



Department
for Environment
Food & Rural Affairs

www.defra.gov.uk

Waste Prevention Programme for England

Call for evidence

March 2013

© Crown copyright 2013

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/ or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or e-mail: psi@nationalarchives.gsi.gov.uk

This document/publication is also available on our website at:

www.defra.gov.uk/consult

Any enquiries regarding this document/publication should be sent to us at:

The Waste Prevention team
Defra
Area 6C
Ergon House
Horseferry Road
London
SW1P 2AL

Or emailed to wasteprevention@defra.gsi.gov.uk

Contents

Executive Summary	1
Section One: Introduction	3
Purpose of this Call for Evidence	3
What is waste prevention?	4
Who has an interest	6
Section Two: Background	7
Waste arisings.....	8
The benefits of waste prevention	12
Market Failures	14
Priority areas for action	14
Measuring waste prevention	17
Section Three: Business	19
Waste arisings.....	19
Reuse, remanufacture and repair.....	21
The benefits of waste prevention to businesses.....	24
Barriers and Behavioural Challenges	24
What has already been done?	26
Section Four: Consumers and Communities	29
Waste arisings.....	29
Consumption patterns	29
Waste prevention, reuse and repair patterns	30
The benefits of waste prevention to consumers and communities	32
Barriers and behavioural challenges	33
What has already been done?	36
Section Five: Government and the public sector	38

National Government	38
Local Government	39
Next Steps	41
How to respond	41
Publication of responses	42
Annex A: List of questions	43
Annex B: Data tables	46
Annex C: References	48

Executive Summary

The government will publish the first Waste Prevention Programme for England by December 2013. This is a Defra priority, aiming to support growth and help householders, local councils and businesses to save money. The Programme takes forward a commitment in the Government Review of Waste Policy in England 2011 and fulfils a requirement of the revised Waste Framework Directive (2008/98/EC). This Call for Evidence sets out the evidence we have, priorities, barriers, opportunities and ongoing action, and invites views and information to help inform the Programme.

Preventing waste from occurring delivers the best environmental and economic outcome, and is key to moving towards a more sustainable economy. The term 'waste prevention' includes many different activities, from designing products so they last longer, are easily repaired and use fewer or less hazardous resources, to ensuring services are available so that unwanted items get a second life through reuse.

The global environment is changing at an unprecedented rate; within decades we are likely to face significant pressures on energy, resources and the natural environment. The UK uses approximately 470 million tonnes (Mt) material resources each year, with over 250Mt of resources becoming waste each year. This waste of resources results in increased costs to businesses for the purchase of unnecessary materials, and in the costs of disposing of those materials. Although around half of this waste is recovered for recycling, this still results in the loss of large quantities of valuable materials.

Evidence from 2009 shows that simple measures to produce less waste which pay back within a year, could save UK businesses around £17bn and avoid greenhouse gas emissions of 16 million tonnes of carbon dioxide equivalent (MtCO_{2e}) annually. This represents around 3% of UK emissions and nearly 4% of gross UK business profits. These figures could be greater when longer term investments are considered. Additionally, a move towards more service-based business models, and an emphasis on innovative design and production techniques are likely to result in further changes and opportunities.

Waste production is gradually declining in England. In 2010, total waste generation was estimated at 177Mt, continuing a decrease in waste arisings from 325.3Mt in 2004. Commercial and industrial waste accounts for 27%, construction and demolition waste 44% and household waste for 13% of waste generated in England by weight.

Priority areas for waste prevention or reuse activity have been identified as food, textiles, construction and demolition and the chemical and healthcare sectors, paper and card, electronic and electrical equipment and furniture and other bulky items (particularly from households).

This Call for Evidence sets out why businesses and consumers may not take action to maximise potential savings, including behavioural as well as more practical barriers. There are a number of market failures. The real costs of manufacturing, purchasing or disposal may not be fully apparent, for example, from the physical cost of the loss of

resource where material is purchased but not fully utilised, to a lack of understanding of the full environmental damage of the disposal of an item. Other barriers include the need for initial investment for some waste prevention actions and constraints on the availability of resources, such as finance, staff capacity (including management) and time. A supportive corporate culture and leadership commitment to integrate waste prevention activities is also important.

In other situations, the beneficiaries of waste prevention actions may not be the same as those who incur the cost of those actions and there may therefore be little financial incentive to take preventative action. Consumers or businesses may not be aware of the different choices when buying goods (e.g. hiring a limited use item rather than purchasing the item, buying a second hand product in place of a new product) or disposing of unwanted items. Additionally, concerns over cost-effectiveness, reliability and purchasing rights reduce people's willingness to repair items or purchase reused goods.

There are good examples of action that has already been taken by businesses, charities and social enterprises as well as consumers themselves to reduce waste arisings and increase reuse. Government too, national and local, often in partnership with industry and others has taken significant steps forward.

