we are worried about carbon emissions and we are also worried about the waste of resource that is represented by waste. I think we have started to move politically from a feeling that waste is an end of pipe problem to be dealt with in the most economically rational way to thinking about waste as a recoverable resource. The tone and the spirit of it were very much more positive. Of course, we then have to have policy instruments, whether fiscal or regulatory, to put that into practice. We did almost at the same time have the very welcome, larger than expected rise in the Landfill Tax, which we have talked about—very positive, although it may not be doing exactly what was envisaged—but, frankly, we do not have a lot else. The targets for municipal waste recycling were not put up hugely. There are no targets bearing on commercial and industrial waste in the Waste Strategy other than mentioning possibly working

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towards a 50 per cent recycling target for construction and demolition waste when we should be able to recycle 90 per cent of that stream, to be honest. So it is very unambitious on the industrial waste side, and a lot of talk about products and materials and looking at them but no envisaged policy instruments. There is a new unit within Defra that will apparently look at products and materials, but there is nothing on the table in terms of the product standards we have been talking about or the product levies, or reform of VAT or individual producer responsibility or any of the things that we can quite clearly identify as being appropriately biting instruments to get change. That is what we work on now, advocating that this general positive tone in the Waste Strategy is followed up by very definite policy instruments and certainly is not taken in the wrong direction by diversions into notions about energy from waste solving all our energy security problems.

Q584 Lord Howie of Troon: Better than expected is rather encouraging.

Ms Dibb: We have also been looking at where we think it needs to go next. What we are calling for is a packaging strategy because we think in relation to packaging it certainly does not go far enough and is lacking ambition. We are calling on BERR and other departments and agencies to come together to develop a strategy particularly on packaging. We felt it was a lost opportunity in the Waste Strategy to adopt what we said earlier are rather unambitious targets of the Courtauld Commitment. It has just adopted them; it has not set any longer term targets and that is a particular weakness in it. There are other weaknesses around the current packaging legislation, for example regulation around excess packaging. In reality it is pretty unenforceable, partly because the wording around consumer acceptability is often used as a get-out clause, to say that it is really what consumers want. That has not been tested in our view. Secondly, the enforcement agencies are local trading standards departments that are stretched across so many areas that it really is not a priority for them. Unless we get that sorted out, for example through bringing all those parties together in a packaging strategy, we are not really going to make progress there, we feel.

Q585 Lord Howie of Troon: With funding you do not get everything, do you?

Ms Dibb: It is always useful to call for it and to ask what the next step is, where do we go from here. We should not rest on our laurels.

Q586 Lord Haskel: Under the Climate Change Bill, each Government department has now appointed a Minister in charge of adaptation. Do you think that

this is where we might find some co-ordination over waste disposal and some of the things that you have been talking about?

Mr Lee: Not really. I think what you will see is that there is much more rigorous accountability placed with Permanent Secretaries in each department for the operations of that department. I hope you will be seeing some announcements on that very shortly. I think that is good because it places the accountability where it needs to be. It is saying to those Permanent Secretaries, "You are as responsible for the sustainability performance of your department, particularly carbon but lots of other things, as you are for its financial performance. This is written in to your remit."

Q587 Chairman: Does that keep them awake at night?

Mr Lee: Put it this way: it did not used to but I think over the last few weeks—

Chairman: Over the last few years, we find that Permanent Secretaries have a rather cavalier attitude towards other people's money.

Q588 Lord Lewis of Newnham: We did have a Green Minister in each department a number of years ago. What has happened to those?

Mr Lee: The Green Minister system has slightly gone by the wayside. It is not effective.

Q589 Lord Crickhowell: We are coming on now to the Sustainability Development Commission's ideas on the roadmap approach. I am slightly tempted to inquire whether if you had a roadmap approach to the giving of evidence to this Committee you would have produced 144 pages of evidence before you started talking to us, all of which had to be printed and would eventually finish in the wastepaper basket. I do think we need to get the presentation of these cases right. This is quite an important point which relates to road-mapping. As you say, the key objective of the roadmap is to build a critical mass of enthusiasm and commitment for the stakeholders in what is quite a complex process. If you are going to get that, the whole thing has to be presented rather clearly and sharply and not be swamped in a mass of documentation and paper. I make that point. What are the key products or sectors that most urgently need a long-term waste strategy and to which this whole technique might be directed?

Ms Dibb: It is a technique that we have been advocating; it is a technique that we advocated Defra take up as ten product roadmaps and we are pleased to say that Defra has initiated ten product roadmaps. We are keen, and are working closely with Defra and other Government departments now, to learn the lessons of the road mapping approach, and Defra will be presenting a report this summer on its products

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and material strategy that will be reporting on how road-mapping can be used. One of the key principles of the roadmap, and you will see in the document that we sent, six stages of the roadmap is about convening and about bringing people together. For us I think it is less about the pieces of paper; it is about bringing people together, giving space in which they can themselves determine—that is people from government, business, civil society and other interests—what possible research they might need, what possible evidence they might need to help build that roadmap. It very much starts with bringing people together. We have identified three areas that we have been working on where we feel this approach can best be advocated in relation to the subject which we are talking about today. One relates to packaging, which I have just spoken about. The second one relates to construction, which Andrew may say a bit more about. The one I want to say something about now is food waste. Food waste is a big problem. It is not just a moral issue, and for many people it is, but it is a really important issue for carbon emissions. At the moment, something like 6.7 tonnes of food waste comes from our households.

Q590 Baroness Platt of Writtle: Part of the trouble there is the sell-by date, is it not?

Ms Dibb: That is one of the issues that needs to be looked at in this. The second point is that that equates to something like 15 million tonnes of CO₂. It is not a small problem but a large problem.

Q591 Baroness Sharp of Guildford: It is methane too because if it goes to landfill, it creates methane.

Mr Lee: It is equivalent to, and so a lot of it is methane, yes.

Ms Dibb: So there is a very big potential there for addressing food waste and to contribute positively to our climate change impacts. We do not yet, in our view, have an adequate strategy to address that. The current WRAP commitments—and you may have seen some of the advertising around the food waste campaign—is committed by this month to reduce food waste by 100,000 tonnes. That sounds a lot but it is only about 1.5 per cent of the actual problem. Our question is: what then? What are the longer term targets? What can be realistically achieved around food waste? We are not getting there at the moment and that is where we feel we need a longer term strategy. There are all kinds of barriers. You have mentioned the issue about sell-by dates. I think that is one point that perhaps needs to be looked at. There are real food safety issues around many foods. The sell-by and use-by dates were introduced at a time when we had had a lot of major problems on food poisoning.

Baroness Platt of Writtle: I do not pay much regard to them. I just go on using them until they are finished.

Q592 Lord Lewis of Newnham: Particularly on coconuts!

Ms Dibb: You are right; there is a lot of education that can be done on this. When is it important, when is the best-before date just because it is not going to be too old and dried and shrivelled, and when is it a real food safety issue?

Q593 Baroness Platt of Writtle: You can judge that yourself. You do not need a sell-by date to tell you that.

Ms Dibb: There are other things that we need to look at about how we have got ourselves into this situation. Part of that, in our view, is the way that retailers encourage us to buy more food than we need. A good example of that is two-for-one offers or other special offers. We have a retail model that is highly competitive about giving us these good deals on food. We know from the work that we have done in visiting some of the suppliers to supermarkets, that they are the ones that bear the costs of many of these two-for-one offers, that they know that that food is going to rot, and particularly when it is based around fresh food. Is that a responsible retailing model, we would ask, when we are also trying to address the issue of food waste? We are not saying it is all about just two-for-one offers, but it is an example where we think that industry ought to get together to think about whether there are other ways in which they can offer value to customers that is not contributing to food waste.

Q594 Lord Crickhowell: What are the roles of Government, business and the consumer in all this? What is the balance between the two or the three in getting this working?

Ms Dibb: Government clearly has a role as an enabler. Government in its own statement has expressly set out what some of that means. I think in our submission we have given you the four-E diagram of how it can enable and play a role. In terms of a roadmap, we see a key role for Government as being this convenor. Business obviously brings its expertise; it brings its own experience and its responsibility and commitment. We have seen sectors of business now, not just the retailers but other sectors of business, saying: yes, we see the opportunities here, both in terms of our customers and also now in terms of our shareholders addressing the appropriate rate of sustainability issues for their business. Quite clearly, consumers have a role too. We have talked about the limitations and expectations of what the consumers can realistically be expected to do. We also know from the research that has been done on consumers that on many of these issues, particularly waste—waste is really high on the consumers' agenda—what they need business and Government to do is to make it easier for them to

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be able to make more appropriate choices. Of course there is a role for civil society organisations and academics to come together.

Q595 Baroness Sharp of Guildford: Do you not worry that the Government's whole macro economic model is not predicated too much on greening and not enough on saving perhaps? It does seem to me a sheer absurdity to encourage people to go out and buy goods and then they have to buy themselves storage space in which to put them. The fastest growing area is these yellow storage places. This is a society which is now so affluent that it is buying all kinds of things and yet we cannot afford not to.

Mr Lee: That is absolutely right, and there is quite a fundamental issue. If you break that down a bit, what is the link between economic growth, consumption, a lot of which is unsustainable in terms of energy and materials, and the need to generate a tax base to pay for public services? That is one of the areas that we are looking at and will be publishing something on later this year. You are right; we have to get into those fundamentals as well. A society which is predicated on economic growth, which means continually increased consumption, cannot be sustainable. Economic activity is a different matter altogether. A lot of the things we are talking about today would provide all sorts of economic activity and models for business and social enterprise, but we have to look at that as well. Then you get into the fundamentals of: what do we all consume; what are these products for; what are they doing for us beyond what it says in the tin? There is the product level and the very practical level we have talked a lot about today in the interventions. There is also a broader issue about: there is no point having the most sustainable product in the world if you have 26 of them in your home and you have four televisions, even though the televisions are more efficient. It is absolute level of consumption as well as product design, and that is a really tough one. We are going to have to get into that.

Q596 Baroness Sharp of Guildford: It is a very tough one. It perhaps explains why the Treasury is so keen on some of these things.

Mr Lee: Absolutely, and they are knocking on the door.

Q597 Baroness Platt of Writtle: The Sustainable Development Commission comments that Government performance in terms of waste reduction is variable—you said it varied across departments—and that some departments lack the baseline data. What further research or work should be undertaken to enable departments to provide this information accurately and to ensure that the targets

set are both challenging and achievable and not a straightjacket?

Mr Lee: The history is shocking. If you go and talk to the Office of Government Commerce they will tell you how shocking. They now have to deal with this on behalf of the Treasury, so the level of information, the quality of the information about some of these things, is appallingly bad. There are very basic things like which bits of departments do you include and which not—magistrates' courts come in, MoD sells off through Qinetiq. I would say, in fairness, there is a serious drive now to get this sorted. Cabinet Secretary Gus O'Donnell has now decided that this is a reputational issue of Government's competence and so there is a lot of work now being done to get that baseline together, from which you can then set targets. At the moment, the trouble is we are saying you should set more ambitious targets but many Government departments are struggling to meet the targets they have anyway. On waste they are sort of doing okay, but that is because the waste targets are not very ambitious and because they are not driving it through procurement and other things. It will take a long time to do this. We talked to every individual Government department in detail about this at the SDC because they have to present their plans to us. It is a requirement of the Sustainable Development Strategy. They confess; there are small teams of people in these departments struggling with this stuff, desperately trying to get the information together, but compared with the best performance in some areas of business, they are miles behind. It is going to be a complete culture change to get the data, set the realistic targets and then find the leadership and action inside departments to make this happen. We think it is so important because it is not just the direct impact those departments are having; it is the leadership. How you can say to the rest of society, "We are going to have a Climate Bill that says you reduce year-on-year emissions to get to this target and, by the way, we cannot do it on our own operations". It just does not stack up.

Q598 Baroness Platt of Writtle: I think you are talking about a long-term thing, are you not? Every page of your roadmap is long-term. I think it is this encouragement that is important, but some witnesses have commented that Government procurement policies are sometimes too prescriptive and do not adequately take into account the needs of small businesses, which may be competing for procurement contracts, and some things will be contradictory to others, which I think is difficult. Is there a need to make procurement policies more practical and focused to foster innovation and allow small businesses the chance to compete?

11 March 2008 Ms Julie Hill, Miss Hannah Hislop, Mr Andrew Lee and Ms Sue Dibb

Mr Lee: In fairness, I do not know what other witnesses have said about this. The Sustainable Procurement Taskforce was an almost exhaustive and very inclusive process. I think it is about implementing those recommendations. There are these quick wins; there is a framework which departments are supposed to use to tackle this. It is recognised that you do not want to pursue sustainability but exclude small suppliers, for instance. I really think it is a question of getting on with it, to be honest. Part of the issue is about skills and knowledge and capacity within departments.

Q599 Baroness Platt of Writtle: And flexibility, I would say.

Mr Lee: Yes.

Q600 Lord Lewis of Newnham: Can I just ask the question of you. You have repeatedly used things like carbon figures and carbon footprints, things of this particular nature across a variety of different issues. How reliable are these particular assessments? Does anybody assess the reliability of a figure that comes forward? Certainly I think in terms of biofuels we get vastly different figures depending upon whether you include or exclude a certain type of commodity in the actual cycle or not.

Ms Hill: I think it depends on whether the data is derived from, say, regulatory measures or trading or the financial measures. Where there is a very high stake in having those figures right because of the impact on a business, they will probably be more accurate than, say, voluntary disclosure or figures that have been put forward by businesses individually on differing methodologies. We know that standardisation of carbon calculation methodologies is a big issue going forward. That was highlighted by the carbon foot-printing work by the retailers; it has been highlighted by the Carbon Trust.

I could be very crude and say at the end of the day if all this was regulated, then you would get accurate figures. Either a prosecution or a price tag would depend on the companies concerned doing accurate measurements. A lot of what is in the research field has been done by academics and it is by no means clear that their methodologies are consistent. We know that this is an issue, and it is wider than carbon. It is an issue about resource flow data. We know shockingly little about the stuff that moves through the economy—what materials it is, what quantity it is in, what are the carbon and other consequences of processing it into product. We simply have not wanted or needed to know any of that before because we have not sought to manage it. As we know in the well-known mantra: if you cannot measure, you cannot manage. As soon as we want to manage resource properly, we will have to find the ways of measuring it. There undoubtedly needs to be more government-funded research in this area or, as I say, the very simple alternative is to put a general obligation on all of business to know its mass balance, which applies in some parts of America, and business does the measuring and there is no argument.

Q601 Chairman: Thank you very much. You have been very fulsome in your evidence. There are one or two things which I notice from our check list we have not covered, issues relating to WEEE directives and collective producer responsibility. We will drop you a line and ask you for more information in that area. If you have any afterthoughts, second or third thoughts, please let us have them, regardless of the amount of paper involved.

Ms Hill: We will do it all electronically.

Chairman: You send it to us and we will use up the Norwegian forests. Thank you very much for coming this morning.

Supplementary Memorandum by Green Alliance

If a completely zero waste society is possible, how can this be achieved, how quickly could this be done, and what might be the possible difficulties in getting there? (Q.546)

- Achieving “absolute zero” waste is probably unrealistic, but we don’t know how near we can get without trying.
- We have to want to design society that way, and to provide incentives to do this—both economic and regulatory—and through removing risk and uncertainty for business.
- It is difficult to specify a timeframe—companies can move very fast if given the right incentives.
- Constraints to the zero waste future are not human ingenuity but political will, perceived cost, globalisation (not just distances, but governance across boundaries).
- None of these constraints are reasons for the UK to avoid a leadership role.

At the moment, products, materials and systems of consumption are not designed for reduction in raw material and energy use, and neither are they designed for recovery and recycling because the economic incentives to do so are insufficient. Virgin materials are cheap enough, and disposal is cheap enough, to allow the economy to function with a very low degree of extraction of value from resources before they are discarded. Instead, economic drivers are on functionality, price and desirability/fashion trends. The “environment” is still an externality which is only factored into the conditioning of the free market where we have been able to identify very specific problems (eg hazardous substances), political imperatives (eg the recent furore over plastic bags and bottled water) or where there is a perceived consumer perception advantage of a “sustainable” product or service.

The cradle-to-cradle future is beguiling because it envisages a world of more possibilities, not less. But it will not happen without a fundamental shift in the economic drivers on business. We need the costs of landfill to go up yet further, the cost of virgin materials to rise, and regulations to mandate greater use of recycled content and design for recyclability.

In order to maintain a zero waste society, would non-renewable resources have to be kept in circulation ad infinitum and is this realistic? (Q. 533)

- As before, we don't know the limits of this because we haven't tried to get anywhere near it.
- It means designing for easy recovery as well as recycling, and that means whole system design not just products.
- Products would need to be designed for disassembly, so probably simpler, with less diversity of materials, less complex combinations that are hard to separate.
- Systems of manufacture, distribution, retail and resource recovery (which is what waste treatment should evolve into) will all need to be geared for reclaiming material efficiently post-consumer.
- Contamination would need to be reduced, particularly contamination with biowastes. That is why current municipal waste handling presents such a challenge to resource recovery—there is not yet (and not everywhere) sufficient separation at source.
- There seems to be a choice between good segregation at source and then taking materials down relatively simple materials reclamation routes, or mixing streams and investing in complex kit to separate them out and extract value.

At the moment a lot of what passes for recycling is actually “downcycling”—where materials are used a further once or twice at most en route to the inevitable landfill site. In a zero waste society non-renewable resources would be kept in circulation to a much greater extent. It would entail products being made from fewer combinations of simpler materials. Complex materials such as composites and those with harmful additives would therefore have to be phased out. At the end of a product's life, its constituent material would be easily recovered and new product made using the same materials. Where new materials were developed, the feedstock for the new material would be taken from material recovered from discarded products. This would be real recycling—and could even be “upcycling” where materials go from less valuable products into more valuable ones. Logistically, we would have to design systems of collection and recovery, which minimised the contamination of non-renewable resources with other materials, particularly organic wastes.

Is there a role for legislation in the design process in order to encourage waste reduction? If so, what sort of regulations should be put in place? What drawbacks might arise from implementing such legislation? (Q. 556)

- Product standards, recycled content and recyclability, are needed but may be complex to set and enforce; and complicated by the need to factor in carbon and water.
- Individual producer responsibility (IPR)—make producers responsible for end of life on an individual basis and they will optimise design. Drawbacks are that there are some things it doesn't work for (food, nappies); and it involves complex and potentially overlapping logistics.
- Product levies—incentivise the “good”.
- Procurement—government seems to find this hard.

We need producer responsibility legislation that bears on designers to a much greater extent that it does currently—eg UK has not transposed Article 8.2 of the WEEE directive, which means that the UK has a system of collective producer responsibility for WEEE, rather than a system of individual producer responsibility which provides a much more direct incentive for companies to design products with waste reduction and closed loop

systems in mind. At the moment companies that make their products more easy to dismantle or use simpler combinations of materials, for example, pay just as much as those that don't—we have a free rider problem.

Green Alliance has recently published a report calling for VAT to be replaced by an environmental goods tax, graduated in accordance with environmental impacts with full exemptions for best in class products. Unlike taxes on final disposal such as landfill, such a fiscal instrument would work much closer to where decisions about design are made. Obvious barriers are that a) VAT is currently an EU competence and b) we would need a system/institution for deciding what constitutes “highest performing” on environmental impacts across the board. We suggest starting with levies on particular classes of products and materials such as packaging and batteries, and designing them in a way that will stimulate innovation towards better alternatives.

There is a role for public procurement and in particular forward commitment procurement as suggested by CEMEP.

Green Alliance has suggested that as part of the implementation of the EU Energy-Using Products (EuP) Directive, the United Kingdom should set standards for elements of design other than energy, in order to encourage a more sustainable design process. But the government has told us that waste reduction is not their main priority for this legislation and that they would only encourage the Commission to include requirements to reduce waste where “that was identified as having the potential to be controlled, cost-efficiently, via better eco-design, where there were no other more suitable policy instruments, for example WEEE and RoHS”. Do you still believe that the EuP Directive should be implemented in such a way as to encourage waste reduction, or would other policy measures be more effective?

- The availability of policy instruments does not necessarily mean that all are used to good effect! UK implementation of producer responsibility directives is not driving change as well as it could.
- If the Government is arguing that waste policy has a role in reducing carbon emissions, then surely it is logical to use an instrument aimed at conditioning energy use to also examine how it can condition use of materials and thus avoidance of waste and energy together?

We were unaware that the Government has said that waste reduction is not a priority for EUP. This is a shame—it should be a chance to look at products in an integrated way, and there are many that are not covered by WEEE or RoHS. One of the problems arising from the greater visibility of climate change is the almost exclusive focus in the consumer arena on carbon and carbon footprinting. Carbon is relatively easy to measure and is always bad (in the sense that all efforts are directed to having less of it) so it is perhaps not surprising that it has drawn all the attention. But we need to examine to what extent carbon is a good proxy for resource use (including water) and other important environmental impacts. At the moment there is an assumption that carbon is a good proxy for overall environmental impact in most cases. This may well be true, but there might also be important areas where this is not the case and tensions and trade-offs exist between a product or package's carbon impacts and its other environmental impacts, and this is something that EUP could address.

Have economic penalties such as the landfill tax been effective at changing manufacturers' attitudes towards the creation of waste at the design stage, or are they simply seen as an unavoidable cost that has to be met during waste disposal?

- Penalties are not biting as hard as envisaged.
- Not yet working their way upstream to design.

The landfill tax escalator, particularly since its increase to £8/tonne a year, has been successful in that it has signalled a long-term investment trajectory away from landfill. This is making recycling more “economic” in terms of the relative price of disposal against recycling, but it is clear that products and materials are not yet being designed to optimise this process. Environmental considerations are not yet routinely specified in designers' briefs where the majority of environmental impacts of a product are determined.

Alternative infrastructure has not come on stream as fast as envisaged. Reasons for this include: planning problems; the complex PFI process and risk; the base price of landfill not as high as anticipated, as companies drop prices to get rid of permitted void; continual talk of “merchant” facilities, but no-one seems quite clear when and where.

Producer responsibility can be implemented in a number of ways, including product standards, sector-specific targets for resource efficiency or responsibility for a closed-loop, zero-waste system. Why have producer responsibility schemes not been wholly successful and how do you think they could be improved?

- Fragmented responsibility—IPR better (HP).
- Not working upstream to influence design (except maybe ELV).

We believe producer responsibility schemes have, in general, not been wholly successful because they have managed to fragment and dilute responsibility through the involvement of third party compliance organisations. The UK's market-based PRN system for packaging waste, for example, is dominated by a small number of companies. Valpak, the biggest compliance schemes, has almost 70 per cent of the market. Its domination allows it to achieve the lowest possible price of compliance for its members. Individually obligated companies shop around for the best deal, which blunts the influence of PRN prices and lessens the pressure to reduce packaging waste at source. This is a very common problem—only 900 out of 5,000 obligated companies purchase PRNs for themselves. These few companies that purchase PRNs themselves are much more aware of the quantity of material handled and the costs to their bottom line associated with it.

Our market-based approach to packaging waste in the UK has focussed recovery on secondary packaging waste at a retail level, leaving local authorities and the public largely unaffected. As a result we have relatively low levels of recycling of aluminium cans, for example, despite their high embodied energy and recyclability, compared to other EU countries.

Current approaches capture materials from products at end-of-life, but there is insufficient market pull for recycles or reuse options, making closed loop systems difficult to achieve.

The End of Life Vehicles Directive may be one of the few examples where recycling considerations seem to have driven genuine redesign.

Green Alliance has described a scenario where producers have responsibility for their products at all stages of their life cycle, not just the standards to which they are manufactured but by conditioning their use (ie how much energy and water they use) and having responsibility for them at end of life, in a closed loop system. This would need to be done on a sectoral basis and would need unprecedented buy-in from industry and it is highly unlikely that such systems could be achieved through voluntary initiatives.

Consumers often buy products on the basis of cost, convenience, habit or fashion. It has therefore been suggested that retailers should only be able to supply “environmentally-friendly” products that leave consumers with no choice about whether to buy sustainable items or not. Is it realistic to expect to alter consumer behaviour in this way and, if so, who should be responsible for this “choice-editing”? (Q.572)

- We can't shop our way out of trouble on the basis of what we have now.
- It may imply restricting some options if they can never meet the cradle to cradle aspiration—but increasing choice of innovative, sustainable products—choice for the eco-aware currently very restricted indeed!

On the contrary, it is unrealistic to expect a small minority of consumers committed to sustainability to shop our way out of the problem. In 2004 Tony Blair said that he wanted to see the day when consumers can expect environmental responsibility to be as fundamental to products as health and safety is now.

The phrase “choice-editing” implies restricting choice for consumers. We're not arguing that consumers should have less of a choice about the products they buy, just out of a range of products presented, consumers can be assured that whichever one they choose will meet high standards for a range of environmental considerations. Retailers already choice-edit on a range of criteria already, as they could not possibly stock every version of a product.

How can the sustainability of individual products be communicated to consumers in a clear, meaningful manner? (Q.573)

- A “cradle to cradle” designed society would have less need for consumer labelling to influence at point of sale.
- Post-consumer is another matter—compostable packaging highlights importance of getting that right.

In a world where every product meets the environmental standards we would wish for, there would be less of a need for the plethora of sometimes confusing labels that consumers are expected to weigh up in their purchasing decisions. A carbon label, for example, is the end result of a very useful process that can identify energy and

resource savings along the whole supply chain. However, it is not clear what response is expected or desired from a consumer seeing a carbon label on a bag of crisps, for example.

Labels that tell a consumer what to do with a product post-use are a different matter—these should be clear and joined up with waste collection and treatment infrastructure. Our work on compostable packaging is a case in point—it illustrates the fact that sustainable products can only take place in sustainable systems—ie there is no point have compostable packaging if there is no route by which the consumer can compost it, or if it is unclear what the consumer should do.

Some evidence has suggested that encouraging more product service systems, where products such as cars or washing machines are leased out temporarily as a service and then returned to the manufacturer to re-use or recycle, could reduce consumption. Do you think that consumers in the United Kingdom are prepared to embrace more of these service models and how successful could they be at reducing waste? (Q.577)

— Yes, but not a panacea.

We believe that product service systems could successfully reduce waste in a number of areas, and that consumers in the UK are prepared to embrace more of them, particularly where they could save them money. Services such as streetcars are already experiencing significant growth. Companies such as Interface already use a product service model for carpets.

With regard to the WEEE Directive, we have heard from several witnesses that individual producer responsibility (IPR) is almost impossible to implement, so collective producer responsibility (CPR) has been implemented instead. Has this interim solution of CPR successfully fed back to manufacturers to influence their design processes, or has the collective element of the responsibility reduced its impact?

Do you think that IPR could ever be effectively implemented within the United Kingdom, and if so, what barriers would need to be overcome first?

From our discussions with industry and other NGOs, it is clear that collective producer responsibility has not been enough to drive change in product design so that products become easier and cheaper to recycle. The main reason for this is that CPR provides a company with no incentive for improvements in product design, as costs are allocated on a market share basis rather than the actual end-of-life management cost of that company's products. The potential innovation that could have arisen through companies competing with each other to drive down end-of-life costs is not stimulated, and so improvements in product design and take-back logistics are slower than they would be under an IPR model. Differences in national transposition of the concept of IPR also cause legal and financial risks for companies trading across EU borders.

Producers being individually responsible for the end-of-life costs of their products does not mean that producers are unable to work together to manage WEEE in collective recycling systems. This means that producers do not need to develop separate infrastructure to collect and manage their own brands of WEEE only.

Other countries, such as Japan, have had success with implementing an IPR system that creates incentives for design for recycling. According to a consortium of organisations including Hewlett Packard, Braun, Electrolux and Sony Europe, the Japanese system has resulted in:

- Use of Design for Environment assessment tools including end-of-life phase.
- Marking of materials and locations for ease of dismantling.
- Unification of materials (plastics, magnetic alloys).
- Reduction of the number of components and screws.
- Standardisation of screws.
- Use of recycled plastics in new components (not downcycling).
- Development of recycling technologies.
- Separation of various types of plastics.
- Tools for ease of manual dismantling.
- Communication between recyclers and designers.

We believe that there is no reason why the UK should not have an equally successful system of individual producer responsibility, and that the barriers lie in perceptions of what counts as “least-cost compliance” with EU directives. An IPR system would start to give genuine incentives for greener design which have been very much lacking from the UK’s current interventions on waste and resources.

April 2008

TUESDAY 18 MARCH 2008

Present	Crickhowell, L	Methuen, L
	Haskel, L	O'Neill of Clackmannan, L (Chairman)
	Howie of Troon, L	Platt of Writtle, B
	Lewis of Newnham, L	Selborne, E
	May of Oxford, L	Sharp of Guildford, B

Memorandum by Professor Sue Grimes SITA and Royal Academy Professor of Waste Management, of the Centre for Environmental Control & Waste Management, Imperial College, London

1. BETTER DESIGN AND THE USE OF MATERIALS

The concept of “design for the environment” is directed essentially at the end of life of products in order to maximise reuse and recycling of materials.

The problem faced by many industries is that there is often a conflict between fitness for purpose of their products and the ease of material recovery at end of life. There are undoubtedly barriers to the use of sustainable materials in production where there is a possibility that the technical performance of the product is diminished. Although emphasis is sometimes placed on changes in the materials specified at the design phase, there are in fact three ways of achieving sustainability throughout the life of a product:

- (i) Direct replacement of materials that have an adverse environmental impact with materials that lead to greater sustainability. This would be the preferred option subject to manufacturing, fitness for purpose and end-of-life treatment issues. In this context a major problem arises from the use of composite materials by manufacturers—for example plastics that contain additives such as fire retardants and conducting materials to reduce electrostatic properties but which make the composite difficult or expensive to reuse or recycle. For this reason research on the use of more sustainable materials in design for the environment must take account of the need for efficient and economic end of life disposal in addition to the product technical specifications.
- (ii) Electronic smart tagging of product materials and components to permit automatic sorting of materials at end of life into fractions that maximise opportunities for reuse, recycle and remanufacture. This method also has to involve the design stage of the product life cycle to ensure that the information contained in the tags permits the identification of components and materials after deconstruction to ensure that the data on the tag identify the specification of the material or component; the best practicable economic and environmental recovery options for reuse, recycle or remanufacture and information on the return of valuable secondary materials to appropriate commercial cycles.
- (iii) In situations where it is not possible to alter design to accommodate new materials or tagging methodologies, because of technical requirements, new technologies to ensure that maximum recycling, reuse and recovery have to be developed to recover value at end of life. An example of this would be the development of leaching technologies to separate composite materials into fractions that can be reused and recycled, while minimising the amount of material going to landfill.

The hierarchy of these strategies is:

- Replacement is preferable to tagging.
- Tagging is preferable to separation technology.
- Separation technology is preferable to end of life disposal.

There is no doubt that better design could minimise the creation of waste that is difficult to recycle. Design input alone, however, is unlikely to achieve sustainability without the involvement of experts from the fields of material science and waste treatment for optimum recovery. Sustainability throughout the life cycle of a product will best be achieved through greater interaction between practitioners in design for purpose, in the development of new materials and in the methods of maximising reuse, recycling and remanufacture and such collaboration must be encouraged.

2. GOVERNMENT POLICY

A major problem for the reuse and recycling industries lies in the legal definition of waste. In some situations, a perfectly acceptable reusable by-product of waste treatment will still be regarded as waste requiring any user to have a waste management licence. Although this definition has been modified in some circumstances recently, sustainability will never be achieved if the products from treatment of waste are not regarded as commercial products in their own right without carrying the label “waste” forward to their end use.

An opportunity exists for the Government to promote the development of new methods to achieve sustainable products through the Environmental Trust bodies’ use of funds from the landfill tax credit scheme. The recent restrictions placed on the Environmental Trusts on the direct uses of the funds specifically exclude this type of support. There seems to be no logical reason why the Trusts should not be able to support research and development of research solutions that are promising but not currently close to market. The current concept of the need to develop partnerships between the Trusts and the industry sector could catalyse more work on linking manufacture to end of life recovery provided that there is sufficient interest from the waste producing manufacturing industries, otherwise landfill tax benefits will be wasted.

3. SKILLS

There are many training programmes in universities, colleges and institutions such as the CIWM that include consideration that sustainable waste in broader industrial training courses. Although this is a good starting point there is a case for the urgent development of training programmes at the highest level to maximise knowledge input from all of the branches of science and technology to produce graduates with expertise on sustainable manufacture from design to end-of-life treatment. This training ideally should be at post-graduate level and include (i) Masters degrees to enable graduates in appropriate disciplines to extend their knowledge base into other disciplines and (ii) industrially-based Doctorate degrees (such as the Eng.D.) to encourage inter-disciplinary research to close knowledge gaps and develop novel methodologies and techniques for sustainability.

October 2007

Memorandum by The Institute of Materials, Minerals and Mining (IoM3)

SUMMARY

Our main observation is that there is a lack of “standardised” information on eco-design. So it is difficult for engineers and designers to include considerations of sustainability and environmental impacts in the evaluation of new products and processes. There are developments to provide standards for the supply of this information and there are many efforts to educate engineers and designers in the most appropriate use of new materials to minimise the environmental impacts. It is important that the whole population is made aware of the importance of resource efficiency not only in relation to climate change but also in terms of materials availability/security of supply. The classification of waste needs to be more intelligently defined. Government policies and objectives should encourage innovation in new products and processes and the development of new skills to support a more rapid shift towards sustainability.

1. *Better design and use of materials*

Better design and a more knowledgeable use of materials and manufacturing processes can minimise the creation of waste.

The term waste is a general term which if applied to materials can create negative implications which do not assist reuse or recycling. It would be more appropriate to consider material that is not the primary output to be classified as by-products. These by-products should only be considered to be waste if they are not utilised further or are sent to a disposal facility.

The main factor that influences the use of materials is the availability of the relevant information. In general this information is related to the engineering performance or specification of the product and the associated costs. Common standards for information defining sustainability are not readily available. Some single factor ratings have been used to compare the performance of products and materials but more comprehensive methods for full comparison, taking material, energy and environmental impact into account need to be agreed as international standards. Given the lack of information on sustainability indicators, product

designers and project engineers have great difficulty in taking into account the life-cycle impacts of their design for new products and new process operations.

The development of new materials is frequently an opportunity for new and innovative designs. “*Materials World*”, the monthly magazine of The Institute of Materials Minerals and Mining (IoM3), publishes many examples of this synergy every month. There is also strong evidence of interaction between material scientists and designers. The September 2007 issue of the magazine “*Engineering*” includes an article on the potential uses of new versions of Aluminium—Lithium alloys for reducing the weight of airframes. The new alloys were designed to meet the requirements of the design engineers and the high cost required that the products made from these alloys had to be manufactured close to the final product size in order to avoid machining: which would create waste. Another example was the European project to create light-weight steel automobile bodies. In this case, the auto-body, the steel and the process for forming the steel were all designed interactively to produce the optimum combination of strength, formability and body shape. These achievements have become possible because of the high levels of intellectual knowledge and capability of the material scientists and material engineers, for whom IoM3 is the professional engineering institute.

It is important that design and material considerations are integrated. In addition to performance and cost considerations Eco-design should take the following factors into account:

- Design for minimising resource use (commensurate with performance).
- Design for process/product efficiency.
- Consider appropriate design life and “end of life” fate.
- Consider all environmental impacts.
- Consider human and social factors.
- Consider material compatibility factors (in use and recycling).
- Consider potential for dismantling, repair, re-manufacture.
- Could recycled inputs be used?
- Are substitute materials available?

If we consider the case of light weighting with advanced high strength steels, these “new” steels are indeed lighter but they can be difficult to dismantle and even repair. If the designer does not take this into account the products may be more difficult to recycle or repair and thus a change introduced with the aim of improving resource efficiency could have the opposite effect.

This example highlights the need to adopt a holistic approach to design, materials and recycling. These issues should not be separated and viewed in isolation. To move to a more sustainable approach all aspects of the life cycle of the product must be considered.

A number of designers have sustainability and environment factors within their remit but there is a need to spread the word further, possibly at Graphic Design courses at University. The IoM3 is encouraging designers to make more imaginative use of new materials—MADE is a new Magazine initiative from IoM3.

For packaging, Defra have an active committee endeavouring to provide standards on how to create CO₂ mission rates for all products, including packaging. These must have a global consensus to be widely accepted.

The main conclusion for this section is that there is a lack of information on sustainability in a suitable or standard form rather than gaps of knowledge and insufficient communication between all of the stake holders in the product life cycles. There has been a major global effort for the last 20 years within the ISO Technical Committee TC184/SC4 to develop international standards for the communication of engineering information in independent forms that can be processed in the software for engineering design and for process management. The latest application of this technology is a new standard, ISO 10303-235, that would represent sustainability data for computer processing and enable the data to be conserved for long term archiving. More extensive use of this technology would enable a market and a supply chain to be developed for the creation and supply of sustainability data for use in engineering design. Other standards in the same series provide resources for managing the information about the whole life-cycle of a product and could provide a new source of sustainability information.

2. *Business framework*

The current policies, regulatory and legal frameworks seem to confuse and do not support the development of better and more sustainable products and processes. There is evidence that the main emphasis in the UK is on avoiding risk, which is inimicable to innovation. For example, the legislation that provides enhanced capital allowances for installing specified types of environmental devices seems to be too restrictive as new types of products do not qualify because they are not defined in the lists that are part of the legislation.

The European Commission has recently conducted a consultation exercise to support the development of action plans for Sustainable Production and Consumption and Sustainable Industrial Policy. The aim is to develop a more integrated approach to legislation and policies that impact on sustainability.

The business conception is that the adoption of sustainability involves a cost, because this is easily identified and measurable. However there is insufficient understanding of the benefits, because the methodology for estimating these is not well developed and there is not an obvious way of itemising these benefits in the company accounts. There is a situation similar to the pressure several years ago to adopt better quality control and quality assurance in British industries. The adoption of formal quality procedures was seen first as a cost and a burden on business but these procedures are now regarded as essential to be able continue in business.

Some businesses are examining their environmental performance even if this is from the point of view of identifying potential liabilities or negative consumer reactions. They need to be encouraged to work with the environmental authorities to develop ways of improving their performance. There are a number of business support agencies that can help them to do this (Carbon Trust, Envirowise, NISP and the KTNs). Within the packaging world there are other agencies helping environmental performance eg WRAP, INCPEN, EUROOPEN. Cost reduction techniques can significantly save on waste as well as adding to the bottom line in packaging. Other European Member States do many things better with regards to waste and the environment.

Global businesses are addressing the increase in consumer interest in environmental issues and some have shown that taking the lead in advances in Eco-design (eg hybrid cars) can secure part of the market.

There are initiatives that are in place to encourage sustainability that come from the European Commission where sustainability has been incorporated under the umbrella of Innovation. The INNOVA group of projects and networks have inextricably linked sustainability and innovation together in order to support the amended Lisbon Agenda.

3. *Government Policy*

Government policy should aim to ensure that the necessary skills to incorporate sustainability into new design and processes are available and continue to be developed. The UK Government should support the initiatives of the European Commission to unite the collection of EU policies that were developed during a period of learning and the evaluation of alternative strategies.

There is an aspiration to make public procurement more sustainable but for this to happen some guidelines must be developed and disseminated to the supply chain. Procurement practice is still based mainly on initial price because of the lack of relevant information to make alternative decisions.

Policy should encourage collaboration between stakeholders involved in different stages of product life cycle; for example, raw material suppliers, manufacturers, dismantlers, recyclers, legislators, etc. to ensure that there is a more integrated approach to sustainability.

Is it possible to consider tax incentives for businesses that can show that they have made a real improvement in the sustainability of their operations?

4. *Skills*

The IoM3 is responsible to the Engineering Council for the accreditation of university degrees as part of the progress to Chartered Engineer (CEng) status. Most University courses already include sustainability and environmental issues in their courses and there is the opportunity to emphasise this requirement in future assessments of the suitability of courses. These changes have been introduced by the engineering profession as an extension of their social responsibility to ensure the safety of the products and processes for which they are responsible.

The IoM3 sponsors a range of material based design courses and competitions for schools and design students. These are lacking on the packaging side although there are diploma courses available from The Packaging Society leading to a degree course. There are innumerable courses, seminars and workshops on sustainability,

eg The Green Summit at RSA London 29/30 Oct. Employers need to encourage participation and to allow staff to go. Maybe a Government allowance on such activities could help.

However the extension of the engineering responsibility to include sustainability and environmental factors will require a broadening of the knowledge of engineers to include areas of science for which they have not been traditionally trained and to include social and political factors which will be in constant flux.

October 2007

Memorandum by the Institution of Chemical Engineers (IChemE)

ABOUT ICHEMÉ

IChemE is the hub for chemical, biochemical and process engineering professionals worldwide. The heart of the process community, IChemE promotes competence and a commitment to best practice, advancing the science and practice of chemical engineering for the benefit of society and supporting the professional development of an international membership exceeding 27,000. The Institution has the role of a learned society, publishing books, journals and training packages and organising events and courses including the successful Hazards Symposium Series and the 12th International Symposium on Safety and Loss Prevention in the Process Industries in May 2007.

BACKGROUND

- 1) This response was prepared by a group of senior professional chemical engineers in Institution of Chemical Engineers (IChemE) membership with extensive experience of chemical process operations, sustainable development and environmental protection. IChemE gratefully acknowledges the leadership role played by Malcolm Wilkinson in preparing this consultation response.
- 2) This output is representative of the broad consensus of opinion within the group and is published as IChemE's formal response to the House of Lords Science and Technology Committee inquiry into waste reduction.

INTRODUCTION

- 3) Perhaps the first point to make about waste is the problem of gaining a quantitative and up to date understanding of who produces what and where it goes. This is due to the difficulty of interpreting the plethora of data produced by different sources and the fact that the latest published data is from 2004. This of course pre-dates the 2005 Hazardous Waste Directive and only covers the first reporting period (2001–03) of the Landfill Directive.
- 4) What is clear though is that the tonnage of waste produced in the UK continues to increase year on year and this is particularly true for municipal waste. Conversely the total waste produced by the chemical industry, and the proportion classed as hazardous, is on a downward trend and the amount of hazardous material recycled, by energy recovery or reprocessing, is increasing. Whilst this is encouraging, there is still much that can be done to further reduce this waste stream which, after all, represents a financial loss to the industry not only due to the costs of disposal but also because of the raw material and processing costs it inherently contains.

BETTER DESIGN AND THE USE OF MATERIALS

- 5) Better design and use of materials should focus on two aspects, namely the product itself and the packaging it is sold in.
- 6) Better product design must focus on commercial "afterlife". Often the end of a product's life is prematurely determined by technological or stylistic obsolescence rather than fundamental performance or quality failure. If commercial "afterlife" is incorporated into the design strategy the value added to the molecules, products, processes and systems can be recovered and reused at their highest value level.
- 7) Materials selection should be based on maximising the use of renewable substances; evaluating the inherent nature of all selected materials and energy inputs to ensure they are as benign as possible; and minimising material diversity in the product to make it easier at the end of its life to disassemble for reuse and recycle.

8) End of life considerations have become a serious design requirement in some industries mainly as a result of legislation such as the End of Life Vehicle Directive and the Waste Electrical and Electronic Equipment Directive. The design principle here is that highly complex, high entropy substances should be preserved for reuse whilst substances of minimal complexity are favoured for recycling or disposal. End of life design decisions should be based on the invested material and energy and subsequent complexity across all design scales.

9) Process design should be based on preventing waste rather than treating or cleaning it up after it is formed; maximising mass, energy, space and time efficiency; and not building in unnecessary capacity or capability.

10) Packaging design is an undervalued activity. The vast majority of today's domestic waste is packaging and much of it, invariably plastic, is both unnecessary and persistent in the environment. Manufacturers and retailers need to place much greater emphasis on minimising packaging, providing facilities for return and choosing materials that can be recycled or are bio-degradable.

11) Considerations of sustainability remain well down the list of factors impacting on the selection of materials and the design of products and processes in most organisations. The 12 Principles of Green Engineering¹ provide a common language for the conversations that must take place between designers of molecules, materials, components, products and complex systems. Whilst there are examples of the application of many of these principles in isolation, designers have not systematically integrated them into a holistic design approach and this remains the challenge.

BUSINESS FRAMEWORK

12) The current policy on sustainable development is fragmented with inconsistent buy-in across government departments; it is not clear and as such has not been well communicated. The Government has consistently sent out confusing messages either by contradicting policy (Fuel Duty Escalator) or saying one thing and doing another (Climate Change Bill v airport expansion). Consequently the regulatory and legal framework is also fragmented and whilst it has led to improvements in some industries it has in no way begun to make sustainable design central to business thinking.

13) The Technology Strategy Board has designated Sustainable Production and Consumption and Advanced Materials as key technology areas which both play to the sustainability agenda but the available funding limits the number of research projects and hence the level of industrial involvement. The extent to which the R&D tax credit scheme has further contributed to developments in this area is not clear.

14) The long running Envirowise programme has supported business in reducing waste, and the establishment of the Waste & Resources Action Programme (WRAP) and the National Industrial Symbiosis Programme (NISP) has provided business with some focus on recycling and finding innovative uses for waste material. These practical initiatives are particularly relevant for SMEs. They tend to focus on immediate operational issues and whilst they solve problems they rarely tackle root cause and have low impact on strategic thinking.

15) The Chemistry Leadership Council published a "Vision for the Sustainable Production and Use of Chemicals" in 2005 but uptake of the broad principles enshrined therein has to date not been widespread. The process industry is highly regulated and aspects of the Integrated Pollution Prevention & Control (IPPC) legislation promote continuous improvement and therefore incrementally move towards more sustainable operations. Registration, Evaluation and Authorisation of Chemicals (REACH) legislation will also encourage product substitution and again is a move forward. Nonetheless substantial technology innovation is required to really advance industry to a new level of performance and the risk/reward profile has not to date been viewed conducive to significant action.

GOVERNMENT POLICY

16) Waste has been the Government's *bête noire*; an area of grandiose strategy statements and no policy follow through; hence our position as third worst in Europe for material going to landfill. It has consistently dragged its feet in implementing EU Directives and even when implementing them has failed to provide resources to do so effectively. Exemplar countries, such as Denmark and the Netherlands, should be used as sources of best practice.

17) Significant progress on waste minimisation and sustainable development requires innovation both technological and organisational. Government should provide the environment to encourage such activity and where necessary the legislation to drive it. This requires a holistic policy approach laying out clear

¹ (Anastas, P; Zimmerman, J. *Environmental Science & Technology*, 2003, 37, 94A-101A)

objectives and timescales which businesses can use to strategically plan their operations. Innovation requires support that goes beyond the research phase and into development; in the process industry specifically current financial incentives stop short of the point at which the risk/reward profile becomes acceptable.

SKILLS

18) Sustainable development is part of the core chemical engineering degree curriculum required for Institution of Chemical Engineers course accreditation. Two university chemical engineering departments, Oxford and Newcastle, have benefited from Royal Academy of Engineering funded chairs in sustainable development and the teaching material they have generated is available across the community. There are now cadres of young chemical engineers beginning to emerge from universities with an understanding of sustainable development and experience of applying the concepts in their design projects.

October 2007

Examination of Witnesses

Witnesses: PROFESSOR SUE GRIMES, Centre for Environmental Control and Waste Management, Imperial College London, DR NORMAN SWINDELLS, Chairman, Sustainable Development Group, The Institute of Materials, Minerals and Mining and MR MALCOLM WILKINSON, Chairman, Sustainability Subject Group, The Institution of Chemical Engineers, examined.

Q602 Chairman: Good morning ladies and gentlemen; can we welcome you here. Thank you for your written evidence so far. Perhaps we can start off with Professor Grimes, would you introduce yourself?

Professor Grimes: Thank you very much, my Lord Chairman. I am Professor Sue Grimes; I am the SITA and Royal Academy of Engineering Professor of Waste Management at Imperial College.

Dr Swindells: My Lord Chairman, I am Norman Swindells, Managing Director of Ferrodag Limited, which is concerned with information representation and I am Chairman of the Sustainable Development Group of the Institute of Materials, Minerals and Mining.

Mr Wilkinson: Good morning. I am Malcolm Wilkinson and I am here as the Chairman of the Institution of Chemical Engineers Sustainability Subject Group.

Q603 Chairman: Thank you very much. If we could start off with materials and resource efficiency. One of the things that we have noticed is that there is a lack of standardised information on materials and products, and this seems to be causing difficulties for designers who want to utilise their materials in the most sustainable way. What data could be made available to designers and engineers to assist them in developing innovative products and processes which would lead to less waste? How do you see getting a consistent database which is easily accessible and available? Who would like to start?

Dr Swindells: Perhaps I could start. I think there are two main requirements for engineering data to support the whole lifecycle approach, such as is integrated in the IPP Programme of the European Commission. I think first of all there should be design and manufacturing information that can accompany

the product, even a complex product, throughout the whole life of the product; so when you come to the end of life you can manage the end of life process without creating any waste. For that kind of thing we have now developed a series of international standards because you have to have data that is independent from the kind of software that the engineers used to create the design in the first place. That is now being applied to be able to deal with the whole life history. Then the second one is that you want to be able to estimate the impact of the manufacturing process and the use of the product on the environment and that is the lifecycle assessment. Some of that impact comes at the beginning of the life when there is process waste, but all engineers aim to reduce that waste because it is economically a problem. But at the end of the life we need more data than is available to people. There is a new database from the European Commission, which deals with the impacts of several common products, such as steel sections and steel sheets and aluminium sheets. I think there is also a Defra research programme to try to find a way to provide information to companies about the kind of impact of their product in the environment. Then we are trying to make a connection between these two in the new European programme called DEPUIS, where we are developing distance learning methods where we are able to get engineers and designers more aware of the possibilities of this data standardisation that is now becoming feasible for the first time.

Q604 Chairman: From what you are saying there is a Defra initiative, there is an EU database, but what about the rest of the world? You have to start somewhere, I accept that, but how would you internationalise this so that it could be readily acceptable in Japan or in China or in the United

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States? Would the ISO route be the best one to go down?

Dr Swindells: The ISO standards are developed by a committee called, with the jargon of ISO, the TC184/SC4, and that is a global project. It includes delegates from all the main manufacturing nations—Japan, Korea, Germany, the USA, the UK, and every main manufacturing sector in the world is represented there—and that has been working very successfully for the last 20 years. The problem is, you are quite right, my Lord Chairman, that it is one of the world's best kept secrets—not enough people know about it. So we are trying to make it more available by DEPUIS but it is quite hard to get people to understand, first of all, what the problem is and secondly that there is a solution to the problem.

Q605 Chairman: Do you think you could drop us a note on this because obviously if a lot of work has been done on it and it is rather a well kept secret it might be useful for us to publish that along with our written evidence at an appropriate time.

Dr Swindells: Yes, my Lord Chairman.

Q606 Lord Haskel: Could we come to the question of actually assessing the resource efficiency of the waste that is produced? There are measures such as “total raw materials used per kilogram of product”, or “atom efficiency” or “e-factor” can be used, and that is mainly in the chemical sector. How widespread is the use of these measures, and are they effective at enabling businesses to recognise the amount of waste that they produce?

Professor Grimes: In terms of the e-factor we are talking about the volume of waste generated in the production of material as a fraction of the tonnage of the material produced. How widely used? It is used in the chemical industry but I think that a better parameter is obtained when you start having accountants looking at the cost of waste, and the Environment Agency has proposed that industry should look at accounting for their waste and costing every step through the production of waste. So if you are looking at the cost of raw materials through reworking, through production constraints and so on, I think we can build up a better picture in terms of the overall measures and how they can impact on use of materials. I think that the e-factor is very useful; it gives us a volume, it gives us a fraction of tonnage or a percentage of tonnage, but very often we could be talking about materials that could be embedded in composites which actually are much more difficult to deal with. It is really a balance between working out the type of component and the volume of component, but there are well documented pieces of work on environmental accounting procedures for costing waste.

Q607 Lord Haskel: In this accounting world which you have just told about is there a measure, for instance, of the recovery value from the waste—the energy that you can recover from it or the materials which you then offset against the cost of the waste, so that you can then compare what you are doing with somebody else?

Professor Grimes: I think you are absolutely right. The documentation I am talking about is perhaps a couple of years old now and it is only more recently that we have been really looking at this focus on energy and recovery in the big picture, but I think there is definitely scope for calculation of the amount of energy to get a cost benefit analysis derived from it.

Q608 Lord Haskel: Is there anything existing at the moment or is that to be done?

Professor Grimes: There could well be something existing but I do not actually have access to that information.

Mr Wilkinson: Talking about the process industry in particular, the measures that you quote in the question are very crude and they are certainly used—and of course they do not give you any judgment on perhaps the energy efficiency of the process, or even the environmental impacts of the waste that is invariably produced. So I think companies that are using these systems have moved to a more complex measurement system and there are a number around, which you can look at—the Dow Eco Efficiency System is quite well known and well publicised. Other companies like GSK have internal systems which are not so well publicised, but they measure a much wider range of parameters and they certainly use them to assess processes from the environmental point of view. The Institution of Chemical Engineers of course has also produced a set of sustainability metrics which, moving outside just the broad environmental area, tries to look at economic and social aspects of production as well. But on the accountancy front I think we are still some way away from having a system which properly accounts for waste, and in the accounting sense I think we are still looking at production in the age old way of rewarding shareholders rather than looking at how it might be impacting on the environment as a whole and on society as a whole.

Q609 Lord Haskel: On the different methods of measuring which you have just mentioned is there any one that is standard in industry so that firms can compare each other's performance?

Mr Wilkinson: No, I think is the simple answer to that. Lifecycle assessment, which Dr Swindells mentioned, there is an international standard for that, of course, as Dr Swindells said, but we would hardly say that it was widely used. It is very complex and it requires a massive amount of data and a

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massive amount of research to do it and most times companies are trying to get their products through the development phase and to market as quickly as possible and LCA is usually difficult to implement. We really have a fundamental issue here about accounting and about accounting for sustainability and we have a fundamental issue that really needs to be crunched.

Q610 Earl of Selborne: I would like to ask about the Materials And Design Exchange, which we understand is bringing together the design and the materials communities in order to stimulate innovation, promote the transfer of materials, knowledge and improve the competitiveness of UK business. Could you tell us what response there has been towards this exchange from the design and materials communities and what are the benefits for members? Also, perhaps, to what extent sustainability features as one of the goals of the exchange.

Dr Swindells: My Lord, I can answer this. My colleague Sumeet Bellara from The Institute of Materials Minerals and Mining is responsible for this and from his report I think you could say that MADE has been extremely successful. It is the node design of the Materials Knowledge Transfer Network. First of all, they have produced a magazine which is published three times a year and that reaches 4000 readers. Then they have had a whole series of events, including recently in the last two or three months one about Waste Not Want Not, about recycling use, and they had 67 people at that. Other ones typically would have between 50 and 100 people and they have those meetings every month or so. They have a Web presence with 1000 online members and they have several awards for different concepts given to designers who are working with materials in novel ways or with a novel use for them. Then they have a materials resource centre which encourages more designers to use more innovative materials. They have an electronic news letter, which reaches over 1000 designers. They have a strong link with the Royal College of Art and with the Design Council and had a large presence in London at the Design Festival. The impression I get is that it has been a very good way to bring both designers and engineers together in this field.

Q611 Lord Haskel: It sounds from your description as if it is essentially a knowledge transfer organisation.

Dr Swindells: Yes.

Q612 Lord Haskel: And also from your response it is clear that sustainability and waste reduction is indeed a core function.

Dr Swindells: It is a core function and it seems to be increasing in the attractiveness and in the way as to how they can bring the engineers face to face with the designers at these events.

Q613 Lord Haskel: Who funds the exchange?

Dr Swindells: I think it is part of the Materials KTN, with which Lord Haskel will be familiar. It comes from the government funding through the Materials KTN Network.

Q614 Lord Lewis of Newnham: Dr Grimes, I think in your written evidence you do actually state, if I can quote, "There are undoubtedly barriers to the use of sustainable materials in production where there is a possibility that the technical performance of the product is diminished". What are the priority materials which have a negative environmental impact, and have you been able to replace these by more sustainable options due to technical difficulties?

Professor Grimes: The function of a designer and the function of a producer of a product is to design something that is fit for purpose, and we have to accept that because consumers want to buy products that are fit for purpose and functioning, and that is where the design constraints are. In terms of changes that have been made, perhaps through perception, if we just take a step back to the lead-tin solder in the electronics industry that was replaced and that was replaced because of the perceived problems associated with lead, for example, the effect it might have in the aquifer as lead was leached through from a landfill site. In fact the problem there is that it was actually perception because in fact a lead-tin solder could be recovered quite safely and recycled at end of life, if you took up the end of life option. But that has forced the industry to think of new changes of inputting a new lead-free solder. The area that I think is perhaps more of a challenge is the area of composites and in particular, again sticking with electronics, we have brominated flame retardants in composites that are being used in the plastic casings of electronic devices, just as one example, and they are there to impart flame retardant properties. I think that there is a school of thought—and in fact some of the industry in Europe is actually moving completely away from the use of decabromodiphenyl ethers, which are effectively the brominated flame retardants, and have replaced the materials. The actual function I think will just take time to see how that does perform. But in terms of their development and their process they have removed those types of materials from their products. But there will be cases where a component such as a flame retardant is such an important aspect of a product that it cannot be changed, and I think it is at that point that we need to think about ways in which we can recover the material selectively at end of life, and we have

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developed a technology that can achieve this. I think the barriers are really more where we have composite materials and there are two types of situation—where we have the composite, say, on an electronics motherboard where it can be recovered in its own right relatively easily, or where additives are embedded in a material such as a plastic. We can thus look at direct replacement of the composite but there will be barriers to the uptake of the replacement in terms of the economics, function and fitness for purpose, but where the replacement is still a composite, I think there should be a way to tag the material to optimise the material recovery at end of life.

Q615 Lord Lewis of Newnham: What further research is needed to address these technical barriers? Who is doing this and is it adequately funded?

Professor Grimes: I think that there are barriers, undoubtedly; there are the barriers associated with industry being prepared to take up new technology; there are barriers arising from the fact that changes in legislation can reverse policies and can create a non-competitive environment. And there are barriers associated with the opportunities for markets for recyclate materials. Indeed, academics are also at fault because we do not help industry understand some of these elements in a much better way. I think that research needs to be done on, first of all, what the barriers are now. But equally we cannot just stop there, we actually have to look at ways of overcoming those specific barriers that we have collectively identified.

Q616 Lord Haskel: Where is the funding coming from? Is there government funding for this or Research Council funding for this?

Professor Grimes: As a specific theme of research to help industry I think that this could only be sought through Research Council funding.

Q617 Lord Haskel: Mr Wilkinson.

Mr Wilkinson: You can look at this at two levels. You can look at a material and say, “This material is potentially damaging to the environment; how can I substitute it with another material?” Or you can look at it at a much higher level and say, “This is what I am trying to do with this material; what other way can I achieve the same functionality entirely?” For example, in a broader sense would you include petrol, perhaps as being one such exemplar, of a material with a negative environmental impact? You might therefore rather look at not replacing petrol with, say, some other fuel but look at the fundamentals of moving people around the place. I think we have to start really in all sorts of areas looking at what we are trying to deliver rather than necessarily starting with what material we are going to deliver it with, and take

a much more fundamental approach. That is obviously a major mindset change in the educational chain.

Q618 Lord Haskel: I wanted to make a point and that is that, for instance, the Institute of Materials, as I know, has done some work on improving the materials out of which you make boilers so that they can now be run at ten degrees higher so that you get 10 per cent more efficiency out of the boilers. So there are some quite simple things actually that you can do.

Dr Swindells: My Lord Chairman, the problems are now coming about from other directions. We have the directives on the hazardous waste and the REACH directives and it is not very clear whether these have been derived on the basis about what is possible or upon the other basis of what people are frightened of. I think we need much more involvement with the engineering profession at a much earlier stage in the development of issues such as the points made by Professor Grimes about the lead. We have produced an engineering solution to the reduction of lead but that is a very expensive solution. It may be easier just to have a better method of recovering the lead rather than just saying that we have to get rid of the lead. That is a fear approach rather than, as Mr Wilkinson was saying, a more considered approach. My suggestion would be to have much more involvement with engineering at an earlier stage when developing these directives and the legislation that goes with them.

Q619 Lord Lewis of Newnham: You have made what I think is a very important point. There are many compounds that we know appear in the hazardous list and as a result of that you can say that they are forbidden to you. But there are new materials, of course, that are quite often combinations which in themselves are hazardous and have not been recognised. Is anybody testing that particular aspect of the science?

Dr Swindells: I think the REACH Directive requires this testing to be done but the expectation is that now that the people have looked at it they believe that they are going to have to find new metallurgy to replace these combinations which have been identified as hazardous. But it can be absurd in some cases because in the early stage of the REACH legislation they did not distinguish between alloys and metals and the components of those alloys, and so the idea was that nickel oxide was carcinogenic then nickel oxide was made into nickel and nickel was included into stainless steel, and therefore stainless steel was carcinogenic.

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Q620 Lord Lewis of Newnham: The prime example of this to me is sodium chloride. Sodium and chlorine are quite nasty compounds but sodium chloride together is a perfectly reasonable compound.

Dr Swindells: It is.

Lord Crickhowell: Having chaired another Committee, which a colleague of this Committee was also on, on the whole REACH Regulations I think if we start getting down that road today we might get entangled for a very long time without actually adding much to the whole business about waste. There is a very comprehensive report that has been produced to the House on the REACH Regulations, and I do not think it is the job probably of this Committee to try and duplicate that inquiry.

Chairman: Yes, I think we should move on.

Q621 Lord Howie of Troon: I want to ask about the education of young designers and engineers as far as sustainability and waste reduction is concerned—and I speak as an engineer myself, by the way. Do you think that undergraduate courses should include an overview of sustainability or would it be better to leave that to the Masters and Doctorate level?

Professor Grimes: I think there is a very good case of actually introducing undergraduates to sustainability and waste issues, but I think at that point—and I think you would be alluding to this in your question—at such a level it would be peripheral to the degree that the candidates are following, but, nevertheless, it would be a good exposure. In your question you said would it not be better to introduce this combination of training at a Masters and Doctorate level and my answer is absolutely yes, it would be a much better level because of the multi-disciplinarity in these two subject areas and they need to be brought together. Even if you look at the Masters courses that are running currently, particularly from my area of waste management, all of them are focused at end of life rather than at looking at whole life sustainability. There are some that have elements that will bring in parallel topics but I think there is a good opportunity for looking at sustainable resource management and seeking to bring those two aspects together. I think the other opportunity is at the Doctorate level, again an area in which I have a number of years of experience having had ten students going through an Eng.D programme, I think the attractiveness of that type of programme sits very comfortably with this particular subject in the sense that you would be placing high quality graduates in an industry where they would learn very quickly what sustainability meant within that industry and that they in parallel would learn the generic research methods that bring together sustainability and industrial practice, and I think that that really would be the strongest development and outcome. I think there is an opportunity—and I am

trying to push it forward myself at Imperial—and seeking support from the Research Councils through their programme Living with Environmental Change, to try and bridge this gap and seek to develop these types of programmes.

Q622 Lord Howie of Troon: I think that engineering is such a wide subject in any case that it would be difficult to cram in any more. What do our engineers think about it?

Mr Wilkinson: Sustainable development is now part of the core curriculum for chemical engineering undergraduates—at least it is in the list of what should be in the core curriculum; so all of the accredited departments are trying to address the issue. I think our objective is to drive it into the curriculum in the same way that we have driven safety into the curriculum. For a chemical engineer now safety is a fundamental part of the design approach and our objective is to make sustainable development a fundamental part of the design approach too in that same way. I do not think we are there yet—it has only been a core component of the curriculum for perhaps three years now. As I said at the seminar, there is an issue around material, around what are you actually going to teach, and the Royal Academy of Engineering of course funded a number of Chairs in sustainable development at various engineering faculties around the UK, and they have produced some material which is globally available, which any department can use. So there is the start of a framework but I think there is still some way to go.

Q623 Lord Howie of Troon: How much do they actually do?

Mr Wilkinson: I am sorry you have asked me that because I asked exactly the same question of our Accreditation Committee and they do not actually have an answer yet! I think the answer would be that it is variable across departments; there are some departments which really focus on it and it really is part of their curriculum, and others where it is very much an add-on and it is quite peripheral treatment at this moment. As I say, we are some way away from it being quite where we would like it to be.

Dr Swindells: I support Mr Wilkinson in the same way. The Institute of Materials accredits universities and colleges according to the requirements of the Engineering Council, and that includes sustainability in all its guidelines. I got the same answer as Mr Wilkinson when I asked how many, and the answer was, “We do not know yet.” So I think it is a very important issue. I agree with my colleagues there is a requirement to be able to set an appropriate intellectual standard in the engineering course so that they do not see it as a kind of hand waving exercise by comparison with their more mathematical-based subjects. I think it is quite an intellectual challenge for

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the teachers to be able to set the appropriate standard appropriate to a degree course.

Mr Wilkinson: I have a story that demonstrates some success. Talking to industrialists they are starting to say, “My new chemical engineering graduates appearing on their first day are asking, ‘What are we doing about sustainability?’” So that is quite a step forward.

Q624 Baroness Platt of Writtle: It is clearly a very fast moving subject, not clearly appreciated at all levels, and one has to think in terms of whole lifecycle. How much continual professional development is happening with people who are actually already in the industry?

Dr Swindells: There are several examples. The Institute of Materials Minerals and Mining provides a list of personal development courses and one I noticed from the London Metropolitan University is particularly concerned with design for minimising the production of waste. The extent of that course is only four days, so I think it is a developing situation, and probably Professor Grimes will know more than me.

Professor Grimes: Most of the courses that I have come across are MSc courses, but of course having run MSE programmes myself it is very easy to convert these into short taught modules. But in terms of sustainability and design, and sustainability and waste management, very little I would say.

Q625 Chairman: So there is not very much sustainability in waste management in the structure of the courses?

Professor Grimes: No.

Q626 Chairman: You are talking about it for metals but you are not talking about it for education in any serious way. The top-up courses, you are not really giving very much weight to them, so would that be done on a voluntary basis or if there are statutory requirements that might well follow on from, for example, what we are doing, would you think this would be a requirement for people to sustain their professional qualifications to have to undergo courses of this nature at regular intervals as, let us say, medics have to do in some of their areas? Obviously that is rather more a matter of life and death.

Professor Grimes: So that we get a holistic view of sustainable design through to end of life I think it is a very good thing to encourage development programmes that would actually offer industrialists short top-up training. I think we have seen it in environmental management and environmental systems that have developed over the years and that has taken off very effectively. So it has given people an awareness and an understanding. The market will

perhaps be smaller looking at sustainability and design for end of life but, nevertheless, I think there is good scope for trying to set up such training.

Mr Wilkinson: Our subject groups do run half day, evening and one day events, conferences, and if you looked at the range of issues now you would start to see an increasing number of events focusing on sustainable development and sustainability. Although they are not in any sense accredited—you do not get points for attending—they do help continuous professional development. If you are talking about a point system we are back to talking about licensing engineers, are we not, and the whole gamut of, as you say, making it like the medical profession.

Q627 Baroness Sharp of Guildford: Picking up the same issue we have been told consistently that more dialogue is needed between designers and the processing companies. To what extent is there evidence to suggest that this type of dialogue has been successful in reducing the amount of waste created by products throughout their lifecycle? Is there enough data available about this as well?

Dr Swindells: I do not know about data, but there several examples where that has happened. There is an example from the steel industry where the steel producers developed a strong relationship with their suppliers of scrap materials, particularly to reduce the amount of copper in the stuff that they were sending to the steel manufacturers—and that was an ongoing thing. Another example is from the auto industry, where they now have to take responsibility for the recovery of materials from end of life vehicles and this proportion has gone up from 85% to 95%. But there they have a whole infrastructure of control, so the original equipment manufacturers control the supply chain to the input for the car but they also control the reverse chain in the other direction, and in that case they have designers embedded in the companies so that they can make the decisions at the design stage to save the company money when they get to the recycling stage. One way that companies are doing this is to reduce the amount of types of plastic, for example, and also to make large components, things like insides of doors of a car, just in one plastic so that you have one thing to be dealt with as a whole. So I think that these kinds of situations are starting because they are being driven by the directive in the legislation that says they have to take responsibility for these things, but there are only a few parts of industry where that is happening.

Q628 Baroness Sharp of Guildford: Do you think that without the directive this would not necessarily have happened?

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Dr Swindells: Certainly not, no.

Professor Grimes: If I could just add to that from a personal example my work with GSK, an example of where their design team have actually been speaking to recyclers, their Lucozade bottle was formally a PET bottle with a PVC sleeve and of course once they started talking to the recyclers the recyclers said, “Get rid of that PVC,” so of course now they have designed their bottle as a fully PET-base matrix, with a little bit of polypropylene. But that has been based on the problems associated with density material, so it is going to ease separation at end of life. But just picking up the point there about the automotive industry, again with work that we are doing with GSK we are looking at opportunities to use high quality plastics in a second use application and the automotive industry is one such example that provides an opportunity for these types of high quality streams where it can cope with a little bit of contamination in a recycle stream and can be carried forward. So these are just parts of the process that are underway.

Mr Wilkinson: Can I just add a point? These issues are supply chain issues, as you clearly say, and they have to be considered as such. There is some interesting work by Professor Clift of the University of Surrey, looking at these issues in supply chains. He plots, looking at a product—and he has done it for a range of things, mobile phones, for example, for Nokia—at the carbon footprint across the total lifecycle of the product against its added value, and then he divides that up along the supply chain. So ideally you would want a straight line at 45 degrees as the ratio between carbon footprint and added value for the total product, but what you are actually seeing, of course, is for the extractive industries a huge environmental impact and hardly any added value. And as you go along the supply chain the curve flattens out and the manufacturers have a bit less environmental impact and a bit more added value and it finishes up with the retailer with hardly any environmental impact and a huge added value. Then of course when you focus on it in that way, with the objective of trying to drive the curve down to the 45 degree line, you can start to see where changes need to be made.

Baroness Sharp of Guildford: That is very interesting.

Q629 Lord May of Oxford: Still on reusable materials, we have heard a lot about the difficulties in separating raw materials from these waste streams and I would like to ask you what do you see in the way of new technologies that can help us do that and what are the likely implications for the design stage?

Professor Grimes: If I could just comment on that I think it links very closely back to the first question that was asked about materials and standards, and I think there is a huge opportunity to try and link materials and understanding what the materials are

at the start of life through to end of life. The example that we are working on at the moment, again with research with GSK—and we have a grant application to the Technology Strategy Board with Veolia and Asda and GSK—is looking at tagging for use in recycling post-consumer waste, by putting tags on materials at the start of their product life, the products at the start of their product life, so that that can be tracked through to end of life, and that will facilitate the ease of separation of moving to automatic sorting. Tagging will provide a means of identifying recyclable, re-manufacturable reusable or recoverable components and will also provide a means for identifying those hazardous components that we spoke about earlier, such as the brominated flame retardants. The way this will be achieved will be using a tag and in the first instance it will be just using a tag like an RFID—a radio frequency identification tag—but moving on from there it is to develop the conducting polymer type tag, which effectively will give us just an ink spot of information on each component within a product that will be of value at end-of-life. That is one aspect of new technology and of course if you link that to something like a reverse vending machine where we have some trials taking place with GSK again, in the country, capturing the stream of a PET bottle; but what the reverse vending availability could offer, if it is appropriately configured, is the opportunity to source separate the waste so that you can separate out your PET and PVC, and something like the Olympics would be an ideal standpoint to be able to actually demonstrate that type of process where you can apply RFID.

Q630 Lord Crickhowell: We have divided our evidence today between the academics and those who are dealing with the other end of the equation and perhaps it is a pity because on this particular question I note that the waste management company, Biffa, is giving evidence later. So, noting all this great academic work and the holistic lifecycle counting of approach, and so on, they say, “It is our view that product designers and engineers are blissfully ignorant of end of life impacts arising from the products they design, and that this coactivity can best be established by transparent economic producer responsibility.” I am rather sad that we are not having an exchange between them at this moment. But how would you answer that? Indeed, it has almost been admitted in some of the evidence that while a lot of work is going on it is not yet perhaps coming through at the end to the real world. Do you think that the Biffa comment has an element of truth in it, or is it unfair?

Dr Swindells: I think it is largely true because—probably Mr Wilkinson will support me in this—the education of engineers is predicated on performance; in other words, all of the time you are talking about

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the performance of the thing in its main use, and all the education is about analysis of how to analyse this performance. And you have to have a different way of thinking about the thing in the holistic way; you have to have a synthesising approach, and that has only become relatively new. I personally conducted research into the methods of separation and recovery of plastic with RFID tags in 1998 to 2000 and actually my company has a patent on this. But there are other methods; there is a UK patented thermal method which has demonstrated the feasibility of separating lead and brass and zinc and non-metallic alloys from the mixed waste streams that you get out of the shredders. The problem is that it is only recently that we have got to the stage where we have to think of the separation and identification of separate waste streams, when everything is sent through a shredder that will smash it all into lots of bits. There is almost no engineering needed in that kind of situation. So I think that the situation has changed quite recently and I think that the comment by Biffa will change.

Mr Wilkinson: I am not an academic, to start with, and with no intention of being flip I would say in answer to your question: what do you expect? We are back to accounting again really. If corporate performances are judged against rewarding shareholders and we make no attempt to value resource use and impact on the environment in that accounting procedure, how are we expected to respond?

Professor Grimes: In terms of producer responsibility I do have a lot of sympathy with the waste industry and with Biffa's comments. I think if you are looking at products coming right through to end of life then the poor waste management industry has to deal with it and I think there should be an element of producer responsibility. We are hearing about carbon accounting and other issues that are there to serve as an economic measure and I think there is scope for this, to be able to apply it throughout the chain, and I do support the comment. I think we do need to take a serious look and I think that producers need to take account of the sustainability-end of life issue, where and at what point they are accountable and for how long they are accountable for end of life products and who takes over that accountability down the chain. Perhaps we need some education programmes or CPD training to assist us in trying to bring this problem to a head.

Q631 Baroness Platt of Writtle: What research is being conducted into the barriers that prevent companies from making use of existing technology and materials which might enable waste reduction?

Professor Grimes: I alluded to this in answer to an earlier question, but I think that the barriers, as I see it, are the legislative barriers. We have the driver of

legislation but legislation can sometimes be reversed and of course that becomes a huge handicap in terms of maintaining your competitive advantage. Also the point about the markets for recyclates is a very clear issue. And there is the other point about the significant capital cost that might be required to invest in new technology; and questions asking about what research has been done to evaluate how these barriers can be overcome. I am not aware of any particular research that has been done. I know that there was a time some years ago that we did research on new technologies that were coming to the fore, but I think it is time now to look at technology today in the light of the current legislative regime as to what is likely to be able to overcome and what will remain as a barrier, and would be disadvantageous for industry to follow.

Q632 Lord Crickhowell: My final question is about the legal definition of waste and a number of you raise this in your papers. There is a very strong thread of criticism about government policy running through all the papers, both on the question of definition, on the funding of new methods in the Imperial College paper; but the real humdinger of criticism comes in the Institution of Chemical Engineers' evidence, where you say, "Waste has been the government's *bête noire*; an area of grandiose strategy statements and no policy follow through; hence our position as third worst in Europe for material going to landfill," and the failure to implement EU Directives and the need for holistic policy, and so on. I would like you to widen the answer to this final question perhaps a little beyond the agreement about the need for a re-definition of waste, to whether the wider issue of the role of government and government policy generally is wide enough and where you think we are going wrong and not doing as well as our European colleagues?

Mr Wilkinson: I think we have just been behind the game compared to other European countries, and the examples are quite legion, are they not, which we do not need to go into? One of our problems has certainly been our planning situation, our planning regulations and so on, which, for example, have prevented perhaps the expansion in, say, using waste for energy, for example, which has happened to a large extent in Germany and a couple of other European nations. So we have had some clear difficulty there. We have just finished up with a very poor record for the amount of material that does go to landfill. Third worst in Europe would be right.

Q633 Lord Crickhowell: But the big change that you are looking for would be what, then?

Mr Wilkinson: The now improving waste regulations are going to start to have an impact, provided that it does not result in a lot of fly tipping, which seems to

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be one response. I think the implementation of some of the directives coming out of Europe will start to move us to a better situation.

Professor Grimes: If I could just comment? I think that the single biggest change would be if we actually decided that waste should only be material destined for final disposal. I think that anything in between or anything that can be re-used or recycled should be defined as a non-waste by-product, and I think nobody got themselves in a bigger problem really than the EU where in their sixth framework programme they set about a challenge of “sustainable use of resources and waste management”, and followed that a few years later with a thematic strategy of waste prevention and recycling, and of course what has actually happened because of the legislation, where it sits at the moment, is that where people have the vision or the opportunities to prevent waste and encourage recycling and the reuse of resources their hands are tied behind their back because of this definition, because the implications of the definition, where it excludes the by-product and is very prescriptive on the waste, means that there is a cost element that has to be overcome, not least, for example, licensing of your premises if you are going to be collecting material or treating material or reusing material in some way. So I think the single biggest change will be to say, right, waste is material destined for final disposal; let us open up the opportunity to say that anything that can be deemed to be within legislative terms reused, recycled should be defined as a non-waste by-product.

Q634 Lord Crickhowell: You have a particular criticism of funding and the restrictions placed on environmental trusts in your paper. Do you want to say any more about that?

Professor Grimes: I am the beneficiary actually of landfill trust funding in terms of my post, which is also supported by The Royal Academy of Engineering, and I think that the difficulty for my sponsoring Trust is that they are now faced with Landfill Communities Funds and they are no longer allowed to fund educational programmes, and I think that we are actually at the heart here of something which needs education, and that is that we need to be educated, users need to be educated, industry needs to be educated, and I think it would be of great benefit if we were able to say, “Let us look at the Landfill Communities Fund now and say that this is one area in which we could really direct some funding which would give benefit back to UK plc and move us forward.”

Dr Swindells: I support both of my colleagues in this. The opinion of The Institute of Materials Minerals and Mining is that we need a more intelligent definition of waste.

Chairman: Thank you very much for your evidence. As I say to all of our witnesses, if you have any additional afterthoughts that you would like to share with us we will be more than happy to receive them; and we will reserve the right, when we look at the evidence, to see if there are some things that we want to hear a bit more about from you and we will get back to you if we can. You have been extremely helpful this morning and we are most grateful.

**Supplementary memorandum by the Sustainable Development Group of the Institute of Materials,
Minerals and Mining**

MATERIALS AND RESOURCE EFFICIENCY

What data could be made available to designers and engineers to assist them in developing innovative products and processes which create less waste?

There are two main requirements for engineering data to support the whole-life approach of the Integrated Product Policy (IPP) of the European Commission:

1. Design and manufacturing data should accompany a complex product throughout its life so that its End-of-Life (EoL) phase can be properly managed. Lifetimes of these products are longer than the lifetime of the software systems that were used in their design and manufacture. This requires standardised computer representations for product data that are independent of proprietary software. Such standards are provided by applications of ISO 10303: Product data representation and exchange and by the other standards developed by ISO Technical Committee 184, Sub-committee 4 (ISO TC184/SC4).
2. Data that can be used to estimate the impact on the environment of the product throughout its life and to support design decisions that minimise waste.

There are two main lifecycle stages where waste is generated—as a consequence of the manufacturing process at the beginning of life (BoL waste), and at the end of a life stage (EoL waste). All engineering processes aim to reduce waste at the processing stage for economic reasons. Some guidance is needed for those designers who are not embedded in a manufacturing company of the waste reduction potential of different production

methods. Data for environmental impact and typical waste fractions are needed on more manufacturing technologies such as casting and forging, as examples. Some of the data needed for evaluating the environmental impacts of inputs and outputs, both for the local process and for the background effects in life cycle assessment, is becoming available in the ELCD system of the European Commission for several common product families, eg steel sections and steel sheet, aluminium sheet and aluminium extrusions, etc. Possibly, the DEFRA Research Program on Production Management Methods will also provide data for common environmental impact situations that will be easier for UK companies to understand and to take into account in their design of new products.

