

Making the most of packaging

A strategy for a low-carbon economy



June 2009

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<http://www.defra.gov.uk/environment/waste/topics/packaging/strategy.htm>

Published by the Department for Environment, Food and Rural Affairs

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Over the past decade, more and more of the UK's packaging waste has been recycled. In 2008 we recycled 61% of it. Businesses have also reduced the packaging used on a range of products, often in ways consumers have not been aware of. And the amount of packaging on our groceries has stopped increasing.

But we want to do more to make sure that the right amount of packaging is used, and that more is recycled (and where appropriate, recovered) when we have finished with it.

If we can do this, we will use fewer raw materials, save transport costs and greenhouse gas emissions, and reduce the amount of waste we as consumers – as well as local authorities – have to deal with. That's good for people and businesses, and good for the planet.

Building on the packaging sector's record of innovation, the public expects to see the challenges of resource efficiency and low-carbon living addressed in the design of all packaging.

As for packaging recycling, there are a number of ways in which further improvements can be made. Funding mechanisms can be made more transparent. With funding from packaging producers, local authorities can do more, including collecting a wider range of plastics for recycling.

Using recycled materials in packaging helps businesses and the environment. It takes 95% less energy to manufacture a drinks can from recycled aluminium than to make it from virgin ore. Using recovered plastics can save up to 25% of the costs of virgin polymers, and increasing the use of recycled content has the potential to make our recycling system more sustainable and more resilient. So will raising the quality of the recyclates we generate.

All of us as consumers have our part to play in this. Recycling clearly matters, but we need to be able to translate our concerns into doing things that make a difference.

To make the transition to a low carbon, resource-efficient economy, all business sectors will need to consider their products and operations. This strategy is an opportunity for the packaging industry to show the way.



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Executive summary

Why review packaging policy?

Packaging fulfils an important role in our lives. It protects food and other goods on their journey from farm or factory via warehouses and shops until they arrive at homes, offices or wherever they are used. The key role of packaging is to avoid spoilage and damage in the supply system and in the home.

And yet, recent surveys show that consumers believe packaging is the top environmental problem in relation to the products they buy. Alongside addressing these concerns, packaging policy needs to contribute to greater resource efficiency and the fight against climate change, as part of the wider goal to reduce the overall environmental impacts of our supply chains.

This document is the result of a strategic review of policy, undertaken by the Department for Environment, Food and Rural Affairs (Defra), the Department for Business Innovation & Skills (BIS), and the Devolved Administrations of Scotland, Wales and Northern Ireland, with input from a wide range of stakeholders.

We will consult widely on all the specific policy proposals it contains. Unless otherwise stated, this Strategy extends to all of the United Kingdom. In Scotland, the Scottish Government is due to consult on a new National Waste Management Plan shortly. This strategy will form part of its consultation. In Wales, the Welsh Assembly Government published for consultation on 29 April 2009 a new Waste Strategy for Wales entitled *Towards Zero Waste; One Wales: One Planet*¹. It also intends to consult on a series of sector plans that will form part of the delivery mechanism. This strategy will form part of the consultation process.

Where we want to take packaging policy: a vision

Packaging policy should minimise the environmental impact of packaging over its whole life cycle, without compromising its ability to protect the product. This starts with **optimising packaging** through:

- designing it in line with sustainability principles, and with re-usability, recyclability or recovery in mind – as a standard
- delivering real reductions in packaging, under existing and new voluntary agreements
- market innovation and development which meet the growing demand for re-useable and recycled packaging, across all types of packaging.

It continues with **maximising the recycling** of waste packaging, through:

- more recycling by householders; recycling schemes that collect all the main packaging materials and are easy to use;
- local authorities and businesses treating waste packaging as a resource, leading to more recycling by businesses, and a new emphasis on quality in household collection and sorting;
- working from where we are now towards the recycling rates achieved by the best EU performers.

¹ <http://wales.gov.uk/consultations/environmentandcountryside/wastestrategy>.

Successes so far and future challenges

Since 1997, businesses throughout the packaging supply chain² in the UK have been responsible for minimising the amount of packaging they use and ensuring that a proportion of the packaging they handle is recovered and recycled.

These *producer responsibility* regulations work with market pressures on businesses (e.g. to reduce the cost of their raw materials) and voluntary agreements such as the Courtauld Commitment, signed by major grocery retailers, brands and suppliers in 2005.

These policies have scored significant successes over the years. Businesses' need to reduce the cost of their raw materials has driven packaging optimisation, with substantial benefits for consumers and the environment. The Courtauld Commitment signatories have halted the growth in grocery packaging waste, and are on target to meet their 2010 objectives of reducing such waste. In 2008, the UK recycled 61% of its packaging waste, a massive increase from the 28% achieved in 1997, at relatively low cost to business. This means over 6.6 million tonnes of packaging waste diverted from landfill, and over 8.9 million tonnes of CO₂ equivalent emissions avoided.

This strategy is about building on these successes to address the challenges of the next 10 years. These include reversing the historical trend of overall packaging growth, and making the packaging that is used as resource-efficient as possible. In the current economic climate, business will be keen to make the most of packaging reduction savings. While large scale changes involving investment in new machinery might be constrained, small changes may offer real financial benefits in reduced material costs, storage space and transport.

The UK will also need to enhance its packaging recycling performance – which contributes to the waste recycling targets set across the constituent nations of the UK – with the aim of having a robust recycling system in the face of uncertain market conditions. Finally, packaging policy will need to encompass the diverging needs and expectations of consumers, local authorities, packaging producers, retailers and brands, and reprocessors; all of which pull the various parts of the packaging chain in different directions.

Measuring what matters: weight vs carbon

Weight-based targets – used in most EU legislation – are fairly easy to understand, and reductions and recycling relatively easy to measure. However, they do not always work well in the wider climate change context. For example, they do not account for whole life cycle impacts.

Government will consider the best way to measure the environmental impact of packaging, and thus our progress towards our policy objectives. We will look at what a move from weight-based to carbon-based targets would involve in practice, and at the balance of costs and benefits of such a move, in consultation with a range of industry and other experts.

² from raw material manufacturers, businesses converting this raw material into packaging products, businesses who pack or fill packaging, to wholesalers and retailers, service providers and importers.

The way forward: optimisation

Government wants to see more packaging designed to make best use of resources, across the whole packaging supply chain. To make this happen,

- i. Government will work with others to **raise the profile of eco-design and increase its uptake by business**. Various organisations offer free advice to businesses on this. Over the next couple of years, government will work with them to raise awareness of these services, making use of their visits and contacts with companies. We will set up a central information point for eco-design which will explain clearly what advice is out there and for whom.
- ii. Government will review the scope for promoting **refillable and reusable packaging**, which offer cost-saving opportunities for businesses, and could reduce waste for them and consumers alike.
- iii. **Recyclability** must be built into packaging design to maximise the environmental and economic return on packaging waste. Government will work with stakeholders, WRAP and others to promote best practice in packaging recyclability, and suitability for specific forms of recovery (eg anaerobic digestion) where appropriate.
- iv. The UK Government, the Devolved Administrations and their Agencies will lead from the front through **public procurement**. The EU core criteria for 'green' public sector tendering procedures include requirements for the amount of recyclable, recoverable and recycled content in the packaging used.
- v. WRAP will identify priority sectors for **packaging reductions**, and work with Government, trade organisations and key business partners to negotiate the next generation of voluntary agreements for the period 2010-15. Also, given the scope for benefits for both business and the environment, government looks forward to receiving ambitious proposals from signatories to the Courtauld Commitment and WRAP for new targets covering the period 2010-15. Alongside voluntary measures, powers to impose statutory reduction targets are now part of the Scottish Government's Climate Change Bill. The Welsh Assembly Government will consider its approach as part of its new waste strategy.
- vi. Consumers need to let businesses know when packaging goes beyond what they regard as normal or acceptable. They can do so by choosing alternative products, complaining to the retailer or manufacturer, or asking Trading Standards to investigate. Government will work with others to **raise consumers' awareness and make enforcement action easier**. This will include developing a tool with enforcement bodies to help enforce the Regulations. WRAP will work with manufacturers and retailers of products commonly thought to be excessively packaged.

The way forward: greater recycling

The UK's packaging recycling has risen massively over the past decade, and analysis shows that more can be achieved over the next 10 years.

- i. **Improving recycling rates for each of the main packaging materials.**
 - For *aluminium*, the focus will be on increasing collection, through recycling at work, local authority foil and can collections, and investment in on-the-go infrastructure. In addition, in England, the Government will consult on the option of banning aluminium (among other materials) from landfill. Wales will consider its approach following the consultation on its new waste strategy which is taking a material approach. Scotland will consider its approach after the current project on landfill bans reports later this year.
 - Work on *glass* will aim to increase collection rates from commercial and industrial sources

(pubs, clubs, restaurants etc), through voluntary agreements. In addition, government will consult on ways of reducing the amount of waste glass used as aggregates, as there are far better environmental (and possibly economic) gains to be had from closed loop recycling.

- For *plastic*, we will take action to increase recycling rates from commerce and industry. On the household side, we will consult on new producer responsibility targets to increase plastic bottle recycling and to widen collection and recycling to other types of plastic. New targets would be phased in as recycling capacity develops through WRAP's work on sorting, reprocessing and end markets for mixed plastics. This work includes a £5 million capital grants scheme run by WRAP for the Scottish Government, to increase the amount of plastics reprocessing in Scotland.

- ii. **Improving the quality of recyclates** is essential, as market conditions since the last quarter of 2008 have shown, for UK reprocessors and for UK access to export markets. Our ambition is that by 2019, going for the high quality market is standard.

For this to happen, we need businesses and local authorities to treat recycling as a source of potential revenue rather than just a way of avoiding landfill tax liabilities. Work is starting in England on making recycling for SMEs easier, and this issue will be addressed as part of the review of the waste strategies for Scotland and Wales. We will work with WRAP and local authority partners to advise on the use of income-sharing contracts. Getting a direct share of the value of recyclates provides an incentive for adapting collection and sorting systems towards higher quality outputs, with better revenues. The Welsh Assembly Government proposes to promote kerbside sort collection methods, which contribute more to its strategic objectives of reducing the impact of packaging materials on the ecological and carbon footprints of Wales.

The quality delivered by Material Recovery Facilities (MRFs) – which sort recyclates collected co-mingled at the kerbside – is crucial. WRAP will continue to work with MRF operators over the next two years to raise standards. We call on MRF operators to take part in this, and in the Environmental Services Association's Recycling Registration Service, an independent, externally audited scheme focusing on MRF export standards.

To secure compliant waste exports, the Environment Agencies are working with local authorities, the waste industry and others to ensure that quality is addressed at all stages of the waste collection and processing systems. Resources are being concentrated on facilities where poor quality outputs have been found. This work is backed by additional funding from Defra.

- iii. **Increasing recycled content** in the packaging used across the supply chain could help the UK recycling system's resilience to market changes. Working with WRAP and industry partners, we will explore the opportunities and barriers to bringing this about.
- iv. **More investment by packaging producers** is needed to increase recycling and improve the quality of the materials collected for recycling.

Government will consult on a number of changes to the Producer Responsibility Regulations and other measures, to ensure that the current market-based system delivers additional funding effectively. Objectives include: promoting greater collaboration of all the parts of the packaging chain, making producer funding more transparent, reviewing the role of compliance schemes and individually registered producers (Great Britain only), and introducing civil sanctions (in England and Wales). The UK Government may review the effectiveness of the funding system when the Packaging Directive is reviewed; the Devolved Administrations may do so earlier.

We will also review with stakeholders, and seek to improve, the data on how much packaging is placed on the market, and where it ends up, for each country in the UK where possible.

- v. **Careful planning by local authorities** will be needed to take advantage of extra producer funding, especially since new collection contracts and service changes often have long lead-in

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times. Local authorities should start considering now how they could benefit and make any funding go further.

We will work through the Regional Improvement and Efficiency Partnerships and WRAP to help English local authorities examine the cost savings and service improvements available to them through greater partnership working. The Welsh Assembly Government is working with the Welsh Local Government Association on a continuous programme of recycling service improvement. The Scottish Government will consider this issue in partnership with the Convention of Scottish Local Authorities, as part of the review of the National Waste Management Plan for Scotland.

In England and Northern Ireland, we will investigate how we can further support local authorities to get the best out of the tendering process for recyclables collection and sorting services. Additional resources (similar to the Defra 'Transactor' concept available for PFI contracts) could be used to assist local authorities in developing the tender documents, and during tender assessment/contract negotiation. The Scottish Government will consider, in partnership with the Convention of Scottish Local Authorities, if any action is required on these issues.

Finally, Government will ensure that there is better co-ordination than there has been in the past between the producer responsibility regime for packaging and the national waste strategies in the four nations of the UK, including work to divert household waste from landfill and increase its recycling, in line with EU and domestic targets.

Implementation plan

This document contains an outline implementation plan, which shows the timescales for taking the proposed work forward. It shows that the delivery of the Strategy will rely on action from partners throughout the packaging chain, as well as government and its delivery agencies.

We will monitor progress through the systems in place in England, Scotland, Wales and Northern Ireland for their respective Waste Strategies. We will consult widely on all individual policy proposals, and assess their costs and benefits in line with Better Regulation principles.

Chapter 1 – Packaging policy: the story so far

1. The role of packaging in our daily lives

As a society, we seem to have a love-hate relationship with packaging.

Packaging fulfils an important role in our lives. It protects food and other goods on their journey from farm or factory via warehouses and shops until they arrive at homes, offices or wherever they are used. Packaging helps to reduce the amount of wastage through spoilage and damage in the supply system and in the home. Consumer packaging increases shelf life for the retailer and allows consumers to keep food fresher for longer. Other roles include dispensing products, carrying an increasing amount of information – much of which is required by law, being easy to open and re-close, showing when tampering has occurred, and being child resistant.

The total amount of packaging used in the UK has increased by 1-2% a year on average over the past decade (except, recently, in the grocery sector). This growth is expected to continue³ in line with household and population growth. In 2007, it is estimated that 10.6m tonnes of packaging was placed on the market in the UK. At the end of its life, about 55% of this packaging ends up as commercial and industrial waste and about 45% ends up as household waste. In 2007, packaging accounted for an estimated 4.7m tonnes⁴ – around one fifth – of the household waste stream and around 5% of all waste sent to landfill.

Recent surveys⁵ show that consumers believe that packaging is the top environmental problem in relation to the products they buy. Less packaging, and more recyclable, recycled or biodegradable packaging came at the top of their wish list. Yet in a different survey, 57% said they 'never' avoided buying goods they felt had too much packaging⁶. So there seems to be a disconnect between what consumers say they want and their behaviour in the shops. Packaging only seems to become visible – and a problem – when people come to dispose of it. At which point, it is perhaps unsurprising that consumers expect government at all levels to tackle it⁷.

2. Current packaging policy

The root of our current policy is the EC Directive on Packaging and Packaging Waste (94/62/EC, as amended by Directive 2004/12/EC). The Directive was introduced to create a single market for packaging, and to increase recycling and recovery⁸ levels across the EU.

It requires all Member States to ensure that packaging meets certain requirements and that a minimum of 60% of all packaging waste is recovered (of which 55% must be recycled) by 31 December 2008. Thereafter, performance against the targets must be maintained. The directive also sets down specific recycling/recovery targets for glass (60%), paper/board (60%), metals (50%), plastics (22.5%) and wood (15%). The UK has achieved or exceeded these targets. In 2008, the UK recycled 61% of its packaging waste, a massive increase from the 28% achieved in 1997.

³ See Figure 1 in Annex A for a breakdown of historical and expected growth, by material.

⁴ The figure of 4.7m tonnes of packaging in the household waste stream was estimated as part of the work undertaken by ERM in the run-up to the Waste Strategy for England 2007. The figure used in the PMSU report, 5.9m tonnes, comes from an unpublished compositional analysis.

⁵ Packaging and Recycling – Addressing Shopper Concerns (Sept 2008) Ipsos Mori for IGD, see www.igd.com/consumer; Public Attitudes to Packaging (2008), Ipsos Mori for Incpen.

⁶ Survey of Public Attitudes and Behaviours toward the Environment (2007), Defra. This survey was England-only.

⁷ Understanding Household Waste Prevention Behaviour – WR0112 (Jan 2007), Defra

⁸ Definitions of recovery and recycling can be found in Section 5 of Chapter 5. Recycling is a form of recovery. Others include anaerobic digestion and energy from waste.

Chapter 1 – Packaging policy: the story so far

Two sets of regulations transpose the Directive in the United Kingdom.

The UK **Packaging (Essential Requirements) Regulations 2003** (as amended) cover, among other things, the Directive's provisions on minimisation, requirements for recoverable and re-useable packaging, and excess packaging. These Regulations require packaging to be manufactured so that its 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. The Regulations are enforced by Trading Standards Officers across Great Britain and the Department of Enterprise Trade and Investment in Northern Ireland.

The **Producer Responsibility Obligations (Packaging Waste) Regulations 2007** (as amended) apply to England, Scotland and Wales, with parallel Regulations made in Northern Ireland⁹. They require businesses with an annual turnover in excess of £2 million and which handle more than 50 tonnes of packaging a year to recover and recycle a proportion of the packaging they handle. The Regulations are enforced by the Environment Agency (in England and Wales), the Scottish Environment Protection Agency and the Northern Ireland Environment Agency.

Packaging producers

In the regulatory context, the word 'producer' does not only cover the manufacturers of packaging. It covers any business that is part of the packaging supply chain, from raw material manufacturers, businesses converting this raw material into packaging products, businesses who pack or fill packaging, to wholesalers and retailers, businesses who provide services and importers.

The amount that a producer has to recover or recycle depends on:

- how much packaging they handle (small companies or companies who do not handle much packaging are exempted from the Regulations);
- their role in the packaging supply chain¹⁰;
- the recovery and recycling targets set by government for each material. The Packaging Regulations set annual business targets designed to enable the UK to meet the Directive targets. The business targets are higher than the Directive ones to make up for the small business exemption (which covers an estimated 15% of all packaging put on the market in the UK).

Table 1 – UK business targets up to 2010

	2008	2009	2010
Paper recycling	67.5%	68.5%	69.5%
Glass recycling	78%	80%	81%
Aluminium recycling	35%	38%	40%
Steel recycling	68%	68.5%	69%
Plastic recycling	26%	27%	29%
Wood recycling	20.5%	21%	22%
Overall recovery *	72%	73%	74%

* of which 92% minimum must be achieved through recycling

⁹ The Producer Responsibility Obligations (Packaging Waste) Regulations (Northern Ireland) 2007, as amended.

¹⁰ See Table 1 in Annex A for a detailed breakdown.

Chapter 1 – Packaging policy: the story so far

A market based system was developed to achieve compliance with the targets at relatively low cost to industry. Businesses must provide evidence that they have discharged their legal obligation to recover/recycle a certain amount of packaging waste. This evidence is in the form of Packaging Waste Recovery Notes (PRNs) and Packaging Waste Export Recovery Notes (PERNs). These evidence notes are issued by accredited packaging waste reprocessors and exporters, respectively. An accredited reprocessor/exporter can issue PRNs/PERNs to the amount of waste reprocessed (e.g. 100 tonnes of steel reprocessed allows the reprocessor to 'sell' 100 PRNs in steel).

The evidence notes have two functions. Firstly, they demonstrate that a certain amount of recovery/recycling has been undertaken on the behalf of producers. In that sense, they are a 'counting tool'. Secondly, they are a way to channel producer funding to recycling/recovery operations. Proceeds from the sale of PRNs/PERNs to producers are intended to finance improvements in the collection and recycling infrastructure across the UK.

The UK relies on export markets for recycling more than most EU countries. In 2007, 36% of recycled packaging waste was recycled outside the UK. Recyclates are global commodities, and they flow to where the demand (and therefore price) is highest. When international markets contract, the UK's ability to meet the recycling targets set under the Packaging Directive is potentially affected.

The mysteries of the PRN system... explained

Q. How is the price of PRNs/PERNs decided?

A. PRNs/PERNs have a market value which depends on relative supply and demand (and perceptions of scarcity). The value of PRNs/PERNs is not proportional to the value of materials.

*The more difficult or expensive materials are to collect and recycle...
then the smaller the quantity that gets recycled...
and therefore the more expensive the PRN/PERN.*

*Similarly, the more limited the available reprocessing capacity
or the demand for the materia...
then the smaller the quantity that gets recycled...
and therefore the more expensive the PRN/PERN.*

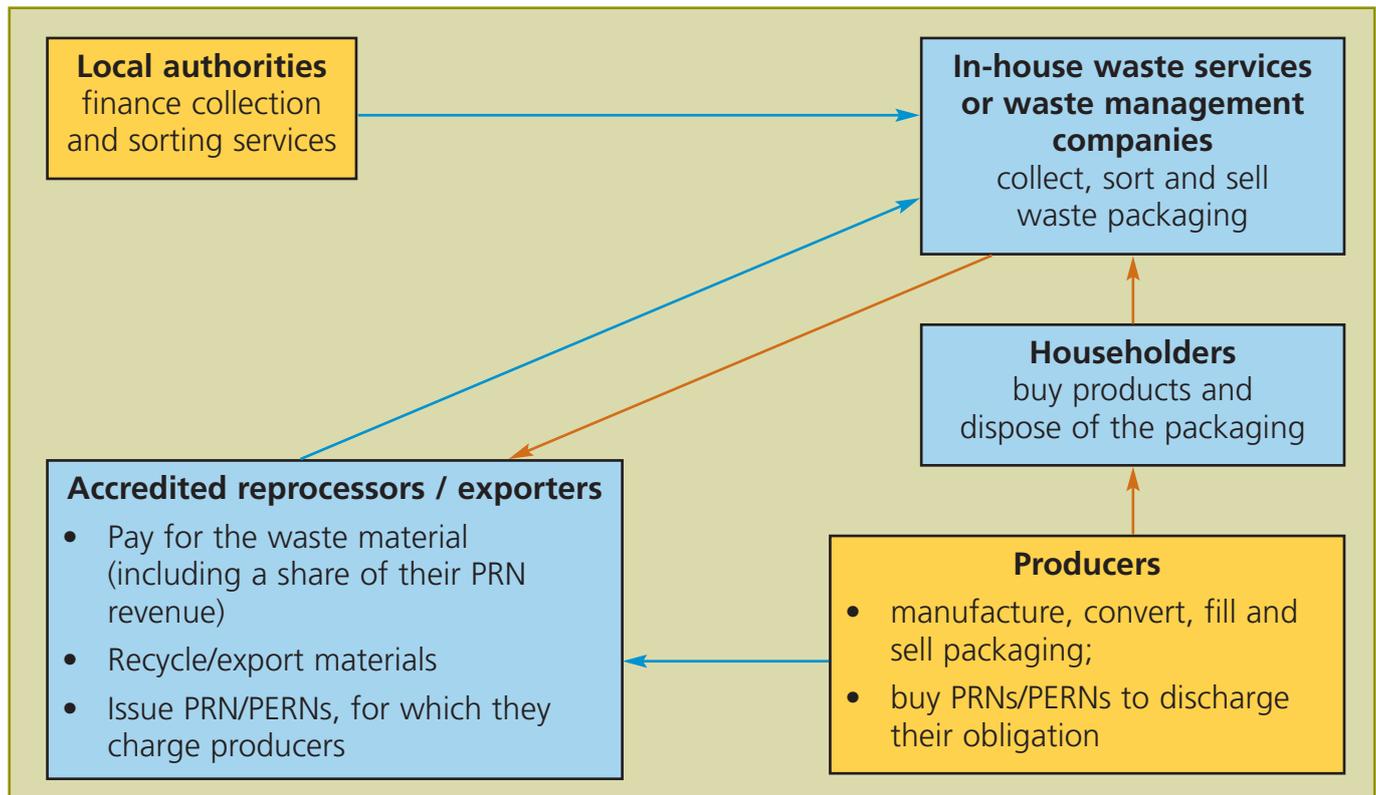
And conversely.

Q. Who pays what to whom?

A. The diagram below shows the flow of materials (in red) and the funding flows (in blue) between the key actors in the household packaging chain.

For commercial waste and industrial waste, the situation is similar in many respects, though businesses pay waste management companies (or local authorities) to collect their recyclable waste, or they may have direct contracts with reprocessor or exporters.

Chapter 1 – Packaging policy: the story so far



In addition to the legislation, initiatives by industry and supported by the Waste & Resources Action Programme (WRAP) have delivered progress on packaging reduction. The biggest among them is the Courtauld Commitment, a voluntary agreement which extends across the UK, between WRAP and major grocery businesses (retailers and brand owners). For packaging, the key aims of the agreements were to design out packaging waste growth by 2008, and to deliver absolute reductions in packaging waste by 2010.¹¹

To deliver this, retailers, brands and their suppliers are working in partnership with WRAP to develop new packaging solutions and technologies across the whole supply chain. This includes using innovative packaging formats; reducing the weight of packaging items; and developing packaging design guidance.

Forty-one major retailers, brands and suppliers have joined Courtauld since it was launched in July 2005. This represents 92% by value of the UK supermarkets and major brands operating across all grocery categories. They meet annually to review progress, share information and develop future initiatives to embed real change.

A parallel voluntary agreement is being developed within the home improvement and DIY sector.

¹¹ The agreement also includes an objective to help reduce food waste from households by 155,000 tonnes by 2010, against a 2008 baseline.

3. What policies have achieved so far

The current packaging policy has achieved much in the past decade.

Optimisation



(Picture: WRAP)

Many businesses have reduced their input costs by applying the Essential Requirements Regulations and broader principles of packaging reduction. The Producer Responsibility Regulations have an in-built incentive for companies to minimise the packaging they handle: the less packaging they handle, the less they have to pay towards recovery and recycling.

Signatories to the Courtauld Commitment have halted the growth in packaging waste as planned, and are on target to meet the 2010 objectives of reducing such waste.

This has been achieved despite a 2% growth in the grocery sector and 0.5% population growth per year since the Commitment was signed in 2005. Some supermarkets have also made reduction commitments beyond those required by the Courtauld Commitment.

A few examples of packaging reduction (source: WRAP)

Marks and Spencer changed the plastic tray used to protect its beef to a thin skin pack wrapped tightly around the product. This method cut the packaging down by 69% and extended the shelf life of the product by four days.