Section One: Introduction

1. Preventing waste from occurring delivers the best environmental and economic outcome, and is key to moving towards a more sustainable economy. The term 'waste prevention' includes many different activities, from designing products so they last longer, are easily repaired and use fewer or less hazardous resources to ensuring services are available so that unwanted items get a second life through reuse.
2. A Defra priority, waste prevention aims to support growth and help householders, local councils and businesses to save money. By reducing waste generated, it will also reduce damage to the environment; for example by helping reduce carbon dioxide emissions and helping to conserve resources, such as rare earth metals.
3. The government will publish the first Waste Prevention Programme for England by December 2013, taking forward a commitment in the Government Review of Waste Policy in England 2011¹, and fulfilling a requirement of the revised Waste Framework Directive (2008/98/EC)². The Waste Prevention Programme will:
 - help businesses recognise and act upon potential savings through better resource efficiency and preventing waste, to contribute to a more sustainable economy
 - make it easier for people to find out how to reduce their waste, and how to reuse items they no longer want
 - support action by local and central government, businesses and civil society to capitalise on these opportunities.

Purpose of this Call for Evidence

4. The government is currently collecting evidence and views to inform the Waste Prevention Programme for England. The findings from this exercise will be used to support development of the Programme, along with a summary of evidence which we will publish in 2013.
5. The scope of this work includes material waste produced within England, but does not explicitly include wasted water or energy on their own (although savings in these areas would generally be additional benefits of any waste prevention activities). The Devolved Administrations are developing their own Waste Prevention Programmes which will be published separately.
6. The Call for Evidence sets out our understanding of available data and other insights on the current situation together with barriers to reducing waste arisings in England through waste prevention, reuse and repair. A series of questions aimed at gathering additional evidence to expand our knowledge base and explore some practical issues

is also included. Please see Annex A for a full list of questions. A separate template is available to record responses.

What is waste prevention?

7. Waste prevention is at the top of the waste hierarchy, delivering environmental, economic and social benefits.

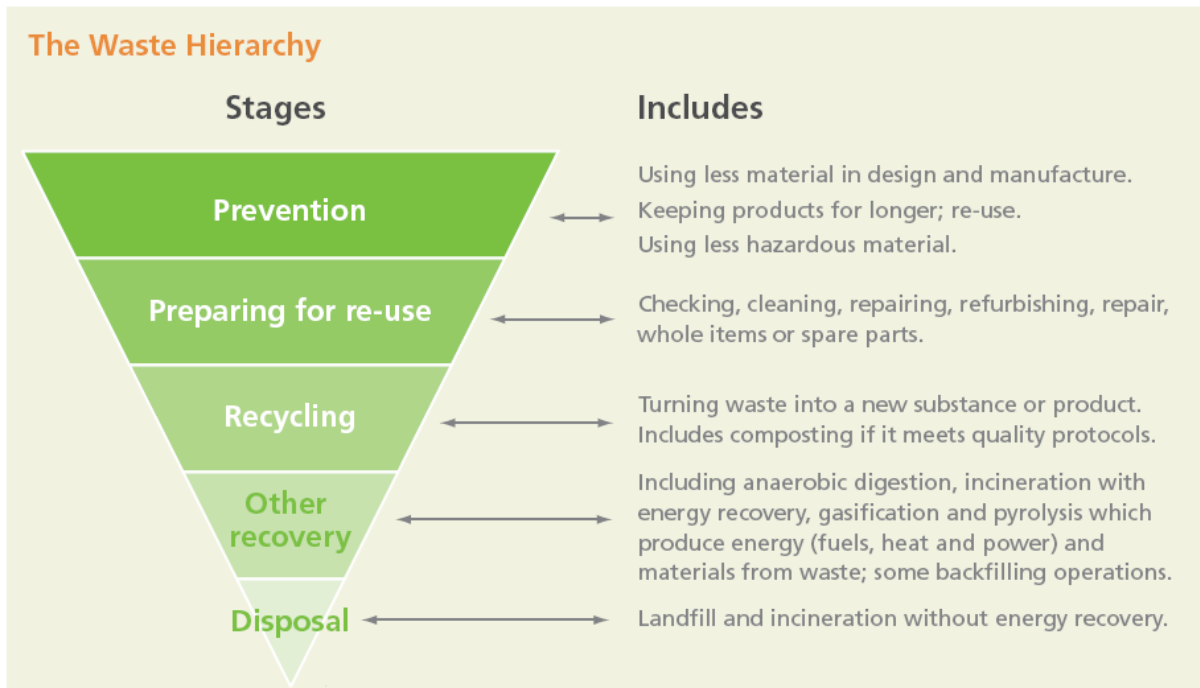


Figure 1: The Waste Hierarchy

8. The revised Waste Framework Directive defines waste prevention as measures taken before a substance, material or product has become waste, that reduce:
- (a) the quantity of waste, including through the reuse of products or the extension of the life span of products
 - (b) the adverse impacts of the generated waste on the environment and human health, or
 - (c) the content of harmful substances in materials and products.
9. In addition, 'preparing for reuse' is defined as checking, cleaning or repairing recovery operations, by which products or components of products *that have become waste* are prepared so that they can be reused without any other pre-processing.
10. In practice, these definitions encompass a wide range of actions. The following terms are used within this document to refer to these varied actions:
- **avoidance** - reducing process waste, buying fewer items