The DEPUIS project, funded by the European Commission (www.depui.enea.it) is developing distance learning methods, accessible via the Internet, to achieve a synthesis between these two technologies and is aimed at increasing the awareness and knowledge of designers and engineers of methods to support life cycle thinking.

Measures such as “total raw materials used per kg of product” are used in some manufacturing plants, and “atom efficiency” or “e-factor” can be used in the chemical sector. How widespread is the use of such measures and are they effective at enabling businesses to recognise the amount of waste they produce?

Data based on kg is more relevant to the engineering manufacture of discrete products. The other measures may be more appropriate for continuous stream production, such as in chemical processes.

The Materials And Design Exchange (MADE) is bringing together the design and materials communities in order to “stimulate innovation, promote the transfer of materials knowledge and improve the competitiveness of UK business”. What response has there been towards this exchange from the design and materials communities and what are the benefits for members?

- MADE is the design node of the Materials KTN and is funded by the UK Government through the Technology Strategy Board.
- MADE magazine is published 3 times a year and reaches over 4000 readers. An article on packaging design appears in each issue.
- Made events have included:
 - On average IoM³ organises 6 MADE workshops a year, each attracting about 60 delegates. So far this year we have run three of these; Aluminium in the Living Environment (45 people attended), Waste Not! Want Not! (about recycling and reuse—67 people attended) and Beating Around the Bush! (about Natural Materials 57 people attended).
 - Exhibition stands. This year we have spoken to about 1000 people over three days at the Surface Design Show in Islington.
 - Two Royal College of Art run discussions per year.
 - One Design Council led evening lecture per year.
 - A large presence at the London Design Festival
- We have over 1000 online members, though we expect the remainder 3000 who receive the magazine to sign up over time.
- We have had 17 SPARK award applications; a £5000 award to pay for proof of concept testing given to designers who are working with a material in a novel way or a novel material. So far two have been completed, three are currently going ahead, six are set to go ahead for the future.
- A Materials Resource Centre holding about 1000 materials samples. Since opening in September 2007, we have had over 100 visitors, some in groups of 10—20 people. These tend to be groups of students from universities, whereas design professionals visit alone or combine MADE events with visits.
- An electronic newsletter reaching over 1000 designers.

We appeal to the whole of the materials community from academics to producers and consultants. We have had contact with product designers, furniture designers, architects, fashion designers and beyond. We also visit as many design college end of year shows every year, to spread the word and engage with the students.

The conclusion is that MADE has achieved a strong link between product designers and materials engineers and that the issues of sustainability and waste reduction have been a prominent part of their activities.

What are the priority materials that have a negative environmental impact but which have not yet been replaced by more sustainable options due to technical difficulties?

One obvious example is the use of lead solder in printed circuit assemblies. The large global manufacturers have now been able to replace the lead solder with tin/silver/copper (SAC) alloys but the processes are more complicated and require better knowledge and understanding of the consequences of the changes than would be available to technicians and repair-men. There are other consequences of the RoHS and REACH Directives that may require new metallurgical developments and it is not clear where these can be found. There is also the example that the replacement of halogen gases in refrigerators produced a by-product that was a potent green-house gas and this had to be anticipated and specially treated.

EDUCATION

To what extent is sustainability and waste reduction included in the curricula for young designers and engineers? Should undergraduate courses include a broad overview of sustainability, or should there be focussed courses for Masters and Doctoral programmes?

The Engineering Council embraces and includes sustainability within three of its five Learning Outcomes—Design; Economic, Social and Environmental Issues; and Engineering Practice that are expected of all Accreditable education & training programmes.

Sustainability is cited specifically within the IoM3 Prospectus as one of the Institute's eight broad activity areas in addressing the Materials Cycle as recycling and sustainability. The topic is therefore fundamental to the Institute and an imperative for professional recognition.

Universities and colleges, in seeking Accreditation of their education and training programmes via the IoM3, have to meet certain criteria, criteria which also are recognised (and demanded) by the Engineering Council, and fully embrace these Learning Outcomes.

IoM³ Accredits programmes at various academic levels, and issues specific Guidelines for intending FE/HE establishments. These Guidelines address the learning requirements for programmes leading to EngTech, IEng or CEng Registration, via qualifications such as National Certificate or Diploma in Science or Engineering/C & G Higher Professional Diploma in Engineering/Apprenticeship Framework Certificate; Foundation Degrees; BEng; BEng(H); and MEng.

Guidelines have also been prepared for Accreditable Further Learning Schemes, which embrace all of the above sub-degree, and degree level programmes, plus postgraduate programmes such as MSc/MRes/EngDoc. For each set of Institute Accreditation Guidelines, a matching Proforma has been prepared for intending applicants seeking Accreditation to complete. Each of these Guidelines Documents explains about the Learning Outcomes and, through the Proforma requires FE/HE establishments to address these requirements, including recycling and sustainability.

Several Universities also provide Masters Courses for more specific training and specialisation in sustainability and the reduction in waste through design. The DEPUIS project (see Question 1) will support continued professional education.

The Packaging Society, part of IoM³, is revising its textbook on packaging design to include sustainability and recycling and to emphasise its importance along with Protection, Information and Anti-counterfeiting.

Comment from Dr. Mark Jolly (University of Birmingham):

It is my opinion that sustainability should be embedded into engineering programmes. Despite the requirements of the Engineering Council UK to demonstrate an understanding and appreciation of sustainability issues, from my experience, most academic programmes really only pay lip service to this. This is probably more the case in the research oriented universities because the majority of the academics are interested in research which is an intellectual challenge that does not necessarily include sustainability. They have not “bought-in” to the sustainability story. It is essential that such academics are somehow “encouraged” to include sustainability on their teaching and research—the best way to do this is somehow provide a financial incentive which is added to their basic research in some way. I see this as quite a challenge.

RE-USE OF MATERIALS

What dialogue is there between waste processing companies and designers of materials, components and products and how successful has it been in reducing the amount of waste created by products throughout their life-cycles?

The concept of design also applies to primary products such as steel. As an example from the steel sector, the Acelor steel company in Luxembourg developed relationships with their local scrap supply chain in order to reduce the amount of copper that was included in the scrap. The recycling of Aluminium beverage cans, of which this Committee will have already heard, is another example of a good link between the management of waste and the recycling of aluminium to a specified quality.

There are many examples from the automotive sector where there are four key factors:

Directives and legislation require OEMs to take producer responsibility for the amount of material that is recovered from a vehicle at the end-of-life (ELV);

OEMs control the whole supply chain for components and the creation of new organisations such as AutoGreen and Cartakeback have been licensed by the OEMs and have the resources to process the ELV for dismantling in a systematic manner;

Designers in the OEMs are an integral part of the manufacturing process and not an add-on extra;

The need to design for increased dismantling as a result of the increase from 85% to 95% in the amount of the vehicle that is to be recovered.

The greatest problem is with plastics that are an increasing part of the vehicle construction as part of the need to reduce weight. New designs of components now use fewer types and grades of plastic materials and are designed for easy removal on dismantling. Nissan have shown that it is possible to make all their engineering plastic components from Polypropylene. Many OEMs are demonstrating that recovered plastic materials can achieve the specifications needed for re-use as engineered components.

There are initiatives from The Packaging Society for collections and incineration with renewable energy and the start of a non-recyclable waste conversion project with BRE.

One objective should be to aim for a long working life and for components that can be refurbished and re-used wherever possible. However products will reach the end of their useful life and we should then aim to maximise the recovery of the resources. In ancient societies where resources were scarce there was little wastage and valuable materials were effectively recycled. The critical factors are the cost of recovery versus the cost of new materials. Products are usually made from several components made from different materials. Some materials may be compatible for recycling but usually the materials have a higher value if they can be segregated. The important thing for designers to consider is the compatibility of materials in terms of recycling and the ease of dismantling. In the ideal situation the products would be designed to facilitate recycling. Some businesses are moving along the remanufacturing or recycling route, such as Xerox, Caterpillar and Sony.

What novel technologies can be used to separate raw materials from mixed waste streams and what consideration needs to be taken of these technologies during the design stage of a product?

Research into methods for the separation and recovery of plastics was started at the University of Liverpool in the 1970s. Argonne National Laboratory in the USA has developed discriminating flotation techniques sensitive enough to be able to separate grades of plastic materials. The feasibility of separating lead, brass, zinc and non-magnetic alloys from mixed waste streams by a thermal method has been demonstrated by a DTI SMART Award and is the subject of a UK Patent. This has advantages over shipping the mixed waste to the Far East for hand-sorting.

There is also the need to investigate how materials can be separated before they get into mixed waste streams, eg by using novel methods of 'disbonding' parts of components by using novel technologies, such as adhesives that contain thermally expandable microspheres, or carbon nanotubes or ceramic nanoparticles that allow joints to be disbanded cleanly and provide high value materials for reuse, recycling etc. In 1998-2000 Ferroday Ltd demonstrated the use of RFID tags to carry more information on the material constituents of components and holds a UK Patent on this method. With RFID tags the problem is to design the location of the tag so that it will not be damaged in use and to ensure that it can be present and detected in the recovery cycle.

Colour analysis can sort different types of glass packaging and such a facility is to be installed at Beatson Clark at Rotherham.

If materials are scarce or valuable they are usually recovered. Metals for example have usually had significant value and the technology for recovering them is well known. Nevertheless if these are dispersed in complex matrices or in complex composites the cost of recovery might exceed the current value. In low cost societies

manual sorting has been the simple technique used for initial separation/sorting processes. However this is not viable when labour costs are high so higher technology methods have been developed and can be used for quite complex separation processes (a Norwegian company has developed a range of automated devices for the automatic sorting of different material mixtures—these are based on a range of different sensor systems and PLC control of the segregation method). So in short, materials can be recovered from mixtures if they are valuable enough.

However it would be more efficient if designs could facilitate the segregation of materials into streams that are either easy to sort or compatible for recycling.

What research is being conducted into the barriers that prevent companies from making use of existing technology and materials which might enable waste reduction?

The main focus of this enquiry is on how to minimise waste from the design stage—rather than what to do with waste that is generated from current practices. This is a very perceptive approach because it has the potential to lead to the most significant gains. The UK can establish a global position if it invests in sustainable design. To do this all stakeholders (designers, scientists, engineers, manufacturers and end users) must have a better appreciation of sustainability. Sustainable education issues are important. The old “Silo” mentality of engineering (Civil, mechanical, electrical, electronic, materials, IT, etc) could not address whole of life issues, environmental issues were often tacked on at the end of the process. Scientists and Engineers must have a broader perspective and must be able to collaborate in design teams.

There is no magic formula for sustainability—we will not achieve it by a single piece of legislation or policy. The move towards sustainability must be a process of continuous improvement—of course we need to deal with the end-of life material from current production methods but we stand to gain the most by participating in the development of more sustainable designs. One of the barriers will be that businesses have already sunk costs in established designs and manufacturing processes. Government can support step-change developments by encouraging businesses to be more innovative (TSB, KTNs, KTPs etc) but businesses need to be convinced that governmental policies are long term and that they have cross party support- so that they are not re-engineered after every election. With the widespread concerns about global warming it should be possible to achieve a common approach towards sustainability.

There is no central planning and coordination of strategy for the collection of packaging waste. There is a need to reduce the emphasis on landfill and local authorities need guidance on a central method of working and the public need better explanations of the issues. There is a need to analyse the success of efforts elsewhere in Europe and in the USA to decide on the best way forward.

REGULATION

The Waste Framework Directive is currently being revised and offers an opportunity to introduce a formal definition of by-products. Do you think that such a definition would help to clarify the distinction between unusable waste and usable by-products, and would it enable businesses to be more efficient with their resources?

An improved definition of waste, to be able to distinguish between by-products with a potential further use and unusable waste, was a recommendation of the written submission to the Sub-Committee.

Part of the problem is that the word “Waste” has a negative connotation. So once a material has been defined as a waste it is difficult to overcome the perception that it has no value. However the EU probably decided to go for a simple definition of Waste to avoid the complex task of deciding on a case by case basis if a material is a waste or a by-product. If a material is defined as a Waste then it must be managed as such and this brings along a significant administrative burden.

The legislators want to prevent businesses defining their residues as by-products if in reality they have no potential to be utilised. The legislative issue arises from the point at which a material is defined as a waste. Is it by its very nature a waste or is it a waste if no-body can use it in an economically viable way?

The EA in the UK has promised to listen to the business view on the management of by-products from their operations. In some specific cases it has been agreed that materials are not considered to be wastes (eg Blast Furnace Slag). In others the situation has been more complex and has the potential to reduce the utilisation of secondary materials (eg Fly Ash).

We need to consider what we are trying to achieve through the legislation. We want to ensure that businesses manage the residues from their operations in a responsible manner. Any hazardous materials should be managed in an appropriate way and any other materials should be managed in the most sustainable way.

Every effort should be made to re-use secondary materials but it would not make sense if the environmental impact of re-use was greater than that of safe disposal. This is why the concept of Industrial Ecology is important. It may not be viable, in an economic or environmental sense, to transport by-products over long distances but where there are aggregations of industries in close proximity may be able to make beneficial use of each others by-products. The NISP organisation fosters relationships between businesses that can interact to their mutual benefit.

It is important to use Life Cycle Thinking because this will impact on where businesses locate and will address how the products can be managed effectively at the end of life. Material selection and methods of assembly which are decided at the design stage have a significant impact on the potential for resource efficient management at the end-of-life.

SUSTAINABLE DATA FOR WASTE MANAGEMENT

The standardised computer representation of product and process data is important for the whole—life approach of Integrated Product Policy (IPP) of the European Commission because:

- technical data is generated by, and stored in, computer application software;
- this data has to be shared and exchanged in current working practice between many different organisations with many different systems and applications and with many different methods of working;
- the data may have to be conserved for longer than the lifetime of any computer system or software application for long life products;
- the data needs to be understood and used in the future by unknown systems.

Product data technology using open International Standards has been developed by the global manufacturing sector in order to solve these problems. The technology has been developed over the last 20 years by the ISO Committee TC184/SC4² in a cooperative effort involving hundreds of engineers from all of the world's major manufacturing nations and most of the world's industrial sectors. Its applications are used in automobile, aerospace, chemical plant, defence, offshore oil and gas and shipbuilding. British engineers have played a major role in this development.

The use of open standards for the representation of product and process data presents a new concept for the communication of information by computerised methods. Every computer software system is unique in its internal organisation of its data and also in the internal identifications that are assigned to the data items—the software data model. Direct transfer of data from one system for use by a different software system will fail because the receiving system will try to interpret the transferred data according to its own internal data model, which will be different. The use of data produced by one software system by a different software system requires the conversion from one data model to the other. However for many-to-many direct communications between n different data models there would be need to be $n(n-1)$ separate data conversion interfaces so that each software system would be able to interpret between any of the different models of the data that it could receive.

The standards that are the basis of product data technology include:

- *ISO 10303 Product data representation and exchange (STEP)*—computer-processable information models that are specifications for technical information on individual products, processes and properties for all stages of the product life cycle.
- *ISO 13584 Parts libraries (PLIB)*—computer-processable data dictionaries to support the terminology needed in applications of ISO 10303 standards.
- *ISO 15926 Reference data libraries*—provides a reference source for standardised technical terms used in major construction projects such as offshore oil and gas rigs and chemical process plant.

The objective of these standards is to provide a neutral mechanism capable of describing product and process data throughout the life-cycle of a product, independently from any particular software system. Information represented by the standards from ISO TC184/SC4 reduces the costs of developing special data formats and individual file translators between alternative systems.

These standard specifications provide a data framework (information model) for both the structure (syntax) and the meaning (semantics) of the information, as well as a data format for the data files (ISO 10303-21). They provide the means for data interchange between different systems by file transfer and for long term archiving for the conservation of the information because both the syntax and the semantics of the

² <http://www.tc184-sc4.org/>

information are conserved. All of these standards are written in the EXPRESS language (ISO 10303-11) and can be implemented in software applications to provide a standardised, neutral interface to any computer application or system.

The application of these standards is “Information Engineering”—applying the same engineering principles to product information as are applied to all manufactured products. Information is produced to a specification and quality control and quality assurance ensures that the information is fit for its purpose. Partial or incomplete information can be supplemented with additional information produced to the same specification.

EXAMPLES OF PRODUCT DATA STANDARDS FOR THE WHOLE LIFE-CYCLE

ISO 10303-203: Configuration of 3D designs of mechanical parts and assemblies

This application of ISO 10303 provides the means of communication between different computer-aided design (CAD) systems. It is widely used in the automobile and aerospace industries and is implemented in most commercial CAD systems. ISO 10303-203 is very important for defining the details of the product shape and construction when making decisions for the end-of-life strategy.

ISO 10303-210: Electronic assembly, interconnection and core design

This standard is very important for defining the technical details of electronic products that are subject to the WEEE Directive.

ISO 10303-214: Core data for automobile design processes

ISO 10303-214 is widely used in the German automobile industry. The standard is able to describe the assembly of any product, not only automobiles. Therefore the resources of this standard will be very valuable for specifying the details of complex products for making decisions on the dismantling and disposal at their end-of-life.

ISO 10303-235: Engineering properties for product design and verification

ISO 10303-235 is designed to provide a specification for the data for any property measured by any method. The names and definitions of measurement methods and their associated properties for a particular domain would be defined in dictionaries that conform to ISO 13584. The standard provides an audit trail through the methods used to derive a property and would enable the reliability of a property value to be specified. ISO 10303-235 is designed to specify the computerised representation of environmental data and data from other results, such as nuclear monitoring and disposal, which have to be conserved. The detailed properties of products and their components can also be represented and so the use of this standard would support a supply chain for the provision of data for life cycle assessment.

ISO 10303-239: Product life-cycle support (PLCS)

ISO 10303-239 provides the capability to support all of the information required to design maintenance solutions for a product throughout its life, to track planned and unplanned maintenance based on the actual state of the product and the changing state of the product as components are replaced and repaired. PLCS can also be used to associate technical document and training materials with various valid product configurations. PLCS could be used as the basis for specifying end-of-life strategies for the dismantling and disposal of a complex product.

In all of these cases, the data specified by these standards can accompany a product throughout its life-cycle because the specification of the information is independent from proprietary software.

March 2008

Memorandum by The Chartered Institution of Wastes Management

The Chartered Institution of Wastes Management (CIWM) is the professional body which represents around 7,300 waste management professionals, predominantly in the UK but also overseas. The CIWM sets the professional standards for individuals working in the waste management industry and has various grades of membership determined by education, qualification and experience.

EXECUTIVE SUMMARY

The Chartered Institution of Wastes Management (CIWM) welcomes this opportunity to present evidence for an important examination of the practice and future development of waste reduction in the UK. In preparing this evidence the Institution has consulted with experts members from several of its Special Interest Groups, including its Waste and Resources, and Strategy Groups, and their comments have incorporated into this response.

The Committee have posed a series of questions as the basis for this inquiry and these are dealt with in detail below. CIWM would however raise five main points as follows:

Terminology—the use of terms such as “minimisation”, “prevention” and “reduction” of wastes causes confusion. CIWM would prefer concentration on waste reduction in this inquiry, as this implies an active, managed and measurable process using baseline data and on a time and/or product basis. CIWM believes that waste prevention can only begin from a clear understanding of resource use—including energy, water and materials, and wastage. Lack of such understanding is a frequent frustration to waste reduction, leaving minimisation or prevention as poorly defined aspirational targets in many cases with poor reporting of what is actually achieved.

Waste Strategies—This inquiry is timely given the recent (May 2007) launch of the new Waste Strategy for England and work on other UK national waste strategies. CIWM welcomes the broader scope of these strategies which have in the past concentrated on municipal waste and recycling. Whilst both are clearly important, true resource efficiency and environment protection lies in action on waste from all sectors, not just the less than 10 per cent from municipal sources. The English waste strategy contains many proposals to support waste reduction but this relies heavily on further and more detailed work to be done. In turn, this relies on strong co-ordination by Defra between various government departments and with a broad range of stakeholders—all of whom have a role in delivering the strategy in the real world. CIWM is happy to commit to this work and the sustained co-ordination needed to support it.

Resource Efficiency—waste prevention needs to be viewed within the broader objective of whole life cycle assessment of products and services. Our objective should be to reduce energy, water and materials consumption in all stages of design, manufacture, use and end-of-life management, not just focus on cutting visible waste production at the production or use stages. This requires data, information, tools and skills to do and the practice of LCA needs support if it is to deliver better design or products and processes in future.

Co-ordination—Government already supports resource efficiency and waste reduction through a variety of bodies. Whilst much good work is done through these bodies there is a clear need for co-ordination and targeting of their efforts, especially if changes are to be made at the SME end of the business spectrum. Clear communications of the need for resource efficiency and the business and environmental benefits is vital. Government also must monitor the effectiveness of these measures closely as most initiatives depend on cost saving opportunities for businesses. If these do not bring about improvements needed in resource efficiency more enforceable measures will need to be considered.

Priorities—this inquiry will inevitably and rightly consider high visibility issues such as packaging, carrier bags and disposable nappies. Whilst these are important in their own right and in terms of their effectiveness in supporting more general interest in resource efficiency, there are other activities and waste streams that could have a much greater impact in environmental and business terms including transport and food wastes. Again, CIWM would urge a whole life cycle approach to identifying future priorities for waste reduction / resource efficiency action.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste?

Are there any barriers to how knowledge in this area can best be translated and applied?

1) Better design and materials use can indeed help prevent waste. However, the prime objective in design should be to minimise the whole life cycle cost of products and services. This should take into account all materials and energy used from winning and provision of raw materials, the product’s use and its “end of life” management or disposal. The science of life cycle analysis is still developing and data, tools and skills to use them will be needed if we are to make justifiable decisions on which designs are most sustainable, rather than producing “least visible waste” designs.

- 2) Any public examination of waste prevention will inevitably focus on products highly visible to the public—including plastic carrier bags, disposable nappies and packaging. However, in the pursuit of resource efficiency and least environmental cost, rigorous analysis and concentration on more important issues such as food waste (around 20 per cent by weight of household waste) is needed.
- 3) Packaging and packaging waste reduction remains important, however, in view of the materials and energy used and because of the clear public interest. Changing public attitudes and behaviours in issues such as packaging can lead to altered awareness and performance in other areas with potentially even greater environmental impact such as transport for example. It is still important, however, to consider packaging from a full environmental cost perspective. Packaging helps to reduce wastage of the goods contained especially for delicate goods (including electronics) or for foods which—when correctly packaged—suffer fewer transport and handling losses and have longer shelf / kitchen life. These savings have considerable energy and materials benefits “upstream” in the production process. Optimising packaging involves striking the right balance between product and health protection and the materials and energy used.
- 4) Much work has already been done in reducing packaging materials use, the weight of a glass milk bottle has fallen from over 500 g to less than 250g. Two case studies on PET light-weighting were reported in August 2007, where 500ml bottles were reduced from 26g to 24g, without compromising the brand shape of the bottle. There are, however, limits to light-weighting packaging, especially if it no longer adequately protects the contents or if it undermines reuse which does have an important role in minimising the creation of waste.
- 5) Promoting design for reuse, remanufacturing and recycling has been encouraged for many years and there are more examples in consumer electronic goods and vehicles where parts and materials are being recovered and reused.
- 6) EU and UK legislation already exists to reduce the creation of hazardous wastes, in connection with waste electrical and electronic equipment (Restriction of Hazardous Substances—RoHS) and more widely through the Registration, Evaluation, Authorisation and Restriction of Chemicals—REACH). Other materials substitutions are also possible—eg using cardboard to reduce the need for polystyrene. This helps simplify the wastes and supports high quality secondary material recycling—but may have complex impacts in terms of the energy costs of transport for example. Careful assessment of whole life cycle costs is needed in such cases.
- 7) CIWM would support continued but better co-ordinated integration between the various product and Resource Knowledge Transfer Networks which should be encouraged to facilitate knowledge transfer between different industry sectors. Better interaction is needed between those responsible for design, manufacture and supply of products and the waste and resources management sector—both in terms of better design for end of life and to ensure this industry supplies secondary materials back into the market of the right quality.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

- 8) CIWM believes the primary driver is cost for most products. Other measures are needed to drive manufacturers and designers to increase their use of secondary materials. Our sector is focused on reprocessing waste materials to a standard where it can be placed on to the market—where there is confidence to buy and use. Manufacturers need to be confident that it is good clean quality material going to market; this can be underpinned by recycled content drivers. An example of a positive one is recycled content of newsprint paper.
- 9) Primarily cost, other considerations are product design (including regulations concerning food containment), design criteria (look, durability, strength), client requirement and storage criteria (vapour barriers, temperature).
- 10) Moving away from virgin materials will depend upon recovered materials meeting product standards, quality and cost. This is difficult to maintain in a mixed and variable commodity world where prices are volatile.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

- 11) There is a historic tendency to focus on raw material specifications when selecting resources, and there is a need for engineers, in particular, to be guided towards fit-for-purpose product specifications as an alternative approach. The long term strategy should be to ensure that life cycle analysis of materials used is included in design and engineering.

12) Although there are one or two good examples of designing for end-of-life CIWM believes that awareness and understanding of materials and end-of-life impacts is generally low.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

13) New materials do have an influence on design and designers and materials scientists will interact. However, CIWM believes that there is not enough interaction with the resource and waste management industry; eg biodegradable/degradable plastics are a new material being used by designers and engineers without full consideration of the potential impact on the quality of composts through cross contamination by the different types of plastic.

14) Research and Design on new materials needs to feed through to scientists and designers.

Can better designed products offset the increase in consumption?

15) In part, this is constrained by unfettered consumer behaviour. Consumers will be influenced by fashion and new designs, and will not necessarily purchase items which last longer, reducing consumption. Much consumption, it could be argued, is driven by the need to replace items that have built in obsolescence. The greater availability of higher levels of disposable income in the UK exacerbates this tendency.

16) The paradigm of reducing packaging and long lasting products may in fact not be the best solution. Reuse schemes for eg bottles and plastic containers cannot be implemented if the bottles are too fragile, also longer lasting white goods may in fact have more harmful environmental impacts in the use of energy than replacements. Manufacturers are now seriously considering the leasing of items like cars and white goods so that consumers can have the best environmental product and that producers exercise their responsibility by getting the materials back for recycling and also component parts for reuse.

17) Another issue is whether increased consumerism is being promoted by marketing campaigns based on environmental and/or ethical issues, especially where such products replace those already owned by consumers.

18) CIWM is not aware of any research but it would seem reasonable to assume that individuals who purchase environmentally and/or socially more responsible products are less likely so simply dispose of products they already own by dumping them. They are more likely to try and ensure their reuse—whether on E-bay, at car boot sales, through Freecycle networks etc—or leave in garages or lofts.

Are there any other gaps in knowledge and how are they being addressed?

19) The Environment Agency and Defra are currently working on a series of Quality Protocols, to determine when wastes cease to be wastes and become acceptable as secondary raw materials, based on fit-for-purpose product specifications. The first Quality Protocol, for compost, was published in March 2007.

20) This has led to the waste and resource management industry approaching the manufacturing industries to ask them to consider whether the materials they discard can be reprocessed into secondary materials and at what quality.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

21) There is growing evidence of businesses reducing materials and energy use / wastage as a part of their corporate social responsibility, for example in the construction and retail sectors. Supply chain pressure exerted through these “early movers” will be an increasingly important driver for resource efficiency. However, for most businesses, waste prevention is still driven through opportunities to reduce costs or to comply with legislation.

22) An example of a purely voluntary arrangement is the Courtauld Commitment by large retailers focused on packaging. This could be a powerful way to make change and to influence buyer behaviour, but previous voluntary arrangements in other areas, eg farm plastics, have not been effective. Time available to make important changes in materials management is short and Government must monitor the effectiveness of voluntary arrangements closely and be prepared to replace them with enforceable alternatives if necessary. Arrangements such as the Courtauld Commitment will not be appropriate for smaller businesses unless it is heavily adapted and supported for their needs. Another example of voluntary practise is the objective in parts of the construction sector to drive for zero waste to landfill much earlier (2010) than proposed in the draft sustainable construction strategy (2020). Such a commitment will need to be supported by better materials separation, management and reporting services through waste and resource managers.

23) The mandatory introduction of Site Waste Management Plans in 2008 for most construction sites (suggested project threshold £250,000) is an innovative approach that CIWM believes will lead to waste prevention. This could be applied to other industry sectors through mandatory reporting on environmental performance by businesses, including wastes and energy / resources use.

24) Rapid development of waste legislation—mostly led by the EU—has improved standards and driven the cost of responsible wastes and resources management upwards in the UK. Examples include the Landfill Directive, changes to hazardous waste management and the Landfill Tax. Higher costs and business responsibilities for waste help drive waste prevention as businesses strive to ensure compliance and to control costs—especially where previously the low cost of waste disposal has discouraged concentration on waste as an important business issue.

25) Business awareness of policy and legislation relating to waste is often still low however. Awareness of specific producer responsibility legislation is better understood by obligated businesses, but more general responsibilities such as the waste Duty of Care are poorly understood. Government must ensure that strategies and legislation for waste and resources are backed by clear and sustained communications programmes—one of the benefits being support for better waste prevention. The Environment Agency's NetRegs web-based tool helps provide authoritative legislation and policy information to businesses, but this depends on the businesses themselves to recognising they need the information. More active measures are needed to communicate with businesses.

26) Businesses often rely on their waste service provider to help them to be compliant. This is an important area for added value service by the waste sector, and will become more so as waste legislation becomes more complex and onerous in future. CIWM believes that waste managers should increasingly be in a position to advise customers on waste compliance and on the types and quantities of wastes that businesses produce in the future.

27) Formal Producer Responsibilities have been introduced for a series of product types: vehicles, packaging, electronics and batteries. Their focus is on end-of-life recycling and recovery, but businesses' obligations to meet these responsibilities are a force behind product design to reduce material use and improve recyclability. In packaging, setting targets for recycling recovery have led to increased tonnages being collected. The parallel Essential Requirements legislation (1998 as amended in 2003) focusing on design has been less rigorously enforced and there have been few examples of prosecution for offences.

28) Government supports waste prevention and better design initiatives for businesses through the Business Resource Efficiency and Waste (BREW) programme. This programme distributes Landfill Tax—derived funds to a range of delivery bodies including:

- WRAP—the waste and resources action programme.
- NISP—the National Industrial Symbiosis Programme.
- RDAs.
- Envirowise.
- The Environment Agency.

29) These programmes promote resource efficiency in process or product design through cost savings for businesses. Although there is a recognised need to help SMEs to benefit from these opportunities, they remain the hardest “targets” to reach. It is right that landfill tax paid by businesses is used to help those businesses to be more competitive and more resource efficient in the process. CIWM wishes to see Government maintain their commitment to this programme and not reduce its funding after the current year. More targeting of BREW resources through delivery bodies is needed to reach smaller organisations rather than larger ones who are aware of the need for and advantages of waste prevention and better design. Much simpler communication is also needed to guide businesses to sources of information and support. The number of initiatives driven

locally regionally and nationally can overlap and confuse businesses. There is considerable scope for better co-ordination and communication between business support bodies working in this area—BREW funded or otherwise. CIWM would like to see one BREW funded body take the lead in this area.

What other measures can promote a focus on waste reduction among businesses?

30) Prompting “extended” producer responsibility to cover business practice and that of its supply chain companies.

31) Promote the concept for businesses to consider their product at the end of its life in order to understand its impact from design to disposal. Therefore encouraging whole life cycle analyses.

What lessons can business learn from international experience?

CIWM declines to comment.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

32) Promoting the issue of waste reduction in its own estate, and that of public organisations in general. This should also cover procurement, in terms of products containing recyclable materials. SEPA has gone further in this respect by specifying minimum percentages for aggregates and paper.

33) CIWM believes it is the Government’s job to reallocate landfill tax monies via initiatives like BREW to support better use of resources and business performance. However, CIWM does not want to see a reduction in the proportion of tax being paid, being used in this way.

34) CIWM believes that the Government should continue to support initiatives like NISP to stimulate the secondary materials markets, protocol and standards.

35) Specific Government policies could include:

- Promote the role of waste reduction as part of Corporate Social Responsibility (introducing mandatory reporting guidelines if voluntary measures are unsuccessful).
- Restriction of certain materials to allow the simplification of reprocessing at the end-of-life.
- Consider specific bans on the manufacture of short-life products (eg the decision to promote long-life/low-energy light bulbs and phase out traditional light bulbs).
- Explores taxes (and/or bans) on selected items including virgin raw materials.
- Regulation over unsolicited mail.
- Early confirmation that the new landfill tax escalator of £8 per tonne with effect from April 2008 will continue beyond 2010–11.
- Consideration if the landfill tax on inert is too low.
- Further bans on landfilling certain wastes from all sectors and not just municipal solid wastes.
- Proactive communication strategies across all sectors.
- Economic incentives to generate and use energy from renewable sources including the recovery of energy from residual wastes.

How does Government policy link up with European strategies and action plans?

CIWM declines to comment.

What lessons can be learnt from other countries—within the EU and globally?

36) CIWM believes other EU member states are much further advanced in waste management infrastructure to recover valuable materials and energy from their wastes. As early input to Defra’s waste strategy review and development CIWM commissioned a report to examine the reasons for these differences.³

³ Please follow this link for *Delivering Key Waste Management Infrastructure: Lessons Learned from Europe*. November 2005 <http://www.ciwm.co.uk/mediastore/FILES/12134.pdf>

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

CIWM declines to comment.

What role do marketing strategies play in influencing more sustainable design?

CIWM declines to comment.

Are there any gaps in knowledge in this area?

CIWM declines to comment.

SKILLS

How is sustainable design integrated into the design syllabus?

37) CIWM does not know, but supports the inclusion of sustainable design into the design syllabus. CIWM would be delighted to be involved and offers its help in any way appropriate to make this happen. The Centre for Sustainable Design have worked hard at this and have had a marked influence at Government and regional level but their influence at industry level has been limited.

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

38) CIWM has been running Waste Awareness Certificate (WAC) courses for a number of years, to the resource and waste management industry as well as many other sectors. As the WAC courses have grown CIWM has realised the need for sector specific versions. WAC plus Construction has been developed and delivered and work is ongoing with WAC plus Healthcare.⁴

39) It is very important that considerations of sustainable resource use and waste production are also included in course materials for design, engineering and marketing students and business qualifications in general.

October 2007

Memorandum by Biffa

Biffa Waste Services is one of the largest waste management companies operating in the UK and can justifiably claim to be the most diverse in terms of its spread of interest in industrial/commercial and domestic collection, landfill, liquid waste and specialist hazardous waste management systems, and has a turnover of just under £800 million at a current annualised rate. We have over 150 operating centres throughout the UK and handle 14 million tonnes of material that is treated, landfilled or recycled on behalf of an extensive customer base exceeding 95,000 in the public, commercial and industrial sectors plus collection services to 1.3 million households. On the face of it it may seem strange that a waste management company should take an interest in waste minimisation but we do so on the basis that to do otherwise would amount to burying our head in the sands of progress. It is for this reason that we have invested substantially in responding to the challenge of future change impacting on the sector, most specifically in terms of resource flow accounting, carbon pricing, diversion of material from landfill and the adoption of low carbon emission innovative technologies as substitutes to landfill.

1. BETTER DESIGN AND THE USE OF MATERIALS

1.1 Improved product design is of most notable relevance in relation to longer lived consumer durables where life expectancy is often shortened as a result of failure by a specific component in the design. As a result—in the absence of any nationwide cost effective repair and maintenance infrastructure—entire products are scrapped. Lifetime longevity could be extended if products such as electrical and electronic white goods, and IT equipment were modular.

1.2 The implementation of Producer Responsibility in the UK since 1997 has been disjointed and not integrated in terms of methodology, process or structures. In consequence, there is a major disconnect between ownership of end of life waste streams and the design/production process. Whilst this process is now becoming

⁴ See <http://www.ciwm.co.uk/pm/389>

more rational (in the case of electrical goods, batteries, and automotive, for example), we believe that the failure by HMG to apply an integrated approach to Producer Responsibility financial liability has resulted in a “lost” two decades in which end-of-life management processes could have been integrated into the design and manufacturing process. Over the years we have regularly made Parliamentary submissions on this theme on the basis of our observations of end of life management. We can forward these should you wish to consider IPP in greater depth.

1.3 There needs to be an involvement with academics possessing specialist skills in holistic lifecycle accounting which accounts properly for the trade-offs between extended product longevity (for instance, washing machines lasting two decades or more) against the benefits of ongoing technical developments (which materially improve in-use energy consumption, for instance) to establish, on a product by product sector basis, trade-offs between embedded carbon inputs in manufacture, use, and end of life destruction. These balances alter significantly between different categories of consumer capital goods (including housing).

1.4 It is our view that product designers and engineers are blissfully ignorant of end of life impacts arising from the products they design and that this connectivity can best be established by transparent, economic, Producer Responsibility.

1.5 In terms of knowledge gaps, we believe there needs to be more government leadership on the development of holistic British Standards in relation to calculating carbon equivalents for different products in their manufacturing, use, and end life phases. This work should be developed in conjunction with initiatives aimed at standardising approaches to corporate carbon accounting as propounded by the Aldersgate Group. This has started in the form of the proposed PAS 2050 standard but the process needs to be accelerated.

2. BUSINESS FRAMEWORK

2.1 Our comments above apply—particularly in relation to Producer Responsibility and Integrated Product Policy (IPP), and the carbon agenda.

2.2 Government needs to establish longer range policy frameworks which involve:

- First, implementing integrated resource flow accounting systems across public and private sectors.
- Second, confirming transparent standards to convert that resource flow data to carbon equivalents via PAS 2050.
- Third, driving national and international agreements on Tradeable Permit regimes which create price transparency for every tonne of carbon equivalent emission.

As a consequence, businesses would then be able to arrive at strategic assessments of their externality as well as internality financial exposure.

2.3 We would refer you to the work being undertaken on sustainable consumption and production and IPP in the EU context. The level of awareness and understanding among businesses—possibly with the exception of FTSE100—is poor.

3. GOVERNMENT POLICY

3.1 Government policy on waste reduction needs to be integrated coherently into a wider approach to sustainable consumption and production. Both Defra and BERR are moving in this direction and have addressed SCP in the context of industrial, as well as consumer understanding. This work is at an early stage, however, and there are opportunities for closer integration, particularly with regard to allaying fears that waste minimisation and IPP is somehow a threat to UK sectoral or national competitiveness in the international arena.

4. CONSUMER BEHAVIOUR

4.1 Professional trade bodies such as the Chartered Institute of Marketing and the Chartered Institute of Purchasing and Supply need to adopt a far higher profile in relation to emergent environmental pressures, particularly with regard to carbon dioxide impacts and the significance of embedded carbon footprints at all stages of the product lifecycle in different sectors. We would suggest that at present this is little understood or appreciated.

4.2 Improved design is often a collateral process to establishing products as a fashion item rather than a functional product. As a consequence, fashion drives in its wake a tendency to shorter lifecycles and higher levels of disposability. The positioning of different manufacturers in similar product segments is often

illustrative of the nuances of their differences to environmental impacts and awareness. It is difficult to regulate public consumption and potentially dangerous. Companies will drive that process through internalising carbon costs and increasing that on their market plans.

4.3 On an optimistic note, the oligopolistic market structures of traditional consumer capital goods and consumer goods supply chains is often more likely to predispose them to accelerated change through the natural process of incorporating environmental claims into the competitive process. As exemplars we would cite the fortunes of Ford/GM and Toyota in automobiles, Tesco/Marks & Spencer and Walmart in carbon labelling, B&Q and Homebase in eco-labelling and PepsiCo/Coca-Cola in soft drinks. The supply of consumer goods markets has moved heavily in terms of embedded values in brands and environment is the latest component which has to be taken into account and developed as part of that brand awareness. As a consequence, main board directors of these oligopolies are increasingly concerned with the role of design and end of life impact in the context of balance sheet goodwill represented by the brand. Get it wrong and the market value of the company rapidly erodes. Government needs to recognise that process and identify the appropriate budgetary, fiscal and regulatory balance of policies most appropriate to engender and accelerate that awareness at the highest level.

October 2007

Memorandum by the Local Authority Recycling Advisory Committee (LARAC)

The comments below are sent on behalf of the Local Authority Recycling Advisory Committee (LARAC). LARAC is an association of well over 400 local authorities across England, Scotland Wales and Northern Ireland whose waste management and recycling professionals' co-ordinate and operate waste management services. Membership is drawn from all types of authority including statutory Waste Collection (WCA), Waste Disposal (WDA) and Unitary.

Overall LARAC recognises that its members do not have a direct influence over product design, industrial production and supply chain management, however the membership wishes to promote better integration between all organisations and sectors whose activities bear on the management of materials and energy within the economy. This particularly applies to the formation of public perceptions about the importance of waste reduction, which in turn will influence both political priorities and consumer choices. Local authorities have an important part to play in bringing about the required cultural changes. They should be engaged, encouraged and adequately resourced to exert community leadership through waste awareness and education programmes.

LARAC would put forward the following comments relating to the better design and use of materials:

DESIGNING FOR BETTER DURABILITY

Measures that encourage the design of more durable products could include tax incentives for operations that repair or renovate products (eg VAT concessions) and more comprehensive producer liabilities for end-of-life products.

DESIGNING FOR REMANUFACTURE

Design for ease of identification, construction and replacement of parts would militate towards remanufacture being a viable option for a wider range of products. Restrictive practices such as requiring or encouraging only the use of branded components should be discouraged.

DESIGNING LESS WASTEFUL PACKAGING

Public perception is that packaging creates waste. Whilst this is not always true, a comprehensive review of consumer packaging will, we believe, considerably reduce waste. We would encourage designs that reduce and simplify packaging (avoiding the use of more than one material), militating away from packaging whose principal function is better promotion of the product and towards packaging whose principal function is appropriate protection and efficient transportation of the product. "Lightweighting" of packaging is to be promoted, giving environmental and cost benefits both in the reduction of material used and in terms of energy

to transport the materials, but not necessarily through transferring from one material to another. For example an independent Life Cycle Analysis (LCA) should be used to determine whether (easily recyclable) glass packaging should be replaced by lighter weight but more complex plastic packaging.

DESIGNING FOR MORE USE OF SECONDARY MATERIALS

Designing products so that recycled materials can be more readily incorporated will reduce the demand for virgin resources and therefore reduce waste. This move would also close the recycling loop and would encourage the development of the UK's reprocessing infrastructure. Increasing taxes on carbon and environmentally damaging virgin materials (such as aggregates or peat) would promote both the more efficient use of raw materials and development of standards based on "fit for purpose" criteria that promote the use of secondary materials when appropriate.

SIMPLIFYING DESIGN

It is important that the move to reduce the amount of waste or material used in the development of the product is not at the expense of the possibility for reuse and recycling at the end of life. For example, the use of composite materials may enable waste at the point of production to be minimised but may increase the waste generated at the point of disposal. It is essential that a full Life Cycle Analysis is carried out on any proposals to ensure that there is a net environmental benefit.

DESIGN FOR RECYCLING, NOT DISPOSAL

Although recycling is not synonymous with waste reduction, LARAC believes that policies that tax "end of pipe" solutions to resources management will promote both waste avoidance and recycling. A number of financial instruments may be available to achieve this, from increasing landfill tax to taxing carbon. Measures encouraging greater energy efficiency will help, but decisions must be made on the basis of whole product lifecycles, including winning the raw materials and disposing of the end products—not just the assembly or manufacture of the product.

12 October 2007

Examination of Witnesses

Witnesses: MR CHRISTOPHER MURPHY, Deputy Chief Executive, The Chartered Institution of Wastes Management, MR PETER JONES, Director, Biffa, MR MARTIN WHEATLEY, Programme Director, Local Government Association, and DR ANDREW CRAIG, Principal Policy Officer, LARAC, gave evidence.

Q635 Chairman: Good afternoon, gentlemen, you have been sitting in the audience—constituting the audience almost—but could I start with Dr Craig and just ask you to introduce yourself before we proceed?

Dr Craig: I am Andrew Craig, I work for the Tees Valley Joint Strategy Unit and I am here as the Policy Officer for the Local Authority Recycling Advisory Committee, LARAC.

Mr Jones: I am Peter Jones, I am an employee and Director of Biffa, the waste company (as we used to call it) it is now a resource management company. I have been in the industry for 19 years, all as a director with Biffa.

Mr Wheatley: I am Martin Wheatley, a Programme Director at the Local Government Association, responsible for environment issues.

Mr Murphy: Christopher Murphy, I am the Deputy Chief Executive of the Chartered Institution of Wastes Management, representing 7,500 professionals in the waste industry.

Q636 Chairman: Thank you. Mr Murphy, your evidence says that you prefer the term "waste reduction" to "waste minimisation" or "waste prevention". Why "waste reduction" in preference to the others?

Mr Murphy: In this case we think that "waste reduction" is the right term. We are aware that there are a number of terms which are used to describe the activities at the top of the hierarchy: we have minimisation, prevention, avoidance and reduction and the use of these terms inappropriately can lead to confusion unless they are properly defined. For example, we have a Waste Minimisation Act, waste prevention is enshrined within the Waste Framework and within national strategies also and we have waste reduction pilots, the incentives for local authorities. They are all used and we have no problem with the multiple uses provided they are either synonymous, and that that is clearly defined, or they are defined in themselves. I think we said in our evidence that waste reduction is the correct term

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here because it implies an active, balanced and measurable process using baseline data on a time or on a product basis, so by all means use “reduction” especially if it is used for targets, if it defines what we are at, where we are now and what sort of targets we want for reduction.

Q637 Chairman: What is the relationship between waste reduction and material efficiency or resource efficiency and how do you link those?

Mr Murphy: It is part and parcel of a holistic or generalistic view of prevention. Prevention or minimisation will include specific targets, resource use, awareness-raising, it is all implicit in this generalistic term which is prevention or minimisation.

Q638 Lord May of Oxford: This does have slightly the elements of angels on pinheads and I do not want to argue about the words, but the amount of waste we produce and the profligacy of the culture we have, just saying we want to reduce it rather than minimise it is a substantial difference; how do you defend that? You can reduce it easily and painlessly, leaving much room to do more, whereas minimisation is much more susceptible to qualification in terms of existing technologies.

Mr Murphy: Indeed, and prevention and avoidance are also terms that are used.

Q639 Lord May of Oxford: Why do you go for the softer option?

Mr Murphy: Because we look at prevention as being aligned with, say, zero waste. It is a philosophy, we would all like to get to that stage, but it is not achievable at the present time so let us look at something which is achievable.

Q640 Lord Crickhowell: You will have heard my last question in the previous session about the definition of waste, the role of government and so on. Defra and the Environment Agency are currently working on a series of Quality Protocols to specify when certain products are no longer classified as waste and can be re-used as secondary raw materials. How effective have these protocols been and how have the waste processing companies worked with industry to consider which materials might be reprocessed?

Mr Jones: Perhaps I might lead off there. I would certainly connect with the responses to your question from the earlier witnesses, Lord Crickhowell, and if we look at this holistically the word “waste” is really about the semantics of the economics. Wool was valuable in medieval times but it is almost a waste now because of changed market circumstances; coal might be valuable now but it

was possibly regarded as a waste in Norman times. If you stand back from where our economy is now, globally as well as nationally, you will see a dramatic change in expectations or perceptions of waste, driven first by the substantial increases in population that are taking place in China and India as they move to a consumption economy. We are now in a climate where supply chains are aware of the carbon agenda and we have a lot of technological redundancy that we are going to have to replace with low carbon technologies. We are moving into a framework of commodity scarcity in terms of the absolute availability of virgin materials, so I think we are going to see a revolution in the volumetric reduction of waste because all of those drivers are expanding the demand side of the equation and pushing up the value for material that historically was thrown away, discarded and seen to have no economic value. Specifically (in relation to the protocols) I would say that that sort of more macro approach has not impacted on the choice of priorities; the early debate about protocols was really around lobby groups which were scientifically well-founded in the metals industry around the use of iron oxides, the use of plastics as a coal substitute in the steel industry, which was under economic pressure, the construction industry around gypsum and the issues around aggregates. Timber also figured in the issue around waste-derived fuels in response to the hardening prices for energy and the opportunities there. Out of that we have done pretty well because WRAP has now grabbed some of these initiatives and they have come up with a framework, but if asked what could we do further to push this debate, it is going to be about saying more about the path of landfill taxes after 2011. It is going to be about gripping and integrating issues around public procurement in the health service (in relation to energy,) in the Department for Transport (in relation to re-use of aggregates and specifications and housing stock renewal. It is going to be about tackling the issues over an on-line database because this debate is still in an utter vacuum about the material flow of resources. We talk about resource efficiency but we still have no integrated framework that is as accurate as that which, say, the Bank of England and the Prime Minister have in relation it flows of credit in the economy—which I am sure they will be extremely interested in this week if not for the next few weeks. As far as money flows are concerned we need that sort of knowledge for flows of carbon, silicates, aggregates, nitrogen, etc in the economy. Finally, we need that which you touched upon earlier—a valuation system that takes this multiplicity of protocols around material streams or products in specific supply chains and then put that into some sort of common yardstick. Carbon looks

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as if it is going to be the common denominator because the “great British public” do not understand “apples and oranges” but if they are equated back to a common yardstick of measurement in terms of carbon potential, and then we go to the following stage of valuing that carbon (which probably will be done once the cap and trade system starts to bite) then we will have all the beans in a row, we will know where specific materials are flowing, and the protocols attached to them which will provide a funding and investment framework for industry. We will be able to transpose that on the basis of academic and scientific research on the threat or opportunity in terms of carbon reduction or avoidance in terms of CO₂ and then finally we will value it. That creates the loop back to the front end of the system which then enables businesses to make much more rational decisions about the externality as well as the internality cost of the economic framework to which they have operated for the last 200 years.

Q641 Lord Crickhowell: You have given a very helpful briefing on the whole question of general policy perhaps compared to the answer I got at the end of the last session, but one specific thing you have not really made clear to me and that is where we are on the legal redefinition of waste and how much further we have to go. This has been the central point in almost every bit of evidence we have had.

Mr Jones: I sense that the Environment Agency are taking a more pragmatic and practical line. In the early stages, at grassroots level in the Agency, there tended to be a multiplicity of different regional interpretations of waste definitions, and there was incredible variability. From our perspective we have seen a sea-change in the sense of direction in the Agency; they have appointed internal specialists who have the power to override local technically-sound interpretations maybe, but which are practically stupid otherwise.

Q642 Chairman: Mr Murphy, you wanted to come in and you want to come in as well, Dr Craig.

Mr Murphy: I might add that this links to the discussion earlier about by-products. It would be ambitious to think that the framework directive will be redefining waste as such, although it is considering by-products and waste. The protocols work that has been undertaken by WRAP and the Environment Agency was looking at that point where waste can be taken out of the waste stream and can be considered as a product or as a utilisable resource, and they have done some extremely good work on industrial and commercial wastes so that they are not defined as waste, they fall outside of

the regulatory regime and then are put back into use. We are talking about significant amounts here, of the eight protocols which are underway the thoughts are that they could avoid nine million tonnes of waste and about six million tonnes of potential capital to UK Plc, so they are big numbers here. It is a redefinition, to take it out of the regulatory regime for waste.

Dr Craig: This work is going on and the Environment Agency and the Government are in many cases a bit cautious because the emphasis is still on reducing pollution locally, the emphasis has not really gone onto the large macro-economical carbon agenda which Mr Jones was referring to. It might help if I give a couple of specific examples of what is going on here, and one is to do with waste oil, a question about whether it should be recycled as a fuel or the more expensive option which is to have it reprocessed into a lubricant again. The question here which is being tested in High Court is whether it can be used as a fuel in a way that does not increase pollution, whereas the raw materials which are used to make most products are pretty dirty materials and they have to go through a process to make them clean. In a sense actually can what have been wastes be redefined as products and then at some stage put into the processes so that they are processed and used with no overall increase in pollution and certainly considerable environmental gains, if you think of the carbon agenda, for example. The other example is compost; the biodegradable material that is recyclable into compost at the moment has to be made from source-separated bio-waste and then mechanical biological treatment produces material that is a stabilised bio-waste but is actually only fit to be landfilled, so the benefit of that compost material on the land is lost. The adverse effect on the environment is reduced because it emits carbon dioxide and not methane but it is nonetheless wasted. I have a feeling that we need to speed things up so that these MBT (mechanical biological processes) can be designed to produce material that is fit for purpose, for something else apart from just putting into landfill, and certainly most processes at the moment are only designed to make material that should be landfilled and there are now some more sophisticated processes that produce material that is very difficult to distinguish from compost made from source-separated waste. They are just two examples to think about.

Q643 Earl of Selborne: There are a number of interventions available and indeed used to increase the ratio of waste diverted such as tax, statutory and voluntary agreements, information and advice, regulation, planning, public procurement and

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funding. Which of all these needs to be reinforced or, indeed, what new interventions might deliver a better ratio?

Dr Craig: The Government with the Environment Agency can speed up the process of considering waste materials and I am not sure a new intervention is needed. The provision of the waste framework directive is looking at the end of waste and encouraging different countries to come up with protocols, which is indeed happening. I am not sure that new interventions at this stage are needed, just a speeding up of the overall process.

Mr Wheatley: If I might add, My Lord Chairman, in the previous session there was some discussion about the UK's position in relation to other European countries, and it is maybe no coincidence that we have so far failed to adopt a couple of policy approaches which do apply in many other European countries that have much lower rates of waste to landfill. One of those is about producer responsibility for packaging; for example in Germany there is something called the Green Dot Scheme which makes producers very responsible for meeting the costs of disposing of packaging waste and they fund local authorities to do that, and that sets up a much clearer financial incentive to minimise waste. The other area is that in many parts of Europe householders have financial incentives to minimise the amount of landfill waste that they put out and, again, the LGA has been calling for councils that think this is a good approach to have the power to introduce financial incentives for householders, and we support the recommendations of the Commons CLG Select Committee that rather than the five very circumscribed pilots that are in the current Climate Change Bill, also councils should have a more widely-drawn power to introduce financial incentives in a way that they think would affect consumer behaviour.

Q644 Earl of Selborne: One of the initiatives which has been mentioned already which other countries seem to be ahead of us on or have chosen to be ahead of us on, perhaps rightly or wrongly, is energy from waste. Is this something that planning is holding back, or is it undesirable to try to make more energy from waste?

Mr Jones: I would suggest that in terms of remaining blockages I have identified three that I would suggest to you. The first is around the interaction and positioning of the waste debate in the context of the agricultural debate. Biofuels and our agricultural strategies produce a tonne of waste by-product for every tonne of fuel, regardless of the issues around the carbon footprint and benefits or disbenefits of that approach. But we are moving into the carbon economy and we are handling that

carbon economy through different government departments. BERR is responsible for large energy schemes and we are disposing of waste which is in fact around 30 to 40 million tonnes of carbon as coal equivalent to landfill each year and there are tremendous interactions between these sectors. Therefore, the first block is a cultural one around the whole carbon debate. Recent revisions upwards to the UK carbon dioxide emission to 750 million tonnes is ten times more than the tonnage we put to landfill in total and about 20 times more than the tonnage of carbon going to landfill, so we have to move carbon management from the back end of the system right to the front end. The way we accelerate that, I suggest, is that we shift from a fairly pedestrian pace around the carbon reduction commitment and the way that carbon pricing is entering the thinking of main board directors, via fairly complicated systems. Secondly, we have a ragged and disparate approach on producer responsibility. As you may know, I have been a scathing critic over the last ten years experience in this area where it is reaching a climactic fiasco with the WEEE regulations. The whole thing is on the verge of breakdown because we have lost the simplicity of placing responsibility for the end-life management of products on to the manufacturers, and that message is still not going out unequivocally. In fact, in the electronics industry some of the manufacturers have now realised that they have lost control and ownership of those back end resources in a world where the price of steel has rocketed; copper, aluminium and some of the rare earth metals have changed that economic equation. The third issue I would posit is around the practicalities of the planning system. There is an immense variability, as I go round local authorities—and Martin and Andrew may care to comment—in the extent of their responsibilities. Some think that their planning responsibility extends to just management of domestic refuse and that industrial and commercial is going to look after itself. At the other extreme you have places like Somerset where they see the waste industry no longer as the waste industry, but as a normal industrial process, part of the resource efficiency agenda. They envisage provision for co-locating waste to energy plants alongside the gaps that are emerging in the big heat and electrical load users as we face the prospect of 30 per cent of our electrical capacity coming off stream with the closure of dirty coal and ageing nuclear capacity. It is in the planning system and the way that the local authorities really do understand that waste is not a problem around domestic dustbins, it is an opportunity around job creation, employment and new industrial activities for the low carbon industrial revolution that we are now moving into.

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Q645 Earl of Selborne: If I can just take you back to what Lord Crickhowell mentioned in the earlier session, you are pretty scathing about the lack of connectivity which designers and engineers show to the end-life impacts and you call for transparent economic producer responsibility. Could you just tell us what that in practice means, for example, to resolve the WEEE dilemma?

Mr Jones: There seems to be about a million tonnes of domestic WEEE in the UK and it falls into three different segments in terms of electronics, brown goods and white goods, but the industry fought tooth and nail through its various trade associations to refuse financial liability for that waste material eight to ten years ago. I guess because in those days they realised that those additional costs might not be recoverable from the very powerful negotiating stances taken by the big retailers who were themselves anyway moving into manufacturing, so producers resisted it. In the waste industry I was suggesting to them that they could accept that cost liability and what they needed to do was to persuade government to address not whether they should or should not be given cost liability, but what government should do to provide cost transparency and move the debate to green tariffs and transparency of audit systems. That would have enabled them to pass on much of these costs, much like VAT, subject to independent audit by government. Then they would have retained ownership of a million tonnes worth of assorted plastics, ferrous and non-ferrous materials which would have economic value. The industry put forward cost claims of around £360 million, or £360 a tonne when the waste industry collects material for about £40 a tonne and takes it to large centralised networks. The other opportunity for the waste industry, which we and Biffa predicted, was that if they bid competitively for big regional contracts, probably based around regional development agency regions, they would have had the economic incentive and economies of scale to offer the lowest costs possible for collection. They would have created critical mass for the reprocessing of these materials through large-scale systems. Against that opportunity what we have actually ended up with is the industry being held to ransom because local authorities have sold on their rights to tradable permits to intermediaries who are now demanding very excessive amounts of money for those proofs of recycling. Nobody can find out where half the material is going because others are effectively stripping the valuable white goods out of the system because scrap prices are so high. Again, if you look at the case of fridges, which was the subject of a select committee inquiry in the other place some years ago, even now Defra can only find around

about 25 to 35 per cent of the global warming gases used as refrigerants in an area where there is supposed to be producer responsibility. Unfortunately—and there are many people who share my view in the industry—we ought to be revisiting this whole concept and integrating producer responsibility in the material efficiency and minimisation debate.

Q646 Lord Haskel: Would you then add corporate social responsibility to the range of interventions which are made? After all, many firms make declarations about sustainability in their CSR statements; is this kind of thing enough and would this kind of thing overcome a lot of the problems that we have with government interventions?

Mr Jones: There is a recent development where you are seeing partnerships between NGOs (people like Greenpeace, Friends of the Earth and so on) and the major corporates, because the market—the great British public—is now responding to these signals and clearly that is most advanced in the food retailing sector where they are driving new initiatives now. I recently chaired and released a report last week of distributed energy opportunities in the food chain, and CSR is a big driver that will come through the Carbon Reduction Commitment, but again it is going to be probably 2011–12 before there are going to be meaningful, sectorally-driven league tables identifying against the PAS2050 standard for carbon measurement. Only in 2012–13 might we be able to say definitively whether a Marks & Spencer's yoghurt produces less grammes of CO₂ per pack than a Tesco one; at the moment CSR is being used but it is being used in strange ways with different standards. Free-loaders are exploiting gaps, so the blue chips are then consolidating into coalitions to make sure that we drive standards to try and stop these free-loaders taking advantage of a process that is under way.

Mr Murphy: Just to support what Peter said and without sounding too cynical, corporate social responsibility was used as a marketing tool in the past and I think now because of public awareness and because of pressures from environmental groups these commitments will be a voluntary commitment, policed by the public and by environmental groups, so corporate responsibility is actually meaning an awful lot more and is developing into voluntary commitments.

Q647 Lord Methuen: Based on current data and predictions when might UK landfill capacity be reached, and I guess this is very variable across the country.

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Mr Murphy: I have some data from the Environment Agency and albeit that it is about two years old they claim that there is nearly 700 million cubic metres of landfill capacity remaining, which does not mean an awful lot in itself. The important thing is that in the previous year the capacity did not fall significantly in that the amount of capacity used to dispose of waste was similar to or replaced by the additional permitted void space so we are in balance for that 12 months. I have not got the information since then and of course it is regionally very different: in the North East and North West—outside London basically—it is between six and nine years capacity, but significantly lower than that in the South East, something between three and four years in the South East, but of course that very much depends on the permitted void space, whether we can get through the planning permissions and whether we can be effective in reducing waste. It might be that that tails off or balances out over future years.

Q648 Lord Lewis of Newnham: Can I be clear, are you saying that that is the amount of landfill that is registered for landfill or are you saying that that is the potential for landfill?

Mr Murphy: That is permitted landfill, not potential, that which has a licence or permit as they will become.

Q649 Lord Lewis of Newnham: So it is possible that there will be an extra amount available in seven years time.

Mr Murphy: Yes, there are many holes in the ground; they might be inappropriately placed or they might be inappropriate for other reasons.

Q650 Lord Lewis of Newnham: It is just unfortunate, when you said seven years it rather suggested that in seven years time doomsday was here and landfill had gone as it were, but I do not think that is what you are saying.

Mr Murphy: That is not what I am saying, no.

Mr Jones: Historically most waste companies operate to a seven-year cycle on landfill in the back pocket. That seven-year cycle is driven by a five-year planning process plus two years to just make sure that one is not trying to run a waste company and there is nowhere to take the waste (in which case you would never pick it up). In terms of the EA data there is a distinction that needs to be drawn between what has achieved planning consent and, of that total, how much is permitted. What companies like us have tended to do recently is not to purchase and procure landfills, but enter into royalty agreements. Economically by 2012 landfill will have to charge around £80/£90 per tonne gate fees and that is 20

to 30 per cent above the alternative costs or gate fees that could be charged by new technologies, whether they are thermal, biological, mechanical or whatever. What we have seen is a reduction of the active licensed landfills for municipal household-type waste from around 700 in the late nineties; the latest EA data that I saw reported for the “wide licence” sites was 267 and that would suggest that there has been a net closure rate of around one a week. Nevertheless, the ones that remain tend to be increasing in size because the fixed overhead costs at one or two million pounds for a planning consent mean that you start looking for larger and larger sites so that you are defraying the cost over a bigger and bigger cubic capacity that you have available for disposal. Generally I would suspect—and this is again something that you might care to recommend to Defra, that they actually start drawing out these distinctions and put some research into it, because the last information was three years old. What is happening is that biologically active inputs of waste are declining so you have a reduction in supply because companies like us are not reinvesting—we are assuming that in three years time we will be buying these new technologies—but the demand is also declining as local authorities adopt recycling initiatives and composting initiatives. You have a moving target really. Generally capacity has probably gone from seven years back to five years, Lord Lewis.

Lord Howie of Troon: Very briefly, how far do your predictions take into account reclamation from the sea? We have a very large coastline, much of which could not be used for that purpose but the rest could perhaps.

Q651 Chairman: Mr Murphy, does your organisation take account of these kinds of considerations in waste management?

Mr Murphy: We have this information from the Environment Agency but I am unclear about the question.

Q652 Lord Howie of Troon: You can dump waste in the sea; for example, a good deal of the waste material from the Channel Tunnel was dumped in the sea adjacent to the tunnel. There are a great many places where things of that nature can conveniently be done and I am wondering how far these predictions have taken that into account.

Mr Murphy: The predictions are for landfill only, not any other sort of disposal.

Lord Howie of Troon: It would make the figures look rather more reassuring—to me at any rate.

Chairman: It depends how often we are digging Channel Tunnels I suppose. Baroness Sharp, if we can move on.

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Q653 Baroness Sharp of Guildford: Waste reduction is only one of the many environmental considerations and obviously has sometimes to be compromised to take account of other factors: for example, it may be more environmentally friendly to dispose of an old product and thereby create waste if a newer product uses energy more efficiently. Who, if anyone, is responsible for examining such trade-offs and disseminating the information to businesses, local authorities and members of the public?

Mr Wheatley: If I might start, My Lord Chairman, the question is into an important issue which we pick up from our member councils and they pick up from their public and we are very grateful for the keenness on the part of the public to do things that are positive environmentally, but there is a great deal of confusion about some of the trade-offs that are in the question. For example, people are confused about whether they will do more environmental damage by buying a new product and throwing away an old one than carrying on running an energy-inefficient boiler or something of that kind. Much information that the public has access to is derived from commercial organisations who are obviously trying to sell a product, and they will be stating their case as they are perfectly entitled to but it may not be the most objective. The Government, in its action plan on sustainable procurement, talks about setting up a national centre that would put out information of that kind. I have not seen any update recently on how that is going, but if there were that sort of standard source of information available our member councils would be very willing to play a part in explaining it to their public and encouraging them to make the right decisions about carrying on with inefficient old products versus buying new efficient ones.

Q654 Baroness Sharp of Guildford: Should the UK meet its targets to increase its use of renewable sources of energy, do you think this would shift the balance of decisions in favour of waste reduction?

Mr Murphy: You have caught me on the hop somewhat. It could do, yes, if we are generating more energy from the use of renewables then it has to make certain consumable products that much more efficient to produce and that much more valuable to the user. I suppose it is a factor, but whether it will be a significant factor in the short term is another matter.

Q655 Baroness Sharp of Guildford: What about the BREW-funded projects? We have heard that some of those may not receive further funding until after this year; what impact would the cessation of this funding have on waste reduction in the UK?

Mr Murphy: As far as the waste protocols are concerned, we are assured that the work will continue despite the fact that the BREW funding will cease, but there are other funding pots from other agencies. If that had happened and then that amount of waste material and that potential financial benefit to the UK was lost because the investment was lost from BREW it would have been devastating, I think it is a real shame. As mentioned earlier, the loss of the environmental body research fund was devastating as well.

Q656 Chairman: Dr Craig, do you want to come in on this point?

Dr Craig: Yes, if I may. The background to this is, of course, the Government's undertaking to recycle extra money it raises through the landfill tax in the business sector through the BREW fund and also in the local authority sector back to local authorities, and I believe there is some doubt about whether this is actually happening as the Government is keeping more of this money to itself for the Treasury generally. The focus of the BREW fund has had to shift from giving help to individual companies for waste reduction and better use of resources to providing some general information and advice to companies about how they should do it.

Mr Jones: You may care to recommend, My Lord Chairman, that there could be a body that actually marshals all this because in the area of carbon accounting you have got the Climate Change Commission under Adair Turner, you have got the Carbon Reduction Group under Paul Ekins, you have got the national accounts in the NAO and the ONS looking at CO₂ footprints. We are members of the Aldersgate Group which is campaigning for common metrics for carbon and standards. The second big area is product integrity and the introductions of new products. These tend to be an area dominated by the NGOs—the Green Alliance have done a lot of work with bio-plastics in the food retail chain and concluded that if you put bio-plastics in bottles you may be creating more problems than solutions. In the advisory area like NISP, the National Industrial Symbiosis Programme and the Knowledge Transfer Networks, and it does need a map because not all these organisations share their evidential processes before they shooting them out on an unsuspecting public. They are using different standards.

Q657 Lord Methuen: Should it be the role of waste processing companies and materials suppliers to work with designers and manufacturers to ensure that the disposal or use of products at the end of their lives are considered at the design stage?

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Mr Jones: Yes, very much so. I suggest that if we had a single point manufacturer/producer responsible for physical products, then they would be letting major contracts and there would be a commercial relationship where there would be feedback. The costs of waste management would be much like a cost of production, and therefore they would look at the cost of waste management in the same way that they look at energy efficiency or materials efficiency or product functionality on the inbound chain. We have lost that connectivity because it is diametrically opposite to that at the moment. The waste industry goes its own way—not just conventional waste companies but these other end process technologies, almost regardless of information or co-operation of the manufacturers.

Mr Wheatley: If I may add, My Lord Chairman, it is also very important that there is a dialogue with people responsible for recycling and disposal in local authorities, and indeed we in the association have been promoting a discussion with trade bodies on the manufacturer and retailer side so that there is more of a dialogue between people who are thinking about new products and people who are responsible for their disposal. There have been instances where, for the best of intentions, people have introduced for example new packaging materials not aware that they are extremely difficult for authorities to collect and recycle, so things actually end up in landfill when they were intended to be recyclable; we need to avoid that sort of outcome and we will avoid it by having a lot of dialogue upstream with everybody agreeing to play their part in a process that corresponds to the waste hierarchy.

Mr Murphy: Lord Crickhowell mentioned in the previous evidence session that there are questions which seem to be segregated between educationalists and the industry so perhaps I will take the opportunity to launch into an answer which my colleagues might have made. We would like to see that sort of education system pick up on designs so that those undergraduates and postgraduates who are looking at design, architecture and manufacture are aware of the opportunities and the innovation in the secondary product industry so that they can design, not for obsolescence but for recycling, they can design for remanufacture, put products into the system which can be then re-used again and again.

Q658 Lord Methuen: I would like to mention this vexed product of coloured glass. We all segregate our glass into the different colours and we understand that when it then leaves the collection point it all gets bundled in together and hence becomes totally useless. Can you comment on that because it strikes me that this is an area where particularly people like Biffa and your associate

companies and the other companies in the same business have a problem.

Mr Jones: Much of that material is mixed because the economics of the process favour its reintegration back into road surfaces, and effectively what we are doing is using incredibly carbon-intensive silicates in the form of scrap glass, to compete against sandpits so we have lost the benefit of all that carbon energy we put in. The reason for that is that the distances to take that material back to the centralised processing centres are too great and the carbon cost is not included in the equation. The rising costs of energy are now creating shifts in the demand pull from the glass industry and we as a company—and indeed other of our competitors—are rolling out large-scale glass reclamation programmes for commercial disposers in brewing, the entertainments industry, hotels and those sorts of areas. Ultimately, where you have carbon intensive products like glass you can use a regulatory approach or just introduce a glass ban to landfill; if you had those sorts of signals then you would get quite large material shifts.

Q659 Chairman: Does anyone from local government want to say anything about that because it is not wholly the responsibility of commercial firms, that type of issue, is it?

Dr Craig: Local authorities are to a large extent governed by the economics of this and as it is a lot less expensive just to collect mixed glass, if there is an outlet for that, that is what the local authorities will tend to do. We try to work with local authorities, making the case that even though it costs local authorities more to get colour separation and although there is more green glass than the country is able to recycle, the brown and the colourless glass are in demand but the price premium that they are able to get for those two is not sufficient to make it economically advantageous to local authorities to do that because, as you know, local authorities have got many choices and many priorities about where they put their funds.

Mr Wheatley: In that answer and his previous one Dr Craig alludes to a very important point about the extreme financial pressures on local authorities, a very, very constrained financial settlement, and as Dr Craig mentioned the Government has shifted its policy on the recycling of landfill tax revenues so that in the CSR period we are just entering, £1.5 billion of landfill tax funding which would, under the Government's previous policy, have come back to local government is not going into local government. That will almost inevitably force local authorities to take a very hardnosed economic attitude to the sorts of services they undertake, they will not be able to afford to do things that are not the minimum cost solution to securing recycling and

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disposal. That is a great pity and we would very much welcome this Committee's support and other people's support in pressing the Government to rethink that going back on its earlier undertakings.

Q660 Chairman: Do you not think that part of the problem is that there are too many local authorities with insufficient markets for this kind of activity and that really it would be more sensible to give it to larger strategic authorities, because the idea of local control seems to have gone out of the window—when there are private companies doing it anyway the degree of democratic accountability is very limited. Would it not be better if you just threw your hands up and said “We cannot do this any more because we are not big enough, we are not efficient enough and there are too many of us trying to do it”?

Mr Wheatley: My Lord Chairman, one can to some extent have one's cake and eat it. One of the things that is in the Climate Change Bill that we support very strongly is the introduction of a power to create joint waste authorities and that means that local authorities can work together.

Q661 Chairman: Is that they were unable to do it before or is it that now that you have the legislation you are encouraged?

Mr Wheatley: There is a strengthened statutory framework for collaboration between authorities, and that is very welcome. There is still a strong case for local control over waste, particularly as it becomes not just a service but a means of achieving very important environmental imperatives through individual behaviour change, that local authorities as bodies that are close to local people are very well-placed to encourage people to think about their behaviour and its environmental impacts. I would have said that maintaining local control at a fundamental level over how waste gets collected and disposed of is absolutely right, but there is a lot of scope for local authorities to work together on some of the more downstream aspects to secure economies of scale and make sure that their practices follow the best available evidence.

Q662 Chairman: Can I just get it right: you have always had that power to come together and to cooperate and so far it has not been used. Now that there is going to be in the Climate Change Bill the legislative means whereby this is going to happen, the myopia of local authorities so far in seeing what to most people is blindingly obvious is now going to be transformed because there is going to be an additional legislative power which they do not really need because they had it already.

Mr Wheatley: First of all the power was in the local government Public Involvement in Health Bill. It was possible for local authorities to come together before but that legislation has removed some of the obstacles and difficulties that stood in their way in the past and I know that a number of authorities are already developing this sort of arrangement or have developed it. We could certainly let you have a note on that point if you would find it helpful.

Lord Lewis of Newnham: I would appreciate knowing what these obstacles were.

Q663 Chairman: The heads of most councils I would suspect, and officials who were looking after their bailiwicks.

Mr Wheatley: As I said, My Lord Chairman, I am very happy to let you have a more detailed note on that point if you would find it helpful.

Lord Crickhowell: Can I come back to this whole question of cost? I heard your answer on bottles and yet we heard from the industry that again in Europe they do not seem to be having the problem or they are meeting it in some way, and that our industry is therefore being gravely damaged by what is happening. The chartered institute does rightly say that the primary driver for most manufacturing is the cost of those products and we are hearing that cost comes into the whole equation about whether you get virgin projects out and how you collect and so on. We have been told repeatedly in evidence that the contracts that local authorities provide to waste management companies are usually based on tonnage of waste, and that means that lighter materials—aluminium is a particularly good example of a high quality, recyclable material—never get collected at all. We had a reference earlier and we heard again in the evidence that somehow because of these cost factors a lot of the material is disappearing into informal channels and going perhaps to exports and illegal exports. Is there something fundamentally wrong with the whole arrangement at the moment, that it is based on weight rather than on some other factor, that we have not got a proper balance of costs to get the maximum benefit out of it? Our continental competitors do seem to be doing much better in this field; is this to do with costs and weight? Can you elaborate on what is going wrong—and it is clearly going wrong at present?

Q664 Chairman: We are conscious of time so if you can keep your answers fairly short that would be helpful, but Dr Craig and then Mr Jones.

Dr Craig: The fact is that local authorities have been set weight-based targets and there is a related issue which is around the costs specifically in relation to packaging but also other related things. Local

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authorities at the moment pay the collection costs of the lighter materials which we would like to get more of out of the waste stream and because they have got very low bulk density they are very expensive to collect in terms of pounds per tonne. There is a question that your Lordships might consider about whether this cost should be borne by local authorities at all. Certainly local authorities do not need any more targets when it comes to waste management; we have plenty of those and we have more than succeeded in achieving the targets that the Government has set us. For very lightweight materials when the cost of collection per tonne is very high there is a considerable gap between the value of the material when you have it to sell and the actual cost of collecting it. The answer to this is to shift it over to producer responsibility and say that producers should be working with local authorities. We agree that there should be more consistency between the systems that are operated to collect waste, both from individual people and from firms, but the cost is a crucial issue as far as local authorities go.

Mr Jones: My suggestion, My Lord Chairman, for the differences between the EU and the UK is that the EU is ten years ahead of us.

Q665 Chairman: We are part of the EU as well.

Mr Jones: In mainland Europe the waste industry has been stable for ten years because they have had high landfill taxes, they have had certainty on technologies and so on. Here in the UK we have this dynamic of four major factors that are in a state of changing and evolving tension: the first is what is happening to local authorities in terms of scale economies, the second is the fact that if you establish this much more decisive approach in terms of producer responsibility, then on our estimates—and I can provide you with a note—10–12 million tonnes of the 30 million tonnes for which local authorities are responsible would change from being a cost liability on the local community and they would in fact receive an income from those industry supply chains. We have batteries on the go, we have nappies—there are 1.5 million tonnes of incontinence pads and nappies in the stream that are a cost on local authorities but in fact they are generated in part by the NHS and also of course by stances for products that may or may not be used efficiently. The third dimension is this issue around the closure of landfill sites and the fact that the tax, which is now at £24 after ten years, is going to go to £48 in the next three years, so you have this sharp acceleration which is creating uncertainty. The fourth big block is the box labelled technology: are we going to go down the thermal route, the biological route, anaerobic digestion or recycling

and different companies and different regions are approaching that differently so you have a complete situation of instability created by these four major issue areas.

Q666 Baroness Platt of Whittle: How successful have national and local government been in implementing sustainable procurement policies that consider the entire life-cycle of the products?

Mr Wheatley: The Local Government Association thinks it is a very important area as part of the work we are doing on climate change and we see waste as very much a component of what local authorities can do to tackle climate change. Work has been going on into sustainable procurement and some local authorities—Wakefield, Newcastle, Easington, Norfolk spring to mind—are already pursuing very progressive and effective approaches to sustainability and procurement, but a local government working group published a report in November last year which sets out a road map for the local authority sector to improve the sustainability of its procurement approaches, notably carbon, and the other things that go with carbon like whether our products generate a lot of waste, particularly non-recyclable waste. We are now in the process of organising an action plan that will take the recommendations of that task force report forward. The only caveat I will put on all of that is again the extreme financial pressures that local authorities are under and a strong pressure to achieve short-term efficiency savings which may not be the same as a long-term sustainable definition of the costs and benefits of particular types of procurement.

Q667 Baroness Platt of Whittle: What conversations do local authorities hold with waste processing companies when developing procurement policies and how do they educate their staff to consider the full life-cycle implications of the materials and products they purchase, because it is a life-cycle thing, is it not?

Mr Wheatley: I very much agree, My Lord Chairman. It is certainly part of the work I have just referred to both to encourage local authorities, particularly in combination, to have an intelligent dialogue with people with whom they are in a commercial relationship—the people they source goods from and the people whom they dispose of them to—so that the private sector has the scale and certainty it needs to come forward with procurement solutions that work for local authorities. Again, it is also an element of the work that I have just referred to for councils to think about how they educate all of their staff, not just a handful of procurement staff, to think about the

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decisions they make and to make them more sustainable.

Q668 Baroness Platt of Whittle: The Federation of Small Businesses told us that small businesses are sometimes unable to compete for procurement contracts—this follows up what you have just said—because the standards are aimed towards big business. Do you think that there is a need to alter the ways in which the procurement policies are developed?

Mr Wheatley: Of course local authorities, under the financial pressures to which I have alluded, are often going to have to go for best value solutions, and those will often inevitably be delivered by the largest companies, but local authorities also adopt a variety of approaches to try and even out the playing field between larger and smaller businesses. For example, many authorities run what are called meet the buyer days when small businesses can come into the council and talk to the people who are making procurement decisions and get a clear idea of what the council needs.

Q669 Lord Haskel: Is this matter about small businesses really a problem? What happens to their waste, do we know?

Mr Wheatley: Certainly many local authorities have been taking very progressive initiatives, going beyond what they are statutorily required to do, to provide the sort of recycling service that small businesses often find it hard to secure from the private sector, but local authorities do face something of a disincentive to collect waste from businesses because any residual waste that they end up with is subject to the Landfill Allowance Trading Scheme (LATS), unlike private contractors. It is something that authorities will try and help with if they can, but we do think we need a more consistent and secure central government policy framework to encourage more action in that area. I suppose my other observation, thinking of Mr Jones' earlier points, is that as the rate of landfill tax increases there will be more and more incentive on the private sector to provide recycling and re-use solutions for smaller businesses to a greater extent than they do at the moment. Only last week actually I saw a facility in Liverpool that is now taking quite small quantities of construction waste from smaller builders and I understand that is passing the point of breakeven now, precisely because of the effect of the rapid increases of landfill tax.