Coca-Cola has reduced the weight of its soft drink cans by 5%, potentially saving 15,000 tonnes of packaging a year across the European aluminium can sector. This represents approximately 78,000 tonnes of CO₂ – the equivalent of taking 25,000 cars off the road.

Northern Foods changed the design of their Goodfella's pizza box, reducing their transit packaging by 4,000 tonnes a year. Because the new boxes stack better, the company also cut a million transport miles per year and cut the number of pizzas damaged before they reach the consumer by 75% – thus reducing food waste.

WRAP's Glass Rite Wine project looked at how the packaging used to get wine from the vineyard to the consumer could be reduced. By importing in bulk and using lighter bottles, Glass Rite Wine has cut CO₂ emissions by an estimated 28,300 tonnes, the equivalent of taking 8,500 cars off the road.

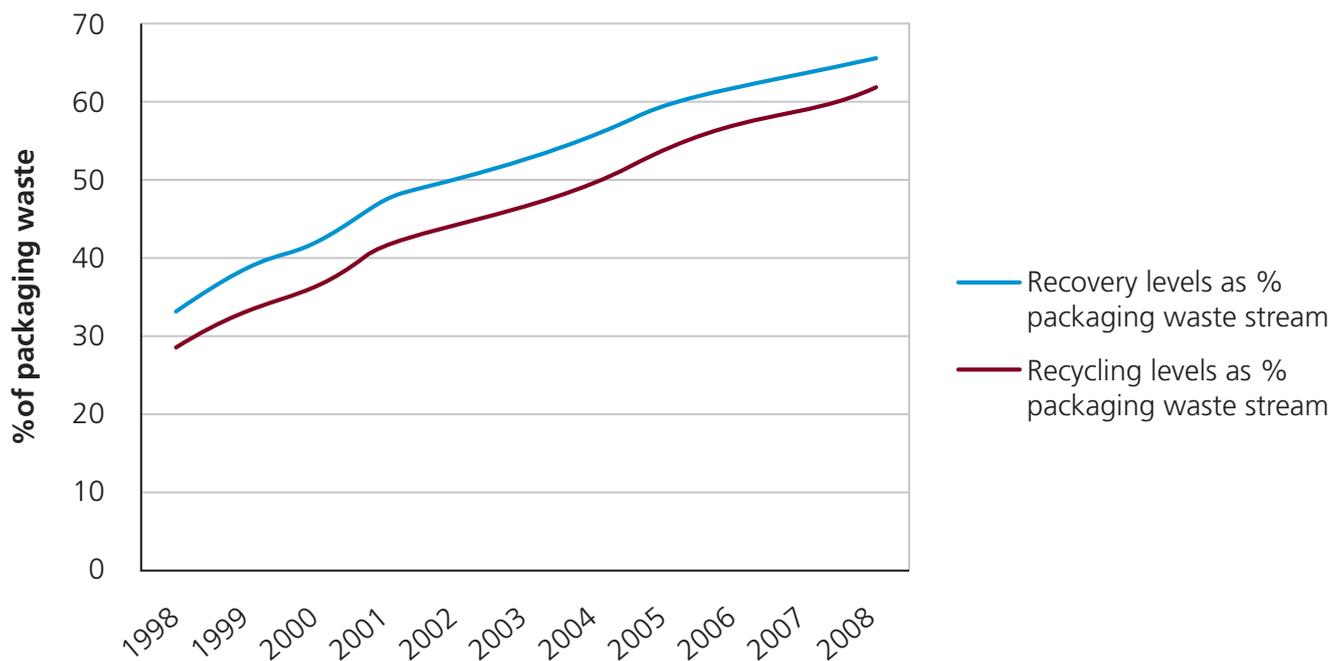
Heinz has changed the design of its 'easy open' can ends, saving 1,400 tonnes of steel without any effect on the performance of the cans and saving Heinz in the region of \$750,000 in production costs worldwide.

Chapter 1 – Packaging policy: the story so far

Recycling and recovery

Producer responsibility has directly contributed to the increase in recycling and recovery of packaging waste in the UK – from only 28% in 1997 to 61% in 2008¹² (and a move from 30% to 65% for overall recovery). This means that in 2008, over 6.6 million tonnes of waste were diverted from landfill, and over 8.9 million tonnes of CO₂ equivalent emissions were avoided.

Figure 1 – proportion of waste packaging recycled and recovered, 1998-2008



The current system has also delivered improvements in reprocessing capacity, at relatively low cost to businesses – approximately £577 million over 10 years. These costs compare favourably with costs in other Member States.¹³

¹² For a breakdown of recycling performance by material, see Figure 2 and Table 2 in Annex A.

¹³ Section 5 in Chapter 6 consider these in greater detail.

Chapter 2 – The challenges of the future

1. A new policy context

Public expectations and strategic policy goals are shifting.

The 2007 **Waste Strategy for England** has put the fight against climate change and the need for more efficient use of resources at the centre of waste policy. Its key objectives are to:

- decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re-use;
- meet and exceed the Landfill Directive (1999/31/EC) diversion targets for biodegradable municipal waste in 2010, 2013 and 2020;
- increase diversion from landfill of non-municipal waste and secure better integration of treatment for municipal and non-municipal waste;
- secure the investment in infrastructure needed to divert waste from landfill and for the management of hazardous waste; and
- get the most environmental benefit from that investment, through increased recycling of resources and recovery of energy from residual waste using a mix of technologies.

The Waste Strategy for England aims to reduce the amount of household waste not reused, recycled or composted from over 22.2m tonnes in 2000 to 15.8m tonnes in 2010 – a 29% reduction. Packaging has a clear role to play in this, alongside larger waste streams, such as food waste.

Since publication, England's reduction target of 45% by 2020 has been given additional impetus by the **revised EU Waste Framework Directive** (2008/98/EC), which requires Member States to recycle 50% of household waste by 2020, including paper, metal, plastic and glass. The revised Directive also requires Member States to establish waste prevention programmes by the end of 2013.

In Scotland, the Cabinet Secretary for Rural Affairs and the Environment made a statement to the Scottish Parliament on 24 January 2008 about the **Scottish Government's vision for a zero waste society**. Key targets and objectives outlined in that statement were:

- To achieve 40% recycling and composting of municipal waste by 2010; 50% by 2013; 60% by 2020 and 70% by 2025.
- To stop the growth in municipal waste by 2010.
- No more than 25% of municipal waste to be treated by energy from waste by 2025.
- No more than 5% of municipal waste to be landfilled by 2025.

The Cabinet Secretary also announced that the Scottish Government would prepare a new National Waste Management Plan for Scotland.

The **Northern Ireland Waste Strategy 2006-2020** sets a target of 45% recycling and composting of household waste by 2020, and 60% for commercial/industrial waste recycling by 2020.

In Wales, the proposed revised national waste strategy, published for consultation on 29 April, sets strategic objectives for reducing the ecological and carbon footprints of Wales and other sustainable development outcomes. These will then be 'translated' into a municipal sector plan which will describe how services will deliver. This sector plan will dovetail with others, including one focused on the retail sector. The waste strategy for Wales proposes the following two main targets:

Chapter 2 – The challenges of the future

- By 2025 we want all sectors in Wales to be recycling at least 70% of their waste – this includes businesses, households and the public sector. This will go a big way to helping us achieve zero waste;
- By 2050 we hope to have achieved zero waste. This will mean that products and services will be designed so they have eliminated waste entirely.

In addition to these strategic drivers, across the UK the profile of packaging as a waste issue among consumers and in the media has risen steadily over the past few years. Although the number of committed recyclers and participation rates still need to be increased, research shows that recycling is now firmly embedded in public consciousness, with 8 out of 10 people agreeing that they 'have a duty to recycle'¹⁴. The Scottish Household Survey shows that over 80% of Scottish households are participating in some form of recycling activity¹⁵.

So it is not surprising that consumers want to know why packaging is used, what can be reduced and how they can recycle it.¹⁶ They often are not aware of the role of what the packaging has contributed in getting the product to them. Insufficient information can lead to confusion about what can and cannot be recycled. Plastics are of particular concern, because although they are light, their volume makes them conspicuous, and only bottles are widely collected.

2. Improving current policies in the light of experience

Despite the reductions achieved by businesses over the years¹⁷, the total **amount of packaging used** has continued to increase (except recently in the grocery sector).

Some products appear to use more or stronger packaging than may be necessary. The benchmarking work done by WRAP across a wide range of grocery packaging suggests wide disparities in the amount of packaging used in similar products. For example, a 75cl wine bottle can weigh anything between 300g and over 900g.

Recent surveys and campaigns have shown that there remains a perception among consumers that some products are 'over-packaged', and that packaging features disproportionately in their waste bins. The volume of packaging, especially plastics, remains highly visible to consumers. By contrast, packaging reductions are seldom publicised effectively and mostly go unnoticed.

Government is aware that enforcement action can be hampered by a small part of the Directive wording. Companies who are unwilling to reduce their packaging as a result of Trading Standards intervention can point to a subjective criterion, 'acceptance for the packed product and for the consumer', in the Directive's text.

Better enforcement of the essential requirements across other Member States would better help to realise single market goals and make the regulatory drivers for packaging minimisation all the more enforceable. The UK has therefore welcomed Commission's proposal to study and issue guidance on interpretation of the essential requirements¹⁸.

In an economic downturn, resource efficiency becomes even more important. For consumers, it means less material to bring home, less in their bin, less burden on councils' waste services (and council finances). For businesses, even relatively small changes can lead to financial benefits. Moving

¹⁴ Survey of Attitudes and Behaviour in relation to the Environment, British Market Research Bureau for Defra, 2007. See <http://www.defra.gov.uk/news/2007/071102b.htm>

¹⁵ <http://www.scotland.gov.uk/Publications/2008/08/SHSQ12008>

¹⁶ See Section 1 of Chapter 1 for details.

¹⁷ See Section 3 of Chapter 1.

¹⁸ EC Report on the implementation of Packaging & Packaging Waste Directive & its impacts on the Environment (December 2006)

Chapter 2 – The challenges of the future

towards the lightest weight for a given packaging product has the potential to minimise the use of valuable resources, reduce input costs, energy consumption and transport costs, all of which make both business and environmental sense. As an example, if every cereal box was as light as the lightest on the market, it would save £10.4 million in raw material costs and 17,000 tonnes of CO₂.

Turning to **recycling**, packaging policy will need to deal with the pressures that pull the various parts of the packaging chain in different directions:

- Consumers' feedback to retailers and local authorities suggest that they want recycling services that are simple to use, and a greater range of packaging collected for recycling (with plastics other than bottles topping the wish list). They do not always see the link between their buying habits and the resulting waste;
- Retailers and brands have much influence on what gets placed on the market (especially for grocery items), but little on the local recycling infrastructure. Their packaging choices are driven partly by the need to deliver products to the consumer in good condition, and partly by costs. Retailers are concerned about the range of plastics currently collected by local authorities, which is limited by the available sorting and reprocessing capacity. It is estimated that this leads to 2/3 of their recyclable packaging being labelled as 'not recyclable' (i.e. not collected);
- Local authorities take decisions on recycling and recovery based on a very wide range of factors, including budgetary constraints, the housing stock and demographics of their area and the need to meet weight-based EU-driven targets on landfill diversion of biodegradable waste. They have a statutory requirement to collect household waste from their residents. They collect packaging for recycling because it makes up a significant proportion of the household waste and most materials have dependable end markets.

Weight-based targets act as incentives for collecting and recycling heavy materials such as glass, paper, and steel, but not aluminium or plastics which are lighter. It is estimated that packaging accounts for 30-50% of dry recyclates (the rest is paper products like newspaper)¹⁹. This will include high value materials such as metals. Local authorities feel vulnerable to retailers' choices of packaging, on which they have had no influence but which they have to cope with at the end of life.

Historically most local authorities have negotiated recycling contracts with waste management companies without deep commercial knowledge of the value of the material collected. This means that plants which sort waste from households are geared mostly towards dealing with as much material as possible instead of focusing on quality to maximise revenue from the sale of recyclates. Unless local authorities market their recyclates themselves, or have built detailed reporting requirements into their contracts, the value of PRN revenue (a proportion of which gets passed down in the price of materials and should therefore lower waste management costs) will not be visible to them. Local authorities' ability to borrow to finance improvements is constrained: they can only borrow to finance capital expenditure.

- For most of the UK's 6,500 registered packaging producers, compliance is limited to a financial transaction: the purchase of evidence notes. Producers may not have a clear view over what the £55-60m they pay for PRNs/PERNs is used for.

¹⁹ Estimates based on data reported to WasteDataFlow by Local Authorities, 2006/7

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So far, targets have been achieved by recycling and recovering the most easily available (and thus cheapest) waste, often from the commercial & industrial waste stream. Retrieving packaging from the household waste stream has only been key to achieving recycling targets for aluminium and glass. The aluminium targets have been fairly low, and the glass market has been skewed by the use of waste glass in aggregates. This means that producers have not, so far, had to channel significant sums of money into helping local authorities develop or improve their recycling services.

- The UK recycling system relies on a mixture of domestic reprocessing and export. UK reprocessors need quality recyclates for their operations to be profitable. They are competing against export markets where the combination of high demand and lower labour costs has, in the past few years, made prices attractive even for lower quality recyclates. For some – but not all – materials, the prices paid by UK reprocessor and exporters have provided an incentive for waste management companies to gear collection and sorting systems towards greater quality. A large proportion of the PRN/PERN revenue is used as price support (that is, reprocessor and exporters are passing some or all of the PRN value down to waste companies as part of the 'normal' price paid for materials). That money does not constitute an investment 'premium'.

3. A ten-year view: possible futures for packaging use

In order to develop a strategy that embraces not only the immediate challenges ahead, but also those of the next 5-10 years, we commissioned a short horizon-scanning project.

Horizon-scanning: purpose and process

Horizon-scanning analyses current trends and embryonic ideas or developments to produce a range of scenarios about how the world might look in the future. This involves exploring possibilities that look unlikely in today's world but could become a reality in a decade. This long-term thinking can help policy be more robust, and more proactive in shaping the future.

The horizon-scanning work on packaging reviewed a wide range of research, surveys, reports, and news items. It identified the most important factors which will or which could affect the context for business and consumer choices, and government intervention, on packaging and packaging waste between now and 2019.²⁰

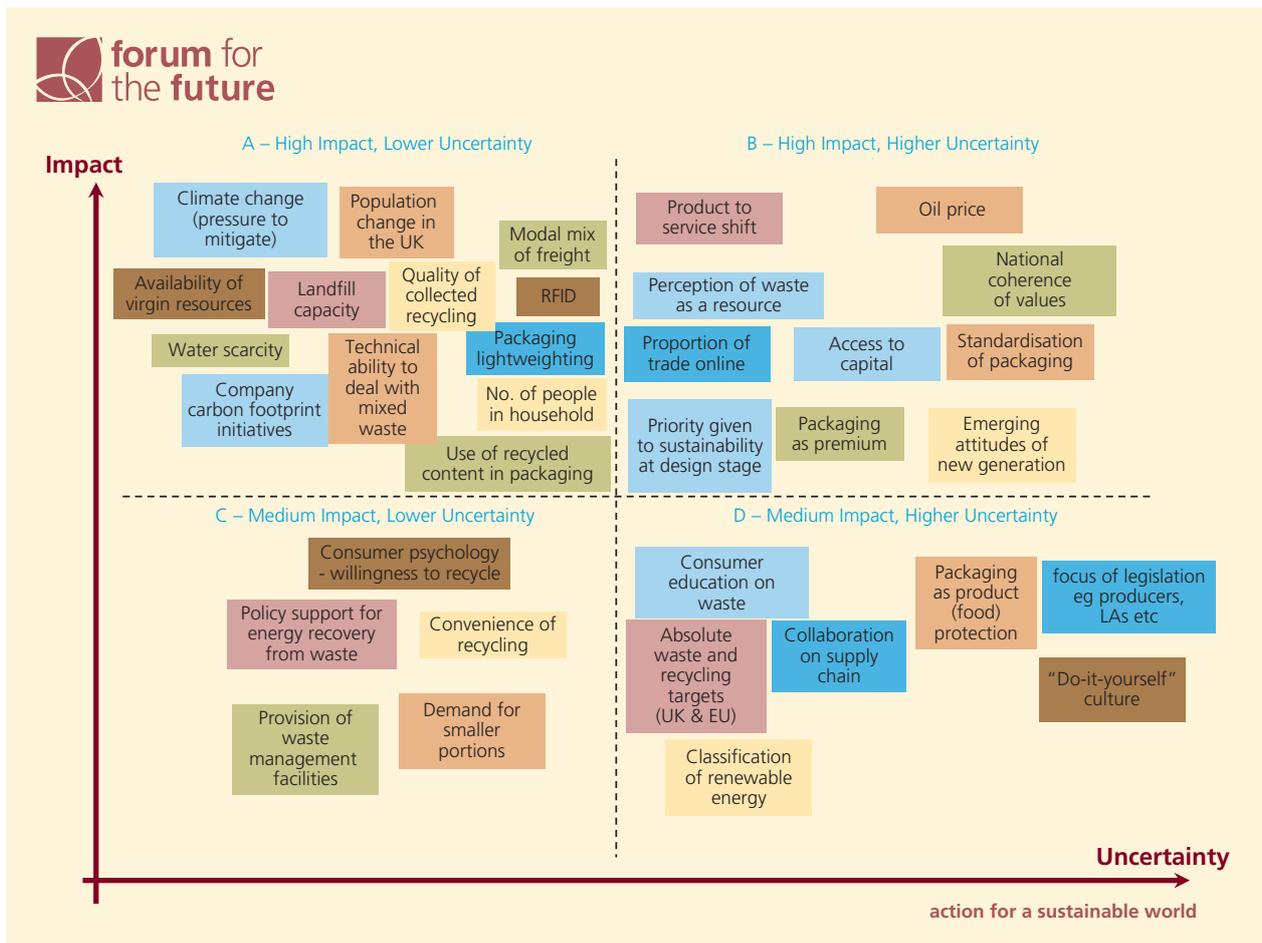
These 150 or so factors ranged from macro-level trends such as population numbers and resource depletion, to specific variables such as technological advances in packaging systems. The factors were then ranked according to their potential impact, and how certain we are about them. For example, the analysis suggests that oil prices will have an enormous impact on packaging waste (and so it is a high impact factor) but the price per barrel in 2019 remains unknown (so it is also an uncertain factor).

No scenario is more likely than another. Their aim is not to predict the future but to make informed guesses about what could happen, so that policy measures can be tested against a range of possible future situations. The scenarios do not prescribe the decisions that stakeholders might make, or the legislation under which they may have to operate.

²⁰ Forum for the Future for Defra, 2008. The full project report and database of the trends considered can be found at www.defra.gov.uk/waste/topics/packaging/index.htm

Chapter 2 – The challenges of the future

The results: key trends and possible scenarios



There are a number of factors that are high impact and whose future directions we can be more sure of (mapped in the top-left quadrant of the graph above). They are assumed to be the same across the different scenarios, though each scenario may be affected by them in different ways. The most important of these factors are:

- The direct environmental impacts of climate change, and the pressure to reduce emissions of greenhouse gases (though how organisations respond to this pressure is less certain);
- The declining availability of virgin materials for use in packaging;
- The availability of water, set to decline substantially in the next decade. A premium on water will affect manufacturing sites as well as product;
- The UK population: the Office of National Statistics projects an increase of up to 4 million over the next decade. In the past, packaging waste volumes have been strongly correlated with population;
- Availability of landfill, also set to decline over the next decade.

Three possible scenarios for the future emerged from looking at the trends in combination, each with different implications for the future use of packaging. **These scenarios assume that the current packaging policy continues unchanged. This allows us to identify most clearly where we need to influence the future.** They do not factor in any expansion of the Courtauld Commitment either to other grocery signatories or to other sectors. They do not explicitly model the effects of the planned reductions under Courtauld in the grocery sector, although they assume a pressure to decrease packaging (along the lines of the Courtauld Commitment) in each scenario.

Chapter 2 – The challenges of the future

Packaging use in 2019: three possible scenarios

“Mixed messages”

By 2019, the business sector continues to push on packaging innovation including end-of-life. But progress on waste targets is hampered by multiple conflicting signals, including demands for convenience, a lingering perception of packaging as denoting quality, the large number of one-person households and difficulty in having messages heard.

In this scenario, packaging has increased overall, with the greatest increase in primary packaging (approx. 2% a year, compared with a historic trend of around 1.5%).

“Online opportunities”

By 2019 commerce has shifted onto the internet in a major way. High-street shops display ‘samples’ for people to look at, and then order online (except food). A shift from product (eg sale of TV set) to services (sale of TV channel bundle with a TV set included) takes place across the economy. This creates opportunities for supply chain efficiencies and collaboration between different companies and sectors on packaging (e.g. more standard formats).

In this scenario, primary packaging has continued to increase at around 1.5% per year due to increased population and trade, but its role as a branding tool has decreased and its role in providing information is often obsolete. Display packaging is still at its 2009 levels (despite increase in trade). Transit packaging has increased (around 1% per annum) due to higher trade but a high proportion of this packaging is reused.

“Values shift”

There has been a gradual shift in perceptions of waste, which is by 2019 habitually treated as a resource. This is in large part due to a prolonged global recession (from which the world is now gradually emerging) and an increasing recognition of resource scarcity. A greater emphasis is placed on repair and re-use as well as community sharing and home production of food and other goods.

In this scenario, primary packaging has increased overall, alongside very limited increases in display and transport packaging.

A more detailed summary is available at Annex B.

How the findings are going to be used

The horizon-scanning has highlighted a number of defining trends for packaging, which should be tracked to ensure that policies remain effective.

The trends and the scenarios will help ‘future-proof’ policies, ensuring that the ambitions government sets are achievable under all scenarios. The mix of actions needed to achieve these ambitions might differ for each scenario. This work will help spot any crucial changes that would require those actions to be reviewed.

Overall, without further intervention, all scenarios foresee a likely growth in packaging, albeit at different rates, and with a different split by material in each case. We can therefore conclude that, whatever happens between now and 2019, it will be crucial to optimise packaging at source, taking into account its environmental impact over its whole life-cycle, and deliver voluntary agreements on reduction.

Chapter 3 – Vision for the future

1. A new strategy

The previous chapters have set out the opportunities and challenges facing packaging over the next decade.

This chapter sets out a vision of what packaging policy needs to achieve in order to foster greater resource efficiency, prepare the packaging chain – from manufacturers to users to waste management companies – for a low-carbon economy, and address consumer concerns.

It constitutes a response to the *Food Matters* report, published by the Prime Minister's Strategy Unit in July 2008, which called for a review of packaging policy and a new food packaging strategy for England. Action 5.8²¹ states:

“A new strategy for packaging waste in England will be developed, set within the framework provided by the Waste Strategy for England. The strategy will encourage more prevention of packaging at source. It will aim to get incentives better aligned along the food chain to encourage more prevention of packaging and more re-use and recycling. It will also aim to improve information flows from manufacturers through retailers, consumers and local authorities to re-processors.”

Packaging markets, packaging policy, and the opportunities and challenges identified earlier extend to all types of packaging, whether food-related or not, and beyond boundaries within the UK. Therefore our strategic vision goes beyond the *Food Matters* recommendations, and applies to primary (consumer) as well as secondary and tertiary (commercial and transport) packaging, across all sectors of the economy.

Unless otherwise shown, this Strategy extends across the UK. The Scottish Government will consult on this Strategy as part of its forthcoming consultation on a new draft National Waste Management Plan for Scotland.

2. Optimising packaging

For packaging as for every other type of waste, the first and most effective way to pave the way for a low-carbon economy and to drive resource efficiency is to reduce waste at source. It can take a variety of shapes, from eliminating excess packaging to designing the remainder better.

The overall aim should be to minimise the environmental impact of packaging over its whole life cycle. It is a complex issue, involving a whole range of considerations, including whether reductions in packaging could cause a worse impact by increasing product loss.

Optimised packaging will be achieved when...

- packaging is designed in line with sustainability principles, and with re-usability, recyclability or recovery in mind – as standard
- real reductions in packaging are delivered and maintained over time, under existing and new voluntary agreements;
- market innovation and development meet the growing demand for re-useable and recycled packaging, across all types of packaging – primary, secondary and tertiary.

Chapter 5 below sets out ways of achieving this vision.

²¹ http://www.cabinetoffice.gov.uk/~media/assets/www.cabinetoffice.gov.uk/strategy/food/food_matters%20pdf.ashx. The full text of this action is reproduced in Annex A.

Chapter 3 – Vision for the future

3. Increasing the recycling of packaging waste

After waste prevention and re-use, the next step in minimising the environmental impact of packaging is to maximise its recycling, and where this is not economic, to find other carbon- and economically efficient recovery routes (including energy from waste).

Packaging recycling will be maximised when...

- more householders recycle more packaging, encouraged by clear and consistent information, and recycling schemes which collect all the main packaging materials and are easy to use;
- local authorities and businesses treat waste packaging as a resource. This leads to more recycling by businesses, and to the household collection and sorting infrastructure being designed and operated to maximise the quality of (and therefore the economic return on) the materials collected;
- we continue to recycle and recover over 60% of the packaging waste in the UK, working towards the recycling rates achieved by the best EU performers.

Chapter 6 below sets out ways of achieving this vision.

Research by Defra and WRAP unequivocally show that recycling paper, card, glass, plastics and metals (but not wood) is environmentally preferable to any other waste management option, provided that recycling streams are clean enough. This is true whether the recycling takes place in the UK or abroad.²²

Where packaging waste cannot sensibly be re-used or recycled, energy recovery may be preferable to landfilling. This will depend on the material, and the type of recovery (eg incineration, anaerobic digestion, etc). For example, burning oil-based plastics releases fossil carbon emissions which are avoided by landfilling. By contrast, burning wood or paper is carbon neutral and also avoids the formation of the more powerful greenhouse gas, methane, in landfill. Tools such as WRATE – a life cycle assessment tool for comparing waste management options – will help managers of packaging waste streams to make the right choice between energy recovery and landfill.

Depending on the material, all packaging waste should ideally be either recycled or have energy recovered from it. The latter will require a network of anaerobic digestion and other energy from waste plants to be developed, together with better awareness among local authorities and businesses of the energy potential of some types of waste.

²² Environmental Benefits of Recycling, WRAP, 2006; ERM (2006), Carbon & Energy Impacts of Waste Management (Defra Waste & Resources Evidence Programme – WR0602); CO2 impacts of transporting the UK's recovered paper and plastic bottles to China, WRAP, Aug 2008.