- **reduction** - designing products so they last longer and are used for longer (including upgradability and reparability and ease of disassembly). Also, using less materials per unit and reducing the use of hazardous substances in materials and products
- **reuse** - buying and selling *whole* used items, possibly after washing or minor repair (other terms used, particularly in the construction sector include reclaimed)
- **remanufacturing** – restoring a product to a *like-new* condition by reusing, reconditioning and replacing parts (other terms used include refurbishment)
- **repair** – repair and/or replacement of a component part in a used item.

11. For the purposes of this Call for Evidence, we are seeking information on activities which fall under both ‘waste prevention’ and ‘preparation for reuse’ as, in practice, these actions can result from similar behaviours.

12. Effective waste prevention relies on actions being taken throughout the life of a product or material including design, distribution, and use. Figure 2 below illustrates the range of activities which can be undertaken at different stages of a product’s lifecycle which result in the prevention of waste.

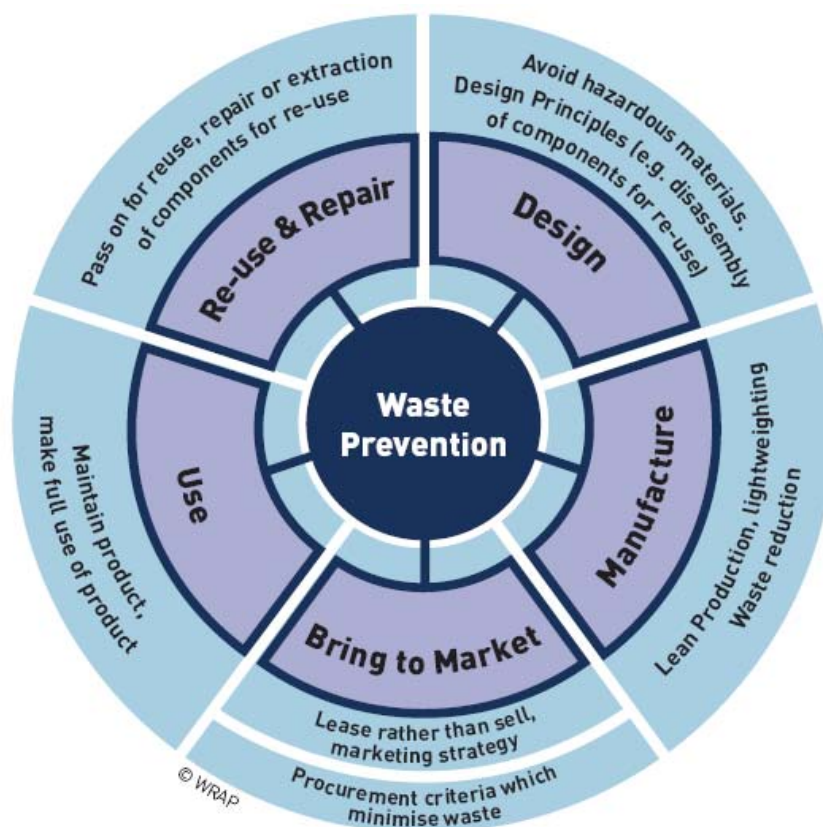


Figure 2: Illustration of waste prevention activities at different product lifestyle stages, WRAP

13. Waste prevention does not include waste management activities such as recycling. Defra does not consider home composting to be a strict waste prevention measure as the waste is still produced, even though it does reduce the amount of waste that needs to be collected.

Who has an interest

14. This Call is addressed to individuals and organisations that have an interest in greater resource efficiency and reducing the amount of waste being produced across the economy. Interested parties range from consumer representatives, environmental organisations and local government through to industry representatives, trade associations and waste management organisations. Consultees may choose to contribute to and address only those questions that are most relevant to them and their activities.

Section Two: Background

15. The global environment is changing at an unprecedented rate; within decades we are likely to face significant pressures on energy, resources and the natural environment. By 2050, international studies predict that water demand will rise by 55%³ and food production will need to rise by 60%⁴ to meet demand. Global energy demand will continue to rise, growing by more than one-third by 2035.⁵
16. Global population is expected to rise to 8 billion (bn) by 2030, with 3bn new middle class consumers, resulting in new demand for goods. The population of England is set to grow by 20% by 2035⁶. Global commodity prices have risen 147% since 2000, with historically high levels of price volatility⁷. These increases are also being felt by consumers now due to fluctuations in the cost of key ingredients. The cost of sunscreen reportedly rose during the summer of 2012 due to steep increases in titanium oxide prices by up to 75%.⁸
17. Based on 2010 data, the UK uses approximately 470 million tonnes (Mt) of material resources each year. However, **over 250Mt of resources become waste each year.**⁹ This waste of resources results in increased costs to businesses for the purchase of unnecessary materials, and in the costs of disposing of those materials. Although around half of this waste is recovered for recycling, this still results in the loss of large quantities of valuable materials.