Dr Craig: My Lord Chairman, in its Waste Strategy 2007 the Government announced that it wanted local authorities to become more engaged with businesses and commercial waste generally, presumably through direct provision of services and

partly through the provision of better advice on the former. The operation of the LATS actually militates very strongly against that and for local authorities to collect more commercial waste looks as if it is increasing both the risk and the cost of having enough landfill allowances to cover their obligations there. The Government has just done a light touch review of LATS although, unfortunately, it did not extend to questions such as should the commercial waste that local authorities collect be included in LATS or should private sector companies that collect the same commercial waste also be subject to targets and possible financial penalties.

Mr Murphy: As a £3 million industry employing 40 odd people we (CIWM) are an SME and three or four years ago we found it extremely difficult to get rid of our recycled paper—you can imagine that we are a very efficient recycling organisation as well as all the other work we do—but now when the market is enhanced there are others competing with the local authority to actually collect our recycled paper who want to get into the market, but none of them will collect the other materials because with economies of scale we cannot generate enough for it to make it worthwhile. This is a big issue as well for SMEs.

Q670 Lord Haskel: Do you pay to have your waste collected or is it something that the local authority does for you?

Mr Murphy: The waste is collected by the local authority for a charge, the paper is taken away because there is a market and a value.

Q671 Lord May of Oxford: Defra's Waste Strategy reports that targets will be set for local authorities focusing on the "amount of municipal and household waste produced, recycled and landfilled", with the indicator actually being the "average amount of household waste per person that is not re-used, recycled or composted". Do you think that is a sensible way to frame the indicator?

Mr Wheatley: If I might start, My Lord Chairman, what we have ended up with in the national indicator set for local authorities is three indicators, all of which one way or another are about the amount of waste that either does or does not end up in landfill. Of course, in the new performance regime for local authorities no local authority would have to choose any of those three targets; my view is that actually local authority behaviour is much more likely to be driven by landfill tax and the LATS regime than it is by these targets. Of course, both of those would drive local authorities to minimise waste disposed to landfill, but of course that is then open to criticism that authorities may

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find ways of avoiding their landfill liability by recycling rather than mechanisms that are preferable in terms of the waste hierarchy of re-use or avoidance. In practice between collection and disposal costs recycling is still often a costly activity for local authorities and if local authorities can find a way of avoiding collecting waste in the first place it would certainly prefer to do that rather than collect it for recycling, but that takes us back to some of the points that a number of us have made in this session about the need for a central government policy framework that promotes avoidance and re-use, which we do not quite have at the moment.

Lord May of Oxford: I particularly liked the answer that Mr Wheatley gave to an earlier question which relates to that very problem.

Q672 Chairman: That is fine. Mr Jones.

Mr Jones: One brief point if I may, My Lord Chairman. It is worth making the point to your Committee that we have this enormous divide between waste from households and waste from industry and commerce, because in the mid-nineties, when the Landfill Directive was translated, a translator presumably assumed that in English parlance municipal waste means waste from households. In mainland Europe “municipal waste”

is waste that is similar to that from households and in Europe all businesses, SMEs included, are subject to LATS-type frameworks and all of the requirements that are imposed on British local authorities. The only driver in the UK has been the landfill tax, and that is a major confabulation—if that is the right word—that has been introduced into this debate, probably by the act of one translator.

Q673 Chairman: We are going to Brussels and we will explore that point; we will see if we can find the suspect but what we will do with them I am not sure, whether they are recycled remains to be seen. Can I thank you very much for your evidence this morning. I am conscious, Mr Wheatley, that in the light of our discussion you might want to submit something further and I know that there were certain areas that you wanted to explore and speak about. If you have not covered them all then please do not have any qualms about getting in touch with us, we are quite happy to accept additional notes. Mr Jones, you said there was a point you could provide us with some information on as well. That would be helpful.

Chairman: Thank you very much for your evidence and thank you for your patience.

Supplementary Memorandum by Biffa

Producer Responsibility (Q665)

For the last decade we have been emphasising the need to review the Construct for Producer Responsibility funding as it was originally determined by the Sir Peter Parker Review Group. Now that commodity prices are heading upwards due to demand, capacity limits and the cost of embedded carbon, there is a clear case for single point Producer/Importer financial liability for end Waste Management costs. With that responsibility would come ownership and with ownership would come economic benefit in the form of cheap raw materials or income streams.

In this construct sector, bodies or individual brands would be obliged to let large scale (regional) contracts for collection and disposal through tendering processes similar to public sector waste collection/disposal. They would require to be supervised by the OFT or subject to Audit Commission control and be obliged to declare their net recovery cost on the product. In the following sectors: packaging, WEEE, nappies/incontinence materials, chemicals/HHW, tyres, ELVs; the effect would be to remove financial liability for around 12 million tonnes of materials from the public purse onto supply chains equivalent to around £1.2 billion of cost for collection and disposal. Environmentally the impact would probably be significantly lower due to route collection logistics, densities and economies of scale in underwriting capacity supply guarantees for end life processing plant—whether for recycling, composting or CHP Energy. As the existing confused and cluttered framework for managing Producer Responsibility achieves sclerosis, such an approach is urgently needed.

June 2008

TUESDAY 1 APRIL 2008

Present	Crickhowell, L Haskel, L Howie of Troon, L Methuen, L	O'Neill of Clackmannan, L (Chairman) Platt of Writtle, B Selborne, E of Sharp of Guildford, B
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Memorandum by The Society of Motor Manufacturers and Traders Limited

1. The Society of Motor Manufacturers and Traders (SMMT) is the leading trade association for the UK automotive industry, providing expert advice and information to its members as well as to external organisations. It represents more than 500 member companies ranging from vehicle manufacturers, component and material suppliers to power-train providers and design engineers. The motor industry is a crucial sector of the UK economy, generating a manufacturing turnover of £47 billion, contributing well over 10 per cent of the UK's total exports and supporting around 850,000 jobs.
2. SMMT members are regulated in many areas that require them to be resource efficient such as IPPC, packaging waste and have producer responsibility for End of Life Vehicles which requires them to meet demanding material recovery targets. SMMT members are also acutely aware of the need to reduce CO₂ emissions from all sources, and therefore seek to be efficient in manufacturing, operation and recovery of their products.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

The automotive product development activity establishes the key features required for a new vehicle programme. This could include marketing clinics to gauge consumer opinion and benchmarking current market leaders in the segment. An important consideration at this stage is the production cost and weight of the final vehicle. It follows that every component design will undergo an evaluation which will include manufacturing and material efficiency before sign off for prototype production. Computer aided design packages have given engineers the capability to evaluate component performance on screen and optimise material usage. The End of Life Vehicle Directive required manufacturers to eliminate certain heavy metals from their products; this required the component supply industry to inform their vehicle manufacturer clients what materials and quantities were used. This led to the formation of the International Materials Database System (IMDS) widely used today. ELV legislation also required the creation of a new ISO standard 22628 Road Vehicles-Recyclability and Recoverability Calculation method. This was followed by another EU Directive for Type Approval for Re-usability, Recoverability and Recyclability. This Directive requires that from 15 December 2008 Manufacturers must demonstrate using the ISO standard that a new vehicle can be reused or re-cycled to 85 per cent within an overall 95 per cent recovery target. Manufacturers have developed lists of proven recovery processes to satisfy the heavily regulated material streams generated at end-of-life. I think this demonstrates that good design, avoidance of waste and recovery at end-of-life are important considerations in the development phase.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

The modern motor vehicle is required to meet many legislative requirements, crash protection, material recovery, and the need to reduce weight to achieve CO₂ targets. These requirements often conflict with each other. Looking at the whole life cycle of a vehicle it is evident that the use phase in terms of CO₂ has the most significant environmental impact at around 85 per cent. Production of the vehicle uses around 10 per cent and end of life 5 per cent. So materials that offer weight saving offer the most environmental benefit. This has led to an increase in the use of light alloys for some applications and total aluminium body structures in others. High strength steels are used in place of mild steel in some areas to gain a weight reduction. Metals are highly sustainable and readily recycled back into new product. Between 10 per cent and 12 per cent by weight of a

car is plastic of some description. All manufacturers provide dismantling information for all of their products through the International Dismantling Information System IDIS this allows a dismantler to identify what type of plastic a component is made of and how to remove it. The logistics and economics of this approach are variable. The Plastic Reprocessing Validation Exercise PROVE demonstrated that polypropylene could be extracted from shredder residue and processed with virgin material into a Nissan air cleaner unit. This post shredder recovery of material is the most efficient and cost effective method of reaching recovery targets.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

As mentioned above Type Approval requires manufacturers to demonstrate 95 per cent recovery at end of life. Lack of availability of materials would impact on cost and would promote the search for more sustainable alternatives. Manufacturers are also concerned that robust processes exist to reach the high recovery targets. One example developed by Volkswagen the VW-Sicon process is now successfully installed in several European countries. The proposed new Waste Framework Directive changes the definition of recycling and could affect the viability of this new technology. Only a broad and consistent recycling definition as proposed by the EU Commission will create legal certainty and ensure the continued development and investment in innovative and eco-efficient recycling plants.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

The automotive industry requires materials and components to undergo accelerated durability testing before incorporating new materials into production. Our Research and Development centres in collaboration with the supply chain are continuously evaluating materials and processes to meet improved product specification in areas of weight, performance, NVH, safety, durability, assembly and disassembly. Some of our R&D facilities have access to patent facilities on site.

Can better designed products offset the increase in consumption?

Vehicles are more robust and durable than ever before, with the effect that average vehicle life is increasing. Consumption remains high because consumers judge that the alternative options for mobility and transport of goods as not viable or less attractive.

Are there any other gaps in knowledge and how are they being addressed?

The automotive industry operates on a global scale and there are many alliances between companies on power train or body components. Very often they have a common supply base. Companies work in close co-operation with academia and chartered institutes. There is in the UK Government sponsored Knowledge Transfer Networks including SMMT Foresight Vehicle programme a collaboration between industry, academia and Government. More than 100 research projects have benefited.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

Existing and new proposed EU legislation is not always coherent and is sometimes contradictory. New legislation should be based on good impact assessments with a life cycle perspective. The ELV Directive provided in article 7.2 that by the end of 2005 there would be a review of the targets set for 2015 of 85 per cent reuse and recycling within an overall 95 per cent recovery target. A multi stakeholder group provided a report that gave several options but that concluded that targets would not be as effective in reducing waste from vehicles as restricting landfill. This would stimulate investment in innovative post shredder technologies.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

Vehicle Manufactures all have environmental policies that promote sustainable thinking from the top of the organisation. At the detailed level there are specific internal processes that ensure the consideration of sustainability in design and other business areas.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

Government as the regulator and its agencies as enforcers should first ensure that waste laws are practical in application and simple to understand. Industry views should be listened to and UK competitiveness protected. Like manufacturers' good design, legislation should be tested for unintended consequences. Once laws are passed they must be correctly enforced, those who comply often have to invest heavily whilst those who do not comply escape both investment and too often enforcement. Looking at ELV enforcement, Government agencies are failing to enforce correctly in the ELV recovery network and non compliant businesses are making the compliant sector un-competitive. DVLA have failed to implement a foolproof Certificate of Destruction system, an essential component of ELV legislation. For 2006 this led to only recording around 600,000 vehicles as depolluted and recycled against an expected 2,000,000. For 2007 this has reached around 1,000,000 but still represents less than 50 per cent of the forecast for scrapped vehicles.

How does Government policy link up with European strategies and action plans?

Vehicle manufacturers must have consistent harmonised legislation in all member states. It is impossible to design and build vehicles for specific national material requirements. It is also important that duplication of legislation is avoided, ELV, WEEE, and the batteries directive all require collection systems and recycling targets to be met. It is essential that there is no product overlap and that vehicle manufacturers meet their obligations through the ELV regulations.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

CO₂ emissions from the UK passenger car fleet are now below 1990 levels, linked to a 13 per cent reduction in average new car CO₂ emissions in the last ten years. This has been achieved partly by improved design and technology and partly by market shift. As smaller cars have become as highly specified as larger cars, the option to down size is more attractive. Diesel engines are quieter and more efficient as well as meeting demanding regulated emission standards. Government is hindering further CO₂ progress by not encouraging dieselisation. In 1997 there were no cars below 120gm/km of CO₂ now that is 5.4 per cent under 120 and 23.5 per cent under 140.

What role do marketing strategies play in influencing more sustainable design?

Evidence from the King report, LowCVP Car buyer research report and DfT 2004 found that the most important factors in car purchase are, in order price, size, reliability, comfort, safety, running costs, fuel consumption, appearance. Least important are Environment and emissions. If the consumer was buying the lowest emitter in any VM model range then new car CO₂ emissions would be 139gm/km (ie 16 per cent lower than today) The consumer wants choice and diversity, manufactures have to deliver that and build in environmental performance as standard.

The SMMT 8th report "Towards Sustainability" examines production, consumption and recovery of vehicles and examines CO₂ emitted through the vehicle life cycle. Based on LIRECAR 2004 study less than 5 per cent of a vehicle's total life energy is consumed in recovery/disposal. This 5 per cent can be mitigated by efficient post shredder recovery operations.

RECOVERY AND DISPOSAL

SMMT is of the opinion that only waste recovery that is environmentally sound should be undertaken. The energy consumed and consequent CO₂ emissions produced can only be justified where worthwhile substitution or efficiency levels are reached.

END OF WASTE

SMMT consider that the reclassification of waste as a secondary raw material once it reaches a standardised specification is correct. This has been achieved with the PROVE project for recycled plastics. Whether a market exists or not does not affect the product, and should not be a criterion for deciding whether it is still waste or secondary raw material, markets for recycled materials have to compete economically with virgin material. The incentive to recycle efficiently to reduce cost and the fluctuation of virgin material price will impact markets differently over time.

SMMT would prefer that existing engineering standard processes and bodies determine the quality criteria required rather than use the comitology procedure.

February 2008

Examination of Witnesses

Witnesses: MR STEVE FRANKLIN, Senior Manager, Environment Group, The Society of Motor Manufacturers and Traders Limited, MR JERRY HARDCASTLE, Vice-President, Vehicle Design and Development, Nissan Technical Centre Europe, and MR PETER STOKES, Vehicle Compliance Manager, GS Product Technical Group Services, Volkswagen Group United Kingdom Limited and Chairman of the Consortium for Automotive Recycling (CARE), examined.

Q674 Chairman: Good morning, gentlemen. Perhaps, Mr Franklin, you could introduce yourself and your colleagues can do so along the line.

Mr Franklin: Yes, thank you very much, good morning. My name is Steve Franklin and I head up the Environment Department of the SMMT; I have been there for eight years, predominantly taken on to look after the ELV legislation implementation in the UK. I have had a total of 45 years in the motor industry, manufacturing predominantly, but a little bit of product development.

Mr Hardcastle: Good morning, ladies and gentlemen, I am Jerry Hardcastle, I am the Vice-President for Vehicle Design and Development at Nissan Technical Centre Europe, based in Cranfield, UK. I have responsibility for other offices in Barcelona, Brussels, Bonn and Moscow. From a business point of view I have a reporting line to Nissan Europe and from a functional point of view I have a reporting line to the global research and development function, Nissan Technical Centre, in Japan.

Mr Stokes: Good morning. My official job title is Vehicle Compliance Manager for Volkswagen Group in the United Kingdom. My relevance to this Committee is that it was my job to ensure that our group met the end-of-life vehicle responsibilities and, as part of that, became chair of the Consortium for Automotive Recycling which was formed in the mid-Nineties to tease out and work with a lot of the issues that we have now put to bed enabling the End-of-Life Vehicle Directive to function in the UK, so my experience is more on the recycling end rather than my colleagues' which is on the design.

Q675 Chairman: That is very helpful, gentlemen, thank you. This morning we recognise that at least two of you will be talking on behalf of your companies, and we will see you about complaints we have about your vehicles later on. As far as Mr Franklin is concerned, I imagine you will be able to range over the subject as best you can.

Mr Franklin: I would like to think that we can cover the whole remit if necessary, yes.

Q676 Chairman: Perhaps we could start with you, Mr Hardcastle. To what extent can better design and novel materials be used to reduce waste in the automotive industry? Can we start with the design end as it were?

Mr Hardcastle: There are a number of ways that we can reduce waste and they are quite often related to the reduction of weight and also a reduction of cost as well. For example, we would use a particularly high strength steel, sometimes up to 980 megapascals. If you use a steel like this it is actually difficult to manufacture with, difficult to weld, difficult to form; however it allows us to delete additional brackets and it allows us to use thinner material, so therefore at the end of the vehicle's life there is less material that needs to be recycled. We can also use a ultra high modular plastic for the bumper; in that case we could delete some of the bracket trays and the aluminium supports that might be behind the bumper, and that would of course reduce the weight and reduce the cost, but it also deletes some metal parts that then do not have to be wasted or recycled. In the area of the catalyst, for example, for emissions control, those

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have precious metals on them which are necessary for the function of the catalyst, but we would try and minimise the amount of precious metal required in order to get the exact performance, which of course stops you using the precious metals in the first place and also makes it easier to recover them because there is less of them at the end of the process. They are just a few of the ideas; there are many more ideas if you would like to hear more.

Mr Stokes: I would agree with my colleague. One thing that is worth pointing out, and I am sure you are aware, is that the design end of building a car is intrinsically tied to the tail-end and the way the vehicle is actually treated. The way that the vehicle is shredded at the end of its life has a direct influence on how you build it at the beginning of its life. To illustrate that, a couple of examples: in the mid-Nineties one manufacturer was making plastic bumpers which were a plastic skin which was filled with a liquid foam and there were metal brackets set into that. Once the foam hardened it actually bonded to the plastic skin and bonded to the metal brackets which, when the vehicle was shredded, meant that you had a mix of materials that was very difficult to separate, very difficult to recycle and would more than likely end up in landfill. Moving away from those techniques of using dissimilar materials for making a component means that you end up with something which can fragmentise easily and is subsequently easier to recycle.

Mr Franklin: There are many computer-aided techniques now for designing components that are very materially efficient—Nastran is an example of computer-aided technology where we can eliminate material and get down to absolutely the minimum requirement of material to be used and then get an efficient design. For instance, if you were looking at crash performance, you could actually simulate that very effectively and put in high-strength steels instead of heavier mild steels in particular areas, so the design aspect at that point becomes crucial.

Q677 Lord Methuen: May I ask a question about the shredding process? Have you semi-dismantled the car by this time, so you have taken the bumpers off and other plastic components and you are shredding the individual components rather than the whole thing?

Mr Stokes: No, it is economically impractical to do that, so the bare minimum of hand dismantling actually takes place, which would be the removal of fluids and the removal of what the directive calls hazardous substances—batteries and mercury components, those sorts of things. The vehicle is then crushed and shredded and then the materials subsequently extracted from that.

Mr Franklin: If I could just add something to that, something like two million ELVs are disposed of in the UK every year although at the moment the

DVLA is only recognising about a million. That is the equivalent of about seven Nissan factories worth of production, but we have 1400 authorised treatment facilities (ATFs) actually disposing of the vehicles, so the logistics of moving the stock around are not quite so good. Although, yes, you could take off plastic bumpers and plastic components, the logistics of getting them all together at the dismantling stage do not really tie up unless you have got a moulder right next door to you, so we tend to look at it going to the shredders, and there are only about 35 shredders in the UK so you get better logistics of recovering material.

Q678 Lord Haskel: What happens to the other million?

Mr Franklin: We would like to think that the other million were correctly disposed of but there are some issues that you may be aware of with the DVLA at the moment. Central to the ELV legislation is a certificate of destruction; every vehicle entering an ATF should be issued with a certificate of destruction. The DVLA has not implemented that in quite the way we would have liked it to have done in terms of there is an ability to make some self-declaration of scrapping the vehicle on a V5, therefore it does not end up logged with a Certificate of Destruction (CoD). This is something on which we and DTI (now BERR) have made continuous representations to them.

Q679 Baroness Sharp of Guildford: How far is there recycling of parts as they go along? The modularisation of motor cars in this way means that rather than dents being pushed out there is a tendency to just take off the door and put a new door on or take off the bumper and put a new bumper on. How far is there any recycling of these parts as they go along?

Mr Franklin: There are some insurance schemes that recognise the use of using recycled parts. They are in their infancy but there is an opportunity; if you say “I do not mind having recycled parts put on my vehicle if and when I damage it” then you can have that done. The reparability is one of the major things that we look at. As the vehicles become more complex in their design the reparability issues do become quite severe: we are using adhesives now, we are using different forms of joining technology and there is so much integrity in the build of a vehicle now—its crash protection et cetera—that it has to be very carefully looked after when repairing crash damage.

Q680 Lord Crickhowell: On reparability, as seen from the car owner/driver’s point of view, there are some changes which seem to make things worse rather than better—no doubt there are good reasons why those changes have happened. For example,

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exhaust systems: exhaust systems still rust and still have to be replaced but now it is a much more major operation because instead of just having a box replaced you find it has got a catalyst and something or other in it and it is quite a big component so an awful lot has to be changed. Many of us do not quite understand why the car bumper has been eliminated entirely from the back of motor cars; people do still bump their vehicles in one way or another and now you actually bump in a way that means you have to replace a large part of the front or back of your car when in the past you had a bumper for protection. I do not quite see why some of these minor points cannot be improved so that not only does the owner have rather less hassle of replacement than he currently does, but actually I would have thought it would eliminate a certain amount of waste as well. I am sure there is a very straightforward answer and I would love to know.

Mr Franklin: I am sure Jerry will have some answers for that, but just one I can think of immediately is crash. Obviously we have got to have crumple zones and if you look at the way a car deforms now the cabin is intact because any energy is absorbed at the front end on impact. The latest piece of legislation on pedestrian protection is even more important for having soft front ends of vehicles to protect the pedestrian, and up to 30 miles per hour all would expect to survive—the bonnet will rise up so there is no hard landing. I have said in the written evidence there are a lot of design criteria that we have to mix and match and not everyone is consistent and they do not all necessarily help each other out, but that is a specific example there.

Mr Hardcastle: Particularly the bumper area, as Steve mentioned, is critical for pedestrian impact and there is strict legislation about how the vehicle impacts on the knee of a pedestrian and what happens when that occurs. We could fix a great big bull bar to the front and protect the car but that would clearly start doing a lot more damage elsewhere so that is one thing that drives that. Of course, the driver for the catalyst and making the exhaust system more complicated is the CO₂ emissions from the vehicle, hydrocarbons et cetera. In diesels we are now fitting diesel particulate filters and all of that is for legislation or other performance improvements and, unfortunately, then you get the trade-off that things are becoming more complicated and they are not the simple vehicles that we were used to in the past.

Q681 Chairman: If we can maybe move to production waste at this stage, how do you address the challenge of production waste as designers? If you have been told not perhaps that you have to have soft-fronted cars and the end of bull bars but also we want to see reductions in emissions and waste in the

production process itself. What kind of instructions do you give to your people in that area?

Mr Hardcastle: In terms of production waste, one key area is that we would design a component so that it can be made with the least amount of waste material. This is things like the blankings, so that when you are blanking something out of steel you would try and make the shape so that it can be nested in a pattern that does not waste material. That is one thing that we might be asked to do. Another way to avoid waste is when we are actually packaging parts for delivery, so we would take parts and we would maybe change the assembly level or the shape of them so that we can stack them in a box and get more on the trucks so that there is less waste in those terms.

Q682 Chairman: What about the supply chain as well, the people from whom you source your materials?

Mr Hardcastle: We issue a purchasing green guideline from Nissan to all of our suppliers, so we tend to ask them to take responsibility for their own waste and recycling. Nissan as a company just does not like waste.

Q683 Chairman: How do you ensure that these guidelines you issue are actually followed through? Do you have somebody who goes around and checks the supplier's factory or is the pricing mechanism such that they do not have much room to manoeuvre, they feel they have to recycle and be as careful as possible?

Mr Hardcastle: The second one is what drives the waste reduction, we do not have green police but we demand cost reductions and efficiency improvements year on year on year. We know inside our own plant that when you demand those kinds of cost reductions it makes people avoid waste—waste is expensive in every way. If you do not use the material then you have to pay to dispose of it so by driving the cost we understand that that tends to drive the waste reduction at the same time. We do not police the cost.

Q684 Chairman: You do not actually police the process by anything other than the margin mechanism of price.

Mr Hardcastle: No. For example, when we are painting a part or when we are painting a vehicle there is a huge cost of wasted paint in monetary terms but also wasted paint and paint sludge is difficult to dispose of, so it is in our interests to use as little paint as possible and we have special high pressure nozzles to spray and also special electrostatic paint so that it sticks to the body and does not run off. Using those techniques we drive the cost down and drive the waste down so it is self-fulfilling, it works, you do not have to bring in a waste policeman in effect.

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Mr Franklin: It is something we have been doing for so long now that we have almost forgotten how good it is, but we always used to have in our companies goods inwards inspections, in other words you would buy in from a supplier and then you would look at everything he sent you and then say yes or no. Now we have continuous process control which means that 99.9 per cent is always going to be okay, so what you are actually saying is that just by looking at that process you know you have eliminated waste because the quality is assured. Jerry mentioned paintshops; probably one of the biggest areas of energy use and potential waste is the old air-spray where you used to wave a spray gun around, now we programme robots electrostatically and there is absolutely minimal waste. Two reasons: one is cost, the other is emissions where once again we are legislated.

Mr Stokes: If I can also add at that point that post-production scrap is probably some of the easiest scrap to recycle because it is clean, it is not contaminated with any other waste as the material would be if it were on a vehicle. Plastics are routinely now collected and recycled at our factories, as with any press scraps as well.

Q685 Chairman: One last question in this area: how do you get the message across to your designers about, for example, the life-cycle impacts of vehicles and their components? Do you keep nagging them or is there a means whereby you get that message across?

Mr Hardcastle: Each component or system that we develop we give it a performance, cost and weight target as you would expect, but also for each of the components we conduct a recyclability assessment. We have some specialists in the company who can help the designers look at the design and see that we are achieving recyclability; for example, on a door trim we used to have 25 different materials and through working together between the recyclability experts and the designers we are now down to one mono-material, polypropylene, for every part of the door trim. That makes it hugely more recyclable than the 25 parts before. They also did a packaging study on those parts, which is part of the waste, so there is a system in place which promotes the activity. Also, from a corporate point of view, we have a Nissan green programme which is to promote recovery, re-use and recycling and that Nissan green programme is used externally but it is also used as a communication internally to encourage all of the staff, in whatever role—design, manufacturing or administration—to reduce waste.

Q686 Baroness Platt of Writtle: In today's *Times* there is a very interesting pull-out on plastics, and they have a sector skill council. When you answered the questions I noticed that the Society did not

answer the question on skills. We all know that there is a great shortage of both science and engineering skills—and I speak as an engineer—at all levels, we are talking about chartered, technician and craft, and I would have thought that you would have had a sector skills council.

Mr Franklin: We tend to rely on university degrees—

Q687 Baroness Platt of Writtle: I was thinking about all levels.

Mr Franklin: The Institute of the Motor Industry does have a similar thing which has a training council. They do liaise with the SMMT and we do put together packages; unfortunately I am not that aware of what they are but there are packages of education which are available. It is either via the Institute of the Motor Industry or via SMMT and in conjunction with academia.

Q688 Baroness Platt of Writtle: Because it is vital for your shop floor workers.

Mr Franklin: Yes. Also what you do get is that companies like Nissan will undergo through the in-house training on specifics and if something comes to the fore that will be subject to some sort of internal training. It is a good question and what tends to happen, particularly on plastics, is that we have got the British Plastics Federation and they have an ELV group meeting where we talk about plastics and the recyclability of plastics, what we are doing with PVC, and this knowledge does disseminate out because all parties there are talking about it and then it goes back into the companies to see what can be done. The PRoVE project, which we mention in our evidence, was a good example of that and in fact Nissan did produce quite a few components from recycled plastics. From that, knowledge spreads out, but I take your point about training councils and they are aware and I could probably supply that evidence to you after the meeting.

Chairman: There is a passing reference to the Academy; perhaps we could hear a little bit more about that as well because that is one of the means whereby people are getting trained or up-skilled, if I can use that expression. Lord Methuen.

Q689 Lord Methuen: Have Volkswagen and Nissan taken high-level strategic decisions to reduce waste and, if so, what strategies have you implemented within your factories to do this?

Mr Stokes: Yes, it is absolutely fundamental now that we do that on a number of fronts. There are the obvious ones in terms of cost savings and in terms of not using excess materials, throwing materials away, so you have a reduction in cost and you have a reduced waste cost. If you can process those materials into components and into vehicles using less energy you have savings there and so there are pretty

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important drivers to do that. Latterly, our customers are becoming far more aware in terms of how vehicles are actually produced, not just what comes out of the pump in terms of fuel consumption, but they are now looking for us to provide information about how you minimise those things. We produce, as do most manufacturers now, sustainability reports and energy reports which detail the material usages and energy costs and energy use for the vehicles that we produce. If it is of any use we are happy to supply one of those to the Committee.

Q690 Lord Methuen: Am I right in thinking that when you are recycling plastic materials you tend to use these for what I would call “non-cosmetically sensitive things”, i.e. the bits under the bonnet where they cannot be seen in general rather than the dashboard which is part of your high profile?

Mr Stokes: Generally speaking that is the case because the material does degrade and as you use it multiple times then it makes sense to use it in an area where it is not going to be visually effective but where it can still perform a useful function.

Mr Hardcastle: In Nissan we have about 50 applications of recycled plastic using ten different material grades. We use them on the door trim, as I mentioned, polypropylene, and we would like to introduce more recycled parts onto that, but one of the problems with recycled plastic is we do not know what colour it is going to come out, so when we paint it all we try and colour match it but the base colour is different, so actually the customer would notice because the recycled plastic would be a slightly darker shade or lighter shade, so there is a cosmetic reason why we cannot do it from the customer point of view. Clearly, we do like to use recycled plastic because currently it is about half the price of virgin polypropylene, and the reason for that is the high oil price currently. Therefore we want to use recycled plastic in as many places as we can, so it is in our interests to develop the properties so that they can be used. One is colour-matching and another one is the way that the plastic fractures in a crash scenario. If the plastic part is covering an airbag, when the airbag fires we need a consistent deployment of the airbag which means we need to know exactly what the plastic will do. We can only do that with virgin material at the moment but virgin material costs twice as much as recycled plastic so we would like to develop recycled plastic with a similar consistency. Again, it is that cost demand that is driving this.

Q691 Earl of Selborne: In the helpful written evidence from the Society of Motor Manufacturers and Traders there is a reference to the process to determine the key features required for a new vehicle programme. You say “an important consideration . . . is the production cost and weight of the final

vehicle. It follows that every component design will undergo an evaluation which will include manufacturing and material efficiency before sign off for prototype production.” What would such evaluations entail and what information would you expect to be produced?

Mr Franklin: The way these engineering departments work is you tend to have a component engineer and he will be looking after a set of components and he will always have some criteria that those components need to meet. He will have some history, some previous warranty on that component, a cost target, a weight target, and then they will look at things like a teardown of a previous part, maybe a teardown of competitors’ parts, they will look at the number of cycles that it can perform, so it will be tested to the number of cycles before failure, they will do an FMEA—a failure mode and effect analysis—on it to find out why it failed,—what they could do to change it and to alter that failure, there will be a salt bath corrosion test on it, there will be an environmental test in terms of temperature from minus 20 to plus 40, all that sort of information, and then there will be a loop that says is that the right material, is this the best that we can do with this component, and we will go back to that, so you will get a whole mass of information about that specific component. Obviously it will differ from component to component but there will be, basically, a sheet that needs to be filled in with that information.

Q692 Earl of Selborne: I think it was Mr Stokes who referred earlier to year on year efficiencies, which is clearly what you are striving for, but would all sectors of the industry use the same measurement of material efficiency?

Mr Stokes: That is a good question. We have the international IMDS, the international materials database system, which yields a level of consistency at least across the materials which are specified. I did not mean to infer that year on year improvements would be made, it is normally from one model cycle to model cycle that improvements would be made. Generally speaking although cars are large they have not increased in weight as much as they could have so we would not want you to think that year on year we are making improvements but it is more about the model cycle.

Q693 Chairman: How long is the model cycle?

Mr Stokes: It varies from manufacturer to manufacturer, but six to seven years, but within that there will be small changes in terms of trim level changes or specifications that take place.

Mr Hardcastle: The upper body cycle might be six years, but we would try and get ten years or more from the chassis and the power train. The customer at the moment is demanding to change the body

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shape but not necessarily change the power train or the under-body parts of the car.

Q694 Lord Howie of Troon: It occurs to me, My Lord Chairman, that I could declare a peripheral interest because pre-history, in the Sixties, I was the Member of Parliament for Luton which at that time was quite well-known for its heavy car industry but any information that I had back then would be well out of date now. It is clear from the conversation that you have done quite a bit to increase the use of recycled materials. Can you tell me what percentage of metal and non-metal parts is made from virgin raw materials?

Mr Stokes: In a word probably no.

Q695 Lord Howie of Troon: There must be some variation.

Mr Stokes: There is, and if we take metal as an example, most metal is recovered and recycled whether it is from cars or washing machines or other products and from structural metal. This is then sold out onto the open market and it is from the open market that we purchase, so how much of that is actually recycle and how much is virgin material is very difficult to actually pin down as far as I am aware because we are just purchasing from the pool of material that is available.

Q696 Lord Howie of Troon: Could you make a guess?

Mr Hardcastle: As Peter said, certainly for steel and aluminium basically we buy it to a specification and then that supplier governs the recycle arrangements, so as long as it has certain material properties we will buy it. We understand that of the materials we are buying in Nissan, steel is about five to ten per cent recycled so 90 per cent of it is probably virgin, but on aluminium about 45 to 55 per cent is recycled.

Q697 Baroness Platt of Writtle: But aluminium is infinitely recyclable, is it not?

Mr Hardcastle: Yes, and the process of taking aluminium from ore is a lot more difficult than taking it from scrap.

Q698 Baroness Platt of Writtle: I was rather surprised that aluminium was not mentioned much, because it makes for a lighter car, does it not? You say in your evidence that most of the carbon footprint is during the life of a car, so aluminium ought really to be lighter and better and recyclable.

Mr Franklin: There has been an interesting debate in the industry; as you can imagine, the steel industry responded very strongly to the fact that people were moving over to aluminium bodies and they did an ULSAB programme—ultra light steel automotive body—which then introduced one of the things like

tailor-welded blanks, which meant that you did not have to put reinforcements in, so that an inner door which would have had a reinforcement in it now had a thicker piece of material laser-welded into it and then pressed to try and compete with and get to the same sort of position that aluminium was offering. You are absolutely right, Audi and the Volkswagen Group have got aluminium vehicles and there is a different structure, the way they are assembled is different, but there are definite advantages. Seat frames tend to be magnesium now—there are more aluminium components in the vehicle, but not necessarily going to a whole aluminium body.

Q699 Lord Howie of Troon: You cannot control this, can you, except through the pricing system, it is left to the supplier as to whether it is virgin or recycled.

Mr Hardcastle: For us in Nissan, for steel and aluminium, we leave it to the supplier but for plastics, particularly polypropylene, then for the reason I mentioned earlier we would demand recycled material because it is cheaper. We use about 50 kilograms of recycled plastic on a Qashqai, the latest Nissan to be launched, which means we are generating about 12,000 tonnes of demand a year for recycled plastic.

Q700 Lord Howie of Troon: I want to ask you about something else, I want to ask you about RFID tags, and I would like you for the record to explain to us just what they are and to what extent they are used to aid the disassembly and sorting of materials at the end of life?

Mr Stokes: That is a radio frequency identity tag and you can basically think of it as an electronic key. It is a bit like if you have got a dog you can have one of these injected in your dog so it can be identified with a scanner later on. There was a proposal at some point that components on a vehicle would have an RFID tag embedded and this would allow people to identify particular components, dismantle those, box them up and ship them off for processing.

Q701 Lord Howie of Troon: Does it work?

Mr Stokes: It is not used as far as I am aware.

Q702 Lord Howie of Troon: That is a very good answer.

Mr Stokes: One of the reasons it is not used is—we touched on the point earlier—that a vehicle actually is not hand-dismantled, it is actually just crushed and stripped into its component materials and then those are recovered later, so there is no drive to actually do that at the front end. The second point to bring to bear is that the directive forces manufacturers to label all the plastic components on the vehicle with the material composition and the material type, so if you took the plastic bumper off you could actually

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identify whether it was polypropylene or whatever the material was that it was manufactured from.

Q703 Lord Howie of Troon: That is very good.

Mr Stokes: Building onto that, manufacturers also produce an international dismantling information system which gives exploded diagrams of the models and again details the material that components are made of on that particular vehicle so the directive wraps most of that up.

Q704 Lord Howie of Troon: I suppose this crushing process means that you are unable to reprocess or reuse such items as the car radio.

Mr Stokes: If there were any value in reusing the car radio that probably would be taken out at the scrap yard and if they thought there was a market for any of those parts then they would take them out and try to sell them.

Q705 Lord Howie of Troon: But there is not a market, is there?

Mr Stokes: For some vehicles there is and there are people out in the trade there who make a very good living on the sale of those parts.

Q706 Baroness Sharp of Guildford: To some extent we have already covered the question I was going to ask about plastics recycling. The Plastics Reprocessing Validation Exercise demonstrated that recyclate plastic could be recycled into specified engineering grade plastics which could be used in components. We have already discussed to some extent the limitations on that: what is the proportion these days of recycled plastic being used in vehicles; do we have a figure for that?

Mr Hardcastle: We estimate about five per cent of the vehicle weight is recycled plastic.

Q707 Baroness Sharp of Guildford: And the prime plastic or unrecycled plastic?

Mr Hardcastle: Probably two or three times that is virgin plastic; for the reasons I explained we are still having to buy the virgin material.

Q708 Baroness Sharp of Guildford: Yes. From the answer that Mr Stokes gave I take it that this international dismantling information system is actually being used and is helpful, is it?

Mr Stokes: It is available but whether people are actually using it or not is uncertain—bearing in mind that the end process tends to drive the system and there is less desire to take the vehicles apart then it tends to be used to more identify where hazardous materials are within vehicles that need to be removed rather than where can I find nylon within the vehicle, for example, and how do I extract that nylon from the vehicle, because it just is not done in that way.

Mr Hardcastle: As was pointed out, it is difficult to take the parts off, so this door trim that I talked about is 100 per cent polypropylene. All of the parts in a car that are polypropylene are recyclable, but it ends up in the shredder and the shredder is clearly not reading that. But the fact is if you put 100 per cent polypropylene in with the steel and the aluminium it makes it easier to then recycle, so the label itself at the moment is not necessarily so useful at the end of life. However, somebody earlier asked what about collecting used parts, and we did have a system in Germany where we could collect bumpers from vehicles and then if you can look at the bumpers and each one of them is labelled then we have a sure way of recycling that material.

Q709 Baroness Sharp of Guildford: I guess there is a fair amount of bumper plastic to be recycled around. Picking up on this business of shredding, evidence we received from Ford suggested that the advanced post-shredder treatment allows virtually all materials to be recycled and recovered. Is this actually the case and what incentives are there for manufacturers to invest in these technologies and to what extent do manufacturers actually conduct research in this?

Mr Franklin: As you know, the ELV legislation says that we have got to recover up to 95 per cent and recycle up to 85 per cent by 2015. For 2006 in the UK manufacturers have met their target—BERR have analysed the results coming through and we have achieved 80 per cent recycling. Predominantly this is via the shredder but with post-shredder technologies. We do see that it is going to be very difficult to get to 85 per cent or 95 per cent recovery and we do have concerns that it may be using far more energy than is really good for it when really what we should be concentrating on is the in-use phase as the most important part of the environmental footprint of the vehicle, not the end-of-life stage. We do not really want to be recycling things just for recycling's sake, but currently the shredding companies are looking at investing and the UK's largest shredding company has teamed up with an American company to recycle plastics. There are some concerns about the REACH legislation and how that affects recycling, so there are some unknowns and we do have some concerns in that area.

Mr Stokes: It is fair to point out that at that post-shredder separation stage there has not actually been any recycling, all there has been is a refining of the different materials into different levels of purity and then you need to find end markets for those to pull those through and actually have those recycled. Without wishing to sound like a Volkswagen advert we worked with a company called Sicon in Germany and patented a series of designs which takes today's measure of separation and really moves that several stages on to the level where we are pretty confident we

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can hit the 95 per cent target economically in 2015. I do not know what sort of economics we will have in 2015 but it is looking viable today and that technology is rolling out in different countries across Europe, because we need to get that in and working in advance of 2015, not just try and make it work in 2015.

Q710 Baroness Sharp of Guildford: Are you under greater pressure in countries like Germany than you are in the UK to achieve these levels?

Mr Stokes: No, the directive casts its net right across the whole of the EU 27, and our company took the view that we are the ultimate financial backstop as a responsible producer, that if we could do something which would leverage those costs down at the post-separation stage, then it was actually worth that investment at the front to save ourselves and give ourselves some economic certainty.

Mr Franklin: In fact the UK is probably at the forefront, we are under more pressure because we are the only country in Europe that has got right-hand drive, so we are actually treating our vehicles whereas a lot of the others are going further east, so you do not see the big numbers in the other Member States at the moment. One of the other concerns we have on that recycling, the VW-Sicon process that Peter mentioned, is that the second reading of the Waste Framework Directive takes place this week and recycling as a definition is a big concern to us. The Commission proposal we are very happy with, that would allow for that VW-Sicon process, but the amendments proposed probably stop it so any investment which we really need to do now to get to all these forthcoming targets is stalled because of this rather narrow definition of recycling.

Q711 Lord Haskel: What are the commercial arrangements regarding the recycling? You give us the impression that you are the companies that do the recycling; is that so or do you have sub-contractors and so are you really dependent on the efficiency of the sub-contractors?

Mr Stokes: You are absolutely right. The manufacturers do sub-contract, it is not a core competence that we have. Our role within the UK implementation was to organise that we had net-backs and take-back points and that these things had enough density so that people could take back their end-of-life vehicles free of charge. Where those vehicles are brought to us, then we have the responsibility to ensure that our contractor then goes on to meet our obligation of the 85 per cent target. You are absolutely right, we do not do the recycling but we are managing that if you like through our contractors.

Q712 Lord Haskel: Are you finding that there are enough recyclers appearing and that they are technically competent, able and efficient?

Mr Stokes: Yes, there are. There are still an awful lot out there that are operating unlicensed and outside the regulations, which is problematic for us, we would like to see that regulated more strongly so that more of the vehicles come into what we would call legitimate contracted and uncontracted networks, but if we look back and see where we were five years ago the landscape has changed dramatically. There were fears that the regulations would impose massive costs on recyclers and that people would throw their hat in the air and not continue in the business and that we might only have 300 or 400 operators. Across the United Kingdom we are around 1400 now, Steve.

Mr Franklin: It is approaching 1400.

Mr Stokes: Those are officially licensed sites and you have then got a grey network behind that that is also dabbling in the business because of the value of the materials involved.

Q713 Chairman: Before we move on, Mr Stokes, could you perhaps send us a note about the VW-Sicon arrangement and particularly the technologies that have been developed in that area because it is something which has not appeared on our radar screens so far.

Mr Stokes: We have not done a very good job on communication then.

Q714 Lord Crickhowell: If we could move on I want to display my ignorance about something you have just been telling us and then really follow up Lord Haskel's question. I confess I do not know enough about the End-of-Life Vehicle Directive and how it actually works. You talk about these great percentages and how you achieve them but I am not clear, and I probably ought to be, about what the arrangements are for making sure that these things do happen. We have talked about some parts of the industry simply moving stuff on and one of the features, I am sorry to say as a Welshman, of my fellow countrymen and particularly farmers is that they like to leave their cars in fields, having just dumped them there when they come to the end of life, some of them in very large numbers, which causes a problem for organisations like the National Parks, and all over the countryside I am afraid you will see cars or what were cars once upon a time. What are the powers and what are the regulatory effects, how do you actually get the percentages, how do you get people to do it? I am not clear how the regulation works.

Mr Franklin: I mentioned the DVLA earlier on and they should be the driver in demanding a COD and that should get you out of continuous taxation, so every last owner should need to know that they need

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to take their car to an authorised treatment centre where it will be treated and taken in free of charge by the manufacturer's sub-contractors.

Q715 Lord Crickhowell: Does that not happen?

Mr Franklin: It is happening but there is not the driver for it, the DVLA has not created that driver that we really need, so it is happening but it is happening in lower numbers than we would have expected and would have hoped for. After that, as you may know, the legislation says that 85 per cent of last owners need to be within ten miles of an ATF and no one must travel more than 30 miles, and Peter spent a wonderful time up in the Shetland Islands last week.

Mr Stokes: I was going to say the problems that you have in Wales are equally apparent up in the Shetland Islands as well. We went up to inspect two facilities that we have got there, our two northernmost facilities.

Mr Franklin: Every last owner has the opportunity to take his car back free of charge to an authorised treatment facility.

Q716 Lord Crickhowell: The opportunity, but no compulsion.

Mr Franklin: If he is not going to tax it then obviously there is a penalty for not taxing your car and that should be followed up.

Q717 Lord Methuen: Can I interrupt there, surely if he has put a SORN (statutory off road notification) in then his obligation to tax disappears.

Mr Franklin: That would be the alternative, yes. He would need to SORN it.

Q718 Lord Methuen: If he has done a SORN then he can leave it in his field and let it rust.

Mr Franklin: He could do that, yes.

Chairman: Interesting though this is we must try and make progress, colleagues; could we try and get to the next question. Lady Platt.

Q719 Baroness Platt of Writtle: Ford has reported that the greatest environmental impact of a vehicle's life occurs during the use phase and so a focus on dismantling and recycling at the end of life will only have a limited benefit. Instead it recommends that more attention should be paid to the post-shredder treatments and that the disposal of shredder residue in landfill should be restricted. We have covered this a bit; do you agree with this statement and should regulation be used or changed to encourage such a shift in approach?

Mr Franklin: We have a European organisation and we talked to the Commission about our forthcoming targets. One of the recommendations we said is that if landfill is less available—and of course it is

becoming less available—then alternative post-shredder technology is much more viable. Do we need to do more in terms of legislation? Probably not: we have got the landfill tax escalator, we have got the landfill directive which is already restricting what can go to landfill and how it has got to be treated, so this transition is taking place, that landfill is becoming less available and post-shredder technology is becoming more viable.

Q720 Baroness Platt of Writtle: How could the Government and industry work together to support research into novel processes which increase the value of shredder residue and to establish markets for the residues which you have mentioned which are currently sent to landfill?

Mr Stokes: That is an interesting question. We have done the work with the VW-Sicon process and that is one of a number of processes, some thermal, which are in operation today. One of your colleagues mentioned that it is not actually us that does the recycling, it is the recycling industry that does that and in its early years CARE formed the kind of environment that allowed co-operation between all of those parties when we really did not know anything about going beyond extracting metals and how to do that. We did a lot of work—we were involved with the PRoVE project, we had a number of research projects that we paid for that enhanced the knowledge that was available. Now we have moved into a more commercial phase the recyclers are, if you like, doing their own thing now, doing their own research, because they see a commercial advantage in being able to extract more material from a vehicle hulk. Whilst it sounds like a bit of a cop-out so there is less for us to do, the industry does not actually want us to become too involved in it now because it is their job, it is their business, and it is where they will get commercial advantage over their own competitors.

Q721 Lord Haskel: I wonder if we could get on to the technology for a moment; could you tell us where vehicle manufacturers go for advice on novel materials or waste reduction initiatives and good practice generally?

Mr Hardcastle: One of our first points of call is sitting next to me, we would turn to the SMMT; we can get good advice from Steve and his colleagues. We would also approach bodies like the British Plastics Federation who have their own interest; clearly, materials suppliers or the recycling companies like Luxus Plastic or Linpac for aluminium, Corus for steel, we would take advice from all of those. We also talk to universities in the UK—for example, Warwick University has a bi-annual conference that we attend and Oxford Brookes had an initiative called Drivenet which was looking at energy efficient

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material usage, so we use that kind of information. Then for more novel materials like carbon fibre or something like that we are turning towards the aerospace industries and asking them. They have been using these materials for longer than us so we are turning to them and asking if we were to use these materials what do we do? For example, Renault, our partners, have some conversation ongoing with the likes of Airbus, for example, that kind of information exchange is very useful for us.

Q722 Lord Howie of Troon: There are a number of legislative burdens, as I suppose we might call them, on vehicles including things like crash protection, material recovery, carbon dioxide targets or weight reduction. As you said earlier on, sometimes these conflict with each other. Could you give us some examples where these conflicting priorities might have caused difficulties in design?

Mr Hardcastle: You mentioned crash protection, and that is one of them. The reason is that crash protection requires additional strength which not always but invariably increases the material usage and then the weight of the vehicle, so (1) we have used more material so there is more to dispose of, (2) the heavier the vehicle the greater the conflict with the CO₂ emissions. Also with crash protection we have now introduced lots of airbags and the more airbags we bring in then the more explosive devices there are; they need to be managed correctly before the car goes into the shredder so they need to be deployed to remove that hazard. We want to improve the CO₂ reduction which means we should drive down the weight of the vehicles, and one of the ways to do that would be to use some engineering plastics like nylons or carbon fibre materials, but actually those two materials are much more difficult to recycle at the moment than steel or polypropylene so we get some conflict there. Steve mentioned REACH but that could cause us a problem in the future in that when we are taking these recycled materials, by the nature of the recycling process we are not 100 per cent guaranteed what is in those materials, and when they are made from older materials—PVCs or older plastics—and get into the recycling chain they could actually bring lead into the recycled plastic. Clearly we cannot use it then and in order to screen that out it would be very difficult and require spectrometer analysis of every batch of material, so it is starting to potentially conflict. The last example I have got is the elimination of fluorocarbons or CFCs and HFCs; we are now going for a CO₂-based air conditioning system which on the whole is good but the CO₂ system is less efficient so our air conditioning equipment potentially is bigger and heavier and, again, that is against the idea to try and reduce the weight of the vehicle. They are all engineering challenges that people like myself like, they are the

sorts of things that we enjoy from a day-to-day point of view, so I do not want to say one or the other is better but they are some examples of the challenges that we face.

Q723 Lord Howie of Troon: I must say that as a civil engineer I would like easy problems rather than difficult problems. I described the legislation as burdensome, fairly or unfairly, do you think that the existing legislation could be improved to deal with these conflicts and make life easier for you?

Mr Franklin: When some legislation comes out you always think was that thought about in connection with this other piece of legislation, and you very often come to the conclusion that it probably was not. If you spoke to most people in the motor industry now and asked them what is the main driver, it would be CO₂, there is nothing else, that has got to be it. If you then introduce some safety requirement or some other requirement then you have to balance that against this compulsion to meet very demanding CO₂ requirements.

Mr Stokes: We had one of our internal SMMT presentations with a very nice chart which showed a steady progression in the reduction of CO₂ and then it showed the impact of different pieces of legislation in actually degrading the improvement in CO₂ that had been made.

Q724 Lord Howie of Troon: Apart from legislation in this area can you tell me if there are any incentives which might lead to innovation and so on?

Mr Franklin: There are not so much incentives but there are Government-funded schemes. The SMMT manages the Foresight Vehicle Programme which has something like 100 or so programmes running and looking at innovative thinking—it is a combination of industry and academia—and there is Government-funding for that programme, so it is a sort of incentive but I am not sure if that is what you had in mind.

Mr Hardcastle: From the innovation point of view there are a number of incentives now where we can join together with universities and government bodies to tackle the CO₂ problem, and if there were grants or other kinds of incentives for universities and manufacturers to work at a very early stage of waste reduction then with innovative materials I am sure—

Q725 Lord Howie of Troon: When you say Government grants, do you give grants to people?

Mr Hardcastle: Yes, usually when we take a Government grant we are obliged to give some of our money at the same time. To be honest, the money in itself is interesting but usually the process of trying to get the money brings the right people together and it is a good way of bringing the universities and the

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manufacturers and the government bodies into one room to actually talk about the problem, to start tackling the problem. The grant itself will not be enough for Nissan to do the job for everyone but by that innovative process we will be looking for the commercial benefit and once the commercial benefit is identified we are off and running, but it is that incentive to get the right bodies into the right room to start talking about the problem that is important.

Q726 Lord Haskel: The SMMT has said that the proposed new Waste Framework Directive would change the definition of recycling which “could affect the viability” of some technologies to meet recovery targets. How would you like the definition of recycling to change? In your evidence you also said that the “SMMT consider that the reclassification of waste as a secondary raw material once it reaches a standardised specification is correct.”

Mr Franklin: Thanks for that question, I am glad you have brought it up, because it has been debated and the second reading is in the EP this week. There are something like 200 different amendments, but this one is pretty critical for us. The Waste Framework Directive sits on top of the ELV Directive, the WEEE Directive, the Packaging Framework Directive et cetera, under which there are various definitions of recycling. The definition that we like is the Commission’s proposal, which is recycling means the recovery of wastes into products or substances, whether for the original or other purpose, it does not include energy recovery. That definition allows things like the VW Sicon process to function; the tighter and much narrower definition does not. Sorry, what was the second part?

Q727 Lord Haskel: You did say that the “reclassification of waste as a secondary raw material once it reaches a standardised specification is correct.” Would you say that is a way of dealing with this?

Mr Franklin: It is all about the end of waste. When you have done something to a product and you have a bag of something, you say this is a product, but no one wants to buy it. You have transformed it into a product and that is the end of waste as far as you are concerned, even though there is not a market, that is the unfortunate thing. We would say this is a product, we can use it, so it is really about the definition of the end of waste.

Q728 Lord Haskel: It does again come down to some sort of commercial investment.

Mr Franklin: To stimulate the market.

Q729 Lord Haskel: Yes.

Mr Hardcastle: As Peter pointed out you have got to consider this car in the Shetlands; what are we going to do with a car in the Shetlands, because if we have to transport it to the mainland or all the way to London to deal with the final recovery of materials or the recycling of the materials I am sure we will have used a lot more energy in doing that so we think it is important to tackle recovery in whatever form we can, in both a commercial form and an energy balance form.

Q730 Lord Haskel: You would like to see energy included in the calculation.

Mr Hardcastle: There needs to be an option in certain situations where it is just not feasible to bring the vehicle to the facilities that are required to do these special processes.

Q731 Lord Methuen: We have talked to some extent about the End-of-Life Vehicle Directive and I am not sure how much more you can add to that, but how does enforcement of this directive in the UK compare with that in other EU countries? You have already said that a lot of the ELV vehicles go east to Turkey or even further east; is there anything more you would like to add about ELV and its relationship with the industry?

Mr Franklin: One of the interesting things about the ELV legislation in Europe is that the piece of statutory legislation it was brought in on was the environmental one which means that Member States can actually alter the legislation slightly, so you do get different systems in different countries, which is a major disadvantage for motor manufacturers because they have to do different things. By and large I would say that the UK is probably one of the more successful implementations of the ELV legislation, it has been well administered with just one hiccup, and that is the DVLA CoD administration. If we could kill that one off it would be very good.

Q732 Lord Methuen: Are companies encouraged to exceed their ELV targets and are they punished if the targets are not met?

Mr Franklin: We did not want to put ourselves at risk by finding out if we would be punished but clearly the enforcement programme was quite harsh and we have only just submitted and had our evidence approved for 2006 where we did meet the target, but BERR were very methodical and demanded to see the evidence of actually meeting that target.

Q733 Lord Methuen: What are the punishments if you do not?

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Mr Franklin: There is a range of fines and what is not clear and probably would not be until you got to court is whether the fine—let us say it is a £5,000 fine—is that for every occurrence or what; you are not quite sure until you actually get to court. Nobody wanted to be in that situation, certainly not vehicle manufacturers, and we have met our targets.

Q734 Baroness Platt of Writtle: We have heard that the Japanese government worked closely with industry to develop their equivalent of the ELV Directive, the Automobile Recycling Law. How did Nissan and other companies work with the Japanese government in this process and how useful was it for industry to be included in such an exercise?

Mr Hardcastle: I am possibly the best qualified here. The specialists from each car manufacturer, the so-called JAMA (Japan Automobile Manufacturers Association) joined together with Japan Automobile Importers Association—which would have included our Volkswagen friends—and they were invited to work with the government and it was called the Automobile Recycling Law, as you said. The Ministry of Economy, Trade and Industry is responsible for enforcing the law and two key organisations were established to manage it, one was the Japan Automobile Recycling Centre, and that basically deals with information exchange and fund management, and then the part that Nissan and the other manufacturers joined in was the Japan Automobile Recycling Partnership. This was a window organisation for all of the manufacturers, basically to collect and recycle airbags, fluorocarbons and then the automotive shredded residue that we were discussing earlier. What the legislation entails is that the customer pays a fee when he or she buys the car which is a payment towards the recycling of the vehicle; typically it is about £50 to £90 for a medium-sized car. That money is then distributed to these organisations that I have described to facilitate the removal of CFCs and airbags and also facilitate the disposal of the shredded residue. The key thing is that the shredded residue became the responsibility of the manufacturer—this is particularly in Japan—and as there is not much landfill available in Japan it became the responsibility of Nissan, Volkswagen, Toyota, Honda et cetera to dispose of this residue or recover it. In order to promote some kind of competition they established two teams, one team which Nissan was in and actually Volkswagen as an importer were in our team and Mitsubishi, and then another team that Toyota and Honda were in. Those two teams are competing with each other on how to tackle the shredded residue, and if they can reduce the cost of the shredded residue or improve the profit or the recycling, then they can reduce the sticker price on the car, so they can say that this car is only £50 because it is a better design for recycling, or this car

is £90 because it is not so good. Through that competition therefore the manufacturer is required to do the recycling. There is one key point that does not exist here though, and that is that Nissan and all of the manufacturers are allowed to put this shredded residue into the furnaces as a fuel, and that is counted as recovery, so we can claim a recovery rate of 95 per cent but it is not necessarily recycled. If we are talking about Nissan cars in Japan there is almost no demand for recycled plastic, there is almost no recycled plastic used on the cars manufactured and assembled in Japan, so although there is a good system and we have taken part in it, we have to be very careful that the overwhelming environment that created it is somewhat different to the environment that we are talking about now in the EU or the UK.

Baroness Platt of Writtle: Perhaps you might like to write that down because it would be useful to us to know the difference between the ELV Directive and what is happening in Japan because obviously it has very interesting results as far as we are concerned.

Q735 Earl of Selborne: The key to that is to hear that the Japanese are allowed to take energy from the waste. You say that one of the clubs is getting 95 per cent; would the other group be getting 95 per cent as well if you measure energy from waste?

Mr Hardcastle: Basically a 95 per cent recovery rate is the target for everybody to achieve. Everybody is achieving very similar levels but the competition is in the cost of dealing with the shredded residue. For example, the total vehicle recovery rate is 95 per cent and of the shredded residue about 63 to 75 per cent can be recovered. There are an awful lot of statistics here so I think the best thing, as already suggested, is that when we submit the description of how the system is working we declare some figures for you. For example, we know that 3.5 million vehicles went through the system in fiscal year 2006 and we collected and destroyed 250,000 kilograms of CFCs and 520,000 kilograms of HFCs. I have access to a lot of information, therefore, which would be useful for you, and it would be even more useful if I write it down.

Q736 Chairman: That would be very helpful, Mr Hardcastle. We are not asking you to give total recall this morning but it would be useful to have that. We are seeing some people from Toyota and will be talking to them along similar lines, but they are obviously the other team and it would be helpful to get your reflections on it and what the figures tend to mean.

Mr Hardcastle: Just to be sure, on the front end of the processes we are all the same, it is just at the point after the vehicle is shredded, that is where we start to compete, and we are all in the Japan Automobile

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Recycling Partnership so we are in the same team and then competing.

Q737 Chairman: Just as a final point this morning, one of the things that has become clear is that there are 27 nations in the EU which by and large follow one set of rules but there are a number of international players in a sense so that outside of Europe you have Japan, you have Korea, you have North America and we also heard about India and Brazil. In some of these countries the same cars by and large are being produced but in other countries they are not; how do you as car manufacturers and the Society view the differing legislative pushes and to what extent does the home country still have the last word. At VW you cannot go anywhere without tripping over a Passat—in Beijing, for example. How do you view that as manufacturers and to whom are you answerable: the home company and the home country, or to what extent do you have to meet the requirements of the countries into which you are selling?

Mr Stokes: Basically there are three levels to that. Obviously, to be able to sell into those markets you have to comply with the regulations of that market or you are just not able to compete in that space. For me there are another two levels which are the production side requirements which dictate how you build the vehicle and the sort of ethos that goes into things at that stage, so are you allowed to include lead or not, are you allowed to leave cadmium or not. In those sorts of areas we would probably agree that if that is the standard across the biggest number of countries possible, that is a good thing. As Steve mentioned—and perhaps Jerry will enlarge on that—the End-of-Life Vehicle Directive itself was introduced under an act which allowed the Member State to shape the regulation to fit its particular demographic and its particular country. My personal view is that it was not necessarily easier for us to do that but taking a pragmatic view of it, it probably was a useful thing to do because the recycling infrastructure that we have got in the UK, for example, is different to that of the Czech Republic or Poland or other areas in Europe, so the regulations needed to be tailored to work in a

way which was right for those individual markets but it did make things more complicated for us.

Mr Hardcastle: Basically we look at all of the legislation, as I am sure Volkswagen do as well, and we try to create a global framework by ourselves, so we try and harmonise as much as possible because otherwise we just confuse all of our engineers, manufacturing plants and everything, so we try and create a global framework, but clearly that does not exist and it does cause us problems. As Peter mentioned, the deletion of lead, EU and Korea have different levels, different timeframes, and it causes us some confusion as to what should we do, where should we do it first. Also, within the EU, the introduction and timing of the policy legislation can be different from the application of it—paint emissions legislation for factories, for example. We have a plant in Sunderland and a plant in Barcelona and although the legislation is primarily the same, the application is somewhat different so we adapt to that situation. We also find conflicts between some legislation. For example, if we are disposing of a car radio the way the car audio system is disposed of in the shredder takes into account some legislation. We could remove the audio system and dispose of it by the waste electronics method and the treatment would be slightly different, so we have to take into account all of that, but our request really is if we could have international harmonisation, it just makes our job so much easier.

Q738 Chairman: I am not going to comment. Would you like to add anything, Mr Franklin, or not?

Mr Franklin: There are global technical regulations and through the UN we meet to discuss in great detail items that they are proposing on, say, brake legislation, steering legislation. That exists, and then you suddenly get something coming in from the EU which does not always help that situation, so harmonisation has got to be the watchword.

Chairman: On that Utopian note we will finish for the morning. Thank you very much for your advice and information; we will be getting back to you because there are a number of points you raise that are really very interesting and we would like some help and assistance on them. If you feel on reflection that there is anything you wished you had said then, please, do not hesitate to get in touch. Thank you very much.

TUESDAY 6 MAY 2008

Present	Bhattacharyya, L Haskel, L Howie of Troon, L	Methuen, L O'Neil of Clackmannan, L (Chairman) Selborne, E
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Memorandum by the Building Research Establishment (BRE)

The BRE Group is a world leading research, consultancy, training, testing and certification organisation delivering sustainability and innovation across the built environment and beyond.

Our mission is to “Build a better world”. We help our clients create better buildings and communities and solve problems with confidence.

BRE CENTRE FOR RESOURCE EFFICIENCY

BRE's Centre for Resource Efficiency actively seeks to work with organisations that share their objective of: “Reduce environmental impacts and costs through resource efficiency”.

BRE's Centre for Resource Efficiency is continually developing its capabilities as a world-leading centre of expertise on waste auditing, waste minimisation and waste management in the construction, demolition, refurbishment, manufacturing and related industries. The Centre provides a one-stop-shop of integrated solutions to the whole supply chain on all aspects of material waste including research, consultancy, testing, re-engineering and specifying. The Centre has pioneered best practice in construction resource efficiency with a range of different projects, services, techniques and software tools available to the industry.

We have considered each of the issues raised in this inquiry and have included a response where appropriate.

BETTER DESIGN AND THE USE OF MATERIALS

Design and the use of materials

Design could play an important part in achieving waste reduction in the built environment. However, there are a multitude of considerations in addition to resource efficiency that take priority. These include look, design life, whole life cost, skills, time, operational energy and water use, life cycle impacts of materials to name but a few. Resource efficiency needs to be embedded within this overall design decision making to avoid being a sidelined activity. Simple messages on waste reduction and design include:

- precut materials delivered to site;
- off site fabricated products;
- specifying materials with lower wastage rates on installation, lower hazard content, fit for purpose and design life;
- design for deconstruction, repair and refurbishment; and
- long lived and durable buildings (avoiding design that becomes easily dated/shabby).

Sustainability and the use of materials

In the context of life cycle assessment, waste issues form part of the overall assessment. If these issues are separated and focused on without this overall context, there is a risk that overall environmental impact could increase. It is important that waste is considered, along with resource efficiency, within the wider sustainable consumption and production agenda. Energy use and water use are other key environmental impacts to consider.

We propose adopting a decision making hierarchy that enables:

- overall life cycle impact to be considered as a first priority;
- single impacts to be focused on and improvements made; and
- reiteration of overall life cycle impacts following single impact improvements.

Life cycle assessment (LCA) is basically the combined effect of single impacts. Therefore, it could be concluded that material resource efficiency measures will affect the LCA result in a positive or negative way. If the result is positive then these measures should be accelerated.

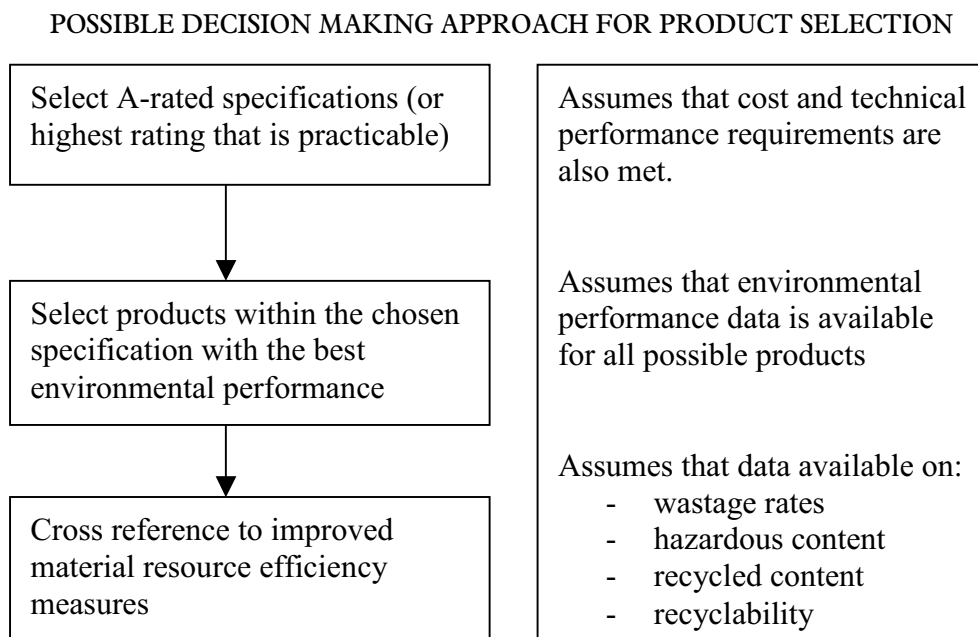
This is fine in principle, if all products and processes have reported in terms of LCA and it is easy to extract the data relating to single impacts. Many construction products do not have a Type III environmental declaration.¹ It is also difficult to see how LCA in the construction products field will drive forward material resource efficiency measures. This is partly due to incomplete LCA data, but also due to the weighting allocated to impacts.

Weighting of LCA data is the only way to derive a single metric, eg carbon equivalence or ecopoints. It is also an inherently subjective process. Climate change and the need to reduce fossil fuel consumption has meant that related impacts attract a higher weighting than any other type of impact. In the absence of other drivers this would not be a problem, ie most of the focus would be on reducing energy with other issues only considered once this has been achieved. However, we are living in a world where multiple drivers operate including the need to:

- reduce waste to landfill;
- reduce consumption of materials;
- reduce contamination of the environment;
- reduce whole life costs; and
- reduce local environmental/social impact.

The current status of LCA does not reconcile all these needs sufficiently.

Figure 1



Better designed products and consumption

There is no simple answer in isolation of how the products will be specified, distributed, installed, maintained and removed/disposed of. Therefore, decisions made by all those in the supply chain should be considered when improving the design of certain products.

¹ Type III environmental declarations present quantified environmental information on the life cycle of a product (based on independently verified LCA data, LCI data or information modules in accordance with the ISO 14040 series) to enable comparisons between products fulfilling the same function.

An integrated approach to waste reduction in the construction sector would achieve greater impacts than one reliant upon design decisions. For example:

<i>Commitments</i>	<i>Purpose/Links</i>
Set baseline data for construction related waste	Start process of improvement
Measure performance consistently in terms of waste reduction, reuse, recycling etc per company, sector, process and product	Measure levels of improvement
Extended producer responsibility for all key construction products OR industry agreed voluntary commitments	Promote resource efficiency on a product basis, eg returnable packaging, ecodesign
Supply chain commitments in place for all government procured projects	Targets for waste reduction will only be met if the supply chain is committed to combined action
Relevant professional training/education to include modules on resource efficiency	Construction professionals educated to consider resource efficiency to be part of their future jobs eg designers
Strengthen the Code for Sustainable Homes to require significant waste reduction at levels 3 onwards	Sets out requirements to reduce waste as part of overall standard
Recommendations	
Develop consistent method of measuring carbon impacts relating to waste and resources	Links to reducing overall environmental impact of construction through better decision making
Develop consistent method of measuring whole life cost impacts relating to waste and resources	Links to reducing overall cost of resources and waste through better decision making
Encourage the reduction of waste in preference to recycling	Recycling has been promoted above reduction and reuse. It is important to redress the balance

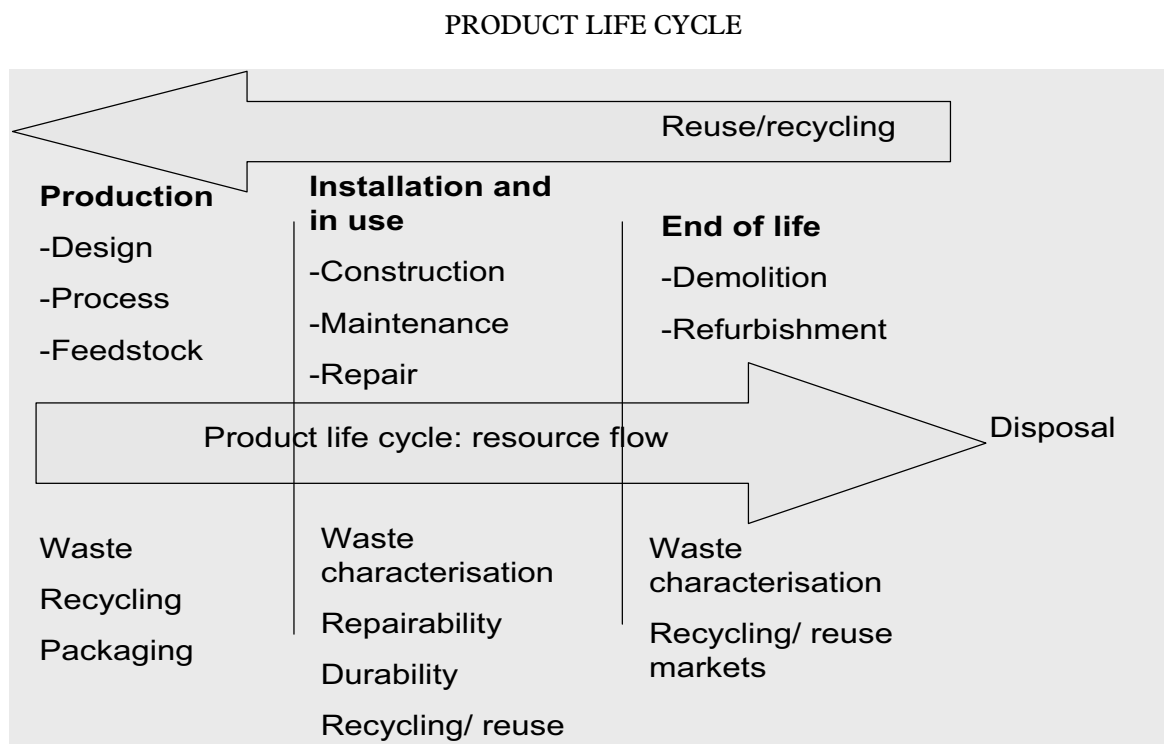
BUSINESS FRAMEWORK

The introduction of Site Waste Management Plans from April 2008 (to be confirmed) provides a good foundation upon which to encourage waste reduction throughout the supply chain. In the first few years it is likely that businesses will focus upon demonstrating compliance with the legislation and associated policies, such as the Code for Sustainable Homes. However, BRE is developing Site Waste Management Planning tools with a carbon calculator module to drive the user much more in the direction of waste reduction. The logic in applying carbon calculation mainly derives from the reduction in embodied energy from using less materials. Carbon benefits from recycling are likely to be far less significant when compared to not producing the waste in the first place. Our tools will make this saving much more obvious, which along with the better cost savings should eventually promote waste reduction within a framework of overall sustainability ie avoiding the trap of focusing on a single sustainability issue.

Waste reduction in action

BRE believes that most construction waste can be avoided if the supply chain is set up to prevent it arising. This is the premise behind an industry and government funded project currently underway. This project—Be Aware—tracks products through their life cycle, collecting data on how much and what waste is produced along the way. The next stage is to model alternative scenarios in terms of improved resource efficiency and the overall life cycle impact resulting. Over the next few months, supply chain workshops will be carried out with certain sectors, including modern methods of construction, plastic/composite construction products, and timber based construction products. At these workshops, the industry stakeholders will be presented with the data captured for each set of products and asked to identify opportunities and barriers to reducing waste at each stage of the product life cycle. The results of each workshop will be used to generate guidance for each sector group. The points of intervention and life cycle are summarised in the diagram below.

Figure 2



Better information is needed to facilitate waste reduction. There is little point presenting the construction sector with generic targets to reduce waste unless these are accompanied by more specific guidance and data on who is accountable for which aspect of the waste stream. Isolating this information is a pre-requisite to developing sector based voluntary agreements/commitments to reduce waste, as illustrated in the Ashdown agreement. This agreement has been completed for the manufacturers of plasterboard and is still being developed for other aspects of the supply chain, such as design, installation and demolition. Once all the specific agreements are in place, it will be possible to bring them altogether within a supply chain agreement to reduce waste and divert waste from landfill. Then it will be necessary to report progress against the overall and specific agreements.

BRE has been developing construction waste benchmarks for over 10 years. A Defra funded project is helping to create the first comprehensive set of national construction, refurbishment and demolition benchmarks. These are accessed from our smartwaste web site and will be added to by other datasets, along with those generated through BRE's web-base reporting software. The site waste management planning tool currently under development will add significant data to the benchmarking web site and support the construction industry in predicting the waste they will produce, set targets for waste reduction and measure progress towards those targets.

Government support role

Government funded support is extensive in this area, perhaps to the point of having "too many cooks", some of which are attempting to attract the attention of the same businesses. This causes confusion in terms of where to access the best support. A thorough knowledge of the construction sector should be a pre-requisite to offering support in this area. Without this, the support agencies tend to over-simplify resource efficiency, eg recycling/recycled content, and under estimate the interdependencies in the supply chain and overall building performance.

Product design and consumption patterns and behaviour

A great deal of debate revolves around the need to conserve resources compared with reducing operational impacts of buildings. A recent report suggested that carbon emissions from homes could only be reduced to levels required for government targets if levels of demolition were significantly increased, ie knock down poorly performing homes and replace with new energy efficient ones.

One major concern with this recommendation would be the massive increase in demolition waste. Demolition waste may form the bulk of the 100 million tonnes per year produced from construction related waste (no-one knows the actual breakdown of composition in terms of construction, demolition and refurbishment waste). If demolition rates increase, so does the amount of waste produced. Currently, around 90 per cent of demolition waste is recycled; these high recycling levels cannot be sustained should waste produced increase and markets shrink. Markets may decline due to the move from more traditional forms of construction to those more likely to be lighter weight and off site fabricated. These modern methods of construction offer savings in terms of time and skills; the case has yet to be proven for reduced waste production over the life cycle.

The alternative to increasing demolition is to improve the environmental performance of existing homes so that the materials used to build them are kept in the building stock. Realisation that it is absolutely essential to improve the existing building stock's operational performance is increasing within government, industry and building owners. BRE is offering support to all these stakeholders through its work on refurbishment case studies (BRE Stable Block), decision making tools (T-Zero) and certification of domestic energy assessors, micro generation products and installers. With all the increase in refurbishment activity will be an increase in waste. The T-Zero project is gathering data on a whole range of environmental issues, including the amount and type of waste associated with refurbishment. Pre-refurbishment audits can identify products and materials that can be retained whilst minimising waste produced from the installation of new products.

October 2007

Examination of Witnesses

Witnesses: Ms GILLI HOBBS, Director of Resource Efficiency, Building Research Establishment, and MR ANDREW SWAIN, United Kingdom Environmental Advisor, Aggregate Industries, examined.

Q739 Chairman: Good morning. We realise that another witness, Martin Brock, has yet to appear due to transport difficulties. We will include him if and when he arrives. Perhaps, before we start the questioning, you could introduce yourselves.

Ms Hobbs: My name is Gilli Hobbs, I am Director of Resource Efficiency at the Building Research Establishment (BRE). The BRE has been helping the industry and Government in terms of all matters related to the built environment since the 1920s. I have been there slightly less time! I have clocked up about 18 years on resource efficiency.

Mr Swain: I am Andy Swain from a company called Aggregate Industries. We are predominantly a major supplier of primary aggregates, ready-mixed concrete and pre-cast building material products. I am an environmental adviser for the company. My background is civil engineering. Waste is a particular issue in civil engineering, so I spent ten years in that sort of area and joined Aggregate Industries two years ago. A lot of our pre-cast building material products include recycled aggregate within the material, so I have an interest on both sides.

Q740 Chairman: Thank you. Where do the primary waste streams in the construction industry arise from? What would you identify as the streams?

Equally important, once we have established what you would regard as these primary waste streams, how do you see them in terms of value. Obviously you could waste a lot of energy trying to retrieve waste which is, frankly, not worth it in terms of effort or cost or even environmental benefit. How do you identify these major streams?

Ms Hobbs: I tend to split them into demolition waste, refurbishment waste, construction waste and then the civil side of things as well. They are all very different waste streams and the composition of the waste within them is quite different as well. The studies that have been carried out to date have focused pretty much on the aggregates aspect of the waste stream, so we have quite good statistics in terms of the amount of waste that is generated that can essentially be converted into aggregates but we have less information on the more active waste. The BRE has been undertaking benchmarking studies with support from Defra. From that, I can give you an idea of the composition for housing waste: for example, 17 per cent, the biggest single component of the waste stream, is packaging waste by volume. Then you have other quite significant wastes: concrete, bricks, plastics and timber. That is the general composition. It is pretty much the case that those that can be processed quite easily tend to be the ones that are recycled the highest.

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Q741 Chairman: We have heard varying claims about the amount of material on site that is wasted and it ranges from 13 per cent to 30 per cent. Do you have information centrally or in terms of your experience, Mr Swain, to suggest whether or not these figures are realistic? It is quite a substantial divergence. What is your take on this?

Mr Swain: I think it is. I think there is a variety in the percentage of waste because of the types of projects that are carried out and various sizes of project and types of project that are carried out. It is important to make a differentiation between a civil engineering project and a construction project. Within civil engineering, most of the high value waste tends to be bulk aggregates, earthworks material, whereas in construction, house building and office building, it tends to be packaging type waste. It is important to make a distinction there between the two sorts of projects that we are discussing. The figures you have quoted are probably quite accurate. I do not think as an industry we are particularly good at recording the amount of waste that is generated and what we regard as waste in the first place.

