

House of Lords Science and Technology Committee
Inquiry into Waste Reduction
Green Alliance submission

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 longterm, 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 website².

Responses to questions

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 movement³. 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."⁴
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;

¹ http://www.green-alliance.org.uk/grea_p.aspx?id=956

² www.green-alliance.org.uk.

³ See <http://www.massbalance.org/resource/massbalance>

⁴ The Mass Balance Movement, 2006, p3

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 nature⁵.

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 model⁶.

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"⁷.

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

⁵ William McDonough & Michael Braungart, 2002, *Cradle to Cradle*, p79

⁶ Kate Krebs, executive director of America's National Recycling Coalition, quoted in 'The Truth about Recycling', *The Economist*, 7 June 2007

⁷ Dorothy MacKenzie, personal communication, 10 October 2007

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):**

Country	Waste per capita (kg)	Landfill (% of total)	Recycled/composted/other (% of total)	Incineration (% of total)
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
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"⁸.

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"⁹.

⁸ IPPR/Green Alliance, 2006, *A Zero Waste UK*, p12.

⁹ 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 ACCPE¹⁰ 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 Bureau¹¹ 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 energy¹².

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-design¹³. The aggregates levy has made recycled aggregate an economic choice in some

¹⁰ The Government's Advisory Committee on Consumer Products and the Environment (ACCPE), which issued three reports and was disbanded in 2005.

¹¹ The European Environment Bureau (EEB) is a pan-European, Brussels based coalition of NGOs.

¹² Green Alliance, 2005, *Return to Sender: producer responsibility and product policy*, p17.

¹³ "Is European end-of-life vehicle legislation living up to expectations? Assessing the impact of the ELVDirective on 'green' innovation and vehicle recovery" by Jason Gerrard and Milin Kandlikar, *Journal of Cleaner Production*, vol. 15, issue 1, 2007

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;
- Few of the packages carried labels explaining how they should be treated at end of life. Putting them in green waste collection as an 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 focused 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' (led 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 this¹⁴.

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 betterdesigned 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.

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

¹⁴ <http://www.defra.gov.uk/environment/business/commission/index.htm>

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 nongreen 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.

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