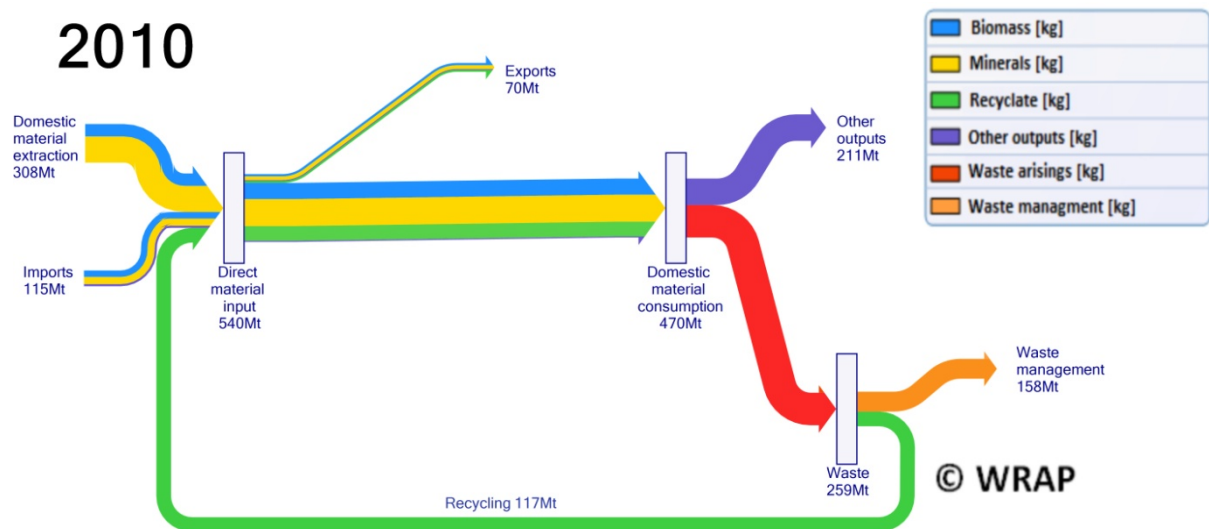


Figure 3: Sankey diagram to demonstrate resource flows within the UK economy¹⁰

18. Since 1993 the structure of the UK economy has shifted towards the services sector. The consequence of this is that more of the goods UK households consume are now produced abroad. The UK is therefore placing much broader demands on global natural resources. The UK's carbon footprint in 2010 was 9% higher than in 1993 when emissions in products are included.¹¹

Waste arisings

19. Waste production is gradually declining in England. In 2010, total waste generation was estimated at 177Mt¹² in England¹. This is continuing a decrease in waste arisings from 325.3Mt in 2004. Per head of population, the UK produces 526t municipal waste per year (2009), down from a peak of 603t in 2004. Compared to the EU15 countries, the UK produces the 6th lowest quantity of waste per capita.¹³

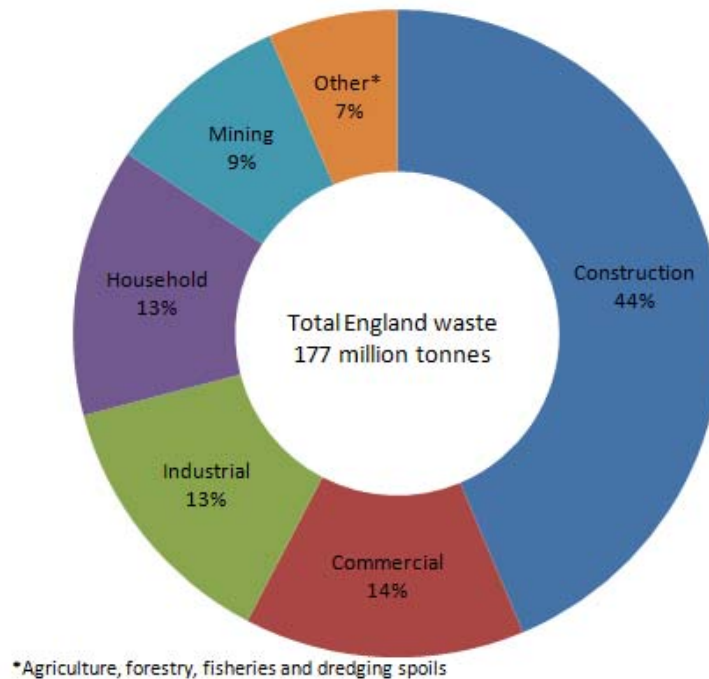


Figure 4: The distribution of waste arising in England by the key sectors, Defra 2010

20. The waste arisings data from England has been considered in further detail below. Divided into three main sectors; commercial and industrial (C&I); construction and demolition (C&D); and household waste, the following graphs illustrate the composition of waste arising from each of these sectors by weight. Additional graphs show the composition of hazardous waste for these sectors. Data presented is from 2010. This has been compiled from numerous sources, some of which are new data and some of which are estimates based on previous collections or administrative sources.¹²

¹ Data tables are available at Annex B

Commercial and industrial waste

21. C&I waste accounts for 48Mt (27%) of waste generated in England¹⁴. 4.6Mt of hazardous waste is produced from the C&I sector.