Q742 Chairman: Is that even taking into account the EU Packaging Directive which imposes quite a lot of responsibilities of a costly character on businesses?

Mr Swain: It does. We are lacking take-back schemes in the industry, for construction projects to take back their waste packing to their supplier and manufacturers. There is a lot of material at the end of the job that goes to waste because there is no local market for it, if you like, to recycle it or to reuse it.

Q743 Chairman: I realise that Mr Brock from Balfour Beatty would probably have been able to help us on this issue but maybe you can say from your own experience and results. Are large construction companies aware of the financial costs of waste? If they are—and one assumes they would be—in your experience, how can they communicate that down the chain to the second and third tier contractors for whom they have responsibility?

Ms Hobbs: We have been working with quite a few companies to set benchmarks for the overall amount of waste they are looking to produce compared to the floor area. That seems to be quite a powerful way of getting everybody to focus on waste reduction. It is very difficult to get people to focus on waste reduction because it is not particularly tangible. You can look at how much waste has been recycled. You can look at those costs; they are quite tangible. Waste reduction is not tangible because you are trying to quantify something that no longer is there. Having this measurement is very important, in order to measure waste reduction. You can then say how much money you are saving. The critical thing everybody is trying to work out is: What is the

business case? If I invest this much in terms of waste reduction activities, am I going to get the money back myself in terms of reduced waste costs? It is not as simple as that. Sometimes, for example, the site might be undertaking waste reduction activities but somebody else could be benefiting financially. The things I have seen from the industry in terms of communication tend to be when people come onto the site, they have their Site Waste Management Plan that basically tells everybody on the site what activities should be carried out in terms of waste reduction and recycling, and that is then communicated to people through the site induction and also through tool-box talks throughout the project. That ongoing communication might be posters, telling people how they are doing, et cetera.

Q744 Chairman: It is really exhortation rather than carrot and stick.

Ms Hobbs: Yes.

Q745 Chairman: You are really telling us that they are going through the motions but they are not doing very much.

Ms Hobbs: I would not say they are not doing very much.

Q746 Chairman: Would they put their hands up and say, “We’ve told them that they shouldn’t do this but we’ve not done anything about it other than that”?

Ms Hobbs: I think everybody is going through a learning process at the moment. The Site Waste Management Plans will mean that everything is at least contained within one place. Whereas it has been sort of scattered about, there have been ad hoc activities, the Site Waste Management Plan will at least centralise some of those activities. A lot of companies are doing a lot in order to maximise their resource use on sites. With waste reduction it is more difficult. You really need to go back up the supply chain to reduce waste and there really is not enough information to help people prioritise their actions on waste reduction. In terms of diverting waste from landfill, there is a lot of work going on throughout the construction industry. They are diverting a lot of waste from landfill. In demolition alone we are looking at 90 per cent plus diversion rates from landfill typically. They are doing a lot, it is just that waste reduction is quite a difficult one to tap into.

Mr Swain: I would have to concur with what Gilli has said: you have to go back up the supply chain and look at the ultimate client and the designers of the whole construction process, because there is a lot of waste that can be minimised through good design and through the influence of the client.

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Q747 Chairman: You say you are working with member bodies or companies to establish best practice. Where would you go to see examples of best practice? Would it be the UK or would it be companies abroad? From what you were telling me (a) there seems to be a somewhat latter day conversation and (b) it has been suggested that there are higher levels of productivity and efficiency outwith the UK in the construction industry. Are you looking within the UK or are you looking outwith to try to find examples of best practice? If nobody here is really all that good, what is the point of trying to find the best of an indifferent lot when you might be able to go elsewhere and have examples of really super best practice.

Ms Hobbs: I am on an international group, the CIB, for construction product materials stewardship. We had our first meeting last year. It was built upon a previous group that was looking at design and deconstruction. We did a roundtable with this group and I can honestly say that examples and information from the UK were at least as good as anything else that was coming out internationally around the table. That was not just Europe, it was America, China, throughout—an international group. We, the UK, had plenty to talk about in that international group, so I do not think we should be scared of using our own UK examples.

Q748 Chairman: You would see that as anecdotal evidence rather than hard and fast statistical evidence.

Ms Hobbs: We were the only ones who were able to supply statistics in terms of the amount of waste that was typically produced on construction sites. Very few other countries seemed to have that information. This is the first step.

Mr Swain: In the UK we do some best practice small projects, or islands of best practice, if you like, but we do not do it continually on construction projects.

Q749 Lord Howie of Troon: I should say, first of all, that I am a Fellow of the Institution of Civil Engineers and I have been involved in the construction industry for quite a long time. I was the first of the Committee to query this waste figure of 30 odd per cent, which, to be quite frank, I do not believe. In attempting to support it, I was sent a report by the Sustainable Development Commission. There is a section on construction waste which I would like to turn to. It says, “The construction and demolition industry contributes 33 per cent to the UK’s volumes of waste.” That is an entirely different figure. It is not 33 per cent of construction waste, it is the whole thing. What is more, it includes both construction waste and demolition waste, and we are told elsewhere that something like 90 per cent of the demolition waste is reused; it is not waste at all. I find

these figures confusing and I would like you to de-confuse me. The range of 13 per cent to 30 per cent as an engineer just leaves me cold. I am not interested in a range of statistics of that sort.

Ms Hobbs: The 30 per cent, I think, relates to the amount of waste. Say you had a load of construction materials delivered to site to do a project, for example, 100 tonnes of material, 30 per cent of the materials are being wasted. I do not agree with that figure either. Each individual product has different wastage rates and we do not know what the wastage rate is overall because nobody has ever undertaken those sorts of studies, those mass amount studies, so it is very much finger in the air job for that. In terms of the 33 per cent, that is basically saying that, of all the waste the UK produces, which is around 335 million tonnes, one-third of that waste is coming from the combined activity of the construction and demolition industries. That is where the 33 per cent comes from and that is globally, compared to the overall amount of waste produced. Demolition waste would still be classed as waste. Until it is converted or reprocessed into a product, essentially it is classified as waste. We still have that amount of waste being produced; it is just that, of the waste being produced, most of it is being recycled.

Lord Howie of Troon: I will not pursue this, Chairman. I will merely say that I am convinced now that the figures are an illusion.

Q750 Lord Methuen: Aggregates are often compounds of a variety of wastes. Are there technical limits as to the quantity and quality of the waste material that can be re-used in this way?

Mr Swain: I would first query the question there because primary aggregates are obviously aggregates that are quarried materials, whereas secondary aggregates or recycled aggregates do consist of a variety of waste streams. Yes, there are technical limits, but that would be applicable to virgin primary aggregates as well, so they are comparable in terms of specification of aggregate. The concern, in terms of the variety of waste streams, is on the quality of the feedstock in the first instance—whether it has plastics or timber mixed in with it. There is a cross-contamination issue. The work that the Waste Resource Action Programme has done in terms of the waste Quality Protocol has been particularly useful for identifying specifications, or a standard, if you like, for recycled aggregates in that area. In terms of reusing aggregates and recycled aggregates, it is the nature of the project and location to market, and the cost of recycling it versus the cost of disposing of it. Unfortunately, it is still sometimes cheaper to dispose of the material than it is to recycle it and take it to the market and reuse it.

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Q751 Lord Methuen: The landfill tax—

Mr Swain: The landfill tax is beginning to bite quite severely. On some projects it is still more economic to dispose of it than reuse it and you have to remember that the contractors are profit driven and are trying to make as much money as they can with the project and deliver it on time. Unfortunately, materials are wasted in that respect.

Q752 Lord Methuen: How well do we understand the properties of these aggregate materials which contain waste? Does our understanding limit the functions for which we can use the materials?

Mr Swain: In terms of construction demolition waste, we have a good handle on what we can and cannot do with recycled secondary type aggregates from a construction project.

Ms Hobbs: Yes, definitely. There is good data there.

Mr Swain: In terms of specification, we know how these materials would perform in terms of the civil engineering projects they could be used for.

Q753 Lord Haskel: You were explaining how the excess is probably best got rid of in some ways. Is there not any arrangement within the industry, as there are in many other industries, where suppliers will take back excess aggregate or building materials or whatever it is? Obviously you cannot calculate to the nearest whatever it is how much you are going to need, so usually suppliers will take it back and use it for another order. Is that not a way of dealing with it?

Mr Swain: It certainly is and I would like to see more of it. Unfortunately it does not happen a great deal. You have to think of the range of construction projects we might deal with from large to small. Certainly on a smaller project I do not think you would see that unless you had a significant buying power with the supplier. Construction is one of the only industries I know of that over-orders material or calculates a waste percentage into material with a view to wasting that material before it has even been used it. When you open packs of materials you might have damaged materials as well, so it is not just construction and demolition waste, it is damaged materials that are wasted when being stored improperly on site. That makes it difficult for a supplier to come and collect part materials and part packs, but I would certainly like to see more of that in the industry. As a supplier, I would like to be able to offer that to some of our larger customers.

Q754 Lord Methuen: Is part of the problem in something like the construction industry—and I am thinking of the use of plasterboard, for instance—that the sizes in which materials are sold are not necessarily ideal for the purposes for which they are going to be used?

Mr Swain: This is true. You have hit the nail on the head there, yes. You are right in terms of how materials are supplied as well. The supply chain needs to look at that. The influence of clients and designers could again be very helpful here, in looking at manufacturers and contractors in trying to drive that improvement forward.

Ms Hobbs: That comes down to costs again. When you get pre-cut plasterboard there is a cost attached to that. As Andrew said, a lot of it is just down to costs at the end of the day. It is quite often cheaper to buy bulk materials in and waste them than it is to get the pre-cut plasterboard delivered.

Q755 Chairman: Cheaper for whom?

Ms Hobbs: Cheaper for the site, through usual procurement routes.

Q756 Chairman: At the end of the day, we are talking about a customer. We are not talking about a producer. This seems ridiculous, that we, as consumers, whether big companies or individuals, seem to be paying over the odds for more kit and more materials simply because it is inconvenient for an inefficient industry to get its finger out. Is that really what you are telling us?

Ms Hobbs: It is not a factory line. A construction site is not a factory line. I am not saying I agree with this necessarily, but from the discussions I have had with the industry, the cost penalties associated with delaying the project because you have run out of a bit of plasterboard far outweigh the costs of disposing of that waste plasterboard.

Mr Swain: I think the nature of contracts is changing, which helps the situation. In a traditional civil engineering project, the client gives a specification and a design for a project and the contractor goes away and builds it at a certain cost. Whatever he can save on the cost is money in his back pocket. Now what is happening is the client, designer and the contractor are working together in terms of cost savings, and value engineering to engineer out waste and other problems with the project. I think that is a step in the right direction, but we still have that gap between the ultimate customer (the client) and the contractor and his supplier of the material, because the contractor is the customer of the supplier rather than the client, if that makes sense.

Chairman: That is the point I was trying to make.

Q757 Earl of Selborne: Could you tell us if any research has been undertaken in the different waste streams within the construction industry?

Ms Hobbs: The BRE is carrying out quite a lot of research in terms of different ways of quantifying. We have also worked with the Market Transformation Programme, where we have looked at particular sectors (roofing products, flooring products,

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plasterboard, insulation), quantified the amount of waste that is being produced now, and modelled it into the future to see if there is an increasing or decreasing impact. There are a lot of waste composition studies that either are being completed or are under way that would give us better information in terms of the non aggregate waste aspects.

Q758 Earl of Selborne: Could you give us some flavour as to which waste streams you think are going to be increasing?

Ms Hobbs: Insulation particularly is quite a big waste stream that is going to increase in terms of volume. If you think about it, you have the building regs that are requiring increasing levels of insulation in buildings, so if you are then saying that you have millions more metres square of insulation going into buildings and 10 per cent of that is wasted, typically, in terms of off-cut material, then you have an increasing amount of waste from insulation. When those buildings come to be demolished, then you have increasing layers of insulation waste that are going to come out during the demolition side of things. Currently it is quite difficult to see how that waste is going to be diverted from landfill in significant quantities. I would say that insulation is one of the potential waste streams of the future that we are going to have to deal with increasingly.

Q759 Earl of Selborne: It has been argued to us that past research has focused too much on a limited number of materials in a limited number of construction activities. Is there a need for research into reprocessing techniques, including those that can operate at a site level?

Mr Swain: The construction industry has been quite proactive, looking at options for reusing materials on site in terms of bulk materials, soils and recycled aggregates, but I think you are right that we need to look at site-specific recycling, or local areas around hotspots, or urban areas, if you like, for recycling centres where small volumes of material which are normally uneconomic to reprocess on site could be taken to be processed. Whether that is on site or at an offsite facility within an urban area, I think that would be very favourable. The industry has also been proactive in looking at non-construction type waste, in terms of replacing primary aggregates and cement replacements and sand replacements in construction materials as well. There is a lot of research and development going on at the moment, certainly within my organisation and others, in terms of non-construction waste within construction products.

Q760 Lord Haskel: For measuring sustainability, the BRE has developed a series of environmental assessment methods, known as BREEAM. Do they work? How effective are they? What do they do?

Ms Hobbs: BREEAM is basically a building level assessment of lots of different sustainability aspects. I have my crib sheet here because I am not that *au fait* with BREEAM. It looks at the operational energy of the building, along with things like the water use and the materials that are going into the building. It does look at waste, land use and ecology. You look at all these different sections and you basically can do good things within them to reduce impacts. The more you do, the more credits you get. Then, depending on the number of credits you get, the BREEAM building design stage will get maybe a pass, or good, or very good, or excellent. They have just introduced an outstanding category. I think they work. 100,000 buildings in the UK have been certified to BREEAM already. Half a million buildings have been registered for certification. There is the design stage, but there is also a post-construction review to make sure that all the things they said they were going to do have been done basically—so there is the pre assessment and the post assessment. They do work in terms of trying to get the overall environmental impact of that building improved. It is a strong tool for that.

Mr Swain: Perhaps I could introduce another acronym, CEEQUAL—which is very similar to BREEAM but covers the civil engineering construction project. It stands for Civil Engineering Environmental Quality Assessment Scheme and assesses the sustainable performance of a civil engineering project. There are two sections within the CEEQUAL scheme that cover waste: waste management on site and minimising waste, but there is also material selection and what proportion of materials are reused and recycled and so on. That is a positive, proactive way for clients, designers and contractors to demonstrate best practice, going that extra step on a construction project, a civil engineering project. I think both BREEAM and CEEQUAL have particular merit. Again, if we could influence that, I would like to see greater focus on the need for CEEQUAL on government-funded projects.¹

Q761 Lord Haskel: Are there pressures within the industry for buildings to conform and for construction sites to conform?

Mr Swain: Yes.

Q762 Lord Haskel: For instance, if the Government said they wanted to build a school, would there be any benefit in saying that they have to fulfil these particular statements?

¹ www.ceequal.com

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Mr Swain: Yes. BREEAM is already there. In terms of specification of contract requirements, they will specify that the building must meet a certain BREEAM rating.

Q763 Lord Haskel: This is already in practice, is it?

Mr Swain: That is already in practice. I would like to see the same for CEEQUAL. At the moment it is a voluntary scheme, so the industry is stepping up to the plate and saying, “We feel that this particular project is going beyond the legal minimum. I would like to see that bring brought out in government type funded projects.

Ms Hobbs: There is BREEAM Olympics, for example. Lots of the high profile projects already have BREEAM but it is a standard for certain publicly procured buildings to achieve a certain level of BREEAM, like very good or excellent. It really is a focal point to reach certain standards of sustainability.

Q764 Lord Haskel: Is there pressure in the private sector to meet these standards?

Mr Swain: Obviously there is an award scheme and a certificate at the end of it, so private companies like to be able to promote themselves as a sustainable business, whether it is within the construction building type area or civil engineering. There is kudos from going through these assessment schemes.

Q765 Lord Haskel: As far as planning permission and all that sort of thing is concerned, it is voluntary.

Mr Swain: It is voluntary, yes, but I think it does help with the planning process because in order to get a number of credits you have to have a number of systems in place in terms of your environmental performance before you can go ahead with that. Generally you would expect it to be quite a competent contractor or client going forward with those sorts of schemes anyway, but I would still like to see it pushed down through the supply chain.

Q766 Lord Howie of Troon: We have been told by the BRE that the present life-cycle impacts do not really bring together such matters as waste reduction and carbon reduction. How can the weightings of various environmental aspects affect the output of a life-cycle assessment and how might that affect the design and construction of a building or a civil engineering project?

Ms Hobbs: Life-cycle assessment basically looks at a number of issues, of which waste and recycling are just two out of maybe 13 different impacts that will be quantified. To take this table, for example, you might want to look at the energy required for it along with the water use, pollution, waste, and recycling impacts; so, in eco points, this table might have this many eco points compared to that table. You need to

weight everything, in order to get it to a single figure. When I was putting the submission in, it was really that, once everything is weighted and put into a single number, it is quite difficult to extract the waste information, to make decisions based upon waste reduction, and also make sure you are making the wider decision based upon environmental impacts. But the weighting is required in order to get a single metric, which is the only way you can simplify things, so really you need to go back a step and have greater transparency in the individual impacts that make up that weighted figure. Then you can start to make decisions on waste reduction. Having made those decisions on reducing the energy consumption of a building, looking for specifications that have a lower environmental impact and looking for products that automatically have a lower environmental impact, then trying to reduce it further through reducing the waste and through increasing the opportunities for resource use. That is the sort of hierarchy of decision-making that we think we should undertake at the BRE and it is a question of whether we have enough information at each of those stages to help people make those decisions. Currently the answer is that we do not have that information. Suppliers quite often do not have that information, even if their customers ask for it. Until you have that, how can you start to make those decisions really?

Q767 Lord Howie of Troon: Are these life-cycle assessments reliable? My house in north-west London will be 100 years old—this month, I think, or sometime quite soon. I cannot imagine someone sitting down and assessing a life cycle of 100 years. The Forth Bridge is even older. How reliable are these really?

Ms Hobbs: To take this table, when you are designing it you say, “We expect this table to last for 20 years” and you would then quantify the impacts over 20 years. If it lasts 100 years, then you have started off on the wrong premise. As you say, that is exactly what is happening with buildings, they are lasting and have to last a lot longer than their design life, so, in the life-cycle assumption you used, you may have used the wrong figure.

Q768 Lord Howie of Troon: We are back to illusion again, are we not?

Ms Hobbs: Yes. There is a lot of that.

Q769 Chairman: Maybe we could move on from the industry to legislation and government policies. We have heard that once the “waste” label has been put on to materials, this can hinder their re-use. Is this the case? Which valuable materials in the construction industry do you think should have the waste label taken away from them, so that people are not inclined to go to landfill? Is this a problem?

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Mr Swain: It is a real problem. It is a huge problem. The waste label is probably the biggest problem we have, actually. But we have these legislative controls in place, and I think it is important that we keep those. The definition of waste is based on case law. That also makes it difficult for people to make a decision because it is a bit of a grey area, if you like. It is never clear cut whether a material is or is not a waste and it is sometimes very difficult to get that guidance and to make a commitment on whether it is a waste or not. Once it has that waste label, that dictates what you can and cannot do with that material, in terms of where you place it and how you process it and who you give it to. I think it is important to maintain those legal controls. I think we need to be clearer on guidance, certainly from the regulator, on what we can and cannot do with certain waste materials. Defra and the EA are going in the right direction with the number of waste Quality Protocols that have been developed at the moment. Some of these have an impact on the construction industry in terms of materials. If we could move away from the term “waste” and call it a resource, I think that would start educating people that waste is not a waste, it is a resource that has a potential for use or re-use elsewhere. Rather than the legal position, it is just the terminology “waste” that gives it a label. Clients and designers do not like the idea of using waste materials because it conjures up an image of inferior product. It is far beyond that. We have already said we have technical specifications for site materials. We can demonstrate that they would perform like a virgin product. It is the labelling that is the problem rather than the legal bit.

Q770 Earl of Selborne: Clearly this is a key area. I understand that you are saying we must keep the legal controls, but you have found in the past that case law has been unhelpful with the designation.

Mr Swain: It has. As soon as you have a waste material, you have to jump through a number of hoops in order to recycle it, reprocess it, or take it somewhere to do those sorts of activities. The law has changed recently, in terms of environmental permitting, to make it a lot easier to do some of those activities, but it really does cut off a number of contractors and clients, certainly at the smaller end of the market. With the hassle of jumping through those hoops, it is a lot easier for them just to dispose of it.

Q771 Earl of Selborne: I wonder, therefore, whether secondary legislation is needed rather than relying on case history. If you redefined what is meant by waste in certain categories in law then there would not be any danger of a legal case producing an unhelpful result.

Mr Swain: I mentioned the quality protocols that have been developed with WRAP and Defra and other organisations. They make it quite clear when that waste ceases to be a waste and what is required in terms of process. They are very useful but, again, I think they should be communicated more widely within the industry. You have to remember that there is a handful of large, major contractors who are aware of this stuff but below that there is a huge amount of small- to medium-sized businesses that generate huge amounts of waste materials which are not aware of the protocols and need help and education.

Q772 Lord Methuen: We discussed landfill briefly earlier and its incentive to reduce waste within the construction industry. The Sustainable Development Commission argued that the cost of landfill remains too low compared to other more sustainable alternatives and represents a relatively small proportion of the business operation expenses. Do you think that the landfill tax is high enough to drive waste reduction?

Mr Swain: I do not think my colleagues will be very happy with this, but I do not think it is high enough, no. We need to make it a significant burden, for people to consider other options in terms of the re-use or recycling of that material. It still is cheaper, in certain areas, to dispose of to landfill inert construction demolition waste than it is to re-use or recycle it.

Ms Hobbs: I think you probably need a differential landfill tax based upon the environmental impacts of landfilling particular materials. There are lots of holes in the ground that need to be filled up, so you do need to have a certain amount of landfill going on anyway, but there are certain materials that will produce more methane, for example, and they are easier to recycle, and so it needs to be a bit more sophisticated in order to actively prevent certain materials from going to landfill by either banning them or making it prohibitively expensive for those materials to go in.

Q773 Lord Howie of Troon: Appropriate materials from building sites can be used for reclamation from the sea. It has been done. The Channel Tunnel is a very good example of that. Would that be described as landfill and subject to the tax, or would it more sensibly be described as reclamation and exempt from the tax?

Mr Swain: It would be exempt from the tax. Waste only attracts tax when it goes to a licensed landfill facility. If it was re-used elsewhere as an engineering fill, then it would not attract the tax but it would be subject to waste management legislation—and, again, that can prove difficult in some circumstances.

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Q774 Chairman: Can you explain to us something about the aggregate levy. How does this work? Is it effective?

Mr Swain: The aggregate levy is not a tax but a levy that is added to primary aggregates that come straight out of the ground. I think it is £1.90 per tonne increasing to £2 per tonne from April 2009 and it is applied to virgin materials. In essence, that cost is passed on to the customer, whoever is buying that material, so the price of aggregates has obviously gone up. The incentive behind that was for customers to look elsewhere and to look at recycled materials. That has happened, but . . . Perhaps that levy is not high enough—though I would not like to say that. That is the idea behind it. The Government has put a levy on virgin materials and a tax on materials being disposed of to landfill to encourage this re-use and recycling. I do not think we are quite there yet.

Q775 Lord Haskel: On the question of landfill, we were in Flanders the other week and they have no landfill in Flanders. Would that be a way of dealing with it here? Would people be able to find alternative uses?

Mr Swain: You have mentioned looking in the broader term to other areas. Obviously Holland does not have a great deal of landfill space either and they are quite innovative in terms of what they do with their recycling of their materials, from domestic waste as well as construction waste. We are running out of void space in the UK. I think we need to prepare as a construction industry by looking at smarter ways of dealing with our waste materials.

Q776 Lord Howie of Troon: I want to ask you about Site Waste Management Plans. They have been voluntary up to now, I believe. Have they been useful in reducing waste? Do you think that making them mandatory is a good idea?

Ms Hobbs: Site Waste Management Plans are now compulsory for any site over £300,000. They have a dual objective: to reduce fly-tipping and to improve resource efficiency. They will encourage resource efficiency, in terms of understanding how much waste you have and what you are going to do with it in advance of the construction site starting. It has yet to be proven that they will reduce the amount of waste produced, because, as we have said before, you have to move up the supply chain a lot more to reduce waste, but, in terms of making it much more obvious what is going to happen on the site in terms of managing materials, the Site Waste Management Plan is going to be very effective.

Lord Howie of Troon: Thank you very much.

Ms Hobbs: They are compulsory for any site over £300,000. One of the things that we did suggest at the time of the consultation was that there was a central place to collect these plans so that we start to get a

much better idea in terms of the amount of waste that is being produced but, also, what the different companies were doing to manage their waste—because that would all have to be written down. Unfortunately, that has not happened, so that is an opportunity missed really, because now each company has its own Site Waste Management Plan without there being a central place to log them.

Q777 Lord Howie of Troon: If they are compulsory but they are not working terribly well, as you seem to be saying, what should be done about it?

Ms Hobbs: We proposed that they should be logged centrally; first of all, to help enforcement but, also, so that we could start to collect information in terms of what sort of actions are being undertaken. In order to comply with the legislation, you do not have to reduce the amount of waste that you produce; you have to make statements regarding waste minimisation. You have to measure the amount of waste being produced and you have to review your plan during the construction and also afterwards, but there is no compulsion within that to do anything better really—which is a shame.

Q778 Lord Howie of Troon: Is the saving worth the cost of making the plan?

Ms Hobbs: Yes, it is. A cost impact assessment was carried out and they did save money.

Mr Swain: They were only introduced as mandatory from 1 April or 6 April this year, so I think it is early days to say. The fact that they were first voluntary and are now mandatory within the industry shows how slow the industry is to take up these sorts of things. It could have done it on a voluntary basis but has not. I would concur with what Gilli said really: it is very useful in terms of getting the client and the designers and the contractors towards thinking about the waste that is being produced. At least it is a step in the right direction. Most importantly, it ensures compliance with the legal requirements in terms of the duty of care, making sure that waste is disposed of properly or handled properly—which is a big failing in the industry at the moment. I would only say that it is on projects of £300,000 or more and there are a lot of construction projects out there that are much less than that. But if it is so important, why do we not just introduce it as mandatory, across the board through the planning process? Again, the key is in communication and education in the industry. The major contractors have got it, but the smaller guys perhaps are not aware of the requirement in the first place. But the plans are a good thing.

Q779 Lord Bhattacharyya: How do you measure the Site Waste Management Plans? What criteria do you use? Do you carry out a simulation, to see what will

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happen if you do it this way or that way? Do you go through a very structured approach?

Ms Hobbs: The only requirement of the legislation is to measure inert hazardous and non-hazardous. The BRE has its own Site Waste Management Planning tool which separates it out into much more detail. That is our way of having a consistent way of measuring construction waste that is then automatically fed into the benchmarking website and then relayed back to the industry. We average out waste that would be produced for different types of construction, so that they can then use that in order to create their plan and hopefully improve against it. The BRE has a consistent way of measuring waste. Constructing Excellence have key performance indicators in terms of waste. Different contractors have their own ways of collecting waste. Again a missed opportunity is in not having a commonly agreed set of benchmarking data. At the moment there is the BRE one and then it is up to the individual companies as to whether they use our tool or not really.

Q780 Lord Bhattacharyya: Has the cost gone up because the plans are mandatory now?

Mr Swain: I do not think it has, no. As I was saying earlier, the important thing is to get the clients, designers and contractors to think about the waste they are going to produce and then to monitor against it. The benchmarking is key to that. If used properly, then you can review the pattern: Why did we not meet our expectations? Why have we failed in those particular areas?

Q781 Lord Bhattacharyya: If I were a contractor, I would say, "I have got to do all this mandatory stuff, I'm going to raise it by 10 per cent." How does he decide whether it is 10 per cent, 5 per cent, or 15 per cent? Or is it the blind leading the blind?

Mr Swain: Yes, contractors could do that, but I think the purpose of it is to improve performance. If the contractor did it like that, then he would be fooling himself and not playing in the spirit of the game—although I am sure there are those people out there—but the client should have an involvement in it as well.

Ms Hobbs: The reason why the threshold was set at £300,000 is because the impact studies showed that was the point at which the cost of writing a Site Waste Management Plan and implementing it was exceeded by the financial benefits from having a Site Waste Management Plan. That is why we have the £300,000 threshold.

Q782 Earl of Selborne: All new homes now have to be rated against the Code for Sustainable Homes, which measures their sustainability against nine categories of sustainable design, one of which is waste. Do you think that enough weight is given to

the waste category in the overall assessment and how accurate do you think the assessments will be at indicating the true sustainability of the project?

Ms Hobbs: The Code for Sustainable Homes is a residential equivalent of BREEAM. It is a government code. Again, you have these different sections within it which are weighted in accordance to what is considered to be their relative importance. Within the Code for Sustainable Homes, the waste aspect has 6.4 per cent of the weighting for the overall code whereas energy is 36 per cent—which I think you would probably expect, given the carbon reduction targets. We have a very difficult target to meet in terms of carbon reduction and you would expect the energy aspect to be weighted accordingly. In terms of whether or not there is enough weight, the code could really drive people towards waste reduction, if there were mandatory levels that you have to meet within the code. There are mandatory levels for energy, water and waste, but the mandatory level for waste is that you have to have a Site Waste Management Plan. The Site Waste Management Plans are now mandatory anyway, so the only enhancement upon what is already law is to measure the waste in greater detail. You get additional credits for reducing waste and for diverting waste from landfill. When you get into the higher levels of the code, code levels 5 and 6, it is very difficult to get to those levels without trying to get all the credits you possibly can, so any developers trying to get to code 5 or 6 will automatically try to get the additional credits on the waste section. They will really try to get the credit for reducing waste and they will really try to get the credit for recycling because there is a cost saving to them. Ultimately there should be a cost saving, so it would be silly not to try to get those credits. The weighting might be low, but at the higher levels you really have to try to get every single credit you can.

Q783 Earl of Selborne: How do you think that developers of new homes view these codes? Do you think they will have an incentive to go for these higher classifications?

Ms Hobbs: They are having to. As Andrew was saying, it is back to the client. If they specify a code level 5 or 6, then they will have to design to that level.

Q784 Earl of Selborne: And that is driven by the purchaser.

Mr Swain: Yes. My only concern with the code is, again, coming back to smaller companies: companies which do not need to produce a Site Waste Management Plan get the credit by default, as I understand it. I would like to see them challenged in some way so that they would have to produce a Site Waste Management Plan, even though they are not

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required by law. I think that would get them thinking about waste as an issue for them.

Q785 Lord Haskel: Another way the Government has tried to improve things is through the roadmaps that Defra are creating in their Market Transformation Programme. They have a roadmap for plasterboard, resulting in the setting of targets to increase the recycling of plasterboard waste. Do you think this is a success? How was the industry involved in this?

Ms Hobbs: I was involved with this from start to finish through the Market Transformation Programme. It is the other way around, to be honest. We did the work on the waste aspect, quantifying how much waste was produced now and how much into the future. We could see that there was a rising impact and so we worked with the industry to think about how those impacts could be reduced realistically. The industry was very proactive and went to Defra and suggested a voluntary agreement for reducing the amount of plasterboard that was produced and diverted waste from landfill. That has basically been agreed with the manufacturers. We are currently working with the contractors who install the plasterboard, along with the resource management industry and also the demolition industry, to have equivalent agreements for plasterboard in terms of reducing the amount of waste produced and diverting it from landfill. Defra have since looked at plasterboard in its wider sense, in terms of how we reduce the environmental impact of plasterboard, through a roadmap. Waste is one environmental impact of many we really need to consider. The industry working on reducing its waste is a very good starting point and the roadmap is hopefully going to look at other environmental impacts that can be targeted as well. If there were big impacts, a similar agreement should be set up to reduce that impact as well.

Q786 Lord Haskel: Is this going to apply to other products apart from plasterboard?

Ms Hobbs: A sensitive point, really. We are working on these other product groups within the Market Transformation Programme. We were going through the same process of gathering information, showing whether there was an increasing impact, looking at actions to reduce those impacts, and then, potentially, a voluntary agreement with roofing products, flooring products, insulation, windows, and modern methods of construction. Unfortunately, because of budgetary constraints, they do not have enough money to look at everything, so they are focusing much more on energy-using products. The work that has been carried out on these other products, non energy-using construction products, has been stopped, basically. It is a very powerful way to do things, but it is not going to be going ahead through the Market Transformation Programme in the foreseeable future, and so we transferred that work into another programme called the Construction Resources and Waste Platform, whereby we are going to look at two additional products and try to get voluntary agreements for them. We are hoping that one will be insulation and the other will be bricks and blocks.

Q787 Lord Haskel: But is it your commercial pressures to reduce the amount of plasterboard waste and the bricks and the block waste that you are telling us about? Surely there are commercial pressures to do it?

Ms Hobbs: Yes, which is why the industry is very proactive in coming forward and working with the Government to identify what can be done, but they would rather do it at a national level rather than try to do it individually.

Chairman: We have covered all the areas that we want to cover, but as ever we will probably think of something afterwards so we might want to write to you; and equally if there is anything that you want to supplement our questions with we would be more than happy to take any additional information. Obviously we will be in touch with Mr Brock as he has not been able to attend today and we will try and arrange for him to have sight of the evidence and if there is anything that he would wish to supplement it with we will be happy to accept that too. Thank you very much for your time.

Memorandum by Laing O'Rourke

EXECUTIVE SUMMARY

Laing O'Rourke seeks to challenge and change the image of construction worldwide, part of a vision developed against the background of a very different commercial dynamic—but arguably a vision of even greater relevance now than when first set out more than a decade ago.

Within our wider vision the Group also seeks to be the company of first choice for all stakeholders and, finally, we say that with leanness and agility we will adopt processes to compete with world-leading businesses.

In each aspect of this three-pronged vision the focus is on learning, changing and—above all—behaving in a manner which transforms the “attractiveness” of the sector in which we operate. Clearly one of the least attractive aspects of an industry not noted for its environmental management credentials is the reputation attached to it around waste—in all its forms.

With a Group turnover in the order of £4 billion and worldwide employees of around 30,000 we carry significant responsibilities. As the UK’s largest privately-owned construction Group we seek to challenge and change in a number of ways, principally:

- the practical application of innovative solutions to complex challenges;
- training and developing employees and, above all; and
- instilling the culture of everyone returning home safely every day.

These are the pillars on which our businesses are built and by referencing these in the context of the overarching vision we meet each challenge. Defining waste consistently and coherently, while creating practical strategies to mitigate waste in all its forms demands responsiveness within an overall framework—and real engagement with the consequences of failing to act on waste at all levels of the business.

This means ensuring that our people are not operating rules by rote but actively thinking through the waste mitigation opportunities (and risks) presented at each step within a supply chain and site assembly process. Empowerment of the individual comes through shared knowledge and an ingrained understanding of the importance of tackling waste, against the environmental consequences of which we are all too well aware.

Our approach to this is within the context of the various regulatory and legislative boundaries which govern the industry. While those boundaries are appropriate, we nevertheless seek to work collaboratively with our clients, suppliers and other stakeholders to ensure we pursue ways of going above and beyond regulation.

This means, for example, going beyond construction to adapt learnings from elsewhere. As a Group we firmly believe that a radical shift away from the traditional labour intense, component heavy onsite environment is not only the way of the past, but the great ally of wastefulness.

Lean, efficient offsite manufacturing and pre-assembly methods, adopting techniques from industries such as automotive manufacturing, are the way of the future. Fewer people onsite, working with fewer pre-ordered materials in an efficient, clean and effective manner reduces component waste and introduces measurable cost and safety benefits.

Our commitment to offsite manufacturing is tangible. It can be seen through our investment in the proposed Steetley manufacturing facility on the Nottinghamshire/Derbyshire border which will be the most advanced pre-assembly plant of its kind in Europe. Additionally we are investing heavily in ensuring that the onsite teams employed to assemble finished components are highly skilled, properly rewarded individuals who see themselves as part of high-performing teams moving from project to project.

While this is the broad aspiration of the Group, our goals will be better met if we can influence policy direction in the development and design of public sector construction whereby the benefits of consistency can be shared. This means the critical examination of whether bespoke designs, often presenting challenging and unique concepts in the public realm, are the most sensible way of minimising waste and maximising shared efficiencies.

Our goal is to become a Total Solutions Provider for all our clients. This means involvement at the earliest stage of any project through its design and assembly and on into the maintenance and eventual decommissioning phases. The resource benefits that are presented by managing waste at each stage of this process are limitless—and the Laing O’Rourke Group is fully committed to playing its part in meeting that challenge head on.

BACKGROUND

Laing O’Rourke Group (LO’R) is the largest privately owned construction company in the UK, with offices in Germany, India, Australia and UAE and around 30,000 employees worldwide. We specialise in delivering ambitious construction projects and are responsible for some of the most innovative construction solutions anywhere in the world. However, as a major construction company, we are well aware of the growing pressure to reduce the impact of construction waste upon the environment and further reduce wastage of resources.

Beyond a growing raft of regulations (such as the implementation of Site Waste Management Plans) and market pressures (such as increasing landfill tax), public and private sector client organisations are increasingly looking to set requirements to reduce waste, recover and recycle more materials. Reducing the amount of waste generated, diverting materials from landfill and reusing recovered materials are genuine cost-neutral and cost-saving incentives to reduce waste.

Laing O'Rourke's Corporate Responsibility (CR) Strategy (and more specifically, its Environmental Management Objectives) sets targets and strategy for key elements of the sustainable construction agenda. For example, we have a corporate target to reduce waste from our construction sites and in the imminent future we intend to introduce corporate indicators for m³/£100k spend, the percentage of waste we send to landfill, and our total spend on waste.

To accelerate our waste management agenda from "compliance" to "minimisation" and "resource efficiency", Laing O'Rourke engaged with the Government's Waste & Resources Action Programme (WRAP). WRAP has supported Laing O'Rourke in finalising its revised Site Waste Management Plan (SWMP) template and developing accompanying guidance, which was rolled out to all sites in advance of the introduction of the Site Waste Management Plan Regulations in April 2008. Together with training site staff on how to implement the resulting SWMP, LO'R is committed to integrating waste minimisation, sustainable waste management, and waste data reporting requirements into its procurement procedures. In addition, Laing O'Rourke is looking to increase the use of recycled material in its construction projects by trialling WRAP's Recycled Content Toolkit across LOR's businesses and projects.

Innovative technological solutions such as design, off-site production, logistics and better site management practices including procurement procedures, are all part of Laing O'Rourke's agenda for improving waste performance. We believe we have put in place a coherent process which fits with our CR strategy, is integrated into core business processes and can deliver significant waste savings in the construction process.

1. TECHNICAL SOLUTIONS FOR MINIMISING WASTE

Design

Laing O'Rourke believes substantial savings can be achieved by adopting principles of standardisation in design or by engaging with the supply chain to ensure that standard manufactured components can be adjusted to suit a specific design.

For example, plasterboard is a product which often attracts a significant amount of waste from over-ordering or from cuts, because the panels do not match the designed dimensions. On the Laing O'Rourke Meath Gardens Project, standard length plasterboards of 2.7 m (instead of 2.4 m) were used as we recognised that there was an opportunity to save money and reduce waste by using boards which matched the floor to ceiling height. Production of waste plasterboard was greatly reduced as all horizontal cuts and joints were virtually eliminated from the dry lining works.

The water industry is another sector which has adopted innovative solutions to reduce waste through trenchless technology. Through our alliance with Welsh Water, we have rehabilitated approximately 370,000 metres of pipeline during the 2007–08 period with approximately 332,000 metres being undertaken through trenchless technology. We have estimated that this trenchless technology has saved around 295,000 tonnes of waste, all of which could have potentially been sent to landfill.

Material specification

We believe there are considerable opportunities to minimise waste through product specification, through a "closed loop" or "cradle to cradle" approach, or by using secondary or recycled aggregates which have low environmental impact.

At Heathrow Terminal 5, Laing O'Rourke and BAA strove to include products with a high recycled content in the construction of buildings and infrastructure. Over 80,000 tonnes of recycled and secondary aggregates were brought onto the project in addition to the crushed aggregates generated on site. This included crushed glass from local municipal recycling banks that was used in the construction of the site roads. Up to 30% of the concrete mix used in the construction of the buildings, taxiways and aircraft stands is pulverised fuel ash (PFA), a waste product from the power generation industry. Using this recycled product and an innovative variable thickness concrete saved over 9,100 tonnes of CO₂ emissions.

In 2000, Laing O'Rourke used recycled aggregates as capping for service access roads and car parks at Glasgow International Airport, with similar practices being adopted at Edinburgh Airport for the construction of a 1,320 space single level car park and a multi-storey short-stay car park directly outside the airport terminal building.

By January 2004, Laing O'Rourke was responsible for recycling over 33,000 tonnes of aggregates sourced from both off-site and on-site sources and utilised as a sub-base.

EXAMPLE: EDINBURGH AIRPORT MULTI STOREY CAR PARK

- Recycled and reused 29,000 tonnes of hard and soft landscaping.
- Prevented 1,200 truck movements, saving £72,000.
- Using RSA rather than virgin stone, saving £10,000.
- Saving £165,000 when comparing recycling costs to landfill.
- 50 per cent reduction in truck movements.

2. OFF-SITE MANUFACTURE

Off-site manufacture can offer significant advantages compared to site assembly since the risks associated with weather, programming, trade co-ordination, on-site plant and equipment and project health & safety are reduced. Laing O'Rourke has embedded off-site manufacturing into its core business strategy which is being demonstrated by our investment in the Steetly Manufacturing centre which is due to come on line in August 2009.

In addition Laing O'Rourke owns Crown House Technologies (CHT) a subsidiary company which is experienced in the field of off-site manufacturing of mechanical and electrical building components for air-conditioning, heating, cooling, ventilation, electrical services and sprinkler systems. With an in-house manufacturing capability the projects delivered by CHT have led to improvements in quality, reduced labour, reduced material waste, logistics and improved production performance.

The modular plant rooms arrive on-site ready for installation using a "plug and play" approach. Delivery to site can be on a "just-in-time" basis as the plant room is pre-commissioned and remains sealed until use. The plant rooms are manufactured in CHT's manufacturing facility in Wolverhampton.

Expanded Big Block, a new specialist division of Expanded Limited (owned by Laing O'Rourke) has started to install a prefabricated large format blockwork system manufactured by Xella (and many other manufacturers). Standard blocks are 1,000mm long and 645mm high and are made from calcium silicate; a substance with much lower environmental impact than concrete as it contains no cement—just lime, sand and water. Big Block construction has many benefits over conventional blockwork including shorter programme, less wastage on site as no cutting of blocks is required, no requirement for scaffolding as all laying can be done from scissor lifts, no manual handling of blocks is required and calcium silicate has high thermal mass.

Logistics

Consideration of waste during design, construction and even operational phases of Terminal 5 enabled the successful implementation of waste hierarchy. Over 97 per cent of waste material was recycled or recovered. A "just-in-time" logistics strategy adopted at Heathrow Terminal 5 and on-site housekeeping practices such as designated storage areas and segregated vehicle and pedestrian routes ensured that materials were delivered to the work place as they were needed, and not stored on site. This reduced the amount of material damaged on site and therefore reduced waste. Typically on a construction project, this can account for 10% of materials ordered, which then often end up in a skip unused.

Laing O'Rourke and BAA worked with suppliers to reduce the amount of packaging delivered to the T5 site. To ensure buy in, sustainability workshops were run for suppliers focusing particularly on reducing packaging waste. Other steps were taken to reduce waste from the outset:

- All suppliers were encouraged to reduce packaging as far as possible and choose reusable materials to package their products.
- Where packaging is unavoidable suppliers were encouraged to take back the packaging they supplied for reuse.
- Agreements with the cable suppliers enabled cable drums to be returned to the supplier for reuse.
- Standard specifications for products such as paint enabled them to be ordered in large quantities, thus reducing waste and enabling large packaging to be returned eg ICI Dulux paint cans were returned to the supplier.

On site consolidation of waste using compactors and roll packers, whilst not reducing the weight of waste significantly reduced the volume of waste sent off-site, reducing the number of vehicle movements. Consolidation of hazardous materials during construction significantly reduced the transport of these materials.

3. SITE PRACTICES TO MINIMISE WASTE

(a) *Procurement procedures*

Laing O'Rourke's advocacy support from WRAP included the identification of opportunities for waste minimisation and resource efficiency through procurement practices. Laing O'Rourke's Site Waste Management Procedures require subcontractors (by contractual agreement) to provide information on their waste streams and their ideas to reduce waste quantities. Early engagement of the supply chain, together with designers is key to identifying and reducing waste where Laing O'Rourke plays the role of Principal Contractor.

(b) *Segregation to improve recycling*

Where possible, segregation is provided on Laing O'Rourke projects for waste streams such as wood, metals, plasterboard, paper and office wastes, canteen wastes etc. Segregation facilitates recovery.

Laing O'Rourke has supported Uponor Infrastructure, one of our suppliers on our water contracts to achieve the "Environment Business Outstanding Achievement Award" at the City of London Corporation's Sustainable City Awards in 2007 as well as being highly commended in the resource conservation category. Uponor's scheme, begun in 2005 to take back and recycle customer polyethylene (PE) pipes and fittings waste using its own vehicles, has reclaimed more than 260 tonnes of PE so far.

4. TRAINING AND AWARENESS ON WASTE MANAGEMENT AND MINIMISATION

Laing O'Rourke includes its procedural requirements for waste management within its environmental awareness courses for its senior managers, environmental co-ordinators and site supervisors. Waste Management requirements are also included in our site inductions. In 2008 Laing O'Rourke will engage its supply chain to start to roll out this training to its key suppliers and contractors.

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Examination of Witnesses

Witnesses: MR CAL BAILEY, Marketing and Sustainability Director, NG Bailey, representing the Specialist Engineering Contractors' Group, MR CHRIS SEXTON, Head of Engineering, Laing O'Rourke, Ms LESLEY SEYMOUR, Associate and Sustainable Development Consultant, Buro Happold, representing the Institution of Civil Engineers and MR RAINER ZIMMANN, Associate Director, Arup, examined.

Q788 Chairman: Good morning, ladies and gentlemen. Perhaps we could start as we did before. Mr Zimmann, could you introduce yourself and we will work our way along the line?

Mr Zimmann: Good morning, my name is Rainer Zimmann; I work for a company called Ove Arup and Partners. We are a multidisciplinary engineering consultancy and business consultancy. I am a civil and environmental engineer by training, and I have been working with the construction industry for 12 years, specifically on construction waste and waste management in general.

Ms Seymour: I am Lesley Seymour. I am a chartered civil engineer as well and Chairman of the Institution of Civil Engineers in the southwest. I have recently joined Buro Happold as an Associate, working in their sustainability and advanced technology group and the referenced information I will talk about today was done in a previous role.

Mr Sexton: My Lord, I am Chris Sexton; I am Head of Engineering at Laing O'Rourke. Laing O'Rourke is the biggest privately owned construction company in the UK—30,000 employees and a group turnover

of about £4 billion. I have been with Laing O'Rourke only for four months; previously I was Head of Engineering in the Army.

Mr Bailey: Good morning, my Lords. I am Cal Bailey; I am the Marketing and Sustainability Director of NG Bailey, one of the UK's largest building services firms, and by building services we interpret that very broadly: mechanical and electrical engineering, that is the services—the heating, the cooling, the lighting and the power in buildings. Also the ICT, where we have done a lot of work and we have extended our work recently to include the floors and partitions and ceilings because that interfaces very heavily with our services—we look after the building then throughout its life, during the maintenance period as well. We do a lot of offsite construction for reasons which we may turn to in due course.

Q789 Chairman: We are going to start this morning by going over ground that we have been over before, and you will have heard some of the responses given. This is about the data relating to the amounts of

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construction waste from materials, et cetera. The first question is do we have enough data? Who are the greatest contributors of waste and does it come from new builds, demolition or refurbishment? What is your take on the difference between, let us say, civil engineering and construction as contributors? So a wide range of questions you might not all wish to answer, but who would like to start?

Mr Sexton: My Lord, in terms of the data—and I think hitherto the data has not been particularly good—I think there has only been a requirement to report hazardous data and there have been no regulatory mechanisms for measuring waste data, and some of it has relied on visual estimates and so on. As you heard in the previous session, even the site waste management plans do not require that waste data to be reported upwards and outwards at the moment, although we would be quite happy if it was. The answer to your first question, my Lord, is that hitherto the data has been weak and we are certainly going forward undertaking benchmarking exercises so that in the future we will know very accurately what our waste data is going forward, but I am afraid looking backwards the picture is slightly opaque.

Q790 Chairman: So we are around about year zero plus one?

Mr Sexton: I think we are slightly better than that in that we started this process a few years ago, but it is very much the start of the journey, I think.

Q791 Lord Bhattacharyya: There are some reports which suggest that as much as 30 per cent of the total weight of materials on site is wasted. Is it an accurate figure? Is it credible?

Mr Sexton: I think that the 30 per cent does not refer to the total waste from a site and that figure is likely to be much lower. But we do not have the completely accurate data yet.

Q792 Lord Bhattacharyya: So these reports are not very credible then?

Mr Sexton: I do not think the 30 per cent figure is correct.

Q793 Lord Howie of Troon: Good man! Well done!

Mr Bailey: I would like to analyse waste in a slightly different way, ways which the Committee may wish to take up or may not. We talked about the sources of waste in the analysis from demolition, construction and refurbishment and so on. The analysis I propose would be to do with what I initially called construction error—to do with over ordering, damage in transit, damage on site, the errors that people make on site; secondly, poor planning, which happens before site, which is to do with inadequate planning and incomplete design, and that leads to quite different sorts of waste through work ripped

out then put in again in some different form, over-engineering, poor use of innovation, inadequate time to do proper planning logistics—for example all kinds of areas of waste there. Thirdly, what I call lifetime impacts to do with, for example, if one was to very poorly manufacture or construct a building it might be highly draughty and the need for air tightness testing would dramatically improve the energy performance of that building over its life, for example. Finally, packaging waste is of a different order altogether—that is caused by manufacturers—and that would be the fourth category of waste and it seems to me that one needs to analyse the causes of waste quite carefully in order really to understand how to solve these problems.

Q794 Lord Bhattacharyya: So if you are taking the total system from beginning to end what would be your estimate regarding waste?

Mr Bailey: I am not going to give you an overall estimate for each of those areas; I have some data on some areas and in terms of the areas I am most interested in—and which you may consider this panel most expert in—is the area of planning and design. We have undertaken a project recently in which—and this is definitely in the status of an art and not a science at this stage—it seems to me highly possible to reduce by orders of magnitude the amount of time it takes to construct projects. I have one very good example of a couple of large hospitals with which we are involved, where by accident the time table to commencement of the project was two years longer than necessary—about two years longer than originally planned, I should say. That was caused by delays to a PFI project—the kind of delays one might be very familiar with—and we decided not to just park the project but to continue with design, which, looking back, we are very pleased we did. We were very fortunate to be in this chain, which was highly supportive, highly integrated, and the result was a project for which we lost 40 per cent labour on site and completed nine months early. I think that was an example of huge waste in process which I would put substantially down to poor planning and poor design. If they are done properly substantial costs can come out.

Ms Seymour: Taking civil engineering waste, which is the area that I studied. We found very little public information, and taking Lord Howie's point the classification of construction and demolition waste, once you break down those numbers and look at that demolition waste there is a high percentage of reuse incorporated in that 30 per cent. I think if we talk about waste in construction we should be clear about the reuse component that people are already taking forward and what they are doing. Certainly there is a lack of data in terms of what other panel members have talked about. Site waste management plans I

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think are going to help with that, but the knock-on effect of that is there is a lack of benchmark data; so, say, per metre squared of road construction or bridge construction, of that type of order. I think in setting targets we probably need to look more at the process and what is a realistic target rather than setting an arbitrary target based around the feel good factor number around reducing waste, because in some projects the 20 per cent reduction could be quite innovative and in other projects it could be quite simple.

Q795 Lord Howie of Troon: I repeat that I am a Fellow of ICE and in the past I have been well acquainted with Arup, Buro Happold and Laing's. I do not know where O'Rourke came from! I was a designer when I used to work. To what extent do architects, designers and engineers work together to consider waste reduction? They did not do it in my day—I am talking about now?

Mr Sexton: Picking up on the point that my colleague Mr Bailey made before, there is the whole process from design through to decommissioning and in my view the opportunities for reducing and managing waste are very heavily weighted at the start. So in answer to your question we do get together now with clients and designers; we have a scheme called Building Constructive Relationships, of which some of my colleagues here are a part, to get together, to get contractors, designers and the client all together, and that gives you the really big opportunities to design out the waste. If I might say so, in the previous session there was a lot of concentration of what happens when you get on to the site. The die is to a certain extent cast by that stage and there are numerous things which you can do jointly at the design stage to design out waste, and Mr Bailey has mentioned one of them, which is offsite manufacture. If you can design all the components of whatever you are building offsite and manufacture them offsite and then move them to the site then many of the causes of waste which you heard about earlier, such as the logistics, storing too many things, damage to things on site and so on and so forth, simply do not occur; and in my view that is where we should be focusing our attention, at the front end.

Mr Zimmann: I am from a design background so I completely agree with that. I would like to make a point rather about site waste management plans as well. The wording of that suggests that it actually starts on site but the intention was to start at planning and pre-design stage to get the clients thinking about it and getting a vision out for reducing waste and being resourceful. The work that we have done together with waste with Arup on plasterboard, for instance, has shown that by involving the whole design team the architects and the suppliers of materials is where you get the maximum benefit in

terms of reducing waste in the design process. So it is an integrated profile rather than an individual profile. *Ms Seymour:* The Institution of Civil Engineers prepared a demolition protocol that has been used that is very much at the early planning stages, and we do often forget the demolition part of the contract which is quite an important bit to add in.

Q796 Lord Haskel: The Sustainable Development Commission suggests that the use of construction materials is characterised by what they call a linear process: extraction, manufacture, assembly, construction, maintenance, refurbishment, demolition and then disposal. In many industries now they have what they call a “cradle to cradle” approach, a closed-loop approach where by the time the use has come to an end you can recycle it. Is there any approach made in construction to try and convert this linear process into a cradle to cradle progress?

Mr Zimmann: I think we are progressing towards that development by trying to set our secondary material markets, which I think is one of the key elements. We talked about take-back schemes where multiple suppliers are looking at producer responsibility and actually bringing it back into the production cycle to have actually a closed-loop approach. But that also obviously means that clients, developers, designers who specify materials have to actually select materials that have a certain amount of recycled content in them to create the demand for those sorts of materials, which are better for the environment ultimately. Then we also need to have enough invested in the infrastructure to create and take out this secondary arm of the waste chain and then supply them back into the production cycle. So it is a multi-factorial approach to this supply and demand model really.

Q797 Lord Haskel: Are technologies being developed to facilitate all of these things?

Mr Zimmann: I think there is a lot of work being done to increase awareness, educate people who specify materials, and clients, to set up protocols to encourage people to produce materials, which is a product specifying its quality requirements. Where we are lacking at the moment is whether we actually have enough processing capacity to create that and the availability of markets for those products. The previous panel mentioned treatment hubs, for instance—it has been thought through for contaminated soils, but equally that could be done for secondary aggregate, and that would, I think, also help the SMEs to take some of their materials and actually get the mixed waste and sort it and separate the materials out again, which can be done with high efficiency.

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Q798 Lord Haskel: So it is a matter of will rather than technology?

Mr Zimmann: I think the technology is there, that is not the problem here.

Ms Seymour: The point I want to make on that is the chain of responsibility as to it not being linear; it has to be looped as well. That is something they are trying to produce for the site waste management plans, that everybody takes responsibility and that responsibility carries on down through that process rather than stopping with the first person and not handed on. So I think that is something that we really need to consider. Equally, I have seen site waste management starting to become a dominant service provision, so there are actually groups and organisations that are setting themselves up purely to manage on site waste and getting involved with trying to do trying to do resource efficiency, and to my mind they seem to be very successful in it, so certainly people are making a market opportunity, both out of innovation and taking responsibility across various different sections.

Mr Sexton: The short answer to your question is that it does not have to be linear, and this rather goes back to the previous point about the design stage being absolutely critical. My colleague mentioned specification. At Heathrow Terminal 5 we used 80,000 tonnes of recycled aggregates and 30 per cent of the concrete used pulverised fuel ash, which is a substitute for cement. We have a PFI hospital up in Staffordshire where all the kerbstones are being made not of concrete but recyclable material. This just plays back into the previous thing, that the opportunities to make it a non-linear process are all up in the design stage.

Q799 Earl of Selborne: The new eco-towns offer the opportunity to conduct whole system design and so remove, reduce and recycle construction waste in ways that would not be available to single build projects. What techniques might be available to use in these projects and what would need to be in the specification to encourage such waste reduction?

Mr Bailey: Can I take that from an energy point of view, but I am not completely convinced that the Committee wishes to view energy as a type of waste? To me if you heat a building once why does it not stay hot—every time you heat it or cool it thereafter you are wasting energy, and energy is clearly part of a global loop, a planetary loop, looked at holistically. Looking at this from an energy point of view I would suggest that this is an opportunity to build, if you are building a huge project, greater varieties of energy sources and reduce reliance on the grid, to recycle water, for example, to recycle high grade heat, low grade heat within swimming baths and domestic hot water, for example—huge opportunities to consider eco-towns as single loops for energy. And whilst not

the total story—we are not talking about materials that much at all—but I think it is a very significant opportunity from an energy point of view. Also to add to the security of energy supply, that is going to become an issue in the UK, we believe, and obviously to obtain energy from various sources, not purely the grid, for example. I will let my colleagues talk about materials.

Mr Sexton: Eco-towns I think offer fantastic opportunities to start a town from scratch, which is something that we do not normally have because they normally emerge, and opportunities for collaboration. I think there are some challenges as well. For instance, how you plan and lay down the base infrastructure for the town, how you do that commercially is something which I think is not yet clear. But the sorts of opportunities and benefits which could arise are the ability to recycle waste between different projects in the same town, where you are cutting and filling, you can balance that around the whole of the town so that the net arisings are nil. You can specify common materials around the whole of the towns and that will cut down your waste because what you did not use on one you could use on the other. I think if we were involved in it, again the modern methods of construction and offsite manufacture would feature very largely, so we would produce the components for this eco-town offsite and then bring them on to site, reducing labour, reducing plant, reducing time, reducing noise and so on and so forth. So I think there is a bit of a way to go yet but there are huge opportunities in eco-towns.

Ms Seymour: My thoughts are probably more based around the actual construction activity of the eco-towns whilst they are under development, and I take a point that was made earlier; I think that if you delimited the whole site as being a waste free zone so that nothing goes off the site, effectively, in terms of landfill, that might be a good approach to start with, thinking from that concept that in the construction activity you can constrain it. Thinking about the tender packages—this is before you get to site—it would be foolish not to link some of the tender packages so that the pre-construction works and the post-construction works were linked so there was opportunity to cross transfer waste between demolition and construction activities. Certainly you would need to set aside space on the site for that sort of work to go on, and certainly you would need different types of requirements from the planning body in order to store waste material on the sites for reuse, so the consideration would be needed at quite an early holistic stage to turn them into true eco-towns from their construction. But I think it is all doable.

Mr Zimmann: I am currently involved in the bidding for an eco-town development as part of a collaborative approach for a developer and I think

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that eco-towns should be exemplars really for resource efficiency and should be used as such. There are a few points that we discussed earlier, starting with an earlier vision in the master planning process of actually saying, “Waste actually matters, we want to design it out, and the amount that we cannot design we have to manage in a very sustainable way.” I think it needs a team of clients, developers, architects, designers, constructors, that share this vision and actually set objectives and targets for reducing waste, for reuse and recycling and also commit themselves to monitor that through the whole process and see how things are going. In terms of modern methods of construction, I think without that it would be a failure from the start, really. Also looking at constructional logistics, how materials are delivered to the site and having a construction consolidation centre, for instance, that will assist during the construction phase, but later on when it becomes operational to use that as well as a facility. Clearly having some way of processing the materials will need to be at those construction consolidation centres as well. So it is a fantastic opportunity to realise something in the country where you have, as was said, a blank canvas to start from, more or less.

Q800 Earl of Selborne: I think you have given us a lot of excellent ideas there on the construction of the eco-town. Could you just tell us whether you think there are opportunities at the design stage to change people’s lifestyles once they are living there? In other words, waste reduction in the future from those sites. Are there ways of using that waste, which inevitably in any household or indeed industry will appear, in ways which would not be available outside the eco-town?

Mr Zimmann: I think it should be part of the early design process to think about the operation and management of the eco-town once it is all built and examples are, for instance, looking at local treatment of green waste, looking at opportunities for food waste to be used to create some energy locally that can go towards renewable energy that can be used in the development; and providing enough facilities for separation of waste within dwellings and intermediate storage as well.

Q801 Earl of Selborne: That requires infrastructure at an early stage in order to have the facility.

Mr Zimmann: Yes, and from my perspective and from the example I can talk about that is already embedded in the process to look into those opportunities.

Q802 Earl of Selborne: So presumably any biodegradable waste will have a number of uses, therefore?

Mr Zimmann: Yes and certain business cases or certain technologies and cost benefit analyses obviously will need to be carried out for all these interventions to be more sustainable; but it is possible.

Ms Seymour: Also, in contemplating the idea of an eco-town you do not just want to just look at residential developments; you have to think about mixed use developments and therefore the opportunity of one type of waste generation, say from the domestic sector, can then be reused by the industrial sector, and if they are located within a proximity of a town then that is more viable for use, is it not? If it is all very much segregated you cannot then repay one user—waste for one is a fuel for another, one would suggest. So I think we need to think about how we create multidisciplinary mixed use developments rather than zoned residential versus other types of land usage.

Mr Sexton: Which would also play into looking at the whole travel issue where an enormous amount of fuels are consumed moving people from A to B, from where they live to work, and that sort of thing, and I think if you had the opportunity to design something from scratch there would be opportunities to look at how you could reduce fuel use amongst the people who lived there.

Q803 Lord Methuen: New technologies are now being promoted in the construction industry to make buildings more energy-efficient. Does the use of these novel processes have a knock-on effect on the industry’s ability to reduce waste?

Mr Sexton: I think, my Lord, it does in one important respect, and that is that energy-efficient buildings require a very high level of good quality design and construction, which again plays back into getting that design fixed at an early stage in the project. All those good behaviours and practices for energy-efficient buildings, it would be easy to attend to the waste requirements at the same time, and I think that is a significant step forward. If you get the energy-efficiency right there is no reason why you should not get the waste management right at the same time. But in terms of the direct cause and effect between energy-efficiency and waste I am not sure.

Q804 Lord Methuen: Do more complex buildings with multiple parts make it harder for construction companies to recycle material?

Ms Seymour: In my experience in civil engineering, where we talked before about the grey area of construction waste being supported by law, effectively, anything new coming into that process can seem to be challenging. If people are not familiar with where it sits within the waste hierarchy or the waste chain of custody then any innovative product can become a problem, but a lot of that is down to

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good communication with the various different regulators and people who might feel uncomfortable about the process and with incorporating that waste maybe into a recycled product.

Mr Zimmann: I think when it comes to complex components and complex buildings the biggest issue there is to get it into the design specification and to ensure that the design is not changed last minute because research has shown that that can result in significant wastage, if you have to redesign. So the less complex the building the easier it is to get it right first time really.

Q805 Chairman: Do you think that with these kinds of complex constructions that sufficient attention is given to some of the lower tiered contractors who are not necessarily central at the initial stage, but when they do become part of the process it is often too late?

Mr Zimmann: I think there should be more integration of the different trades and different design aids to ensure that there are openings already designed in and not that any contractor comes and says, “I have to create all these openings or generate waste at the same time.” What I would like to see is more offsite manufacturing where a lot of this can actually be taken out of the equation and it becomes more of a production process as we know from the old mobile industry, which is much more efficient and where you can actually control the by-products much better than on the site.

Ms Seymour: In my experience the major contractors quite often take responsibility for the subcontractor in their management of waste—they cannot stand back from that; it is part of their requirements. So I know that there is quite a lot of activity going on in the construction industry to support those small to medium sized enterprises in developing better practice around waste. It is a long tale.

Mr Sexton: We are certainly involved in that with anybody who works with us in our supply chain.

Mr Bailey: Speaking as someone who sometimes is involved late the cost of that and the inefficiency and the waste that results is just huge and the need for early involvement and the need for integration with the other members of the team who are both designing and building the project is enormous if waste is to be minimised. That is precisely because drawings sometimes are not viewed holistically; that we need to pull things out and put things in again and that is, by definition, waste.

Chairman: Could we move on to the last section of our questions, relating to Government initiatives. We are always loathe to say we are from the Government and we are here to help you, but by the same token I think there are some areas that probably you would want to raise with us.

Q806 Lord Bhattacharyya: To what extent do building regulations specify measures to encourage sustainability and do they contain sufficient provisions to encourage waste reduction during the construction, refurbishment and demolition of buildings?

Mr Zimmann: I think they do provide suitable guidance for energy conservation and other related issues but not for construction waste. The only area that I can think of where it is related is there is some guidance on how to manage contaminated soils, which is quite an important area because there are a lot of soils being moved around on sites, and to retain them on site by having treated them and then they become suitable for use is obviously a good thing. So there is some information on that. But when it comes to demolition, construction practice, refurbishment, I do not think there is any sort of great guidance there.

Q807 Lord Bhattacharyya: As a matter of interest, being in manufacturing, what proportion of buildings get manufactured offsite?

Mr Bailey: For the very best sites it is about 20 per cent currently. We need to understand what we mean by “manufactured”. In a sense everything is manufactured offsite in the sense that a building does not start where it finishes—it is all brought in and it has been manufactured or dug somewhere. But if we talk about modern methods of construction the very best sites would be 20 per cent and the worst would be nil or close to nil. In terms of what is meant by offsite construction that is, in our terms, advanced panels which are fully wired before they arrive on site, cables which need no terminations, taking huge numbers of hours offsite—that is what we mean by offsite manufacture. Buildings that are preassembled, completed, even insulated and very substantially finished in the factory before they are delivered; toilet parts and those kinds of things.

Q808 Lord Bhattacharyya: Are there central factories where you do that?

Mr Sexton: Yes, we have our own factory and we buy from others as well.

Q809 Lord Bhattacharyya: I have recently spoken to Mr O’Rourke, your owner, who said that Laing O’Rourke was going to set up factories all over the country just for that purpose.

Mr Sexton: That is happening, my Lord. We have one factory already in Wolverhampton which produces mechanical and electrical, both components and ready made pods in the way that Mr Bailey was just describing, and we are about to start building a pre-cast concrete factory at the old Steetley Colliery on the Nottinghamshire/Derbyshire border, which will come on stream during the course

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of next year. So that is very much the way in which we are heading as well. Whilst I have the floor, in terms of building regulations I agree with my colleague that building regulations themselves are not particularly strong on waste reduction. I think there is a question whether, given all the planning regulations, strengthening building regulations is the right tool to be strengthening—maybe one could just look at the planning regulations and further strengthen those. It is a matter of choosing the right tool.

Ms Seymour: In addition to building regulations there are also performance specifications around the Highways Agency's specification for materials. The water industry has its own guidance and regulation, which I guess would complement the building regulations in terms of installing resource efficiency as core, and I think that there is still some work to be done there to ensure consistency of regulation from what one would perceive to be Government if the Highways Agency fell under that banner. So if the Highways Agency regulation ties up with the waste management licensing and ties up with resource efficiency I think that will help significantly to reduce waste.

Q810 Lord Methuen: How should waste reduction policies and strategies be tailored for construction businesses of varying sizes? Obviously it is quite a different matter if you have a large firm like Laing O'Rourke as opposed to a small one-man builder.

Mr Bailey: We are a smaller firm. We are large in our sector but I will try and speak on behalf of smaller firms. The issue I have been made most aware of by them is the issue of recycling goods that they may remove from premises when there is refurbishment work going on—electrical goods, heating goods, for example—and I understand that there is considerable difficulty in knowing how to recycle those goods. If they take them to a local authority skip they will be told to go away because they are in a white van and they only take domestic household waste, and yet the manufacturers will not take them back either. So there is some difficulty there and we need simple rules so that they know where to take these goods—manufacturers either do take them or they do not, local authorities either do take them or they do not; and if the answer is no, they do not, then we know there will be a problem. Simple measures like that need to be clarified, and they are not clear at the moment.

Ms Seymour: Taking your point about small contractors, a lot of them, we found, were really struggling with the guidance and the volumes of regulation that they need to be up to speed with, and in order to feel confident that they are making a good decision about construction waste. And to move towards a more resource efficient approach you have

to be really confident that you are interpreting the regulations correctly, and we found that they had problems with that. With the Health & Safety Executive for health and safety, they felt that was very clear where they went for guidance and support. Whereas for construction waste one would assume that maybe the Environment Agency is the first port of call but probably does not address all of their concerns, and maybe we need a clearer line on all environmental issues for people to get information from.

Q811 Lord Haskel: You have told us that the secret of sustainability in waste is really in good design and integration. Is there Government advice which is available to construction companies for this? Is the advice satisfactory and does it encourage people to share the vision?

Mr Sexton: From our perspective there is plenty of advice available and I think we have heard about most of it this morning—the Environment Agency, WRAP, Envirowise, the NISP, BREW and so on and so forth. What we are looking for is clarity and consistency in that advice and as a big player in the construction industry we are able to cope with information coming at us from many different directions with a team of people who are experts in it. So we are fine; there is plenty of advice which we can synthesise, but I do wonder whether much smaller firms are capable of doing it in the way that we can because we are able to devote the resources to it.

Ms Seymour: Equally a number of those funded schemes, certainly the Business Resource Efficiency and Waste one is targeted on waste saving, which you would not suggest is a bad idea. But from what we have discussed this morning you will see that it is the process that is actually important—to instil the correct process into a business such that it becomes part of their culture to be resource efficient, rather than purely looking from where those funded bodies can identify quick wins in terms of large waste savings. I think sometimes the targeting of that support information, maybe helping to look at process more than the delivered out-turn, would be useful. Certainly for small to medium sized enterprises, simplifying guidance and giving them some clear procedures that are easy to follow if there are only four of you in the company would be important.

Mr Zimmann: We might be in a situation where over the last couple of years a lot of investment has been channelled down into actually producing the evidence base and producing exemplars and case studies for good practice, and at the same time there are too many government bodies that have started providing the industry with advice. As for myself, particularly smaller companies probably feel that it is difficult to catch up with all of this. So maybe it is time

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to ensure that there is a bit more focus put on those, and that where there is some crossover that there is good coordination so that there is no duplication of work there.

Ms Seymour: If I can just follow up on that? In our research we found that people were very comfortable going to their professions and the trade bodies to get that information, but where it came from Government agencies they obviously had to reposition themselves into the construction sector, which, as we know, is generally quite traditional. So even finding that information, if it is branded under the WRAP or Envirowise or whatever logo, has to provide legitimacy to that for the construction company to engage with it. We found that where it went through, say, the Civil Engineering and Contractors Association, they were very receptive to that information. So I think the channel to market is important for advice and guidance.

Q812 Chairman: Do you think more could be done and perhaps having better links on the Internet between various sites so that if people are going so far down one food chain, as it were, then an indication can be given that the next subset is not here but somewhere else. It is done in an awful lot of areas but from what you have been saying to us this morning there is a plethora of different information points and maybe what is required is someone to—not necessarily pull all the threads together but to try and link them up.

Mr Bailey: I would very strongly endorse that on behalf of smaller businesses. There are so many sources of advice—and is it advice or is it requirements? Generic advice is not hard to find at all. Knowing what you actually have to do and knowing you have it all is the problem for smaller businesses—indeed, it is a problem for all of us, but as my colleague says large businesses should be able to handle that. But for smaller businesses it is mightily confusing, and the idea of having a single source for that could be very attractive, and for that advice to be simple, easily applied, knowing exactly what you have to do and enforced so that you know that you have to do it and there is no doubt that is a need for every business.

Ms Seymour: That regulation line is important in that single source of guidance where who is the custodian, who is mandating that this actually happens—it is important to make those links as well as purely to advice and guidance.

Q813 Earl of Selborne: I was interested to read in Laing O'Rourke's written submission that you pointed out that procurement procedures offer an opportunity to contribute to waste minimisation and resource efficiency. And it is clear from your

experience of Terminal 5 that where you have a customer, a client in the right frame of mind you have opportunities for recycling and for waste minimisation. In the context of Government initiatives can you tell us to what extent Government as a procurer is equally effective; or what is their record like?

Mr Sexton: We are anticipating a standard of BREEAM excellent, which I think is 70 per cent in all public procurement projects going forward, and that is a pretty high bar and something to which we will have to conform. We are anticipating it coming in—I do not think it has quite been announced yet—and that will be a significant encouragement in public procurement. There are other things in Government from the NAO Report last year, GLA requirements and so on and so forth. So the ultimate answer is yes, the Government is encouraging us through public procurement to do better, and I think that BREEAM excellent for public projects is probably the biggest thing that we are expecting shortly, and in fact we are doing that with the Manchester Schools Programme already.

Ms Seymour: The Office of Government Commerce about 18 months ago came out with their common minimum standards for the construction sector, which specified BREEAM and waste targets and the civil engineering environmental quality assessment rating that you heard about before, and that is effectively being implemented by Government agencies. So there are some increasing standards—they call them minimum standards—above building regulations, and industry standards that the public sector has to procure to. From the NAO Report it suggests that that is challenging and part of the challenge is the cultural transition in movement towards those more collaborative ways of working and attaining those standards. So I think Government is doing quite a lot.

Q814 Earl of Selborne: So what differentiates between rubbing along with these minimum standards to which you are referring and examples of best practice in public procurement?

Ms Seymour: I think the common minimum standards pull those best practices together and sets that as a common minimum standard across all public procurement, such that you all have a level playing field effectively for procuring Government standards, so that is where it sets it forward. So really it is trying to move on beyond minimum standards, which is the other approach, into good or best practice type standards there, that the public sector is proactively supporting, of which BREEAM is one.

Chairman: Thank you very much. That is very helpful. As we always say at the end, if there is

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anything else you would like to provide us with information on, if you think, “I wish I had thought of that,” please feel free to do so because we will also contact you as well if we feel we need to. Thank you,

that has been very helpful; you are a good spread of the industry and I think that the two sessions have not really overlapped in a very difficult way but in a very—if I dare use the word—constructive way!

Supplementary memorandum by Balfour Beatty and Ciria

1. INTRODUCTION

CIRIA is the leading provider of best-practice and performance improvement guidance for the UK construction industry. We bring together stakeholders from across the sector, including clients, contractors and representatives from all parts of the modern build environment supply chain, covering building and civil engineering as well as transport and utilities infrastructure. As a member-based organisation, we invited members to provide comment for our submission, and invited Martin Brock, Quality and Environmental Manager, of Balfour Beatty Civil Engineering Limited (BBCEL) to represent CIRIA.

Martin is a well-respected industry figure and has nearly 20 years experience in environmental management, working as both an enforcer of legislation and as an advisor to industry. For the last 11 years, he has specialised in the civil engineering sector, working particularly on major infrastructure schemes such as the Channel Tunnel Rail Link, M6 Toll, M25 widening and upgrading of Kings Cross station.

BBCEL is a core member of CIRIA, and Martin is a member of CIRIA’s Environment Advisory Panel. This panel contains industry clients, suppliers—from both design and construction organisations and researchers drawn from CIRIA’s 500 member organisations. Martin is also the Chairman of the Construction Confederation’s Environmental Forum. Through its constituent member organisations, the Construction Confederation represents over 4000 individual companies, accounting for 75 per cent of the UK’s turnover. The Environmental Forum meets quarterly and provides a voice for the industry as well as a vehicle for sharing good practice and lessons learned.

As, due to transport difficulties, Martin was not able to attend the Waste Reduction Meeting, this written submission is provided. The answers below are based upon Martin’s extensive experience as noted above. It also includes, where appropriate, views from other CIRIA Members.

CIRIA sees the key issues for reducing construction waste as being:

- Minimising waste to begin with (through better design, involving contractors in design phase, design for deconstruction etc).
- Encouraging good waste management on site (through education, demonstrating how it can be done, and practicing good waste management consistently).
- Recognising the potential for re-use or recycling of materials (ensuring education, markets, ease of transfer and re-use).
- Ensuring that the regulatory and financial framework encourages reuse and recycling (via appropriate incentivising, taxing and enforcement, as well as via government procurement).

CIRIA is involved in a range of knowledge-transfer activities that support these aims through guidance, training, events etc.

2. ANSWERS TO THE QUESTIONS

2.1 What are the primary waste streams in the construction industry and where do these arise? What proportion is primary high value waste compared to secondary low value waste such as packaging?

Members feel that Defra should hold this information. If it is not already readily available (via sources such as BRE), we suggest it should be held centrally and available on request.

The primary waste streams arising from civil engineering schemes (in terms of volume) are:

- Excavated soils—if they cannot be used on site. These soils could be either inert or contaminated.
- Demolition wastes such as: concrete, bricks, hardcore, steel, aluminium, wood and cabling.

It should be noted that on civil engineering projects, very little waste is sent off site in skips. BBCEL's experience is that this is typically less than 4 per cent of the total waste removed from the site, the majority being inert soils or material that is excess to the scheme's requirements.

2.2 Aggregates are often compounds of a variety of wastes. Are there technical limits as to the quantity and type of waste material that could be re-used in this way?

There are clearly technical limits on both quantity and types of material that can be re-used as aggregates. However, the limits are variable and very much site dependent, according to influences such as:

- The type of aggregates contained in the mixture. Typically aggregates with a high concrete content produce a high-value product and those with a higher hard core content, produce a lower value material.
- The ability of the site to segregate and sort the waste to maximise its value. In addition to the technology and skill required to undertake this activity, projects also need to consider the following:
 - Legislative hurdles in terms of Waste Management law.
 - Space required to carry out the operation and store both raw materials and recycled products.
 - Quality control and testing regimes.
 - Logistics and double handling costs.
- The location of good quality waste materials. Recycled aggregates are a relatively low value product and as a result their costs are significantly influenced by haulage. If re-use and recycling schemes are to be commercially viable, the haulage distances need to be comparable with those for the virgin aggregate alternatives. Otherwise, the additional costs of equipment, personnel and land required to run a recycling operation together with the extra haulage distances would exceed the cost of an equivalent virgin material.

In BBCEL's experience, the generation and use of recycled aggregates from waste materials can work, especially on big projects and it can have significant results. For example:

- The M1 Junction 6A-10 motorway widening project is a £298 million scheme that is due for completion in December 2008. Nearly 1 million tonnes of aggregate were required for the earthworks and concrete structures. To date over 90 per cent (900,000 Tonnes) have been sourced from recycled materials: Roughly this has been through:
 - 500,000 tonnes of demolition waste imported and treated on site to produce compliant aggregates.
 - 250,000 tonnes of material recovered from the project and treated on site for re-use.
 - 150,000 tonnes of recycled aggregates purchased from the open market.
- There has also been 1.1 million cubic metres of soils that have been moved around the project as part of the cut-fill balance and to achieve the scheme's landscaping requirements.

2.3 What research is being undertaken into the different waste stream within the construction industry?

A great deal of diverse research is being undertaken into different waste streams within the industry. Support organisations such as BRE, CIRIA, WRAP and TRL are all undertaking research to support and promote certain wastes being used by the construction industry. For example the work undertaken by WRAP on developing Quality Protocols and Guidance Notes to supplement standards has been particularly useful to this industry. CIRIA works with industry to ensure such research is disseminated.

A number of the major contractors in the industry are also conducting their own research to try and find innovative uses for all manner of materials.

2.4 The Building Research Establishment has developed a series of environmental assessment methods, known as BREEAM. What do these assessments involve, how are they applied and do they include waste reduction indicators?

The assessment methods of BREEAM were ably described by Gilli Hobbs of BRE. The BREEAM programme applies to buildings.