Chapter 4 – Packaging and carbon metrics

Having set out our vision for optimisation and recycling, we need to consider the best way to measure the environmental impact of packaging, and our progress towards our policy objectives.

1. Weight-based targets and the climate change agenda

Weight-based targets: pros and cons

At the moment, the Packaging Directive targets are all based on weight – the weight of packaging placed on the market, the weight that arises as waste, and the weight of materials recycled and recovered.

Biodegradable waste landfill diversion and other recycling targets on local authorities are also weight-based. So, of course, is the Landfill Tax, which is the most important driver for business as well as municipal waste.

This has advantages: reductions and recycling rates are relatively easy to measure, and targets can be understood fairly easily. For packaging, there tends to be a fairly straightforward link between weight and carbon emissions in transport: the heavier the packaging, the bigger the emissions.

However, weight-based targets do not always work in the wider climate change context. Making the transition to a low carbon economy will require action in all sectors of the economy and the community, not just in terms of energy use, but also in terms of resource use and waste management.²³

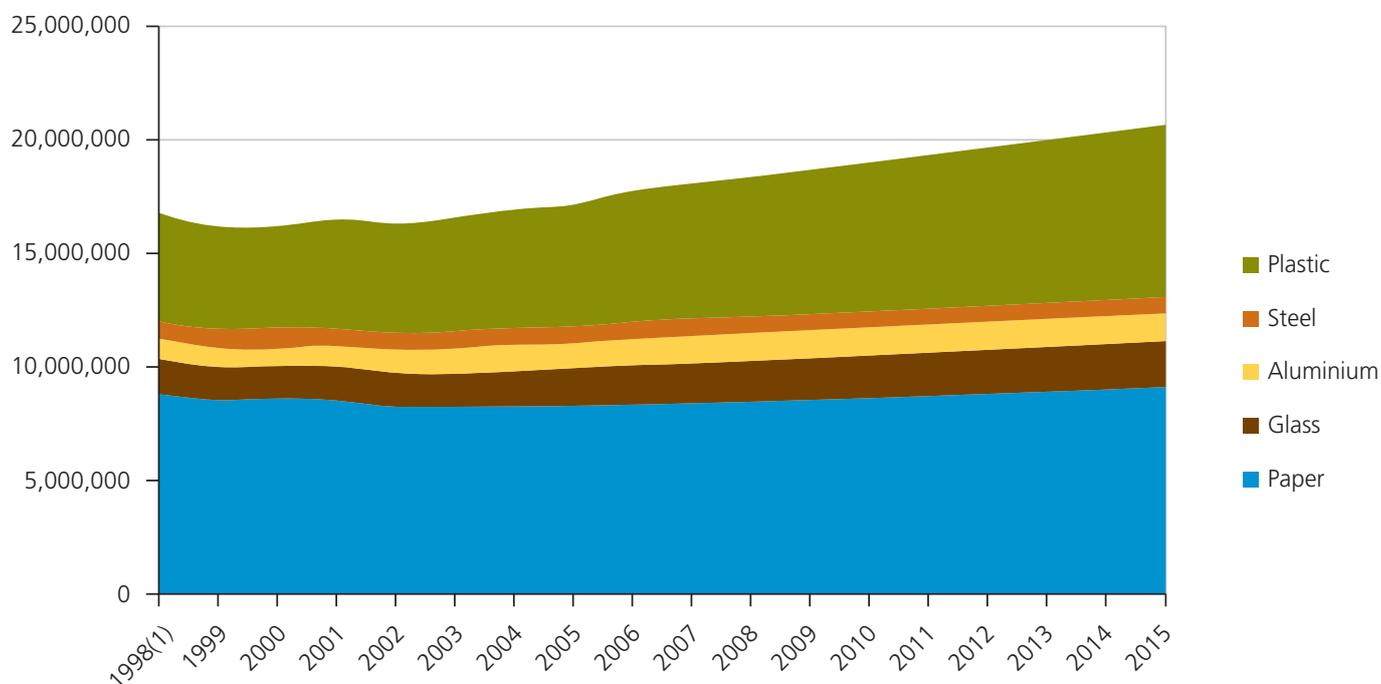
For the packaging sector, this will mean looking at the overall impact of packaging choices over a whole life cycle. The next graph shows the actual (up to 2007) and predicted amount of packaging in the waste stream, and the climate change impacts of each material. It does not take account of the full expected effect of the Courtauld Commitment. The carbon estimates cover the manufacturing stage – from raw material extraction to transport of the packaging unit to retailers, and the end-of-life stage. Impact in use will vary greatly from one product to the next, and are therefore not included.²⁴ The graph suggests that reducing the overall environmental impact of packaging – both by reducing how much gets used and by increasing how much is re-used/refilled and recycled – would produce significant carbon gains.

²³ In this document, 'carbon' is used as shorthand for greenhouse gases, measured in CO₂ equivalent.

²⁴ For more details on the carbon accounting methodology used, please see Annex D.

Chapter 4 – Packaging and carbon metrics

Figure 2 – Estimated packaging climate change impact, in tonnes of CO₂ equivalent (using Defra’s 2007 flow assumptions, and actual 2008 recycling levels)



Reduction and recycling priorities defined on weight alone do not always match these whole life cycle impacts (though it may be possible to set weight-based targets with carbon impacts in mind). Weight-based reduction targets could result in switches to a material which is lighter, but may have a worse carbon impact over its lifecycle. This could happen if the manufacture of the lighter material requires more energy than its performance in use saves compared to a heavier material, and if it is not recyclable. Also, in some cases, reducing the weight of packaging could increase product wastage, which means the resources used in the manufacture of both packaging and product are wasted.

Turning to recycling, targets on local authorities and the Landfill Tax mean that priority is given to diverting the heavier materials from landfill – which for packaging means predominantly glass – or the materials which biodegrade, which for packaging means wood and paper. Lightweight materials such as plastic and aluminium are expensive for councils to collect because of their bulk.

This is an issue for consumers, who would like to recycle their plastic packaging in particular. It is also an issue for climate change. Aluminium is not only very valuable; its production has high climate change impacts. Recycling aluminium uses only 5% of the energy used to manufacture aluminium from bauxite ore. Putting it a different way, each tonne of aluminium recycled avoids 9 tonnes of CO₂ equivalent emissions, while each tonne of plastic recycled avoids 1-1.5 tonnes CO₂ equivalent. One tonne of CO₂ equivalent represents the emissions from driving a small petrol car 3,400 miles²⁵.

Waste from small businesses is under the same constraints: it is more cost-effective for waste contractors to collect one tonne of glass or paper for recycling than one tonne of lighter materials, because the lower density of these means more (in volume) needs to be collected to get to a tonne.

²⁵ <http://www.defra.gov.uk/environment/business/envrpf/pdf/ghg-cf-guidelines-annexes2008.pdf>

Chapter 4 – Packaging and carbon metrics

Going one step further, weight-based recycling targets do not in all cases provide incentives for recycling processes with most climate change benefits. For example, recycling glass back into glass bottles results in carbon (and indeed financial) savings on raw materials use and energy use, thanks to the much lower temperature needed for re-melting glass compared to making new glass. British Glass estimates the CO₂ savings to be in the order of 315kg per tonne of glass recycled back into containers. Where glass is recycled into aggregate, the CO₂ saving is very small, and may actually be negative (i.e. if using glass has a higher impact than the material which it replaces). But in the context of achieving recycling targets, both uses currently count in the same way.

Finally, weight-based targets do not encourage individual manufacturers to increase their use of recycle, or consider the potential depletion of raw materials. Indeed, for some applications, using recycled materials increases pack weight, which is a positive disincentive to using more.

By contrast, carbon metrics would support the UK's climate change agenda by focusing on priorities more accurately.

They would incentivise the collection and recycling of the materials with the most embedded carbon. They would also make the different impact of various recycling and recovery routes visible, by making those an integral part of the calculation. This visibility in itself is likely to influence the behaviour of packaging designers and their brand or retail customers. It may also spur innovation and efficiencies in sorting, treatment and reprocessing.

Using CO₂ equivalent emissions as a proxy for environmental impact

No single indicator can holistically cover all environmental impacts. Water, air quality, toxicity and impact on the landscape may need considering alongside greenhouse gas emissions²⁶. Ideally, target systems would cover all of the main aspects of life cycle assessment. However, in practice using multiple environmental indicators would make the targets complicated to understand and monitor, and costly for companies to administer.

In many cases, carbon can be a good proxy for other environmental impacts and could strike a balance between coverage, simplicity and cost. For example, the pumping and treating of water requires energy inputs, which would be captured in a carbon-based analysis. Also, both the air quality and carbon impacts of packaging derive from energy use (manufacture and transport), and potentially from disposal method. Reductions in and/or increased recycling of packaging would lead to positive carbon and air quality impacts. The proportionate change in impact may be different, but the direction is the same.

2. Preconditions for carbon-based targets

A robust measuring methodology

If CO₂ equivalent emissions are chosen as the main indicator for packaging targets, any effects which changes in the packaging may have on the product it contains will need to be factored in. This is because the environmental impacts of the product will in many cases dwarf those of the packaging. This already occurs under the weight-based targets, since no organisation wishes to increase product damage, or cause loss of shelf life.

²⁶ In Wales the Assembly Government is using the ecological footprint as a key sustainability indicator. Ecological footprint modelling of waste has been used as part of the evidence base to inform the revision of the waste strategy for Wales.

Chapter 4 – Packaging and carbon metrics

Until recently, a significant barrier to moving towards carbon-based targets was the absence of a single, robust and commonly used methodology for carbon footprinting. On 29 October 2008, the British Standards Institution (BSI), launched a consistent method for businesses to assess the greenhouse gas emissions of their products and services, PAS 2050.

PAS 2050 is being used to inform two international standards development processes: the World Resources Institute and World Business Council on Sustainable Development's *Product Greenhouse Gas Protocol*²⁷; and the International Standards Organisation (ISO) product carbon footprint standard. Defra is also talking to the EU and other countries about the development of product footprinting standards, to try and minimise duplication and confusion.

As with the reporting mechanism under the Kyoto Protocol, sector-specific factors for greenhouse gases will need to be agreed and used consistently, and updated as data improves over time. A range of commercial sustainability scoring tools are already on the market, though they do not use a common dataset. Among other things, they aim to help companies measure the relative carbon intensity of their products and packaging.

Credible targets

The overall aim of carbon-based targets for packaging would be to reduce the overall environmental impact of packaging over time.

This could be achieved through any of the following methods, alone or in combination:

- reducing the amounts of packaging used
- switching to materials with lesser carbon impacts
- switching to returnable or re-usable packaging systems
- increasing levels of recycled content
- increasing recycling and recovery, and/or the carbon-efficiency of recovery processes

One option would be to set an overall target for packaging, shared out among producers, possibly in proportion to the amount of packaging they handle.²⁸ This would have the advantage of allowing producers a great deal of flexibility in how they achieve their targets, and may spur innovation. It could also encourage supply chain management and cooperation.

Other steps would be needed in preparation for wide-ranging consultations across the UK, and before we engaged with European partners:

- developing options for what targets could look like in practice, and what administration systems would be needed to support them;
- an analysis of the likely impact of these options, including predicted costs and benefits. This would consider the benefits, if any, of running such a mechanism alongside the EU Emissions Trading Scheme;

²⁷ <http://www.ghgprotocol.org/>

²⁸ The EU Emissions Trading Scheme (ETS) could provide a model for this. The EU ETS is a mechanism to deliver emission reductions across the electricity and energy-intensive sectors in the EU. A capped amount of emissions is allocated to Member States, who then allocate those among companies. Companies who produce fewer emissions than their allowance can sell the surplus to companies who have over-emitted. From 2013, some allowances will be auctioned.

Chapter 4 – Packaging and carbon metrics

- teasing out any perverse incentives/unintended consequences, including substitution effects between material and the impact they could have. Some decisions based on carbon footprint analyses may look counter-intuitive. For example, packaging milk in pouches rather than in bottles may have a lower carbon impact, but pouches are less recyclable than bottles. A shift to using pouches may mean sending more items to landfill, which on the face of it looks undesirable and could cut across targets set at EU level.
- The relationship between carbon-based targets and weight-based targets in EU legislation such as the Landfill Directive and the Waste Framework Directive.

Changes to EU targets

None of the EU regimes which apply directly or indirectly to packaging waste are explicitly aligned with the climate change agenda. If the UK were to switch to carbon metrics ahead of the rest of the EU, UK producers would still have to report against weight-based targets. This would increase the administrative burden on UK businesses, and as discussed above, they may be faced with two potentially conflicting sets of incentives.

Therefore, government has no intention of moving to mandatory carbon-based targets for packaging before the Packaging Directive is reviewed. If our analysis shows that carbon-based targets would deliver our policy objectives more effectively, then we will use the period ahead of a review of the Packaging Directive (likely to start in 2014 at the earliest) to demonstrate these benefits to the Commission and other Member States. The Eco-design for Energy Using Products Directive (2005/32/EC) is the first major Directive that considered resource efficiency over the life-cycle of a product. This was the result of a study that showed that over 80% of all product-related environmental impacts are determined during the product design phase. The extension of the scope to “energy related” products suggests a shift in thinking at the EU level to apply this more broadly.

3. Action plan

Government is aiming for a low carbon economy. There are signs that carbon-based targets for packaging could deliver environmental benefits, but there are also disadvantages to this approach. Among other things, moving to carbon metrics would complicate the data-gathering process and place additional burdens on business. Some choices which reduce the carbon impact may also lead to reduced recyclability. It may be possible to achieve some of the objectives highlighted above by setting weight-based targets to take account of carbon impacts.

Further economic analysis is therefore needed, involving a range of industry and other experts. This will be delivered by June 2010.

Depending on the outcome of this work, government may consult on proposals for carbon targets, to be pursued within the context of the European Commission’s review of the Packaging Directive, which could take place around 2014.

The climate change agenda is already at the heart of discussions relating to the next phase of the Courtauld Commitment, which could provide a useful pilot for carbon-based targets.

In the meantime, this strategy uses carbon indicators to assess the best ways to deal with packaging waste²⁹, and the priority areas for action over the next five years.

²⁹ This is in line with the approach taken in the Waste Strategy for England 2007 and the review of the Wales Waste Strategy.

Chapter 5 – Optimising packaging

Packaging optimisation is all about using the right amount of packaging for what it is required to do. This needs to be done to:

- reduce carbon emissions and conserve resources, saving money in the process.
If every wine bottle sold in the UK was as light as the lightest one currently on the market, it would save 75,000 tonnes of CO₂, and £3.5 million in raw material cost. If every cereal box was as light as the lightest on the market, it would save 17,000 tonnes of CO₂, and £10.4 million in raw material costs.
- convince the consumer that packaging producers are taking the kind of tough action on climate change and resource conservation that is expected from consumers themselves.

Packaging is needed to transport goods, keep food fresh, avoid product damage or theft, and present them to the consumer as intended. Much food packaging design is driven by consumer demands for convenience and freshness.

Each household buys on average nearly 3 tonnes of products a year, including on average 200kg of packaging³⁰ which takes products through an often long and complex supply chain to the consumer. Some products seem to have packaging that fits the needs but others seem excessively packaged. Some open easily, separate and flatten without difficulty; others are harder to unpick and recycle.

So how do we get the balance right? The answer is that innovation and good packaging design can make a real difference. The financial cost and environmental impact of packaging can both be reduced by using the right amount of material in the packaging, using recycled content where appropriate, designing for re-use or for easy disassembly to improve recyclability, and ensuring that at the end of their useful life packaging materials are valued as a resource.

1. The role of packaging design

Government wants to see a greater proportion of packaging designed with sustainability principles in mind across its life cycle. Such an approach helps balance environmental impacts and economic benefits. And of course it takes account of the fundamental role of packaging: protecting the product.

Eco-design is about designing product and packaging systems to ensure products (including their packaging) can be produced, distributed, used and recovered with minimum environmental impact at lowest social and economic cost.

Products and their packaging should be inextricably linked. Too much packaging leads to wasted resources for producing, distributing and processing packaging at end of use. And conversely, using too little or the wrong kind of packaging can result in the product being spoilt or damaged, potentially wasting *all* of the resources used.

Design decisions are complex. They encompass choice of material (including use of recycled content), choice of the packaging format (e.g. bottle, pouch, box or bag), and other functional needs (ease of opening, stacking, display, carrying, safety, preservation etc).

³⁰ ACP Communications Task Force Report "Packaging in Perspective", October 2008

Chapter 5 – Optimising packaging

For packaging to be more sustainable, these functionality criteria will need to be married up with environmental criteria for material and format choices, and their effective reuse, recycling or recovery.³¹ Eco-design needs to be applied not just of the final consumer pack, but across the supply chain of the product. The best overall packaging solution will consider the combination of consumer packaging, packaging used in shops to display products (secondary packaging) and to protect products in transport (tertiary packaging); from manufacturing to end of life.

There is no single answer, nor single material that will provide the perfect solution. Each piece of packaging and the materials, structure, thickness and technology used is designed for the product and will result in an often unique solution.

Changing packaging can take time. Initial design, testing and re-tooling costs can be considerable. Changes can affect the whole supply chain, for example, if they require refitting the manufacturing process to cope with new and different materials, or revising logistics systems and storage. Conversely, changing the packaging used for transport can lead to changes in the primary packaging.

Case study – Pure DAB radios³²

PURE introduced their EcoPlus™ product range in 2007. Their packaging uses cardboard produced with a minimum of 70% recycled material, and finished with water-based varnish. Internal pulp trays are 100% recycled. The user documentation is printed on 100% recycled paper using soya-based inks. PURE see this as the natural extension of their work to reduce the power consumption of the products themselves and make them more efficient.

The packaging designers' brief was to minimise the outer dimensions of the cardboard box, instead of allowing for a larger shelf presence with more space for messaging. This has reduced the amount of materials used, and minimised the environmental cost of transport.

Making it easier for businesses to adopt eco-design

Many companies are already taking the lead and making use of free advice from Envirowise, funded by administrations across the UK. Envirowise provides clear and accessible guidance on packaging eco-design³³, and their *Guide to reducing packaging costs and quantities*³⁴ provides advice and checklists on material choices, which help identify where to focus to achieve the biggest environmental gain. Since November 2008, this has been backed up by the online *Packaging Indicator Design Tool*³⁵, which allows businesses to compare packaging concepts and actual designs against a range of criteria. There are plans to develop the tool further to provide additional design information and best in class data.

Another source of guidance is WRAP's *Evolving Guide to Packaging Design*³⁶ This is regularly updated to take account of new materials, technologies, etc. and includes consideration of the relationship between a product and its packaging.

³¹ According to the Design Council, over 80% of the resources required to manufacture and use a product are committed at the design stage. So the use of eco-design or sustainable design techniques can have a major bearing on the resources consumed/wasted in the manufacture and use of a product and its packaging.

³² <http://www.pure.com/press/release.asp?ID=290>

³³ <http://www.envirowise.gov.uk/uk/Our-Services/Publications/GG908.html>

³⁴ <http://www.envirowise.gov.uk/uk/OurServices/Publications/GG360-Packaging-design-for-the-environment-Reducing-costs-and-quantities-Revised-in-February-2008.html>

³⁵ www.envirowise.gov.uk/pack-in

³⁶ www.wrap.org.uk/retail. The site also has a wide range of examples from the UK and overseas of best practice in packaging design, optimisation and innovation, including an image bank from an International Packaging Study, a concept room to inspire packaging designers and examples of best practice from Courtauld Commitment signatories and others.

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To promote better design and improve technical understanding at the design and specification stages:

- Over the next couple of years, government will work with delivery partners who have direct contacts with companies – such as Business Links and other economic development agencies, WRAP and Trading Standards – to raise awareness of the wealth of free advice available to businesses and promote the adoption of eco-design;
- Government and its delivery partners will develop a central information point for eco-design. This will help businesses access guidance and tools, and clearly explain their aims, functions and audiences;
- Envirowise are planning new face-to-face and online workshops on eco-design for industry in 2009. These include presentations, live Q&A, updates on current and future legislation, and interactive demonstrations³⁷;
- An industry-led working group of the Packaging Recycling Action Group (PRAG)³⁸ has been working on a packaging ‘sustainability matrix’. This is a potential tool to enable businesses to evaluate packaging options against a wide range of environmental and commercial criteria, to support decision-making. Existing tools of this kind are being assessed against key sustainability criteria identified by the group, and depending on this work, a new tool could be developed by the end of 2010;
- Building on this renewed effort and any recommendations from across industry, the Government will review the take up and effectiveness of eco-design guidance.

2. Regulatory drivers: the ‘Essential Requirements’

The ‘*essential requirements*’ in the European Packaging and Packaging Waste Directive³⁹ are measures which ensure that packaging designed in one Member State may be placed without barrier on the market of another Member State so long as it meets the requirements. They set a unified goal at the EU level for minimising the environmental impact of packaging.

These measures are implemented in the UK through the Packaging (Essential Requirements) Regulations 2003 (as amended). The Regulations set the minimum standards necessary for packaging to be considered compliant with the Directive. They do not indicate preferences between material types (e.g. glass versus plastics) or packaging systems (e.g. single trip versus reusable), but promote consideration of broader environmental impact.

Most businesses comply with the regulations and design their packaging to meet stringent cost drivers. The Producer Responsibility Regulations also provide businesses with a financial incentive to minimise packaging and packaging waste. The amount of packaging waste producers have to pay to recover and recycle is directly linked to the amount of packaging they handle.

Moreover, the multimillion pound reduction campaigns by large retail chains and other businesses have gone beyond reducing excess packaging, to address wider packaging and waste reduction, and associated environmental factors around retailing products.

³⁷ <http://www.envirowise.gov.uk/uk/Envirowise-Interactive-Webinars.html>

³⁸ The Packaging Recycling Advisory Group (PRAG) was set up in March 2008 by a cross-section of the retail, manufacturing and waste industries together with WRAP, government and compliance schemes. It is governed by a Steering Group of 35 members which is chaired by Asda Wal*Mart. Its aims are to work with relevant stakeholders to optimise the amount of packaging used, and to improve on the collection, sorting and recycling or recovery infrastructure for packaging from the consumer.

³⁹ Directive on packaging and packaging waste (94/62/EC, as amended)

Enforcement

Trading Standards Officers in local authorities across Great Britain and the Department of Enterprise Trade and Investment in Northern Ireland enforce the *Essential Requirements* on behalf of BIS. They have the power to:

- make test purchases
- enter premises at any reasonable time
- requesting compliance documentation, inspecting processes and performing tests
- issue suspension notices prohibiting the supply of packaging which is considered to breach the Regulations.

Enforcement policy is always to try to resolve cases of non-compliance rather than seek a prosecution. In the majority of cases, when challenged, companies have reduced their packaging or provided the necessary evidence for why the packaging is needed. Where it is necessary to prosecute, proving an offence with legal certainty can be more difficult, but a number of successful prosecutions have been made and cautions have been used.

Six years ago, the then DTI's study on the impacts of the *Essential Requirements*⁴⁰ suggested that the UK had established an effective and robust regime. It found that most companies' packaging policies are driven by cost considerations, and that the *Essential Requirements* provide those responsible for legal compliance or environment policy with a concrete obligation which can be and is used to improve their negotiating position with their colleagues in sales or marketing.

However, not all companies may be aware of the obligations and some may try to avoid complying. To aid awareness and enforcement in this area BIS issued new guidance on the Regulations in December 2008, and Envirowise have provided new design guidance for business. More action is planned both at the UK and at the EU level (see "*Raising awareness, helping enforcement*", below).

Promoting compliance: Standards are there to help businesses

Packers, fillers, brand owners or importers must be able to show that they have taken all reasonable steps to ensure that their packaging is compliant with the *Essential Requirements*. They must have a system of control appropriate for their business, operate it, document it, identify all reasonable steps – and take them.

CEN, the European standards organisation, has developed a set of **standards** based on a management system approach to help industry make better products. To comply, companies work methodically through checklists to ensure that decisions take account of the often conflicting social, environmental and economic factors affecting the choice of packaging. Using these Standards is the recommended route to compliance with the requirements.

Similarly, the application of technical standards offers environmental and economic benefits, reducing waste by using efficient, tested designs and ensuring compatibility across supply systems.

⁴⁰ <http://www.berr.gov.uk/files/file36318.pdf>

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Case Study – environmental and economic benefits of technical standardisation

Plastics drums (around the 200 litre capacity) used to be a number of shapes, colours and closure types – often made to specific designs and colours for companies. This restricted re-sale and re-use to almost zero.

CEN and ISO standards enabled large drums to be manufactured, distributed, filled and emptied with the same equipment by all users. Being the same design allows for the recovery and re-use over multiple cycles across a global supply market – maximising the commercial and environmental efficiency.

If a closure (lid, clip, bung, valve, cap etc) is lost or damaged at any point, the fact that they are standardised means that it is easy to obtain a replacement of the exact same type, thread and seal which enables the container to continue in use.

In October 2008, the International Standards Organisation (ISO) packaging group (ICO/TC122) considered a memorandum for work on a global set of environmental packaging standards based on the CEN Standards for the *Essential Requirements*. A resolution on how this work can be taken forward will be considered at the next meeting later in 2009.

The Packaging Committee of the BSI (British Standards Institution), the UK's National Standards Body, has taken forward a number of initiatives to promote the use of the CEN and other relevant standards for packaging⁴¹. This has involved:

- refreshing the information provided online, making it clear and accessible to non-experts with advice and information on purchasing;
- developing promotional material aimed at senior managers in business.

The BSI is now working on communications to increase the take-up of the standards. BIS will support this by working with a range of delivery partners to promote the design methodologies available in the standards, promote the use of the standards to solve common problems, and thus improve compliance with the *Essential Requirements*.

Raising awareness, helping enforcement

Action is planned at the UK and at the EU level, to help consumers, businesses and enforcement bodies:

- BIS is currently funding the development of a new enforcement tool, designed with input from the Local Authorities Coordinators of Regulatory Services (LACORS) Environmental Task Force and field tested with enforcement officers, to ensure it meets their needs. This project will help overcome concerns raised on consistency of approach and the ability to take enforcement action.
- The UK has welcomed and will contribute to the Commission's study of the implementation by Member States of the Packaging Directive's *Essential Requirements*.⁴² The study aims to examine the issues faced by Member States, enabling a full analysis and effective solutions to be developed. The Directive requires compliance with the *Requirements*, but establishing an enforcement mechanism is optional for Member States. The UK is one of only three Member States with an enforcement regime in place (the others being the Czech Republic and France). Better enforcement across all Member States would help to realise single market goals and give the regulatory drivers for packaging minimisation added influence. This study, which started in April 2009, is due to report in the autumn.