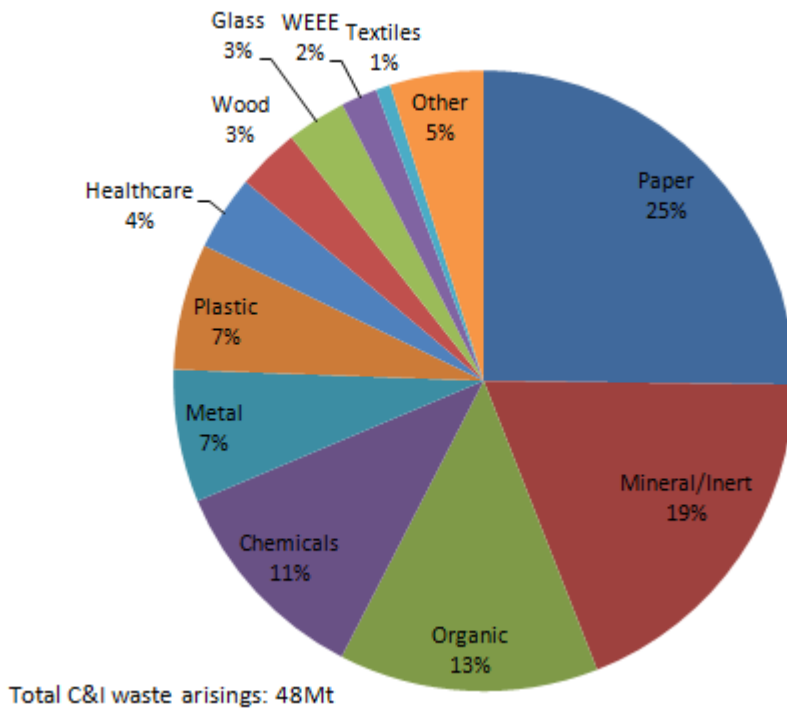


Figure 5: Composition of Commercial and Industrial waste (by weight), Defra 2009

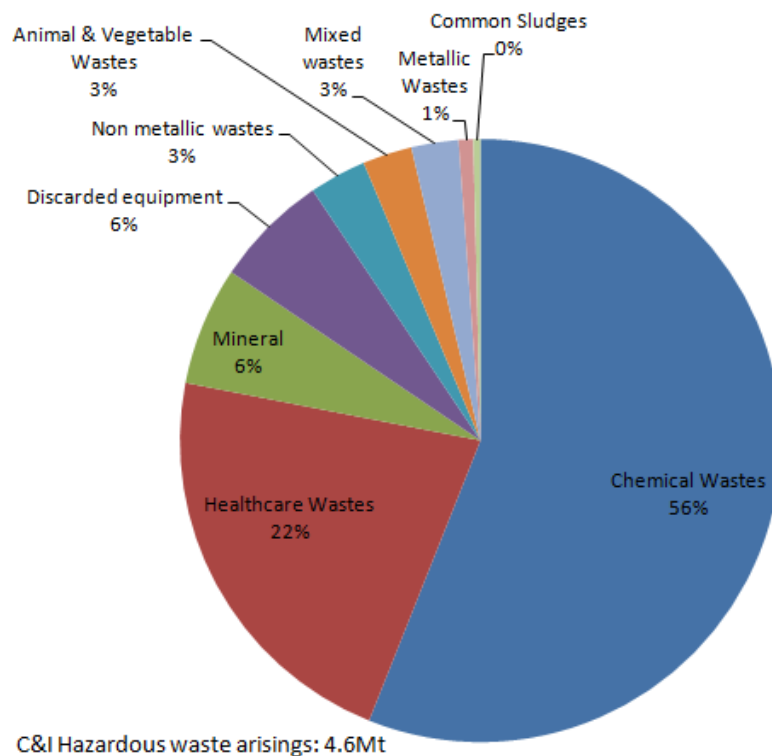


Figure 6: Composition of Commercial and Industrial hazardous waste (by weight), Defra 2009

Construction and demolition waste

22. C&D waste accounts for 77Mt (44%) of waste generated in England. 0.8Mt of hazardous waste is produced from the C&D sector.