However, from a Civil Engineering perspective, the CEEQUAL (Civil Engineering Environmental Quality and Assessment Scheme) Scheme performs a similar role for infrastructure projects.

CEEQUAL provides a points-based scheme for assessment of environmental quality. It includes waste management within the criteria. Further information is available on the scheme website: www.ceequal.com.

2.5 The Building Research Establishment has commented that current assessments of life-cycle impacts do not effectively reconcile the needs of different environmental drivers such as waste reduction and carbon reduction. How can the weightings of different environmental aspects affect the output of a life-cycle assessment and how might that affect the design and construction of a building?

The weightings of different environmental aspects can significantly affect the output of a life-cycle assessment. Life cycle assessment (LCA) can be a useful tool in identifying, and selecting from, the design and construction options for a building (or, indeed, any other type of built asset). This is a complex issue, and CIRIA believes this warrants further research.

2.6 We have heard that once the “waste” label is applied to materials, this can often hinder their re-use. Which valuable materials in the construction industry do you think could be re-used and recycled more effectively and does the definition of waste limit these activities?

Responses from CIRIA’s members indicate that the legal definition of waste is perceived in the industry as hindering re-use. This is particularly so when the producer knows the material has value, but cannot find a practical use at that point in time, and so must “discard” it.

A good example of “waste” that could be reused is Pulverised Fuel Ash (PFA). PFA is a by-product of coal fired power stations and can be used by the construction industry as an additive to concrete to enhance its chemical and physical properties, and also as a light weight fill material.

Having provided this example, my experience is that the legal complexity of the waste regulatory regime is more to blame for materials being labelled waste. There are three reasons for this:

- It is too easy for construction materials to be unnecessarily classed as waste, when in reality they are stocks of materials that have yet to be processed or allocated a new purpose.
- The waste regime is too complex and will often steer contractors towards a solution that utilises virgin materials rather than complete the necessary paperwork and wait for the Environment Agency to respond.
- Advice and guidance on what constitutes waste is ambiguous and leads to variations in approach.
- For smaller contractors, or smaller sites, storage of materials and lack of opportunities for re-use on site, combined with difficulties in re-using elsewhere, can prohibit re-use. The lack of materials recycling facilities (MRFs) and distances from/between sites can also be a barrier. Consolidation centres for re-useable materials could assist in this regard.

2.7 Has the landfill tax acted as an incentive to reduce waste within the construction industry?

The landfill tax has been an incentive but should not be considered as the only one. The aggregates levy plus the high cost of tipping waste at commercial landfill sites have also encouraged contractors to consider recycling opportunities.

To some extent the change in the waste management licensing regime has exacerbated this situation by greatly reducing the number of operating landfill sites. This has resulted in fewer sites, higher gate prices and greater haulage distances.

2.8 Have Site Waste Management Plans (SWMPs), which have previously been voluntary, been successful at reducing waste? Do you think that making SWMPs mandatory will have much effect on waste reduction?

The Regulator has not, to our knowledge, done a great deal of research into this. We hope that research to quantify the impact SWMPs have on reducing waste will be conducted now the new SWMP Regulations are in place so as to demonstrate efficacy.

The Regulations set out how mandatory SWMPs will be enforced. However, there are concerns about whether resources are available to rigorously enforce them in practice.

Responses from CIRIA’s members indicate that the administrative burden (or perceived administrative burden) is thought to be an issue for smaller organisations.

In this industry, the arguments for promoting waste reduction and recycling can only be won using commercial drivers.

2.9 Since 1 May, all new homes have to be rated against the Code for Sustainable Homes which measures their sustainability against nine categories of sustainable design, one of which is waste. Do you think that enough weight is given to the waste category in the overall assessment and how accurate do you think these assessments will be at indicating the true sustainability of a project?

We have no comment on whether enough weighting is given to the waste category. However, CIRIA suggests that the setting, and monitoring of progress towards, targets is a key process in sector step-change toward sustainability.

It has been suggested that the revision of the Building Regulations could incorporate parts of the Code for Sustainable Homes.

2.10 Defra, through its Market Transformation Programme, has created a product roadmap for plasterboard, resulting in the setting of targets to increase the recycling of plasterboard waste. To what extent was industry involved in this process and do you view the project as a success?

Consultation with industry is vital to ensuring both practical targets and industry buy-in. CIRIA would welcome the opportunity to further engage with Defra or other regulators on behalf of our members in future.

May 2008

TUESDAY 13 MAY 2008

Present: Bhattacharyya, L Crickhowell, L Haskel, L Howie of Troon, L Lewis of Newnham, L May of Oxford, L	Methuen, L O'Neill of Clackmannan, L (Chairman) Platt of Writtle, B Selborne, E Sharp of Guildford, B
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Examination of Witnesses

Witnesses: JOAN RUDDOCK MP, Parliamentary Under Secretary of State, Department for Environment, Food and Rural Affairs; IAN PEARSON MP, Minister of State for Science and Innovation, Department for Innovation, Universities and Skills; and MALCOLM WICKS MP, Minister of State for Energy, Department for Business, Enterprise and Regulatory Reform, gave evidence.

Q815 Chairman: Good morning, Ministers, we are very pleased to have you here. I have to say that the last time I had three Ministers before me and I was chairing a Select Committee, the fire alarm went off, and we knew it was an exercise, and the room emptied, but we kept the Ministers hostage and we just kept on going. We do not anticipate fire alarms this morning, although I think it might be warm enough to suggest there is a fire somewhere! We are trying to get something done about the air-conditioning but, as you know, this building does not really lend itself to these technologies, so we will have a rather hot time. Maybe I could start this morning on the subject of the Waste Strategy and data collection. The Waste Strategy for England outlines strategies for the whole waste hierarchy, including prevention, recycling and disposal. Which department is responsible for taking the lead on waste reduction and what criteria have been used to assess progress?

Joan Ruddock: Thank you, Chairman. I will just begin, if I may, because Defra does have the lead on this topic, although obviously other departments contribute, and my colleagues here will be chipping in as and when appropriate. The Waste Strategy that we rely on was published in 2007, about a year ago. It is overseen by a management board which is made up of Defra in the lead, representatives from Treasury, CLG, BERR and the Cabinet Office, as well as key stakeholders. In setting that Waste Strategy, as you have indicated, there is a hierarchy of waste treatments and we very much want that to begin with a reduction in waste. What are the criteria? Well, we looked at the position we had in the year 2000 and we found that there were 22.2 million tonnes of waste arising in the household sector, and obviously historically there has been link to economic growth, so an aim has to be to decouple waste arisings from economic growth. The prediction that we made was that we could go on a trajectory that would take us to 2020, where we have moved from 22.2 million tonnes to 12.2 million tonnes, and that is the course on which

we have set ourselves, and I am glad to say we are making progress in that way, and if members would like, I can go on to describe how we make progress and measure it by milestones and by indicators, if I may just give you that as an opening response.

Q816 Chairman: Yes, that would be fine, if you want to carry on.

Joan Ruddock: We set out at the end of the Waste Strategy on reduction that there would be 90 delivery milestones and that would guide us in terms of the progress that we were making. To give you some examples, we set ourselves a deadline to consult on the review of regulation of inert waste—obviously an important part of the waste stream—and we met that milestone at the end of 2007. We also committed ourselves to developing site waste management plans for the construction industry, which is a huge producer of waste, and we were able to produce the new regulations in April this year. Those are milestones that we have met and of course the primary indicator, as I have already said, is that of taking household waste, measuring that, and then seeing the extent to which we could year-on-year move down to a much lower quantity of waste arisings. That is the household sector and I am sure members may be concerned about the commercial and industrial sector, as indeed am I, but in terms of the answer to the question you posed, those are the criteria and that is the way in which we are measuring and those are our targets.

Q817 Lord Lewis of Newnham: Minister, we are told that the National Household Waste Analysis Programme has ceased and there is no similar scheme, as far as we can make out, that is in place to monitor commercial and industrial waste. How is the Government collecting the necessary data to which you have just referred, on material flows and waste streams in order to support the policy that you have just been enunciating?

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Joan Ruddock: As I have indicated, our concentration has been on household waste and household waste arisings. Primarily of course we have been driven by the European Directive on landfill, and the need to divert waste from landfill, so there has been a big emphasis on this and I have to say that one of the questions that I asked on joining the Department was how are we working on the commercial and industrial sectors? As you rightly say, the National Household Waste Analysis Programme has ceased but we have other sources in place to gain the waste data on that. The main source is called the Waste Data Flow which is co-ordinated by Defra itself, and as a result of that we have good municipal waste data. We have also got the Environment Agency collecting data from all the waste facilities that are subject to permits, so there is very considerable volume of data that the waste permitting system provides to us through the Environment Agency. However, having said that, I am aware that we have got gaps and what we have done is rather than at this time to try to plug all those gaps we have taken priority waste streams—and for example you may have seen just last week a great deal of publicity about food waste and we have made food waste one of the priority streams—and by concentrating on specific streams it will be possible to gain much more data and then to work on the reduction of waste within that particular waste stream. I do want us to be able to plug the gaps that we have and so work is being done on that at the moment, and it will be a matter of finding out where the gaps are, and plugging those gaps, which we have a programme to do. Whether we should return to some comprehensive data-gathering system is questionable because there is an immense cost in this. When it was done by the Environment Agency in 2002, I think the cost was about £3 million, so there have to be considerations as to how we best should fill the particular gaps in our knowledge on data.

Chairman: We have several people wanting to come in; Lord Crickhowell?

Q818 Lord Crickhowell: We will come on to the technical issues later but as you have started on domestic waste, I think my experience must be shared by many that even if you exclude all the material that comes to us as Members of Parliament, the great bulk of waste—and it is a huge bulk of material that I have to dispose—is unwanted paper. There is a huge amount of advertising material, marketing material, very often duplicate, triplicate. Every time you do a mail order you then get ten catalogues from other organisations even if you try and exclude that kind of marketing, and mostly nowadays wrapped, including Hansard, in transparent films which if you are going to separate your paper you have to take out and put in a separate container. Among the priority waste streams, have you got any effective measures

underway to try and reduce this huge volume of paper. If you look at the rubbish outside my house, food waste is pretty small, the bottles and the tin cans are all separated and then there is a vast quantity of unwanted paper. What do we do about it?

Joan Ruddock: We are trying to do a number of things and we have been working with the industry through voluntary agreements over a period of years. What we want to do obviously is, first of all, to reduce the amount of paper that is being sent to people who do not want it. First of all, in consultation with the direct mail industry, we have got a voluntary agreement and also they have set up the mail preference service which is a service whereby you can subscribe and give your name and address, you tell them that you do not want to receive unsolicited mail, and those bodies that actually belong to the organisation and produce mail that may be unsolicited will then cease to send it to you. I have done that but I agree with you although it did enormously reduce the volume that I receive, I still receive some. We are talking to the direct mail industry about trying to better target the way in which direct mail is sent because it is reasonable that some direct mail is sent. People will find that for example they might receive a catalogue that enables them to shop as a consequence and perhaps reduce some of the carbon impacts of travel if they were to receive mail order goods so there is value there and it is a legitimate industry. We want to target it very much better and we have lots of discussions with them. They are making efforts to do that but one of the biggest areas of concern is where the mail is unaddressed, so for example if you use the mail preference service and you stop them sending most of the stuff that is addressed to you personally, how can you stop all the material that is not addressed to you personally. We are discussing with them about coming to a new agreement on establishing a way in which addresses could be flagged as addresses that do not wish to receive unaddressed mail. This would be a considerable move forward and we are in discussions with the industry about this because we believe as you do, that there is a need to reduce. I could say something about the recycling of it which is quite impressive and we are making a lot of progress there, but in terms of reduction I think that is the answer to your question.

Q819 Chairman: I think Mr Wicks wanted to come in as well.

Malcolm Wicks: Chairman, I wanted to go back to the issue of commercial and industrial waste and say that we in our department, the Department of Business, recognise that there is a gap in the statistics and a shortage of reliable data, and we are therefore working very closely with Defra's waste statistics team (and it does not mean they are wasteful statistics but it is team that is collecting the statistics on waste!)

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to look at ways of improving the situation. There is a Defra-led study in hand to examine what new data is really needed to support our policy objectives. We have commissioned a couple of recent studies in this area, one to look at the reliability of current estimates of commercial and industrial waste going into landfill and we also want to rank existing measures to control such waste, for example landfill tax and recycling targets, in terms of their carbon reduction potential so it will help us in the future judge which measures are most important in controlling the waste. I just want to assure the Committee that we recognise there is an issue and we are working with our colleagues in Defra to put it right. Just to emphasise the importance of this, it is estimated that apparently there is twice as much commercial and industrial waste produced as household waste so it is an important issue in terms of data to get this one right. I want to assure the Committee we are working hard to fill those gaps.

Q820 Lord May of Oxford: My question touches on one particular aspect of Lord Crickhowell's question. In large parts of India plastic bags are now simply outlawed because of their persistent and pernicious environmental effects. When, if ever, might Defra and, for that matter, BERR, think about biting this particular bullet?

Joan Ruddock: We have of course said that we will bite that particular bullet. In the Waste Strategy 2007 we said that we wanted to make—and we do not specify plastic bags—single-use carrier bags a thing of the past. It is important that we do not take action on plastic bags that would result in the substitution of paper bags for plastic bags because I am sure, as Lord May will realise, they are even more difficult to deal with in terms of their environmental impacts, so it has got to be single-use carrier bags. What we are doing is taking powers in the Climate Change Bill and we have said that unless there is sufficient progress made on a voluntary basis that we will legislate in secondary legislation next year to produce a charge, and it will be minimum charge so that we would oblige those who wished to distribute single-use bags to make a charge for them. That will be a charge as opposed to the tax that was levied in the conventional way in Ireland (although the results of the Irish tax were that 92 per cent of these bags were no longer distributed) so it is effectively not a ban but a major, major reduction that we are looking for. If I just may say, we cannot in the UK alone, our lawyers tell us, have a ban because it would be against European trade law.

Q821 Chairman: For the record, could you tell us how significant plastic bags are in relation to the waste stream?

Joan Ruddock: They occupy a tiny, tiny proportion of the waste stream, but may I say that is not the sole reason for tackling these bags. The reasons which many people advance are for example that they are a major litter nuisance. That was what prompted the Irish Government that because of the fact they are so light and they catch the air very easily they are a major blight in rural areas and in our towns and cities. In addition to that there is a small impact—and it is only small—on marine life where they end up choking creatures in the sea, but perhaps even more important than all of this is the fact that they are really symbolic of a throwaway and wasteful society. When there is public demand to tackle this aspect of waste then it seems to us that we as a Government need to respond to that demand. We do need to see action because if people are to be persuaded that they need to change their behaviour in relation to many other forms of waste, energy use, et cetera et cetera, if we want environmental behavioural change, we have to start in places where it is very obvious this is symbolic and where people are making a demand to end it.

Q822 Chairman: It sounds very like a *Daily Mail* editorial!

Joan Ruddock: I have to say Chairman, that although the *Daily Mail* became very active on this subject, we had already advanced the case before they began their campaign. I am always delighted to find that our national media wants to do something for the environment in a positive way!

Malcolm Wicks: I just wanted to inform the Committee that I understand that the industry has already agreed to reduce the environmental impact of such bags by 25 per cent by the end of this year, by the end of 2008 and apparently this will be done by reducing the weight of the bags and of course by cutting down on the number of bags.

Q823 Chairman: Which makes them more easy to blow around in the wind and more difficult to catch once they are. Can I just ask one last thing, I was in my supermarket the other day there and I picked up a “recyclable” plastic bag which had no indication as to how many decades it would take to be recycled or the biodegradability. Do you think you could maybe be a little more rigorous when you are getting them to do good things in being able to do it not by stealth but by clear design?

Joan Ruddock: The agreement to which Malcolm Wicks has referred is a very positive one. A great deal has been done through this agreement, but it has only reduced the number of bags being circulated by something like seven per cent. It has done a lot of other things which have had carbon saving and which have been important and are consistent with the 25 per cent reduction in environmental impacts, but it is

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a very complex science, as I am sure several members of this Committee will understand. Biodegradability is something that can be very positive if it is done in the right way but it does not mean that the bags should biodegrade in landfill where of course they will produce methane but biodegradability on a compost heap is of course scientifically and environmentally acceptable, so it is a complex science. We do have to work through this science and we are devoting a lot of resource to working through our delivery bodies on these things, but at the moment we are looking at the single-use carrier bag from the point of view of being symbolic of the wasteful society and the fact we need an end to it, rather than a different form of materials to be made into bags.

Malcolm Wicks: Chairman, I was reflecting on your remarks about the weight of paper bags and it will be for the Committee to make its recommendations, but I hope one will not be that we need weightier plastic bags. I was also reflecting on how difficult it can sometimes be to please select committees!

Chairman: We are not policeable, we are no-go areas as far as Ministers are concerned!

Q824 Lord Howie of Troon: Mrs Ruddock, in your opening remarks you pointed a finger at the construction industry as what we might call a major culprit. In this Committee we were told some while ago that about a third of construction materials are wasted. As a civil engineer myself I just do not believe that. A week or so ago we had representatives of the construction industry before us who dismissed this mythical third. Does your Department have any real statistics on how much waste there is in the construction industry as opposed to these fantasies?

Joan Ruddock: As I indicated, we are not so confident about our statistics in the commercial and industrial sectors as we are in the household sector, and so that is why we want to do some of the plugging of gaps which my colleague has referred to through collaboration between the two departments. I do not want to suggest that the construction industry is irresponsible. When I say that they produce a great deal of waste, that is inevitable from the way in which they work, so first of all we need them to look at whether they can reduce the actual waste arisings, and we believe there is scope for that, but more importantly probably is the reusable material because so much of the material that they do produce is reusable, so recycling and reusing is absolutely crucial to that sector. They are working well with us and, as I indicated, we have got the new site management plans. Those are directed at making sure that the least possible waste is produced on site and that what is produced is recovered and recycled and reused, and there is huge scope for that. I think that there is a big spectrum in the industry so that I

am not surprised if there is a debate about whether it is a third or not, and I think my colleague has something to add.

Malcolm Wicks: Chairman, I have got an estimate here that the construction and demolition industry annually produces three times the amount of waste as all UK households combined, and figures for 2003 show that about 44 per cent of construction waste was used as recycled aggregate, 7 per cent as recycled soil for landfill restoration, with the rest spread on exempt sites, used to fill quarry voids or landfill. Industry and government are working together to try to improve the situation through a strategy for sustainable construction and the strategy is looking at the case for setting very challenging targets to reduce such waste from construction, including to halve construction demolition waste to landfill by 2012 so I just want to reassure the noble Lord that we are on the case and that this is an important part of the waste question.

Q825 Lord Howie of Troon: I am always happy to be reassured but I am not quite. It is not a really a good idea to combine construction and demolition; they are not quite the same thing, and we do know that 90 per cent—

Malcolm Wicks:—One follows the other.

Lord Howie of Troon: Frequently—sometimes not deliberately! About 90 per cent of demolition material is recycled. What I am really wondering about is whether it is counted as waste first and then when it is recycled do you subtract it from your statistics—I do not imagine you do.

Q826 Chairman: Perhaps you could send us a note on this one because the Committee has had conflicting estimates of amounts so I think if we could get perhaps a note on the figures and the rationale behind these figures.

Malcolm Wicks: What we know and what we do not know; we have acknowledged there is a gap.

Chairman: I think we have got everything off our chests, colleagues, and we can make progress now. Lord Haskel?

Q827 Lord Haskel: Could we move on to the business sector and the schemes that the Government runs to support business. There is the National Industrial Symbiosis Programme, there is Envirowise, there is WRAP, and there is the Market Transformation Programme. Could you tell us what their budgets are for the current year and how they compare with previous years and, most important, how do you decide on these budgets, what is the basis of your assessments for this, what are your priorities?

Joan Ruddock: I am happy to tell the Committee the budgets for the year 2008–09. Envirowise is £9.390 million; NISP, which is the symbiosis, is £5.025

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million; WRAP is £43.223 million; and the Market Transformation Programme is £2.750 million. So those are the budgets and if noble Lords had got the figures for previous budgets it would be very clear that there has been a reduction in every one of these budgets. The reason for that is two-fold. One is that we have to look back over a three-year period and clearly investment has been made to develop these fields, to develop business resource efficiency, and to pioneer work of this kind, so there has been a big investment, and of course that has produced very good results. There is no question about it, all of these programmes have produced very good results. In some cases I think some of those programmes have probably reached the end of their natural life and would not require the same level of funding or perhaps funding at all. We have taken a decision, notwithstanding what I have just said, that we should rather reorientate our approach so that we would not give support to business which is on a one-to-one basis or direct business support to a particular company. What we are doing now through all these delivery agencies is providing the evidence about how something should be done, and therefore we can offer that expertise involved with business so that business can make its own progress, and that is a reasonable thing to do because, there is no question about it, that business is now much more aware of the environmental impacts a business has, much more aware of the importance of resource efficiency which of course usually means that they save money. So this is a natural process and that is why we have been able to reorientate our priorities and why the budgets are considerably lower than they were in previous years.

Q828 Lord Haskel: So just to be clear, these budgets that you have just given us are going to be to advise business on best practice in these areas?

Joan Ruddock: These budgets are to organisations that while they are obliged to deliver within our departmental strategy, whether on waste or carbon reductions or whatever, they decide how they spend the money in order to meet what we regard as our departmental priorities, so there would be a range of activities, and it is rather early in the year so we have not got business plans from all of them. For example, I think it will be a couple of weeks or more before WRAP, which is a major delivery body on waste, produce their business plan for this year so I cannot give you the detail of how there will be a breakdown of the £43 million that they have to spend.

Q829 Lord Haskel: So how do you assess where the priorities lie?

Joan Ruddock: We set our overall priorities so that if we are looking at waste, and the subject of this inquiry, then of course that was there in the Waste Strategy that we published last year. We have got

minimisation at the top of the hierarchy and we have recycling, and so they will work to deliver those priorities through the means that they think best, and obviously they have experience of direct engagement with business and they will know what a business needs, so for example a lot of the work that WRAP undertakes is about developing markets because we know it is no good collecting recyclings if indeed there are no markets for recycled products or there are no facilities to actually undertake the recycling, so that is the kind of priority they will take.

Q830 Lord Bhattacharyya: So therefore they will intervene in the market?

Joan Ruddock: They do intervene in the market.

Q831 Lord Bhattacharyya: And set up companies just to recycle these?

Joan Ruddock: They do intervene in the market and they provide some grant funding and they provide expertise and they look to find where there is a need. For example, the use of plastics has become a major, major concern and the fact that we are not able to use as much plastic in this country in either remanufacture or indeed in reprocessing, so WRAP has spent time, energy and money getting facilities on the ground and that is perhaps a world-first recycling facility that is about to be started up.

Q832 Lord Bhattacharyya: So it is not just about giving back best practice?

Joan Ruddock: It is not about giving best practice but that is the way that the programmes will move. I am talking about things, when I mention this particular new enterprise on plastics, that have come out of grants already spent of course, but increasingly, as markets appear, then of course free enterprise comes into play and we will anticipate that more of this will happen and of course we have big drivers for reductions (the landfill tax escalator) so the business world is changing all the time and our budgets reflect that.

Q833 Chairman: Before you go any further, WRAP has experienced something like a 40 per cent cut and it has not yet presented a business plan. Would I be right in saying they were somewhat surprised at the size of the cut and that is why six weeks into the new financial year they have not yet produced a business plan to take account of that? It does not seem to suggest the rationale that you are offering that these schemes have been so successful and are now so developed that in fact they do not really need quite as much money as they had in the past.

Joan Ruddock: Let me put it to you, Chairman, that in the past we have for example—

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Q834 Chairman: On the question of WRAP; just stick with WRAP.

Joan Ruddock: I have to be careful now whether it was WRAP who give this money so I may have to ask an official to check this for me, but I do know in terms of our waste programmes that we have given very substantial sums of public money to for example supermarkets. I think people would understand that as progress is being made—and great progress has been made in the retail sector—that this will no longer be an appropriate use of public money. In the case of WRAP, very specifically, they have had a huge programme of support for local authorities in terms of home composting and they have spent an enormous amount of money on home composting equipment. Again, this has been a hugely successful programme so as the programme increases and increases maybe there is a rationale for saying there should not be any subsidy given to home composting kits, or maybe local authorities themselves should bear the cost, et cetera, et cetera. We are saying two things: firstly, that we will not have the direct agency to business funding in the same way, and, secondly, we are asking delivery bodies to consider—and it is for them to consider—whether indeed they should have some charging schemes because the climate has changed, the environment has changed, and we think that they can make progress. Indeed if we look to the Carbon Trust, which has some relevance to this inquiry, they are raising more and more money from the private sector and complementing the public money that they spend, so I think it is true to say not that WRAP were surprised, because WRAP were very much in dialogue with us on a constant basis about their budget, but they were certainly disappointed, and they have had to reorientate themselves. However, they are a superb organisation and I am completely confident that they can deliver the priorities that we seek from them.

Q835 Chairman: Ian Pearson?

Ian Pearson: Joan and others mentioned sharing best practice. I would like to say something about knowledge transfer, which is clearly linked to it. My Department, Innovation, Universities and Skills, funds a number of activities that are relevant to this agenda. The DIUS sponsored Technology Strategy Board funds, in particular, three Knowledge Transfer Networks which are set up as partnerships between the industry, academia, training organisations, technology intermediaries, technology companies, the finance sector, all working together with an agenda to increase innovation in that particular sector. We have a Resource Efficiency Knowledge Transfer Network; we have an Environment Knowledge Transfer Network and there is also a Materials Knowledge Transfer Network. All of those are very much

looking at the market, looking at opportunities, sharing best practice but also contacts and delivering market-led solutions to a number of these problems, and I think it is important that we factor those into our considerations, in addition to the Technology Strategy Board as well. As you will be aware, we have a number of innovation platforms and the Technology Strategy Board, which is an arm's length body from Government, is considering at the moment the potential for other innovation platforms and I understand is looking potentially at the agri-food chain and also waste management as potential future innovation platforms which will then lead to calls for proposals and collaborative R&D. One of the things that I think is helpful to point out to the Committee is the extent to which our research base is working with the construction industry on the Sustainable Construction agenda. It is looking at new materials for the future which will produce less waste. It is working with the construction industry in looking at better designed buildings which again would reduce waste arisings as part of them, as well as meeting our carbon reduction targets which have been set for new build, so there is a lot of work going on linking our research base with the business sector as well when it comes to looking at the sustainability agenda.

Malcolm Wicks: Perhaps a general contextual point following the question we were asked. I think we recognise in Government that the number of different schemes to support businesses, not just on this issue but on a whole range of issues, has grown like topsy. To be blunt, it is confusing, there are far too many, indeed there are an estimated 3,000 such schemes. We are now involved in a project to get it nearer, say, 100 schemes instead of 3,000 by 2010. Government as a whole spends about £2.5 billion a year supporting business, 40% of which is local funding. I think by rationalising them and by focusing on Business Link as the primary access point, we can help businesses in general, and I think there will be knock-on effects in this rather important area.

Q836 Baroness Sharp of Guildford: I think I am right in saying that 90% of waste in this country derives from industry rather than domestic waste and that the amount spent on WRAP and NISP and so forth is minute compared to the amounts spent in the Carbon Trust and the savings derived from the amounts spent are probably proportionately quite substantial. These programmes have been built up over the course of time and one of the problems that you face is that, okay, big supermarkets should be looking after themselves, and there is absolutely no reason why we should be subsidising big supermarkets and big industry, but a great deal, roughly 50 per cent of that 90 per cent actually comes from small and medium-sized businesses, and it is quite clear from the

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evidence that we have received that those businesses in fact need a great deal of help. The report we had for example from the BREW centre for local authorities, which works in conjunction with the LGA, indicated that 49 per cent of businesses contact their local authority on environmental issues. If a business is willing to consider behavioural change it is important that local authorities be in a position to harness that willingness and to give them support. The support they have been receiving through organisations like BREW has been very substantial and there have been quite substantial savings that have been made. Given that you have got that programme up and running, and that it was beginning to yield very substantial returns, why turn off the tap?

Joan Ruddock: I hope I have indicated that we are not turning off the tap. WRAP funding, as I say, is £43 million; NISP has still got £5 million, Envirowise £9 million, so there are very substantial budgets still available to these organisations. I have tried to indicate that change has happened. As regards advice generally, particularly to small business, there is of course the Business Link programme, and again a lot of the advice that we have and that has come from all the work that has been done by all these different bodies is going into Business Link so that there is a network of regional business advisers that the Government supports, contracted through the regional development agencies, and they are establishing working models for advising industry on how to be more sustainable.

Q837 Baroness Sharp of Guildford: The Business Link people have got no background in this resource efficiency work which is precisely the background that NISP have got, and it is the specialist background in helping to promote resource efficiency which has promoted substantial savings on the part of small and medium-sized business here and, as I say, was beginning to roll itself out, is now known; and the consultants who work with Business Link have not got this specialist background.

Joan Ruddock: I accept they have not had it; they are going to acquire it. It is really important that we take the lessons and make them available in a comprehensive way because however much funding, even at the level of last year's funding, these delivery bodies could not be in contact with every business in the country. No way would they ever be able to give the kind of support they have given on a single business interface on a vast scale. It is needed on a vast scale and that is why it needs to be channelled through the main channel, which is Business Link for the advice in general, but we will continue to see that very specific work is done that will then provide the template for others to follow.

Q838 Lord Bhattacharyya: I would agree that Business Link is the right mechanism but how are you going to train these people? The majority of the people in Business Links are retired or redundant people coming to help small companies; how are you going to train them?

Joan Ruddock: If I may, I would have to give you a note on that because I myself am not involved in the detail at that level and, indeed it is not even directly in my portfolio, unless anybody else would like to answer.

Malcolm Wicks: It is not directly in my portfolio either.

Joan Ruddock: He is closer to it than I am!

Malcolm Wicks: Baroness Shriti Vadera has responsibility in my Department. It seems to me that one of the roles of Business Link is to give generic advice on how to run businesses more cost-effectively and more efficiently. One could well imagine as part of a more general discussion with a small business this issue being raised. I take the point which I think Baroness Sharp is making that some of this requires quite specialist knowledge.

Q839 Baroness Sharp of Guildford: And you have built up this body of specialist knowledge.

Malcolm Wicks: Yes but some of it I guess, at the other end of the continuum, just requires a bit of thinking through and a bit of commonsense, does it not. I am rather impressed by the way in which large numbers of businesses now, not least those with a clear customer interface, have this on their agenda because it is what their customers are demanding. As Joan Ruddock said, we will send the Committee a note on this aspect of Business Link's work.

Chairman: That will be helpful.

Q840 Baroness Platt of Writtle: Personally I was very pleased to hear that you were not having the one-to-one work with businesses because businesses have different and complex problems. It is exciting everybody with the idea of reducing industrial waste that I am sure is going to come out of our report when we come to the background. We have been told that businesses are often confused by the number of different business support organisations promoting waste reduction. Is there any scope for streamlining that? Mr Wicks has said that you are hoping to go down from 3,000 to 100. How will you monitor the success of programmes such as Business Link because I have heard complaints about Business Link because it is not sufficiently experienced in the problems that are facing small businesses particularly, and so how will you monitor their success in explaining waste legislation?

Malcolm Wicks: I think, Chairman, this note should cover that aspect as well. We are setting ourselves a very demanding target. I imagine the Committee

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would rather support the idea of moving from several thousand to 100 organisations, but we will send you a note setting out that in more detail and talking about the monitoring arrangements that will be required.

Q841 Chairman: In the absence of a note Mr Pearson, you wanted to add something?

Ian Pearson: I just wanted to add something because I have been involved in the Business Support Simplification Programme from the innovation perspective, and very much as a Government we want to see Business Link as the gateway to advice so they will be the first point of contact either through their website or through direct contact with Business Link. It is not a question about having Business Link advisers being expert across a wide range of areas, from financial planning to waste minimisation to manufacturing techniques. What it really is about is providing that gateway and access. The message that we get time and time again from businesses is keep it simple, make it easier, there is a confusing range of organisations here providing business support, whether it be from an environmental perspective, financial planning perspective or manufacturing perspective. What we are doing through the Business Support Simplification Programme is undertaking a major rationalisation of our points of contact with industry so that we respond directly to what the CBI, the British Chambers of Commerce and the Federation of Small Businesses and others, are saying to us. Obviously this is a major programme and there are all the metrics that you would expect to be associated with it to measure its performance as it starts to take place, and across a range of these areas the Business Link network over the next 18 months will be very different to the network that it is today as a result of this simplification programme and the product portfolios that it will offer in the future.

Joan Ruddock: Can I just say from the point of view of Defra, obviously we have to feed into this Business Simplification Programme and we will be doing so, but at the same time we are actually reviewing all of our activities with business on resource efficiency and on carbon reduction activity because we think there are some ways of bringing programmes together and creating greater efficiencies and delivering in a more user-friendly way, so we have also got that message and we are doing it for our own bodies and then we will feed in also through the simplification programme.

Malcolm Wicks: Chairman, can I just add—and we will cover this in the note—that Business Link's website has been expanded now to provide additional advice to SMEs on new waste legislation and the more general issue of creating a sustainable business. I think we find from experience that SMEs are often more likely to consult the Business Link website than

communicate, as it were, with us in different ways, but we will provide you with more information about this.

Chairman: I think we would also like information about the website and about how you propose to monitor its effectiveness because a bald statement of the number of hits in itself is insufficient to give a clear picture of what we were looking for.

Q842 Lord Howie of Troon: In that note can you tell us how much of these budgets is swallowed up in administrative costs and how much goes elsewhere?

Malcolm Wicks: Yes, we will do our best to provide that evidence.

Q843 Lord Methuen: To turn to landfill tax now, what percentage of the revenue raised from the landfill tax is being retained to support waste reduction initiatives and how does this figure compare with the percentage retained in previous years?

Joan Ruddock: Again I have the lead on this. We had an agreement which was of course about using some of the landfill tax receipts for waste initiatives, and waste reduction initiatives came within that. Ring-fencing arrangements are ones that are always kept under review, and we have come to a decision with the Treasury that that will no longer be the case, so there is no ring-fencing of landfill tax receipts in this financial year or the subsequent one, so I cannot offer you a comparison with what happened in the past. What I can tell you is that a maximum of eight per cent of landfill tax receipts between 2005 and 2008 were used to fund waste reduction initiatives, so that is the measure of it, and at the moment it is not possible to give a comparable sum because of the changes that I have previously described. We have a whole host of delivery bodies and a range of programmes and we consider that waste reduction is a priority for government but it is not being funded in the way it has been in the past.

Q844 Lord Methuen: The Local Government Association has told us that as a result of the last Comprehensive Spending Review, local authorities will now receive 1.5 billion less from landfill tax revenues. How will this affect their ability to implement short- and long-term waste reduction strategies?

Joan Ruddock: I think that the Department and other Government departments prior to the Comprehensive Spending Review discussed settlements for the funding of local government, and we are satisfied that they can carry out all the duties that are required of them in respect of waste. We believe that it is necessary to give a strong signal throughout the economy about the need to divert waste from landfill. That is what the landfill tax

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escalator is about. For local authorities there are year-on-year efficiencies which they are obliged to make and that is the key because if they make those efficiencies they will have much more money to spend. That is the way the Government has conducted its business vis-à-vis local authorities.

Q845 Lord Methuen: The Flemish Government are aiming to ban landfill in toto. Do you see us going as far as that?

Joan Ruddock: I think the situation is quite different for them in terms of their ability to bury waste at all. We do have landfill sites that can take waste and will continue to take waste into the future, so I would not predict an ending of the use of landfill, but quite clearly we are bound by European law to reduce the amount of waste that goes into landfill and we are on target at the present time in terms of our reductions of waste to landfill. It will become more challenging as time passes and we get closer to 2020. That is why we have looked to introduce some incentives to local authorities to enable them perhaps to encourage more recycling. Recycling rates are going up, recovery rates are going up. We have quadrupled recycling by local authorities since we have been in power in the last ten years, so progress has been made, but I would never be complacent about landfill; it is and will continue to be a real issue.

Q846 Lord Methuen: Do you not think that particularly from the industrial sector that landfill is too cheap compared with other ways of disposing of waste?

Joan Ruddock: Well, I think a balance has always got to be struck and we obviously have to look constantly at what will give the right signal and give the right incentive to people to divert from landfill without making it so expensive that we could potentially end up with far greater problems of illegal disposal, so I think there has to be a balance there. Industry does often say to us—and I have had this said to me by some sectors in industry—“Put it up even more, drive this forward even harder,” but equally one will hear from other businesses that they find that they are already quite stretched. I think that we have probably got the balance right but clearly this can always be reviewed.

Q847 Chairman: One of the things that you said about local authorities was that some of them are very small and you are trying to have joint waste authorities; how successful has this been? How much money have you made available for the joint authorities and what about the regional development agencies; how much money do they get for their waste reduction activities?

Joan Ruddock: I do not have those figures and of course we would partly be talking about the relationship with CLG here, so I do not know if they are any officials present who are able to supply me with a note while this Committee proceeds but if not it would be necessary to write to you because I do not have that detail.

Chairman: Thank you.

Q848 Lord May of Oxford: Focussing in on one of the plethora of acronyms we were discussing earlier, the Market Transformation Programme (MTP) is piloting a roadmap approach to identifying environmental impacts of particular products throughout the entire life cycle. Could you say how the target products were selected, how successful this approach looks and how you monitor progress?

Joan Ruddock: The Market Transformation Programme has been mainly concerned with carbon impacts, so that programme has been working on getting reductions in energy from products. The product roadmap approach is actually being co-ordinated by our division on sustainable products and materials. What we did in approaching this question was to look at the available research and the EU was able to provide information about where the greatest impacts are in terms of areas of consumption. We were told by the EU that 80 per cent of impacts were coming from food, personal transport, buildings, the kind of equipment that we have in buildings and textiles. Those are the major areas where we know we have got consumer impacts that could be addressed. Then we looked in the priority areas at specific products that we could then examine for the roadmap purposes. For example, in food we took milk and fish and in energy using products such as the equipment within homes we took TVs, lighting and motors. In total we got ten products and we have been roadmapping those ten products and that means working through the whole life-cycle analysis. If you were to take clothing, you would go from the time you have a seed that a farmer plants, probably in a developing country, right through to how that plant grows, then to the production of materials, manufacture, retail and eventually disposal of the waste. By mapping the whole life cycle it is possible to see how inputs can be reduced and how waste can be reduced, et cetera, et cetera. We published the first of those recently, which was a milk roadmap. What we do is we work with key stakeholders. We are attempting to get the key stakeholders to sign up to commitments that actually produce lower impacts, less waste, et cetera.

Q849 Lord May of Oxford: Did you say one of the ten was personal transport?

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Joan Ruddock: Yes.

Q850 Lord May of Oxford: The roadmap is particularly appropriate to that! Could you sketch how that is going?

Joan Ruddock: I am afraid I cannot sketch how that is going.

Q851 Lord May of Oxford: It seems a very large topic to try and cover under that heading.

Joan Ruddock: Much work is being done on cars. This is an area where a lot of work has to be done at European level and has to be done through manufacturers because the best way that we could reduce the impacts of cars, if we take them as entities, is clearly in their design, in their fuel efficiency, in their CO₂ emissions and the way in which they are constructed and the End of Life Vehicles Directive has made a big impact. Now vehicles are taken, they are deconstructed and the materials are recycled. Just from memory, I think we have got to about 70 per cent or more recycling and we hope to move to 90 per cent. That is the way forward for cars as entities, but we then have to look at environmental behaviours and that is not to do with waste so much as to do with efficiencies and carbon footprinting. Defra has a whole programme of trying to influence environmental behaviours through our “Act on CO₂” campaign strategy, our website and our calculator. I suspect that will take us away from this inquiry, but that is one of the ways that we will be working.

Malcolm Wicks: We are doing better with the End of Life Vehicles than my colleague was suggesting because the overall performance, taking into account vehicles handled in subcontracted sites as well as the contracted sites, the approved treatment facilities, is actually 83 per cent on a combined total of almost 1.1 million vehicles. We are not complacent, but we are doing relatively well in hitting the targets there.

Q852 Lord May of Oxford: Many years ago the Cleaner Vehicle Task Force’s recommendations were all essentially put in the bin. We simply do not even enforce the MOT regulations. If you compare us with Los Angeles, it is just appalling.

Joan Ruddock: We have heard what you say.

Ian Pearson: On personal transport, recently we have had the King Review that has reported, which is a major piece of work. I wanted to make the point about the link between technology roadmaps and product roadmaps as well. Through the Technology Strategy Board we are producing a number of technology roadmaps which look further out at how technologies might change which might produce new products and new processes in the future. It is important that we build that sort of front-end linkage into the final roadmap process. TSB officials are very

much talking to Defra about these links, particularly in the area of transport but also in the areas of home products and food as well. I think it is right that we build in that technology roadmap and foresight process into the product roadmap and the life-cycle analysis that Joan was talking about.

Q853 Chairman: At the moment a lot of it is working on a voluntary basis. What are you going to do when you establish the scale of recalcitrance as it were? At the moment people are being given the roadmap and they are encouraged to follow it. What happens to those who just do not wish to participate? Are you going to legislate for them? Is there going to be an element of compulsion brought in?

Ian Pearson: Obviously at an EU level there has been a very strong debate about emission limits and the desire to move to 100g per kilometre of CO₂ emissions. One of the things that we are doing through the Technology Strategy Board is supporting a low carbon vehicles innovation platform, which is in the process of funding collaborative R&D to help produce the new breakthroughs in the technologies that would be required if we are going to have lower carbon vehicles on our roads. That is a practical way in which as a Government we are providing support, working with industry to deliver low carbon solutions which are in the process of being mandated through the EU in terms of regulations.

Joan Ruddock: We have a voluntary agreement with major retailers on low energy light bulbs. We have promoted this agreement through various programmes, through CERT and so on in Government. This is where we are leading the field, we are ahead of legislation here, but the legislation we would need is European-wide legislation and that is going to happen. In many of these areas, because of trade law, it will be European legislation, but our voluntary agreements can get us to go down the path, to get ahead of the game and inform the Commission. One of the important things that came out of our work on low energy light bulbs is that there are some health effects. These had not been picked up by the Commission but they have been picked up by us. We have worked with the pressure groups that have people who are sick from various conditions. We are making a real contribution. It is a case of doing both. If we need to legislate then we will, but if we can make headway with voluntary agreements, so be it.

Q854 Lord Crickhowell: I am very glad to hear you say you are picking up the health point, but I do hope there will be some concentrated effort too to make sure that these bulbs give enough light. The problem at the moment and why most people do not use them is because they do not give as much light as ordinary light bulbs. It is a major issue which I believe you

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have got to tackle before you force them down everyone's throat. Can you assure us that waste reduction will continue to be a long-term priority? The second part of my question is about how the Government encourages the best manufactures to continue to be innovative and push the boundaries of sustainability. In putting that question I am bound to raise an issue which we will come back to later, which is individual producer responsibility. We are told, for example, by the Green Alliance that one of the difficulties here is that because we have not transposed article 8.2 of the WEEE Directive we are operating mainly on collective responsibility and it is argued that this has not been as effective. In answering the question about how we can keep it going could you perhaps just say something about how we are going on individual producer responsibility, which seems to have worked in other countries?

Joan Ruddock: We have got the Batteries Directive which we are working on. We need to see this in a wider context and as not just the UK having to act vis-à-vis business or trying to push the boundaries about sustainability because so much of what we work on and transpose comes from Europe. There is a constant surge forward coming from the EU on sustainability and its relationship to business and industry. We take all of that into account and that underpins so much of what we do. I have mentioned so often today the Waste Strategy and that is a long-term strategy, it has been very well received and it is very well understood by business and industry. They are both very clear about where our priorities are. We also think we have given the right economic climate in terms of the landfill tax escalator, making sure that business over the very long term is aware that there is a need to reduce the waste that is produced. That is a very strong signal. We also try to assist business by adopting a very light regulatory regime so that it is possible to exempt certain waste recovery operations from being permitted. This is a very positive signal to industry because it says, "Your material can be recovered, your material can be recycled and can be regarded as a resource, not a waste," and that is very helpful as well. We have got the Environment Agency, we have got WRAP and all the other delivery bodies that we have spoken about that will continue to give their advice and support to business.

Malcolm Wicks: Let me add something about the Waste Electrical and Electronic Equipment Directive which is also known as the WEEE Directive and it is an important aspect of this discussion. An estimated two million tonnes of electrical waste is produced in the United Kingdom every year and each of us as individuals during our lifetime will generate an estimated 3.3 tonnes of electrical waste. We have now implemented the Directive and although it is still early days, we think it is going well. The UK exceeds

the current EC target of 4kg, we are meeting the 6kg target and rising, but it is still early days. In terms of the issue you raised about individual producer responsibility, this is where we do want to move because it would then give an added incentive to the particular company to think right from the first day of designing a product how to design, in a way that is sustainable and so that the materials can be used in the future. What we are all trying to think through—and we meet with the newly established advisory board on this one—is how you do it. There are practical issues because one takes the electrical or electronic waste, the product, down to one's local authority recycling centre and it is a question of how you separate all that out so that it can be properly dealt with by company A or company Z. I think the practical difficulties are really quite strong ones. We need to work this through with the producers, given that it is a producer responsibility, in the months to come.

Q855 *Lord Crickhowell:* My question was very much directed to innovation. We do have the example of Japan before us where there is no doubt that the "top-runner" scheme has driven innovation in a pretty dramatic way. We have had a good deal of evidence from organisations, including the major electrical manufacturers, pointing to a whole list of improvements that it has produced in the manufacturing field. Perhaps you could elaborate a little more on how we can benefit from the experience that we have learned from in Japan. I want to make just a very small secondary point which arises from your remark about driving down to the recycling centre to leave your batteries. Yes, we do that with the big batteries, but why are we not yet following the example that I have observed in many European countries of having outside every chemist shop a place where we can put the little batteries that we have in our everyday bits of apparatus and my hearing aid and so on which most of us simply do not know how to get rid of? It is a very simple thing. It is being done in Europe but it is not being done here. When are you going to do something about it?

Malcolm Wicks: I will give you some more information in writing on batteries because we are trying to move forward on that. At home in our kitchen we have a plastic bag full of batteries ready for us to implement what we are doing on batteries. On the individual producer responsibility point, I do not think I can add to my answer. We will look at the Japanese experience. Some companies are anxious to proceed on this. It is a very practical matter. I used to call it the dump and now I have to call it the recycling centre. I think there is the really practical problem of separating out the different bits of waste and finding the actual producer responsibility. We have now set up an advisory board on this Directive but it has only

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had one or so meetings at the moment. I want to discuss this issue with the advisory board just as soon as I can.

Q856 Lord Crickhowell: You are not quite getting the point I am making, which is not so much about how we get rid of the stuff. We have had a whole list of technological improvements from the electrical industry, for example, the unification of materials, the reduction in the number of components, screws, the standardisation of materials, the development of recycling technologies, separation and so on, arising from the Japanese experience. I am trying to move us to what ought to be the centrepiece of our report, which is how we are getting the design and the technological improvements rather than the local authority end of getting rid of the stuff.

Ian Pearson: I do not think our best manufacturers need any encouragement to be innovative and to push the boundaries of sustainability. When you look at some of our best companies and you look at their annual reports and you look at how they operate in practice, sustainability is very much built into their business model, I do not think it is a separate add-on. I think the issue is more other companies and making sure that right down throughout our manufacturing base we continue to promote sustainability. Malcolm and I sat as members of the Commission on Environmental Markets and Economic Performance, which reported last year and we responded to that report recently. One of the key things coming out of that report is really the strong business opportunities that can result because of the Green Revolution that will need to take place in industry over the next few years. There are strong commercial drivers which give big incentives to companies to act in a more sustainable way. Mention was made of the Japanese top-runner initiative and I think that that has been effective in terms of driving up standards in Japan. My understanding of what we are doing through the EU is adopting a similar sort of process. Joan mentioned the phasing out of non-energy efficient light bulbs and that is part of a similar process to what the Japanese have adopted with their top-runner programme. Across a range of different product areas at a European level the UK has been pushing to say which are the most efficient in the marketplace, which are the least efficient in the marketplace and to seek in the first instance to work voluntarily with industry, but then to move to regulate to ensure that the most inefficient products will not be allowed to be sold in the future and so in effect choice editing will take place. So the decision will be made that products that are very poorly performing in terms of energy efficiency standards but also potentially waste standards in the future will not be allowed on the market in the first place.

Q857 Lord Bhattacharyya: The Prime Minister has entered into discussions about the possibility of introducing a lower tax for more energy efficient products. Could this concept be developed to encourage resource efficiency so that, for example, virgin raw materials could carry a higher tax than recycled or re-used materials?

Joan Ruddock: I am sure you will understand that in all cases of this kind the Minister's standard response is that all tax issues are for the Treasury. I am afraid I have to give that standard response; it is for the Treasury to decide. However, all I can point to is the fact that we have encouraged, for environmental reasons, a differential taxation. One of the best examples in this context is that of the aggregates tax whereby we have got a lower tax on recycled aggregates in order to discourage the use of virgin materials. The principle is well established and it has been applied in that particular example. As I have said so often today, the landfill tax escalator is another very big signal. I am afraid I cannot comment beyond that other than to say that the principle has been accepted and put into practice elsewhere.

Ian Pearson: I just wanted to add a personal view because obviously these matters are matters for the Treasury. In my view two of the failings of neoclassical economics are the failure to take into account the externalities of carbon and, secondly, the failure to take into account fully the externalities in terms of natural resource depletion. I think over the next 20 years or so we will see a strongly performing carbon market that prices in externalities and I think that we will need to have a debate at a global level about the use of natural resources and whether they are properly priced at the moment. That is a big political question. I would be very interested to know whether the Committee has any views on this for the future.

Lord Bhattacharyya: Oil has already started going in that direction.

Q858 Chairman: It is not really our purpose to enter into discussions in quite that depth.

Malcolm Wicks: We will be consulting on batteries in the summer.

Joan Ruddock: We are indeed consulting on batteries, but from Defra's point of view, we do hope very much that we can produce an agreement that means that we will get retailers who actually sell these small batteries of this huge variety to take back the batteries at the end of their life, but it would be those who sell who would take back.

Q859 Lord Haskel: Let us move from tax to technology where you may have a bit more to say. A great deal of research has been carried out by materials designers which focus on the development

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of new materials, more sustainable and lighter. I ought to declare an interest as the President of Materials UK. What is equally important is new technologies into the use of recycled and re-used materials. Are you giving any support to new technologies for doing that?

Ian Pearson: As the Minister responsible for research councils and the Technology Strategy Board it is probably appropriate that I give an initial response to this. The short answer is that we provide substantial funding for research right across the range, whether it is for the development of new materials or new technologies in terms of recycling. As a Government we are providing a lot of support and looking at new technologies across a whole range of renewable energy as well as recycling. I would like to draw the Committee's attention to two particular programmes. The first is the ESRC funded "Waste of the World" five-year research programme which is bringing together researchers from across a range of disciplines, from geography to anthropology and material science and a range of universities, not just in the UK but internationally as well. The whole aim of that programme is to rethink how waste is thought of in the social sciences, to provide a global analysis of waste and to examine how rethinking waste impinges on some of the core concerns of contemporary social science, notably economies, researching globalisation, hazards and risks and such like. The second programme I would like to draw attention to is the cross-research council Living with Environmental Change programme, which is a significant programme that we have funded as part of the new Comprehensive Spending Review settlement. Three of the six objectives of this programme are relevant to minimising waste and to using it as a resource. This is bringing together researchers from across a range of disciplines. When it comes to the objectives, one is specifically about minimising waste and the other is going to address how communities can be encouraged to make the right choices for the environment as well, so there is a significant programme of work there. Lastly, just to add in the work that the Technology Strategy Board is doing as well, the TSB has supported collaborative R&D projects worth around £70 million with Defra on waste minimisation and has an active programme in this area as well.

Q860 Lord Haskel: Re-using materials and recycling materials is an important part of the whole scheme. We have had people say to us that using recycled materials gives the impression that you are selling an inferior product. Do you not think that we should make particular effort in trying to develop new technologies to help firms to use recycled materials because otherwise the whole scheme is not complete?

To complete the circle you really need to have the recycled materials used again.

Ian Pearson: I agree with that. One of the things we are doing as a Government is pumping money into research that will look specifically at some of these areas. We can always have a debate about how much and is it enough. It is clearly a focus of attention for us as a Government that we look at research in this area and what potential there is to improve our understanding and our capabilities.

Q861 Lord Haskel: You do not think it should be more specific?

Ian Pearson: I know that there is specific research in a number of these different areas. Obviously it is not for me as a Minister to make detailed funding decisions on what support should be provided through the research councils, it is very much up to them to do that. The decisions we make as a Government are that we think, for instance, full economic costing is good when it comes to supporting research so that our research is sustainable and, also, that we should be supporting research into some of the biggest challenges facing the world and the UK today and living with environmental changes is one of them. It is then up to the research councils to decide what is the best research to fund on the basis of peer review and the quality of the proposals that they receive.

Q862 Lord Bhattacharyya: One of the big problems of design these days is that because of light weight and producing energy efficient products one uses the sort of materials that cannot be recycled easily, for example, composites. In cars, if you look at light weight materials, inevitably they end up using more and more composites. Aircrafts nowadays are coming in with more and more composites. Although they are being energy efficient because they are lightweight, recycling them becomes a huge problem. How do you cater for that?

Ian Pearson: My Lord, you will know far more than I do about the possibilities in this area, but it is certainly true to say that composites are becoming more pervasive in a lot of products. Only tomorrow the next generation composite wing project will be announced and it does bring challenges. I think the best answer we can give is that we are aware of that as an issue and I am sure research councils will be keen to fund research into the recycling of composite materials. If the Committee has suggestions to make on this matter, I am sure that is something that the research councils would be very keen to consider.

Malcolm Wicks: The Department for Business and the Resource Efficiency Knowledge Transfer Network have just published a report called "Material Security: Ensuring resource availability for the UK economy" and that is looking at the

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security of supply for 69 key raw materials. The conclusion of the report is that far more attention needs to be paid to resource efficiency, including waste minimisation, closed loop recycling and the avoidance of dispersion of critical materials to the environment. That seems to be very much in line with some of the evidence that this inquiry has heard.

Joan Ruddock: Obviously fundamental research is very, very important but so is bringing new techniques to market, which is something that WRAP has been very much engaged in. For example, they have had a successful large-scale trial in recycled PET and there is a novel process for the recycling of HDPE milk bottles back into milk bottles. They have supported market development with capital support on the closed loop London plant at Dagenham which will take 35,000 tonnes per annum of mixed bottles from the UK. One of the members of the Committee said that people often think that these are second rate materials, but there is actually a huge demand from manufactures and retailers for recycled material. Whereas some people may take that view and perhaps some of it comes from ignorance, in industry and commerce itself there is a huge demand for recycled material. We just need to find new ways of using it and making it acceptable both in a utilitarian way and sometimes in a visual way as well. As regards the question about composites, this is one of the reasons why life-cycle analysis is so important, because there has to be a trade off. It may be that for waste purposes we would want less use of composites for carbon footprinting and so doing a life-cycle analysis has to be the basis of making these decisions as to where trade-offs lie.

Q863 Chairman: We visited Xerox earlier in our inquiry and they drew our attention to work which they do in Dundalk, in the south of Ireland, where they take their very large old photocopying machines and they renovate them and they bring them out at a reduced price as last year's model. Do you know if any of your departments procure that sort of equipment? The impression we got was that the departments do not, that they do not practice what they preach because what is good is to have the latest, which is obviously the best and certainly the most expensive. Do you think you could send us a note on what each of your departments does in respect of that type of procurement because it would be interesting as a footnote for the report that we will be producing? Sometimes we think you talk the talk but you do not always walk the walk. It would be helpful for us to find out.

Malcolm Wicks: I think it would be helpful and we could compare it with exemplars like the House of Lords!

Chairman: That is a perfectly fair point.

Q864 Baroness Sharp of Guildford: If one is looking at the waste hierarchy then reduction comes higher up the hierarchy than recycling. The design element is obviously an extremely important one. What is the Government doing to encourage collaboration between industry and academia to enable design students to get a better understanding of the needs of business and indeed of the whole life-cycle analysis approach?

Ian Pearson: As a result of machinery of government changes last year responsibility for the Design Council transferred from the Department of Culture, Media and Sport to my department, the Department for Innovation, Universities and Skills. Certainly the Design Council has been doing a lot to work to promote design. Sustainability is one of the principles of good design and it is very much promoted as such by the Design Council. Creative & Cultural Skills is the sector skills agency responsible for the design sector and it has launched "High-Level Skills for Higher Value", a skills development plan to improve the professional skills of the UK design industry. It has worked on design modules for undergraduate courses at a university level and it has also provided work, recommending a number of approaches to developing design education in schools to ensure that design is built into people's awareness at an early age before they are making decisions on what degree courses to follow. Only in March this year we saw the launch of a design blueprint which outlines the actions needed to implement the Skills Development Plan. There are also plans to set up a UK design skills alliance, which is a partnership with industry and education to take forward the recommendations of the plan. There is quite a lot of work going on in this area at the moment. I really do think that the profile of design and the importance of design and sustainable design have really rocketed in the last few years and lessons are being learned across Government but across industry as well.

Q865 Baroness Sharp of Guildford: It is not just design and sustainability, it is this whole issue of life-cycle analysis that it is important they understand. It is the point that Lord Bhattacharyya was making about engine design: you may use composites and you have got the trade off between the lighter vehicle, the lighter aeroplane and its use over the life cycle. It may be that it is going to be using a lot less fuel because it is so much lighter and that actually the trade off is a very positive one on these sorts of things.

Ian Pearson: That is absolutely right. One of the things that we have learned over the last few years is how to get better at life-cycle analysis. I think practice is spreading amongst industry and certainly across Government as well. If you were to ask me whether more needs to be done the answer is going to be very obviously yes.

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Q866 Earl of Selborne: As soon as a material has to be labelled as a waste it becomes very much harder to use it. The Environment Agency has been working on a series of quality protocols to enable the waste label to be removed in some cases, but it would be very much better if the Waste Framework Directive could be redefined and we could have a better idea, on a European basis, as to what was waste and what was a byproduct. What are the chances of a change in this European legislation? Am I right in thinking that the Environment Agency's protocols are probably not recognised internationally?

Joan Ruddock: Neither the Commission, the Environment Council nor the European Parliament has proposed a revision of the definition of waste in the existing Waste Framework Directive, that is not on the table for discussion. It is very unlikely that the definitions of waste will be revised in the course of the considerations of the Waste Framework Directive. Having said that, what is in the Council's common position is a provision on end of waste and that could have implications for the protocols that the Environment Agency has been working on. If this does remain in the final text then the European Commission would be able to adopt end of waste criteria for specified waste streams. If that happened then that would apply throughout the whole of the EU and we would be bound by it in the normal way. As to the work that the Environment Agency has done and is doing, we consider that still to be valuable and that work should continue. If indeed there are changes Europe-wide then this will put us in a good position to argue what kind of changes should be brought in and to offer the experience of the development of the protocols that we have already done. That is the way that we think things will go. The issue with products is that a byproduct, if it is a true byproduct, ought not to be classified as waste in the first place. If things can be properly defined as byproducts then they should be outside this consideration.

Q867 Earl of Selborne: We have got a situation where the Environment Agency is trying to produce these protocols so that people know whether they have to stick a label on the product or not. If it was done on a European basis it would be much simpler.
Joan Ruddock: Of course.

Q868 Earl of Selborne: Do we not need a change in the Waste Framework Directive? Why are we not urging for it?

Joan Ruddock: As I have tried to indicate, the debate is about end of waste criteria, which we are supporting. I would make the distinction between redefining waste as a whole and looking at the end of waste criteria and that is a distinction that has been made throughout all of the discussions in Europe. We

are not acting alone in this. No one is proposing redefining waste per se. In terms of the end of life waste definitions, we support that. We have experience through the development of our protocols and we think that is indeed the way forward.

Q869 Lord Crickhowell: I am also disappointed and surprised by that answer because we received very powerful evidence from industry early on in our inquiry that one of the major problems was the fact that the Waste Framework Directive was drafted before sustainability became the key issue, it was directed at waste and pollution, and as a former Chairman of the National Rivers Authority who had to deal with it I understand that. In the view of a large chunk of British industry who has given evidence to us it is a very considerable problem. The glass industry gave some very powerful evidence on the effect that it is having on them. It does seem to me it is no good just saying it is not an issue in Europe. I suspect that this Committee will have something quite strong to say on it and it may suggest that perhaps the British Government should be taking a lead on the issue. I do hope that when we come back to look at our report you will consider really carefully whether it is a problem. I am worried that you are saying the Government does not think it is a problem and nothing is happening in Europe when the industrial evidence we have received is that it is a problem.

Joan Ruddock: I hear what you say. All I can tell you is that no bit of the whole of the European machinery is engaged in a debate about redefining waste per se. The focus is on the end of waste criteria and we believe that that is where the focus needs to be, that this is where useful work can be done. It has to be said that if industry as a whole is taking a different view then clearly they have not been able to persuade either the Commission or indeed other Member State governments. We are not isolated in this and we are supportive of this particular way forward and we do think that our own work in this country is useful in that respect.

Q870 Chairman: Are you saying that the two are mutually exclusive or are you saying that, as far as you are concerned, you do not regard what Lord Crickhowell and Earl of Selborne have been saying as being sufficiently relevant to require exercising the British Government?

Joan Ruddock: No. We have not been saying that the definition of waste is not an issue. We are saying that there are no plans to change it by the Commission, the European Parliament or the Council.

Q871 Chairman: Why are you not raising it as an issue since sectors of British industry are greatly exercised by it?

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Joan Ruddock: I would have to check whether indeed the British Government has been raising this as an issue or not. All I can repeat is that we are not saying that it is not an issue, but I am only able to say where we have been putting our pressure, what we have been doing in negotiations and it is limited to the end of waste criteria. I am very happy to produce a note. If there is anything I am able to say about the negotiations that have taken place or the position that the British Government has adopted, I would be very happy to do it, but it is not something that I myself know. I certainly have not been at the Council meetings where this has been discussed.

Chairman: That would be very helpful because it could assist us in sharpening one way or another any recommendation that we might make. The evidence that we have received and the force with which it was expressed suggested that this is a concern of at least one of the major recycling industries. If you could give us information it would help with our recommendation, if the Committee decides to look at it.

Lord May of Oxford: It does look like it is on the Defra radar screen.

Chairman: It will perhaps be our role to put it there!

Q872 Lord Methuen: It has been proposed that choice editing could be employed whereby retailers only stock the most sustainable products on the market and so members of the public are not given the opportunity to purchase the least sustainable options. Would you support such a strategy?

Joan Ruddock: Yes, very much so. You may not like the term choice editing but it is actually quite an effective tool and it underlines and underpins a great deal of the work that Defra is doing on products and materials. Clearly if we can persuade manufacturers and retailers to only stock the most efficient in whatever respect we are talking about, whether it is carbon, waste or whatever, then it makes it much easier for the consumer to make an appropriate purchase. There is obvious value in choice editing. We do think that this is very important. We can achieve this obviously by the decisions of the retailers but also through the use of minimum performance standards for products. It is something that we work on and something that is normally done European-wide. The best example we can give of this, which is energy rather than waste, is if we look at the A to G energy labels, the European standard. That has enabled people to make appropriate choices, ie to get closer to the A than the G, but what we now know is it is having an even bigger effect on the retailers themselves. In terms of their competition policies, they have ended up wanting to present goods at the top end of that scale rather than keeping the whole range and so now it is very unusual to find any product below about a C rating. So it has had a major

effect on retailers and that is why we think that choice editing is a very, very good tool.

Q873 Lord Methuen: Do you not think you should have something like the FSA's "traffic light" system on a product?

Joan Ruddock: There is a whole review being undertaken, particularly on the energy saving products and that is being done at a European level and we are feeding into that. We are having to look now at a range of issues, not just end of life and waste recyclability but also carbon and that is one of the most significant. There is a debate to be had about whether it should be something like traffic lights or whether it should be carbon units. There is a whole debate to be had about labelling and what would be the most appropriate. Choice editing gets us further often than you might obtain with labelling alone.

Q874 Lord May of Oxford: Let me begin my question with a very brief anecdote. When I first became Chief Scientist I would sometimes go into the office early. The Office of Science and Technology was housed in what was then the DTI. I would find every light in the building was on as early as seven o'clock. When I complained about this I was clearly regarded as some sort of eccentric rat bag or some fruit cake person. I was dismissed by being told that the cleaning staff were all contracted, they did not speak English and who cared anyway! I had an eight-month battle which I finally won by seeking to inject myself into the annual appraisal process for the relevant Civil Service officials who were in charge of greenness in the building and I had a brief and, I suspect, very transient triumph. Government departments are clearly in an ideal situation to lead by example in reducing their own waste. However, the Sustainable Development Commission reported that performance is variable, with some departments "still not able to provide complete data for their whole estate." The National Audit Office's report on sustainable construction and refurbishment on the government estate said "a coherent approach to monitoring progress and ensuring compliance" was lacking. What is being done to ensure that government departments meet their own targets, are able to account for their waste and who is taking the lead in addressing these problems, particularly for the estate management?

Malcolm Wicks: Can I reassure Lord May that his influence may have—

Q875 Lord May of Oxford: Remember that I will come and look at the lights!

Malcolm Wicks: Yes, but do not trip over because it is so dark there now sometimes! My Department did extremely well in the latest Sustainable Development Commission report; we came in the top three with a five-star rating. We are not complacent; we want to go

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for gold. In particular, carbon emissions were 14.4 per cent lower than the 1999–2000 baseline and there was a 30.7 per cent reduction in waste arising since 2004–05, making BERR one of the top performers against its target of 55.8 per cent of total waste recycled, *et cetera, et cetera*.

Q876 Lord May of Oxford: If I were a politician I guess I could claim that as my legacy!

Malcolm Wicks: We have followed your lead on this. The results are now clear. I cannot speak for other departments.

Q877 Chairman: Perhaps you could share with us who were first and second?

Malcolm Wicks: I do not know whether in the top three means we were third. I do not think I can share that with you. We can report that to the Committee in due course.

Q878 Chairman: If you could tell us now?

Malcolm Wicks: I do not know.

Q879 Chairman: I am sorry. This sounds like a bit of spin doctoring.

Ian Pearson: I am concerned that there is rather a selective quotation in the question where it says that the Sustainable Development Commission reported that performance is variable. Performance is always bound to be variable.

Q880 Lord May of Oxford: The quotations were not mine but they match my experience.

Ian Pearson: I just happened to be reading yesterday the Sustainable Development in Government Report and it uses a sort of traffic light system to assess performance across areas. For some strange reason blue means excellent progress and red means no progress or poor progress. I think the Government might have some issues with that. It categorises blue as meaning excellent progress being made when it comes to waste reduction. I think it is important to make the Committee aware of that. When it comes to recycling increases that is rated as green overall, which is good progress and means being on track to hit targets. In waste reduction it is blue and that is excellent progress and on recycling it is good progress being made.

Q881 Lord May of Oxford: Perhaps you could give us a written submission about what is being done in respect of sustainable construction and refurbishment on the government estate across Whitehall.

Joan Ruddock: The responsibility now for delivery against government procurement targets is with the Office of Government Commerce, but Defra continues to lead on public procurement policy. I am

going to acknowledge, as the Sustainable Development Commission did, that we have got a very mixed picture. There is no doubt that some government departments on some of these issues are not doing nearly well enough. We are confident that the steps we have taken last year have yielded significant improvements in the performance across government on sustainability. We set out future steps in the Government Response to the SDC's Sustainable Development and Government report published in March and we think that will produce a further step change in performance. We have also announced in the Budget this year plans to establish a Centre of Expertise for Sustainable Procurement to be overseen by a new director-general post of Chief Sustainability Officer within the Office of Government Commerce. Those are very important steps and through those steps we do expect to see a great improvement in the way in which Government pursues these issues.

Q882 Chairman: Will you be undertaking to implement policies more effectively so that it will be easier for products to get on the “quick wins” list? Is that part of the remit of the centre?

Joan Ruddock: It is to oversee, first of all, the extent to which departments have actually adopted the “quick wins” list because that is variable in its own right. Some of those quick wins are around obvious simple products such as low energy light bulbs and copier paper. Those are areas where everyone knows what needs to be done and it is a case of making sure it is being done and to date it has not yet been done. It is not for me to say, but it seems logical that there will be an extension of the products that were under consideration.

Q883 Chairman: We realise that it is really a matter for the OGC. Industry says that if the criteria are too complicated this frightens off small businesses and we have heard evidence which suggests that small businesses benefit from more outcome-focussed, less prescriptive, criteria which allows them to be innovative. It is things like this that one would hope that this centre would resolve. I am a wee bit distressed that it is in the hands of the Office of Government Commerce and that it going to be answerable to that department. I would be almost prepared to lay money, although I am not a betting man, on the fact that when we get the names of the two other departments in the top three the OGC will not be one of them.

Joan Ruddock: May I just say that there is another aspect to this which affects all Government departments and that is the inclusion within permanent secretaries' performance objectives of the delivery of those commitments and holding those permanent secretaries accountable for their

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departments' performance. That is also a powerful tool. Now it is with the permanent secretary for each department, they are accountable, they can be tested on this and indeed the Sustainable Development Commission clearly will remain on our backs and quite rightly so.

Q884 Chairman: We can only just wait and see if these rewards and carrots and sticks move permanent secretaries. Usually what happens is the failure to achieve it means that the permanent secretary gets

moved rather than the efficiency of the department. That is just a tasteless aside which will be my closing remark. Thank you very much.

Malcolm Wicks: Chairman, you rather imagine that now OGC have this responsibility they will move up the table rather quickly!

Chairman: Thank you very much. You have been here for two hours and you have answered our questions as best you could. We look forward to the notes that you are going to give us. We hope you will find our report interesting reading. We may well meet again to discuss it at a later stage.

**Supplementary Memorandum by The Department for Environment, Food and Rural Affairs (Defra);
The Department for Business, Enterprise & Regulatory Reform (BERR); The Department for
Innovation, Universities and Skills (DIUS); and The Office of Government Commerce (OGC)**

GOVERNMENT RESPONSES TO QUESTIONS RAISED BY THE INQUIRY

It was stated that when the Environment Agency collected data on waste streams, the cost was around £3 million in 2002 (Q817). Does this figure only cover the cost of collecting data on household waste? If a comprehensive data-gathering scheme was implemented, collecting data on household, industrial, commercial, construction and demolition waste, how much do you estimate this would cost?

1. The cost cited was for the Environment Agency's National Waste Production Survey. This survey did not collect data on household waste. Data on household waste are collected via Defra's WasteDataFlow project and this system provides good quality information on a quarterly basis. The annual UK cost of WasteDataFlow is around £0.5m; this covers central staff costs, non-pay running costs, payments to contractors and estimated costs to respondents (local authorities).
2. The EA survey collected data on commercial and industrial waste; the 2002–03 survey was estimated to have a total cost of £3m. CLG conduct a biennial survey on aggregate construction and demolition waste. The contracted cost of this for the 2005 survey was £73,532.50.
3. The current Waste Data Strategy aims to collect comprehensive data on all waste streams by utilising administrative data sources, ie returns made by waste facility operators, rather than directly surveying businesses. The Waste Data Strategy encompasses WasteDataFlow and collation of data from existing Environment Agency systems. The Business Case developed for the Waste Data Strategy during 2005 estimated savings to respondents and central government from not carrying out surveys at £1–£1.2m pa—this can be broadly seen as the possible cost of moving back to a survey-based data collection methodology (and excludes the existing cost of collecting municipal waste data). There would be additional, unquantified costs for further surveys on other waste streams such as non-aggregate C&D waste and agricultural waste which would be required to give a comprehensive picture based on surveys.

We were told that BERR was working with Defra's waste statistics team to gather further data on all waste streams and that it had commissioned a couple of studies (Q819). What work has been undertaken so far, what are the studies aiming to achieve and when will they be completed?

4. There are three relevant studies, as follows:

- (i) *Delivering the data for monitoring the Waste Strategy 2007 indicators* (Defra funded)—The purpose of this research study is to identify the data gaps for the Waste Strategy indicators and to determine the most efficient and effective long term and short term solutions for filling these gaps to provide a sufficiently accurate evidence basis for waste policy monitoring. Defra is reviewing the final draft report from the contractors and it is anticipated that this report will be published shortly.
- (ii) *Investigation of Uncertainty in Estimation of Commercial & Industrial (C&I) Waste to landfill* (BERR Funded)—This was completed about six months ago. It addresses the problem that the amount of

C&I waste going to landfill is not measured directly, it has to be derived by subtracting the amount of inert and municipal waste going to landfill from the total amount of waste going to landfill. The study looked at the accuracy of this derived quantity to see if it could be used a reliable indicator of trends in C&I waste management.

- (iii) *Investigation of Carbon Ranking of C&I Waste Reduction Measures* (BERR funded)—This study investigates the potential greenhouse gas savings of the various C&I waste management policy measures currently in place in England (eg the Landfill Tax Escalator, the Courtauld Commitment, The “GlassRite” campaign), The purpose of the study to help ascertain which measures are the most important in helping reach the Governments greenhouse gas reduction targets. This study is close to completion.

BERR is considering setting various targets for the construction industry (Q824). What work is being undertaken as part of these considerations and when might the targets be set?

5. A joint industry Government Strategy for Sustainable Construction is currently being developed and is due to be launched on 11 June. Although BERR is coordinating this work, the actions, commitments and targets are the responsibility of designated groups across the private and public sectors.

6. The actions and deliverables in the current (23 May) draft of the Strategy, which relate to Waste are:

ACTIONS AND DELIVERABLES

<i>Overarching Target</i>		
By 2012, a 50 per cent reduction of construction, demolition and excavation (CD&E) waste to landfill compared to 2008		
<i>List of Actions & Deliverables which contribute to Overarching Target</i>	<i>Body Responsible for each action/deliverable</i>	<i>Timescale</i>
Construction Waste Commitment: individual organisations commit to waste to landfill targets at company level	Waste & Resources Action Programme (WRAP), working with client and contractor sector bodies	Formal Launch in September 2008, then ongoing
Develop guidance on waste reduction for small builders	National Federation of Builders (working with WRAP & Envirowise)	By 2009
Sector resource efficiency plans prepared and implemented by trade associations	Construction Products Association	Three begun by end 2008
Setting an overall target of diversion of demolition waste from landfill	National Federation of Demolition Contractors	By 2009
Extension of Plasterboard Voluntary Agreement to rest of the supply chain	Construction Resources and Waste Platform and WRAP	By 2009
20% reduction in construction packaging waste	Construction Products Association	By 2012

7. The overarching target is not a Government target. Rather, it has been developed by the construction industry and is the responsibility of the Strategic Forum for Construction.

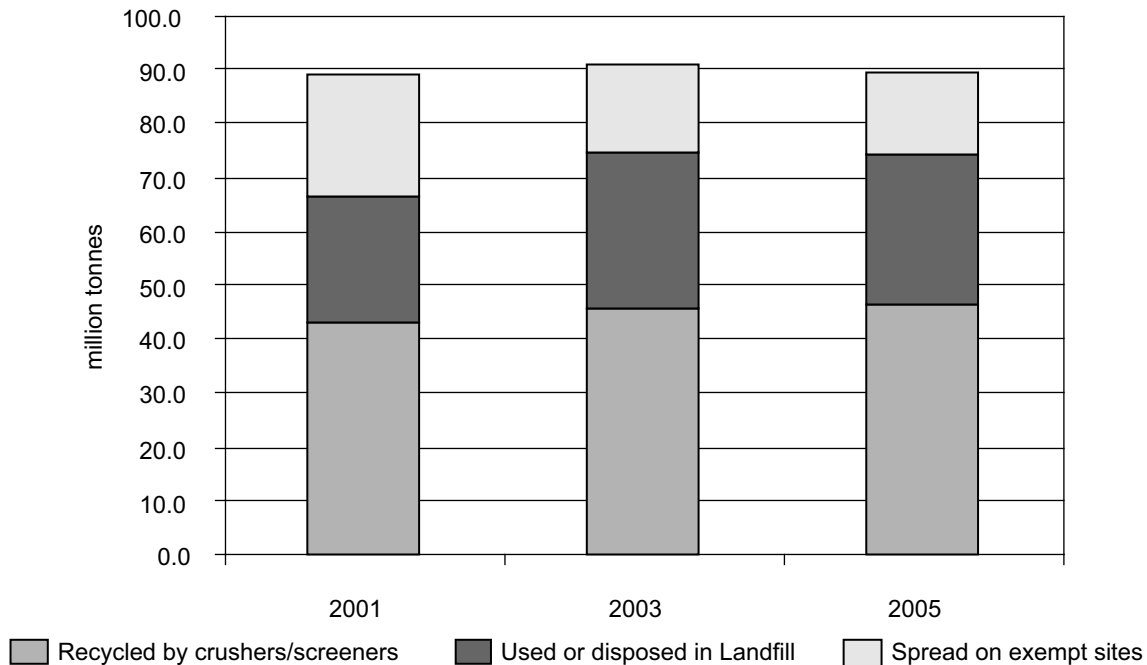
What estimates do the Government have on the amount of waste arising from construction and demolition projects? (QQ 824–826)

8. We estimate that the construction, demolition and excavation (CD&E) industries in England are responsible for the production of over 100 million tonnes of waste per year. Full details of the production and management of this waste are set out below. These figures include waste that is subsequently recycled, including recycling on the site where the waste is produced.

AGGREGATE CD&E WASTE

9. Aggregate waste¹ from the CD&E sector accounts for the largest proportion of waste arisings in England, with approximately 90 million tonnes produced in 2005 (around one-third of total waste). The total arisings are estimated to have remained at this level across the 2001, 2003 and 2005 surveys. Chart 1 illustrates the management methods of CD&E waste from 2001-2005. The data are presented in more detail in Table 1.

Chart 1: Use/Disposal of construction and demolition arisings in England 2001-2005



Source: CLG surveys on arisings and use of construction, demolition and excavation wastes.

Table 1

SUMMARY OF ESTIMATED CD&E AGGREGATE WASTE TONNAGES FOR ENGLAND IN 2005

<i>Category</i>	<i>Tonnage (million tonnes) in 2005</i>
Production of recycled aggregate	42
Production of recycled soil (excluding topsoil)	4
Unprocessed CD&E waste entering licensed landfill—for engineering use	4
Unprocessed CD&E waste entering licensed landfill—for capping use	5
Unprocessed CD&E waste entering licensed landfill—for waste disposal	18
Waste materials (mainly excavation waste) used on registered exempt sites	15
Total	90

Source: CLG survey on arisings and use of aggregate construction, demolition and excavation wastes. Figures are rounded to the nearest million.

10. The recycling of aggregate waste by the CD&E sector includes waste that is recycled on the site where it is produced. Around 52 per cent of aggregate waste was recycled in 2005. Only 20 per cent was disposed to landfill.

¹ CD&E aggregate waste includes waste materials that arise from the construction or demolition of buildings and/or civil engineering infrastructure and excavation waste including naturally occurring soil, stone, rock and similar materials (whether clean or contaminated). It does not include materials such as wood, metals and plastics, which also arise on demolition sites, but have no potential for use as aggregate.

NON-AGGREGATE CD&E WASTE

11. Non-aggregate wastes arising in the CD&E sector include glass, wood, plasterboard, asbestos, metals and plastics. The Welsh Assembly Government recently conducted a survey of Construction and Demolition waste arisings in 2005–06.² This covered aggregate and non-aggregate waste arisings from this sector.

12. In Wales, it was estimated that 12 per cent of CD&E wastes were non-aggregate wastes. Applying this percentage to the aggregate waste arising estimated for England suggests a further 12 million tonnes of non-aggregate wastes were produced by this sector. Estimates by WRAP³ suggest this could be higher, at 15–20 million tonnes of non-inert and mixed CD&E waste, in addition to the aggregate waste described above.