⁴¹ <http://www.bsi-global.com/en/Standards-and-Publications/Industry-Sectors/Manufacturing/Packaging/>

⁴² EC Report on the implementation of Packaging & Packaging Waste Directive & its impacts on the Environment (December 2006)

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- The UK also supports the Commission's proposal to issue further guidance on the *Essential Requirements*. It is expected to provide clarity and help minimise single market problems, through a more uniform understanding by Member States.
- Government is aware that companies who are unwilling to reduce their packaging as a result of Trading Standards intervention can point to a subjective criterion in the Directive's text, 'acceptance for the packed product and for the consumer'. This term enables them to make a legal case that the amount of packaging used is not "excessive" (as it is expected by the consumer and affords the product a competitive advantage in the market; or that it is needed to present the product to the consumer in good condition). The UK would like to see clearer language on this in the Directive to aid enforcement. We have already raised this formally with the Commission, and intend to continue pressing the them for a review of this wording.

3. Reducing packaging

Using less packaging: action plan

Over time, technical advances and innovation have allowed reductions in packaging weight and size, and greater material choices. Substantial savings can be made from seemingly very small changes, as these multiply across each unit and may be transferable to other products in a range. Such reductions are good for both businesses (they reduce input costs) and the environment.

Case studies – Packaging reduction through re-design

Your Packaging Partner of Bradford won the 2008 Trading Standards Institute "Pack It In" award for packaging reduction, sponsored by B&Q. They replaced the old PET pot and cartonboard sleeve of their dips packaging for ASDA by a directly printed pot which uses up to 80% recycled PET. This has saved 24.4 tonnes of cartonboard and diverts 56 tonnes of PET destined for landfill back into packaging.

IBM originally packed its keyboards using EPS (Expanded Polystyrene) end-caps and a large box. Two redesigns have resulted in a much smaller corrugated board box that uses a folded board insert to support and protect the keyboard. The company reduced its costs for materials and transport by £2.2 million as well as improving the recyclability of the packaging.

The question is whether on its own, the market sufficiently drives businesses to make full use of innovation in technology or materials to review the need for packaging in the light of functionality, consumer concerns, and costs. Work done by signatories to the Courtauld Commitment, WRAP and others suggest that there is more potential for reducing packaging.

- Valpak and Incpen have charted the weight of packaging for categories of products against how frequently they are purchased by consumers (using data from two major UK supermarkets)⁴³. This shows which product categories to target to maximise resource savings. Bottled alcoholic drinks is by far the biggest such category, but there are others.
- WRAP has over the past 18 months developed a database⁴⁴ which shows the spread of weight for a particular packaging product and pack size used for food and drink on UK supermarket shelves. It is accessible online to any business who wants to benchmark their packaging against the rest of the market. It shows that there are very significant differences in the weight of packaging which fulfils the same function. Some of this can be attributed to 'premiumisation', i.e. marketing strategies which use packaging to denote quality for premium products.

⁴³ Chart reproduced as Figure 4 in Annex A.

⁴⁴ http://www.wrap.org.uk/retail/tools_for_change/uk_best_in_class/

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Table 4 – potential savings if ‘best in class’ weights were adopted (source: DHL for WRAP, 2007)

Product (sold through traditional grocery retailers)	Packaging weight (tonnes)	Reduction if all moved to the Best in Class weight (tonnes)	Potential cost reduction to business (£)	Potential carbon savings (tonnes of CO ₂ equivalent)
Wine (bottles)	310,107	106,024	3,150,000	75,000
Champagne & sparkling wine	48,573	19,358	570,000	13,000
Cereals (boxed)	40,686	11,868	830,000	17,000
Carbonated (cans)	47,725	10,816	3,710,000	50,000
Beer (cans)	29,276	10,798	3,700,000	50,000
Fruit juice (cartons)	51,144	10,283	720,000	23,000
Coffee (jars)	36,119	9,492	430,000	6,000
Ketchup table sauce	21,222	7,720	N/A	23,000
Whisky (bottles)	28,347	6,733	320,000	4,000
Eggs (tray & boxed)	12,854	6,697	470,000	10,000

- The industry-led Advisory Committee on Packaging (ACP)⁴⁵ Task Force on the *Essential Requirements* (consisting of industry experts, NGOs and LACORS) identified a small number of sectors regarded as ‘over packers’. These are food supplements, cosmetics, IT sundries, confectionery and internet/direct mail selling. Excessive packaging is also often found on imported toys, but the majority of these are produced for a global rather than a UK market. This reduces our ability to influence changes. However, the Packaging Directive can help push the reduction message more effectively.

Using this and other information, WRAP will scope out a programme of work to identify priority sectors in 2009, and work with Government, trade organisations and key business partners to negotiate the **next generation of voluntary agreements** to reduce packaging. We aim to have those agreements in place in 2011, for the period up to 2016, after which they will be reviewed. We believe that moving towards the ‘best in class’ product weights can benefit both businesses and the environment, by minimising the use of natural resources and reducing energy consumption, both of which reduce costs.

There is also scope to refine the objectives of the **Courtauld Commitment** to deliver more benefits for both businesses and the environment. This could consider targets based on carbon rather than weight, extending from just considering household packaging and food waste to reducing all supply chain wastes and ultimately to reducing the carbon impact of products as well as packaging. An industry/WRAP steering group is already looking at these questions, and is due to report by September 2009. Government looks forward to receiving ambitious proposals from signatories and WRAP for new targets covering the period 2010-2015.

While Scotland will continue to be part of the Courtauld Commitment, the Scottish Government has consulted on going further. Powers to impose statutory packaging reduction targets are now part of its Climate Change Bill.

⁴⁵ A non-departmental public body consisting of industry members, established by Defra to advise Government.

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Excessive packaging



Picture: Northamptonshire County Council Trading Standards

As green issues move up the consumer agenda, packaging has become increasingly important. Consumers are now demanding less packaging and more collection facilities to recycle it, so it is important that brands and retailers recognise the impact of their packaging choices. Recent consumer surveys show that there remains a perception that some products are 'over-packaged', and that packaging features disproportionately in consumers' bins.

Yet there is no easy way of defining 'excess packaging'. What constitutes 'excess packaging' may differ from one person to the next, according to what they regard as normal, or acceptable. The purpose and benefits of packaging may not be visible to or understood by consumers. Not all seemingly excessive packaging is in fact excessive:

- People who live on their own for example, including the elderly, welcome packaged food in smaller quantities (so long as it is easy to open), else it goes off before they can eat it all;
- Industry tests show that packaged fruit and vegetables last longer in store and at home. This allows fewer shopping trips and may help avoid food waste;
- Sometimes, more packaging on the product may mean less packaging is needed to protect goods in transit. Overall, this may be better for the environment;
- Small, high value products are often packed awkwardly to aid anti-pilfering, for example computer and mobile phone memory cards, batteries etc. Increasingly though, retailers have solved this problem with card display tags that are exchanged for the product at point of sale.

For business, excessive packaging is a false economy that drives up unnecessary costs across the supply chain. Not only does this create an unnecessary cost to the manufacturer (impacting raw material through to distribution costs), it creates unnecessary waste at end of life. A supply chain that is neither resource efficient, nor sustainable, is not in the interests of business.

Case study – ASDA have saved over £10 million through their packaging reduction programmes in less than 18 months and have invested these savings back into price for the benefit of their customers.

So what can be done to deal with these real and perceived issues?

- As part of its wider work on packaging reductions, WRAP will work with manufacturers and retailers products considered excessively packaged. They have already done this for Easter eggs, and this joint work with industry has resulted in packaging reductions of 25-30% for Easter eggs for Easter 2009.

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- Government will work with Direct.gov, WRAP and compliance schemes to improve consumer information on packaging choices and recycling. Waste Aware Scotland have recently set up a micro-site⁴⁶ aiming to provide Scottish consumers with more information on the purpose of packaging.
- As consumers, we tend to choose products according to our lifestyle (including the quantity and packaging our food comes in) but we need to be more aware of the environmental impacts of these decisions. It is up to all of us as consumers to let businesses know when packaging goes beyond what we regard as normal, or acceptable. We can do so simply by choosing alternative products. Or by contacting retailers or manufacturers, or Trading Standards Officers.
- It is up to retailers and manufacturers to explain the benefit of certain packaging types to the consumer. Unless that packaging can be adequately justified, it may be considered excessive.

4. Designing for re-use

In the waste hierarchy, re-use comes after reduction as the most beneficial way of managing waste.

This is recognised and promoted by the Producer Responsibility Regulations for packaging, which stipulate that packaging counts against a producer's obligation only the first time it is put on the market. A producer who buys re-usable packaging will only have to pay towards its recovery and recycling once.

Re-use in domestic packaging

Re-usable packaging has long been a feature in the home: just consider the example of milk delivered in returnable glass bottles. Non-statutory systems used to exist under which consumers were charged a deposit for some bottles (eg lemonade bottles) and then got the deposit back when they returned the bottles. These bottles were then sent back to the manufacturer for re-filling; they were re-used rather than sent off for recycling. These systems have largely disappeared in the UK, although in Scotland, Barrs still use it for some of their Irn Bru bottles.

However, the market share of refillable packaging has fallen sharply, mostly because of changes in consumption patterns⁴⁷. For a period of time, The Body Shop offered its customers a 10% price reduction if they returned containers to the shop for refilling. It discontinued this scheme in 2002, because only 1% of its customers used the service.⁴⁸ If market trends remain as they are over the next decade⁴⁹, then revitalising re-use will require innovation and ingenuity.

In June 2008, WRAP published a report examining existing refill systems in use around the world⁵⁰. In their simplest form, refill systems could be a pack where there is a screw cap in place of the dispensing mechanism, such as a trigger spray. The report presents a range of international concepts (from grocery, home improvement and health & beauty) suitable for the UK market, and sets out advantages, disadvantages and potential commercial benefits as well as barriers and solutions for take up. There is a huge opportunity to expand the refill product range in the UK, as long as the systems are explained well.

⁴⁶ <http://www.positivepackage.org.uk>

⁴⁷ In 2008 WRAP published a report by Oakdene Hollins on refillable glass beverage container systems. This work investigated the barriers and opportunities for the wider adoption of such systems in the UK. It reviewed systems in place around the globe and the drivers which support them. It concluded that there are opportunities for refillables in the UK but they would probably be most appropriate in conjunction with local sourcing and doorstep deliveries.

⁴⁸ Incpen (May 2008), Mandatory Deposits on Packaging, <http://www.incpen.org/pages/data/MANDATORY%20DEPOSITS%20May%202008.pdf>, p.3.

⁴⁹ And there is at least a possibility they might not – see Section 3 of Chapter 2 on horizon-scanning.

⁵⁰ WRAP (2008), A feasibility study – potential refill solutions for the food and non food retail sectors, http://www.wrap.org.uk/retail/case_studies_research/a_feasibility_study.html

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In 2007, Defra and Boots co-funded a project on 'refillable packaging systems'⁵¹ It aimed to design and assess various packaging concepts against consumer acceptance and sustainability criteria. It concluded that if refillable packaging is carefully designed and applied to appropriate products, it could contribute to reducing packaging waste. To make refillable packaging a success, the research suggested consumers would want it to be: easy and quick to use and/or to refill with no mess; less bulky to store and lighter to transport than the non-refillable packaging. It should clearly be good value, and there should be an obvious reason why the product is sold as a refill. For consumers to try and continue to use refills, they would need to be seen to be widely available.

Market trends and the work done so far by WRAP suggest that there are genuine obstacles to more re-use in primary packaging. Government will review the scope for action on refillable and reusable packaging, and on greater use of concentrates. WRAP will be running a number of projects on this over the next few months.

Re-use in commercial and industrial packaging

Re-useable packaging is not confined to refillable primary packaging. Industrial packaging is designed and manufactured for international use for a wide variety of products, from foodstuffs to hazardous chemicals. It is highly suited to reconditioning and reuse, due to its size and strength. European and International Standards play a key role ensuring compatible systems across a global marketplace. Reuse is prevalent throughout the supply chain with pallets, sacks, crates and barrels for example.

In December 2008 the European Commission extended the derogation on heavy metals in plastic crates and pallets in the Packaging Directive, with the option of a review after 5 years to consider progress. This has removed the need for the early destruction of pallets and crates, avoiding waste and considerable costs to UK industry.

In any part of the supply chain, successful reusable systems depend on local distribution networks and high return rates. WRAP has supported projects in the home improvement sector which have successfully developed reusable transit packaging.

Case studies – re-useable tertiary packaging

In partnership with Home Retail Group (Argos) a reusable packaging system (sofa bag) was developed and trialled for the distribution and delivery of upholstered furniture. The approach identified over 1,500 tonnes per year of packaging savings and has attracted substantial international interest.

The second successful example of returnable transit packaging developed in partnership with WRAP, is the B&Q Worktop Carrierpac. This system, designed for home delivery of kitchen worktops, proved to be successful for up to 18 return trips, reducing packaging by 1,100 tonnes per year at the same time as reducing product damage. It received a gold award in the 2008 Starpack awards and following its adoption will save the retailer £300,000 per year in packaging costs alone.⁵²

⁵¹ Defra research project: "Refillable Packaging Systems" (project code WR0113)
<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=14682&FromSearch=Y&Publisher=1&SearchText=WR01&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

⁵² http://www.wrap.org.uk/retail/case_studies_research/case_study_1.html

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5. Closing the resource loop: recyclability, recycled contents

After reduction and re-use, recyclability needs to be the next priority during the design stage, to maximise the environmental and economic return on the packaging material.

Recovery processes extract economic value and environmental benefit by diverting waste from landfill, and allowing it to be put to new uses.

Recycling is a particular form of recovery. Others include energy from waste incineration, composting, anaerobic digestion etc. This section concentrates on recycling as the most carbon-efficient recovery method (and the most complex).

Why design for recycling

In practice, recyclability is influenced by how easily materials can technically be recycled, how they are combined in a given product, whether they are collected for recycling, and the condition in which they arrive at reprocessing plants.⁵³ Packaging that can be easily recycled should be positively endorsed – especially for materials with a high value and high carbon impact such as aluminium and plastic.

Designing packaging with end-of-use in mind can avoid or to mitigate designs that could impede the recycling process – for example avoiding certain closures, mixed materials and colours.

The easier the packaging is to empty, clean, and separate into its constituent materials, the more likely it is to find a variety of further uses and to be worth more. This in turn can reduce the cost of disposal for both consumers and businesses, and the environmental impact of the packaging used.

Designing for recyclability – example of best practice (source: WRAP/PRAG)

For plastic bottle closures, using HDPE/LDPE/PP caps (rather than metal, PS or PVC) makes recycling easier because there is less risk of contamination in the recycling process. Using the same colour for the closure as for the bottle also makes the waste more valuable and easier to recycle into high value products.

Specific applications (e.g. packaging with barrier properties) may require the use of multi-material packaging that cannot be easily separated into its constituents for recycling. Some packaging might be too contaminated (eg with food residues) to be worth recycling. In both cases, this material may be suitable to be recovered in ways other than recycling.

What more can be done to make design for recyclability standard?

CEN published a report on *Impediments to recycling* in August 2008⁵⁴ to design out or rethink packaging designs leading to problems in recycling. It can be used as a guide for taking into account substances and materials that may be incorporated in packaging and which may, or do, inhibit subsequent operations related to recycling.

In addition, the design working group⁵⁵ of the Packaging Recycling Action Group (PRAG) made a valuable contribution to this issue by compiling a guide on industry best practice for packaging recyclability, with input from industry experts, WRAP, Envirowise and government. Whilst protecting innovation, the guide allows for more uniformity of packaging materials.

⁵³ http://www.wrap.org.uk/retail/case_studies_research/case_study_1.html

⁵⁴ PD CEN/TR 13688:2008 Packaging. Material recycling. Report on requirements for substances and materials to prevent a sustained impediment to recycling (<http://www.bsi-global.com/en/Shop/Publication-Detail?pid=000000000030173505>)

⁵⁵ Industry experts, WRAP, Envirowise and government are contributing to this work.

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Ideally, this best practice guide should be recognised and used across manufacturers and retailers to maximise overall resource efficiency in the way packaging is specified. Taking account of European work in this area, WRAP are planning to launch the initial version of guide by the end of 2009, with a web based tool to follow. Government will work with industry partners and WRAP to publicise the guide and promote its uptake among packaging specifiers.

Closing the loop: greater use of recycled contents



Milk bottles using 30% recycled HDPE. (Picture: M&S)

Stimulating demand for packaging waste materials by increasing the use of recycled contents (in packaging and other applications) is a win-win for economic activity, resource efficiency and climate change. And shoring up demand for recyclable materials is a key ingredient to making the UK's recycling system more resilient to changes in markets.

Current market research suggests that consumers are happy using recycled packaging, and indeed some brands now market on the recycled nature of their packaging. But we are aware of significant technical barriers to greater use of recycled contents in some applications.

In the light of the recent volatility in recycling markets, the UK successfully advocated renewed action on the EU Lead Market Initiative on recycling, published in 2007. This could help share scientific and technical studies on increasing the use of recycled contents and building recyclability into product design.

In the longer term, existing EU measures could be reviewed to include mandatory targets on recycled contents. The maximum recycled content technically achievable will of course vary for different applications. The economic benefit to the manufacturers could be substantial, but it will vary with each use. The UK and other Member States have encouraged the Commission to undertake further analysis of these opportunities.

In the meantime, public and private procurement can play its part in stimulating the market by using its power to create a demand for more sustainable goods. For some existing voluntary EU Green Public Procurement product group specifications, such as cleaning materials, there is a requirement for cardboard package to have 80% or more recycled content. Currently, Green Public Procurement criteria are voluntary, but across all Member States there is a 50% political target that by 2010 all public sector tendering procedures should be "green" i.e. compliant with core criteria specified in the EU Green Public Procurement toolkit. For some of the new product groups currently under consultation, such as thermal insulation, the criteria do specify requirements for the amount of recyclable, recoverable and recycled content of the materials in the packaging used.

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Central Government and its Agencies should be leading from the front through public procurement. Defra has ambitions to be a leader in sustainable procurement by 2009.

In Northern Ireland, public sector tendering procedures will require suppliers and contractors to use best endeavours to implement a sustainable packaging policy. The objective of this policy will be to minimise the amount of packaging used, while maximising the use of recycled and reused materials.

Scottish Government has included provisions in the Scottish Climate Change Bill on specifying recycled content in procurement. The Scottish Government has also taken voluntary measures to encourage public sector bodies to use recycle in construction and paper contracts.

In Wales, the Assembly Government have made commitments to embrace sustainable development principles to influence all aspects of procurement to ensure the environmental, social and economic factors are considered in the framework of value for money, and to encourage all its suppliers to do the same.

Using bio-based packaging

The EU Lead Markets Initiative⁵⁶ selected 'bio based products' as a sector where growth will bring about economic and environmental benefits for the European Community. The UK Government is involved in current discussions at EU level on introducing a USA-style bio preferred programme. Should this go ahead, all EU public procurement would be required to show a preference for bio-based products which have been assessed and added to an EU wide list.

Packaging designed to be anaerobically digested will add to our renewable energy supply. Packaging designed to be composted is resource-efficient because it can be used for growing more feedstocks.

Anaerobic digestion of renewable bioplastics offer a useful option for addressing the end of life issues for food packaging. Foods currently packed in films, such as fresh meat/fish, soups and frozen foods could be treated as whole food items and the food and the packaging disposed of together.

This would have several advantages. It would simplify the segregation of certain food lines. It would generate large quantities of energy (through the evolution of biogas from the bioplastic; each kilogramme of bioplastic can generate 600 litres of biogas). It would save energy that would otherwise have been required to de-package and sterilise the film prior to reuse in another application. And it would derive an added value organic fertiliser.

Most efficient use of carbon in the waste stream can be achieved by:

- Improved recycling of conventional packaging
- Increased bio-based content
- Considered use of bio-based packaging in recovery streams where recycling is not an option.

⁵⁶ http://ec.europa.eu/enterprise/leadmarket/biobased_products.htm

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1. Reaping more environmental benefits from recycling

Why boost packaging recycling rates further?

In 2008 the UK recycled around 61% of its packaging waste, well over our Directive target of 55%. We could stop here, and merely maintain this performance. But not if we want to maximise the efficient use of resources.

Recycling uses less energy than manufacturing from virgin materials, and so saves greenhouse gas emissions. Waste packaging that is in theory recyclable but ends up in landfill, because it is not collected or because there are no end markets (or both) is lost from the resource economy. And in the case of paper and wood, landfilling results in additional methane emissions.⁵⁷

Figure 3b below illustrates the *maximum* potential carbon savings from increased recycling. Even taking into account that there will be a point where recycling will become disproportionately difficult or expensive, the graph suggests that progress can still be made for all materials.

Figure 3a – Packaging waste, recycled and in the residual waste stream (tonnes, 2008)

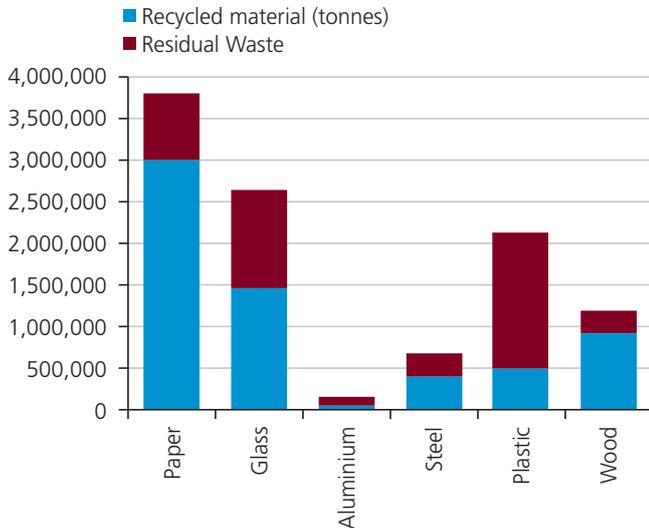
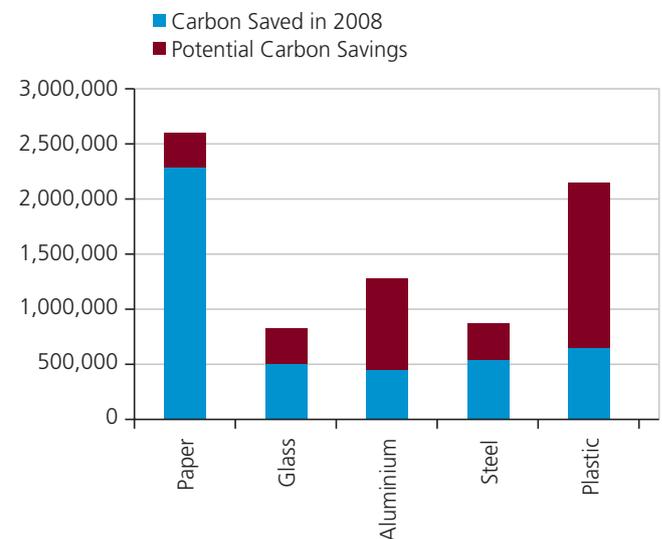


Figure 3b – Actual and potential CO₂ equivalent savings from recycling (CO₂eq tonnes⁵⁸)



⁵⁷ Defra, Waste Strategy for England (2007), p. 54

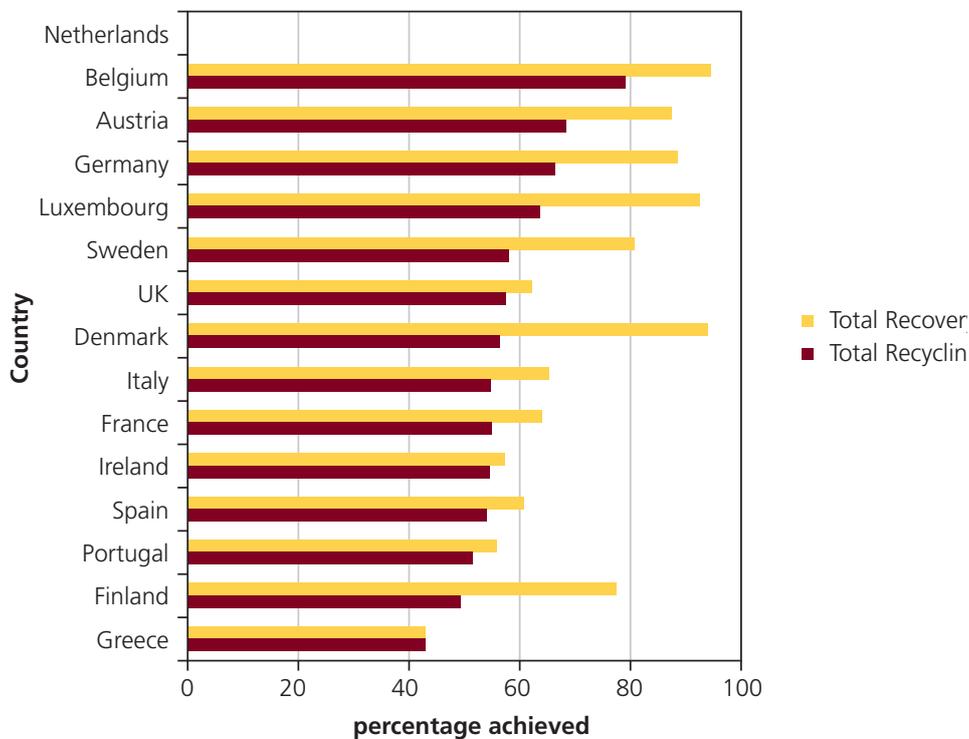
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Working towards the recycling rates of the best EU performers

One of the elements of the vision for recycling (see Section 2 of Chapter 3) is that the UK should not only maintain its performance against EU recycling targets for packaging, but move further towards the recycling rates of the best EU performers. This section explores what this would mean.

The chart below compares the UK's packaging recycling and recovery performance against other Member States (EU15 – Source: European Commission). It shows that the UK is roughly mid-table with respect to recycling rates. A similar ranking for overall recovery rate would find it lower down the table.