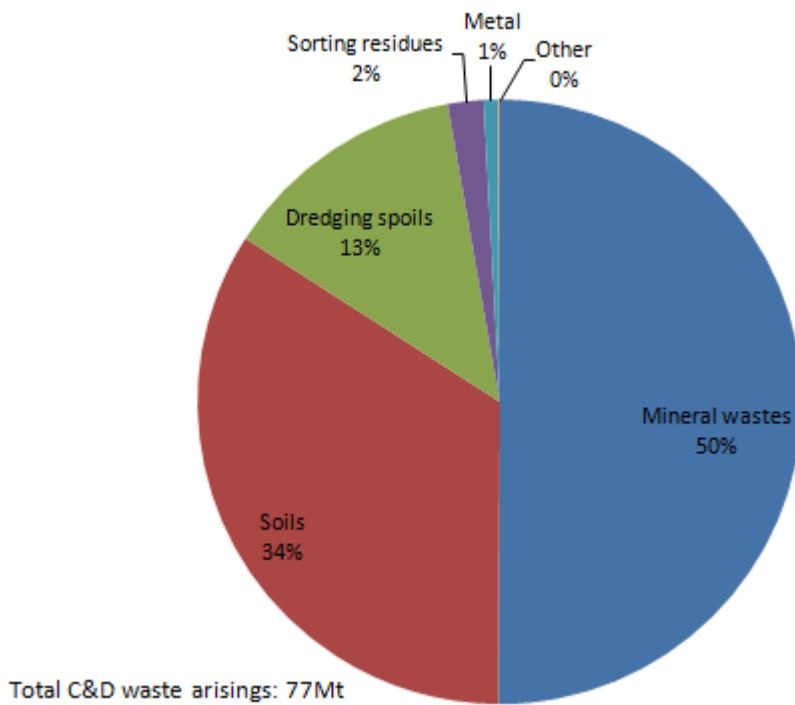


Figure 7: Composition of Construction and Demolition waste (by weight), Defra 2010

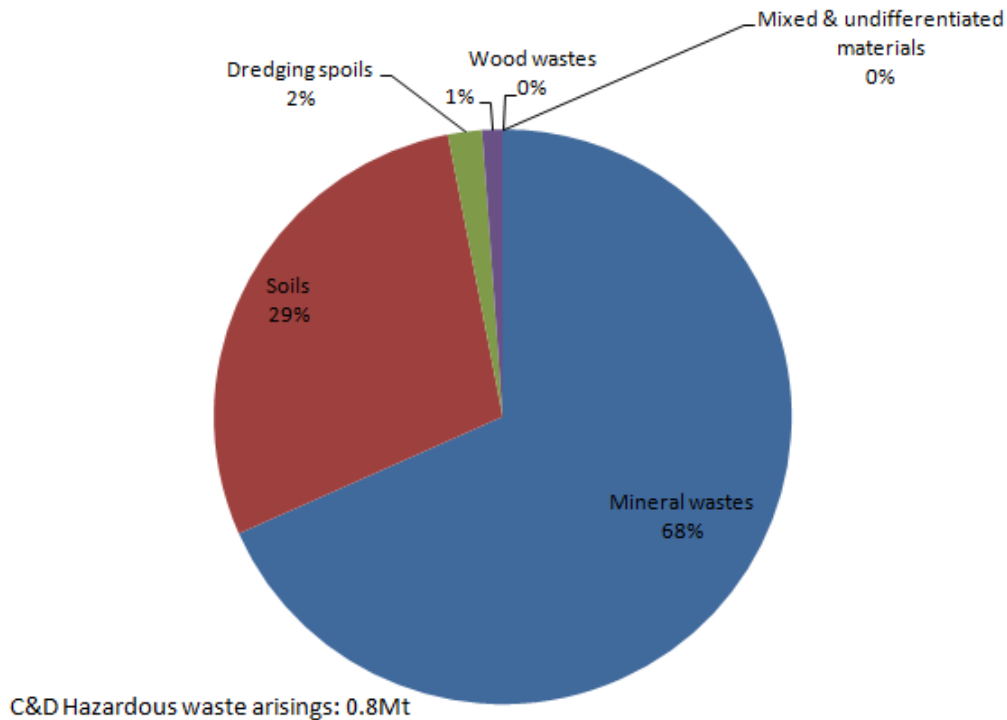


Figure 8: Composition of Construction and Demolition hazardous waste (by weight), Defra 2010

Household waste

23. Household waste accounts for 24Mt (13%) of waste generated in England. 1.0Mt of hazardous waste is produced from the household sector.