During the meeting, the budgets for Envirowise, NISP, WRAP and the MTP were provided for the year 2008–09 (Q827). What were the budgets for these bodies in the year 2007–08? Has the BREW programme of funding now ceased and, if so, how is funding for waste reduction projects now allocated?

13. The budgets for these delivery bodies from the BREW programme (not their total funding) for 2007–08 were as follows:

<i>Delivery body</i>	<i>2007–08 budget</i>
Envirowise	£22.19m
NISP	£8.25m
WRAP	£12.174m
MTP	£3.895m

14. The BREW Programme of funding has now ceased. From 2008/09, allocations for business resource efficiency expenditure will be made from Defra's central budget. Allocations are decided through Defra's business planning process, which seeks to ensure that resources are best matched to Departmental priorities.

We were told that Business Link advisers would receive training on resource efficiency and waste reduction. What form will this training take and who will provide it? How do you monitor the effectiveness of the Business Link website? What proportion of Business Link costs is spent on administration? (QQ837–842)

TRAINING FOR BUSINESS LINK STAFF

15. The Government's Business Support Simplification Programme positions Business Link as the primary access channel for a new streamlined portfolio of less than 100 publicly funded business support products and services.

16. RDAs and BERR/HMRC will work with the business support product owners to ensure that Business Link meets customer support needs.

17. Defra, as the owner of the Promoting Resource Efficiency and Sustainable Waste Management product, will work with RDAs to ensure Business Link is able to deliver the enhanced service, and that customer service teams and advisors are trained to the appropriate level.

18. All Business Link customer-facing staff must be accredited to the appropriate nationally agreed standard of competence—in the case of Business Link advisors, this involves accreditation to the National Occupational Standard for Business Support (as defined by the national standard-setting body for the business support standard, SFEDI)⁴ and the additional Business Link Broker standard.

19. RDAs have asked SFEDI to ensure the National Occupational Standard for Business Support is developed to reflect sustainability as a core element of the national standards.

ADMINISTRATIVE COSTS

20. Government (BERR) provides, through the Regional Development Agency (RDA) Single Pot, £140m per annum to support the core Business Link service.

21. Back office costs⁵ of Business Link Providers as a percentage of core Business Link grant funding over the past three years have come down from 31 per cent to 23 per cent per annum, with plans to reduce these even further. Significant future efficiency gains across the Business Link network are being forecast.

² http://www.environment-agency.gov.uk/regions/wales/816243/1985904/?version=1&lang=_e

³ The Sustainable Use of Resources for the Production of Aggregates in England, WRAP, 2006.

⁴ The Small Firms Enterprise Development Initiative.

⁵ Back office costs include all non-customer facing costs (including Chief Executive; finance; Human Resources; quality; accommodation; and ICT infrastructure costs).

22. Efficiency gains are reinvesting in front line delivery resulting in improved performance. For instance, the number of intensively assisted customers has increased by 48 per cent since 2004–05 to just over 58,000 customers in 2007–08.

MONITORING

23. Contract management of Business Link (excluding the on-line service) was devolved to the RDAs in 2005. Business Link has a centrally defined Management Information Requirement and Customer Satisfaction Methodology with core questions covering the breadth of the service. RDAs have, from 1 April 2008, included a new count on Resource Efficiency: ie the Count of Intensively Assisted businesses that receive assistance to improve their resource efficiency. Results are reported on a quarterly basis.

24. RDAs are also undertaking impact evaluations of the Business Link service in their respective regions.

25. The success of the on-line Environment & Efficiency section is monitored on a regular basis by reviewing how many people are using the section and how they are using it. This includes assessing: how the section performs compared to other parts of the website; which guides and tools are most popular; percentage of successful tool use; how users navigate around the section and individual guides; where users are referred from; and which websites users access when they exit the Business Link website.

26. Feedback is distributed to stakeholders both by e-mail and at meetings. In future, this will be done through a regular monthly report, which will round up new developments to the Environment & Efficiency section and information about its usage. There is regular communication with key stakeholders including Defra, the range of delivery bodies and local Business Link Providers. This is also used as an opportunity to receive feedback on new developments and to monitor and improve links between Business Link and its stakeholders

27. Customer satisfaction with the site as a whole, and the economic impact that the site has on business users, is monitored by surveying businesses at least annually. For the most recent survey, for the year to November 2007, a customer satisfaction rating of 88 per cent was achieved (business users rating the site good, very good or excellent). The overall time and cost savings to business were found to be £251m. The results also indicate that the website helped start-up businesses achieve first year profits of £513m and helped increase established businesses' profits by £210m and reduce their costs by £91m. (These findings relate to time and costs savings to business as a result of using the site, or increased profitability).

How successful have Joint Waste Authorities been at promoting waste reduction? How much funding is provided to Joint Waste Authorities and Regional Development Agencies for waste reduction and how is their work coordinated? (Q847)

JOINT WASTE AUTHORITIES

28. No statutory joint waste authorities yet exist under the Local Government and Public Involvement in Health Act 2007, although a number of joint waste disposal authorities already exist under earlier legislation. The new primary legislation only gained Royal Assent late last year and the necessary secondary legislation is currently being consulted on. It is therefore not possible at this time to assess their success in relation to waste reduction or to comment on current coordination arrangements.

29. Authorities wishing to become Joint Waste Authorities are encouraged to develop their own business case to assess the costs and benefits. In addition to this, in terms of funding, Defra has secured £500,000 to support interested local authorities in the development of proposals for joint waste authorities in 2008–09. It is hoped that further funding will be secured for 2009–10 and 2010–11. Details of how funding will be allocated are still being developed and details will be published in due course on the Defra website.

REGIONAL DEVELOPMENT AGENCIES (RDAs)

30. The Government has issued indicative allocations to the RDAs for the period 2008–11, to enable them to produce their Corporate Plans (see table below). These plans are agreed with BERR, and should flow from the overall tasking of RDAs provided by Government Departments. This tasking framework incorporates the Regional Economic Performance PSA (which includes measures for business resource efficiency) and two cross-cutting principles to be applied to all RDA activities, one of which is sustainable development. RDAs are not specifically tasked on waste reduction.

DETAIL

31. RDAs are sponsored by BERR. In 2008–09, they have been allocated an indicative budget of £2.2bn from six Government Departments: CLG, BERR, Defra, DIUS, DCMS and UKTI. This funding—the Single Programme (commonly known as the “single pot”)—gives RDAs the ability to address regional priorities, whilst at the same time contributing to the delivery of national policy.

32. The RDAs’ indicative budgets for 2008–09 to 2010–11 are set out below:

<i>RDA</i>	<i>2008–09 funding (£m)</i>	<i>2009–10 funding (£m)</i>	<i>2010–11 funding (£m)</i>
Advantage West Midlands	279	275	269
East of England Development Agency	132	130	127
East Midlands Development Agency	159	158	154
London Development Agency	390	385	376
North West Development Agency	391	386	377
One NorthEast	248	244	239
South East England Development Agency	160	158	154
South West of England Regional Development Agency	157	155	151
Yorkshire Forward	303	299	292
Total [Single Budget]	2,219	2,190	2,139

33. The RDAs’ Single Budget was reviewed in the Comprehensive Spending Review in 2007. As part of that Review, RDAs identified cash savings of £350 million, which will be funded from value for money savings.

34. The allocation of the Single Budget between the individual RDAs is determined in part by a formula, which was agreed at the start of Spending Review 2004 period between BERR and the RDAs and reflects the economic needs and opportunities in each region. The budget also takes into account the factors which influence demand in each Region for advice to business provided by Business Links.

35. In addition to their Single Budget, the RDAs have taken over the management of the European Regional Development Fund (ERDF) and the Rural Development Programme (RDPE), which together add substantially to the amounts that individual RDAs can direct towards their Regional Priorities.

What progress has been made towards implementing the Batteries Directive in the United Kingdom? What work is being carried out to determine the most cost effective way of collecting batteries to meet the Directive’s targets? (Q855)

36. BERR are currently consulting on the Internal Market Provisions of the Directive, covering battery composition and labelling of all new batteries placed on the market from September 2008, and are on track to transpose the accompanying regulations on time. The timetable for the Producer Responsibility provisions will be clarified in the Government Response to the public consultation that was held between 20 December 2007 and 13 March 2008.

37. The Department fully intends to meet the collection targets as set by the Batteries Directive regarding portable batteries. We collect just 3 per cent of these batteries at the moment so we have to get the new system right if we are to make up the numbers. This means we have to consult with those who will need to comply with the Directive. We have already started this work with the manufacturers and retailers of portable batteries.

38. Defra has asked WRAP (Waste & Resources Action Programme) to pilot battery collection schemes by working in partnership with a range of local authorities and not for profit organisations that already run recycling collection services. The following methods of collection have been trialled: kerbside, retailer take back, community drop off, postal returns and NHS and Fire Service.

39. The trials form part of a wider effort to develop cost-effective ways for the UK to meet the targets of the EU Batteries Directive. The results of the various trials will be used to help Government and stakeholders identify the best mechanisms and most efficient methods of collection that could be rolled out across the UK. We expect that a combination of collection methods will be needed to achieve the Directive targets in the UK.

What targets do Government departments have for the procurement of remanufactured products? (Q863)

40. There are no targets on the procurement of remanufactured goods.

Is there a need to redefine waste in its entirety, or just to redefine “end of waste”? (QQ 866–871). Does the Government support the introduction of a “by-product” definition into the Waste Framework Directive? Would new definitions of end of waste and by-products negate the need for quality protocols produced by the Environment Agency?

DEFINITION OF WASTE

41. In May 2003 the European Commission began a six-month EU-wide public consultation on the development of a thematic strategy on the sustainable use and management of resources—including waste—as required by the Sixth Community Environment Action Programme (Decision No 1600/2002/EC). The consultation document confirmed that:

“The Commission is ready to hold a debate on the definition of waste. This needs to take into account that amending the waste definition would have far reaching consequences and it is probable that any new definition would also contain a certain degree of uncertainty. Thus, discussion on the virtues and drawbacks of the current and alternative definitions should also cover possibilities to ease the application of the definition and reduce compliance costs”.

42. The outcome of that consultation was announced in December 2005 when the Commission published:

- (a) its “Thematic Strategy on the prevention and recycling of waste” (the Waste Thematic Strategy)); and
- (b) its proposal for a revision of the existing Waste Framework Directive (WFD). The Commission stated in its Waste Thematic Strategy:

Annex 1 : paragraph 1

“In the light of extensive stakeholder consultation the Commission has concluded that there is no need substantively to amend the definition of waste, but that it is necessary to clarify when a waste ceases to be a waste (and becomes a new or secondary raw material)”.

43. The Commission’s supporting document, “EU Waste Policy—The Story Behind The Strategy” explains that:

“6.6.2 The definition of waste

In the preliminary communication, the Commission noted that there had been criticism of the definition of waste, and invited stakeholders to make suggestions or to explain the concrete problems that the definition was causing them. The feedback from this consultation revealed that there is a significant consensus in favour of not radically changing the definition of waste. One reason was that there is no obvious better alternative; another that change would render uncertain the twenty years of case law from the European Court of Justice on the application of the definition that has helped to make the situation clearer”.

44. In October 2006 the Department published a 12-week UK-wide public consultation on the Commission’s proposal to revise the WFD. To assist stakeholders’ participation in the exercise, the consultation paper asked a series of questions. The consultation asked a question about the definitions which the Commission proposed to include in the revised WFD and then asked the following question:

- “(b) *Should any of the other definitions in the existing WFD be revised or new definitions introduced for other terms used in the revised WFD?*”

45. In July 2007 the Department published a summary report on the responses to the UK-wide consultation—which is available on the Department’s website at <http://www.defra.gov.uk/environment/waste/thematicstrat/wastedir-consult-responses.pdf>. The report records (paragraph 3.3) the following comments on the definition of waste:

- “Movable” should be inserted after “any”;
- It should contain a reference to the economic burden on the holder;
- Donations to charity shops should not form part of the definition;
- Animal by-products should not be classified as waste; and
- It should make clear that discarding doesn’t take place if there is defined planned use and intent to put it to that use.

46. In the Government's view, these points do not demonstrate clear-cut stakeholder support for a change in the definition of waste. As to the points themselves, (i) Recital (6) of the Common Position adopted by the Environment Council of Ministers on 20 December 2007 confirms that the revised WFD will apply only "to movable property"; (ii) it is not feasible to classify substances as waste or non-waste by reference to the economic burden on the holder; (iii) donations to charity shops of goods intended for re-use are not classified as waste and the Environment Agency does not control charity shops as waste management operations; (iv) animal by-products controlled under the EU Animal By-Products Regulation are subject to the exclusion provided in Article 2(2)(b) of the Common Position; and (v) Article 4 of the Common Position provides that substances falling within the terms of that provision are to be regarded as non-waste by-products.

47. Information about the negotiations on the revision of the WFD is available on the Department's website at: <http://www.defra.gov.uk/environment/waste/thematicstrat/index.htm> and confirms that:

"Defra held meetings with stakeholders on the Waste Thematic Strategy before the Environment Council met on 9 March 2006. Defra also held a series of stakeholder meetings, to inform the development of the UK's initial views on the revised WFD in March/April 2006 in London and, in association with the Devolved Administrations, in Edinburgh and Belfast. Regular meetings have subsequently been held in London to ensure that stakeholders continue to be informed of developments and engaged in the negotiation process".

48. The most recent of the Department's meetings with stakeholders were held on 28 January, 31 March and 20 May 2008. These meetings provide an opportunity, in addition to the public consultation referred to above, for stakeholders to raise any issues of concern to them relating to the WFD and the negotiations on its revision. In this forum, stakeholders have raised issues relating to the inclusion in the revised WFD of provisions on by-products as non-waste and waste ceasing to be waste. But it is not the case that stakeholders have made use of these meetings to advocate that the UK should be pushing for a revision of the definition of waste itself.

49. The Government addressed the definition of waste in the Waste Strategy for England 2007 (May 2007) and the relevant extract reads as follows:

"The European Commission's current proposal to revise the WFD will not change the definition of waste. The Commission consulted widely on this before presenting its proposals and concluded that 'The feedback from this consultation revealed that there is a significant consensus in favour of not radically amending the definition of waste'. The UK Government agrees with this assessment".

50. Setting aside the question of stakeholder support for a revision of the definition of waste, a relevant consideration is the fact that the revision of the WFD is subject to co-decision by the Council and the European Parliament. As indicated above, the European Commission did not include a new definition of waste in its proposal for a revised WFD. The European Parliament did not include a new definition of waste when it carried out its First Reading of the proposal on 13 February 2007; and none was proposed when the Parliament's Environment Committee met on 8 April 2008 to consider, in the context of the Parliament's Second Reading, amendments to the Council's Common Position.

51. Within the context of the Council, decisions relating to the revised WFD are subject to qualified majority agreement. In the absence of a particular provision's being contained in the Commission's original proposal, this means that any proposal brought forward by an individual Member State must receive sufficient support from other Member States to secure a qualified majority. In relation to the definition of waste, this means in practice (a) sufficient support for a proposal to revise the definition and (b) sufficient support for and agreement on a new definition. During the course of the negotiations on the revision of the WFD, no Member State has taken step (a) and submitted a proposal to revise the existing definition of waste. Aside from the question of support by other Member States, the UK has not taken step (a) because the Government agrees with the assessment made by the European Commission (see above).

52. However, the UK does support two provisions in the Common Position which will provide clarity on currently contentious issues relating to the definition of waste. These are (i) the provisions in Article 5 on end-of-waste and (ii) the provisions in Article 4 on by-products as non-waste.

"END OF WASTE" AND ENVIRONMENT AGENCY PROTOCOLS

53. The European Commission's proposal to revise the WFD contained a provision enabling the Commission to adopt environmental and quality criteria for specified waste streams and, where those criteria were met, the waste in question would be deemed to have ceased to be waste. Whilst the Commission's proposal was subject to revision by Member States, the basic principles of that proposal are retained in Article 5 (End-of-waste status) of the Common Position adopted by the Environment Council. The UK not only supports Article 5

of the Common Position but has also consistently supported the inclusion of an end-of-waste provision in the WFD throughout the negotiations on the Directive's revision.

54. The national end-of-waste protocols being developed by the Environment Agency have broadly the same objective as the end-of-waste criteria that would be adopted by the Commission under Article 5 of the Common Position text of the revised WFD—assuming the revised Directive is adopted in that form. However, there are two significant differences between the protocols and the revised WFD criteria:

- (a) the Environment Agency's end-of-waste protocols are national in scope and, whilst they reflect case law established by the European Court of Justice (ECJ) on the definition of waste, they are non-statutory; and
- (b) the end-of-waste criteria adopted by the Commission would apply throughout the EU and would be legally binding.

55. This means that if the Commission were to adopt binding EU-wide end-of-waste criteria for a waste stream for which the Environment Agency has produced a non-statutory national end-of-waste protocol (eg compost) then the former would supersede the latter. However, an advantage of the Environment Agency's producing national end-of-waste protocols for a range of waste streams is that the UK is well placed to make an effective contribution to the Commission's development of EU-wide end-of-waste criteria—and the UK is currently doing so in the context of the preparatory work being undertaken by the Commission's Joint Research Centre in Seville.

“BY-PRODUCTS” DEFINITION AND ENVIRONMENT AGENCY PROTOCOLS

56. The European Commission's proposal to revise the WFD did not contain any explicit provision on by-products. Instead, the Commission proposed the publication of non-binding guidance based on ECJ case law, on the distinction between production residues as waste and by-products as non-waste. The Commission published its guidance on 21 February 2007 and it is available at <http://ec.europa.eu/environment/waste/strategy.htm>

57. However, most Member States took the view that, if the existing definition of waste was to be re-enacted, then it was important that the revised WFD should address the issue of by-products as non-waste; and took steps to ensure the inclusion of such a provision in the revised WFD. The UK supports the inclusion in the revised WFD of the provision on by-products now contained in Article 4 of the Common Position. The effect of Article 4 of the Common Position is to provide that substances or objects resulting from a production process, the primary aim of which is not the production of that item, may be regarded as non-waste by-products if certain conditions are met.

58. The end-of-waste protocols produced by the Environment Agency will not be negated by the provision on by-products in Article 4 of the Common Position because there is no direct relationship between the two. The by-products provision addresses the issue of when a substance is discarded and becomes waste (and by-products are not to be regarded as waste) and the Agency's protocols address the issue of when waste has been fully recovered or recycled and ceases to be waste.

What is being done to ensure that Government departments can account for their waste and meet sustainable development targets? Which are the top three performing departments (QQ874–878)?

59. All central government departments are covered by the Sustainable Operations on the Government Estate (SOG E) Framework, which contains targets for departments to reduce their waste arisings by 5 per cent by 2010 against 2004–05 levels and to increase recycling rates to 40 per cent of waste arisings by 2010. The Sustainable Development Commission scrutinises government's performance against these targets each year in its Sustainable Development in Government (SDiG) report. In its most recent report (published in March 2008 and covering the year 2006–07) based on this analysis the top three departments in reducing their waste arisings are Department of Health, Her Majesty's Treasury and Department for Business, Enterprise and Regulatory Reform. The best performing departments against the recycling target are Department for Health, Department for International Development and Department for Environment, Food and Rural Affairs. A full copy of the report can be found at: <http://www.sd-commission.org.uk/publications.php?id=700>.

60. However, Government acknowledges that not all departments are making such strong progress, and that there is still more that can be done. In responding to this year's SDiG report, government announced the creation of a Centre of Expertise in Sustainable Procurement (CESP) to address the need for stronger integration between the government's action on procurement and the government estate and the drive to

achieve SOGE targets and Sustainable Procurement Action Plan (SPAP) commitments through stronger cross-Whitehall collaboration. The objectives of this new organisation will be to:

- work with departments to draw up a delivery plan with milestones and a trajectory for the delivery of the government's SOGE targets and SPAP commitment (including those on waste), to be published in Summer 2008;
- ensure delivery of the plan by providing stronger central coordination of performance management, and to provide guidance and support to help departments rapidly develop the capability and capacity to deliver our commitments;
- take account of all the recommendations of the SDC report and, in the delivery plan, lay out timescales for their delivery;
- set out the actions required to counter the barriers that stand in the way of further progress in government and to raise government's capability and leadership in sustainable procurement and operations.

What role does the Office of Government Commerce play with regard to sustainable construction and refurbishment on the Government estate?

61. Departmental Accounting Officers are ultimately responsible for procuring and delivering construction activity to meet departmental business objectives. They are also responsible for the actions of departmental procurement staff in meeting the policy standards and objectives that Government has collectively set itself. Moving forward, all Departmental Accounting Officers will have objectives relating to their departmental performance against the SOGE targets.

62. Central government departments are required to comply with OGC's mandated Common Minimum Standards (CMS) for the procurement of built environments. The CMS identify those policies/initiatives essential to whole-life value for money, while delivering safe, well designed, sustainable and well managed projects. OGC also provides and encourages the application of good practice sustainable construction guidance through its Achieving Excellence in Construction guidance suite, and in particular Guide No 11 on Sustainability.

63. The sustainable operation of the Government estate has been identified by the Cabinet Secretary as one of his four corporate priorities for the civil service for 2008–09. The new Director-General post in OGC of Chief Sustainability Officer (CSO) will strengthen leadership in Whitehall in this area while the CESP will provide the necessary support to help departments deliver their sustainable procurement objectives. Individual departments' performance will be scrutinised by the CSO, with challenge at the highest levels where necessary.

What work will the Centre of Expertise for Sustainable Procurement and the Office of Government Commerce undertake to ensure that the needs of small businesses are taken into account when developing procurement policies? (Q881-883)

64. The Centre of Expertise in Sustainable Procurement has been set up within OGC in order to benefit from close links to OGC's existing work on procurement policy, collaborative procurement and management of the government estate. CESP will work closely with the OGC teams leading on increasing opportunities for small businesses in order to ensure that the needs of SMEs are considered, where relevant, in all its work.

65. The Government wants to see SMEs compete more effectively for public sector contracts, since this is likely to provide greater choice and better value for money, as well as encouraging innovation and enterprise. The Government's policy is to encourage and support SMEs to compete for public sector contracts where this is consistent with the obligations on public procurers to seek value for money and to comply with EU Treaty principles and the EU procurement directives. OGC's newly launched Procurement Policy and Standards Framework (PPSF) provides further information (<http://www.ogc.gov.uk/>).

66. The Government is keen to open up opportunities for small businesses and the Budget 2008 outlined a number of measures to ensure better access to Government procurement for small firms. This included the announcement in "Enterprise: Unlocking the UK's talent" of a free trial for new registrants to the Supply2.gov web portal, which provides business with easy access to lower value contracts (typically below £100,000). The three-month free trial for new registrations runs between May and July 2008 (<http://www.supply2.gov.uk/>). In addition, the Budget 2008 stated that Government would set up an advisory committee, chaired by Anne

Glover (Chief Executive of Amadeus Capital Partners Limited). This will provide advice for the 2008 pre-budget report on necessary Government action to reduce the barriers to SMEs competing for public sector contracts, within the scope of EU law and the policy objective of value for money, and advise on the practicality of setting a goal for SMEs to win 30 per cent of all public sector business in the next five years.

RESPONSE TO ADDITIONAL, QUESTIONS AND INFORMATION REQUESTED:

On 27 November, Mr Neil Thornton, Director of Sustainable Consumption and Production and Waste, told us that Defra would be publishing work over the next few months on what motivates different types of consumers at different points in their lives and what their attitudes are to products and materials. Has this work been published yet and where can it be accessed?

67. Defra published its Framework for Pro-Environmental Behaviours on 14 January 2008. It is available on the Department's website, alongside links to the supporting evidence base: www.defra.gov.uk/evidence/social/behaviour/index.htm

68. The Framework has been developed in order to improve the support Defra and its delivery partners give to consumers. This new evidence base and social marketing framework for pro-environmental behaviours change includes a set of behaviour goals (agreed with stakeholders), new research on current and potential behaviour, an environmental segmentation model and an assessment of the implications for policy.

69. The aim has been to look at the range of pro-environmental behaviours in which Defra has an interest. The report covers environmental sectors such as energy, waste, water, air quality and biodiversity and the big consumption impacts from food and drink, personal travel, homes and household products, and travel tourism.

70. Further research currently being conducted on behalf of Defra includes:

- Public Understanding of links between Climate Change and Energy and Food consumption in the Home.
- Per Capita Carbon Footprints.
- Public Understanding of Sustainable Clothing.
- Household and Economy Wide Impacts of Changing Environmental Behaviours.
- Investigating Motivations—Focusing on Specific Segments and Behaviours.
- Investigating “mavens” with regard to environmental behaviours and the linkages between mavens, social norms, identity, and trust for mainstream consumers.

71. Defra is now applying the behaviours framework to its policy, communications and marketing activities, including the further development of Act on CO₂.

On 11 December, Professor Simon Pollard told us that the Higher Education Funding Council was working to place designers alongside engineers and materials scientists as part of their education. What do these placements involve and what initiatives does the Council have in place to ensure that designers are trained about the industrial applications of their work?

72. HEFCE has worked with the Design Council to raise awareness in HE institutions about the Cox recommendations. As part of this, Design Council and HEFCE facilitated a visit to the US in autumn 2006 to look at the models that had informed the Cox Review recommendations on centres of excellence. This included visiting the Stamford University D-School and MIT Media Lab. The visit helped UK HEIs understand in greater depth overseas models and helped them explore critical dimensions to devising and implementing Cox proposals, particularly the challenges of getting demand from businesses and link to innovative “places” (eg influence of Silicon Valley on D-School). Design Council and HEFCE arranged a similar visit to N Europe in 2007, which was particularly helpful in raising HEI awareness of new curriculum developments and approaches to development of the learning experience. As part of this, HEFCE discussed the formation of the Helsinki “Innovation University” being created through amalgamation of specialist institutions for business, technology and art and design.

73. Recognising that demand (from businesses, students) is a key issue, Design Council has also arranged a number of visits for HEIs to businesses (such as Nissan) to understand business demands for designers, innovators etc, as well as the use made in business of multi-disciplinary teams.

RESPONDING TO INNOVATIVE PROPOSALS:

74. HEFCE has used its Strategic Development Fund where HEIs have come forward with sustainable proposals which address the Cox recommendations. HEFCE regional teams have worked with HEIs to develop these proposals iteratively toward a fundable proposition. As part of this, HEFCE has sought advice from Design Council, and has also worked with NESTA, which has invested in some elements of some new proposals.

75. Major investments related to the centres of excellence recommendation have been:

- £3.8M (of £5.8M project) to Royal College of Art and Imperial Colleges/Tanaka Business School for a new development “Design-London”; and
- £3.4M (of £5.4M project) for Cranfield University working with University of the Arts London for a “Centre for Competitive Creative Design (C4D)”.

76. HEFCE have also funded a small phase one proposal at Northumbria University (£250K) and a Cox-related multi-disciplinary centre at Southampton University (£1.2M) (the latter as part of a larger Employer Engagement project); and a small project at Kingston/St Georges—called the “Innoversity”. This is a pilot for developing inter-disciplinary programmes for designers, engineers etc (total project value £389K; of which HEFCE SDF is £264K).

77. HEFCE have funded a number of proposals related to the other Cox recommendations on SMEs and preparation of students, as part of its Employer Engagement programme.

78. HEFCE are continuing to discuss Cox-related proposals with a number of interested HEIs. A primary issue in developing proposals is sustainability—that is ensuring there is good likelihood of demand from students, employers etc and hence value for money from their initial investment.

In the Waste Strategy for England 2007, the Government said that it would shortly be setting “a new national target for the reduction of commercial and industrial waste going to landfill”. Has this target been set yet and what progress has been made towards meeting it?

79. The Government has not yet set a new national target for the reduction of commercial and industrial waste going to landfill but we are actively engaging with stakeholders on this issue. On 22 May the Waste Stakeholders Group established under the England Waste Strategy discussed what the future policy objectives for commercial and industrial waste should be, and how they might be achieved. One of the key messages from that discussion was that since C&I waste is very varied, it would make more sense to look at action sector by sector, as well as using cross-sectoral approaches like the Landfill Tax. The need for better data on C&I waste was also recognised. Defra is reflecting on the outcome of the meeting and this will inform future proposals by Government for action on C&I waste.

80. The Government’s Sustainable Construction Strategy, scheduled for publication on 11 June (see question 3), will include a separate target of reducing by half construction, demolition and excavation waste sent to landfill by 2012, compared to a 2008 baseline.

In a written answer to the House of Commons on 10 March, an estimate was given of the amount of waste diverted from landfill as a result of BREW-funded work, but it was acknowledged that the results should be viewed with caution because “delivery bodies report according to a range of methodologies”. What work is being undertaken to improve consistency of reporting systems between environmental bodies?

81. The system of metrics used to report BREW results was developed for Defra by consultants Oakdene Hollins, who worked in partnership with delivery bodies in the first year of the BREW Programme (2005–06). This work provided initial guidance to help ensure a degree of consistency in delivery bodies’ initial reporting.

82. In consultation with delivery bodies, Defra developed guidance to encourage greater consistency in delivery body reporting in the second year of the programme (2006–07).

83. In the third year of the programme (2007–08), Defra held two meetings with delivery bodies to explore in more detail the differences between delivery bodies’ reporting methodologies, and seek ways of improving the consistency of reporting.

84. Defra is using the information gained from these meetings to help inform delivery body guidance for reporting from the third year of the programme, which will be issued shortly.

85. Although the BREW Programme has ceased, valuable experience has been gained of monitoring and evaluation techniques. Defra is considering whether this experience can be applied more widely across its delivery bodies, and whether further improvements can be made to performance monitoring systems. This work is being taken forward as part of Defra's review of its resource efficiency and carbon reduction delivery bodies, which is expected to report by the end of 2008.

What progress has the new products and materials unit made to date? Is it using the same roadmap approach as the Market Transformation Programme?

86. The products and materials unit has brought together work in Defra on product life cycle analysis, product information and evidence on sustainable consumption and production and waste, in order to influence and support action on products within Government and elsewhere. The unit has specific responsibilities for work on energy-using products, including Defra's Market Transformation Programme.

87. The unit has made good progress so far in developing approaches to tackle the environmental impacts of products, in catalysing action by others, and in taking forward commitments relating to products and materials in the Waste Strategy for England and the Energy White Paper.

88. Developing a product roadmap approach (building on the experience of the Market Transformation Programme) is a key part of the unit's role. The unit has been working on how the approach can be applied to 10 key product areas (milk, fish & shellfish, televisions, domestic lighting, commercial electric motors, window systems, plasterboard, WCs, clothing, and passenger cars).

89. Examples of other work being done by the unit includes:

- Together with the Carbon Trust, sponsoring BSI to develop a publicly available specification for the measurement of the greenhouse gas emissions "embodied" in products. This will provide an agreed method that can be applied across a wide range of goods and services to enable companies to measure and reduce their impacts;
- Developing evidence and working with business on future standards for energy-using and other products. This includes developing standards for use in public procurement; and
- Influencing the growing international and EU agenda for addressing the impacts of products.

90. A full report on the progress of our products and materials work is due to be published in July.

June 2008

Supplementary memorandum by the Department for Environment, Food and Rural Affairs (Defra)

The Committee has requested clarification on the funding totals for the last three years and for 2008–09 for the Market Transformation Programme, the Waste and Resources Action Programme, the National Industrial Symbiosis Programme, and Envirowise.

THE TOTALS FOR CENTRAL GOVERNMENT FUNDING FOR THE FOUR PROGRAMMES ARE AS FOLLOWS:

	<i>2005–06</i>	<i>2006–07</i>	<i>2007–08</i>	<i>2008–09</i>
Market Transformation Programme	Total—£4.27m	Total—£4.68m	Total—£4.8m	Total—£2.75m
	Comprising:	Comprising:	Comprising:	
	BREW Programme —2.7m	BREW Programme —3.17m	BREW Programme —3.895m	
	Other Defra programmes —1.57m	Other Defra programmes —1.51m	Other Defra programmes —0.905m	
National Industrial Symbiosis Programme	Total—£2.675m	Total—£5.7m	Total—£8.25m	Total—£5.025m
	(all BREW Programme)	(all BREW Programme)	(all BREW Programme)	
Envirowise	Total—£15.542m	Total—£20.002m	Total—£22.19m	Total—£9.390m
	Comprising:	Comprising:	(all BREW Programme)	
	BREW Programme —12m	BREW Programme —17m		

	2005–06	2006–07	2007–08	2008–09
	Other Defra programmes —2.292m	Other Defra programmes —2.292m		
	DTI—1.25m	DTI—0.710m		
Waste and Resources Action Programme	Total—£68.147m	Total—£57.888m	Total—£59.012m	Total—£43.223m
	Comprising: BREW Programme —2.701m	Comprising: BREW Programme —5.736m	Comprising: BREW Programme —12.174m	Comprising: Core Defra funding —39.973m
	Aggregates Levy Sustainability Fund —5.620m	Aggregates Levy Sustainability Fund —2.607m	Aggregates Levy Sustainability Fund —2.7m	Aggregates Levy Sustainability Fund —3.25m
	Other Defra Programmes —59.826m	Other Defra Programmes —49.545m	Other Defra programmes —44.1383m	

Note: Figures given for England only. Envirowise, WRAP and NISP also receive funding from the Devolved Administrations. From 2008-09 there is no separately-identified Business Resource Efficiency and Waste (BREW) programme; a number of BREW-type activities remain funded as part of “core Defra” programmes.

June 2008

Supplementary memorandum by the Department for Innovation, Universities and Skills, with input from the Technology Strategy Board and the Research Councils

RESPONSES TO QUESTIONS RAISED BY THE INQUIRY

Technology Strategy Board told us that over the last four years around £35 million worth of collaborative research and development had been funded through the BREW programme, but that it would not be re-funded in the future. Is this the case?

The Technology Strategy Board will no longer be in receipt of ring-fenced funding from the Defra BREW programme.

Will this type of research be funded through some other source?

Over the next three years the Technology Strategy Board has a budget of £711m with which it will support activities across the whole economy. A further £180 million will be earmarked by the RDAs and £120 million by the Research Councils to spend jointly on activities with the Technology Strategy Board.

Within its overall budget envelope, it is for the Technology Strategy Board to determine priorities and therefore where the funding is invested.

In the specific area of Waste Reduction, the Technology Strategy Board will work closely with Defra to explore opportunities to establish an Innovation Platform. It will also continue to fund business led research projects addressing key application areas such as waste management and resource efficiency alongside research into key technology areas such as “High Value Manufacturing”, “Advanced Materials” and “Information and Communication Technologies”, which can have a direct impact on the aforementioned application areas.

Furthermore, in taking forward and delivering its strategy, it will seek to link its work on technology roadmaps with Defra’s product roadmaps for the high environmental impact areas such as transport, home and food.

Details of how much funding is provided to the Research Councils for waste-related research.

The Research Councils do not receive a specific allocation for waste related research. The Research Councils are responsible for determining the detailed allocations of funding to specific programmes, projects and activities. Such research would be funded through, for example, the EPSRC programmes covering “Process, Environment and Sustainability”, “Materials, Mechanical and Medical Engineering” and the “Sustainable Urban Environment”; and the ESRC’s “Sustainable Technologies” Programme or “Centre for Business Relationships, Accountability, Sustainability and Society” (BRASS).

July 2008

Supplementary Memorandum by the Department for Environment, Food and Rural Affairs (Defra)

The Committee asked to know more about the allocation of landfill tax monies and requested an additional memorandum explaining what ring-fencing arrangements had originally been agreed when the landfill tax was first introduced, and in subsequent years. The Committee also requested to know what ring-fencing was agreed for both waste management and waste reduction initiatives, and what the rest of the landfill tax money had been allocated for.

BUSINESS WASTE

1. Budget 2003 announced that the standard rate of landfill tax, which applies to active wastes, would increase by £3 per tonne in 2005–06 and by at least £3 per tonne in subsequent years on the way to a medium to long-term rate of £35 per tonne. The Government committed to introduce the increases in a way that was revenue-neutral to business as a whole.
2. In line with this commitment, the Spending Review 2004 announced that the additional revenues would be ringfenced and spent on programmes to improve businesses' resource efficiency. In England, the Business Resource Efficiency and Waste (BREW) Programme established a package of resource efficiency initiatives to assist business. The programme distributed £284 million of landfill tax receipts over three years between April 2005 and March 2008. £50 million of landfill tax escalator receipts were returned to the Devolved Administrations for similar programmes to BREW. Finally, approximately £50 million of landfill tax escalator receipts were retained for Enhanced Capital Allowances for advanced waste disposal technology.
3. Approximately two-thirds of the total funding allocated to the BREW Programme provided for waste management and waste reduction initiatives, and the remainder funded projects involving water and energy reduction.

MUNICIPAL WASTE

4. There have not been any ringfencing arrangements in relation to landfill tax revenues from local authorities. The Spending Review 2004 announcement included the return of revenues from the Landfill Tax Escalator to local authorities, via Formula Grant, fulfilling the Chancellor's commitment to keep landfill tax increases resulting from the Escalator revenue-neutral to local authorities overall.
5. As part of Comprehensive Spending Review 2007, the Government looked at the overall pressure on waste management services, including increases in landfill tax, along with the extent to which those pressures could be mitigated. The Government provided local authorities with an overall annual average increase in Government grant over the CSR07 period of 1.5 per cent above inflation. This takes into account local government's landfill tax liability, including the increased costs resulting from the rise in the standard rate escalator from 2008–09, and allows local authorities to deliver effective services including in the area of waste management.

July 2008

Written Evidence

Memorandum by BAN Waste

We consider that there are a number of overarching principles upon which the Government should be basing its waste minimisation policy:

- The prevention of hazardous chemicals from entering the material supply chain.
- Waste reduction measures including producer responsibility measures and eco-design.
- The development of infrastructure and markets for services and products which promote waste minimisation.
- The promotion of waste reduction, product repair, reuse, recycling and composting services.

We are concerned that prevention of hazardous chemicals from being produced does not appear to be a high priority for the Government as this would seem to us to be a fundamental element of a resource based waste management policy.

WS2007 makes considerable reference to waste prevention however we are concerned that current Government proposals may simply result in a switch from landfill to energy recovery at the expense of higher options. This would make a move to the next step up much harder. If waste minimisation is to be achieved and landfill and incineration prevented, then a great deal of new policy, legislation and incentives now need to be introduced.

In our view, the Government needs to harness a range of policies in order to create the circumstances for a resource management and sustainable consumption strategy to flourish. There are a number of approaches which we believe could be considered by the Government to strengthen uptake of waste prevention and minimisation measures. In particular we would highlight the role played by:

- Regulation.
- Fiscal incentives, disincentives and support.
- Behaviour change systems (eg incentive schemes).
- Sustainable procurement policies.
- Statutory waste minimisation targets, reuse/repair/return targets and source separation targets for local authorities, commercial and industrial organisations.
- Infrastructure and market development.
- General public information and awareness raising campaigns (targeting both children and adults).
- The development of information, education, training and advice services to support commercial and industrial sectors, local authorities, government and enforcement agencies.
- Assessment, inspection and enforcement practices.

Policies to reduce and prevent waste need to be strengthened and targeted at:

- householders and school children;
- the extraction, commercial, manufacturing, industrial and trading sectors;
- government bodies and local authorities; and
- enforcement agencies (Health and Safety, Environment Agency, Customs and Excise and Trading Standards).

The chosen mix of regulatory budgetary, fiscal instruments, procurement and enforcement measures will need to trigger change without threats of short term inflationary shocks (as prices are raised to offset environmental costs and taxes) or unemployment (as UK businesses move overseas or cease production rather than compliance with tougher environmental standards).

We urge the Government to seriously explore the important role to be played by regulatory and fiscal measures.

The Government does appear to recognise the importance of education and training and we welcome the wide range of initiatives that the Government has introduced over the last five years.

We are concerned about the bias of funding support in favour of large, capital-intensive waste, reuse and recycling initiatives. This could well be at the expense of the most innovative and important waste minimisation sector in terms of the waste hierarchy—SMEs and the voluntary and community sector.

Infrastructure desperately needs to be improved and local networks of small enterprises set up to support a locally based sustainable consumption and resource-managed economy.

PRODUCER RESPONSIBILITY REGULATION

We support the Government policy aim of the use of the producer responsibility approach to ensure that businesses take responsibility for the environmental impact of products that they place on the market, and particularly once they become waste. However we believe that producer responsibility measures should be mandatory rather than voluntary.

We welcome the recent introduction of legislation which incorporates some elements of producer responsibility requirements, eg Packaging Directive and the WEEE and ELV Directives but we believe that producer responsibility needs to be greatly extended into new fields to capture other products and sectors. Producer responsibility, for instance, should be extended to primary industries, such as the agriculture, quarrying, mining, water and energy producers since they produce amongst the greatest amounts of waste. Mining, construction, agricultural and sewage industries cause the majority of waste from raw resource usage and the majority of waste is generated from manufacturing, construction and demolition and mining activities.¹

Manufacturing, transport infrastructure and building industries should also be targeted since it is at the point of design that there is the greatest capacity to develop product and process alternatives. With reference to the construction and transport infrastructure industry, we welcome the development of Site Waste Management Plans and the Code for Sustainable Homes but consider that there is a need to introduce regulatory environmental management measures. This would help improve sustainability performance, including waste minimisation and hazard reduction during the construction stage, period of usage and demolition.

Producer distributors, retailers, vending operators, fast food outlets and event organisers could also play a role in producer responsibility through stewardship agreements.

We welcome the Government's aim of reducing the overall cost of waste management by establishing incentives for producers to consider the end of life waste management costs however we feel that the focus should be on the prevention of waste, and particularly hazardous waste. It is our view that the Government's view of producer responsibility should be widened to include a requirement on businesses to address and urgently phase out the use of hazardous materials or processes. The aim would be to prevent pollution and achieve zero discharge of persistent or bio-accumulative substances.

We support the methods proposed by the Government of identifying products and materials which have particularly negative waste growth and environmental impacts being developed for Sustainable Consumption and Production (SCP).² We would suggest that this method could be used to identify products and sectors requiring stronger producer responsibility guidance, support or measures.

We believe that there is a need for better integration of different policies affecting waste policy and key to this is the development of linkages between waste and other government policies. We therefore support the development of a Sustainable Development Strategy. It is our view that producer responsibility should require strategic partnerships to be developed with re-processors and links developed to agriculture, water and energy. The producer responsibility approach could create and optimise the development of a more integrated recycling and recovery infrastructure and could level the playing field amongst manufacturers and primary industry operators who are adopting more sustainable and responsible but, possibly, more costly practices eg eco-design or organic farming.

In our view, there are a number of producer responsibility approaches which could be explored:

1. The producer deals with the liability costs of the environmental damage caused by their product.

With this aim in mind, all new materials could be required to undergo mandatory toxicity tests. Manufacturers of materials could be required to take out insurance against any environmental or health problems arising from new products over a 50 year period.

¹ p34, Biffa, Future Perfect 2003.

² *Securing the Future, UK Gov Sustainable Development Strategy*, March 2005.

2. The producer pays for the economic costs of setting up the infrastructure needed to provide reuse, repair, return, recycling or composting facilities to extend the “life” of their products and packaging. The facilities could be on the premises of distributors or traders.

The payment methods could be structured in such a way as to reduce costs for companies which produce durable, repairable, easily recyclable or compostable products with minimal packaging and to deter companies which do not adopt environmentally responsible policies. Stewardship agreements could easily be linked to producer responsibility measures.

3. The producer manages the physical products and their packaging or the effects of the products and their packaging.
4. The producer adopts a take back ownership system.
This approach would combine physical management and economic payment for the product and its waste management.
5. The producer takes responsibility for the product information.

Standardised systems would aid reliable information feedback to customers and stakeholders.

LIFE CYCLE ANALYSIS

We support the European Thematic Strategy recommendation of a whole life-cycle approach to products, services and materials to identify key environmental impacts from waste and resource use.

In our view, the definition of “life-cycle” impacts needs to be comprehensive. We consider that the life-cycle approach should not simply be restricted to the production and consumption phases of products and materials. One option might be to adopt an entire life-cycle approach to producer responsibility incorporating responsibility for waste generated from the extraction of raw materials for the product to post consumption waste. The Ecological Paradigm is an approach which examines the full impact of any chemical product ie its feedstocks, by-products, wastes, compound transformations as it breaks down throughout the life cycle from extraction, synthesis, processing use and disposal until all associated products and wastes are converted to chloride ions.³ Life cycle analysis, when used for long-term decision making, must reflect how each stage of a life cycle is likely to change over time due, for example, to waste composition changes etc.

We support the Government’s proposals to focus on developing data on the environmental impacts, including waste-related impacts, of products across their life-cycle. We welcome proposals for a review of Sustainable Consumption and Production evidence, to identify gaps and priorities and new research requirements.

We agree with the methods outlined in the recent England Waste Review 2007 report of identifying products and materials which have particularly negative waste growth and environmental impacts. We would add “durability of the product” to the list of: “amounts of waste generated and amounts of hazardous waste generated, projected growth rate of product sales and/or product waste; weight and volume; hazardous waste content; use of recyclates and used components; and ease of reuse and recycling”.

HAZARDOUS MATERIALS AND WASTE

We welcome the introduction of a Hazardous Waste Forum and support the Government’s aim to introduce a form of producer responsibility to industrial sectors producing products containing hazardous waste streams such as solvents used for industrial cleaning or lubricating oils, garden pesticides and decorative paints. However, we believe that the Government should also target pharmaceuticals products, cleaning agents, DIY chemicals, general building products (eg insulation), car maintenance chemicals, hygiene and beauty products, agricultural pesticides, growth hormones, weed-killers, slurry, mining and quarrying wastes, ship-building wastes, nuclear waste as well as ammunitions chemical and biological weaponry.

We also welcome the introduction of the REACH regulations.

We support the key challenges set out by the Government for hazardous waste management over the next five years:

- continue the trend for reductions in arisings;
- provide treatment capacity for waste diverted from landfill;
- meet the landfill waste acceptance criteria; and
- tackle mis-management of hazardous waste.

³ Thornton, *Pandora’s Poisons*, 2000.

We would add a new target:

- To prevent or reduce the harmfulness of materials, products or processes.

This target would support the European Framework Directive on Waste which requires member states to encourage “the prevention or reduction of waste production and its harmfulness”. It would also comply with the European Commission’s thematic strategy on the sustainable use and management of resources which will include proposals to reach the Sixth Environmental Action Programme’s aim whereby: “the wastes are non-hazardous or at least present only very low risks to the environment and human health”.

The statistics on chemicals testing are shocking. There are over 11,000 organo-chlorines produced commercially and thousands produced accidentally as by-products. In 1984 there were over 48,000 registered industrial chemicals, 3,300 pesticides, 8,600 food additives and 3,400 cosmetic ingredients in the US alone. For industrial chemicals there have been no complete health checks carried out and no data is available on 78 per cent of the chemicals. Information on accidental by products formed by the chlorine industry is even less.⁴ Even 100 per cent post-consumer recycling will manage only 2 per cent of the total waste stream, without addressing toxicity issues. In our view, all new chemicals should automatically undergo toxicity testing.

In our view a stronger approach is required where toxics have been identified to support the replacement and phase out of those substances. Tighter regulation would help the environment, encourage innovation and stimulate investment in cleaner technologies as was found when CFC’s were treated this way under the Montreal Protocol.

In order to ensure that UK businesses are not commercially disadvantaged by tighter regulation, we urge the Government to consider legally binding international agreements to restrict and phase out and eventually ban the manufacture, generation, use, storage, discharge and disposal of persistent, toxic bio-accumulative substances (similar to international agreements on global warming and ozone depletion). Priority could be set according to the largest scale, most toxic chemicals and processes based on current understanding of hazard posed. The introduction of a rapid phase out process could then be introduced to encourage the development of cleaner substitutes. This could then be followed by a gradual phase out of other synthetics.

In the meantime, in order to encourage greater producer responsibility, chemical companies should be forced to face up to the risks associated with the release of these unknown chemicals on to the environment without toxicity tests. Chemical companies should be required to automatically undertake toxicity tests on all new and hitherto un-tested chemicals before being allowed to sell them on. They should be mandated to obtain insurance for any chemicals they produce and they should not be allowed to release the products to the public without insurance cover for their potential health and environmental impacts.

With reference to household hazardous waste, we welcome the introduction of guidance on good practice by the National Household Hazardous Waste Forum and the Chartered Institute of Waste Managers and are pleased that the Government recognises the need for separate collections of household waste. Household hazardous items requiring immediate attention might include: batteries, oils, pharmaceuticals, paints, pesticides, cleaning fluids etc.

There is also an urgent need to develop hazardous household waste plants for dealing with:

- Fridges and WEEE.
- Cars.
- Fluorescent lamps.
- Batteries.

The banning of materials from landfill is another approach which the Government should consider for deterring the use of hazardous materials in products and for promoting recycling and composting. However, materials bans from landfill must not be undertaken without simultaneous measures to deter incineration and maximise recycling of plastics, paper, cardboard, bio-degradable material etc. We recognise that the banning of specific substances from landfill will reduce the use of landfill. Landfill product and substance bans have, for example, been successfully used in Nova Scotia, Canada, to reduce landfill. In Nova Scotia the following materials have been banned from being landfilled: biological waste which has not been treated and neutralised, beverage containers, corrugated cardboard, newsprint, lead-acid batteries, spent industrial lubricants, used oil, paint, ethylene glycol (car anti-freeze), some plastics, steel/tin containers, glass food containers, compostable organic material from industrial, commercial, institutional and residential sources. Nevertheless, it is our view that landfill material bans should be accompanied by similar restrictions on incineration. The Government’s proposal to ban “all combustible waste” is a key example of an integrated approach to landfill bans. Many combustibles, obviously, have high calorific value and would be extremely useful to the

⁴ Thornton, *Pandora’s Poisons*, 2000.

incineration industry but could equally be a valuable resource to reprocessors or composting companies. Without an integrated policy approach, the banning of all combustible waste from landfills could simply be used as a regulatory carrot to promote incineration at the expense of recycling and composting.

INFORMATION GAPS

The Government's acknowledgement that it does not consider that there is sufficient information and evidence on which to base a single prevention target for all waste or for single major categories of waste points to the need for work to be undertaken to address the issue. Research could be undertaken to:

- Analyse who produces waste, where, what the composition of waste is, why they produce it, whether they recycle, compost or dispose of it and how their behaviour and the waste composition might change under different circumstances.
- Identify resource exchange schemes, recycling collection services, reprocessing, waste minimisation services and products and suppliers.

A detailed analysis of waste content, waste flows and current infrastructure is essential if the Government and Regional Development Agencies are to: identify the likely future composition of waste; scope the number of processing facilities required and identify the infrastructure strengths and weaknesses in each region. It will also help them to review the likely future infrastructure, costs, regulatory options, charges and taxes and fiscal remedies, procurement policies, contracts and funding requirements.

The New Technologies Fund has provided excellent opportunities for research into capital based back-end technology approaches to waste management however much more support needs to be provided to establish the best approaches to front end elements of the waste strategy:

- waste minimisation (reuse and repair schemes, producer responsibility measures);
- educational issues;
- network support;
- market development;
- price intervention measures; and
- support for the community sector.

REGULATION

A firmer approach is required to promote waste minimisation, recycling and composting. Where this has been used (LATS/landfill tax/PRN's/incineration directive) this is when real changes occur. A phased introduction of voluntary to mandatory would allow for the considerations of business to be taken into account.

The recent report by the Sustainable Consumption Round Table (May 2006) "I will if you will" claims that people want to adopt greener habits, but many believe individual action is futile. The Government cannot therefore wait for businesses and consumers to take voluntary measures to adopt green practices and lifestyles. According to the Round Table report action stimulated by regulation can be effective and go down well with the public. People are generally quite happy with measures that bring positive environmental results, even at some cost to themselves, so long as those measures are applied fairly. This means that government must take a lead in mandating and implementing regulatory, fiscal and best practice initiatives.

We would urge the Government to introduce mandatory "stewardship" requirements on producers and retailers, traders and event organisers.

We believe that there is a need to design products which generate less waste in use, result in less process and end-of-life waste and do not use any potentially hazardous materials in their manufacture. However, we do recognise the need in exceptional circumstances a restricted amount of pharmaceuticals to use hazardous components.

We welcome the Government's assurance that it is committed to promote eco-design as a mainstream element of good design practice by bringing together expertise through a new Sustainable Design Forum and the international Sustainable Products Task Force, with support from the Market Transformation Programme, Envirowise's Designtrack scheme and WRAP's Innovation Fund.

We support the development of policies designed to bring forward products, streams and services which are less harmful to the environment through the work of the Market Transformation Programme and the Environment Agency. We support the promotion of less harmful products, systems and services although we would prefer the use of enforcement practices rather than the introduction of voluntary measures. It is

therefore our view that the “consensus” approach should be replaced with a mandatory requirement to reduce waste and achieve more efficient resource use at the product design phase.

We welcome the Eco-design for Energy-saving Products Framework Directive.

We also welcome the two new policy instruments (Site Waste Management Plans and the Code for Sustainable Homes) to promote the adoption of more responsible environmental management systems in the construction sector.

However, more producer responsibility measures need to be introduced which result in a sustainable process whereby any product, service or process leaves no unusable waste; uses sustainable energy and replenishes the resource base in a closed loop economy. This means designing out pollution and waste at the start of the process through Clean Product Design and Clean Production, and sensitive material selection. If there is a problem at the end of the useful life of a product, process or service, then the point at which the “problem” was introduced must be re-designed so that the problem is no longer within the process. Successful waste and pollution management can only be achieved if the entire chain is considered.

There are a number of regulatory approaches which could be used to promote producer responsibility practices:

- On-site recycling and composting facilities requirements for large businesses.
- Packaging take-back, re-fill or ease of recyclability or compostability requirements (especially for transport packaging companies eg pallets, cardboard; secondary packaging and primary packaging eg cans, jam jars etc).
- Minimum recycled or recovered material content standards (especially in non-food packaging).
- Minimum energy, water and materials-efficiency standards.
- Ease of dismantling requirements (for reuse, repair, replacement or upgrading of parts).
- Disposal bans and restrictions.
- Materials bans and restrictions.
- Product bans and restrictions.
- Trade protection measures.
- Toxicity testing of new or untested chemicals requirements.
- Mandatory insurance cover for companies which make chemicals to cover the costs of any potential health and environmental impacts.
- Separate kerbside collection service for hazardous household waste.
- Separate kerbside collection service for kitchen and garden waste.
- Minimum seven materials kerbside recycling collection service.

FISCAL ISSUES

Current production and waste management practices are unsustainable. Therefore, we believe that the Government should not be relying solely or too heavily on market forces and pricing structures to develop sustainable industrial, business and householder practices. Given that non-renewable resources will eventually have to be phased out, the Government should be planning how to implement that process in the least damaging manner.

We consider that more direct government intervention in pricing policies can help to achieve environmental goals by ensuring that prices reflect environmental impacts and discourage behaviour that damages the environment. We therefore welcome:

- ending co-disposal of hazardous and non hazardous wastes in landfill;
- landfill tax;
- aggregates levy;
- local household incentive pilot schemes;
- Landfill Allowance Trading Scheme (LATS); and
- Tradable Packaging Waste Recovery Notes (PRNs).

We support the use of economic instruments to encourage behaviour change by manufacturers, traders, local authorities and consumers but this needs to be combined with other regulatory, educational, research and best practice policies.

A number of EU instruments are currently being prepared which may impact on business behaviour and that these may create price drivers to stimulate industry higher up the waste hierarchy. Those EU instruments relate to:

- Producer Responsibility.
- Traded Pollution Permits.
- Energy Taxation or offsets.

We welcome the broad aim of those proposals.

However, we do not believe that the tax and economic instruments currently in use and proposed are sufficient to stimulate moves towards industries higher up the waste hierarchy. It is our view that the economic playing field must be rebalanced and the hierarchy of profitability must match the environmental hierarchy.

In our view, Government intervention could further stimulate the following scenarios:

- The cost of waste disposal increasing (due to inflation, fiscal and regulatory disincentives towards landfill and incineration).
- The development and implementation of best practice techniques of collection and sorting (due to the introduction of waste minimisation and source separation targets and the development of new “Green Academies” and other educational initiatives).
- Source separated kerbside collection costs decreasing. As these schemes become more efficient, costs will reduce, markets will pick up, prices will rise and more people will be enthused to take part in recycling. Investment in the necessary infrastructure will be essential to develop local industries.
- The long-term costs of raw materials rising particularly those subject to environmental constraints.
- The use of hazardous materials decreasing and the increasing use of eco-design and producer responsibility measures (due to fiscal and regulatory policies).
- The cost of reprocessed materials reducing (due to increased materials supply and more supplier outlets).
- Innovative, industrial techniques replacing artisan methods of disassembly and reprocessing with the result of reduced costs (due to the increasing use of producer responsibility measures).
- The development of a waste minimisation, recycling and composting infrastructure that is locally based and dominated by SM enterprises and voluntary and community organisations. The SMEs and VCOs operating repair and reuse services could be based in busy, convenient locations such as supermarkets thereby encouraging customer behaviour change.

This could be promoted by the introduction of a number of fiscal measures—environmental taxes, tax breaks and exemptions, subsidy reform, grants and local tax rebates. The aim would be to change price signals in the market place in favour of more environmentally friendly products.

Economic instruments which could be considered include:

- Virgin materials taxes.
- Removing subsidies for virgin materials.
- Abstraction taxes.
- A requirement on all primary industries, manufacturers and retailers to contribute to the cost of recycling as well as disposal.
- Removal of tax advantages for industrial processes that give rise to environmental degradation.
- Polluter taxes (eg energy, pollution, emissions and/or discharges taxes) on all companies which produce the most toxic classes of chemical eg chlorine and organo-chlorines, SO_x, NO_x, CO₂.
- Cutting the subsidies presently given to incineration. The application of the Climate Change Levy, for instance, to mixed waste energy from waste schemes would enable practices higher up the waste hierarchy to compete on a more level playing field.
- Tax rebates or subsidies to manufacturers for eco-design/producer responsibility schemes.
- Producer responsibility trading systems linked to the National Industrial Symbiosis Programme on-line database for tracking hazardous waste, composting, reused and recycled materials. The database could be greatly expanded and processes introduced to link the system to producer responsibility trading schemes.
- Grants for: business collaboration, networking and academia work to support producer responsibility processes.

- Grants for reuse, remanufacture facilities (like the BREW fund).
- Disposable product taxes (for low durability or short life products such as disposable nappies, tampons, plastic bags). This would help more accurately reflect the cost of disposal. Repair and reconditioning services are often perceived as being expensive or inconvenient. Some products are increasingly cheaper to dispose of than repair (eg watches and shoes). Taxes on low durability, short life products could be used to set up the infrastructure needed to support businesses that repair and recondition products and improve customer access to those services.
- Resource toxicity taxes eg on companies that use toxic materials in products (eg heavy metals) where safer, more sustainable materials are available.
- Repair, reuse or environmental performance improvement allowances. Tradable allowance options of this kind could be introduced to help the market deliver environmental outcomes more efficiently.
- A sustainability levy applied to all goods and services.
- Introducing a price guarantee scheme for recycled materials to fund the build-up costs of seven stream recycling (including food waste and hazardous waste).
- Grants for doorstep collection/delivery reuse schemes. These might help to address the difficulties of access to services.
- Deposit/refund systems (where consumers have to pay high mandated deposits on non-refillable containers but they can claim the deposit back for refillable containers).
- Recycling/reuse tax rebates for retailers operating take-back schemes to meet storage costs.
- Business rebates for charities and reuse community/voluntary organisations to contribute to the high costs that this important sector is forced to undertake to dispose of low quality donations that cannot be sold or recycled.
- Import tariffs on imported clothing and shoes. The negative perceptions of second hand goods have seriously impacted on the work of the charity sector because of the cheapness of foreign imports particularly of new clothing and shoes.
- Export tariffs on the sale of co-mingled recyclates.
- Advanced disposal fees (paid when the product is bought) imposed on products which are hazardous and harder to dispose of eg fridges, pvc, batteries, electrical goods, vehicles.
- Introducing a disposal tax that reflects the environmental hierarchy by changing the current landfill tax into a waste disposal tax that reflects the environmental costs of different disposal options.
- A change in the landfill tax regulations so that the 20 per cent offsets are paid into a publicly-run waste minimisation/recycling fund.

The tax revenue accrued could be used to pay for:

- Building the infrastructure needed to promote the reuse, repair, return, recycling or composting facilities to extend the “life” of their products and packaging. Reuse, repair, return, recycling and composting services need to be convenient and locally based to promote the market and make the service a more economic option for customers.
- Funding local authority, community and voluntary sector schemes and the Strategy Unit.
- Promoting greater partnership work between local authorities, community and voluntary groups and small firms.
- Setting up a materials recovery fund.
- Recycling and waste minimisation educational programmes.
- Setting up a transition fund for workers and communities working in the most polluting industries (eg chlorine and organo-chlorine industry based areas) to support alternative economic development and training during the transition phase to safer technologies.

Currently, the bulk of the financial costs, penalties and risks associated with recycling, composting and waste disposal of UK and imported goods are being borne by Council Tax payers and Councils. The introduction of fiscal measures would be the quickest method of encouraging businesses to review their waste and resource management and purchasing practices. When waste becomes a cost issue to business, waste minimisation, recycling and composting targets will also become greater priorities. Measures need to be introduced which divert the costs of recycling or disposal of household waste collection (particularly hazardous waste) away from taxpayers to primary industries, manufacturers, distributors and retail operators. In this way, those organisations dealing with, and financially benefiting from, a product (from extraction of raw materials to disposal) could be held accountable for their role in creating waste and other environmental impacts. The

producers would be required to develop and implement waste (and other) environmental management strategies to reduce the environmental impact of their activities. In this context, producer responsibility would be extended from manufacturing to cross all sectors and would include a broader range of sustainability issues. It would also encourage more responsible and integrated working practices.

In our view, other measures could also be introduced targeting local authorities to promote the development of waste strategies higher up the waste hierarchy. These could include:

- Funding to local authorities to set up the infrastructure required to promote waste minimisation and other policies high up the waste hierarchy.
- A mandatory restriction on waste contracts of five years. This would help create the flexibility needed to enable local authorities to genuinely review their policies at five yearly intervals. This would also allow local authorities to honestly feed into the five year waste reviews by the Regional Technical Advisory Bodies. In addition, it would enable developing national and European policies and changes in waste management policies to be more quickly enacted.
- Stop joint tendering of recycling collection and refuse contracts to private companies (as these threaten the ability of community groups to compete with national companies.) Longer term integrated waste contracts shut out competition and penalise community groups.
- More stringent green procurement requirements on Government and public bodies to support environmentally preferable products procurement systems. Government criteria for awarding Local Authority Beacon status should include demonstrating best practice in waste minimisation measures, buying recyclables etc.
- End the commercial confidentiality of waste contracts.
- Grants to support waste minimisation practices within the local authority area with an emphasis on support for local small businesses and other organisations.
- Greater flexibility for local authorities to develop local environmental taxes and rebates. For example, we support the mooted proposals to allow local authorities to introduce variable charging for services to householders in a form (eg general waste/recycling ratio) that supports the waste hierarchy and supports the polluter pays principle. This would raise awareness about the issues but would also have to be accompanied with a major awareness raising campaign to explain why such local fiscal measures were needed.

An Environmental Tax Commission could be set up to examine the complex economic and regulatory impacts ahead of and after their introduction. Such a commission could be responsible for rebalancing the economic and sustainability playing field. The Commission could administer transitional funds and assess methods of “animating” change.

GREEN PROCUREMENT AND PRACTICES

Local government procurement policies could stimulate the market for green businesses. However, there is a lack of knowledge about these issues amongst officers (as well as the public, businesses, academic institutions and other networks). Government bodies need guidance on green procurement. We therefore very much welcome the Sustainable Procurement Task Force and plans to achieve sustainable development through procurement practices and the production of a National Action Plan.

There is a need to map out and promote best practice in terms of:

- green procurement policies;
- waste minimisation practices; and
- sustainable practices and environmental management systems within businesses.

Green procurement could apply to building specifications, lighting, energy, etc. This would help boost and support a stable “green” market.

The Environment Agency green procurement policy embraces a whole range of factors including the environmental performance of the potential supplier. This might provide a good starting point.

Punitive measures could be introduced to encourage best practice by local authorities. Financial penalties could be used against local authorities and government agencies that fail to meet targets for waste management and green product procurement to reduce waste and waste impacts and promote green manufacturers.

The development by local authorities of publicly available lists of approved local suppliers with green/social credentials might encourage suppliers to support businesses with higher environmental management standards. If the list was publicly available this could be an excellent resource for members of the public and businesses. It would act as a further stimulant to businesses and suppliers to become more responsible and would additionally act as an excellent publicity outlet for exemplary companies. The British Standard for environmental management systems could be useful indicator for local authorities to use in relation to identifying and supporting responsible suppliers and manufacturers.

MARKET DEVELOPMENT

Market development is very much linked to the RDA aspect in the new WS2007. However, RDAs do not have a background in that area and have extremely limited resources. Consideration needs to be given to how RDAs will interact and communicate with local authorities. This is certainly not a standard practice at the moment.

In our view, if the development of markets for recycled materials is to be accelerated, then systems need to be put in place to ensure the promotion of:

- High quality of materials particularly through increased and improved sorting.
- Information and tracking systems.
- Security of supply.
- A larger number of local materials supplier outlets.
- More recycling and reprocessing facilities.
- Green procurement as standard practice.
- Business education and training.
- Fiscal incentives or disincentives for businesses to recycle.

If the full environmental and economic benefits of composting and recycling are to be achieved then end markets must exist. If end markets are to be developed and sustained, then customers must have trust in the reliability and quality of products they buy.

Standards are critical in order to reassure those members of the public or reprocessors planning to use the materials confidence in a consistent product. In our view, the establishment of high standards for materials is critical if the market for recycled goods, and, in particular, municipal compost is to be developed.

Collection authorities therefore need to focus on the collection of high quality materials. The Composting Association has reported that a number of mixed waste plants abroad have failed because of the poor quality of the material and particularly the inability of processors to extract small glass fragments from the material.

In our view, cleanliness is key to the production of high quality materials. Separate collection (as opposed to mixed waste collection which is subsequently sorted) is therefore critical for the efficient collection of clean feedstock.

We note with some concern Defra's proposal that "The main potential outlets (for biodegradable waste material) include agricultural land, which depends on its value as a soil improver and fertiliser, plus horticultural, landscaping or domestic uses". The National Farmers' Union has stated that the potential to use composted mixed municipal waste for agriculture is probably limited. The NFU have concerns about contaminants getting into the food chain. We agree with that view and do not believe that agricultural, sewage and forest material should be mixed with the composted elements of residual general waste. We have concerns that once land where "soil improver" has been used has been sold on, it may inadvertently be used for food production.

We understand that compost had now been given or is imminently due to be given new quality standards that enable it now to be called a product not waste. We welcome this measure. Composting by community organisations has been discouraged by some waste regulations. We hope that this measure will encourage greater composting by community organisations.

In our view, the current Best Value Performance Indicator (BVPI) definition of compost which incorporates the term "soil improver" set standards that are so low that they bring the current BVPI definition of compost into disrepute. In our view, there is a need for clarity on the BVPI for compost. The definition of compost should be consistent across EU in order to stimulate demand for compost and establish common quality standards to help with acceptability. There should be a requirement that local authorities undertake separate doorstep collections of organic matter in order to prevent the sham recovery of waste materials. "Soil improver" should therefore not classify as compost under the BVPI definition for compost.

The NFU have pointed out the need for tracking systems for compost and “traceability”. That is a requirement which we would support.

The statutory imposition of targets for commercial organisations and local authorities would both help to secure a constant supply of materials for recycling collection and reprocessing organisations and increase the materials available.

Alternatively, export controls or tariffs might be a means of maximising security of supply by restricting the opportunities for exports of materials abroad.

The development of large-scale recycling will also depend on the creation of regional-level processing and remanufacturing plants that can draw on local materials and use existing infrastructure as well as the connections between these producers and wider international markets.

Facilities developing recycled materials are widely distributed (relative to most primary materials) so there are opportunities to develop the materials market.

This sets a challenge for the new regional development agencies; they should work with local collection authorities to build up local processing capacity to match the expanded supplies of recycled materials, and with the private sector to expand the recycling of wood, construction and demolition waste, tyres, commercial organics etc.

For this to occur there is a need for education and training of businesses and pecuniary incentives to recycle.

Green procurement practices must be promoted to become the norm. We therefore welcome Defra’s proposal to continue to fund WRAP projects which stimulate domestic markets for recycled materials and promote “green” procurement. We also support the Sustainable Procurement Task Force’s work to stimulate markets through the development of innovative goods and services.

Investment in waste swap systems might be a useful means of making the reprocessed materials market more accessible to the wider public and businesses.

Regional economic policy could play a crucial role in linking all these issues through the local economy to the global economy.

The focus of waste minimisation, reuse and repair activities need to focus on the work of the Voluntary Community Sector and Small to Medium Enterprises. This is dealt with below.

VOLUNTARY AND COMMUNITY SECTOR AND SMALL AND MEDIUM ENTERPRISES

The waste minimisation sector is dominated by small to medium sized enterprises and voluntary and community organisations. This is likely to continue, however the sector requires major support if it is to expand and the barriers that are deterring customers from using repair and reuse services and products need to be urgently and effectively addressed.

We welcome the review of the WIP to consider how to encourage the development of new providers of services and facilities (including community sector).

However, it is our view that voluntary and community waste organisations need much more support to enable them to compete on a more even playing field with the private sector.

Currently, the cost of industrial technologies, the size of plants and treatment means SMEs and the VCS are excluded from PFI opportunities but if the focus was on services higher up the waste hierarchy, especially waste minimisation, recycling and composting then the opportunities for SMEs and VCSs could be opened up.

The size of PFIs should be limited to discourage capital intensive technology projects eg incineration/pyrolysis or large materials reclamation facilities. PFIs should support less capital waste minimisation and recycling/composting projects. Local authority PFI projects should also have to fulfil various general criteria eg promotion of sustainable development, contribution to local cultural, social, health, safety, regeneration or educational objectives and rigorous cost benefit analysis.

Local Authorities need to be encouraged to support community and voluntary sector recycling organisations through procurement packages that emphasise the additional training and educational services that charities and reuse initiatives often offer. In addition, we consider that the general emphasis of national, regional and local regeneration work should be towards sustainable resource management and sustainable consumption policies rather than sustainable waste management.

Local authorities could encourage economic regeneration through work with local SMEs and VCS businesses and Regional Development Agencies. However in order to undertake such work, local authorities would require considerable additional resources to provide the necessary support and investment.

Barriers to the procurement of services by local authorities from the VCS and SME sector could be reduced by the employment of regional waste liaison and business development officers whose role could be to:

- improve co-ordination and development of contractual and partnership opportunities, best practice, legal advice, start-up support;
- liaise between local authorities and other organisations;
- address financial barriers by evaluating and disseminating best practice; and
- improve future practice by supporting research and innovation.

STATUTORY PERFORMANCE STANDARDS AND TARGETS FOR LOCAL AUTHORITIES AND THE LARGE BUSINESS SECTOR

Waste reduction is at the top of the waste hierarchy so the Government decision not to have targets for local authorities for waste reduction is, in our opinion, more than an oversight. This decision could result in another fridge mountain style of crisis.

In our view, targets should reflect stated government policies and the policies should be supported with regulatory, educational, best practice, structural and fiscal initiatives. Other countries do set national waste prevention targets. Scotland has set targets for waste reduction and the EU is discussing including waste reduction targets in new version next year.

We suggest that the Government could produce a waste reduction target for local authorities.

Another approach might be to develop repair/return/reuse targets for local authorities. Materials reduction, return, repair and reuse is higher up the waste hierarchy than recovery so these targets should replace the current recovery target for collection authorities.

Higher levels of divergence from landfill would be more likely to be achieved and the clear message established that waste is a resource if targets for the land-filling, reuse, recycling, composting of commercial and industrial waste were set. The introduction of business and industry reuse, recycling and composting targets and targets for other sustainability issues (such as those relating to energy and water use) would create a more integrated approach to waste and sustainability policies. They would stimulate greater awareness about sustainability issues—particularly if they were accompanied by fiscal penalties or incentives. Targets for large businesses would also create economies of scale that could help to boost the recyclates market and general green economy.

Currently the Government acknowledges that it “does not consider that there is sufficient information and evidence on which to base a single prevention target for all waste or for single major categories of waste” (page 21, paragraph 28, England Draft Waste Review). This points to the need for work to be undertaken to analyse who produces waste, where, what the composition of waste is, why they produce it, and how it might change under different circumstances.

The Government proposal that directors of large private and quoted companies will be required to consider and report on non-financial key performance indicators that are relevant to their business, including information relating to environmental matters, including waste could provide a starting point on which to obtain this basic information. The report *Future Perfect* by Biffa (2003) suggested that targets for waste reduction and recycling by businesses could include a statutory requirement to provide environmental reporting data on waste management performance, resource productivity, biodiversity etc in the annual reports and accounts. If the data collection and reporting was carried out in a standard format and automatically passed to the Environment Agency, then the information gathered could provide the basis for the development of national, regional and local waste strategy policies and the assessment of waste infrastructure needs as well as funding requirements. That is a measure we support and believe would encourage transparency as well as greater corporate social responsibility. If this work is to be carried out by the Environment Agency, then the Agency will need considerable investment to enable it to process the information quickly. Such work would provide the basis for baseline waste prevention (and recycling) targets.

As a starting point, we welcome the proposal that the Environment Agency will set a reduction in “waste disposal target” for industries that it regulates.

Statutory waste reduction and materials repair, return and reuse targets for manufacturers and other large companies might be another method of promoting best practice amongst commercial and industrial organisations—particularly manufacturers. The introduction of statutory waste reduction, reuse/repair/return targets and recycling and composting targets across all waste sectors together with producer responsibility measures would also push waste issues higher up the business agenda. Non-compliance with the target could

result in financial penalties or other measures. Waste reduction targets for the biggest polluters could be monitored by the Environment Agency.

Home and community composting of kitchen and garden waste is the most sustainable form of composting yet it is not classed as a category of composting. According to a recent report by Dr Alan Knipe (May 2006, Lets Recycle), councils could save millions of pounds a year by encouraging householders to compost food waste at home, rather than splashing out on major centralised treatment plants. “Based upon the 10 per cent of UK households using food waste digesters between 10 and 25 centralised treatment facilities need not be constructed and there would be potential cost savings of in excess of £20 million a year”. The House of Commons Select Committee proposed that local authorities could estimate the amount of home composted waste by identifying households with gardens and following the purchase of home composters (from local authorities or other major suppliers). They recommended that the Government, Local Government Association, Composting Association and Community Composting Network should find a method for assessing the amount of home composting in the targets to local authorities. There is a similar need to monitor composting on allotments and other forms of community composting. The current definition of compost creates a disincentive to local authorities to promote home and community composting of kitchen and garden waste. Therefore home and community composted waste should be included in municipal composting figures.

The promotion of waste minimisation measures is difficult where co-mingled wheelie bin systems are in operation using compaction lorries to crush the recyclates. The use of compaction lorries for collecting products is not compatible with the aim of restoring and repairing them. The mandatory use of box schemes for the collection of waste minimisation or hazardous materials would require local authorities to collect products for reuse or repair such as tools, spectacles, stamps, cds, dvds, videos, watches, etc or the reduced disposal of hazardous waste materials. A further system of assessment might therefore be to introduce a new “source separated materials collection” target whereby local authorities could be required to increase the number and range of materials collected by means of source separation methods of collection. This might have to be individualised to take into account the composition of the waste of each of the local authorities. We would suggest a minimum number of three separate waste streams (including compost and hazardous waste) but with the aim of collecting a minimum of seven waste streams.

A separation target would probably require a mandatory increase in the number of waste streams that local authorities are required to provide a kerbside collection service for. We therefore consider that there is a need to increase the number of recyclable items collection authorities are required to collect from households. We suggest that the Household Waste Recycling Act 2003 be amended to increase the number of items to at least seven.

EDUCATION

We support the Waste Minimisation Toolkit which is a valuable aid in the development of data collection, measurement tools and behaviour change approaches.

In our view, there are a number of barriers discouraging members of the public from using services or buying products which reduce waste or promote reuse, recycling or composting:

- Lack of knowledge about the environmental impacts of actions they take and services and products they use.
- Lack of knowledge about what they as individuals can do to minimise those impacts (eg using washable nappies, Mooncups, composting waste).
- Lack of knowledge about best practice products and services available locally (nappy laundry services, community composting facilities, hire companies).
- Lack of knowledge about environmental issues relating to individual products.
- Negative perceptions about reuse schemes (eg share, lease, hire, repair, refill and return services)—in particular facilities being inconvenient.
- Negative perceptions that second-hand products, refurbished goods or items made from recycled materials are poor quality and/or expensive.
- Lack of interest in or incentive to change behaviour.
- Lack of access to information about the above.

Lack of knowledge about the environmental impacts of actions they take and services and products they use

We support the Environmental Action Fund's aim to promote greater awareness on these issues.

The Eco and Enviro Schools schemes are other useful tools for promoting responsible attitudes amongst young people towards their environment and encouraging them to understand information that is already available about products.

Both schemes warrant continued support.

Lack of knowledge about what they as individuals can do to minimise those impacts

We support Environment Direct—a public advice service on the impacts of different goods and services and on how to make the most sustainable consumption choices. The website is a superb resource.

We also support the Recycle Now and Smart Shopping communication campaigns. These, too, are educational tools which should be continued on a sustained basis.

Lack of knowledge about best practice products and services available locally

Whilst we support national educational campaigns such as the Recycle Now media advertising, the work of WRAP and the retailers Reusable Bag Campaign, we consider that it is essential that educational campaigns should also be supported which promote local schemes (both waste minimisation and recycling/composting). In our view local campaigning works best because it can be adapted to suit the particular characteristics of the audience and schemes operating in the area.

In addition, educational campaigns should be aimed at a wider audience (including hard to reach communities) and be a sustained activity.

There is a need to map out and promote best practice businesses and services to the public and other businesses, academic institutions and other networks.

Policies promoting corporate social responsibility and public access to information would also encourage companies to demonstrate greater public accountability.

Other information to assist customers in extending the life of their purchases could include:

- Information provided by operators of convenience stores, vending and fast food outlets, organisers of public and private events about the locations of local repair centres, facilities to support reuse, recycling and composting. This could be publicised on sales receipts (eg Nova Scotia), posters or leaflets.
- Recycling system endorsement labelling (eg Germany's Green Dot system where consumers can leave the product in designated bins and the product is guaranteed to be recycled).

Lack of knowledge about environmental issues relating to individual products

We support the recent development by Defra of a web site and a pocket sized guide to environmental labels in order to help people understand the many different kinds of labels already produced. We think this will be a useful public tool.

However, product information in different sectors needs to be standardised. Information needs to be in a usable, clear and honest form.

There is widespread mis-use of symbols, which not only causes confusion to members of the public but can create problems for reprocessing companies. The plastic recycling symbol, for example, has widely been abused by packaging producers to suggest to members of the public that the product could be easily recycled. In fact, the wide range of plasticisers, softeners etc that could form part of a container means that, whilst plastic bottles often have a similar chemical make-up, yoghurt containers and other packaging with the recycling symbol on do not and so can not be easily recycled.

Lack of knowledge about environmental issues relating to individual products

Information needs to support the customer in:

- comparing products; or
- identifying the options realistically available to them for extending the life of the product.

Potential labelling and symbols which would support comparison on sustainable consumption indicators could include:

- Seal-of-approval types of environmental labelling.
- Environmental information labelling (energy efficiency, CFC use, recycled content or targets, recyclability, expected lifetime).
- Ecological Foot printing or Environmental Assessment Measures.
- Product hazard and product durability labelling (eg listings of the hazardous properties of the product produced during its life cycle and their impacts).
- Lead by example schemes which identify and promote businesses adopting best environmental practice.

Lack of interest in or incentive to change behaviour

We support waste minimisation measures such as behaviour change systems (especially positive incentive schemes).