Total Packaging Recovery and Recycling EU15 2005



⁵⁸ Based on the CO₂ equivalent savings calculated for the Waste Strategy for England 2007, except for aluminium where more recent figures from Alupro have been used.

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The predominant place of recycling in the UK's recovery infrastructure puts the UK in a strong position to meet the challenges of the CO₂ and resource efficiency agenda. Boosting recycling, alongside the expansion of other recovery methods such as anaerobic digestion and energy from waste incineration – as set out in the Waste Strategy for England 2007, the Northern Ireland Waste Strategy and the draft waste strategy currently being consulted on in Wales – will increase the UK's overall recovery over time. The forthcoming National Waste Management Plan for Scotland will outline the Scottish Government's commitment to waste prevention and high levels of recycling, including the use of anaerobic digestion to treat food waste. The Scottish Government has indicated that energy from waste can play a part in reducing the amount of waste sent to landfill and that all plants should aim for high levels of efficiency.

Waste (including packaging waste) continues to be a big issue across Europe, and we can expect most Member States' performance to rise over the next five years. As an example, France has set itself a 75% recycling target on household packaging, to be achieved by 2012. Acknowledging the variety of definitions and counting mechanisms among Member States, it is reasonable to assume that, ***in order to lift the UK's performance into the upper quartile of the EU15 by 2014, we would need to recycle at least 75% of our packaging waste.***

Maximising carbon savings

In carbon terms, not all packaging recycling options deliver the same benefits.

There are, broadly speaking, three main types of recycling:

- 'closed loop application' is where a waste packaging product gets recycled back into the same product;
- 'closed loop material' is where a packaging product gets recycled into a different product, but still replaces the same virgin material or is itself recyclable;
- 'open loop' is where a packaging product gets recycled into a different product but does not replace the same virgin material or cannot be recycled after this first pass.

The following table illustrates these concepts for each of the main packaging materials, and also sets out recovery scenarios for the sake of completeness.

Table 4 – recycling typology (Source: WRAP)

	Closed loop application	Closed loop material	Open loop	Recovery
Aluminium	Can to can	Can to casting (eg car part)	Not applicable	Energy from waste (laminates only)
Glass	Bottle to bottle	Bottle to insulation	Bottle to aggregate	Not applicable
Paper	Board to board	Paper to board	Paper to insulation or to animal bedding; Composting	Energy from waste; Solid Recovered Fuel Refuse Derived Fuel ⁵⁹ Sludge; Combustion/spreading
Plastics	Bottle to bottle or other packaging	Bottle to plastic pipe Bottle to strapping Bottle to fibre Carrier bags to damp proof membrane	Bottle to bench Bottle to kerbstones Bottle to insulation	Energy from waste; Solid Recovered Fuel/Refuse Derived Fuel; Diesel production; Anaerobic digestion (biodegradable plastics only)
Steel	Can to can	Can to casting (eg beam)	Not applicable	Not applicable

⁵⁹ Processes of producing fuel from shredding municipal solid waste or by steam pressure, treating the waste in an autoclave. The waste used consists largely of plastic and biodegradable waste.

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Initial analysis⁶⁰ shows that, in most cases, the biggest environmental benefit is obtained through the closed loop routes. So the question is how policies can promote both an increase in quantities recycled, and the most carbon-efficient recycling options, where the difference is significant.

2. Priorities for action: the materials view

The previous section showed that the potential progress in terms of environmental benefits will vary by packaging material. This section reviews the need for action for each of them.⁶¹

Aluminium

Aluminium is highly valuable, infinitely recyclable, and every tonne of aluminium recycled saves nine tonnes of CO₂ equivalent emissions. Yet recent recycling targets (35% for 2008) have proved challenging. The fundamental issue is how much is collected.

95% of aluminium packaging waste (drinks cans, ready meal trays etc) arises in the household stream. Because of its value, aluminium should be a material of choice for local authorities to collect. While over 95% of them do so, few have engineered their collection systems to maximise how much they collect. Partly, this is because landfill diversion reporting is weight-based, as are household recycling targets and the new National Indicators in England. This offers no incentive to collect light materials such as aluminium.

Approximately 18% of aluminium packaging is used 'on the go', and it tends to end up in street bins rather than be taken home to be recycled. This proportion is even higher for aluminium cans, where 30% of all cans sold (about 28,000 tonnes of cans) are consumed 'on-the-go'.

Increasing recycling in public places has a beneficial impact on other materials, such as plastics and steel. At the same time, we also need to recycle more of the drinks containers consumed at home.

To address both, across the UK,

- Aluminium trade body Alupro is working with local authorities to encourage the collection of aluminium foil. Its objective is to get another 60 authorities collecting foil. It is estimated that only 11% of the 22,100 tonnes of foil packaging put on the market at the moment is recycled.
- WRAP will work with the aluminium industry to encourage local authorities who do not currently collect aluminium beverage cans at the kerbside to start doing so.
- Alupro has also launched a campaign to boost recycling at work, with WRAP support. It will analyse what drives or stops collection, and develop a best practice model to encourage interest from collectors. The project will run for the next two years, with a gradual national roll-out as infrastructure develops.
- A number of individual businesses, including most notably Coca Cola and Tesco, are investing in on-the-go infrastructure.
- Given the very clear environmental benefits of recycling more aluminium packaging, government will consult on increasing aluminium targets over the next decade. This would unlock additional producer funds for expanding the collection infrastructure.



(Picture: Alupro)

⁶⁰ See Table 4 Annex A.

⁶¹ This is aligned with the approach taken by the Waste Strategy for England 2007.

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In addition, in England Defra launched a Code of Practice on Recycling in Public Places in June 2008. It is intended to encourage businesses such as theme park operators, leisure centres etc to provide recycling bins for visitors. BSI have recently published a Standard on sustainable event management.⁶²

Waste Awareness Wales and the Wales Community Recycling Network Cylch have produced a downloadable events recycling guide, that aims to get business, individuals and the public sector minimising and recycling waste anywhere.

The proposed Scottish Climate Change Bill aims to encourage further recycling by giving a power to the Scottish Government to make regulations which would impose duties on public sector bodies and businesses with units over a certain size to provide recycling facilities for customers, staff and, where appropriate, the public. A voluntary Code of Practice is a possible alternative.

Government is commissioning a UK-wide study into the environmental and economic consequences and the practical implications of introducing additional landfill bans. Research into how such restrictions have worked in other countries was recently completed. Further research into ban options and their impacts is due by end of September 2009. There would be full consultation before any landfill bans were introduced in any part of the UK. In England, the Waste Strategy 2007 includes a commitment to consult on options for further restrictions on the landfilling of biodegradable and recyclable wastes, including priority waste materials like aluminium.

Glass

Glass recycling targets (78% for 2008) have so far been met, but they remain challenging and rely for one third on aggregates as an end market. The amount of recovered container glass destined for uses other than remelt into containers, including mineral wool and aggregates, has more than doubled since 2005.

The aggregates market offers a valuable service, as it provides a home for material coming from Local Authorities that otherwise would go to landfill. However, aggregates is an open loop application, and in carbon terms a sub-optimal one. Recycling 1 tonne of glass into containers saves 0.3 tonnes of CO₂ equivalent; turning it into aggregates produces on average no saving.

Looking at quantity, between a quarter and a fifth of waste glass packaging arises in the commercial and industrial stream, and a large proportion of this in pubs, clubs, restaurants etc. WRAP research estimates that only 16-21% of glass packaging used in the hospitality sector is recycled. There might be as much as half a million tonne still to be recycled each year.

- Working with WRAP, Government will negotiate sector-specific voluntary agreements to address this.

Turning to quality, the way in which glass is collected often dictates its end use. The market for container glass calls for clear cullet, of which there is an increasing shortage. Collecting glass in colour-sorted containers is more costly, particularly if collected at the kerbside. Clear cullet is more valuable than mixed cullet, but the difference in value does not always cover the additional costs of sorted collection.

⁶² <http://www.bsigroup.com/Shop/Publication-Detail/?pid=00000000030146791>

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Due to the expansion of kerbside collections, more glass is being collected overall. 70% of UK local authorities now collect glass at the kerbside, accounting for around 55 % of the glass recovered from households.⁶³ Around 15% of local authorities operate fully co-mingled glass collections, with a similar number operating two-stream co-mingled systems, where glass is collected with plastic and aluminium containers. This glass waste is not usually handled in a way that allows colour-sorting. So the only end market for it is aggregates.

Another issue is that glass collected in co-mingled collections often gets broken into small shards, which contaminate the (non-packaging) paper stream. This reduces the quality, and therefore the end markets and value, of the paper recyclates.

- Government will consult on options to maximise the carbon benefits of glass packaging recycling. This could include setting separate producer responsibility recycling targets by colour; or setting targets for each end market, increasing the target for closed-loop uses over time.

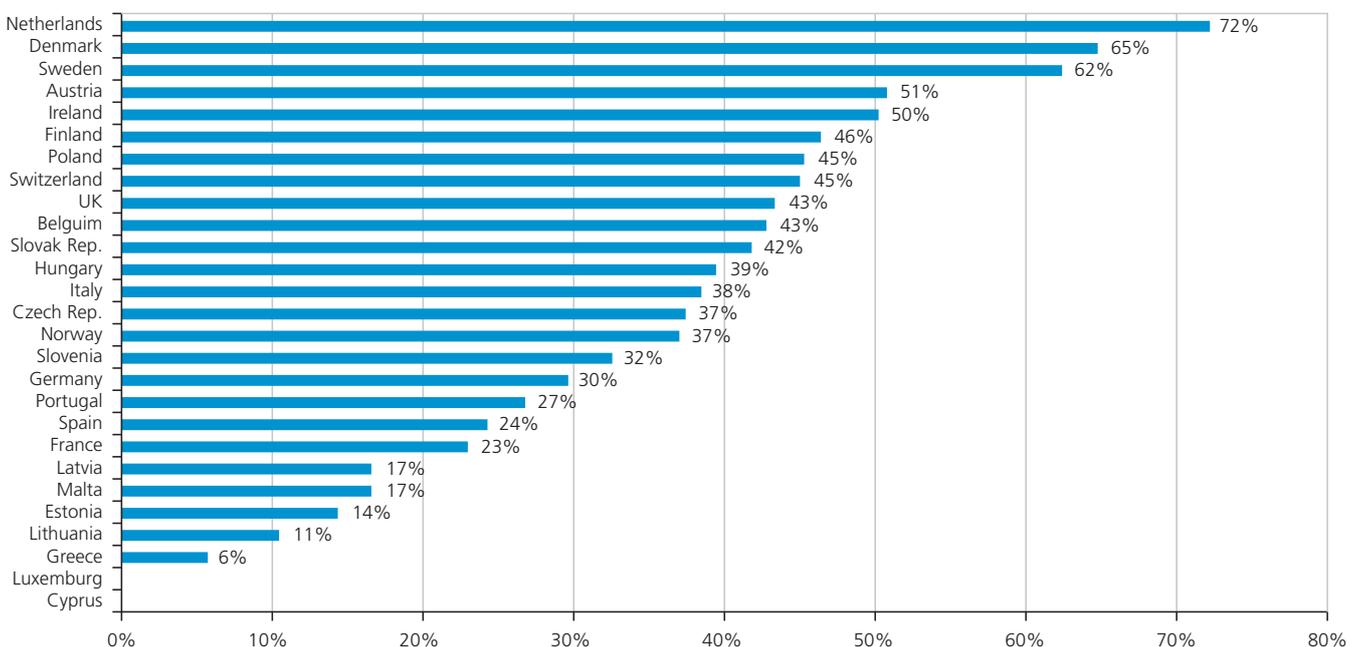
Plastics

Figures 3a and 3b above clearly show that recycling more plastic packaging could save substantial greenhouse gas emissions.

Commercial and industrial plastics packaging account for one third of all plastics packaging, and in 2006 an estimated 43% was recycled. Although the UK is relatively well-placed among EU Member States, recycling rates would need to go up significantly for the UK to be on a par with the best performers (see figure 4). Raising recycling to 50% could save an additional 56,000 tonnes of CO₂ equivalent, going up to 136,000 tonnes if this was raised to 60%.

- We will work with the Advisory Committee on Packaging, WRAP, the environment agencies, plastics organisations and waste management companies to improve our understanding of the data on commercial and industrial plastics recycling. Then we will consider whether any action specific to the commercial and industrial sector is needed.

Figure 4 – Commercial and industrial plastics packaging recycling rates 2006 (source: Plastic Data Alliance)

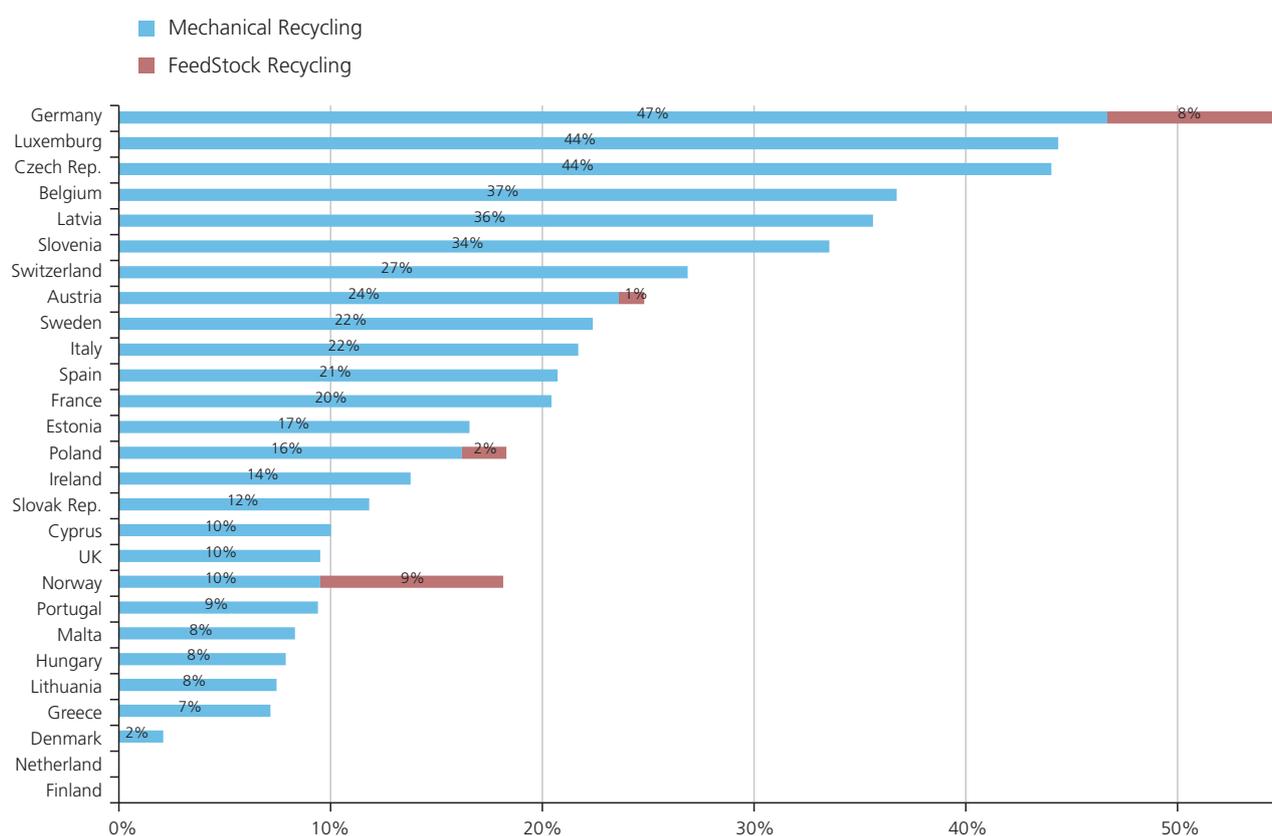


⁶³ WRAP glass market report, 2008 http://www.wrap.org.uk/downloads/Glass_MSR_update.ac7e5f6f.6009.pdf

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Action is most pressing on the household side. End markets for the common plastics polymers (PET and HDPE) have developed in the past 5 years, with the result that plastic bottles recycling now stand at 35%.⁶⁴ Despite this considerable improvement, international comparisons show how much more could be done.

Figure 5 – Household plastic packaging recycling rates 2006 (Source: Plastic Data Alliance)



Because of their popularity as packaging materials and their volume, plastics are very visible to consumers, who are putting pressure on local authorities and retailers to extend recycling services to other plastic types. However, doing this would require an appropriate sorting and reprocessing infrastructure to be in place, and developed end markets.

- We will continue to support WRAP's work on increasing plastics recycling which will include:
 - developing self-sustaining closed loop end markets for mixed plastics,
 - working with the reprocessing sector to establish sufficient capacity,
 - working with local authorities, waste management companies and others to help set up a mixed plastics sorting infrastructure. WRAP are currently trialling commercial-scale sorting and reprocessing technologies, to test how a greater variety of plastics can be collected, sorted and reprocessed economically;
 - working to increase the recyclability of plastic packaging.
- We will consult on how to adapt producer responsibility targets to deliver a phased expansion in plastics recycling. One possible option would be to split the plastic target according to packaging types (film, bottles, non-bottle rigid plastics, and other plastics), and raise the targets at different speeds to match the increased availability of sorting and reprocessing capacity, starting with an increase in the bottles target from 2011. Other options will be explored.

⁶⁴ http://www.wrap.org.uk/manufacturing/info_by_material/plastic/plastics_collection.html

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- There has been a significant growth in biopolymers⁶⁵ (plastics made of biomass) in recent years. They account for less than 10% of the UK plastics packaging market. These materials can extend the shelf life of perishables, and simplify back-of-store waste management. However, in some cases they can contaminate established recycling operations for both oil based plastics and compostable material, and must be managed carefully. Brands and retailers using biopolymers have a special responsibility to improve public understanding of the materials.⁶⁶ The Department of Energy and Climate Change (DECC) funded National Non-Food Crops Centre (NNFCC), WRAP and AFOR (Association for Organics Recycling) to develop and introduce a new Home Compostable packaging certification scheme later in 2009. The new scheme will have a compostable label system (an extension of the On-Pack Recycling Label scheme) and provide clear, consistent consumer advice on how to dispose of compostable packaging as well as how to recycle it. The NNFCC and other stakeholders are also working with the entire supply chain to promote the use of bio-based products (both durable and biodegradable) where these contribute to resource efficiency.

Steel

Steel scrap is a valuable commodity, with mature end markets both in the UK and abroad. The 2008 business target for steel was 68%, and the UK recycled or recovered 417,000 tonnes of steel in 2008.

In the medium term, the main challenge in steel will be to maintain the quantities which are collected and reprocessed within the regulatory system. Because the value of producer funding normally makes up a very small proportion of the trade price of a tonne of steel (at the end of 2007, this was around 7.5%), some reprocessors and exporters do not have sufficient incentive to become accredited. This could mean that more recycling happens than gets counted. The Producer Responsibility Regulations were amended in July 2008 to mitigate this market pressure. We will continue to monitor market developments with the help of industry partners and the Advisory Committee on Packaging.

Recycling rates for steel beverage cans (e.g. those used for beer) will benefit from the measures targeting cans consumed outside the home, set out in the section on aluminium above.

Paper

The UK regularly exceeds its paper packaging recycling targets (67.5% for 2008), due mostly to the commercial and industrial stream, from where material is collected easily and cheaply. Building on this performance incrementally, over time, would deliver additional carbon savings at low cost.

- Government will consult on targets for 2010 and beyond in line with recent increases.

Wood

Our recycling targets for wood packaging (20.5% in 2008) – which arise as waste mainly in the commercial and industrial sector – were exceeded. We do not propose to take further packaging-specific action. Government will be setting out in the Renewable Energy Strategy plans for enhancing the use of waste for energy, including wood.

⁶⁵ Biopolymers are polymers derived from biomass. They may be natural polymers (e.g. cellulose), or synthetic polymers made from biomass monomers (e.g. Polylactic Acid) or synthetic polymers made from synthetic monomers derived from biomass (e.g. Polythene derived from bioethanol). Oxy-degradable (degradable) plastics are not biopolymers.

⁶⁶ For more details, please see <http://www.wrap.org.uk/retail/materials/biopolymers.html>

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3. Making improvements happen

Key improvements

As Chapter 1 has shown, the dramatic increase in packaging recycling in the UK over the past decade has been a success story. We want to build on this over the next decade, in order to maximise the energy saved, the reduction in raw material extraction and the greenhouse gas savings, and maintain the many jobs created through packaging recycling.

So we will need to:

- increase the proportion of packaging steel, glass, paper and above all aluminium and plastics collected for recycling. This will involve providing incentives both for businesses to recycle more, and for local authorities to expand the range of materials they collect for recycling, and possibly from the kerbside, with better information to residents;
- increase the proportion of glass collected in such a way that it can be used for re-melt to make new containers, and develop sorting and reprocessing technologies that allow more closed loop recycling of plastics.

Achieving these goals will require different measures for each material. However, there are common themes. First, they are unlikely to be reached without concerted action by individuals, businesses, local and central government, and packaging producers. Second, they will require investment.

The rest of this chapter examines how best to bring these improvements about, in a way that is cost-effective for all concerned.

Value for money for taxpayers and consumers

In a perfect world, the price of goods (including packaging) would reflect the full cost – economic, social and environmental – of disposing of them when they become waste. In reality this is almost never the case.

The Packaging Directive was brought in to address this market failure in respect of packaging by obliging Member States to set up a recycling infrastructure for both business and household waste, involving packaging producers and others in doing so.

All Member States have done this through producer responsibility systems. The extent to which producers share the responsibility for recycling with others (eg local authorities and individual businesses) varies across Member States. Depending on where that balance of responsibility lies, two groups ultimately pay for the costs of disposing of packaging waste, in varying proportion:

- taxpayers, through their Council tax and the proportion of general taxation that funds local authorities' waste services, and
- consumers, through the price they pay for goods, which will take into account what the businesses they buy from have to pay for their own waste disposal, and the compliance costs of recycling targets to the packaging chain.

In many cases this will be one and the same group of people, so regardless of where the balance of funding lies, *the whole chain* that manages packaging waste (including local authorities, waste management companies, reprocessor and producers) needs to offer best possible value for money in delivering an increase in the quantity and quality of packaging collected for recycling.

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4. Treating packaging waste as a valuable resource

A key element in ensuring value for money is to organise packaging recycling systems so that the value of the recyclates they produce is maximised.

On economic grounds, recycling competes with landfilling and energy-from-waste as a disposal method for packaging waste. Comparing the costs of each of these waste management methods to local authorities, at the time of writing, gives the following picture⁶⁷:

- Collecting and landfilling a tonne of municipal waste costs in the region of £90 (including landfill tax). It can be assumed that the cost for a tonne of packaging will be similar (the bulk density will be roughly similar);
- Collection and gate fees for a tonne of municipal waste going to energy-from-waste are approximately £100. As above, it can be assumed that the cost for a tonne of packaging will be similar;
- Collecting and sorting a tonne of dry recyclate (assumed to be 50-70% packaging and 30-50% non-packaging paper) costs in the region of £80 per tonne in a 4-material kerbside sort system, and £95 in a 5-material comingled scheme (including MRF gate fee) to local authorities. Both figures are net of the sale of the recyclate. It is worth noting that these figures are very sensitive to variations in the price of paper and card.

This is based on costs in urban areas; rural area costs are estimated to be about £10 per tonne more.

We do not have collection costs for businesses, however, they will be subject to gate fees and benefit from materials prices that are similar and in some cases higher.

In other words, it should make economic as well as environmental sense to recycle as much packaging waste as is possible, in systems that maximise quality.

It is worth noting that the recent market downturn runs counter to a longer-term upward trend in prices for the main packaging materials, as the graphs at Figure 3 in Annex A clearly show.

In order for the whole recycling system to give better environmental results, and to apportion appropriate costs to all parties (packaging producers, other businesses, local authorities and ultimately, consumers and taxpayers), we need to move to a situation where most businesses (particularly SMEs) and local authorities treat recycling as a source of revenue to offset their waste management costs, rather than chiefly a way of avoiding landfill tax liabilities.

Increasing how much packaging businesses recycle

We want more businesses to start thinking about their wastes as a resource, and so be part of the move towards a low carbon economy.⁶⁸ We want them to understand and track the commodity value of their “waste”, and to realise that waste disposal costs are not a liability about which nothing can be done.

⁶⁷ Source: WRAP estimates of collection costs; WRAP (2008), Gate Fees Report, http://www.wrap.org.uk/downloads/W504GateFeesReport_FINAL.adbecb94.5755.pdf, and WRAP Materials Pricing Report, 22 April 2009.

⁶⁸ Building on the work of the Commission on Environmental Markets and Economic Performance

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There are a number of actions businesses can take relatively quickly⁶⁹:

- Examine their waste disposal costs and consider getting together with a nearby business to recycle waste. One business's waste could be turned into another business' raw materials. To support this, WRAP and NISP are working together to find new industrial markets for recyclates in the UK.
- Ask their suppliers about take-back schemes for unused products. They may be able to get their money back, or at least a portion of the cost.
- Let their customers and suppliers know they are committed to reducing their environmental impact, and promote it through their marketing. More than a third of consumers would favour a product that has been designed with either low environmental impact, minimal packaging or recyclability in mind.

In the wake of the Waste Strategy 2007, Defra has been engaging with key waste stakeholders on priorities for commercial and industrial waste reduction. Following further consultation with stakeholders, and subject to Ministers' views, we are aiming to publish a statement of our strategic aims on commercial and industrial waste, including waste reduction, in summer 2009.

In Wales, there is a small grant scheme administered by WRAP to support SME recycling collections.⁷⁰

The new Waste Management Plan for Scotland will outline the Scottish Government's objectives on commercial and industrial waste, to be consulted on in Summer 2009. There is already a Business Waste Framework in Scotland⁷¹.

Quality matters

There is a direct link between the quality of packaging recyclates and their price. The better their quality (that is, the most highly sorted and the less contaminated they are), the more they are likely to fetch on the highly competitive, global commodity market.

There is a link too between quality and carbon-efficiency: closed loop processes (especially closed loop application) tend to require higher quality recyclates than open loop processes. For example, plastic food grade recycling is greatly helped by having an adequate supply of high quality bales of plastic bottles. Contamination by other plastics packaging items as well as non plastics materials (eg paper, dirt etc) and biodegradable plastics can result in a substantial drop in operating efficiency of the recycling plant along with greater water consumption and higher residual waste disposal costs.