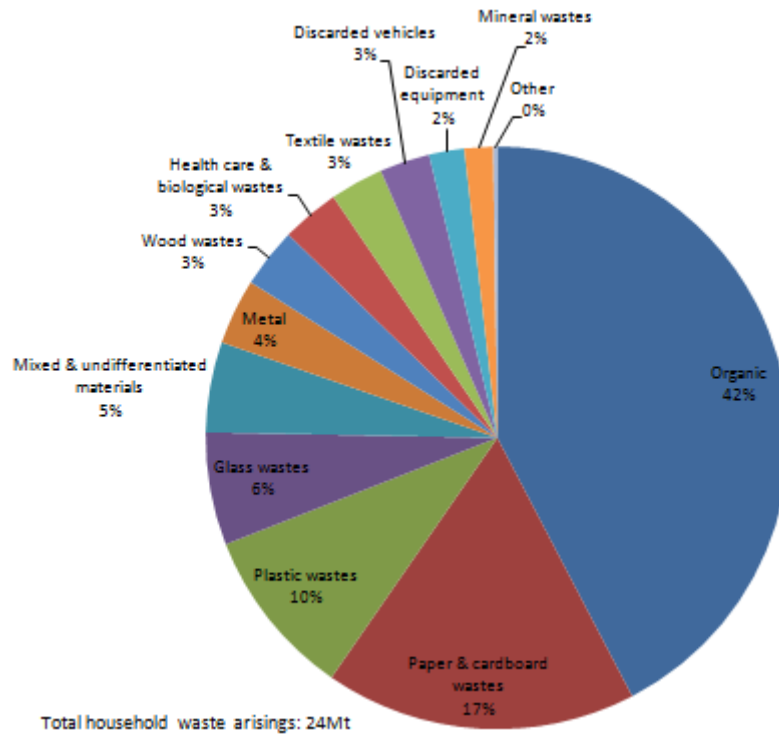


Figure 9: Composition of Household waste (by weight), Defra 2010

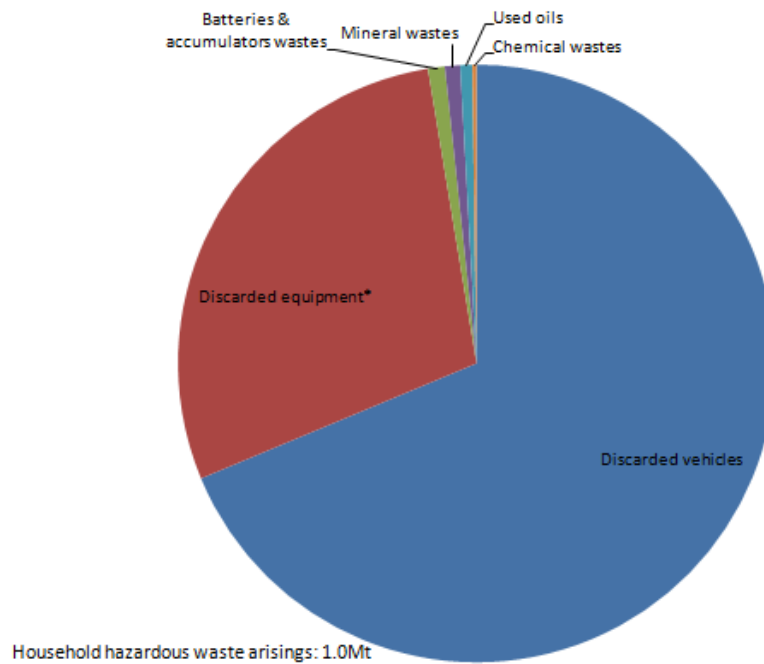


Figure 10: Composition of Household hazardous waste (by weight), Defra 2010

The benefits of waste prevention

Waste Prevention and Economic Growth

Waste prevention has been identified as a priority action for promoting economic growth in the UK. By reducing waste that is created in the production of goods and services, businesses can increase the amount they produce for a given level of inputs. This makes the UK economy more productive.

- i. Producer Savings: When producers create less waste they can reduce the resources required to manage that waste and devote those resources to more productive uses.
- ii. Consumer Savings: When consumers reduce their waste generation they use fewer financial resources to purchase products that become waste; their financial liability for waste management should also reduce. This frees up financial resources for other uses.
- iii. New Industries: Some prevention and reuse activities may require innovation and the development of new practices and technologies. If the UK can lead the way in this innovation there may be benefits in terms of new jobs and economic activity.
- iv. Environmental Impact: By preventing the degradation of the natural environment, which may create conditions that are adverse to growth, waste prevention contributes to the long term growth potential of the UK economy.

24. The UK economy is dependent on global trade and resources. Moving to more sustainable practices will enable the UK to grow, maintain prosperity and safeguard the environment. This means delivering value through lower resource inputs. This can come through innovation, changed business models and different patterns of consumption.

25. Resource efficiency, of which preventing waste is a key aspect, helps build economic resilience and helps businesses weather difficult economic times.

The further benefits of business resource efficiency, Defra 2011

Key findings

Estimated **£23bn** of financial savings within a year to businesses from simple measures to use less energy, water and minimising waste, based on 2009 data.

£18bn is estimated to come from waste, of which **£17bn** is attributable to waste prevention in the form of using raw materials more efficiently (e.g. through lean production) and generating less waste. Implementing these measures is estimated to require very little or no investment.

These savings represent avoid greenhouse gas emissions of **16 million tonnes** of carbon dioxide equivalent (MtCO₂e) annually.

Four sectors are estimated to account for 78 per cent of the potential £18bn savings opportunities in waste. Those are: chemicals/ non-metallic minerals, metals manufacturing, power and utilities, and construction.