Whilst we do support the right of local authorities to introduce variable charging and other punitive behaviour change systems with members of the public we think that the emphasis should be on incentive schemes. It is our view that well promoted incentive schemes can encourage greater public support for recycling and waste minimisation and can help to reduce the need for punitive measures.

In addition, there is an imperative to combine incentive/disincentive work with simple to use, clearly promoted and supported recycling, composting and waste minimisation schemes. For example, box collection schemes are far easier to support in terms of educating residents about contamination issues. When contamination of wheelie bins takes place, the collection crews are unable to see contamination at the bottom of the bins. Nor are they able to simply leave a clear card explaining why particular materials are not collected. Instead, local authorities have to rely on the far more intimidating and negative method of employing monitoring officers to identify bins with contamination and then door knocking the householder to explain what they have “done wrong”.

Currently, members of the public are not encouraged to use repair services, buy second-hand or reconditioned products or products that are made from recycled materials. Incentive schemes combined with awareness raising campaigns could be used to educate members of the public about the benefits of supporting sustainable products and services and motivating them to take action. Washington State’s “Get in the Loop” scheme has proved successful and works by combining advertising (about the importance of buying recycled and telling them where they can buy recycled content products) with free promotional material to participating retailers and retailer promotion according to their level of participation in the scheme. Incentive schemes and awareness raising campaigns could be used in a similar way to motivate members of the public to buy second hand or refurbished goods.

Behaviour change campaigns could also be used to change trader, manufacturer or supplier behaviour eg low waste packaging procurement policies.

Negative perceptions about reuse schemes—in particular facilities being inconvenient

There is an urgent need to explore measures (particularly fiscal policies) to develop a waste minimisation infrastructure dominated by small, locally based businesses. If a sustainable consumption and resource management economy is to be developed then issues of logistical inconvenience for reprocessors and potential customers must be addressed. However, these policies need to co-exist with educational campaigns to address issues relating to negative perceptions and lack of knowledge.

Negative perceptions that second-hand products, refurbished goods or items made from recycled materials are poor quality and/or expensive

The UK reprocessing and manufacturing industries compete on the world market by focusing on quality products. This fact highlights the importance of encouraging the collection of quality recyclates and composting materials and the imperative of encouraging source separation methods of collection (rather than co-mingled collection systems which suffer from high rates of contamination). A move to targets focusing on source separation and waste minimisation would assist in this regard.

Members of the public and reprocessors must have faith in the products they buy. It is vital that standards are improved.

Market development of quality goods needs to be combined with promotional work. Promotional advertising needs to be sustained to raise awareness and support for waste minimisation activities, services and products, recycling and goods made from recycled materials.

Lack of access to information

Gaps exist in public access to information about the above-mentioned issues. In particular hard to reach groups are often overlooked because of the expense of the communication methods required to target those groups.

We welcome the Government's recognition of the importance of local authorities translating information on services into languages spoken by ethnic communities but in our experience local authorities are reluctant to provide that service. The problem relates to cost and the number of languages spoken (65 in Newcastle).

The situation is even worse as far as the provision of information to individuals with disabilities is concerned especially deaf individuals who may require the information in BSL format and blind or partially sighted householders who may require formats for their particular sight difficulties (eg cd, tape, large print, Braille, daisy disc etc). This is despite the provisions of the Disability Discrimination Act 1995.

Similar difficulties relate to providing information (eg in tape format) to individuals who cannot read. In our opinion, local authorities require additional support to target these hard to reach groups.

Other information gaps include involvement of customers and stakeholders. Attention needs to be paid to widening access to information to:

- members of the public in general;
- customers; and
- shareholders.

We welcome the requirement on Directors of large private and quoted companies to consider and report on non-financial key performance indicators that are relevant to their business, including environmental and waste issues.

Additional information to shareholders, customers and other stakeholders could be supplied through performance data relating to statutory targets for waste reduction and recycling. Customers and shareholders could be more heavily involved in discussions and decisions about sustainability issues.

BUSINESS SUPPORT

Businesses need support and easy and cheap access to information, training, advice and funding to enable them to make informed choices themselves.

We support the BREW funded work of Envirowise, the Environment Agency's NetRegs, WRAP and the work of Business Links. We also support the Environment Agency's pilot on-line Internet service "What do I do with my waste" and NetRegs guidance.

In addition, we welcome Defra's proposal that it could help improve SMEs access to appropriate recycling and recovery services by a combination of:

- advice and support under BREW, for companies to improve their waste management and maximise resource efficiency;
- financial support under BREW for organisations to set up recycling collection services for commercial enterprises; and
- placing recycling obligations on some or all businesses and/or waste management companies.

We welcome the introduction of the National Industrial Symbiosis Programme (matching one operator's waste with another's raw materials needs) and believe that the principles of industrial symbiosis provide significant potential for further resource efficiencies. We believe that the database could be expanded to contain information about distribution centres and waste resources. This would be especially useful for manufacturers and organisations wishing to exchange, sell or buy materials. The promotion of the National Industrial Symbiosis Programme or a similar type of database amongst the charity, refurbishment, repair and reuse sector might prove useful. An on-line database for tracking hazardous waste, composting, reused and recycled materials could also be linked to producer responsibility trading systems.

Businesses need clarity about which organisations to approach for advice. Training and educational opportunities for businesses, public and statutory professionals across all sectors could be supported further in relation to green economies with the establishment of:

- A new type of Green Academy. It could be charged with developing organisational forms, knowledge and skills relevant to zero waste and sustainable consumption. Its curricula and priorities would be set by the needs of developing environmental markets. Hence its research, teaching and skill formation would be linked closely to ground level projects providing learning opportunities to those in or outside employment. The promotion of sustainable business practices including resource efficiency and waste prevention and environmental education would be part of the training of infrastructure development of professionals and unskilled staff.
- The appointment of Zero Waste Advisers—some recruited from leading waste minimisation, recycling and composting projects overseas—to advise on waste reduction and recycling schemes and projects. The group could be part of an international network, promoting exchanges and part time attachments and linking into practitioners' associations.
- A Sustainable Development Agency incorporating a Zero Waste Agency to promote resource efficiency and act as a guardian of public health.
- A national network of Regional Waste Reduction and Recycling Co-ordinators. Work of this nature is invaluable but needs funding.
- Best practice guidance (perhaps through the use of a web site) on green procurement practices could be made publicly available for use by central and local government, their agencies and public bodies. Best practice guidance could also be supplied on ways of supporting waste minimisation, repair, reuse, recycling and composting. This sort of information could be of assistance to a wide range of individuals and organisations.

If businesses are to respond appropriately to legislation then the Government and Environment Agency need to provide clear and comprehensive guidance well in advance of regulatory changes in order to allow sufficient time for investments. The government currently uses a wide range of communications channels to inform business about the requirements of legislation but we consider that there need to be clearer points of reference for business training and education particularly in relation to sustainable business development.

There may be business opportunities for consultancies to open up a niche market on advice on resource efficiency but this may require some initial government support.

October 2007

Memorandum by Boots plc

INTRODUCTION—THE PRODUCT JOURNEY

Understanding the role of products in the context of sustainability requires a holistic appraisal of the interplay between the various societal and environmental impacts a product may have throughout its lifecycle from “cradle to grave”. This can be termed the Product Journey.

This holistic approach, mirroring the working of natural ecosystems, is rapidly evolving. The way society has addressed environmental, social and ethical issues has changed considerably over the last twenty years. From an early focus on the mitigation of “end of pipe” impacts, thinking has now moved on to a more holistic and sustainable approach closely linked to the concept of social responsibility. Understanding the complex systems that determine our effect on the social and natural environment is now seen as critical in meeting the challenges facing society.

For product developers, manufacturers and retailers this evolution has been mirrored by a move from the management of single issues such as the environmental impact of packaging waste or product safety into the arena of whole product impact and sustainable product development. Entire product lifespans can now be considered using cradle-to-cradle thinking.

This is recognised in the UK Government Sustainable Development Strategy:⁵

“We need a major shift to deliver new products and services with lower environmental impacts across their life cycle, while at the same time boosting competitiveness. And we need to build on people’s growing awareness of social and environmental concerns, and the importance of their roles as citizens and consumers”.

⁵ *Securing the Future, UK Government Sustainable Development Strategy 2005.*

However the interplay between the various factors influencing sustainable development is complex and potential solutions are only beginning to be understood. Policy and regulation needs to reflect the need for a holistic approach to keep pace with this thinking.

HOW A HOLISTIC APPROACH CAN ACHIEVE SUSTAINABLE PRODUCTS AND REDUCE WASTE

Using the questions posed by the Committee the following examples demonstrate how taking a holistic “Product Journey” approach can help achieve reductions in waste.

What role can better design and materials play in minimising waste?

Better design is key to minimising impacts throughout the product’s lifecycle. Approximately 80 per cent of the products impact is decided at the design stage. Designers and specifiers need be aware of the product’s journey from cradle to grave and build this into design strategies. Examples of good design practice include:

- The correct selection of materials to reduce end of life impacts.
- Design for disassembly including minimising the number of materials used to aid recovery.
- Ensuring that the consumer can easily pass on waste materials to the appropriate recovery route.
- Designing for consumer needs.

Progress in this area has been limited by a lack of awareness by designers of end of life processes and waste management infrastructure. Inclusion of these aspects in design education and subsequent inclusion in clients’ design briefs should help to address this. Links should also be built between product designers, the supply side of the product development process and the waste management industry.

Factors influencing the use of materials

Three main factors influence material choice:

- Cost.
- Technical requirements.
- Availability.

Availability is becoming of increasing importance. For example the uptake of post consumer recycled polymers in packaging is being hampered by a lack of available reprocessing facilities which clean and process the material into a form that can be used in new high value applications.

There is a need to create simple metrics to measure the “sustainability footprint” of materials to enable this to become a factor in material selection.

Can Better Design Offset the Increase in Consumption?

Better design has a significant role to play in reducing waste and unnecessary consumption. This can be achieved by factors such as:

- Increased durability.
- Increased repairability or facilities to upgrade products.
- Correct portioning to meet consumer needs and demographics.
- Including design features to reduce waste product.
- Design for local sourcing/production.
- Consideration of providing “services” instead of “products”.

It is important to consider all activities associated with the product at the design stage. For example packaging has a significant role to play in product design. Considering packaging as part of the overall product can open up significant opportunities. In the case of liquid products such as those in the personal care sector matching the product viscosity to the packaging dispensing system can significantly reduce the amount of unusable product that the consumer is unable to access from the container. In addition packaging design can be used to ensure the consumer uses the correct amount of product to perform its function. Additionally consideration of sales and transit packaging should be integrated together in order to ensure optimisation. Often these elements are considered in isolation giving the potential for unnecessary waste.

Designers hold the key to creating novel partnerships between unrelated parts of the supply chain. Examples include replacing a product with a service (eg, car manufacturers providing “mobility” rather than selling cars) or the introduction of consumer refillable products. This provides the opportunity for significant innovation and creation of new markets.

Major Barriers to be overcome

If a holistic approach to sustainable product design is to be achieved a number of major barriers need to be overcome:

1. Product Designers need awareness of the complete product supply chain including end of life. Design education should have a focus on this aspect. Product specifiers should ensure their design briefs include waste reduction requirements.
2. More understanding of the challenges faced by the waste management sector is required by the product supply sector (and vice versa). Co-operative working is required by the whole supply chain to address waste issues.
3. Regulations and government policy need to be more holistic in nature. There are many examples of regulations that focus on one aspect of the supply chain. For example the Packaging Waste regulations aim to reduce packaging by weight. They take no account of recycled material content, product wastage or the impact of different material types.
4. There is a lack of a national integrated waste management infrastructure. The majority of product suppliers and retailers are national (or international) in scope. Waste management infrastructure is very localised based on individual Local Authorities. This leads to certain materials being collected in one area but not in a neighbouring authority. This structure prevents national brands and retailers from providing consistent advice to consumers and prevents co-ordinated product design and material selection choices being made.
5. There is a lack of planning for new materials entering the market. For example there has recently been significant growth in the use of compostable and bio-based materials. However facilities for dealing with these materials and labelling for consumer information are lagging well behind.
6. Planning and investment for waste management facilities typically follows a 10–20 year cycle whereas new product development follows two to three year cycles. Therefore waste management planning is continually falling behind product development.

14 November 2007

Memorandum by the Business Resource Efficiency and Waste Centre for Local Authorities

HOW ARE LOCAL AUTHORITIES SUPPORTING WASTE PREVENTION WITHIN THEIR LOCAL BUSINESS COMMUNITIES?

1. THE SCOPE OF THE PROBLEM

Waste and the inefficient use of resources is a growing problem that impacts on the environmental, social and economic aspects of all modern economies. Total waste arisings in England were estimated to be around 272 million tonnes per annum in 2007 and is expected to rise by 13 per cent per annum⁶ with 90 per cent coming from the commercial and industrial sector, mining and quarrying, agriculture and other “business” related activities.

The costs of disposing of materials classed as waste are rising. The standard rate of tax will increase by £8 per tonne per year from April 2008 until at least 2010–11 to give greater financial incentives to businesses to reduce, reuse and recycle waste (from £32/tonne now to £48/tonne in 2010). These costs take no account of the rising costs of obtaining raw materials and the energy used in manufacturing goods or the environmental impacts associated with disposal. The question is whether this fiscal incentive is enough to encourage businesses to reduce the waste they produce, rather than consume the cost of disposal. From the evidence provided below, it is clear that other initiatives can also enable the behavioural change required within businesses to start reducing their waste.

⁶ Defra (2007) “Waste Strategy for England 2007”, Stationery Office, London, pp 10–12.

2. DEMAND FROM THE BUSINESS COMMUNITY

2.1 *National Focus*

Over the last five years there have been numerous pieces of research led by government-funded organisations investigating the level of knowledge and activity amongst business communities on environmental issues, and what is needed to achieve behavioural change to reduce their impact on the environment.

During the last decade there has been a notable shift in the reported attitude of businesses towards improving their environmental performance and specifically how they can reduce their waste and improve the efficient use of their resources.

For the last five years the Environment Agency has been running an SME (Small and Medium sized Enterprises) survey that looks at identifying environmental attitudes and behaviour amongst businesses. The focus has been on SMEs because they make up 99 per cent of the economic profile of the UK.⁷ The most recent survey, *SME-nvironment 2007*, reports that:

“overall, levels of environmental awareness and activity amongst SMEs across the UK were low, particularly among micro SMEs (0–9 employees). However, the performance of English businesses in terms of their environmental awareness has improved between 2005 and 2007”.⁸

The general message from this survey is that more businesses within England are willing to engage in the environmental agenda, look at ways in which they can reduce, reuse and recycle their waste and gain and improve profits through more efficient use of their resources. The report also highlights the important role local authorities can play in supporting businesses to take action. According to the report 49 per cent of businesses contact their local authority on environmental issues and 30 per cent see local authorities as a valuable source of environmental information.⁹ This type of feedback highlights the important role local authorities can play to inform local business behaviour, especially if they are the first port of call for a local business looking for guidance. However, if a business is willing to consider behavioral change it is important for local authorities to be in a position to harness that willingness and be able to support and enable the means by which change can happen.

2.2 *Local Focus*

More localised pieces of work from within local authorities back up the Environment Agency report. Oxfordshire County Council has undertaken two county wide business waste surveys, in 2005 and 2007. The main purpose of these surveys was to identify local business needs and feed them into the development of services and strategies that would enable local businesses to reduce, reuse and recycle. The results of the survey showed that SMEs tend to have a lack of awareness about environmental legislation, in particular their Duty of Care,¹⁰ and they require the provision of services such as trade waste recycling to enable them to change their behaviour. Many of the businesses also cited their local authority as the primary organisation they would look to for support to deal with their waste more effectively.

Recommendations from Oxfordshire County Council’s Trade Waste Report 2005 included:

- Development of an awareness campaign to educate SMEs to reduce, reuse and recycle their waste.
- Support for business to business resource exchange.
- Encouragement of trade waste collection services to provide businesses with an option to recycle; and a feasibility study of local bring sites for business that want to recycle but can’t have their waste collected.¹¹

These recommendations identified areas in which Oxfordshire County Council could improve the management of services to local businesses, and in turn support the behavioural change required within businesses to manage their resources more efficiently.

⁷ National Statistics. Statistical Press Release. BERR URN 07/92 2007. <http://stats.berr.gov.uk/ed/sme/smestats2006-ukspr.pdf>

⁸ Environment Agency (2007) “SME-nvironment 2007 (England)”, available at: www.netregs.gov.uk/commondata/acrobat/smenvironment2007uk_1856733.pdf.

⁹ Ibid.

¹⁰ Environmental Protection Act 1990, Chapter 43, available at: http://www.opsi.gov.uk/acts/acts1990/Ukpga_19900043_en_1.

¹¹ Oxfordshire County Council (2005) “Trade Waste Report 2005”, p 17.

3. ADDRESSING THE ISSUES

The recent publication of the Waste Strategy (England 2007) encourages local authorities:

“to use their role as local community leaders in partnership with businesses, other local, sub-regional and regional public sector organisations and third sector organisations to achieve a more integrated approach to resources and waste in their area”.¹²

The Strategy also draws attention to the particular difficulties faced by SMEs in recycling their waste, exemplified by the survey results discussed above, and the benefits they could receive from local authority support.

4. LOCAL GOVERNMENT ROLE

The framework of various statutory and discretionary obligations in which local authorities work enable them to undertake both practical and strategic work to support their business community in achieving resource efficiency savings and can act, should they wish, in a variety of ways that can range from the direct provision of business recycling services to the development of resource management strategies and suitable planning strategies. Local authorities can also address the level in which they support local businesses from preventing or reducing waste production through Local Area Agreements and Sustainable Community Strategies, all of which are statutory obligations to develop, however, they do not have a statutory obligation to include targets around business resource efficiency and waste reduction. Nor do they have any statutory obligation to recycle business waste, only Waste Collection Authorities have an obligation to “arrange for the collection of trade waste on request”.¹³

Local authorities also have a leadership role in their communities. The importance of this role is increasingly being recognised and the legal powers they have are being explored and utilised. However, the extent to which any particular local authority acts upon their discretionary, rather than statutory, powers depends on local political decisions. It is the decision making at this local level that can make the difference between a resource efficient approach to a resource intensive one, and is critical to helping businesses plan their use of resources, if they are to continue to be competitive in the domestic and international markets.¹⁴

5. THE BREW CENTRE FOR LOCAL AUTHORITIES

In April 2006 a consortium formed between the Local Government Association, the National Industrial Symbiosis Programme (NISP) and Oxfordshire County Council set up a central support service for local authorities, funded through Defra’s Business Resource Efficiency and Waste (BREW) Programme operational between 2002–06 and 2007–08. The BREW Centre for Local Authorities (BREW Centre) provides support and guidance to local authorities enabling them to develop and implement better services, strategies and infrastructure to their local business community and help the business community to become more resource efficient, reduce waste and improve overall profits in the local area.

The BREW Centre’s overall objective is to support the Government’s vision of the future¹⁵ where businesses operate within their environmental means, without negatively impacting on their competitiveness. It also seeks to encourage more profitable businesses through minimised waste and more efficient use of materials, waste and energy and provide intelligence on hard outputs such as the reduction in greenhouse gases or equivalents, material diverted from landfill and cost savings to businesses achieved by the projects it funds.

The BREW Centre also aims to create an enabling and innovating environment where all councils do more to plan, deliver, join-up and evaluate activity to support businesses to be more resource efficient by responding to local needs and circumstances and adding value through building on existing structures.

The Centre is designed to act as a conduit for other Government funded delivery bodies, in line with a Government statement of values,¹⁶ enabling them to engage with businesses and ensuring a joined up approach at both a local and regional level, reducing the potential for duplication and ensuring businesses receive the greatest benefits from the delivery bodies.

¹² Defra (2007) “Waste Strategy for England 2007”, Stationery Office, London, pp 10–12, 88–89.

¹³ Environmental Protection Act 1990.

¹⁴ Business Taskforce on Sustainable Consumption and Production. Decentralised Energy: business opportunity in resource efficiency and carbon management; 2008. p 3.

¹⁵ Defra (2007) “Draft strategy for the future of the BREW Programme”, Stationery The programme will be: Accessible; Commercially aware and responsive to needs; Future focused; Prioritised; Collaborative; and Innovative.

¹⁶ Ibid.

Since it was formed the BREW Centre has delivered a “central” support service for councils which has encouraged and supported local authorities to do more for their business community. It has funded over 35 local authority business resource efficiency projects in 2006–07 and 2007–08, shared the lessons learned through a series of national and regional networking events and researched and disseminated over 100 good practice case studies as well as providing information, guidance and advice to local authorities. An “active learning” network of over 850 local authority officers has disseminated how action can help local business and the environment.

The BREW Centre has offered support and funds to local authorities to develop and deliver resource efficiency projects in the following areas:

1. **Business Waste Recycling:** To provide separate collection/bring sites for recyclable materials to business waste customers or projects that influence local private contractors to offer more recycling services as a part of business waste collections.
2. **Business Waste/Resource Management Strategies:** To enable a greater understanding of the business waste produced in a localised areas and the strategies and action plans needed to enable businesses to become more resource efficient and divert waste away from landfill.
3. **Planning:** To ensure that waste planning documents are underpinned by a “Material Resources Strategy” to create the right environment for private sector investment.
4. **Sector Specific Support:** To ensure that there is support for business sectors particularly affected by landfill tax increases or new regulation.
5. **Business Advice Support:** To support local business through Local Business Partnerships (LBPs) or other business networks.
6. **Procurement:** To develop the use of procurement to support resource management.
7. **Public Sector:** To work with other public sector organisations such as the police or fire services to help them design out crime and fire risk (arson) arising from the storage of waste.
8. **To create the right environment for private sector investment to build waste management/materials processing facilities and actively encourage business to the area.**

Below is a list of local authority led projects the BREW Centre has supported during 2006–07 and 2007–08. Further examples of how local authorities within England are supporting their business community reduce waste and improve their resource efficiency can be found at www.eas.local.gov.uk/brew.

5.1 *Business Resource Efficiency Pack*

The Business Resource Efficiency Pack was specifically designed for SMEs, to help them identify how they can reduce, reuse and recycle their waste. The pack was originally designed by Oxfordshire County Council through the support of the Republic of Ireland’s Race Against Waste (RAW) team, and part financed by the South East Economic Development Agency. It was designed so that Oxfordshire County Council could promote the waste reduction message from the household into the workplace and vice versa, and after a consultation with local businesses it was concluded that a booklet would support the required behavioural change within local businesses. Since Oxfordshire County Council agreed to deliver the BREW Centre for Local Authorities it has been able to offer the use of the pack to over 35 other local authorities across England with over 6000 businesses receiving the information.

5.2 *Hampshire County Council Increasing Secondary Aggregates*

Construction, excavation and demolition wastes comprise of about half of the overall waste stream in Hampshire. The County Council saw significant scope to reduce the volume as well as increase the amount recycled back into aggregates, soils and related materials and products with the later option having important benefits in reducing the environmental impacts associated with mining primary aggregates. Hampshire County Council has long been advocates of promoting waste as a resource through a programme of leadership and engagement involving other partners in the County. A prime example of this was a project in 2006–07 looking at addressing local minerals and waste policies, in line with the regional spatial strategy, and identifying opportunities for improving the use of secondary aggregates through engaging and consulting with the construction sector.

5.3 *Isle of Wight Business Waste Strategy*

In 2006–07 the Isle of Wight identified the need to address the island’s approach to waste management, with the harsh reality that their reliance on landfill would have to end by 2015. The Council had a good understanding of the requirements to deal with household waste, however, it wanted to take a more holistic approach to resource management on the island and sort to develop their understanding of their business communities waste management requirements. The consultation exercise led to the development of a Business Waste Strategy which identified the role the authority can play in supporting its business community in reducing, reusing and recycling their waste. The strategy also helped the authority inform the development of new technology, enabling them to deal with the waste they produced on the island and reduce the amount of waste that needed to be shipped off the island.

5.4 *Milton Keynes Behavioural Change Business Seminars*

Milton Keynes Council recognised the success of an environmental support service delivered by the Green Business Network (GBN) in the neighbouring authority of Bedfordshire. Milton Keynes Council sought funding in 2007–08 for the GBN to deliver similar services within its authority’s boundary. The GBN agreed to run regular seminars and events for local businesses dealing with environmental and related issues; provide on-line and on-site support to businesses; and put businesses in touch with other businesses or organisations that provide environmental help and advice in particular, addressing how businesses can reduce their waste production.

5.5 *Manchester City Business Resource Efficiency for Manufacturers*

Manchester City Council, in 2007–08, worked with a number of local partners to provide a service to 30 SMEs in the manufacturing sector to provide a full range of support services and advice mechanisms to minimise their waste, increase their energy efficiency and allow them to become more profitable. Businesses were selected following research and consultation with partners and were signed up to a year long scheme. SMEs in the manufacturing sector were targeted due to the size and nature of their business being particularly affected by landfill tax increases. Manufacturing businesses generally use a large amount of raw materials and have high energy consumption. This creates a high potential for savings to be made, both environmentally and financially. There are clusters of manufacturing businesses in industrial estates throughout Manchester and in particular Trafford Park, which were suitable for the project and in a position to work with each other to make the financial and resource savings.

5.6 *Oxfordshire County Council Trade Waste Recycling Centre*

In 2005 Oxfordshire County Council undertook a county wide trade waste survey to determine the needs of their business community. The recommendations within the resulting report included the need amongst local businesses for a trade recycling collection and bring service. As a Waste Disposal Authority the County Council could not directly improve the provision of recycling collection services to its local businesses, however, it could look at ways in which it could work with the private sector to improve the provision of trade recycling bring sites. Appendix 6 provides an overview of their trade recycling centre project delivered in 2007, including some of the results.

5.7 *BREW Centre Results*

The BREW Centre projects and services have shown that with a relatively small amount of kick-start funding and support, services can be developed and implemented that have a high impact on the ability to improve business resource efficiency.¹⁷ At present 62 per cent of Waste Collection Authorities are collecting business wastes and of those 38 per cent are providing a recycling service. Initial findings from a BREW Centre survey show that there has been a 7.5 per cent rise in the number of local authorities providing a trade recycling service over an eight month period, indicating a growing realisation of their ability to improve services to businesses,¹⁸ and a local authority’s ability to support its business community to reduce, reuse and recycle.

¹⁷ BREW Centre for Local Authorities (2007) “Trade Waste Recycling Report”, available at: <http://www.eas.local.gov.uk/BREWContent.asp?nc=5PKZ&id=11494>.

¹⁸ BREW Centre for Local Authorities (2007) “Trade Waste Recycling Report”, available at: <http://www.eas.local.gov.uk/BREWContent.asp?nc=5PKZ&id=11494>.

Table 1 details the outputs the BREW Centre has achieved between 2006–07 and 2007–08. The results exemplify how local authorities, whether taking a strategic or direct role in supporting businesses to improve the use of their resources, can have a significant impact in reducing waste to landfill, reducing carbon emissions and importantly decoupling economic growth from environmental protection through enabling financial savings.

Table 1

BREW CENTRE OUTPUTS FOR 2006–07 TO 2007–08 (DATABUILD LTD)

<i>Metrics</i>	<i>Units</i>	<i>Figures with attribution</i>	<i>Figures with attribution and persistence</i>
Diversion from landfill	Tonnes	71,753	358,733
Virgin raw materials saved	Tonnes	139,271	696,325
Carbon dioxide savings	Tonnes	34,093	170,430
Reduction in potable water	m ³	24	120
Reduction in hazardous waste	Tonnes	67,551	337,755
Cost savings to businesses	Pounds	9,424,869	47,123,371
Cost savings to the LA	Pounds	54,238	271,190
Additional sales	Pounds	3,183,946	15,919,728

Over the last two years the BREW Centre has developed a network of officers and worked with their local authorities on a series of case studies designed to provide actionable advice and “lessons learned” and also show how their projects and services have been specified, designed, financed, implemented and operated in practice. Case studies are available on a dedicated website www.eas.local.gov.uk/brew.

6. WORKING WITH REGIONAL DEVELOPMENT AGENCIES

Regional development agencies (RDAs) look to work with local authorities to translate national and regional demands into local action. RDAs provide regional leadership, ensuring that major regional decisions and plans are informed by sustainable development priorities and analysis, enabling them to deliver carbon reduction in the business sector, supporting resource efficiency advice for SMEs through the Business Link organisation, and through their role in regional co-ordination of business resource efficiency activity (previously funded through Defra’s Business Resource Efficiency and Waste Programme (BREW) Programme). Examples of RDAs supporting local authorities who wish to help their business community prevent waste production include:

- South East Economic Development Agency’s funding for the development of the Business Resource Efficiency Pack by Oxfordshire County Council.
- Yorkshire Forward’s support for the development of trade recycling services offered by local authorities.
- North West Regional Development Agency support for the development of EnviroConnect. A business advise service local authorities can sign post their businesses to for information on improving their environmental performance, including how to prevent waste (www.environmentconnect.co.uk).
- Advantage Waste Midland’s “Waste is Money” event, linking the private sector and public sector together identifying suitable resource/material exchange through the National Industrial Symbiosis Programme (www.nisp.org.uk).

7. THE FUTURE

Through the Sub-National Review¹⁹ the emerging policy is to combine existing economic strategies and planning strategies for each English region into a single integrated regional strategy to be drawn up by the RDA to bring together the economic, social and environmental objectives for each region. The RDAs will have to be aware of the needs of the business community, the waste management industry and local authorities and must consider and interpret any national, regional or local data. They must also interpret intelligence on constraints to capacity development and consider national policy expectations and requirements. This is

¹⁹ <http://www.berr.gov.uk/regional/sub-national-review/page40430.html>

particularly important as the resulting strategies will have a profound impact on the business community at a time when it is evident that more businesses are opening their doors to issues around environmental performance and resource efficiency.²⁰

Local government leadership and vision has to be an essential part of the drive for resource management. The decoupling of economic growth from environmental impact can be achieved through encouraging local authorities to use their leadership role in influencing resource management within their locality which can go some way to addressing climate change. It is the decision making at this local level that can make the difference between a resource efficient approach to a resource intensive one and is critical to helping businesses plan their use of resources, if they are to continue to be competitive in the domestic and international markets. Local authorities can provide direct and more strategic support to their local businesses, and by doing so can divert significant material away from landfill, prevent virgin material from being used and importantly save businesses money. Small businesses need practical measures to help them address their waste and may need to be shown how reduction and reuse methods can affect them as they may find it hard to apply generalised or isolated case studies to their specific situations. That is what the BREW Centre projects and NISP provide. Information alone can too often be binned or not accessed.

1 May 2008

Memorandum by the Electronic Producers Environmental Policy Forum

The Electronic Producers Environmental Policy Forum (EPEPF) works to inform the Government and Parliament about the impact of current legislation on the sustainability of electrical products. Members of the Forum include industry leaders such as Sony, Samsung, Hewlett Packard and Canon.

Most recently, the EPEPF has been working to draw the attention of parliamentarians to the problems caused by the Government's inchoate transposition of the Waste Electrical and Electronic Equipment (WEEE) Directive.

The European Union's WEEE Directive charges the producers and retailers of electronic and electrical equipment with responsibility for increasing the reuse, recovery and recycling of WEEE. In a letter to the waste disposal authorities in England (dated 18 April 2007), Jeanne Grey, Assistant Director of WEEE Implementation argued that:

“The aim of the WEEE Directive is to minimise the negative environmental and health impacts of WEEE, and contribute positively to sustainable development by maximising the separate collection of WEEE from other forms of waste. This separate collection is the precursor to the appropriate treatment of WEEE and subsequent reuse, recycling and recovery of WEEE and environmentally disposal of any residual WEEE”.

However, as currently transposed in the UK, the WEEE Directive only enforces a system of Collective Producer Responsibility (CPR) which does not maximise the collection, reuse or recycling of WEEE. CPR makes producers of electrical and electronic goods responsible for a proportion of all WEEE that is equal to the amount of product that they put on the market. Under CPR, the cost of recovery, recycling and reuse are absorbed collectively by all producers. CPR does not provide any single producer with the incentive to make their products easier to recycle or reuse.

The EPEPF believes that the Government should fully transpose article 8.2 of the original EU WEEE Directive which would bring about Individual Producer Responsibility (IPR) in the UK.

While CPR makes each manufacturer responsible for a proportion of all WEEE, under IPR each manufacturer is only responsible for the WEEE arising from their own products and therefore creates an incentive for each producer to design their products in such a way as to make them easier to recycle or reuse.

R J Lipset,²¹ the pioneer of producer responsibility theory has argued that:

“There is little doubt that extended producer responsibility generates both economic and political incentives for waste recovery and more broadly, green design”.

IPR provides a competitive incentive for producers to design their products so that they are easier and therefore cheaper to recycle. By making them liable for any and all charges arising from the costs of recycling or reusing only their own products, IPR provides producers with a powerful economic incentive to design those products in a way that makes them easier and cheaper to recycle or reuse.

²⁰ Environment Agency (2007) “SME-nvironment 2007 (England)”, available at: www.netregs.gov.uk/commdata/acrobat/smenvironment2007uk_1856733.pdf.

²¹ Lifset, R J, “Take it Back: Extended Producer Responsibility as a Form of Incentive Based Policy” *Journal of Resource Management and Technology*, Vol 21, No 4, December 1993.

Without the transposition of article 8.2, the incentive to encourage producers to focus on design for recycling is absent. This jeopardises the attainment of the Directive's objective which was to create "an economic incentive for producers to adapt the design of their products to the prerequisites of sound waste management". [EC: WEEE (2000)].

12 Member States have transposed Article 8.2 (including Belgium, Cyprus, Italy and Sweden) while 12 Member States have not (including France, Spain and the UK). Four Member States have partially transposed article 8.2 (including Germany).

While the UK Government has indicated its willingness to implement IPR in principle, they have claimed that they cannot transpose article 8.2 until a fully workable model is available. Workable IPR models already exist in other countries such as Sweden, Japan and parts of America. While an IPR system that sees producers collecting, recycling and reusing their own products may not be possible in the UK at this juncture, as a first step, a system that makes producers responsible for a proportion of WEEE equal to the electrical and electronic equipment they actually put on the market, worked out through brand sampling from the waste stream, would be a possible and positive first step. In conclusion, the EPEPF believe that without IPR, the WEEE Directive is failing in its main objective: to establish an incentive or producers to design products for easier recycling and that the first step is to ensure that Article 8.2 is properly transposed in the UK.

22 October 2007

Memorandum by Essex County Council

SUMMARY

It is the view of Essex County Council that if there is to be a true commitment to the waste hierarchy which clearly places reduction and reuse above recycling, then there must to be a much greater public and industry focus on waste prevention and minimisation over the long term.

Adoption of waste prevention and minimisation activities by the public is, in the main, low as generally these activities are, from the public perspective, time consuming, out of their control and require significant changes in lifestyle which are often seen as reducing the quality of their life (ie having to go without). As a result of the viewpoint of the public it is often difficult for local authorities to significantly influence behaviour particularly when most activity is focused on enabling and encouraging.

Adoption of waste prevention and minimisation activities by industry seems to vary greatly; taking place only where a clear financial or competitive advantage can be demonstrated.

If waste management is going to shift significantly up the waste hierarchy then a more interventionist approach is required to tackle the issues at source, primarily focusing on producers, manufacturers and retailers. This should focus on all stages along the product supply chain to ensure waste generation is minimised at the design/manufacture phase of products, and greater steps are taken to remove the use of unnecessary packaging.

With regard to the public, the issue of reduction and reuse needs to be escalated at a national level. Public awareness of the issues, problems, opportunities and costs needs to be raised as a way of stimulating individual action. The ultimate goal should be that generating high levels of waste is seen as socially unacceptable behaviour and taking active steps to reduce waste is normalised. For this goal to be achieved it is likely that even after tackling waste at source and "pricking" social conscience, further actions will need to be taken of a punitive nature. We would support any activities which provided greater information to the consumer on the environmental impact of their purchasing choices and would highlight the success of energy efficiency labelling on electrical goods as a model which could be replicated for wasteful products.

Making changes to the current pricing framework for household waste to allow for variable charging for household waste will enable local authorities to take the ultimate actions against those generating excessive waste; this approach will also fully embrace the polluter pays principle. This approach is prevalent in the water, gas and electricity industries and Essex believes that the option to introduce direct financial linkages for waste need to be available to local authorities.

Charging for waste in this manner has focused the attention of commercial organisations to reduce waste and there is no reason to doubt a similar effect will be seen on domestic waste providing all steps are taken to enable householders to prevent and minimise waste (eg through home composting) and maximise recycling prior to introducing punitive measures.

BETTER DESIGN AND USE OF MATERIALS

What role can better design and material play in minimising the creation of waste?

If waste reduction is going to be effectively tackled it is essential that there is a shift away from end of pipe solutions. The public generally feel that waste avoidance is out of their control as products are not designed with waste avoidance as a primary focus. The over use of packaging and the disposable nature of many products results in high levels of waste which the public feel is an inevitable result of consumerism.

Opportunities to “design-out” waste within the end products as well as within manufacturing process must be taken by designers and manufacturers if overall waste arisings are to be reduced. This will require a shift in mindset for manufacturers as well as support.

The work of WRAP within the area of supporting manufacturers and retail buyers must continue. The work being undertaken by WRAP to promote the use of alternative materials and the light-weighting of packaging has started to have an impact within the industry. This work needs to be expanded and promoted more widely. The promotion of actions taken by manufacturers and/or retailers can then form part of the purchasing decision made by the public.

Great strides have been made to reduce the quantity of collected waste through the introduction and promotion of home composting as a waste reduction tool. Since 2000 Essex has distributed and supported the use of over 95,000 compost bins (in partnership with WRAP from 2005). The use of bins by almost a fifth of Essex households has undoubtedly reduced the quantity of material collected by Essex waste authorities. This at-source treatment of waste provides a ready opportunity for manufacturers to focus on the use of biodegradable packaging/materials which can readily be disposed of within home composting units.

Essex County Council is taking a lead in addressing the challenges around production of waste created by development pressures in the region. Policies and guidance are in place which will influence the design process to take account of the waste arising from developments.

The Urban Place Supplement (UPS), a companion document to the Essex Design Guide which provides guidance on the layout and design of housing and mixed use development, sets out criteria for new development that will minimise waste, reduce pollution and promotes sustainable construction. The UPS challenges designers to:

- have regard to the reuse of materials that may already exist on site;
- consider the advantages of off site pre-assembled, prefabricated or standard sized components, which can reduce the amount waste produced during the construction process;
- choose materials which have good weathering properties that are durable and capable of being recycled. This will thus minimising waste during the life time of the building; and
- designing deconstruction into properties enable further reuse of materials.

These principle factors are equally transferable to the manufacture/retail sector.

The requirement for some developers to have Site Waste Plans has played a major role in increasing knowledge within the construction industry. This should be extended to ensure waste reduction in terms of the choice of materials is also factored into the design of such developments.

Can better designed products offset the increase in consumption?

Improvements to the design of products can undoubtedly lead to a reduction in consumption by the public particularly when design improvements are coupled with increased durability and reusability. However for impact to be maximised, this approach needs to be undertaken in a climate of increased awareness and public consciousness so that there is a direct link between the waste reduction design elements of a product and the purchasing decisions of the consumer.

Greater availability of information to the public on the material efficiency of products (through a similar eco-labeling approach as that adopted for product energy usage) when coupled with the normalisation of waste reduction/prevention will assist the public in making informed purchasing choices.

In targeting the end product, it should not be ignored that significant levels of resource consumption take place in the development and manufacture of products, and therefore improvements to the design of products must be extended to the manufacturing process. The impact of increasing material resource efficiency within the manufacture of products will have a much greater impact on total waste arisings within the UK than focusing solely on the end product.

The activities of Envirowise, WRAP and the National Industrial Symbiosis Programme (NISP) have introduced the concept of resource efficiency and co-operation between differing business sectors as a means of improving performance and reducing consumption by businesses. These activities must be continued to ensure that the concept of waste reduction and increased resource efficiency become central to the ethos of manufactures. This concept has been extended on a regional and local scale with both the public and SMEs through the promotion of waste exchanges.

Are there any gaps in knowledge and how are they being addressed?

Essex has had some experience in this area in relation to the promotion of the ethos of the UPS. This has demonstrated that in a rapidly changing physical and policy environment everyone is on a steep learning curve, including those in the development industry and local authorities.

The Essex Design Initiative learning programme aims to disseminate information, increase the knowledge and skills to developers/agents/local authority planners around the issues contained within the UPS. Included in this programme there are seminars which address waste management and minimisation. It is however a challenge to capture the small builder carrying out small scale development [less than 10 units] which accounts for 87 per cent of the planning applications in Essex for new housing, however these developments only account for about 1 per cent of new housing stock.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

The producer responsibility regulatory framework has gone some way in focusing the manufacturing and retail sector on producing and specifying more sustainable products and improved processes which minimise waste arisings. Essex would support an approach which increases the scope of producer responsibility to other products and allows for organisations to meet their obligations through the sale/design of reusability, longevity and upgradability into products.

The key legislative tool available to local government to tackle excessive waste resulting from products placed on the market is *The Packaging (Essential Requirements) Regulations 2003*. This does enable Trading Standards (Weights and Measures Authorities) to take action against those that place on the market goods which use excessive packaging. Although supportive of this legislation the low number of successful actions taken against those responsible for putting over-packaged products on the market highlights the inherent difficulty in applying these regulations. Essex would wish to see a simplification of these regulations to enable greater applicability and the extension for enforcement to the Environment Agency. This would enable a much greater use of the regulations against national and international manufacturers.

Current national policies and regulations support the development of sustainable solutions but generally central government legislation does not demand the use of sustainable products, for example, the Government's Code for Sustainable Homes that sets the minimum standard for the environmental impact of materials in house building requires elements of construction to meet the BRE Green Guide 2006 rating of at least D, however Code compliance is currently voluntary. It is instead left to individual authorities, agencies, landowners, clients to require the use of more sustainable products/processes.

The number of enquires handled by Essex County Council would seem to indicate that the level of understanding, particularly amongst small and medium sized enterprises, is low. It is essential that all business sectors understand and adopt the necessary measures to ensure legal compliance and the adoption of good practice.

What other measures can promote a focus on waste reduction among business?

In addition to the use of punitive fiscal and/or legislative measures the key aspect which will encourage the adoption of waste reduction measures by business is if this can be demonstrated to improve efficiency or provide a competitive advantage.

The role of Envirowise and NISP and similar local/regional agencies have positively impacted on the way in which business use material resources providing them with the opportunity to reduce costs, increase efficiency and thus allowing them to compete more effectively within the market place. The work of such organisations must therefore be encouraged and allowed to continue.

The opportunities for business to have a competitive advantage through improved resource efficiency can also be driven by public expectations. If the inefficient use of resources is seen as socially unacceptable by the general public then those organisations that can demonstrate a good track record in this area will have greater opportunity to prosper.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issues of waste reduction?

If waste management is going to shift significantly up the waste hierarchy then there needs to be an increased government focus on waste reduction. Essex CC feels that a more interventionist approach is required to tackle the issues at source, primarily focusing on producers, manufacturers and retailers. This should focus on all stages along the product supply chain to ensure waste generation is minimised at the design/manufacture phase of products and greater steps are taken to remove the use of unnecessary packaging.

Government intervention can take a number of forms including the use of punitive measures. These could take the form of an extension producer responsibility regulation to tackle single use/disposable items such as razors, cameras or nappies where a reusable or longer lived alternative exists, thus ensuring the true cost of these items is reflected in the retail price. A greater requirement for repairability/upgradability to be designed into products or the introduction of a minimum lifespan/warranty period for products could be introduced.

Government also needs to take a lead in demonstrating what can be achieved to reduce waste by putting waste reduction into practice within its own operations. The adoption of government departmental targets for waste reduction along side those for recycling should be adopted to demonstrate real commitment to the waste hierarchy.

It is only once active measures have been taken to design waste out of products that either national or local government can expect the public to adopt greater waste avoidance within the home. Despite the almost universal acceptance and understanding of the need to recycle there still seems to be widespread ignorance amongst the public with regard to the concept of waste reduction or the need to take personal responsibility.

A key role of government needs to be to develop and fund an overarching national waste prevention message over a long period. Such a message must tap into the public consciousness and make use of the drivers which influence public behaviour in this area, many of which may not be associated with environmental concerns. As with all campaigns aimed at changing behaviour it is essential that these are carried out over an extended period and properly resourced. WRAP have demonstrated significant success in developing the national recycling campaign which has been almost universally adopted by local authorities.

In raising the public understanding and acceptance of waste reduction it is essential that Government takes the necessary actions to enable the public to make informed choices. This could take the form of extending the eco-labelling approach to highlight the efficiency of products with regard to the use of material within the final product and during the manufacture. Such an approach has clearly resulted in an increase in the uptake of energy efficient products and there is no reason to assume this could not be replicated for waste reduction.

Although the role of reuse is often seen as delaying the entry of material into the waste stream and therefore not true reduction, its role in waste management and the wider social benefits should not be ignored. The third sector play an active role in the provision of reuse activities resulting in significant social and economic spin-off benefits. A requirement to incorporate repairability into the design of products would stimulate this area of activity.

The use of punitive measures targeted at the public disposing of waste can only be used once reasonable effort has been taken to “design-out” inefficient material use in products, provide the public with alternative purchasing options. Essex County Council supports the recent consultation on the introduction of measures to enable Waste Authorities to operate differential charging mechanisms for waste collection and disposal. It is however the view of Essex that for this to work effectively there must be the flexibility for waste to be treated like utility and that charges must be set at a level to influence behaviour.

CONSUMER BEHAVIOUR

How can better design be used to effect a change in consumption patterns and behaviour?

Better design and the use of materials without fiscal measures or actions which limit consumer choice will only influence consumer behaviour if there is a public groundswell against inefficient use of materials. As previously stated the ultimate goal should be to ensure high waste generation whether it is by the public or manufacturers is seen as socially unacceptable. This will only be achieved through an effective, continuous and high profile national public awareness campaign.

A shift in public opinion against inefficient resource use and high levels of waste generation together with improved product information on resource efficiency will assist in shifting public consumption patterns. This will be further enhanced when coupled with fiscal measures such as those detailed previously.

Are there any gaps in this area?

Significant gaps exist in knowledge relating to the impact of socio-demographics on consumption and therefore the triggers which influence purchasing choices and behavioural shift. If waste reduction is to be achieved successfully the ideal approach is that this is driven through public demand rather than fiscal or legislation, although these have a part to play. Such a shift in public opinion can only be achieved through a true understanding of what motivates the public to minimise waste.

22 October 2007

Memorandum by Ford Motor Company

FORD MOTOR COMPANY IN BRITAIN

1. FMC group companies in Britain employ around 30,000 people—approximately one third of all Ford Motor Company employees in Europe. 15,500 of these people are employees of Jaguar and Land Rover. Three Ford Motor Company brands build vehicles in the country—Ford “Blue Oval”, Jaguar and Land Rover.
2. Research and development forms an important part of FMC’s activity in the UK and accounts for 80 per cent of automotive industry R&D in Britain. FMC employs around 9,500 people at its three main technical centres in the country: the Ford of Britain technical centre at Dunton, Essex, and the Gaydon and Whitley complexes responsible for Jaguar and Land Rover engineering development. R&D is also conducted into diesel engine engineering at the Ford Dagenham Diesel Centre and among the technical teams working in FMC manufacturing facilities. Spending on R&D in the UK for Ford Motor Company brands is around £800 million annually.

SUMMARY OF KEY MESSAGES

3. Ford is proactive in its use of recycled, renewable and low life-cycle impact materials and we are looking at ways of increasing use where appropriate.
4. Ford’s approach to the environmental impacts of its products and processes has evolved from “designing for disassembly” to “designing for recycling” and finally to “designing for sustainability”.
5. Ford of Europe’s Product Sustainability Index (PSI) is a result of this learning process. The report is a comprehensive model-by-model approach to addressing the environmental, social and economic impact of vehicles from the earliest stages of their development.
6. Designing for waste reduction or recycling does not necessarily optimise environmental impacts—a life-cycle approach must be adopted. 85% of a vehicle’s life-cycle CO₂ is associated with the in-use phase. A recycling-driven change that detrimentally affects this phase could have a net negative effect over the life-cycle.
7. Article 7.2 of the End-of-Life Vehicle Directive requires new targets of 85 per cent recycling and 95 per cent recovery by 2015. According to ACEA, a more efficient approach is to send stronger signals to the waste treatment market by further restricting the availability of landfill.

8. End-of-Life Vehicle recycling targets can limit the auto industry's ability to meet legislation in other areas, importantly CO₂ emissions and the regulated tailpipe emissions, and may discriminate against weight reduction measures.

BACKGROUND

9. Ford has applied Design for Environment principles since the early 90s. Then, the focus was on improving disassembly of vehicles by taking into account accessibility of parts to be disassembled, the type and number of different fasteners used and the marking of parts for easy identification. At that time disassembly was seen as the preferred End-of-Life strategy.

10. In the mid-90s the possibilities of mechanical recycling were increasingly taken into account in the strategy, leading to design guidelines that covered aspects such as material complexity and material compatibility. In the late 90s there was a shift in design philosophy from end-of-life to a total life-cycle focus. The material and component production phase as well as the in-use phase appeared on the Design for Environment agenda.

11. The reason for this shift was that several studies had shown that recycling only contributes a small amount to the total life-cycle impact, that the in-use phase is clearly dominant and that a focus solely on the end-of-life phase could have a net negative effect over the whole life-cycle. Since 2002 social and economic aspects in addition to the environmental aspects have been included in the design optimisation. Ford refers to the new approach as Design for Sustainability.

12. Ford is proactive in its use of recycled, renewable and low life-cycle impact materials and we are looking at ways of increasing use where appropriate. European Ford vehicles contain between 8–15 kg recycled non-metals each depending on the model type.

13. Example parts include:

- Housings for air-conditioning systems made of recycled polypropylene bottle caps.
- Engine covers made of recycled polyamide.
- Wheelhouse linings made of recycled polypropylene.
- Sound damping/insulation materials made of recycled textile waste/scrap and recycled bitumen.
- Fan wheels and frames made of recycled carpets and packaging tapes.
- Air filter housings made of recycled car battery casings.
- Door mirrors made of various types of recycled housings.
- Radiator grilles made of recycled bumper material.

14. Ford Motor Company was the UK's first vehicle manufacturer to offer free take back of all qualifying end-of-life vehicles. A network comprising approximately 130 treatment facilities and 20 collection points has been established UK-wide. Ford's end-of-life vehicle network now extends across all EU Member States and beyond.

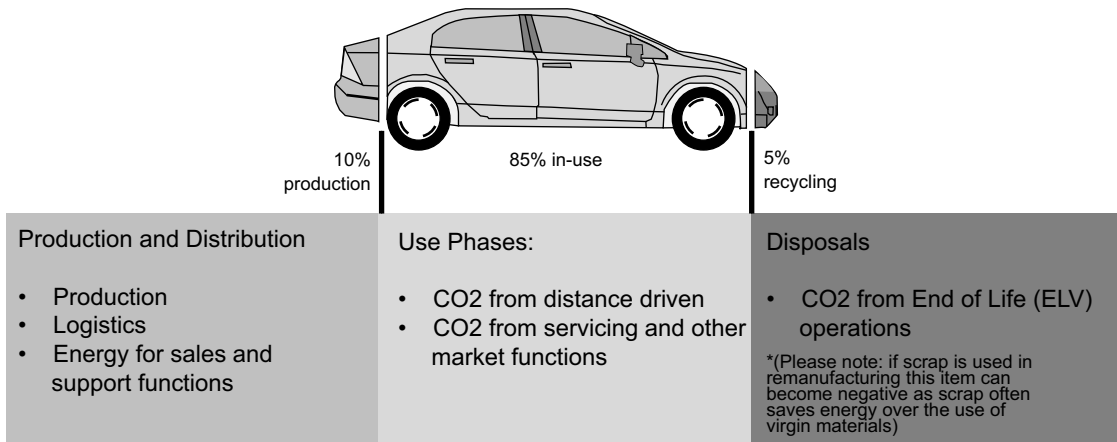
15. Information about the UK disposal network is made available to the last customer via the Ford website, (www.ford.co.uk), our contracted network partner Cartakeback.com Ltd (www.cartakeback.com), a hotline number, or e-mail.

BETTER DESIGN AND THE USE OF MATERIALS

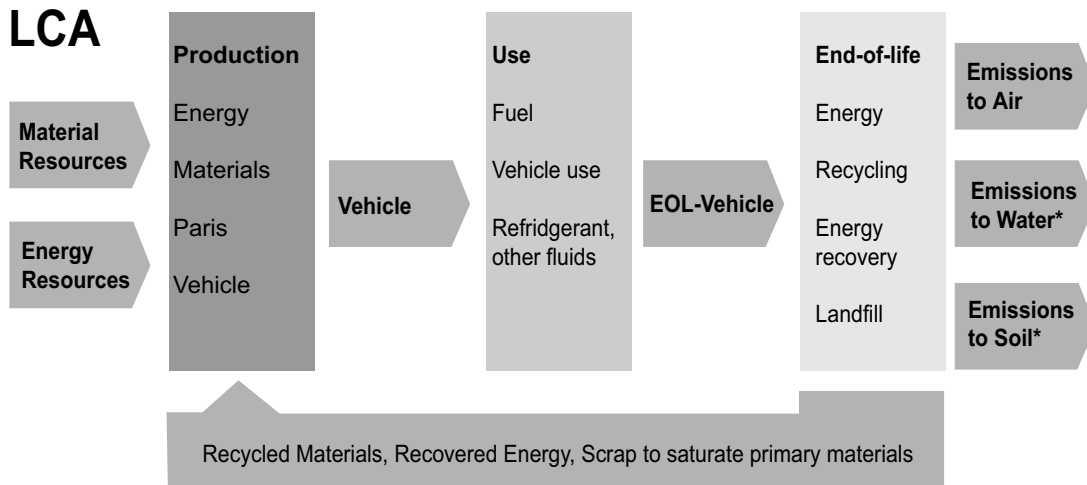
What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

16. Ford's approach to assessing the impacts of waste from its products and processes has evolved from "designing for disassembly" to "designing for recycling" and finally to "designing for sustainability". The life-cycle approach is far more important than focusing only on one particular aspect of the life-cycle.

17. In the case of vehicles, design changes to improve disassembly and recycling have no significant environmental benefit due to the relatively small contribution of the end-of-life phase to the overall life-cycle impact. The figure below illustrates that 85 per cent of a vehicle’s environmental impact is generated in the in-use phase.



18. Taking a more holistic life-cycle approach to design and materials selection can optimise the environmental impact. The Ford Product Sustainability Index (example attached) report is a comprehensive model-by-model approach to addressing the environmental, social and economic impact of vehicles from the earliest stages of their development. The figure below illustrates the components of the whole life-cycle approach to sustainable design.



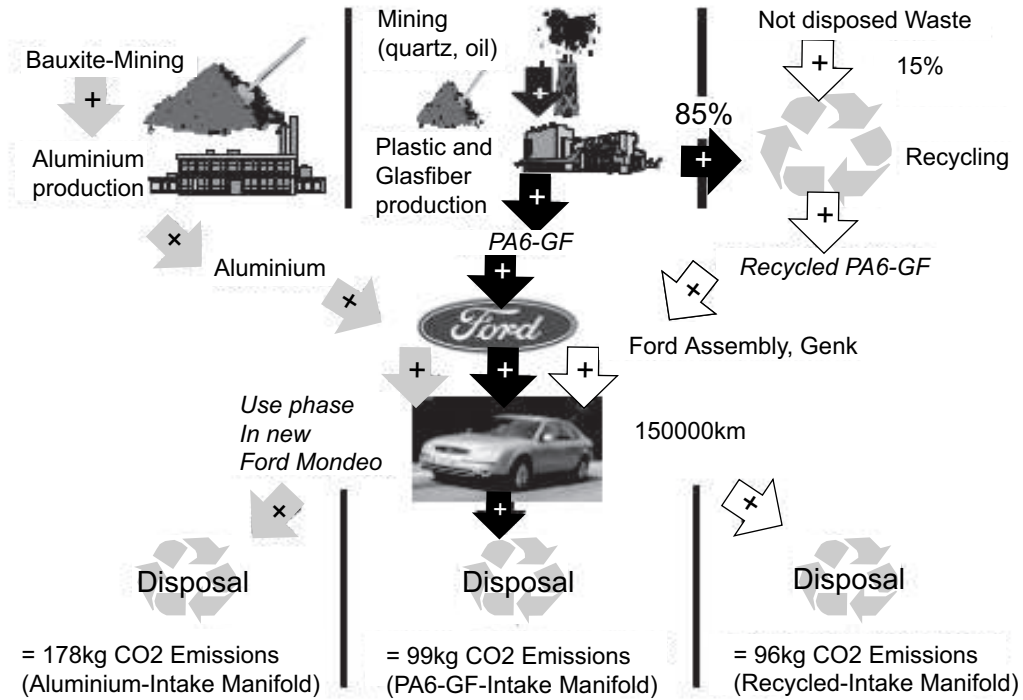
19. Automotive manufacturers use significant proportions of steel and other alloys, plastics and some precious metals in their products. The cost of these materials is sufficient incentive to minimise waste in the production process itself. Cars are one of society’s most recycled products due to the high value of the vehicle at the end of its life. This is evident by the widespread absence of abandoned vehicles throughout the UK.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

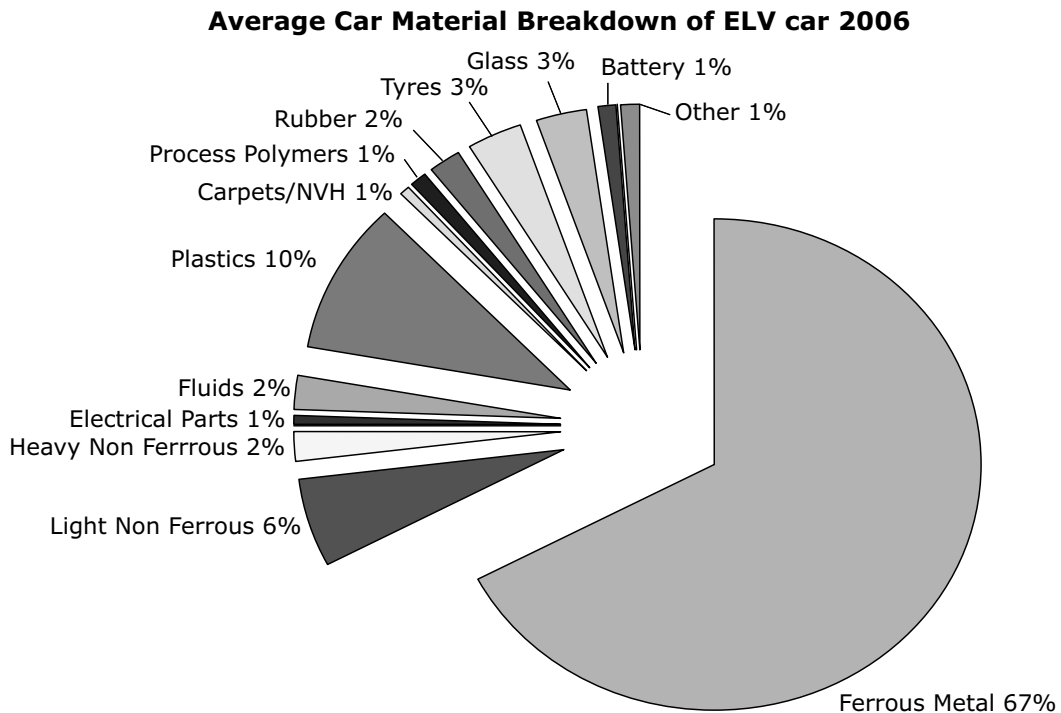
20. Cost, technical and environmental performance, manufacturability, durability, substance restrictions (voluntary and regulated) and weight are some common examples of factors influencing such decisions, although others will come into play depending on the particular application.

21. Ford Motor Company has established within its global Ford Product Development System (FPDS), a vehicle product system which strives to minimise the total environmental impact of vehicles. This approach is illustrated with the intake manifold example below where a recycled product generates the lowest lifetime CO₂

emissions. It should be noted that the improvement in lifetime CO₂ from utilising recycled content is not as significant as that from discontinuing the use of aluminium. This, in turn, makes recycling targets more difficult to achieve.



22. Understanding the overall life-cycle benefits when selecting materials is key. Focusing only on recycling can be detrimental. For example, reducing material complexity to improve recyclability may lead to over-engineering of materials resulting in increased weight, leading to greater fuel consumption in the in-use phase and increasing the overall environmental impact. Conversely, engineering lighter vehicles with composite panels or aluminium body structures can reduce environmental impacts in the in-use phase but may make mass-based recycling targets more difficult to achieve. The figure provided by the SMMT below illustrates the proportion of metals in an average UK end-of-life vehicle.



To what extent do product designers and engineers take into account the availability and the end-of-life impacts of raw materials?

23. Automotive industry past practice was to enable reuse and recycling through ease of dismantling of targeted parts as well as through material selection (eg to improve material compatibility). Recent scientific studies have shown that while such an approach imposes severe design constraints (eg on craftsmanship, weight, packaging), it delivers few, if any, of the perceived benefits.

24. There is a fundamental difference between vehicle assembly where workers are trained to assemble few parts for one or two vehicles and vehicle disassembly where workers have to cope with hundreds of different vehicle types, of all ages and some damaged or with damaged fasteners.

25. Real-world dismantling tests have shown that only a small portion of the dismantling time can be addressed by product design. Most theoretical linkages between design aspects as length of screws, accessibility, visibility, etc. are overruled in practice by issues such as operator experience and work organisation. This means Design for Disassembly is not really an effective approach. From an environmental perspective dismantling is clearly not preferable compared to Post-Shredder Treatment separation.

26. From a purely environmental perspective—when taking the whole vehicle life-cycle into account—the end-of-life phase of certain types of non-metals does not play any significant role in terms of potential environmental impacts or recycling credits. These efforts result in no remarkable improvement for the environment.

27. Advanced recycling methods (Post-Shredder Treatment) exist that allow the recycling and recovery of literally all materials for vehicles in the end-of-life stage. Thus a focus on life-cycle impact is more relevant on material selection than a focus specifically on end-of-life. The general waste hierarchy (recycling is better than energy recovery is better than landfilling) has also been shown not to apply in the case of automotive non-metals.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

28. Any impacts will be application-specific, affecting any number of parameters (for example weight, strength, stiffness, manufacturability, and cost).

Can better designed products offset the increase in consumption?

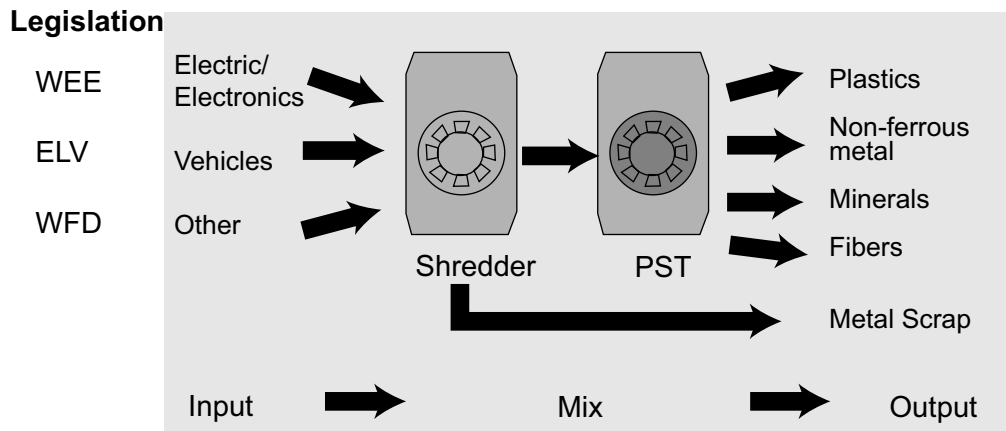
29. Recycling-driven changes to product design can sometimes jeopardise the overall environmental performance (see above). In consequence, design needs to be more holistic. The Ford approach has evolved from “designing for disassembly” to “designing for recycling” and finally to “designing for sustainability”. Ford of Europe’s Product Sustainability Index (PSI) is a result of this learning process.

30. Vehicles are highly recyclable (the European average is approximately 85 per cent). Only 5 per cent of the life-cycle energy is used at the end-of-life stage and 10 per cent during its manufacture. It is therefore most important to address the remaining 85 per cent of life-cycle energy consumption from the in-use phase. Reduction in consumption is therefore best tackled by a series of low CO₂ vehicle technologies such as efficiency improvement, weight reduction, reduced parasitic energy loss and new low-carbon fuels.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

31. Processing of end-of-life vehicles is already heavily regulated. Article 7.2 of the End-of-life Vehicle Directive requires new targets of 85 per cent recycling and 95 per cent recovery by 2015, up from the current 80 per cent and 85 per cent respectively. The environmental aspects of the Directive already control potential pollution risks and the use of heavy metals, and the global economic demand for metals of all types ensures their efficient recycling. The remainder (mainly plastics) can be efficiently recycled based on Post-Shredder Treatment (PST) techniques. Thus we would propose in the case of end-of-life vehicles that greater emphasis be placed on PST rather than recycling or recovery targets.



32. According to the European Automotive Manufacturer's Association, ACEA, the most effective policy instrument to achieve the goal of waste reduction (and the promotion of PST) is a restriction of landfilling of automotive shredder residue. Investments in advanced recycling processes are not being made because the landfilling alternative is both available and affordable. Regulation can help further by establishing markets for the automotive residues which are currently landfilled. Setting increasingly stringent end-of-life vehicle recycling targets for automotive manufacturers to meet will not create such a market.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

33. The Ford Product Sustainability Index (example attached) report is a comprehensive model-by-model approach to addressing the environmental, social and economic impact of vehicles from the earliest stages of their development. It includes a foreword from John Fleming, President and CEO of Ford of Europe stressing the importance of sustainable design for business thinking.

What other measures can promote a focus on waste reduction among businesses?

34. An exclusive focus on waste reduction can sometimes be detrimental to the environment.

What lessons can business learn from international experience?

35. An exclusive focus on waste reduction can sometimes be detrimental to the environment.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

36. The role of Government is to ensure that the market mechanisms can work. Increased raw material prices and the limiting options of cheap landfilling are already creating a natural business incentive for a change. Creating markets for waste streams not already recycled will clearly reduce waste further, as will incentives for automotive shredders to invest in the latest Post-Shredder Technologies.

37. End-of-Life Vehicle recycling targets, alongside safety and air quality regulations, limit the auto industry's ability to meet its principal environmental focus of reducing CO₂ emissions. Recycling targets penalise manufacturers that include a light-weighting approach in their low-CO₂ strategies.

How does Government policy link up with European strategies and action plans?

38. The end-of-life vehicle experience has been uniform across the EU and other countries. As a global business the automotive industry needs a common and consistent approach. Piecemeal national solutions will elicit a sub-optimal response.

What lessons can be learnt from other countries—within the EU and globally?

39. The end-of-life vehicle experience has been uniform across the EU and other countries.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

40. Fuel economy indicators and gear shift indicators can support the right change in driving behaviour and use of vehicles. Consumers demand increased durability and longevity—slowing the rate of penetration of more efficient products into the market.

What role do marketing strategies play in influencing more sustainable design?

41. The in-use phase of the product life-cycle has the greatest impact in environmental terms. Fuel consumption, as a proxy for CO₂ emissions, is already an important factor in the consumers purchase consideration. As well as meeting our legal obligations to disclose the CO₂ emissions of our products, we further advise our consumers on a voluntary basis through printed media and at our dealerships. Further research into consumer attitudes to the environment would be welcomed.

Are there any gaps in knowledge in this area?

42. Consumers are the key to success. Their demand triggers production and consumption. Therefore research activities around the establishment and maintenance of sustainable consumer behaviour would be welcomed.

SKILLS

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

43. These considerations are already integral to the Ford product design philosophy.

March 2008

Memorandum by Forum for the Future

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

It can play a role, but one should be aware of panaceas and general rules of thumb. The often quoted one here is that 80 per cent of the environmental impact is dictated (and can be designed out) at the design stage. Actual experiences suggest that this may be distracting, that all waste reduction problems are not design problems and that there are a serious amount of things to do even before you go upstream. Electronic recycling is one example of that (where it is not design, but the recycling technologies and policy landscape that affect the efficiencies and rates). Paint tin recycling is another similar case where design changes are negligible in comparison to improving the efficiencies of collection and recycling facilities. Recommendation—starting from the specific context, material and waste stream is everything.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

A general question this—but sustainability most frequently links to material choice through cost and efficiency issues ie using less, costs less. Two trends building on this are that retailers are starting to consider and drive change in material selection of their purchased services (M&S, B&Q) and leadership work is beginning to transfer material and resource issues into carbon savings or footprints. In general though, material selection and resource efficiency are forgotten pieces of the sustainability jigsaw with all the emphasis on carbon and climate change.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

It is not clear whether availability of resource is a major driver (unless linked to real resource scarcity or some other emotive issue ie palm oil). End of life is an issue, but massively driven by the policy framework, such as recycling schemes, take back, etc.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

It does not drive it too much, but these are new issues that material scientists can and are using to justify their work as well as new applications.

Can better designed products offset the increase in consumption?

Only marginally. It can help to reduce individual resource intensity per unit of consumption (product), but for big and real changes we need new consumption systems, ways to deliver service, well-being and utility to people. Probably a new way to organise production and consumption. There is also no substitute for policy change driving changes to consumption. We are kidding ourselves if we think people will “buy their way out of trouble...”

Are there any other gaps in knowledge and how are they being addressed?

We may be misinterpreting the term “design” in all this. We need to interpret it in its broad, rather than narrow sense. We tend to think that any early stage, strategic design that will design out the unsustainability in the first place will be done by designers. This is not the case or will be. This form of influential “design” is done from many and varied places within companies (the CEO, marketing, R&D, strategy, etc). A knowledge gap would be to help people identify where these influential sustainable design places actually are.

We need to have meaningful discussions about the end versus front-of-pipe argument in terms of waste reduction.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

In general it is a bit compliance-focused, driving minimum standard. It would be great to have more policy development that drives real transformation rather than incrementalism. Two ways to think of this are WRAP (which is good, but at best incremental) versus DTI Innovation funding (which is at least seed funding some interesting industrial experiments on waste reduction and sustainable design). Much more of the latter is preferable.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

Sustainable design thinking and awareness is really, really low. Work on sustainable design/innovation is only just starting to take off. It’s a fantastic time, but Forum for the Future are really at the cutting edge of this leadership work. Most other sustainable design is of the type promoted and supported by WRAP or Envirowise. It is OK, but not very ambitious, visionary or inspiring and driven by compliance. In terms of delivering a sustainable future we have little hope.

What other measures can promote a focus on waste reduction among businesses?

Carbon/climate change seems the current flavour of the month. How about linking waste reduction more to that?

What lessons can business learn from international experience?

Japan is much more aggressive in its waste reduction policy and industry practice, and lots can be learned from them. Not least in their ambitious policies.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

More inspiring examples, pilot projects and cases of how we could get radical and be visionary around waste reduction. Let us look at some ways to radically rethink production and consumption systems driven by dramatic waste reduction targets.

How does Government policy link up with European strategies and action plans?

What lessons can be learnt from other countries—within the EU and globally?

Cultural issues from other countries. The importance of political leadership and brave policies which might initially be unpopular and controversial.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

It can influence, but there are all sorts of and perhaps better ways to change consumption and behaviour. We are currently overemphasising information and choice to consumers. Will carbon labels or health warnings on airline tickets really stop people flying? It is doubtful; there are other and better ways to do this. Let us choose our battles carefully in terms of product design and consumption.

What role do marketing strategies play in influencing more sustainable design?

Potentially huge; practically, not so much other than the few leadership cases such as UK retailers at the moment.

Are there any gaps in knowledge in this area?

A sensible discussion and identification of where product design can really help here. A blanket policy on sustainable product design promoting consumption changes is not favourable, but there are areas where it can help. Let us start there first.

SKILLS

How is sustainable design integrated into the design syllabus?

In several and various ways. Please note that in certain cases this is driven significantly by the personal interests of the students, not the vision or commitment of the staff or institutes. There are three models:

1. The stand-alone sustainable design course (this is the old model, but seems to be dying off in the UK now).
2. The module or project integrated into the existing design course (a growing number of courses are doing this now).
3. The sustainable module or project integrated into a non-design course (a couple of MBAs are playing with this idea. It helps if design is recognised in the first instance).

It would be helpful to refer to the Design Council's recent review and recommendations on Design Skills²²—which Forum for the Future worked on and input into. Our feeling is that sustainable design is not quite as explicit as it should be.

²² <http://www.designcouncil.org.uk/en/Design-Council/3/Publications/High-level-Skills-for-Higher-Value/>

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

Very little as far as we are aware.

Forum for the Future are also involved in the following relevant projects and activities:

1. Design and delivery of Zero Emissions paint systems²³—with ICI paints and Carillion (DTI funded) looking at innovative ways to radically rethink and reduce waste and emissions from all parts of the paint supply chain. Estimated yearly results from this are:
 - Landfill reduction—5000 tonnes;
 - GHG reduction—11000 tonnes;
 - Water savings—29000 tonnes.
2. Project with Vodafone looking at management of electronic waste in East Africa.
3. Waste Opportunity—The report, *Wasted Opportunities*, was written for Tetra Pak—a major producer of liquid food packaging, and a Forum business partner. It looked at why there are such low levels of recycling of packaging in the UK.
4. Individual sustainable design projects—of which waste will be a factor—with several partners, such as Unilever, SC Johnson, Calor, Philips.

Memorandum by Mike Read Associates

INTRODUCTORY NOTES

Mike Read Associates (MRA) is an international environmental consultancy, established in 1987 and has worked for clients including the UK, German, and Australian Governments, as well as the European Parliament. Since 2002 MRA has developed expertise in resource efficiency in the UK, including work on waste prevention for Defra, water efficiency with the Environment Agency, and the development of Beyond Recycling.²⁴

In the context of this evidence it is assumed that waste “reduction” is distinct from and excludes recycling. Indeed it is taken to be equivalent to the Organisation for Economic Co-operation and Development (OECD) interpretation of waste prevention (as a subset of waste minimisation), ie prevention being avoidance, reduction at source and reuse of products, as distinct from recovery (including recycling) and disposal. Thus essentially a beginning-of-pipe approach including issues such as design, efficient production and use, and levels of consumption.

We have only answered those questions where we have factual information or a considered opinion to offer.

WASTE REDUCTION AND CLIMATE CHANGE

While a certain amount of effort has been given to assessing the greenhouse gas (GHG) mitigation aspects of recycling,²⁵ virtually no effort has been expended to date on assessing mitigation benefits of waste prevention, even though the benefits are likely to be significantly greater. Given the primacy of tackling climate change this is an odd omission.

Fortunately Defra’s recent *Waste and Resources Evidence Strategy 2007–11* refers to a need for further research in this area (Table 4.1, Section E in the Strategy). We suggest this is an issue of the highest priority both to provide the evidence for the primary environmental benefits of waste prevention, and to contribute to knowledge on practical GHG mitigation techniques.

Mike Read Associates has been endeavouring to assemble and assess the various models used for making calculations of the GHG benefits of waste prevention. The few models that have been developed generally focus on avoided emissions associated with material disposal but completely ignore the reduced emissions associated with avoided extraction of raw materials, avoided transport, avoided manufacture, avoided use, and even avoided recycling.

An attempt was made within the Government’s Waste Strategy 2007 (Annex 1, Appendix 1) to provide assessments of the relative benefits of recycling and waste prevention, but as Defra acknowledge the basis for the calculations is not sophisticated (James Vause, pers. comm.). For instance, the waste prevention figures in

²³ http://www.forumforthefuture.org.uk/business/businesscasestudies_page88.aspx

²⁴ www.beyondrecycling.net

²⁵ Carbon Balances and Energy Impacts of the Management of UK Wastes. ERM and Golder Associates report for Defra.

the Strategy represent the energy that would have been used to make the material, but omit the wider production and consumption processes.

A much more sophisticated model, known as WARM²⁶ has been developed by the US Environmental Protection Agency. However this model also suffers from significant flaws. For instance, the methodologies used for calculating GHG benefits of waste prevention and of recycling differ significantly, and subsequent presentation of the figures in a comparative context is misleading.

We strongly suggest that developing robust methodologies for assessing the GHG benefits of waste reduction needs to be given a very high priority.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

Waste reduction substantially relies on beginning-of-pipe solutions (as opposed to the end-of-pipe approaches offered by recycling, landfill, or combustion) and could be said to comprise four main elements, namely:

1. producing fewer items;
2. producing items more efficiently;
3. acquiring fewer items; and
4. using items more efficiently.

The first two of these four require better design and choice of materials, and there are considerable barriers to knowledge in this area.

Waste reduction requires a wider range of skills and a more inter-disciplinary approach than for more conventional waste management. The knowledge barriers appear to be particularly acute in terms of knowledge transfer between disciplines. A proposal for a waste prevention “network” to, *inter alia*, address this challenge has been developed by Mike Read Associates as part of a Defra-funded research project.²⁷ An expanded and more detailed proposal for a “Beyond Recycling” Network has been developed with the University of Northampton.

It appears rare for waste reduction to even be included in design briefs for products. Inclusion at the design brief stage could radically improve resource efficiency.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

Cost and availability appear paramount in most contexts. Where a claim of sustainability can be applied (legitimately or otherwise) to a commonly used material this will be used to promote the material or product, but change to a less unsustainable material appears relatively rare.

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

Most designers, including engineering designers work to design briefs. As mentioned above, these often do not include consideration of sustainable production and consumption.

Can better designed products offset the increase in consumption?

To a limited extent only. Products that consume fewer materials in their production, transport, retail and use can help reduce the growth in impact of increasing consumption. However it seems likely that a very considerable reduction in material consumption is required to achieve truly sustainable material use, along with reducing greenhouse gas emissions towards necessary targets.

²⁶ <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/climate/tools.htm>

²⁷ Towards an Efficient Waste Prevention “Network”. Mike Read Associates, July 2007. Available at <http://www.beyondrecycling.net/scopingstudy/index.html>

Are there any other gaps in knowledge and how are they being addressed?

The biggest gap in knowledge would appear to be how design affects not just material use in a product but material consumption over a product's potential life, and the greenhouse gas emissions associated therewith. This is a discipline that appears as much in its infancy as it is important.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

While many policy, regulatory and legal instruments (producer responsibility, landfill taxes, etc), acting individually, incentivise greater sustainability, the overall framework still appears to prioritise profitability and shareholder value far above sustainability. Indeed, the very means used to judge success countervail promotion of sustainable products and processes. For instance at national level Gross Domestic Product can readily be seen as a measure of how swiftly material and environmental capital is being exhausted.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

While some businesses are considering sustainable design, there remains that a perception that a product with a reduced "footprint" compared to its predecessor is *de facto* "environmentally friendly". However this is frequently just as fallacious as considering a reduced debt to be a credit. It appears that many more initiatives meet business needs than meet environmental needs.

Waste reduction actually offers considerable scope for cost cutting for business, as is evidenced by success of some of the elements of the BREW family of programmes.²⁸

What other measures can promote a focus on waste reduction among businesses?

1. taxation and regulatory structures that favour the production of long-lived, repairable, refurbishable and upgradeable products; and
2. personal carbon allowances.

What lessons can business learn from international experience?

Although rapidly emerging as an issue of great importance, waste reduction appears to be as yet poorly understood across the developed world, and as yet there is little effort to gather and disseminate best practice. Ironically the best practice may be found in the developing world where greater value is put on efficient resource use and reuse.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

Until very recently, waste reduction—despite being at the top of the Government's waste management hierarchy—has received remarkably little attention or funding. There are signs in the recent *Waste Strategy 2007* that this is changing, however there is a great deal more to do. The establishment of statutory municipal waste prevention targets for local authorities, alongside their waste recycling targets, would be one valuable step, if accompanied by the necessary research, resources and guidance.