For some materials, local authorities and waste management companies will only have a choice of end markets if they can get quality right. The example of glass is the most striking one: most types of mixed glass can only go into aggregates.

Most collection systems used by local authorities can produce recyclates of suitable quality for the end markets which give best environmental benefits. But collection costs, sorting throughput rates, and the value of recovered materials will all influence the quality of recyclates in practice.

⁶⁹ <http://www.businesslink.gov.uk/bdotg/action/detail?type=ONEOFFPAGE&itemId=1081838672&r.lc=en&r.t=CAMPAIGN&r.i=1081750153&r.s=e>

⁷⁰ http://www.wrap.org.uk/businesses/sme_recycling_programme/index.html

⁷¹ <http://www.scotland.gov.uk/Publications/2007/03/105641>

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(colour-separated glass. Source: WRAP)

For example a tonne of colour separated glass cullet is currently worth around £24 whereas mixed colour glass cullet is worth around £18/t.⁷² However, Local Authorities believe that collecting glass at the kerbside colour separated costs them more than collecting it mixed.

A significant proportion of UK waste packaging is currently exported for recycling abroad, where it delivers environmental benefits by replacing virgin material in manufacturing. In the past few years, lower quality material has been exported to the Far East, because of a combination of strong demand and low labour costs (making it relatively cheap to carry out further sorting at the destination). This has particularly been the case for plastics and paper. But even before the late 2008 downturn, China – which is a big export market for the UK – had steadily been raising the standard of material they would accept.⁷³

When markets contract, foreign reprocessors become more demanding in terms of quality. It then becomes much more difficult to find markets for lower quality material, as we saw in the last quarter of 2008. The price for mixed paper and mixed plastic bottles fell further than the price of sorted material, and for a while poorer quality bales struggled to find a market. Improving the quality of recyclates would increase the resilience of the UK recycling system to market changes.

There should be a virtuous circle linking the market value of recyclates, quality specifications, sorting infrastructure and collection systems. Sometimes, for a variety of reasons, collection systems drive the rest, rather than the other way around. We want to reconnect all the parts of the chain so that by 2019, going for the quality market is standard. Section 6 below sets out how.

Improving the quality of Material Recovery Facilities (MRFs)

Material Recovery Facilities (MRFs) are where recyclates collected at the kerbside in co-mingled collections (and some trade waste) are sorted into different material streams. Once separated they may go on for further reprocessing or directly for recycling either in the UK or overseas.

With the increase in the number of local authorities using co-mingled collections, improving quality at MRFs is crucial to sustainable recycling.

MRFs need to be built with future requirements in mind, so they are able to adapt to new market demands (eg sorting of mixed plastics). The quality of recyclates from MRFs depends on good design, up-to-date sorting technologies, appropriate throughput rates, and input materials that follow specifications.

⁷² http://www.wrap.org.uk/downloads/Kerbside_collection_report_160608.b920135c.5504.pdf or <http://www.wrap.org.uk/downloads/ROTATEKerbsideGlassCollection.5e478c8a.2892.pdf>

⁷³ <http://www.wrap.org.uk/downloads/PlasticsMktRep.11453932.4755.pdf>

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Without these, materials will not be sorted properly. This results in higher contamination levels, which reduce the price of the recyclate and may even lead to it being rejected by reprocessors, re-sorted or at worst landfilled⁷⁴. This can result in additional costs for local authorities. With export markets becoming more demanding, MRFs and their customers are particularly vulnerable to loss of income from a decline in the value of their recyclate.

To raise standards, Government will continue to support WRAP's programme of work with MRF operators over the next two years, and calls on MRF operators to take part. This includes:

- Promoting and sharing good practice across the MRF sector; providing practical guidance to help MRFs achieve ISO standards. Workshops have already taken place in early 2009 across the UK, bringing together local authorities, waste management companies, reprocessors, recyclers, and enforcement agencies.
- Benchmarking the quality of MRF recyclate: anonymised trials throughout the UK were completed in mid 2009. About 21 MRFs have already signed up. WRAP will then encourage all MRFs to benchmark themselves against this data, and will assist those MRFs who want to improve quality;
- A project on whether MRFs can separate glass from a co-mingled waste stream to a quality suitable for remelt will be run during 2009;
- Over the next two years, initially working with reprocessors, discuss the possibility of developing quality standards for recyclate.

The Environmental Services Association (ESA) has shown leadership on raising industry standards on exports by launching its Recycling Registration Service⁷⁵ (RRS) in April 2007. This is an independent, externally audited scheme, which helps registered MRF operators demonstrate that waste:

- is handled or processed at the registered MRF in accordance with good industry practice in the UK
- complies with Green List waste guidance
- when exported goes to a recovery facility that is authorised to operate under applicable domestic legislation, is in general compliance with applicable Environment, Health and Safety (EHS) legislation and is operated to a standard broadly equivalent to EU standards.

Registered MRFs are also required to have a written control system to demonstrate that consignments reach the relevant recovery facility, and that written confirmation is received on the status of the recovery facility.

So far, ten MRFs operated by Veolia, SITA, Valpak and WasteCycle are members of RRS. We support this initiative, and would like to see a greater number of MRF operators sign up, to show their commitment to good practice.

⁷⁴ WasteDataFlow shows that in 2007, a total of 1.9m tonnes of dry recyclates was sent to MRFs in the UK. Of this, 99,500 tonnes (5.2%) were rejected and went to landfill.

⁷⁵ <http://rrsuk.org/>

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Enforcement

To ensure quality standards are adhered to and protect importing countries, Defra has provided the Environment Agencies with additional funding to help to secure **compliant waste exports** (including but not limited to packaging). They are working with local authorities, WRAP, compliance schemes and the waste industry to ensure that quality is addressed at all stages of the waste collection and processing systems.

Around 200 inspections have been carried out and all major MRFs have been inspected. Resources are being concentrated on those facilities where poor quality outputs have been found. In addition to return visits to monitor compliance more closely, action has included service of formal notices to prevent exports from MRFs. The Agencies are also involved in intelligence-led inspections at various UK ports.

The Agencies are building their understanding and knowledge of the way in which waste destined for export moves from producers to export sites, which sites are involved and where things go wrong in that chain. This will help inform checks at sites throughout the waste supply chain which the Agencies regulate, as part of their routine compliance and enforcement activity.

In England and Wales, the Environment Agency has also committed specialised enforcement and investigatory staff from its National Enforcement Service to the investigation of illegal exports. This team is supported by a dedicated crime analyst and a financial analyst to assist in an intelligence led approach to enforcement. A number of investigations into illegal exports are on-going. The Scottish Environment Protection Agency, too, has expanded its transfrontier shipment functions, and created a specialist enforcement unit.

5. The role of producer funding

Section 3 above sets out the key improvements needed to meet the UK's vision to recycle more packaging and get the best possible environmental benefits out of recycling by 2019.

Maximising the net benefits of recyclates through better quality is crucial, but will not on its own deliver the investments required, particularly in household recycling where the gaps are widest. So far, UK producers have not had to invest heavily in the household recycling infrastructure, because the current targets mean that (except for glass and aluminium) compliance has been achieved at low cost by focussing on the commercial and industrial waste stream.

Based on the development of the packaging recycling system over the past decade, government believes that the appropriate changes to materials recycling targets will foster the investment needed to achieve our vision. This is backed up by recent work from the Advisory Committee on Packaging, which suggested that increased investment from producers would give a long term impetus to packaging minimisation and continue the work started by WRAP on specific catalyst projects.

The next question is whether our current producer responsibility framework can deliver improvements on the scale required, and in a cost-effective way.

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Considering the evidence, on balance, government believes that the current producer responsibility arrangements can be improved to deliver higher recycling rates cost-effectively, through a number of important changes to the Producer Responsibility Regulations described in the next section of this chapter, and other measures to foster greater collaboration across the packaging waste chain, and more consistent collection services.

The UK Government may consider the effectiveness of the current producer responsibility system again at the time when the Packaging Directive is reviewed, in the light of achievement of the post-2010 recycling targets, and of their effect on local authority support. Devolved Administrations may do so earlier, in the context of their own waste strategies, and in the context of whether the changes to the Producer Responsibility Regulations have led to higher recycling rates, for municipal waste as well as for commercial waste.

In coming to this conclusion, we considered a number of alternatives currently in operation in other Member States. These are summarised below.

A comparison of the main producer responsibility options

i. 'Pure' producer responsibility – the Swedish example

Under this option, the responsibility for collecting, sorting and reprocessing packaging waste falls entirely on producers, who pay a national compliance scheme to operate the system on their behalf. Local authorities are not involved, and bear no cost.

The benefits of this system include setting up a direct (though not necessarily visible) link to consumer behaviour: the more you consume, the more you pay through the price of what you buy. Also, producers should be able to take advantage of economies of scale.

Recycling services are more consistent, and include mixed plastics. In 2006, Sweden achieved 58% recycling (and 80% overall recovery). This compares to 57.5% in the UK for the same year. The quality of recyclable materials collected in Sweden is very high, due to a well-established culture of sorting and cleaning waste packaging among consumers.

On the less positive side, the costs to producers tend to be high. For cardboard and paper, it is about £290 per tonne. For mixed plastics, it is about £1,000 per tonne. Local authorities are left with responsibilities for residual waste.

ii. Administrative system ('Green Dot' and equivalent)

In most EU Member States, the Packaging Directive is implemented through 'administrative' producer responsibility systems. These require producers to contribute to the operation of a compliance scheme (often a single national scheme), which most often contracts directly with local authorities for the collection of packaging waste. This tends to lead to more consistent collection services (though not necessarily more extensive services: few countries collect mixed plastics for recycling).

Some countries (e.g. France, Belgium, Ireland) have set separate recycling targets for commercial and industrial packaging waste and for household packaging waste. Producers of commercial and industrial packaging usually have to join a specific compliance scheme, or they have to enter into contracts with approved reprocessors to recycle their packaging waste. Other countries (e.g. Finland, the Netherlands) do not differentiate between the two waste streams.⁷⁶

⁷⁶ <http://ec.europa.eu/environment/waste/studies/packaging/epwms.pdf>

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Separate household packaging targets have usually led to greater involvement of, and investment in local authority collection systems.⁷⁷ Local authorities still have overall responsibility, but under some systems their choices are constrained. For example, the Belgian FostPlus single compliance scheme contracts with local authorities on behalf of producers. It offers technical support, has a say in how waste management contractors are selected, and markets the recyclates.

In administrative systems, fees for producers are fixed for a given year, usually through negotiations between compliance schemes, local authorities and waste companies, and vary by material. In most countries, local authorities receive a set fee for each tonne of packaging collected and delivered to an approved reprocessor, subject to pre-defined quality criteria. This enables local authorities to forecast producer funding in advance. Administrative systems determine the level of support with less regard to market conditions.

It is worth noting that the proportion of the collection and sorting costs covered by producer funding varies from one country to the next. Local authorities do not normally get the full costs back from producer funding.

A comparison of compliance costs to producers shows that these vary enormously across Member States, for all materials (except wood, which is relatively low cost in all countries)⁷⁸. As an example, French compliance scheme Eco-Emballages has an annual budget of over €400m, for household packaging alone. The remainder of collection costs (currently 44% on average) still fall on local authorities, so the total yearly bill for the consumer/taxpayer in France is likely to be much higher than for their UK counterpart.

Countries which have in the past had higher packaging recycling rates than the UK's have also tended to be among the most expensive for producers. However, cost per tonne to producers is not a good predictor of recycling performance: many countries have higher producer costs and yet lower performance than the UK.

iii. Retailer 'take back' options, including deposits

A number of countries in Europe and elsewhere run packaging collection systems which puts an obligation on retailers to take some packaging back.

Deposit systems – which exist mostly for drink containers – aim to give consumers a financial incentive to return the container to the retailer. In Denmark, which has had a mandatory deposit system since 2002, the return rate for bottles for is around 85%. It approaches 100% for refillable bottles. Some deposit and refund systems function on a voluntary basis, without legislation. A few small voluntary deposit and return schemes continue to operate in the UK.

The Climate Change (Scotland) Bill⁷⁹ contains powers to introduce deposit and return schemes. It is likely that packaging streams initially considered would be drinks containers made from glass, metal or plastic, with other forms of packaging also being potentially considered in due course. Any move to a deposit and return system in Scotland would require further close consultation with retailers and other bodies. The Scottish Government would also need to ensure that any statutory system was in line with EU obligations.

⁷⁷ There are examples of direct producer funding outside the EU too. For example, Ontario's Waste Diversion Act requires all companies that introduce packaging and printed material into Ontario's consumer market to fund 50% of Ontario's municipal Blue Box waste diversion programs, minus the sale value of the recyclates. In 2007 Ontario achieved a 48% recovery rate http://www.stewardshipontario.ca/corporate/pdf/annual_reports/annual_report_2007.pdf.

⁷⁸ There is a list of the costs of packaging compliance in the EU on www.pro-europe.info. This excludes countries where producers pay a large flat fee. Important note: the agreed fees in administrative systems are charged on all the packaging entering the market, whereas the PRN revenue is only raised on the proportion recycled. This must be factored in when comparing scheme costs.

⁷⁹ <http://www.scottish.parliament.uk/s3/bills/17-ClimateChange/b17s3-introd.pdf>

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In July 2008, Defra commissioned consultants ERM to study the feasibility of setting up a deposit scheme for drinks containers in the UK⁸⁰. The study examined whether deposit schemes were likely to increase recycling and to reduce litter. It considered the role of reverse vending⁸¹, the possible impact of deposits on existing collection systems, the issues that would need to be considered in setting up a deposit system, and possible alternatives to deposits. It looked at the experience of deposits in four countries – Denmark, Germany, the Netherlands and Sweden – to draw lessons for a possible UK scheme. The study concluded that deposit systems are likely to increase recycling but that other measures may achieve the same goals more cheaply. An effective deposit and return scheme could divert materials from existing arrangements such as bottle banks or kerbside collections, which have been developed, for the most part, with public funding.

Under a different take-back model, *retailers could introduce their own bring banks for a wide range of packaging materials*. Tesco and Sainsbury's have both trialled this in various formats. On the positive side, this could be seen as the logical extension of producer responsibility, relieving local authorities of their duty to collect packaging waste. On the negative side, the ability to provide this infrastructure is limited by space, and accessibility for householders is likely to be an issue. Also, this would deprive local authorities of a source of revenue by taking valuable recyclates away. Were this system to replace local authority collections, it is likely that the amount of packaging collected for recycling would drop, as the effort of getting the recyclates to the collection points would be more onerous for the public than kerbside collections.

Yet another model would be for retailers and manufacturers to complement local authority provisions by setting up bring banks for items that may not otherwise be widely collected by local authorities. This has been done by the carton industry body ACE UK (Alliance for Beverage Cartons and the Environment) to ensure that cartons, such as those made by Tetra Pak are widely collected across the UK.⁸²

Deposit and bring systems which involve human interaction tend to result in high quality materials. The design of unsupervised bring banks makes a significant difference to their use and contamination.

Unless take-back provisions are made mandatory, and cover the range of materials which is currently being collected by local authorities, local authority collections would need to continue in parallel. Overall, the operation of two parallel systems is likely to increase costs to consumers and taxpayers, with uncertain results on the quantities collected.

iv. Market-based system (e.g. current UK PRN system)

The central idea of market-based producer responsibility systems is that they are set up to boost the reprocessing infrastructure, the collection infrastructure, or both, where the market on its own would not have done enough for targets to be met. In other words, they are intended to pay for recycling that would not have happened otherwise, not for the full cost of recycling packaging. They assume that recycling should over time become the waste management method of choice for businesses as well as local authorities, because of the rise in the cost of landfill, and of the value of recyclates. Both Poland and the UK have implemented the Packaging Directive through such a system.

⁸⁰ ERM for Defra (2008), Review of Packaging Deposits System for the UK (WR1203)
<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=16154&FromSearch=Y&Status=3&Publisher=1&SearchText=deposit&GridPage=1&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

⁸¹ Reverse vending is a collection system whereby consumers are rewarded (in cash, vouchers etc) for bringing back used packaging.

⁸² <http://www.tetrapaksustainability.co.uk/>

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The strength of the UK system is its cost-effectiveness for producers. Since 1999 it has cost an estimated £900m in total, ranging from £42m to £141m per year according to market conditions⁸³. Between 2000 and 2007, it has cost French packaging producers over €2.6 billion on the household side alone to achieve similar levels of recycling.⁸⁴

However, as discussed in Chapter 1, the UK system's weaknesses are its lack of transparency and revenue predictability, and the fact that where compliance can be achieved mostly through commercial and industrial waste recycling, little funding has made its way to local authorities to help boost packaging recycling from households.

Changing material-specific targets as suggested in section 2 above would leverage additional funding. The level of increases would have to be set to both deliver carbon gains and create upfront financial incentives to local authorities and their waste contractors to improve collection and sorting. And we believe there are ways in which transparency could be improved (see section 6 below).

In the second half of 2008, the independent Packaging Recycling Action Group (PRAG) set up a working group to look at funding mechanisms. It compared variations on the last three options above against a set of criteria including, among other things, the likely effectiveness of each option in terms of increasing quality and quantity, value for money, ease of implementation and visibility to consumers and local authorities. Variations on the current system consistently scored higher than the alternatives.

6. Making the current system work better

The current packaging recycling system (including the Producer Responsibility Regulations) has the potential to deliver improvements, but could work more effectively. This section considers what needs changing.

Better data

To operate most effectively, packaging policy requires better data to be available throughout the packaging chain.

We need more accurate information about the amount and types of packaging put on the market. Over the next 18 months, we will discuss with the environment agencies and the industry how this can be achieved. One option is to collate the data submitted by sellers, and refine the reporting categories.

Wider work being carried out on waste data more generally may also help.

For household waste, we will explore how we can supplement the information provided by the WasteDataFlow statistical survey of local authorities through more information from reprocessors.

For commercial and industrial waste data in England Defra has been examining whether a national survey is appropriate or whether a more cost-effective alternative could meet their immediate needs. A decision is expected in summer 2009.

⁸³ This estimate includes total costs to producers (eg scheme fees) which is likely to be more comparable to the Eco-Emballage costs quoted here. The estimated cost of acquiring evidence, on average, was £577m over the 10-year period.

⁸⁴ Eco-Emballages, Annual Reports 2000 to 2007, <http://www.ecoemballages.fr/presse/mediatheque/?id=289&motscles=&categorie=4&theme=&profil=&submit=Lancer+la+recherche>

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The Scottish Government and the Scottish Environment Protection Agency are considering, in the context of the review of the National Waste Management Plan, how to improve commercial and industrial waste data. The Climate Change (Scotland) Bill has a provision allowing the Scottish Ministers to make regulations requiring businesses to report to SEPA on the amounts of waste they produce.

More transparency in and accountability for producer funding

As described in Chapter 1, PRN revenue goes from producers to accredited reprocessor and exporters. It has not been visible to local authorities, either because it has financed reprocessing capacity, or because it has been passed down in whole or in part as in the price paid for materials. For the benefit of producers and local authorities alike, we are committed to making it more transparent.

Data from the Environment Agency (EA), the Scottish Environment Protection Agency (SEPA) and Northern Ireland's Environment Agency (NIEA) for 2007 show that the agencies only received detailed breakdowns from reprocessors showing the broad categories of activities against which the money had been spent for about £38m⁸⁵, out of an estimated total PRN/PERN fund of about £57m. Reporting on this at the end of the compliance year is already an obligation under paragraph (1)(o) of Schedule 5 to the GB Producer Responsibility Regulations and paragraph (1)(o) of Schedule 5 to the Producer Responsibility Obligations (Packaging Waste) Regulations (Northern Ireland) 2007. Non-compliance on this scale is unacceptable.

We will consult next year on options to:

- strengthen reprocessor accountability for the use of PRN funds. This could involve boosting the agencies' and/or the compliance schemes' audit powers, and making the reporting system more robust. This should not be a new burden on reprocessors as the majority already comply.
- change the conditions under which PRNs/PERNs can be issued, to make contributions towards household collection and sorting more visible.

At the same time, we are aware that the current 2-tier fee structure for reprocessors may be discouraging some from getting accredited, and we will explore with the agencies the scope for moving to a more finely graduated system (eg with a flat fee on registration, and then a fee per tonne reprocessed, possibly with a ceiling and a floor).

In the view of the Advisory Committee on Packaging, the *annual* cycle of compliance under the current system provides no incentive for producers and compliance schemes to plan for the long term. The Committee has recommended that the option for producers to register individually and demonstrate compliance themselves should be abolished. It has also advocated a steep increase in responsibilities for compliance schemes, with compliance scheme membership and scheme approval running for three years, and more onerous conditions for approval. Government will consider these recommendations as part of the above consultation exercise. In addition, in England and Wales, the Government is committed to introducing civil sanctions (alongside criminal prosecutions), as provided by the Regulatory Enforcement and Sanctions Act 2008. There is no such commitment in Scotland, due in part to the different legal system.

⁸⁵ Data on the use of PRN revenue reported by reprocessors to the competent authorities (EA, SEPA and NIEA) for 2007. See <http://npwd.environment-agency.gov.uk/>.

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Making producer funding go further – the role of local authorities

Improvements in the quantity and quality of packaging recycled from households, on the scale we are looking for, will not happen overnight. However, local authorities should start considering now how they can make any additional producer funding go further, ahead of changes in contracts (these last around 5-7 years) or renewal of equipment.

In England the Regional Improvement and Efficiency Partnerships are planning a seminar programme for local authority elected members, financial directors and chief executives to share ideas and information about how local authorities can make the most of their extensive investment in recycling systems, in the context of increased recycling targets on packaging producers. In parallel, WRAP will continue to run a training programme for recycling officers, and offer fully-funded tailored support to local authorities on how they can improve services and increase recycling. Government will also encourage local authorities to use an interactive toolkit being developed by Improvement and Efficiency South East to benchmark their collection and disposal services. An “improvement matrix” – case studies relating to efficiencies in collection and disposal is due to be launched later this year.

i. Adopting good practice models to make service provisions more consistent

The Packaging Recycling Action Group (PRAG) addressed the question of increasing the standardisation of recycling systems, so clearer advice can be given to consumers about how to recycle packaging. A working group on collection systems surveyed a number of local authorities about converging on a smaller range of collection systems and suggested six potential options. The responses indicated that while there is a willingness to consider such convergence, views still differ about the preferred systems and the practical barriers to change, including the costs involved, the timing of contract renewals and the availability of convenient sorting and reprocessing capacity.

Nevertheless, it is clear that greater consistency in the coverage and design of local authority recycling systems for packaging has advantages for overall efficiency, effectiveness and consumer satisfaction. We will, therefore, work with the LGA and WRAP to develop evidence based good practice in the design of collection systems to encourage convergence. We will also work with industry bodies to encourage voluntary agreements between groups of local authorities and retailers or compliance schemes to facilitate the uptake of good practice models and develop innovative ways of increasing communications with residents.

The Scottish Government will consider, in partnership with the Convention of Scottish Local Authorities, if any action is required in Scotland on this issue.

ii. Working in partnership

For the recycling of packaging to be as cost-effective as possible for householders, the whole chain of people involved in the collection and marketing of recyclates from households needs to work in concert. This is true where local authorities collect recyclates and market them in-house, and becomes critical where collection, disposal or both are contracted out.

English local authorities fall in one of 3 categories for waste management:

- Waste Collection Authority – WCA (district and borough councils);
- Waste Disposal Authority – WDA (county councils); or
- Unitary authority – responsible for both collection and disposal.

The combination of WCA and WDA is referred to as the ‘two tier system’. In the two tier system each district will be responsible for the collection of waste and recyclables from their respective householders and will then transfer it to the county council (WDA) for disposal.

All Scottish and Welsh local authorities are unitary. In Northern Ireland, district councils are

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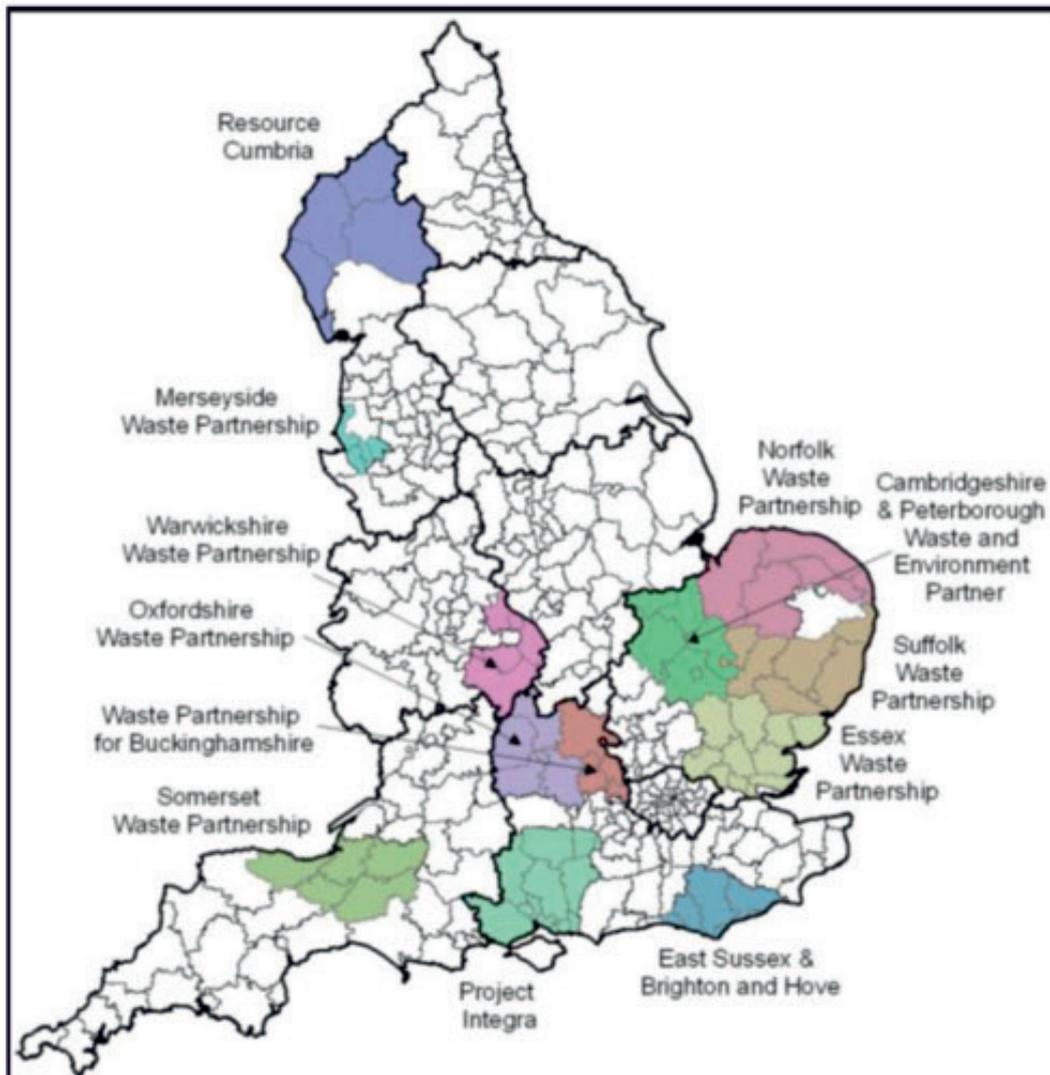
responsible for waste collection and disposal. They have formed into 3 waste management groups who have lead responsibility for developing waste management plans for their constituent councils and for the procurement of major new waste infrastructure. A Programme Delivery Support Unit has also been established to help co-ordinate the delivery of this new infrastructure.

In Scotland, nearly all local authority collection systems are in-house. In England, about half of all Waste Collection Authorities run their collection systems in-house; the others contract them out to a waste management company. Contracts are frequently negotiated by authorities independently, so it is quite possible that in one county, six or seven different waste management companies will be responsible for the collection of waste and recyclables (1 for each Waste Collection Authority), with yet another waste management company (the county council's contractor) responsible for disposal.

The delivery of effective and efficient recyclables collection and marketing in a two tier system therefore depends on the smooth working of a whole network of relationships. Many authorities have recognised the importance of strengthening and formalising these relationships and have formed waste partnerships.

There are currently 12 partnerships of various kind in England (as shown on the map, left).

Figure 6 – Local authority partnership map, England, 2009



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As part of our review of current policy, we built case studies for four groups of local authorities⁸⁶ in England working in partnership, and getting a direct share of the value of their recyclates. A detailed summary of these case studies is in Annex E.

Each group had a different approach to partnership working and revenue-sharing, yet from their experience and other discussions held as part of our policy review, it is clear that:

- more coordinated tendering and operations of district collection systems can deliver a more competitive tendering process, and more efficiently designed service provision. One partnership realised savings of £1.5m a year from economies of scale and integration. Over time, districts working in partnership tend to harmonise their collection systems, leading to more consistent service provisions;
- by contrast, multiple collection contracts often result in different materials being collected in different ways to different specifications. This makes investment in large scale infrastructure such as MRFs much harder at the county level;
- when market risks and rewards are shared across collection and disposal authorities, quality becomes a priority for all throughout their recycling operations. The incentives for adapting collection and sorting systems for higher quality, and therefore better revenue, are more visible. The most striking example of this was in Norfolk, where co-mingled collection systems and the MRF that sorts the waste have been geared towards higher quality markets. In 2007, the district councils received a net rebate of £9/t. They believed that, combined with their recycling credits, this covered collections costs.
- Experience in local authorities of negotiating waste management contracts varies, as these contracts are not tendered on a regular basis. Individual collection contracts are relatively small and so don't often attract many bids. Conversely the waste management companies have dedicated contract negotiation teams. This seems unlikely to deliver equitable contracts.

We want to encourage local authorities, including those which market their recyclates themselves, to work in partnership. In England, Government will work through the Regional Improvement and Efficiency Partnerships and WRAP to help local authorities examine the cost and efficiency savings available to them through greater partnership working.

A number of partnership options are available to local authorities, from the development of joint strategies, joint committees, and inter authority agreements through to the establishment of a joint waste authority. It will be for authorities to determine which of these options best suits their local circumstances, referring to Defra guidance⁸⁷.

Partnership working has also been considered recently by the Zero Waste Think Tank for Scotland and the Scottish Government will pursue this issue further, working with the Convention of Scottish Local Authorities, as part of the review of the National Waste Management Plan for Scotland.

⁸⁶ Norfolk District Councils, working with Norfolk Environmental Waste Services Ltd, Project Integra – Hampshire Local Authorities, West Sussex County Council, and Somerset Waste Partnership

⁸⁷ <http://www.defra.gov.uk/environment/waste/localauth/partnerwork/index.htm>

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iii. Maximising returns on contracts

We will investigate how we can expand the existing direct support available to local authorities to ensure that those authorities in England and Northern Ireland that have contracted or are intending to contract out their recyclables collection and sorting services get the best out of tendering.⁸⁸ Subject to funding, we intend to make additional resources (i.e. similar to the Defra 'Transactor' concept currently available to English local authorities on PFI contracts) available to assist local authorities at key stages in the tendering process as outlined below:

- a) developing the tender documentation, including
 - drafting service specifications
 - contract structures and payment mechanisms
 - how materials should be treated
- b) support during tender assessment/contract negotiation
 - review of method statements
 - technical support to tender evaluation panel
 - how materials are treated within the contract

The UK and Northern Ireland administration will also work with WRAP and local authority partners to advise on the use of income-sharing contracts.

The Scottish Government will consider, in partnership with the Convention of Scottish Local Authorities, if any action is required in Scotland on this issue.

iv. Using other funding sources to improve services

£185 millions' worth of Waste Infrastructure Capital Grants are available to upper tier authorities (unitary and county councils) in most of England between 2008/09 and 2010/11. This is intended to help local authorities that wish to invest to help meet the 2010 landfill target through front-end waste infrastructure, e.g. recycling and composting facilities. Allocations to individual local authorities are available from the local government finance website:⁸⁹ London receives a separate Fund worth £60m over the same period, administered by the new London Waste and Recycling Board.

⁸⁸ Procurement support of this kind is already provided by IESE in the South East
⁸⁹ <http://www.local.communities.gov.uk/finance/0809/capgrant/defrawasteinfra.xls>

Chapter 7 – Making the vision happen

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Achieving our aims will involve Central and Local Government, consumers, manufacturers and retailers, and the waste management industry. Defra, BIS and the Devolved Administrations will promote and encourage action by others, as well as doing things ourselves.

Implementing some of the proposals in this strategy will require changes in the current (secondary) legislation. These will be developed following further consultation, and scrutinised by the UK Parliament, the Scottish Parliament and the Assemblies in Wales and Northern Ireland. All proposals will be accompanied by Impact Assessments.

Packaging optimisation

	By whom	By when
Government and their delivery partners will work with a whole range of public and private sector partners to push the use of eco-design .	BIS Defra and Devolved Administrations Businesses DECC (for bio-based packaging)	Success against a range of take-up metrics to be assessed by mid-2011
<p>Develop a successor to the current Courtauld Commitment (post-2010). Will involve</p> <ul style="list-style-type: none"> extending the current agreement to include all supply chain wastes, which will in turn involve gathering data to assess the amount and type of packaging waste in supply chains, waste prevention reviews within supply chains to identify and share best practice, and developing support tools. piloting a carbon-based approach –aiming to contribute to the evidence base for future negotiations with other Member States and the European Commission on revisions to the EU Packaging Directive and upcoming Eco-Design Directives in time, extending the agreement to cover reducing the carbon impact of products as well as packaging trials to extend the use of refillable and reusable packaging and greater use of concentrates and compacted products. 	Courtauld signatories, WRAP	<p>Completion 2010</p> <p>Refine the benchmarking of packaging by product category (Best in Class) by end 2009</p>
New voluntary agreements UK-wide on packaging minimisation, based on the model of the Courtauld Commitment. These agreements aim to reduce packaging, assist in changing consumer behaviour, tackle product damage rates and support the enhanced use of recycled content in packaging. Will involve activities similar to those for Courtauld Commitment (see above).	WRAP Businesses	<p>First wave of priority sector agreements in 2011.</p> <p>Extending to 2016</p>
<p>Make compliance with and enforcement of the Essential Requirements Regulations easier</p> <ul style="list-style-type: none"> enforcement support tool for Trading Standards Officer promotion of Standards for environmental impact and technical design Contribution to the Commission's studies and further pressing for a review of the subjective criteria in the EU Packaging Directive 	<p>BIS</p> <p>LACORS</p> <p>BIS</p> <p>Defra</p>	2009-10

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<p>Green procurement</p> <ul style="list-style-type: none"> In Scotland, Action Plan on Sustainable Procurement Minimum mandatory environmental standards are set across a range of priority product groups for procurers in Central Government Departments and their Executive Agencies in England through the 'Buy Sustainable – Quick Wins' initiative 	<p>Scottish Government</p> <p>Central Government in England and its Agencies</p>	<p>due to be published in 2009</p> <p>Standards updated on a regular basis</p>
<p>Consumer education</p> <ul style="list-style-type: none"> Government will encourage voluntary agreements between retailers or compliance schemes and groups of local authorities to finance specific initiatives, such as improved collection services or better communication with residents Government will work through a range of partners to develop and introduce a clear and consistent labelling scheme for bio-based packaging, to help consumers make the right disposal decisions 	<p>Defra and the Devolved Administrations; WRAP, Waste Aware Scotland, Waste Awareness Wales; Local Government bodies Industry bodies</p> <p>DECC, Defra and the Devolved Administrations</p>	

Maximising Recycling

	By whom	By when
<p>Implement material specific recycling strategies through modifying the current producer responsibility scheme:</p> <ul style="list-style-type: none"> stretch the packaging recycling targets over time, in line with the specific objectives for each material; will involve providing incentives for businesses to recycle more, and for local authorities to expand the range of materials they collect for recycling, and possibly from the kerbside, with better information to residents. improve data on commercial and industrial plastics recycling 	<p>Defra and Devolved Administrations</p> <p>WRAP</p> <p>Local Authorities</p> <p>Industry</p>	<p>ACP Task Force to examine in 2009.</p> <p>Consultation in 2010, with a view to bringing in new targets from 2011</p>
<p>Increase the transparency of the current producer funding system, so that revenues are more visible to local authorities and producers.</p> <p>Consider other changes to incentivise long-term planning.</p> <p>Explore potential alternatives to current producer responsibility system</p>	<p>Defra and Devolved Administrations, Environment Agencies</p> <p>Local Authorities</p> <p>Industry</p> <p>Devolved Administrations</p>	<p>ACP Task Force to examine in 2009.</p> <p>Consultation in 2010, with a view to bringing in regulatory changes from 2011</p> <p>2009 onwards</p>
<p>Incentivise closed loop uses</p> <ul style="list-style-type: none"> increase the proportion of glass collected in such a way that it can be used to make new containers; develop sorting and reprocessing technologies that allow more closed loop recycling of plastics. 	<p>Defra and Devolved Administrations</p> <p>WRAP</p> <p>Industry</p> <p>Local authorities</p>	<p>Glass – part of the work on targets above.</p> <p>Plastics – to have established at least one mixed plastics reprocessing facility by 2012.</p>

Chapter 7 – Making the vision happen

	By whom	By when
<p>Support for more efficient/effective collection and sorting</p> <ul style="list-style-type: none"> • WRAP work with local authorities and Materials Recovery Facilities (MRFs) operators to improve the quality and therefore the marketability of recyclates; • Defra, WRAP and RIEP support for partnership working, to secure benefits from economies of scale and implement one of the best practice models developed by WRAP to make collections more consistent. • In England, subject to funding, introduce a system of roving contract negotiators with the right level of expertise to help LAs get the best out of their collection and recycling contracts (similar to what is available for PFI contracts); 	<p>Defra and Devolved Administrations WRAP RIEPs BIS</p>	<p>2009-2015</p>
<p>Establish the costs and benefits and logistics of moving to carbon-based targets</p>	<p>Defra and Devolved Administrations DECC WRAP and Courtauld signatories BIS</p>	<p>Study to start in 2009; report end 2010. Possible consultation in 2011. EU negotiations from 2014. Courtauld piloting to start 2010</p>
<p>Improve the accuracy of data about the amount and types of packaging put on the market</p>	<p>Defra, DECC and Devolved Administrations Industry bodies Environment Agencies</p>	<p>2009 onwards</p>

Annex A – Packaging in figures

Annex A – Packaging in figures

Note – all the figures used here are UK figures, unless otherwise stated.

Table 1 – Spread of the total business obligation across the packaging supply chain (as set out in the Producer Responsibility Regulations)

Raw material manufacturing	6%
Converting	9%
Pack/filling	37%
Selling/Retail	48%
Service providing	85%
Importing	100%

Table 2 – Packaging recycling and recovery for 2008 (source: Defra)

Material	Tonnes recycled or recovered	% of packaging waste recycled or recovered
Paper	3,061,110	79.8
Glass	1,613,310	61.3
Aluminium	50,214	34.6
Steel	417,261	61.7
Plastic	516,841	23.7
Wood	938,973	78.5
Total	7,027,923	65.7

Table 3a – PRN/PERN revenue breakdown 2007 (Source: Valpak, based on figures reported to EA, SEPA and NIEA (<http://npwd.environment-agency.gov.uk/>))

Material	Total PRN + PERN revenue	Of which total revenue reported on	Collection	Future collection	Reprocessing capacity	Future capacity	End markets	Future end markets	Not allocated
	£'000	£'000	£'000	£'000	£'000	£'000	£'000	£'000	£'000
Paper	6,076	3,680	2,709	279	476	23	49	56	88
Glass	34,260	19,571	10,324	254	2,224	4,038	429	42	2,260
Aluminium	2,415	2,470	904	891	476	189	6	4	–
Steel	6,102	5,246	2,950	1	1,789	36	–	4	466
Plastic	4,152	3,694	1,833	83	1,377	97	124	27	153
Wood	3,782	3,757	919	48	2,663	3	122	2	–
Recovery	665	312	147	7	–	143	10	5	–
Total	57,452	38,730	19,786	1,563	9,005	4,529	740	140	2,967

Annex A – Packaging in figures

Table 3b – Which corresponds to:

Material	Collection (current + future)	Reprocessing capacity (current +future)	End markets (current + future)	Not allocated to:
Paper	81%	14%	3%	2%
Glass	54%	32%	2%	12%
Aluminium	72%	27%	0%	0%
Steel	56%	35%	0%	9%
Plastic	52%	40%	4%	4%
Wood	26%	71%	3%	0%
Recovery	49%	47%	5%	0%
Total	55%	35%	2%	8%

Table 4 – Comparative CO₂ benefits from the various recycling options

	Quantity going into each end market (kt)	CO ₂ saving per tonne diverted from residual waste management (t)	Resulting CO ₂ eq saving (kt)
Glass (12 months to Jun 2008)			
Closed loop application remelt into container	997 (data source: British Glass; NPWD (exports))	0.315 (domestic); 0.290 (export) (data source: British Glass (2003) Glass Recycling – Life Cycle Carbon Dioxide Emissions; Exports: Wrap (2007) Assessment of the International Trading markets for Recycled Container Glass and their Environmental Implications)	299
Closed loop material remelt into fibre (eg filtration; limited market)	100 (Data source: WRAP have assumed that ½ of the c200k tonnes of cullet used by glasswool industry (Minesco figures) is container)	0.315 (data source: British Glass (2003) Glass Recycling – Life Cycle Carbon Dioxide Emissions)	31
Open loop Aggregates	447 (Residual)	0 (data source: British Glass (2003) Glass Recycling – Life Cycle Carbon Dioxide Emissions)	0
Total	1544 (Data source: NPWD)		331

Annex A – Packaging in figures

	Quantity going into each end market (kt)	CO ₂ saving per tonne diverted from residual waste management (t)	Resulting CO ₂ eq saving (kt)
Paper (2007 figures)			
Closed loop application Mills	3575 (Data sources: CPI (domestic); HMRC / CPI (Exports – imports), NPWD)	1.32 (domestic); 1.1 (export) (Data sources: China CO ₂ data based on UK data minus shipping; estimate of split based on all paper and card recycling WRAP (2006) Environmental Benefits of Recycling. FEFCO (2006) European Database for Corrugated Board Life Cycle Studies. DEFRA (2007) Waste Strategy for England)	4326
Alternative markets (mostly pulp products)	85 (data source: estimated as c.1% of market; 1300t composted (NPWD))	Unknown	Unknown
Total	3660		4326
Plastics (2007 figures)			
PET / HDPE bottles	315 (Data source: Plastic bottle collection survey 2008, http://www.wrap.org.uk/manufacturing/info_by_material/plastic/plastics_collection.html)	1.5 (PET) 1 (HDPE) (Based on 50:50 split between polymers. WRAP (2006) Environmental Benefits of Recycling; and unpublished WRAP research)	394
Films	151 (data source: Residual)	1	151
Mixed plastics	11 (Data source: Plastic bottle collection survey)	0.417 (data source: WRAP (2008) Mixed Waste Plastic LCA minus shipping)	5 (a)
Total	477		550
Aluminium (b)	45 (2007 NPWD figures)	9 (Sources: Alupro; EAA (2008) Environmental Profile Report for the European Aluminium Industry)	404
Steel (b)	383 (2007 NPWD figures)	1.28 (data source: WRAP (2006) Environmental Benefits of Recycling)	490

Figures are based on whole life cycle and account for avoided emissions from waste management alternatives and avoided process emissions.

Unless otherwise specified, figures are based on data contained in WRAP (2006) Environmental Benefits of Recycling and DEFRA (2007) Waste Strategy for England Annex A

(a) Depending on use, the figures range from –9.4kt of CO₂ equivalent, (if it is used in low quality products in lieu of wood – resulting in an increase in emissions) to +4.6kt of CO₂ equivalent (if mechanically separated for closed loop recycling)

(b) There is no open loop recycling in aluminium or steel.

Annex A – Packaging in figures

Figure 1 – Packaging placed on the market (Source: Defra – based on the data used for the 2007 consultation on targets)

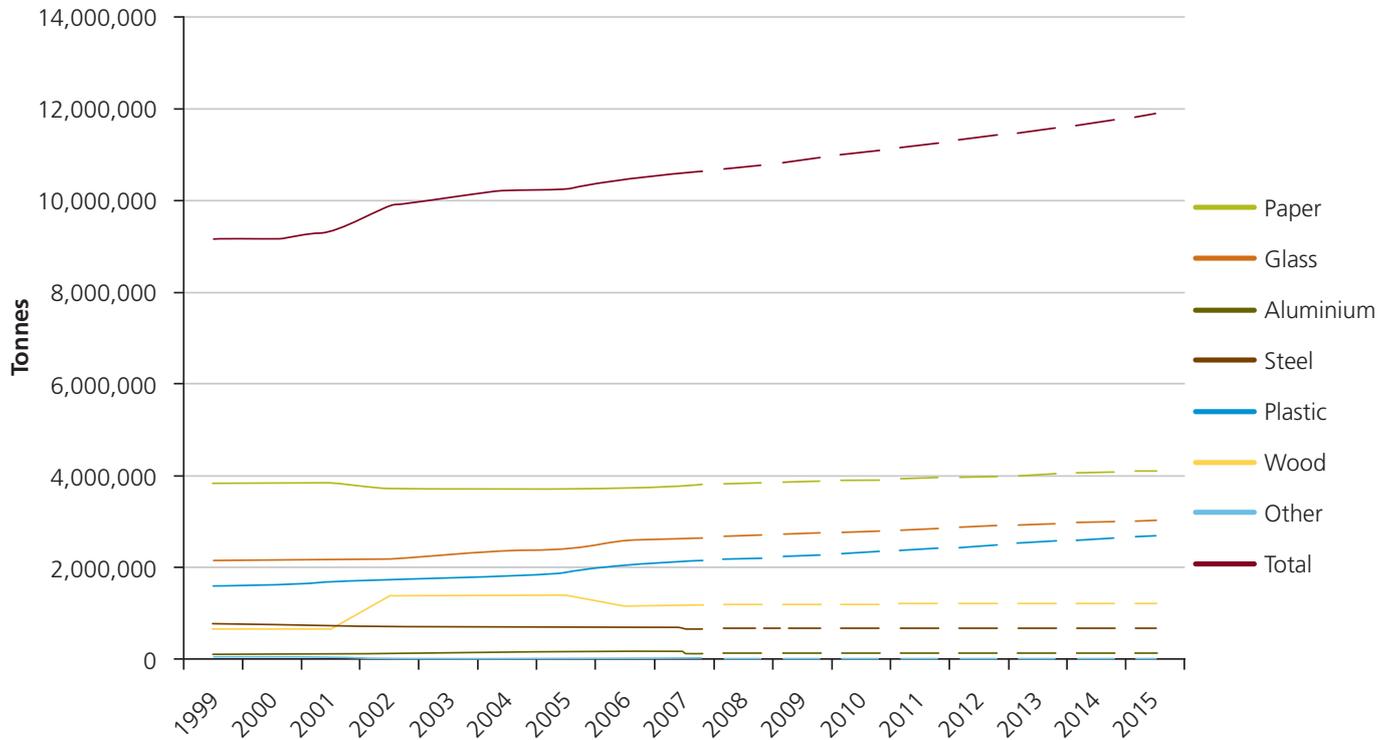
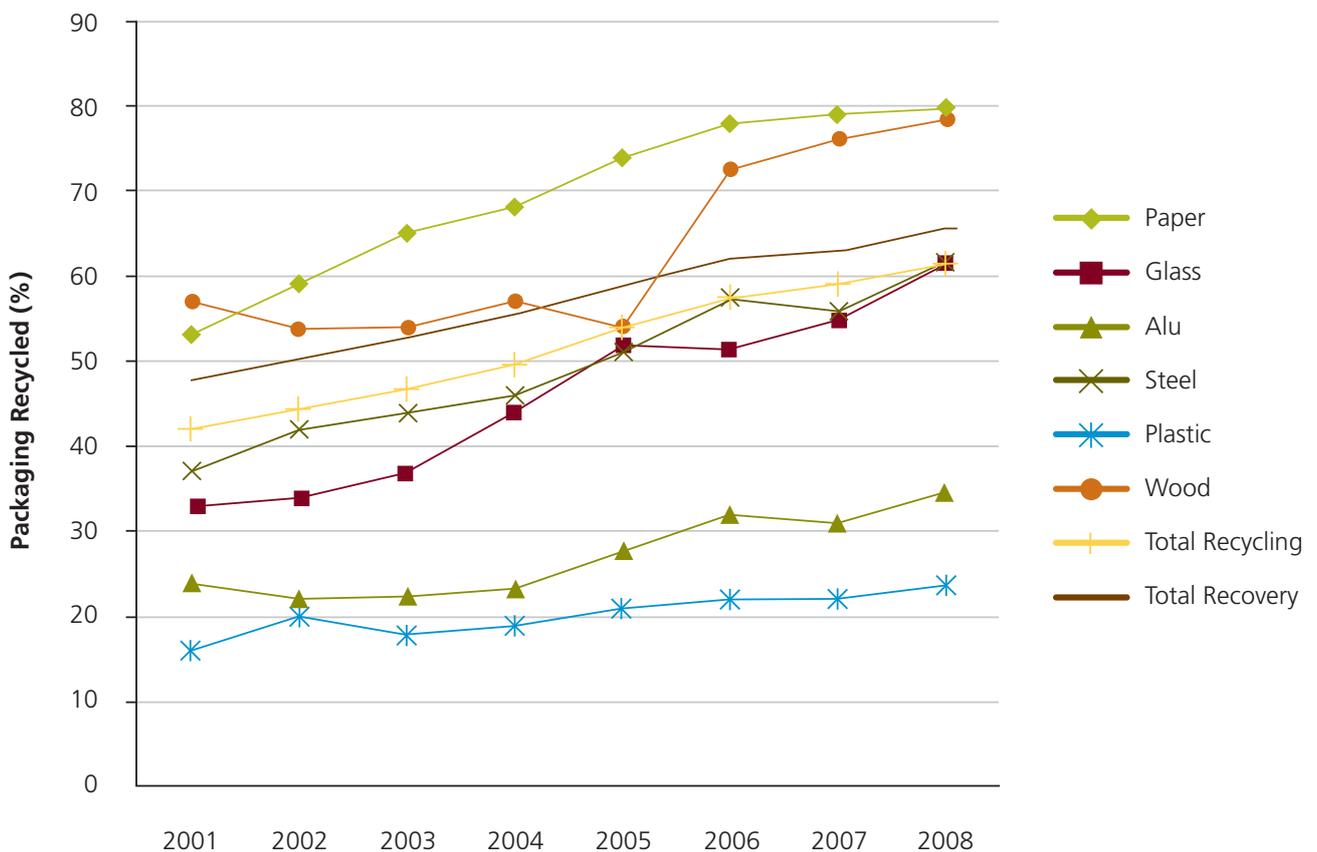


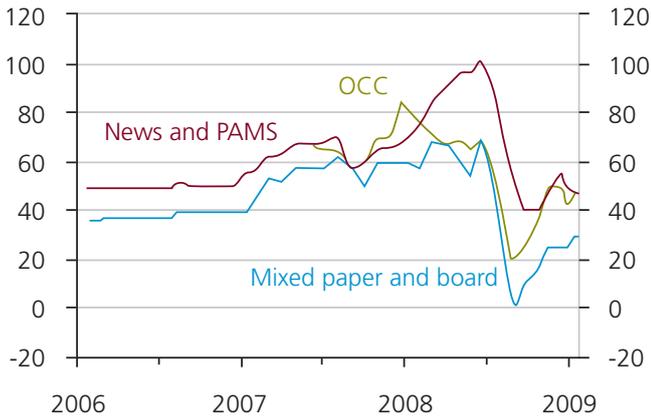
Figure 2 – Packaging recycled and recovered in the UK, 2001-2008



Annex A – Packaging in figures

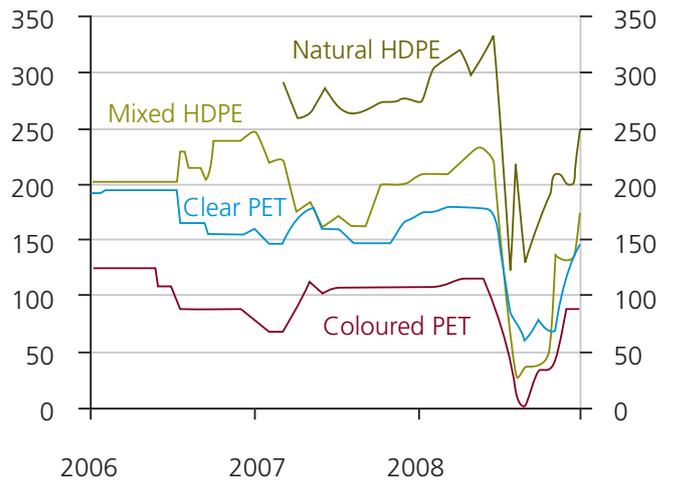
Figure 3 – Average prices for recovered packaging material, 2006-2009, in £ per tonne (source: WRAP)

Figure 3a: paper



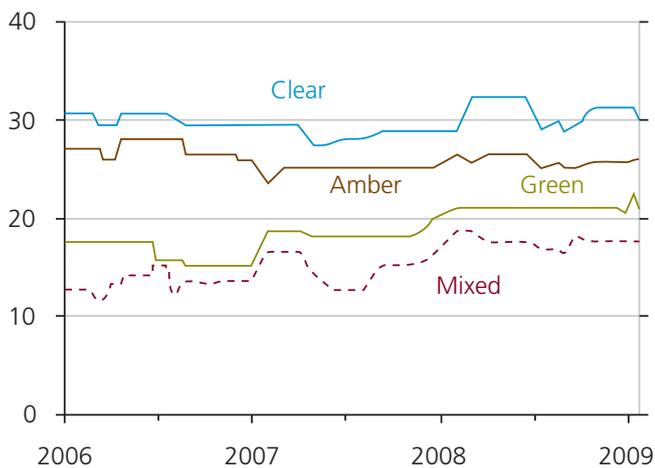
Source: Materials Pricing Report, midpoints of range.