19 October 2007

Memorandum by Milled Carbon Ltd

Milled Carbon Ltd is an SME formed four years ago to seek a route to recycling carbon fibre composites. We have developed a process that continuously recovers carbon fibre from carbon fibre composites be they cured or un-cured. We are selling the recovered fibres back into the industry at a much reduced cost relative to virgin fibres with only a 10 per cent reduction in physical and mechanical properties. We have captured the attention

²⁸ <http://www.defra.gov.uk/Environment/waste/brew/factsheets.htm>.

of major companies such as Boeing, Airbus, Bombardier, BAe, GKN, GE, Ford, BMW, Renault, McLaren, Honda, the marine industry and the MOD to name but a few. We work closely with a number of UK universities on research into recycling methods and materials testing.

BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

Quite simply, designers must consider the whole lifecycle of the product they are designing. This means they must consider how all the component parts will be dealt with at end of life, and in some cases choosing materials for which there is a known route to recycling. Thought must also be given to how the material is used to minimise waste arising from the manufacturing process. This consideration is taking longer to sink in, but having said that current manufacturing processes will be slow to change simply because this does not happen overnight.

What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials? To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

Cost, availability and fitness for purpose. The choice of materials will depend ultimately on cost of raw materials and the on cost to consumers. If consumers want a greener world they are more likely to pay for a more sustainable product, although sustainability has its limits. Availability of materials is paramount, if as in our industry, carbon fibre, there is a shortage, designers will shy away from specifying a material that has limited availability. Fitness for purpose should not be underestimated, no matter how green a designer wants to be, if a material is not fit for purpose it defeats the object of the design and perhaps less sustainable materials will have to be considered.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

Experience shows that there is a considerable gap between what scientists say can be done with materials and what engineers can actually do, as in the case of nano-carbons. In some cases there have been up to 50 per cent of failures in the production of nano carbon fibres. It's the job of the engineers to feed back to the scientists so that we can get the best of research commercialised in a timely manner.

Can better designed products offset the increase in consumption?

As long as it is cheaper to buy a new appliance than repair it, consumption will continue unabated. An enlightened few will attempt to reverse this by personal effort but on the whole the populace just wants a working toaster or iron by the easiest and cheapest method. Better design can push us in the right direction but ultimately we need a long term plan for reducing the "throw away and buy new" mentality. In terms of the carbon fibre industry, if better design equals lower cost, longer life and better margins, the fact that the method used to get it is actually wasteful is pushed to the back of the mind. No one really wants to contemplate the sea changes throughout industry that this will actually entail.

Are there any other gaps in knowledge and how are they being addressed?

Government fails miserably when trying to get the message across. At best we get mixed messages which are then further muddled by government agencies and NGOs all extolling the virtues of sustainability without ensuring the full message is delivered, ie sometimes full sustainability in a product is just not practical unless we stop the habit of consuming it.

BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

Business has got the message, loud and clear, although we are astonished to hear the introduction of new products for which no lifecycle analysis has been carried out, most recently at a conference in Barcelona. The main driver is money, as is to be expected, but in their eagerness to appear green, some companies have perhaps overstated their green credentials which just puts people off.

The regulatory changes over the last few years have made life far more complicated. Government brings in new regulation to engender innovation. But the regulation is not keeping pace with the innovation. It took three years to get guidance from the Environment Agency about where our recycling process sits within the new regs. Having said that, we cannot fault the help our local EA have given us.

How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

I have found that there is a mixture of company policy and personal conviction which drives the sustainability message. We have many enquiries from individuals within companies who want to “do the right thing”. In the case of supply contracts for new products we are seeing the message driven home in more practical methods by having contract clauses that state that there must be a route to recycling as part of the supply contract. We worry that some businesses are jumping on the green bandwagon just to get the kudos without really believing in the message.

What other measures can promote a focus on waste reduction among businesses?

Greater awareness of the cost of disposal, most companies we deal with have no idea of the amount of material they waste and as such seem not to know what the bottom line costs are. We have been able to show a positive cost reduction for disposal purely by making companies take note of what they are throwing away and diverting it from landfill to recycling.

What lessons can business learn from international experience?

Just how bad the rest of the world is at sustainability. Perhaps a little unfair as there are some very good efforts by a number of countries, just not enough.

GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

Stop trying to change consumption habits by hitting us with green taxes. We think given the chance to be more sustainable most people will take it, making us pay for it just causes resentment and resistance.

How does Government policy link up with European strategies and action plans?

Quite well in many respects, but there is still an element of over subscription. We are involved with several UK and EU government initiatives but we are in danger of being swamped with requests to join the plethora of initiatives that seem to appear every month. In some cases there is considerable overlap which just dilutes the effort. There should be one central body in the UK and the EU and they should co-ordinate to avoid overlap.

CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

Better design will always influence consumption patterns, but only because it is “new” and hopefully because the new design does have beneficial impact on the environment. But in the end cost will be the main arbiter. If we really want to change consumption habits then we have to change the industrial model of the country. Retail manufacturing is built around being able to sell the newest model irrespective of the fact that the last model is only six months old and as long as we are bombarded with messages to continually adopt the newest thing, we will.

What role do marketing strategies play in influencing more sustainable design?

As suggested above, marketing is a major influence on how we consume and as such, companies must take greater heed of the effect their marketing will have on consumer habits. Companies need to be a little more honest about what their true green credentials are.

SKILLS

How is sustainable design integrated into the design syllabus? To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

We can only comment on direct experience which seems to show that sustainability is becoming a central pillar in current training and education.

November 2007

Memorandum by the Nappy Alliance

KEY ISSUES

The Nappy Alliance welcomes the House of Lords Science and Technology Committee’s inquiry which looks at sustainable approaches to waste reduction. Disposable nappies currently account for around 4 per cent of all household waste, a percentage which is likely to increase as recycling rates for other waste streams go up. Real nappies are the only alternative to disposable nappies when it comes to waste reduction. Environmental claims made by manufacturers of disposable nappies with regards to the reduced weight of their products and the fact that some of their nappies are now 80 per cent decomposable are irrelevant given that the vast majority of disposable nappies will end up in landfill, where it will take approximately 500 years for them to decompose. In addition, landfill sites create methane, a greenhouse gas which is an even more powerful greenhouse gas than carbon dioxide.

THE ALLIANCE

The Nappy Alliance was established by independent providers of real nappies to act as the trade body for the commercial market of reusable nappies, to promote their use amongst new parents and to address the on-going issue of the 400,000 tonnes of disposable nappies which go to landfill in the UK every year. The Alliance promotes awareness of the key benefits of reusable nappies such as a wider consumer choice, a cheaper option for parents than disposables and environmental benefits and cost savings to waste disposal authorities.

THE SCALE OF DISPOSABLE NAPPY WASTE PROBLEM

Nappy waste currently accounts for 3–4 per cent of all household waste and constitutes the largest identifiable category of household waste. With increasing levels of recycling of other waste streams, this percentage is likely to increase even more. Currently, nearly 3 billion nappies are thrown away in the UK every year—8 million nappies a day. The Environment Agency estimated that the decomposition timescale for some of the materials and chemicals currently used in disposables is more than 500 years. The paper-fluff and faeces should take approximately 100 and 10 years respectively to degrade. Given that 38 per cent of all UK methane emissions are accounted for by landfill, reducing the amount of disposable nappies going to landfill could have a significant impact on the UK’s greenhouse emissions.

CHANGES IN REAL NAPPY DESIGN

Real nappies have come a long way from the “terry towels” which many people remember to the extent that real nappies are now as convenient to use for most parents as disposable nappies. Real nappies come in lots of modern shapes which fasten easily with poppers, Velcro or plastic grips so the nappy fits a baby snugly. Parents have a choice of Flat Nappies, Shaped Nappies, all-in-one nappies or one-size-fits-all nappies.

Two types of liner are generally available: washable or flushable biodegradable type. To prevent leaks most nappies are covered with a breathable waterproof cover also known as a “wrap”.

In addition, modern washing machines are so effective that real nappies no longer need to be pre-soaked or boiled as used to be the case. By using energy efficient washing machines, washing at the right temperature and line drying, young parents can help to significantly reduce the environmental impact of nappies, particularly the creation of landfill.

CHANGES IN DISPOSABLE NAPPY DESIGN

Manufacturers of disposable nappies have trumpeted recent technological improvements such as a reduction of the average weight of an unsoiled disposable nappy by 40 per cent and claim this will greatly reduce the amount of nappy waste going to landfill. In fact, given that most of the weight of disposable nappies is constituted by baby waste (with the average weight of an unsoiled nappy of 44.6g and the average weight of a soiled nappy of around 150g²⁹), reducing the weight of an unsoiled disposable nappy will have little effect once the soiled nappy ends up in landfill.

In addition, and whilst we welcome the fact that some manufacturers of disposable nappies have increased the level of compostable materials in their nappies, the fact remains that in an anaerobic environment such as a landfill where the vast majority of disposable nappies will end up, it will still take many decades for these materials to decompose, whilst creating harmful methane emissions.

LIFE CYCLE ASSESSMENT OF NAPPIES

The Environment Agency which published a Life Cycle Assessment on the environmental impact of both reusable and disposable nappies in 2005, concluded that there was little overall environmental difference between the two products. The Environment Agency has since acknowledged that the study was seriously flawed from the outset. A revised Life Cycle Assessment has been commissioned and after considerable delay is now expected to be published in December. This flawed assessment has obviously caused considerable negative interest amongst certain media but the Nappy Alliance expects this revised Report to reflect the overall environmental benefits of reusable nappies much better than the original report did.

Regardless of the anticipated positive conclusion for real nappies of the revised LCA report, certainly in terms of landfill reduction, real nappies remain the only viable option to disposable nappies.

GOVERNMENT POLICY

The Nappy Alliance welcomes the efforts made by the Government in its recent revised Waste Strategy and its aims to put more emphasis on prevention and reuse, as well as providing stronger incentives for businesses, local authorities and individuals to reduce waste. However, we are disappointed and surprised that its recent consultation—Incentives for recycling by households—actively encouraged local authorities to shy away from taking action on the amount of disposable nappies going to landfill. The consultation document encouraged local areas essentially to give up on what is the one single biggest identifiable source of household waste by explicitly stating that young parents ought to be given more leeway to produce waste because of their dependency on disposable nappies.

There is a viable alternative to disposable nappies in the form of reusable nappies which offer similar levels of convenience as disposable nappies and which do not create any landfill. By not incentivising young parents to use real nappies, the Department appears to be missing an opportunity to significantly reduce the 3–4 per cent of household waste going to landfill which consists of nappy waste.

In addition, the enormous cost of disposing the three billion nappies a year to landfill currently falls exclusively on local authorities and therefore indirectly on local taxpayers. The Government urgently needs to start looking into ways in which manufacturers of disposable nappies cover part of the cost of disposing their products, by means of a levy or an environmental tax on disposable nappies.

²⁹ Environment Agency, Life Cycle Assessment of Disposable Nappies and Reusable Nappies in the UK, 2005, p 22.

SUMMARY

The Nappy Alliance believes that better design and materials can play a key role in the reduction of the amount and volume of waste going to landfill every year. It is however clear that the Government's top priority in reducing landfill should remain waste prevention. For the reasons stated above, we remain skeptical about some of the claims made by manufacturers with regards to changes made to the weight and composition of their products and the effect this will have on landfill reduction. Given that disposable nappies account for 3–4 per cent of all household waste going to landfill and given that a reduction in weight of an unsoiled nappy will have little effect on the tonnage of disposable nappies going to landfill, real nappies are the only viable option for parents who wish to reduce their impact on landfill significantly.

October 2007

Memorandum by the North London Waste Authority (NLWA)

NLWA is one of the six joint waste disposal authorities in England. Almost one million tonnes of London's municipal waste arises in our area per year, making us the second largest disposal authority (by tonnage) in the UK.

The NLWA has also agreed a Waste Prevention Implementation Plan with our constituent boroughs. This plan identifies actions that the NLWA and constituent boroughs can take to reduce waste arising in North London, including home composting, furniture reuse and awareness programmes.

1. BETTER DESIGN AND THE USE OF MATERIALS

What role can better design and materials play in minimising the creation of waste?

Design to reduce waste

1.1 Better design and material choice plays a key role in minimising the creation of waste not just at the point of disposal, but throughout a product's lifecycle. This is in line with the concept of Integrated Product Policy which considers whole of lifecycle impacts, and takes actions to reduce those impacts where it is most effective. The UK Government Sustainable Development Strategy *Securing the future* also recognises the importance of considering lifecycle impacts and "closing the resource loop" through reuse, remanufacture and finally recycling.

1.2 We would urge the Committee to heed the work of the Waste and Resources Action Programme (WRAP) on the development of lightweight wine bottles which highlights the potential to reduce a product's environmental impact throughout its lifecycle.³⁰ Reducing the average weight of wine bottles reduces not only the amount of raw material needed for production and the amount of waste disposed, but also the amount of fuel required to transport the bottles from manufacture, filling, retailing and disposal. It can also deliver cost savings due to the reduction in transport fuel use, raw materials and energy used in production, thus delivering both environmental and economic benefits.

1.3 The lighter bottles have also been designed to achieve their weight loss while maintaining the appearance of a traditional wine bottle and still being suitable for use on existing beverage processing lines. This helps overcome delays associated with production lead-time and process tooling, which represent medium to long term commitments by manufacturers. These lead times can limit the ability of manufacturers to quickly react to new materials and research, leading to a time lag before benefits can be realised.

1.4 WRAP has compiled a searchable database of international examples of innovative design and material choices, along with a database of packaging types used in the UK. These databases, which show information on packaging weights and issues surrounding the new design or material, can be found online.³¹

³⁰ www.wrap.org.uk/retail/materials/glassrite.html

³¹ www.wrap.org.uk/retail/tools_for_change/international_packaging_study/index.html,
www.wrap.org.uk/retail/tools_for_change/uk_best_in_class/index.html

Design for easier recycling

1.5 Better design and material selection of components can also allow easier recycling at the end of the product's useful lifetime, in turn reducing residual waste. For example, plastic bumpers and under-car protection panels can be made up of a mix of many types of plastics. This mix of materials makes it more difficult or even impossible to separate and recycle at the end of its life. If the bumper and protection panels are constructed from a single type of plastic (a "mono-material system"), recycling them at the end of the vehicle's useful life is a much easier and economically viable proposition.

Realising the benefits of better design

1.6 However, the adoption of new designs and materials must be carefully considered to ensure that potential waste reduction benefits are realised. One example is the recent rise in the use of biodegradable plastic bottles. While these biopolymers offer the potential for lighter packaging and can biodegrade under certain conditions, they can contaminate the recycling of conventional plastics if they are accidentally mixed. Separating the two types of plastics requires investment in infra-red technology at materials recycling facilities or better education of the public, who are currently told by many councils simply to recycle "all plastic bottles". As the use of biodegradable plastic grows, this is likely to become a bigger issues for plastics recyclers and councils.³²

1.7 While the packaging industry may indicate a material is "recyclable" by placing a recycling symbol on it, this does not automatically indicate that it is recyclable within the UK. While a material may be theoretically recyclable, collection and processing difficulties, value for money issues or lifecycle environmental issues may result in no recycling infrastructure being provided to the public for this material. One example is yoghurt pots, which are marked with a recycling symbol but are constructed from a plastic not commonly recycled in the UK. This situation can lead to contamination problems for reprocessors and frustration for the recycling public, rendering certain materials as practically not recyclable, even though they theoretically are recyclable. Some form of regulatory control of the use of either the term "recyclable" or a new logo that would inform the public reliably as to the genuine practical recyclability of different materials in the UK may be beneficial.

2. BUSINESS FRAMEWORK

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

2.1 The introduction of extended producer responsibility legislation has the ability to drive an improvement in the sustainability of products and processes in the future. The requirement of manufacturers to take-back their end-of-life products and reduce their packaging, which has already been implemented in some sectors, should encourage manufacturers to minimise packaging, develop products that are more durable and can be repaired more easily and ensure packaging and products can be more easily recycled.

2.2 The introduction of tougher material-specific producer responsibility targets, particularly with sub-sets for household waste, has the potential for far greater impact than the existing system. Currently, there is no responsibility on retailers and manufacturers to "take back" packaging from consumers, nor do producers have to purchase packaging recovery notes generated from the same waste (and therefore appropriate cost) as the type(s) of packing material they are making or using. As such, the general public and local authorities see little impact of the existing producer responsibility requirements on the total amount of household waste generated.

2.3 It is noted that on 11 October 2007 Defra announced a snap consultation on recycling targets for packaging for 2008 beyond. This consultation will update targets for packaging recycling under the *Producer Responsibility Obligations (Packaging Waste) Regulations 2007*. It is understood that these targets will not include targets for recovered household waste.

2.4 The effectiveness of producer responsibility legislation will be determined to some extent by the compliance monitoring and enforcement regime. This is highlighted by the relatively limited impact of the *Packaging (Essential Requirements) Regulations 2003* in preventing excess packaging. While these Regulations include a provision to minimise the weight and volume of packaging, this requirement is offset by considerations of hygiene, safety and consumer acceptance (ie marketing). As a result of these exemptions, it is understood that only four successful prosecutions for excess packaging had been brought under these regulations to May 2007.³³

³² www.wrap.org.uk/downloads/Biopolymer_briefing_final_6th_Sep.b2a4e72b.pdf

³³ http://environment.independent.co.uk/climate_change/article2581248.ece

3. GOVERNMENT POLICY

What is and should be the role of Government in addressing the issue of waste reduction?

3.1 The Waste Strategy 2007, released on 24 May, specifically acknowledges the preference of waste reduction and reuse over recycling. However, while the Strategy sets targets to reduce waste, these targets focus on a percentage reduction in household waste not reused, recycled or composted. As such this target does not act to encourage a real reduction in the total amount of waste generated—as long as authorities increase the amount they recycle or compost, they can meet this “waste reduction” target while still increasing the amount of waste produced overall. This focus on recycling and residual waste targets does not necessarily achieve the best environmental outcome and their statutory nature ensures that the resources devoted to waste reduction in particular by local authorities may well be somewhat diminished.

3.2 A waste reduction target which specifies the absolute amount of residual waste allowed per household may provide a better means to target waste generation. This ensures a household (or local authority) is only allowed to dispose of a set amount of residual waste, regardless of the amount of recycling and composting that occurs. This prevents increases in residual waste being “hidden” by even greater increases in recycling which can occur with a percentage target. Such an approach has been used in Flanders, Belgium since 1997.³⁴

3.3 While the development of true waste prevention targets will help drive local authorities to focus more on waste prevention, this cannot be done without action from industry. Producer responsibility programmes can drive improvements in product design, help influence consumer behaviour (as the costs for improved design and materials are likely to be passed to the consumer) and will ensure that the responsibility for waste management and prevention does not sit solely on the shoulders of local authorities.

3.4 The Government’s waste strategy should be integrated with one on materials used by industry. The multiplication of the number of materials used will inevitably add evergrowing complexity to waste management.

How does Government policy link up with European strategies and action plans?

3.5 There is a general public perception that the UK lags behind the EU when it comes to recycling and waste management practices. Indeed, the recently released *Household Waste Prevention Side Research Programme* report for Defra³⁵ provides very detailed information on waste prevention work in the Netherlands, Germany, Switzerland, Ireland, Denmark and France which demonstrate that these countries have been implementing waste prevention programmes for many years.

3.6 Ironically, while the UK is perceived to lag behind Europe in terms of recycling and waste prevention, it is often accused of “gold plating” EU directives (ie adding on additional requirements that other EU countries don’t have) by some sectors. One means to address both the concerns of the public that the UK lags behind Europe, as well as the desire of businesses for a level playing field within Europe, would be to ensure that the UK leads debate on new waste prevention approaches (such as absolute waste prevention targets). This would ensure the UK is pro-active in the development of new waste prevention policies, whilst ensuring that EU Member States all meet equivalent regulations and requirements in the future.

What lessons can be learnt from other countries—within the EU and globally?

3.7 Industry driven voluntary codes of practice play an important role in helping an industry sector demonstrate its environmental and social responsibility. However, because they are voluntary they only cover those members who are signatories and do not always capture the less “progressive” operators. This can lead to a gap between the expectations of the public and the ability of a voluntary code of practice to deliver results. In these circumstances, a statutory mechanism can play a role to ensure that the entire sector meets its social and environmental responsibilities.

3.8 One example where a statutory mechanism might be considered is in regard to unwanted advertising material, often known as “junk mail”. Many local authorities run “no junk mail” campaigns as part of their waste prevention work. These campaigns involve raising awareness of the Mail Preference Service (MPS) as well as providing “no junk mail” stickers to be used on letterboxes.

³⁴ see chapter 15 of the *Household Waste Prevention Side Research Programme* report for Defra <http://www.the-environment-council.org.uk/waste-prevention-policy.html>

³⁵ see <http://www.the-environment-council.org.uk/waste-prevention-policy.html>

3.9 The MPS is an industry run system which many direct marketers sign up to, allowing residents to opt out of receiving addressed advertising material. However, it does not capture un-addressed material that is hand-delivered. While “no junk mail” stickers may dissuade some companies from placing their advertising in letterboxes, they currently do not carry any legal status and can be ignored with impunity.

3.10 This issue has been recognised in Victoria, Australia where the use of a sticker stating “no junk mail” or “no advertising material” is protected through the *Environment Protection Act 1970*. The Act makes it an offence for advertising material to be placed in a letterbox where such a sticker is on display, punishable by an “on the spot” fine or a fine issued by a court.

3.11 The Victorian *Environment Protection Act 1970* also includes powers to require advertisers to disclose the name of the leaflet distributors and distributors to disclose the name of the depositor of the advertising material (ie the actual person who placed the item through the door). These powers ensure that a responsible party can be tracked down, and enforcement action taken.

3.12 The adoption of a similar approach within the UK would allow for local authority “no junk mail” campaigns to have an even greater effect and would help address one of the gaps in the MPS system.

3.13 There are many more lessons that can be learned from waste prevention programmes implemented in other countries including landfill bans for specific materials, deposits on reusable beverage containers, “pay as you throw” approaches, taxes on packaging and levies on disposable shopping bags. These are all detailed in the recently released report, referenced in the previous section. This report, which was prepared for Defra by Eunomia Research & Consulting, The Environment Council, Öko-Institut, TNO and Atlantic Consulting, provides very detailed information on waste prevention work in the Netherlands, Germany, Switzerland, Ireland, Denmark and France as well as analysis of environmental, social and economic impacts of specific waste reduction policies.

4. CONSUMER BEHAVIOUR

How can better product design be used to effect a change in consumption patterns and behaviour?

4.1 The UK Government’s Sustainable Development Strategy *Securing the Future* (2005) devotes a chapter to the considerations needed to help people make more sustainable choices in their lives. The importance of government engaging, encouraging, enabling and leading by example are all identified as essential to achieve real behaviour change.

4.2 The Sustainable Consumption Roundtable, run between the Sustainable Development Commission and the National Consumer Council, finished its work in May 2006. Its final report *I will if you will*³⁶ also provides detailed information on actions to help promote sustainable consumption amongst the public, businesses and government.

4.3 On a more practical level, improvements in product durability generally provide the opportunity for reduced consumption. For products that perform a function that has remained relatively unchanged, an improvement in durability leads to reduced product turn-over and less waste. A good example of such a product may be a kettle—a durable older kettle stills fulfils the same role as a new kettle.

4.4 However, product durability is unlikely to be as high a consideration for consumers in sectors where the functions of the product have changed and expanded quickly. Examples of these products are mobile phones and personal music players (eg ipods), where technology is rapidly developing. An older mobile phone doesn’t usually fulfil all the same roles as a new mobile phone (may not have a camera, may not have Bluetooth etc). In these circumstances, the durability of the product is less of a consideration for consumers as they are likely to replace the product within a relatively short space of time anyway.

4.5 One product design option that may help address this issue is improved upgradeability, expandability and repairability. If a durable product can be adapted to new developments in technology by having a single component replaced, rather than the whole item, this may help reduce waste tonnages. If a product can be repaired when something goes wrong, rather than being thrown out for a new product, this can also help reduce waste tonnages.

4.6 Retrofitting new operational components to durable products is common in some sectors. For example, in some countries exhaust particulate filters have been retrofitted to diesel vehicles to help them comply with new emission standards, avoiding the need to purchase new engines or whole vehicles. Even the switch to digital television broadcasts in the UK, which will occur between 2008 and 2012, includes an option to upgrade existing televisions using a small set-top box. This will help prolong the life of many televisions that would have otherwise been scrapped in favour of those with a digital receiver.

³⁶ www.sd-commission.org.uk/publications/downloads/I_Will_If_You_Will.pdf

4.7 Extended producer responsibility also plays an important role in product design and in-turn consumption behaviour. If a manufacturer is required to design their product to minimise its waste and ensure its recyclability, they are likely to make significant investment research and development. The cost for this research will in turn be passed onto the ultimate polluter—the consumer who demands the product. This potential rise in the cost of products may prompt the consumer to reconsider the need for the purchase and may result in them placing a higher value on more durable items as they seek to minimise their medium to long term financial outlay on the product.

What role do marketing strategies play in influencing more sustainable design?

4.8 Marketing strategies can play a key role in influencing sustainable design and production, driven from both the consumer side and the manufacturer and retail side. Consumer side demand is often initiated by campaign organisations and pressure groups who raise awareness of particular social and environmental issues that can be affected by purchasing decisions. Examples of such marketing campaigns include the support for free range eggs and fair-trade products.

4.9 As consumers are made aware of the environmental and social issues surrounding these products, they can choose to alter their shopping choices. This in-turn creates a demand for products that manufacturers and retailers react to, investing in more sustainable products. Such campaigns have seen a large growth in the sale of free-range eggs and organic products in recent years.

4.10 Manufacturer and retail side marketing ultimately has the same final outcome—an increased demand for sustainably designed and manufactured products. In these circumstances however, the demand for these products is initially driven by a manufacturer or retailer trying to establish an advantage over competitors. Examples of such marketing include Toyota promoting the hybrid drive system for their Prius and Lexus branded cars and the marketing of Marks and Spencer's "Plan A".

4.11 Government has a limited role in influencing manufacturer and retailer side marketing, they can promote the potential commercial benefits of switching to sustainable products to companies, but their main ability to influence is through economic or legislative instruments. The role of government to raise public awareness of key environmental and social issues is more obvious and has the potential to drive real change in consumer demand for sustainable products. However, a decision to support and promote any particular product on the basis of its sustainability must be based on sound science—the promotion of a product that turns out to have a minimal or negative environmental or social benefit can undermine the credibility of future campaigns.

4.12 Consumer marketing and awareness schemes such as the "shop smart" campaigns run by many councils promote reusable bags and awareness of excess packaging. The effectiveness of such campaigns is indirectly reflected in research undertaken by WRAP for their food waste campaign, which showed that three quarters of people believe that packaging waste is a greater environmental problem than food waste.³⁷

4.13 Manufacturer and retailer side marketing and support exists, through the Government's Envirowise programme (www.envirowise.gov.uk). This scheme provides UK businesses with "free, independent, confidential advice and support on practical ways to increase profits, minimise waste and reduce environmental impact". While the lessons learned from this free advice should influence the sustainable design of products, it will only capture those who choose to participate in the programme.

Are there any gaps in knowledge in this area?

4.14 The success of the national Recycle Now campaign and similar local publicity campaigns has seen the perception of recycling move from a fringe activity into the mainstream. As a result, more and more people have been encouraged to recycle products either through their local kerbside service, at near-entrance facilities or at community reuse and recycling centres.

4.15 However, while recycling has undeniable environmental benefits compared to traditional waste disposal, it is significantly less beneficial than waste reduction or product reuse. Whilst the success of both national and local recycling promotion is to be applauded, the success of the recycling publicity campaigns has seen the "reduce" and "reuse" messages often overlooked by the public.

4.16 As a result, there is a perception amongst the public that recycling is the best thing they can do for the environment. This can lead to a situation where excessive consumption is validated, provided the person undertakes a degree of recycling. This is reflected in the fact that total waste generated per household (including recycling) continues to rise.

³⁷ www.wrap.org.uk/downloads/FoodWasteResearchSummaryFINALADP29_3__07.d145eeb8.pdf

4.17 Reduction can mean both an absolute reduction in consumption and a reduction in the consumption of unsustainable products. The second could be considered “smarter” consumption, choosing to buy a product that will perform a job well over a longer period of life, and can be refurbished or recycled at the end. This form of reduction can allow continued economic growth whilst still addressing the growth of residual waste.

4.18 The challenge exists to encourage reduced consumption of unsustainable products and enable the public to make educated choices. Currently it is harder to engage the public with reduction and re-use messages than traditional recycling messages, as they are perceived to involve a negative impact on lifestyle. Reduction suggests that you get less of what you want while reuse suggests making do with a second-hand item. Recycling on the other hand perpetuates the idea that you can consume what you wish, as long as it is disposed of correctly.

4.19 Few consumers will accept a step backwards in convenience or functionality just to reduce the amount of packaging or improve the product durability. We need to find more ways to achieve waste reduction for day to day products that people buy, whilst ensuring their lifestyles remain the same or improve. Examples of how this can be achieved already include the light-weighting of bottles (discussed earlier), refillable containers and refill stations for detergents,³⁸ reusable shopping bags and the upgrading of computer components such as hard drives and RAM within the existing case.

4.20 We also need to know how to effectively deliver the reduction and reuse message to the community, along with the best way (not just legislation) to engage and drive improvements in product design amongst manufacturers and retailers going forward. Whilst a new Waste Strategy for England has recently been published, and Scotland already has a Waste Prevention Strategy, limited information exists regarding how best to communicate the “non-consumptive” message to the public. If we are to move to a zero-waste, low carbon economy, this will be essential.

16 October 2007

Memorandum from the Scottish Environment Protection Agency (SEPA)

1.1 The Scottish Environment Protection Agency (SEPA) is pleased to have the opportunity to comment on the inquiry by the House of Lords Science and Technology Select Committee (Sub-Committee) into Waste Reduction.

1.2 SEPA is Scotland’s environmental regulator and adviser, responsible to the Scottish Parliament through Ministers. SEPA’s responsibilities include discharges to air, water and land; resource use and radioactivity.

1.3 SEPA in conjunction with the then Scottish Executive developed the *Waste Prevention Plan* for Scottish household waste which was published in February 2007. SEPA currently provides the secretariat to the Scottish Waste Prevention Expert Group on Household Waste Prevention, which advises the Scottish Government on policies and actions to prevent the growth in household waste. The membership of this group is as follows: Scottish Government; SEPA; Confederation of British Industry (Scotland); Waste and Resources Action Programme (WRAP); Scottish Retail Consortium (SRC); Scottish Consumer Council; Scottish Waste Awareness Group; Scottish Environment LINK; Community Recycling Network Scotland (CRNS); Convention of Scottish Local Authorities (CoSLA); Scottish Environmental Services Association (SESA). Defra and the Department for Business, Enterprise and Regulatory Reform (BERR) have observer status. Membership therefore includes representation across the full product life-cycle.

1.4 The Household Waste Prevention—Action Plan (Scotland) was published in February 2007, with the aim of stabilising the growth in household waste arisings by 2010.³⁹ The latest data on growth of household waste in Scotland indicates that waste is growing at around 1.25 per cent per annum,⁴⁰ as compared with 0.5 per cent in England and Wales. It should be noted however that reliable long term trend data is not available, and therefore the above growth rates should be treated with caution.

1.5 The Action Plan contains 20 actions designed to combat the growth in household waste arisings, and is split into five key areas:

- Product designers and manufacturers.
- Retailers.
- Consumers.
- Communities.
- Local authorities.

³⁸ www.ecover.com/gb/en/Products/Dishes/Refill.htm

³⁹ www.sepa.org.uk/nws/data/index.htm

⁴⁰ www.sepa.org.uk/nws/data/index.htm

A list of all 20 Actions is given in Appendix 1.

1.6 SEPA is very much aware that to combat the growth in waste arisings action is required throughout the product life-cycle; and that the further up the life-cycle you go, the less influence can be brought to bear at a local or regional level, so that in order to influence product design action is required at a UK and International level.

1.7 The remainder of this memorandum addresses a selection of the questions detailed in the Call for Evidence.

2. BETTER DESIGN AND THE USE OF MATERIALS

2.1 What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

It is often quoted that 80 per cent of all product related environmental impacts are determined by product design. SEPA is of the view that better design and materials play a vital part in minimising the creation of waste. The work of the Waste and Resources Action Programme (WRAP) has demonstrated that if the top 12 packaged products all moved to Best In Class, then associated packaging waste would be reduced by 61 per cent. It is noted however, that these are early wins, and that further reductions in weight will become more difficult. It is also cautioned that a focus on lightweighting could result in use of materials which are potentially more difficult to deal with at end of life.

SEPA is currently reviewing existing work on the role of design in preventing waste, however notes that products which become waste in Scotland often originate from other countries, therefore influencing design activity in Scotland will have a minimal effect on waste arisings. In addition many products that are manufactured in Scotland are designed elsewhere. In short the issue of sustainable design requires action at an International level and SEPA would welcome the opportunity to work with other UK Administrations to this end. SEPA welcomes the work of the EU on Sustainable Consumption and Production and looks forward to the production of the Action Plan in early 2008.

SEPA believes that it is not only the design and materials used which will have an impact on waste generation, but that the marketing model is also important. For instance a switch to product service systems (PSS) could provide the impetus for waste reduction. A PSS is where a consumer buys a service rather than a product (for instance BT's 1571 service replacing answering machines), or some combination of product and service (eg leasing equipment such as mobile phones, so that the product returns to the manufacturer at end of life, and there is therefore an incentive to design that product for reuse and recycling).

2.2 What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

A number of factors influence the use of materials. However, means should be found to rationalise the use of materials in specific product areas such as packaging to promote effective design issues such as light-weighting and material recovery. Additionally, a great deal of work needs to be undertaken to better understand absolute resource availability as it is already clear that some technology areas are rate limited by the availability of the raw materials necessary for further development. The scarcity of gallium for the development of new generation photovoltaic panels being one example.

2.3 Can better designed products offset the increase in consumption?

The recent EU consultation on Sustainable Consumption and Production noted that household expenditures are projected to double across the EU-25 by 2030. Decoupling this growth in spending from the growth in waste represents a considerable challenge, where design will play a key role, however only time will tell whether it is possible within current models of consumption, or whether a more fundamental shift is required. It should also be noted that increased efficiency of resource use in manufacturing inevitably acts to reduce product cost, resulting in increased consumption.

2.4 Are there any other gaps in knowledge and how are they being addressed?

There is an ongoing need to further develop the use of product life cycle assessment and the parallel system of eco-footprinting for products. If linked to product eco-labelling this would be a powerful tool to guide product development.

3. BUSINESS FRAMEWORK

3.1 *Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?*

SEPA is of the view that the current business framework does not do enough to incentivise the development of more sustainable products. Products can, by and large, be placed on the marketplace without regard for their end of life impacts. The exception to this is those products which fall under Producer Responsibility legislation—namely packaging, waste electrical and electronic equipment (WEEE) and end of life vehicles (ELVs). There are also voluntary producer responsibility agreements with certain sectors such as newsprint. SEPA supports the further development of producer responsibility initiatives, and is currently working on a report on the potential to introduce these. SEPA welcomes the establishment of a Products and Materials Unit within Defra.

3.2 *What other measures can promote a focus on waste reduction among businesses?*

In drawing up the Household Waste Prevention Action Plan for Scotland various actions were considered which were not deemed possible at a Scottish level, but for which there was support, namely: research work to profile the waste associated with individual products; a waste audit requirement prior to placing of products on the marketplace; development of minimum product standards relating to waste; product benchmarking initiatives; variable tax rates for products depending on the amount and type of associated waste; bans on use of certain hazardous materials; development of a “waste charter” for product designers. Significant benefits to businesses and waste resource management service providers would also be realised in developing an obligation on businesses to provide greater detail on the wastes they produce.

4. GOVERNMENT POLICY

4.1 *What is and should be the role of Government in addressing the issue of waste reduction?*

SEPA is of the view that the role of Government in waste reduction is to:

- set a clear policy framework across the whole product life-cycle;
- where there is market failure to correct this;
- to ensure action is guided by research/evidence;
- to stimulate action where there are gaps;
- to promulgate best practice; and
- to influence international policy.

4.2 *How does Government policy link up with European strategies and action plans?*

SEPA believes that in general there is a good fit between Government policy and European Strategies and action plans. SEPA welcomes the requirement in the revised Waste Framework Directive for every member state to have a Waste Prevention Programme. In some cases the UK is pioneering the way (for instance WRAP’s work with retailers), generating approaches which are being picked up for inclusion in the EU’s forthcoming Action Plan on Sustainable Production and Consumption. The EU Thematic Strategy on the Sustainable Use of Natural Resources also provides an international framework for the development of initiatives to reduce waste. UK Administrations could work together to ensure the UK is well represented in this area of work.

5. CONSUMER BEHAVIOUR

5.1 *How can better product design be used to effect a change in consumption patterns and behaviour?*

In order for consumers to buy more sustainable products, these products must firstly be available in the marketplace. Secondly consumers must have the information to be able to choose the more sustainable products, and thirdly they must be motivated to do so. Better product design is a pre-requisite for changing consumption patterns, but in itself is not sufficient. Various routes are available to provide information to consumers—the most obvious of which is labelling, though there are many potential pitfalls. Others include

web based information. Motivation for consumers could be provided through incentive schemes (such as Tesco's green clubcard points), or through differential pricing.

22 October 2007

APPENDIX 1

HOUSEHOLD WASTE PREVENTION ACTION PLAN (SCOTLAND) LIST OF ACTIONS

Action 1: SE/SEPA to publish a report by end 2007 on work being done to encourage sustainable design and sustainable products and the impact that work is having on household waste in Scotland.

Action 2: SWAG to work with Consumer Protection Bodies, Retailers and others to provide better information to consumers on the expected lifespan of key household products, product guarantees and availability of spare parts. Initial information to be on SWAG website by March 2008.

Action 3: SEPA to publish a report by Dec 2007 on potential to introduce further Producer Responsibility initiatives eg for disposable products where a reusable alternative exists. SEPA also to continue reporting on existing Producer Responsibility schemes eg packaging and those to be introduced eg batteries.

Action 4: SE will continue to work with WRAP, SWAG and others to reduce the amount of food waste from Scottish households by 10,000 tonnes by 2008 and 15,000 tonnes by 2010. This will be done by:

- piloting a new consumer-facing food use/waste campaign, which raises awareness of the environmental and economic significance of food waste and provides practical advice to householders on how to avoid wasting the food that they buy;
- developing smarter packaging which may enable food to be kept for longer or which is more appropriate for particular types of households—eg better portioning of food for single occupancy households;
- working with retailers to develop alternative marketing approaches which will reduce the risk of food being wasted; and
- working with the Food Standards Agency to improve consumer understanding of food labels and, in particular, “best before” and “use by” dates.

Action 5: SE will continue to work with WRAP, SWAG and others to reduce the amount of packaging waste from Scottish households by 8,000 tonnes by 2008 and 34,000 tonnes by 2010. This will be done by:

- developing lighter weight packaging or reusable packaging;
- explaining the purpose of packaging to enable households to recognise what represents excessive packaging;
- developing improved systems for consumers to complain to retailers and Trading Standards about excess packaging;
- considering, after carrying out further promotion of packaging regulations, whether further action is required; and
- developing improved packaging guidelines for adoption by retailers and their suppliers.

NB If the Courtauld Commitment should not produce expected results SE will consider further legislative steps for retailers in relation to food and packaging waste.

Although not strictly waste prevention, we will also monitor progress on reverse vending systems and deposit return schemes used to encourage reuse and recycling.

In addition we will ask the Scottish Retail Consortium to consider extending their annual Scottish Retail Excellence Awards to include a category on “waste prevention”.

Action 6: SWAG and others to further promote ways in which consumers can consider their purchasing decisions and prevent household waste. For example by:

- promoting online waste exchanges eg eBay, Freecycle;
- promoting the use of charity shops and auctions for unwanted but reusable items;
- promoting buying “experiences” rather than gifts; and
- promoting borrowing/hiring of items.

Action 7: SE to work with the British Retail Consortium, retailers, UK Government and plastics industry to agree a code of practice to reduce the environmental impact of plastic and paper carrier bags by 2008 (equating to 1,000 tonnes per year).

Action 8: SE/SEPA will take further action with SWAG and others to reduce the amount of unwanted mail delivered to householders by 10 per cent by 2010. We will ensure any code of practice with the Direct Mailing Association extends to Scotland and is publicised.

Action 9: WRAP, SWAG and others to further encourage home composting to increase diversion rates from 8,500 in 2006–07 to 17,000 tonnes by 2007–08 and 24,000 tonnes by 2009–10 (see Annex B). WRAP, SWAG, community groups and others to support Master Composter schemes and to further encourage the use of home food digesters.

Action 10: SE/SEPA to continue to work with SWAG, Local authorities, manufacturers and Community sector groups to reduce the waste impact of nappies (to divert 3,000 tonnes per year).

NB SEPA has produced a “Household Waste Prevention Guide” for local authorities, community groups and others seeking to develop and implement waste prevention projects or campaigns.⁴¹

Action 11: SE/SEPA will develop a “Reuse Framework” with the Community Recycling Network for Scotland (CRNS) and local authorities by Dec 2007. This will include actions such as:

- encouraging the establishment of local waste exchanges;
- improving collection methods for large household items;
- improving reuse facilities at recycling centres;
- ensuring bulky uplift materials are put to good use;
- running a campaign to discourage householders from putting reusable items in the residual waste bin;
- consider whether further action can be taken to encourage repair and refurbishment (taking into account WEEE regulations);
- ensuring leftover paint is used eg through REPAINT schemes;
- encouraging further reuse of goods such as furniture, carpets, mattresses etc;
- learning from experience in other jurisdictions eg Flanders;
- encouraging retailers and the community sector/social economy organisations to work together;
- considering the establishment of skills training for refurbishment activities.

Action 12: SE/SEPA will work with CRNS to encourage the establishment of a further 20 community compost schemes by 2008 diverting an additional 500 tonnes. This will be done in line with existing regulations and involve volunteers where possible. We will also consider what further work can be done in this area.

Action 13: SE will work with Momenta to monitor and report the success of projects funded by INCREASE (the Scottish Executive grant scheme for the community recycling sector) in 2006–07, 2007–08 which contribute to household waste prevention. Some of these projects relate to the provision of in-depth advice to householders on what they can do to minimise waste.

Action 14: SE to ensure waste prevention messages are mainstreamed in the Ecoschools Programme and other waste awareness/education initiatives.

Action 15: SE will provide advice to local authorities on size of residual bins, frequency of residual collections and use of receptacles for recycling, taking into account local variations.

Action 16: SE, working with SEPA, will review annually the possibility of introducing further landfill bans on materials.

Action 17: SE, working with SEPA, will review the existing regulations (the Controlled Waste Regulations 1992) which allow charges to be made by local authorities for the collection of specific types of household waste.

Action 18: SE will issue guidance to local authorities on mainstreaming waste prevention into Service Level Agreements/Contracts.

Action 19: SE will consider further with local authorities and others the role of incentives in recycling/waste prevention.

Action 20: SE will consider, as part of Spending Review 2007, if further resources should be allocated to waste prevention specifically and how resources should be allocated to ensure waste is prevented.

⁴¹ The guide is available at: <http://www.sepa.org.uk/nws/prevention/toolkit.htm>

Memorandum by the South East England Development Agency on behalf of England's Regional Development Agencies

1. England's Regional Development Agencies (RDAs) were established 1999. Their mission is to spread economic prosperity and opportunity to everyone in the nine regions of England by taking a business-led approach to economic and community development.
2. England's RDAs welcome this inquiry in waste reduction. They consider that, to date, policy drivers have concentrated on "end of pipe" solutions once "waste" has been generated rather than tackling the issue at the front of the production process through sustainable innovation, design and waste minimisation. In future a Cradle to Cradle approach whereby materials from end of life products feed back into the production process should be the goal for producers and designers.
3. In line with their regional priorities members of the RDA network in England give businesses, particularly SMEs, support on improving their resource efficiency including waste reduction. However they acknowledge that this support is at a relatively low level, fragmented and has not yet achieved the critical mass to cause a major change in business behaviour. Interest in producing sustainable products and services is still a niche activity.
4. This paper outlines the RDA network approach to resource efficiency and sustainable business and provides examples of the range of activities that RDAs have undertaken and are planning to take in these fields.

BUSINESS FRAMEWORK

5. The RDAs have an important role in providing support to business on resource efficiency and sustainable innovation and design. They are responsible for contracting Business Link (BL) services in their region based on the universal Information, Diagnostic and Brokerage model. Under this model a BL general business adviser (GBA) diagnoses a businesses' need and, where appropriate, "brokers" in the relevant support from public or private solution providers.
6. Following a commitment announced in the pre-budget statement in 2006 the RDAs have run a successful nationwide Business Resource Efficiency audit pilot scheme that gave support to 10,000 SMEs on resource efficiency during 2007/08. The final results of the scheme are currently being collated. However, initial figures indicate that over 10,600 companies will have benefited from this support in the first, pilot year. This is an excellent basis on which the RDAs, BL and specialist support providers can build. It is an example of the mainstreaming of environmental issues into business thinking.
7. During the period April 2005 until March 2008, under the former Business Resource Efficiency and Waste (BREW) programme the RDAs were given a role in their regions to co-ordinate the activities of national publicly funded bodies delivering advice on business resource efficiency eg Envirowise, NISP, WRAP and Carbon Trust. Most RDAs also supported regional programmes for SMEs on resource efficiency and environmental sustainability eg the South West England Regional Development Agency (SWERDA) funded the Envision programme, One North East the Midas programme, NWRDA the Enworks programme in the North West and SEEDA, the Sustainable Business Programme in the South East. Following the change of approach to the provision of business resource efficiency support announced by Defra in February, many RDAs are seeking to use European Regional Development Fund (ERDF) funding to continue these regional programmes in a manner that is compatible with the emerging Business Support Simplification Programme (BSSP).
8. The BSSP is being designed around making Business Link the primary access channel for SMEs for their business support needs. Promoting Resource Efficiency and Sustainable Waste Management (PRESWM) has been identified as one of the product streams within the BSSP. The experiences of the South East England Development Agency (SEEDA) and East Midlands Development Agency (EMDA) in developing new delivery models for business resource efficiency advice, using Business Links as the first point of contact, are being used to develop the delivery of the PRESWM product.
9. Research funded by SEEDA into Sustainable Innovation and Eco-Design concluded that design is only one element of the innovation mix required for new product development. There is a need to get "buy in" from senior strategic managers at the product conceptualisation stage in order to embed sustainability into product design. SEEDA and other RDAs are currently running the "Designing Demand" programme in their respective regions and are planning to emphasis the sustainability strand in their future activity.
10. Via former BREW funding, the South West RDA have funded Knowledge Transfer Partnerships (KTPs) specifically on Resource Efficiency. These have provided a proactive link between businesses and universities with a dedicated resource enabling the application of innovative approaches to improved resource efficiency.

BETTER DESIGN AND THE USE OF MATERIALS

11. The RDA network actively supports better design and use of materials through a number of its business support programmes and signposting SMEs to national business resource efficiency providers. These programmes contribute to waste reduction through:

Adding value by reducing resource inputs

12. The Envirowise Cleaner Design and Design Track service is a good example of delivering the support to businesses that is needed at the waste reduction level of the waste hierarchy. The London Development Agency (LDA) provides support to Envirowise in London through its delivery partner London Remade. The future of the service is being reviewed by Envirowise in light of their financial settlement for 2008–09 from Defra.

13. Manufacturing Advisory Service (MAS). It is important to note that it is not just the “resource efficiency” programmes of the RDAs that are making an impact on waste reduction. The Manufacturing Advisory Service, with its focus on competitiveness in the manufacturing industry often has an indirect impact on raw material usage and waste reduction. For example between April 2005 to March 2008, MAS Yorkshire and Humber supported 315 companies to reduce their scrap/defect rates by an average of 17 per cent. With the widened remit of MAS post-March 2008 to include Resource Efficiency, it is expected that there will be greater resource efficiency benefits delivered through the Manufacturing Advisory Service.

14. MAS is working with London SMEs on areas such as packaging design and production processes to advise them how they can make efficiency gains, including on waste reduction, saving cost for the business in the process.

15. With BREW funding, Yorkshire Forward have provided small scale capital, consultancy and training grants to businesses (Business Resource Efficiency Improvement Grants) to help them to implement resource efficiency changes. Over two years this programme has supported 205 companies to improve their Resource Efficiency. Looking only at reduction in virgin raw material only, the grant scheme supported 38 companies to reduce virgin materials by over 89,000 tonnes.

Taking a sector approach

16. Many RDAs have sought to improve the environmental performance of the priority business sectors in their regions eg construction and tourism.

Construction

Most RDAs have delivered projects seeking to improve construction industry resource management. In particular the Greater South East (the LDA, SEEDA and EEDA) have targeted the construction sector through their joint Construction Resource Efficiency(CoRE) project.

In the SEEDA region the core programme has taken a holistic approach to the construction sector supply chain, with programmes of resource efficiency activity targeted at different sections of the chain. For example, the client side specifiers, both public and private, are given assistance to specify standards of resource efficiency to be included in their projects. Major contractors are supported to train their suppliers collectively into their resource efficiency requirements. A successful SME support programme has provided support on designing and implementing site waste management plans and brokering relationships between innovative waste management companies and the construction sector to achieve greater diversion of construction materials from landfill.

17. SEEDA, the Environment Agency, WRAP, NISP and other key stakeholders in the SE with the agreement of Defra and other government departments will continue this work in their pioneering three year pathway towards a zero waste region initiative which has made reducing construction waste its year one priority. The objective of this activity will be to meet the proposed sustainable construction strategy targets in advance of the target deadlines.

18. RDAs argue that it is important that construction design, processes, products and materials are included in consideration of the waste reduction agenda given that construction, demolition and excavation waste accounts for such a high percentage of England’s waste. The LDA has recently published a guide for developers *Sustainable Development Guide: implementing sustainable design and construction*.⁴² This lifecycle approach to the construction process, centred on the inclusion of a waste reduction target in the Site Waste

⁴² Available on the LDA website at <http://www.lda.gov.uk/server/show/ConWebDoc.2445>

Management Plan, and including the pre-design stage, will help reduce waste through minimum standards on developers and contractors for new RDA development projects in London and the South East including:

- Reduction of waste during design, demolition and construction phases.
- Use of recycled materials during the construction phase.
- Undertaking a pre-demolition audit to maximise the material recovered from the demolition of existing buildings in line with the ICE Demolition Protocol.
- Encouraging the use of consolidation centres, where available, to manage supply of materials and recovery of recyclable material.
- Using prefabricated and standardised modulation components to minimise waste where possible.
- In London all contractors will be required to develop a Site Waste Management Plan (SWMP), which should include the entire development process from the pre-design stage, and will need to set targets for waste reduction and recovery with information on how these targets will be monitored and achieved.

Tourism

19. In 2007 the LDA launched Green Tourism for London,⁴³ an example of another sector-focused programme which helps businesses to improve their resource and energy management. It is aimed at hotels, guesthouses, attractions and venues in London. The scheme has three main aims; to help businesses improve resource and energy management, cut costs and, by awarding a Bronze, Silver or Gold award, help visitors assess the true green credentials of the business before booking. The scheme encourages waste minimisation and to get a Silver Award businesses need to have implemented a number of practical activities to minimise waste.

20. In the South West, the RDA have augmented the regional support for the Green Tourism Business Scheme, a programme operating on a similar principle to the Green Tourism for London initiative. Over 200 tourism businesses have received advisory visits to help them achieve “GTBS” accreditation over the last year.

21. The South West RDA have also run sector-specific resource efficiency programmes with both the Marine sector and the Food/Drink sectors. SEEDA have supported initiatives with in the aerospace sector on resource efficiency.

DESIGNING WASTE OUT

22. In London, the Mayor has recently launched his draft Business Waste Management Strategy *Making waste work in London*. The London Development Agency will be a key partner in the delivery of this Strategy.⁴⁴ This draft Strategy recognises the importance of waste reduction: the chapter “Designing Waste Out” emphasises the importance of the role of better design and specification of materials in reducing waste, and the role of producer responsibility legislation in pushing businesses to take financial ownership for the environmental impact of their products.

23. On packaging, the draft Strategy states that the Government should make lifecycle thinking part of decision-making at the design stage to ensure full account is taken of the waste hierarchy. The draft Strategy also puts forward a proposal for the Mayor of London to call a conference of producers, grocery retailers and London boroughs to:

- Commit to reducing product and packaging waste.
- Discuss the production and retail of materials that cannot be recycled or composted in London (eg compostable packaging) and use their resources to develop processing and reprocessing capacity.
- Discuss the development of consistent and clear product labelling.

Encouragement of more Sustainable Models of business

24. There is a need to encourage greater innovation in the thinking into service provision ie moving away from selling products to the end user towards the selling of services which provides business with an incentive to reuse, recycle or remanufacture the material elements of their services. Examples of this trend are Interface Carpets who sell now a floor surface provision service, Xerox who increase the life of their photocopiers by

⁴³ <http://www.lda.avencs.com/page.asp?id=21>

⁴⁴ The draft Strategy was published for consultation in February 2008 and is available online at <http://www.london.gov.uk/gla/publications/environment/bwms-draft>.

refurbishing them and leasing them out at lower rentals and Cartridge World who are in the business of refilling and reusing computer printer cartridges.

25. SEEDA co-funded the initial research into remanufacturing that identified that the sector was worth £5 billion per annum to the UK economy and led to the setting of the BREW funded Centre for Remanufacturing by Oakdene Hollins. The Centre has identified a number of characteristics and benefits of remanufacture but also barriers to further development of the sector. These mainly centre around the perception of the quality of “second use” products.

GOVERNMENT POLICY

Producer Responsibility and full life costs

26. The RDAs support producer responsibility as a key element of the Government framework to reduce waste. For example, the Mayor of London’s Draft Business Waste Management Strategy considers that significantly higher post-2008 targets than those proposed by Government under the Packaging Producer Responsibility regulations are required to ensure that packaging waste producers reduce the quantity of materials in packaging products to achieve waste reduction.

27. However, they would wish to see more certainty and consistency in the implementation of EU Directive so that business has the confidence to invest in reprocessing capacity for end of life products.

28. An overlying philosophy behind future product policy should think about reducing resource consumption throughout the life cycle of the product eg through lightweighting, redesign and greater energy efficiency, process efficiencies through programmes such as Manufacturing Advisory Service and improving the longevity of products through better component design and making repair easier and cheaper. If repair and reuse are not viable options then products should be designed for disassembly and recyclability. Consideration could be given to imposing a penalty for goods which cannot be recycled.

Improved Data of arisings from Commerce and Industry

29. One of the main barriers to sensible policy making on waste reduction is the lack of consistent data on waste arisings from commerce and industry (C&I). This is a significant concern and remains an outstanding action from Waste Strategy for England, which has not been pursued with any vigour by Defra or the Environment Agency. The last survey of C&I data was undertaken in 2005–06 and the Agency has no plans to repeat the exercise. This lack of data also impacts on investment decisions by the resource management industry. Furthermore the ongoing focus on, and targeting of, Municipal Solid Waste distorts the perception of waste management priorities and the need to reduce C&I arisings.

Procurement

30. As the reports of Sustainable Procurement Task Force and the Commission on Environmental Products and Services identified, public sector procurement can be used as a stimulator of innovation of sustainable products through the forward commitment concept which embeds full life costs thinking into purchasing decisions.

31. In London, the LDA have supported the Mayor’s Green Procurement Code, which is a free support service for London-based organisations committed to reducing their environmental impact through responsible purchasing. Although much of the waste focus is on promoting use of recycled materials, the Code does tackle a broader range of green purchasing issues, including waste prevention and resource efficiency such as through more efficient use of materials.

32. Yorkshire Forward established Recycling Action Yorkshire’s “Buy Recycled” programme in September 2006 to encourage public and private sector organisations to buy more recycled content products and to integrate sustainable procurement into their everyday purchasing decisions. By turning attention to the products and materials purchased by a business the full cost of waste is highlighted, leading to a more balanced effort to reduce and reuse materials as well as recycle waste. To date, March 2008, the “Buy Recycled” programme has helped to divert 47,302 tonnes of waste from landfill through the procurement of recycled content products. This has led to a reduction in CO₂ emissions of 34,319 tonnes.

SKILLS

33. A prime example of the RDAs investment in skills in this area is Yorkshire and Humberside's Manufacturing MASTers Programme, a high level skills programme with an executive MSc in Manufacturing Leadership. There is a full 30 hour programme and at the same level but less content are a series of one day—six hour taster courses (Tier 1).

34. The Tier 1 Taster Day and the Tier 2 30 hour module include “Managing Energy in a Manufacturing Environment” and within the MSc “Sustainable Design and Manufacturing” is an elective module.

35. To date, in a very limited time frame, 11 manufacturing companies and 40 delegates have taken advantage of the “Managing Energy in a Manufacturing Environment” under the Manufacturing MASTers and capitalising on the BREIG grant. 21 companies have taken advantage of the scheme with 97 delegates being trained.

CONCLUSION

36. The RDAs have demonstrated that they can enable an effective and targeted Business Resource Efficiency support service, which over the last few years, has helped some businesses—particularly SMEs—make considerable progress in embedding waste reduction into their business practices.

37. The challenge for government, its agents like RDAs and business, is to find the drivers to make waste reduction a mainstream part of business culture for all firms.

April 2008

Memorandum by Tesco

1. ABOUT TESCO

1.1 Tesco is one of the world's leading international retailers, employing over 450,000 people globally. We recognise the importance of addressing the challenge posed by waste and are committed to playing a leading role in responding to the challenge.

1.2 We have consistently been at the forefront of sustainable development within the retail sector across all areas of our business and have demonstrated a clear commitment to overcoming environmental challenges.

1.3 Across our business, internationally as well as in the UK, we are responding to the challenges posed by waste. We recognise that in order to grow our business in a sustainable way we must continue to address both the challenges and opportunities presented by the waste we generate. Waste is an increasing cost but also a resource.

1.4 Our policy is to use the waste hierarchy to deliver change—through waste minimisation, reuse and recycling. Disposal is viewed as the last resort. To ensure effective engagement across our business we have put waste at the heart of the Tesco Community Plan, with the result that each individual store measures and reports progress towards individual waste reduction targets.

1.5 As a result, in 2006–07 we recycled 71 per cent of the waste generated in our stores and distribution depots, including over 80 per cent of our paper, cardboard and plastic. We also have a long term commitment to divert 80 per cent of our operational waste from landfill which we are making progress towards. In 2007–08 our goal is to divert 75 per cent of waste from landfill.

1.6 We report annually on our progress in reducing waste and increasing recycling through our Corporate Responsibility Review and website. However, in order to ensure that waste reduction remains a prominent business priority, we have committed to achieving the following public targets:

- To reduce the amount of packaging on both branded and Tesco own-label products by 25 per cent by 2010.
- To label all our own-label packaging according to whether it can be reused, recycled or composted by the end of 2008.
- To increase the proportion of waste from our own operations that we recycle from 71 per cent in 2006 to 80 per cent in 2009.
- To double customer recycling at sites where we introduce automated recycling units from 2006 levels by 2008.
- To cut the number of carrier bags given out by 25 per cent by May 2008 compared to May 2006.

1.7 As a signatory to the UK Government's 2005 Courtauld Commitment, we are also committed to helping WRAP achieve the following three targets:

1. To design out packaging waste growth by 2008.
2. To deliver absolute reductions in packaging waste by 2010.
3. To identify ways to tackle the problem of food waste.

1.8 We were also the first retailer to sign up to the Government voluntary code on carrier bags, committing to reduce usage by 25 per cent by 2008.

2. CONSUMER ATTITUDES

2.1 We recognise that we have an important role to play in helping consumers reduce their own waste.

2.2 Consumer concern at excess waste is strong and growing. This is focusing the minds of retailers and manufacturers and encouraging a high degree of competitive innovation.

2.3 When exploring in more detail consumer views on environmental issues, waste and packaging consistently come towards the top of their priority list. 71 per cent of UK customers are concerned about the implications of packaging on the environment and 61 per cent claim to have difficulty in finding products that are not over-packaged.

2.4 Recycling is a key issue for most customers. It is an area where people feel that they are able to do more. It also has a high public profile with attention from local authorities, interest from media and green initiatives in schools, homes and workplaces.

2.5 The majority of people are focused on waste reduction rather than on overall packaging sustainability. Customers often perceive recycling and packaging reduction as positive actions to achieve waste reductions. This is rarely linked directly to the challenge of combating climate change.

2.6 Packaging is becoming an increasingly important factor in making purchasing decisions as customers begin to link the issue of waste with their decisions at the point of sale.

2.7 Key areas of concern for customers include:

- Education: Over 50 per cent of customers feel they do not know enough about packaging and its impact on the environment.
- Recyclability: Customers are confused about what they can and cannot recycle. In particular they dislike plastics, which they perceive to be the least recyclable and sustainable material.
- Over-packaging: Customers do not like unnecessary packaging which they feel is wasteful, both in terms of cost and impact on the environment.
- Labelling: Consumers are confused by the variety of different packaging symbols used.
- Collection facilities: People are frustrated by the lack of collection facilities for plastics and mixed materials and would like Local Authorities to recycle more plastic packaging than just bottles.

3. BARRIERS PREVENTING CONSUMERS FROM DOING MORE

3.1 Consumer research shows that customers want to do more to protect the environment. However, there are a number of barriers preventing them from changing their behaviour. These include:

- the feeling that doing more to reduce waste will make life more complex or more expensive, whether in terms of the price paid at the checkout or council tax;
- a lack of clear consistent information about what to do, what can be recycled, where packaging can be recycled etc; and
- a concern that individual actions will not make a difference.

3.2 Our research also tells us that consumers expect Tesco and other businesses to make it easier and more affordable for them to help the environment by selling products with less packaging, making greater use of reuseable packaging and providing opportunities to recycle more waste where it cannot be reduced or prevented.

3.3 A central aim of work to achieve a sustainable reduction in waste must be to break down the barriers that prevent people from doing more. We are attempting to do this by providing customers with the incentive, opportunity and information they need to act.

3.4 Helping people overcome the feeling that individual actions will not make a difference is a significant opportunity. We need to help consumers understand just how much can be achieved together and that if millions of people undertake millions of small actions, the overall effect will be very large.

3.5 One example of positive consumer response to incentives is the work we have done to reduce the number of carrier bags in circulation as part of our pledge to reduce the number of Tesco bags we give away by 25 per cent or 1 billion.

3.6 Every time customers reuse a bag to take their shopping home from a Tesco store we reward customers with one Green Clubcard⁴⁵ point. The message is very simple: one point is received any time any bag is reused. On collection of a sufficient number of points customers receive vouchers every three months that can either be spent at Tesco or converted into vouchers to spend elsewhere.

3.7 As a result of our Green Clubcard carrier bag initiative we have already reduced the number of new bags we have given away since the launch in August 2006 by 1 billion. In addition to incentivising customers to change their own behaviour initiatives like this also build confidence that individuals, acting together, can bring about significant change.

4. COMMUNICATING WITH CONSUMERS

4.1 Businesses come into direct contact with millions of consumers on a daily basis. This gives business a great opportunity to communicate directly with customers in a variety of ways to help increase awareness and understanding of sustainable lifestyles. Our research suggests that customers will do more to reduce waste and recycle provided they have the opportunity to do so.

4.2 As part of our goal to double the amount of customer recycling at Tesco stores we have made front of store recycling even easier with the introduction of market-leading recycling facilities.

4.3 Our innovative automated recycling units, introduced in 2006, sort plastic, metal and glass so our customers do not have to. The automated units also shred and crush the material collected so that more can be stored, reducing the frequency of collections. The units are located in prominent positions and are highly visible, well lit, brightly coloured and contain simple instructions. Unlike traditional recycling units customers put all their waste into a single inlet, as opposed to different types of materials into different inlets, again ensuring the recycling is simple for consumers. In addition to making recycling simpler and more convenient the new automated units have enabled us to reward customers with Green Clubcard points for recycling.

4.4 Progress to date is encouraging, demonstrating that consumers will respond positively when presented with simple solutions. Our first 27 units are on average collecting 7.69 tonnes of recycle a week, an increase of over 54 per cent traditional units installed in Tesco car parks and 92 per cent higher than the average local authority bring bank (which collects four tonnes per week).

4.5 We have also recently produced twelve million booklets entitled “Little Steps to being Greener” and delivered them directly to customers’ homes in the UK. The booklet sets out hints and tips for consumers on how they can become more environmentally friendly on a day to day basis and compliments our ongoing communication on sustainability issues via the Tesco.com website and the Tesco Magazine.

4.6 Our Greener Living website, launched in October 2007, assists consumers by providing a glossary of green terminology as well as offering advice and tips on ways to reduce environmental impact at home, at work, for parents, in the garden, and when travelling. This practical assistance will help customers to understand more about green choices and how to implement them in a simple and achievable way.

4.7 We have also increased customer information on sustainability issues. On our website environment and climate change sections are located on our homepage alongside our traditional on-line shopping offer thereby maximising visibility for the three million people who access our website every week. Tesco Magazine helps customers understand what practical steps they can take to living more sustainably. For example our October 2007 edition features a 25 page section devoted to the issue of climate change, including guidance on simple things customers can do to help combat climate change and recycle more. The magazine is also now available online.

⁴⁵ Customers earn one Clubcard Point for every £1 spent shopping in-store, at Tesco petrol or on Tesco.com. Customers receive Clubcard Vouchers which they can spend in Tesco stores or elsewhere once they have collected 150 points or more.

5. BREAKING DOWN THE INFORMATION BARRIER

5.1 Businesses and consumers suffer from a lack of clear information on sustainable waste reduction. For action to promote sustainable consumption to be truly effective, information on sustainability needs to be more widely available and communicated simply so that consumers and businesses fully understand how their decisions will impact the environment.

5.2 We believe that clear, consistent information can act as an incentive for positive change. We know that given this type of information consumers will make more sustainable choices. We also believe that business and public authorities working together with consistent messages can help deliver information on sustainable consumption to help consumers understand the context within which their decisions take place and understand the consequences of their behaviour.

5.3 For this reason Tesco is providing £25 million in funding to establish a Sustainable Consumption Institute at the University of Manchester in the UK. The Institute will promote fresh thinking and explore vital areas of research such as how customers can be empowered and incentivised to buy green products and services, how business can adapt to meet customer needs and how we can train the next generation of environmental leaders and experts. Its research and conclusions will be shared freely.

5.4 Drawing on expertise from all four of the University's faculties, Manchester will lead and co-ordinate a wide range of focused research programmes. The SCI will also become a focal point for the next generation of researchers, policymakers and advisers in the area of sustainable consumption through an extensive postgraduate training programme.

5.5 Waste, recycling and packaging have been included in the research themes that will guide the Strategic Management Board in the prioritisation of expenditure on individual research projects. Our aim is to evaluate, and consider the acceptability of, new technologies and approaches to packaging with a view to maximising recycling and minimising waste.

6. PRODUCT LABELLING

6.1 Customers tell us that lack of simple information constitutes a barrier to sustainable waste reduction. We believe that clear, consistent labels, based on universally accepted and commonly understood principles have an important role to play in overcoming this barrier.

6.2 Based on our experience over the past 20 years of developing simple nutritional labelling for products, we believe that more effective recycling labelling can help boost recycling rates. Customers believe that recycling is one area where they can really make a difference. However, there is currently a lot of confusion over what can and cannot be recycled. For example in the UK only one in every four plastic bottles is recycled as customers are confused over whether or not plastic can be recycled.

6.3 Just as in the case of carbon labelling we are working in conjunction with other retailers and the Waste and Resources Action Programme (WRAP) to develop a simple, consistent labelling system to help customers understand which types of packaging can be recycled and where. Our aim is to produce a simple set of symbols that all retailers can use to let consumers know for each component part of a product's packaging whether or not it can be recycled and if so, where.

6.4 We aim for the first labelled products to appear on our shelves in 2008 as a first step towards labelling all Tesco own brand products with recycling information.

7. BETTER DESIGN AND THE USE OF MATERIALS

7.1 Efficient and effective design can play a major role minimising consumer waste, for example by reducing the size and material content of particular products. It can also identify ways of increasing the use of alternative materials that are reusable, recyclable or derived from sustainable resources. Better design can also impact on distribution and reduce waste through the entire supply chain.

7.2 There are a number of factors that affect the use of a particular material in packaging. These include:

- The type and quality of the product.
- Its durability (to ensure that it is fit for purpose and appropriate for the distribution cycle).
- The shelf life of the product.
- Whether it can be reused, recycled, or composted.
- Brand image and competition.
- Legislation.

7.3 Our commercial categories are currently engaged in a review of all packaging—primary, secondary and tertiary—to improve design and meet our targets to reduce primary packaging by 25 per cent by 2010. To help categories achieve packaging reductions they are supported by Technical Managers and a dedicated packaging team who co-ordinate progress across categories and work to identify best practice solutions. The packaging team also works closely with WRAP and our own recycling and carbon footprint teams to develop innovative, eco-friendly and sustainable packaging for next generation products.

7.4 Examples of some of the work that we have already done to reduce packaging through improved design and a better use of materials include:

- Transferring our beer, wine and spirits glass bottles to best in class benchmarks, with the aim of reducing our glass intake for this category by 13,000 tonnes.
- Packaging of all our electrical products is currently being addressed in order to reduce it to minimal levels with maximum recyclable content.
- We aim to source our paper content from Forest Stewardship Council mills and maximise recycled content as far as possible.
- Reductions of our plastic packaging in our chilled category will deliver a saving of 3,700 tonnes a year.
- Moving our Tesco branded detergent to concentrate will reduce our plastic usage on bottles by five hundred tonnes this year. We are now working with branded manufacturers to encourage them to follow suit.
- We aim to introduce recyclable crates in our produce category which we estimate will save 1,100 tonnes of cardboard trays.

7.5 Tesco is clearly only one participant in the packaging and recycling market and we are therefore keen to work with other stakeholder groups to address this challenge.

7.6 We are particularly keen to work closely with local authorities to achieve greater harmonisation between materials collected by local authorities for recycling and the materials used in product packaging. A more uniform local authority approach linked with a greater convergence of packaging specifications has as yet unexploited potential to achieve a closed loop system in which retailer and manufacturer packaging and local authority collection strategies are focused on the same range of materials, simplifying recycling for consumers and stimulating more effective recycling markets.

8. GOVERNMENT POLICY

8.1 Given the level of voluntary progress being made by industry in response to growing consumer concern, we believe that government policy should focus on:

- incentivising further behavioural change, encouraging industry and households to do more; and
- identifying and working to overcome barriers which prevent people from doing more.

Specific areas of action might include:

Fiscal Incentives

Fiscal incentives for waste efficiency have an important role to play. Landfill tax is set to continue to rise at its pre-announced rates until 2009 and the cost of the tax is being passed through to waste generators. This cost pass through is already providing incentive for business to invest to reduce the environmental impact of waste. We believe that the government should consider utilising the additional revenue available from landfill tax to support “green” projects such as front of store recycling units and alternative landfill solutions. We also believe that it would be beneficial for a scheme similar to Landfill Allowances Trading to be introduced for retailers. This would set clear targets on waste to landfill, providing fiscal incentives for achieving and surpassing targets.

Funding Support

It is important to ensure that public funds are available to incentivise and support research and development work on waste technology to help better tackle the environmental impact of waste. Funding support is also likely to facilitate innovation and should be targeted at the most efficient operators in the market. We would urge the Government to review the existing guidelines on state aid to clarify in which cases state aid may be granted to support waste, recycling and environmental protection initiatives.

In particular we believe that recycling credits have the potential to incentivise investment, provided that they are made available by all local authorities. While recycling credits are currently applied universally, a number of local authorities (both county councils and district councils) are proving reluctant to involve private sector operators in the awarding of credits.

This position could be eased by the Government issuing clear guidance on recycling credits and their application at a local authority level. Greater clarity would offer long-term stability in terms of planning for businesses and facilitate business commitment to long term investment in the provision of recycling facilities.

Government can also play an important role in encouraging greater recycling and reuse of waste. In this respect Tesco supports Enhanced Capital Allowances for waste investment. By allowing the cost of capital assets to be written off against a business's taxable profits, Capital Allowances provide fiscal incentives for investment in waste related projects that would otherwise be unaffordable.

Facilitating dialogue and convergence

Ensuring greater consistency and convergence throughout the entire product life-cycle will be a fundamental to making real progress in this area and the Government has a role to play in facilitating co-operation across the supply chain.

The link between packaging and recycling is an example. Packaging for individual products is commonly produced from a wide range of materials across the industry. This multiplicity of materials makes communication to customers about the recycleability of yoghurt pots complex. This complexity is added to by wide variations in local authority recycling and collection programmes. As a result, customers are often unsure about whether and where individual product packaging can be recycled, leading to inertia.

A more sensible starting point would be to work towards greater convergence of materials used in product packaging—so that packaging types (eg yoghurt pots) are made out of a smaller number of materials. Where possible packaging manufacturers should be encouraged to move out of materials that are technically difficult to recycle. This would provide retailers, customers and local authorities with greater potential to work more effectively together to promote recycling.

Consistent use of materials, plus consistent labelling could also be used to encourage local authorities to collect materials in a more consistent way across the UK. It would develop opportunities for more consistent communication and stimulate the development of more effective recycling markets, with fewer materials in circulation, but with larger volumes being recycled.

8.2 We therefore welcome any support from Government to facilitate discussion across the stakeholder groups with the aim of achieving greater levels of consistency and convergence as part of its drive to achieve a sustainable reduction in waste.

October 2007

Memorandum by the Women's Environmental Network

BACKGROUND

Women's Environmental Network (WEN) initiated the Waste Minimisation Act 1998 which gave local authorities the power to implement waste minimisation initiatives, as distinct from recycling. In 1999 we published Shared Advantage which was a series of suggestions for councils once the Act was in force. For some time it was the only guidance in existence about the Act, and Defra referred councils to it. As part of our Waste Prevention campaign, which was funded until 2005 (with nappy waste prevention work still ongoing) we also worked closely with a series of councils, including Bath and East Somerset, West Sussex, Bexley, Enfield and Tower Hamlets, where the office is based.

One of our projects—based around Spitalfields Market in London—involved local businesses and helped them publicise waste prevention initiatives such as reusing carrier bags and other containers to their customers. We set up a mutually beneficial arrangement between the nearby city farm and the market where food waste would be sent direct to compost. Some of the local businesses undertook extra initiatives, such as offering refills of liquid goods, and discounts for returning other packaging. We used the lessons from this project to feed into our national campaigning work.

In 2000, at the request of Michael Meacher MP, then Environment Secretary, we wrote a list of 25 practical suggestions for local authorities for ways to prevent waste.

Many of these ideas are extremely simple and practical, but demand a very different way of looking at things: where waste prevention—as distinct from recycling—is prioritised.

Some initiatives, such as publicising repair shops in a given borough, may each save only small amounts of waste but can be instrumental to creating shifts in attitudes (and are reinforcing local services and employment). As with all community work, this way of affecting behaviour change is time-consuming but eventually rewarding.

In each policy consultation we responded to, we reiterated the importance of prevention at source. At the time (five years ago), waste prevention was still rarely addressed. These days, the heightened public awareness in environmental issues—and especially the clear consumer aversion to over-packaging and plastic bags bears out these arguments. Large manufacturers and retailers have often used “consumer choice”, and values of aesthetics, hygiene and convenience as an excuse to over-package the things they sell.

Our stance is that we must reduce the quantity of waste overall, before even attempting to increase recycling volumes, and current targets do not assist this.

WEN'S PERSPECTIVE

For WEN, the environment is no one single issue: health, food, waste, homes and chemicals are all inextricably interlinked. Just as environmental problems globally disproportionately affect those with the fewest resources, so too, in the UK, the effects of pollution and contamination (eg landfill sites and incinerators) tend to be worst for, and nearest to, those communities who are least well-off.

WEN campaigns for women and men but from a woman's perspective—highlighting the specific ways in which women are affected by environmental degradation and how they can participate in positive change. We equip consumers with the information they need to lobby supermarkets and politicians for change, produce information briefings and give public talks.

We find that in practice people can be dismissive of taking a gendered approach, but the relevance for the waste prevention campaign is high:

- women tend to make the majority of purchasing decisions in the home;
- women still tend to do the majority of domestic tasks and as such are more affected by practical problems such as excess packaging than men or children; and
- a huge amount of marketing is targeted specifically at women.

We aim to positively affect environmental behaviour and show that it is easier to take small steps to improve the environmental quality of our lives. We have worked with the dairy industry on promoting reusable glass bottles; with the jewellery industry on promoting repairs, and with organic beauty companies on providing safe, healthy cosmetics and refillable packaging. We have always been aware of the need to think about what people will do or buy if they are not consuming wasteful products: hence an emphasis on services replacing products.

Like many charities our funding is not certain. We are in the process of fundraising for a new positive campaign—with the working title of “Live Life Don't Waste It”, to help raise awareness of what we define as waste and the environmental cost of disposable products and to support and value alternatives.

WASTE REDUCTION INQUIRY

WEN welcomes the emphasis of the House of Lords inquiry on reducing waste as opposed to recycling, but asks whether it could go even further and look at the issue of prevention at source.

This is not merely an issue of semantics: it is central to the whole way that our society currently deals with waste—as a problem—rather than as a potential resource.

We want to effect a culture shift whereby we value resources properly. Information alone is not enough. We need to redefine what waste is, and build a much greater cultural awareness of the things we dispose of and affect a change in consciousness—through information talks and workshops, educational experiences such as visits to landfill sites. Such measures would help increase our understanding of the value of the things we consume—and hence their worth when we have finished with them so that we can use them in another form or pass them onto other people. By involving people in discussions we would draw on the ideas and creativity of others to spread enthusiasm and promote practical alternatives and action.

In our real nappy project we raise awareness about the environmental impact of nappies and encourage parents and carers to use real nappies and hence minimise waste and the impact on the environment. In our Real Nappies for London scheme, we have worked with London Boroughs to incentivise the use of real nappies. Feedback from the boroughs in the scheme is that it has been far more straightforward than anticipated and a simple but effective approach towards positively changing environmental behaviour.

Another good case in point is the work that the Bioregional Development Group are doing on “a reclamation-led approach to construction”. Through this work, they have concluded that the current policy regime supports the use of recycle more than the reuse of other construction materials—in other words it is cheaper to use recycle even though this demands greater energy consumption.

Waste prevention cuts to the heart of the economy and questions the way we measure “progress”. It calls us urgently to replace our standards of economic growth with those of quality of life. However, early steps can be taken without conflict with economics, providing examples for the future.

One of the main barriers to this kind of shift is an inability or unwillingness to look at things differently: to be prepared to design out waste from the outset of projects; and to use sustainability, rather than cost alone, as an overarching decision-making framework. This kind of approach can of course lead to cost savings, along with waste savings, later down the line.

RECOMMENDATIONS

We recommend that:

- Waste prevention always be prioritised, and separate from recycling (as such we welcome the indicator in the Government’s Waste Strategy for residual waste).
- A large scaling-up of resources put into communication with communities to promote and publicise local initiatives cutting out waste. There is great support for this type of initiative, in our experience, and much more potential to create change by working with small groups than to working with individuals.
- Councils work more closely with local businesses to promote waste prevention services in their community (eg repair shops, low-packaged goods, refills, reuse, wood banks, DIY demolition yards).
- Positive values such as cradle-to-cradle design and zero waste are properly communicated and discussed at community level with examples.
- Strategic initiatives such as WEN’s real nappy project and Bioregional Development Group’s construction work be given more attention and funding.
- Sector-wide waste prevention initiatives with hospitals, schools, local authorities, shops, trains, markets and festivals could build on best practice in recycling and involve staff in finding practical solutions to reducing and preventing waste. The direct experience of employees is vital to identifying and solving specific problems and also to having enough buy-in for organisational change.
- Central government be prepared to promote initiatives which question consumerism and replace a vision of growth with one of quality of life.

November 2007