Figure 3b: plastic bottles



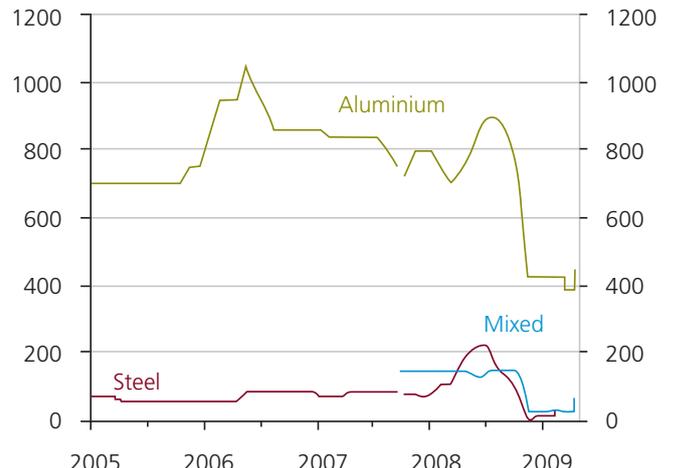
Source: Materials Pricing Report, midpoints of range.

Figure 3c: glass



Source: Materials Pricing Report, midpoints of range.

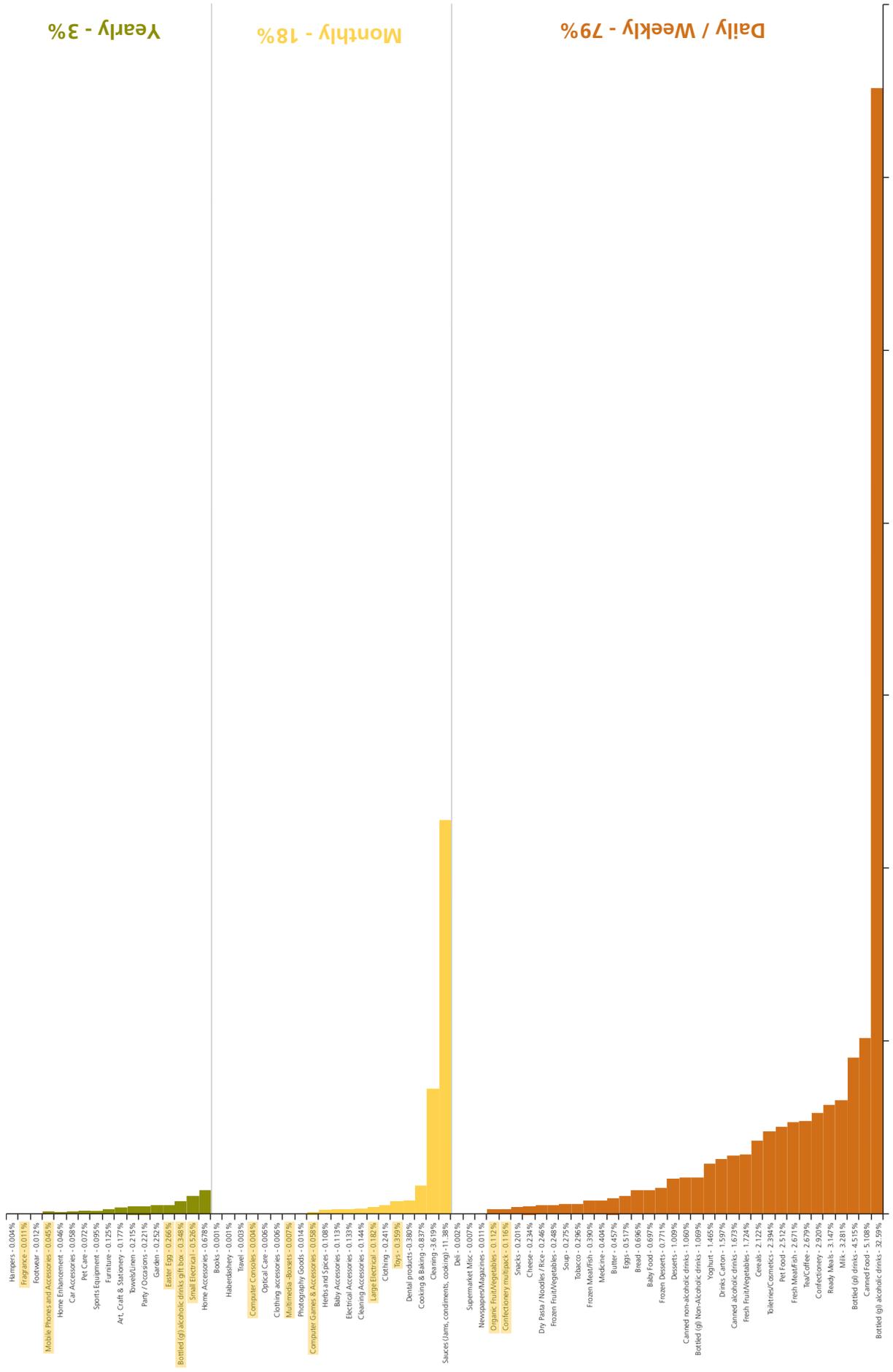
Figure 3d: steel cans



Source: Materials Pricing Report, midpoints of range.

Annex A – Packaging in figures

Figure 4 – Purchase frequency and packaging weight by product category for 2 major UK supermarkets (Source: Valpak & Incpen)



Annex B – Summary of the findings of the horizon-scanning study into packaging use by 2019

Annex B – Summary of the findings of the horizon-scanning study into packaging use by 2019

Study carried out by Forum for the Future for Defra, 2008.

The full project report and database of the trends considered can be found at <http://www.defra.gov.uk/environment/waste/topics/packaging/strategy.htm>

Three possible scenarios for the future emerged from looking at the trends in combination, each with different implications for the future use of packaging. **These scenarios assume that the current packaging policy continues unchanged. This allows us to identify most clearly where we need to influence the future.** They do not factor in any expansion of the Courtauld Commitment either to other grocery signatories or to other sectors. They do not explicitly model the effects of the planned reductions under Courtauld in the grocery sector, although they assume a pressure to decrease packaging (along the lines of the Courtauld Commitment) in each scenario.

No scenario is more likely than another. Their aim is not to predict the future but to make informed guesses about what could happen, so that policy measures can be tested against a range of possible future situations. The scenarios do not prescribe the decisions that stakeholders might make, or the legislation under which they may have to operate.

“Mixed messages”	“Online opportunities”	“Values shift”
<p>By 2019, the business sector continues to push on packaging innovation including end-of-life. But progress on waste targets is hampered by multiple conflicting signals from stakeholders, especially consumers. Demands for convenience, a lingering perception of packaging as denoting quality, proliferation of one-person households and difficulty in having messages heard all hold progress back.</p> <p>In this version of the world in 2019, packaging has increased overall, with the greatest increase in primary packaging (approx. 2% a year, compared with a historic trend of around 1.5%). This means, between 2009 and 2019,</p> <ul style="list-style-type: none"> • paper and cardboard packaging waste up 1-1.5% per annum; • Plastic up 4-6% per year, assuming material substitution takes place • Glass up 3% per annum, • steel down by about 1% per annum; • aluminium down by about 4% per annum. 	<p>By 2019 commerce has shifted onto the internet in a major way – both business-to-consumer and business-to-business. High-street shops display ‘samples’ for people to look at, and then order online (except food). A shift from product (eg sale of TV set) to services (sale of TV channel bundle with a TV set included) takes place across the economy. This creates opportunities for supply chain efficiencies and collaboration between different companies and sectors on packaging waste. Packaging begins to move towards more standard formats.</p> <p>In this version of the world in 2019, primary packaging has continued to increase at around 1.5% per year due to increased population and trade. But the role of packaging as a branding tool has decreased (shelf presence is less important) and its role in providing information is often obsolete because of the online data available and the information provided by Radio-Frequency Identification (RFID) tagging. This means, between 2009 and 2019,</p> <ul style="list-style-type: none"> • sharp decline in glass; down by 2% per annum by the end of the period. Due mainly to a need for lighter weight for transport; 	<p>There has been a gradual shift in perceptions of waste, which is by 2019 habitually treated as a resource. This is in large part due to a prolonged global recession (from which the world is now gradually emerging) and an increasing recognition of resource scarcity. A greater emphasis is placed on repair and re-use as well as community sharing and home production of food and other goods.</p> <p>In this version of the world in 2019, primary packaging would increase overall:</p> <ul style="list-style-type: none"> • glass up 3-4% per annum) because of the new reuse and refill culture. Localisation of the economy limits transports miles, making weight less of an issue. • Paper continues historic growth of 1% per annum. • Plastic growth declines and then reverses towards 2019, due to shift towards local foods economy. Partially offset by re-use and refill capabilities of some plastics packaging.

Annex B – Summary of the findings of the horizon-scanning study into packaging use by 2019

“Mixed messages”	“Online opportunities”	“Values shift”
<p>Growth in glass, steel and aluminium has been restricted as businesses search for lighter, lower carbon alternatives.</p> <p>In the commercial and industrial field, the overall increase in trade leads to an increase of about 1%, although businesses pushing on their carbon targets have managed to move towards secondary and tertiary materials that are reusable and have a high recycled content.</p>	<ul style="list-style-type: none"> • relative decrease in metals for the same reasons; • 0% growth in oil-derived plastics, as high oil prices have driven radical lightweighting and research into alternative materials; bioplastics have doubled since 2009. <p>Secondary packaging: the decrease in manual loading of stores and displaying on shelves has led to a reduction. Total volume of secondary paper and plastic packaging similar to 2009 (despite increase in trade).</p> <p>In tertiary packaging:</p> <ul style="list-style-type: none"> • cardboard packaging up 2% per annum by the end of the period, because of shipping of goods bought online. • plastics, specifically bioplastics for online shipping of perishable goods, up 4-5% per annum • wood up around 0.6% per annum as transport of higher value goods bought online (such as furniture) increases. <p>For commercial and industrial tertiary packaging, overall increase (around 1% per annum) due to higher volumes of trade but a high proportion of this packaging is reused, which has led to a shift towards the use of durable plastics.</p>	<ul style="list-style-type: none"> • Steel up 0.5% per annum, aluminium up 1% per annum, due to the demand for re-useable and flexible use packaging. Also, canned foods serve as a stable base to supplement an unpredictable local supply. <p>In secondary packaging, people buying more locally & direct from suppliers means there is less of a need for ‘double packaged’ goods, particularly as primary packaging is designed to be robust and reusable.</p> <ul style="list-style-type: none"> • Limited growth in paper to around 0.9% per annum; • plastics also show slower growth than historically (around 1.5% per annum), though relatively low oil prices means shrink wrapping is an attractive option. <p>In tertiary packaging:</p> <ul style="list-style-type: none"> • negligible drop in plastic use. Plastic bag use has declined. • paper up 1.2% per annum, due to scaling down of global supply chains. • wood packaging up around 0.6% per annum; needed to protect perishables and glass packaging in transit.

Annex C – Extract from the *Food Matters* Report (PMSU, 2008)

Action 5.8 states:

“A new strategy for dealing with waste packaging in England will be developed, set within the framework provided by the Waste Strategy for England (2007). It will aim to get incentives better aligned along the food chain to encourage reduction in the amount of packaging and more re-use and recycling. It will also aim to improve information flows between manufacturers, retailers, consumers, local authorities and re-processors.

The assessment conducted to inform the strategy will examine what can be done to:

- prevent packaging that does not comply with the Essential Requirements provisions of the EU Packaging Directive and the UK Regulations entering the market;
- increase the availability and consistency of recycling services for household waste for the main packaging materials so that targets and public expectations can be met;
- ensure that packaging is designed with resource efficiency, recyclability, recovery or re-use in mind;
- ensure that material recovered for recycling from the household waste stream meets market needs;
- encourage positive attitudes among consumers towards packaging with recycled content; promote cost-effective reductions in the carbon impacts of the packaging chain; and
- foster synergies between commercial, industrial and household packaging waste collections to improve the economics of collection.

This work will be taken forward by Defra and BIS.

Alongside the development of a packaging strategy the Government will also:

- open discussions on a new voluntary agreement to achieve a demanding target on the net reduction of packaging for 2012 and a new objective to encourage the use of recycled material, and will negotiate Courtauld Commitment-type agreements for other business sectors; and
- work with the British Standards Institution on improving the information that is currently available to businesses on the EU Essential Requirements.

Waste management is a devolved matter. The UK Government will consult the Devolved Administrations about possible participation in initiatives of common interest – such as further development of voluntary agreements with industry. The Regulations on Essential Requirements in packaging are reserved.”

Annex D – Carbon accounting methodology

The figures in Chapter 4 are based on a carbon methodology devised in the Netherlands, with input from packaging producers⁹⁰. The methodology was extrapolated to the UK, with changes to reflect where UK circumstances differ.

What the methodology covers

The carbon levels for each material were set using LCA data on the greenhouse gas emissions associated with the following key stages:

- raw materials extraction;
- primary production of the virgin packaging material;
- packaging shaping process;
- transport to fillers and to market;
- end-of-life:
 - waste transport
 - recycling (using average Dutch recycling rates): the avoided production of virgin material is deducted from the CO₂ calculations, but the processing steps associated with recycling are included;
 - incineration of the material (fossil/combustible plastics only) plus the CO₂ emissions avoided through energy generation at the incineration plant (paper/board and plastics). Again, this is based on data on Dutch incineration efficiencies, energy mix etc.

This excludes the beneficial effects of using packaging to extend the life / preserve the quality of food and drink, and also excludes consumer-related impacts (eg transport from shop, refrigeration etc).

Where goods are recycled, the recycling routes have been identified and substitution ratios agreed. For example, in closed loop recycling of PET it has been assumed that 1kg of recyclate replaced 1kg of primary material. Where PET is recycled into fleece jackets 1kg is assumed to replace 0.5kg of primary material to account for process losses / degradation in quality. For all materials average use of recyclate has been considered in assessing the CO₂ emissions.

When considering the extraction of materials, there is a need to distinguish the carbon dioxide which arises from fossil fuels from that which is taken up by plants and released when the plant degrades (known as 'biogenic CO₂'). Over the whole life of the plant the carbon account can be considered neutral. The burning of fossil fuels releases stored carbon into the atmosphere and cannot be considered neutral.

Under the Dutch model, use of secondary materials for paper and card is associated with higher emissions than use of virgin raw materials. This is due to a number of factors, such as Dutch waste management practices and the way in which biogenic CO₂ is treated. For the same reasons, the net lifecycle CO₂ emissions of wood are less than zero, without any recycling (though with a degree of re-use).

⁹⁰ For more details please see: CE Delft (2007) Environmental indices for the Dutch packaging tax CE Delft: Netherlands

Annex D – Carbon accounting methodology

UK data

In order to apply the Dutch carbon accounting methodology to the UK, we have amended it to include UK-specific data on:

- landfill rates for packaging
- energy mix;
- recycling rates for each material

Many goods are traded on an international basis, and so much of the data developed by trade associations and used in the Netherlands is likely to be applicable to the UK. These include eco-profiles for plastics developed by PlasticsEurope, the global steel industry database held by IISI, the European Aluminium Association data on aluminium production (EAA, 2008), and data held by FEFCO and Pro Carton on cardboard.

In addition to these, data from British Glass (2003) was used to reflect average UK glass production.

The data was used in conjunction with recognised international databases to provide data for life cycle stages not covered by eco-profiles. These include the European Reference Life Cycle Database (ELCD) supported by the EU and Ecoinvent, a database developed by the Swiss Centre for Life Cycle Inventories.

The range of figures for plastics account for differing production methods (foaming, blow moulding, stretch blow moulding and extrusion). Data is based on PlasticsEurope and the Ecoinvent database.

The range of figures provided for paper and glass address potential differences in recycled content and end of life options, based on information from FEFCO, ProCartons, the Waste Strategy for England (2007) and the Ecoinvent database. The figures for beverage cartons are based on data from published sources (e.g. Tetrapak 2008⁹¹) and the Ecoinvent database. The greatest number represents disposal in landfill.

The table below makes an estimate as to the greenhouse gas emissions (measured in CO₂ equivalent) associated with the materials on the UK market at present. These estimates exclude biogenic CO₂ and should be treated as approximations rather than definitive numbers at this stage. The boundaries are those used in the Dutch system.

⁹¹ http://www.cartonpourlaterre.fr/img/rapport_final.pdf

Annex D – Carbon accounting methodology

Table 5 – UK carbon scores in kg CO₂ equivalent per tonne of material

Solid board	1,100 – 3,900
Corrugated board	1,100 – 2,200
Folding boxboard	1,000 – 2,200
Beverage cartons	2,000 – 2,700
Glass	570 – 880
Steel	1,095
Aluminium	5,570
LDPE	2,600
HDPE	2,500
PP	2,500 – 2,900
PET	3,500 – 4,400
(E)PS	3,500 – 4,100

Note that, on its own, a lower CO₂ rating per tonne does not mean a packaging material is necessarily more “environmentally-friendly”. In practical reviews of the environmental impact of packaging (when comparing an aluminium drinks can with a PET bottle, or a beverage carton) it is the actual weight of the competing forms of packaging that counts, and these may be very different. In practice, the environmental performance of a given type of packaging can be estimated by multiplying these figures by the weight of the packaging.

As rates of recycling increase for all materials, therefore decreasing the CO₂ input from primary materials, the carbon scores will decrease.

The figures above will be finalised after consultation with industry experts.

It is worth noting that an update every two years is recommended. This will allow improvements in material supply chains to be incorporated relatively quickly, creating a constant incentive for the industry to improve the environmental performance of the packaging chain.

Analysis prepared by WRAP for Defra, 2008

Annex E – Case studies of Local Authority partnership working and value-sharing in England

Annex E – Case studies of Local Authority partnership working and value-sharing in England

Project Integra – Hampshire Local Authorities

Project Integra is the partnership of all collection authorities in Hampshire, along with Hampshire County Council, the unitary authorities of Portsmouth and Southampton, and a private waste contractor, Veolia Environmental Services (VES), all working together to provide an integrated solution to Hampshire's waste. The Partnership is currently one of the UK's leading performers in diverting more than 85% of household domestic waste from landfill by recycling or recovering energy.

The key priorities for Project Integra are to eliminate reliance on landfill for the disposal of waste and to ensure that all materials are dealt with in the most environmentally, socially and economically efficient way possible.

Project Integra has a long history of successful collaboration at a countywide level and the key to its successes to date is the mutual support and cooperation that exists between all partners.

Contracts for reprocessing recyclate are managed by Veolia Environmental Services and a cross-authority Materials Marketing Group provides strategic guidance to ensure that recyclables are dealt with in a sustainable manner. By producing high quality material outputs, strong and lasting relationships can be created with reprocessors because they know that they can rely on high quality material from Hampshire that meets stringent guidelines on contamination.

To ensure that recyclables are of a high quality, Project Integra has developed a permanent materials analysis facility (MAF) at the Alton MRF (Materials Recovery Facility) to analyse both recycling inputs and outputs and residual streams. The MAF provides current, accurate data to all partners, which enables the partnership to better understand current performance, highlight specific areas for improvement and target funding at projects to address contamination, improve quality and increase the capture of recyclables.

In addition to enabling partners to target specific areas of high contamination, projects have been developed that benefit the whole partnership by identifying operational and communication best practice for improving the overall quality of recyclables.

The MAF data is also used to inform a number of areas including:

- More accurately apportioning the income generated from the sales of recyclables and;
- In WasteDataFlow to provide a more comprehensive assessment of each authorities performance.

By using the MAF to monitor performance, the partnership are able to ensure that they consistently deliver high quality materials to reprocessors. Joint working allows Project Integra to market these materials as a partnership and increases the ability to establish sustainable and lasting relationships with reprocessors.

In addition, working as a collective has also led to recycling and treatment facilities for materials such as glass and garden waste to be set up within the county, minimizing the impact of transportation.

Annex E – Case studies of Local Authority partnership working and value-sharing in England

Somerset Waste Partnerships

Somerset Waste Partnership started in 1992 and established a memorandum of understanding in 1997 which saw the county and district councils in its area working increasingly closer together. The Partnership moved to further formalise its working arrangements with the creation of a joint committee, the Somerset Waste Board, which began on 1st October 2007. This represents all six authorities in Somerset and is now fully responsible for all waste collection and disposal services across the county.

Integral to the creation of the 'virtual unitary' for waste management in Somerset was the desire to have one contract for all collection and recycling services. This replaced the previous nine separate arrangements managed by the five district councils.

A new waste management contract was tendered with representatives from all six Somerset Waste Partnership authorities involved in the evaluation at every stage. A single contract was awarded to ECT Recycling, who previously had four recycling contracts in the county, and started on 15th October 2007. This contract is structured so that the ECT return a share of the profit if this exceeds an agreed percentage. Somerset estimate that the partnership is saving £1.5m a year.

West Sussex County Council

All seven of West Sussex's district councils are involved in the County's disposal contract letting and ongoing management through an MOU. The districts as well as the county share in the profits (and risks) derived from the sale of recyclables which has proved a very effective way to keeping quality as a core driver for all the operations. Viridor guarantee a minimum price which does limit the risks to the local authorities.

Two of the districts have joined to offer a single collection contract which is expected to yield significant benefits both from increased competition for the contract as well as operational efficiency savings.

West Sussex are looking to form a joint board similar to Somerset as they perceive that the benefit of closer partnership working can be achieved this way. They also see the addition of trade waste as a good commercial opportunity especially for achieving higher utilisation rates for the collection fleet. They also pointed out that higher prices could be achieved for recyclables for greater quantities that could be contracted for, again favouring larger disposal operations.

Norfolk Environmental Waste Services Ltd (NEWS)

NEWS was formed in 1993 as an arms' length company owned by Norfolk County Council. However it was Norfolk's district councils that worked together to procure the MRF.

Each district has a separate contract with NEWS but they only differ with regards to logistics arrangements. As the districts all have such similar contracts with NEWS the districts have a contract management board to deal manage these contracts. These common contracts have established standard collection specification and common collection methods. The districts do not pool communications activities though as they are still competitive with each other regarding recycling rates.

The districts have a profit share arrangement with NEWS as follows: the districts pay NEWS a gate fee of around £17/t. NEWS also retains approximately 50% from the sale of the recyclables then the balance is shared between the district councils and NEWS on a 75:25 split. The district councils receive recycling credits which when added to the cost effectiveness of alternate weekly collections across most of the County provides for a very cost effective recycling collection and processing service.

Annex E – Case studies of Local Authority partnership working and value-sharing in England

Glass is not processed through the MRF for Health & Safety and end market acceptability reasons.

Although the County Council owns NEWS the initiative for setting up the MRF arrangement was entirely with NEWS working with the District Councils with no overt support from the County Council.

Conclusions and observations

All of the partnerships are delivering high performing recycling schemes. However the high performance cannot solely be attributable to the partnership working – these local authorities have relatively favourable resident demographics.

The case studies demonstrate a wide variety of approaches to partnership working. However they all display some common characteristics:

- Sharing of market risks and rewards that drives quality
- Greater coordination of contract letting and operational management
- a trend towards harmonised collection systems across districts, within a county. It seems likely that the close working these partnerships foster have helped this process;
- Cost savings through better contracting and/or operational efficiency. One partnership estimates savings of £1.5m a year from economies of scale and integration.

From the case studies and other discussions held as part of the evidence gathering for this strategy review, it is clear that:

- The effectiveness of partnerships appears highly dependent on the enthusiasm of the people involved;
- Joint tendering and operations of districts' collection contracts has the potential to deliver a more competitive tendering process as well as a more efficiently designed service provision;
- Multiple collection contracts often result in different materials being collected in different ways to different specifications. This makes investment in large scale infrastructure such as MRFs, MBT, AD much harder at the county level;
- Both collection and disposal authorities sharing the income from the sale of recyclables seems a highly efficient way of driving quality through all their recycling operations. This way, the incentives for adapting collection and sorting systems towards higher quality, and therefore better revenue, are more visible. The most striking example of this was in Norfolk, where co-mingled collection systems and the MRF that sorts the waste have been geared towards higher quality markets. In 2007, the district councils received a net rebate of £9/t. When combined with their recycling credits, they believe collections costs were covered.
- Experience in local authorities of negotiating waste management contracts varies, as these contracts are not being tendered on a regular basis. Conversely the waste management companies have dedicated contract negotiation teams. This seems unlikely to deliver equitable contracts.

Published by the Department for Environment, Food and Rural Affairs.
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Printed on material that contains a minimum of 100% recycled fibre
for uncoated paper and 75% recycled fibre for coated paper.

Nobel House, 17 Smith Square
London SW1P 3JR

www.defra.gov.uk

PB13189 June 2009