Saving opportunities with a payback greater than one year are estimated at **£33bn**, with around **£22bn** savings opportunities in waste.

The main barriers to realising these benefits are identified as behavioural, financial and a lack of information

26. Evidence undertaken for Defra¹⁵ indicated that savings from waste related resource efficiency measures could deliver savings of around 3% of UK emissions and nearly 4% of gross UK business profits. It is not fully understood how many of these savings have already been made by businesses.
27. Opportunities for economic growth and employment are likely to exist in the repair, reuse and remanufacturing of products, in both infrastructure provision and the subsequent operation of those facilities. However, the extent to which there will be net 'new' jobs created, rather than jobs displaced from other aspects of waste management which are in decline or the wider economy, is not fully understood. Overall there is anecdotal evidence that recycling and reuse operations are more labour-intensive than disposal operations.
28. Elsewhere in the economy, a move towards more service-based business models, and an emphasis on innovative design and production techniques are likely to result in further changes and opportunities. Jobs are likely to require a mix of skills. There will be a need for further growth of skilled labour, particularly in some professional and technical roles. These are anticipated to deliver opportunities for training as well as some less skilled jobs.
29. Using material resources in a more efficient and sustainable way has the potential to deliver a range of benefits across the economy:
- financial benefits to businesses through greater resource efficiency and reduced waste management costs
 - opportunities for diversification and growth from a move to service-based business models
 - opportunities for growth through an increase in repair, reuse and remanufacturing services
 - social benefits through increased jobs and training (assuming that repair and reuse work is UK based)
 - financial benefits to local councils through a reduction in waste needing to be collected
 - benefits to consumers through increased choice in consumption models available and extension of product lifetimes
 - financial benefits to consumers through full use of items or products purchases (for example, reduction in costs associated with wasted food)
 - environmental benefits through the reduction in carbon emissions from material extraction and waste produced, and a reduction in the use of hazardous materials.

Q1. Do you have evidence or case studies where the benefits from managing material resources more efficiently have been measurably achieved (para 29)? Please provide examples.

Market Failures

30. In addition to the potential environmental and financial benefits to be gained from the prevention of waste, it is believed that, in many cases, the costs of preventing waste are far smaller than these benefits². Despite this, waste prevention opportunities are frequently not taken up due to the existence of market failures which inhibit naturally occurring reductions in waste arisings. The key market failures are as follows:

31.

- **Environmental Externalities:** The consumption or production decisions made by individuals and businesses that lead to waste creation may not take into account the environmental damage caused by that waste. The full cost of waste may not be paid for by its producer.
- **Split Incentives:** In many cases the beneficiaries of waste prevention actions may not be the same as those who incur the cost of those actions. For example, a manufacturer may invest in re-designing a product to reduce waste (such as extending product lifetime), but the beneficiary may be the consumer or local authority further down the line. In this way there may be little financial incentive to take preventative actions for those who are able to do so.
- **Information Failures:** Consumers or businesses may not be aware of the value associated with waste efficiency savings; they might fail to appreciate the full costs of waste (for example, unnecessary raw material and labour costs embedded in products)¹⁶; or they may be unaware of the preventative actions which could be taken. Furthermore, information may be too costly to acquire (in terms of time and resources).
- **Behavioural Barriers:** Status quo bias can be a potentially significant barrier to firms¹⁷ where companies underestimate the value of long-term benefits versus short-term costs and/or overestimate the risks associated with such investments. Additionally, individuals may experience loss aversion and place more emphasis on the upfront costs compared to the long run benefits they may get through making a change.
- **Financial Barriers:** Certain waste prevention actions will require an initial investment before benefits can be realised. If businesses or individuals have constrained access to credit then they will be unable to make the investment to realise the subsequent benefits.

Priority areas for action

32. To understand which areas should be a priority, Defra reviewed existing data showing waste generated across the economy. The intention of this scoping work was to understand which sectors and waste streams produced the most significant quantities of waste, the reasons for this, and the opportunities to reduce its production. A number of factors were considered during this work to ensure a balanced view of priorities was obtained, and to ensure the different aspects of waste prevention, as defined in the

² It should be noted that the costs of waste prevention are relatively poorly understood.

waste framework directive (reduction of quantity, adverse impacts of waste and hazardous substances) were explored:

- tonnage of waste produced – most data on waste arisings is collected in this form, and waste arisings trends are observable
- carbon impact of the waste – carbon is used to provide a proxy for the environmental impact of the waste created
- the hazardous nature of the waste.

33. Additionally, consideration was given to materials which have been highlighted by stakeholders during informal discussions, for example, waste electronic and electrical equipment (WEEE), “bulky” household waste (furniture), and carrier bags.

34. On the basis of the size of impact, using the factors outlined above, the following areas have been identified as priorities:

Food waste

- Approximately 15Mt of food and drink are wasted each year¹⁸. Just over half of this (7.2Mt) is from households. A further 3.5Mt arises from food manufacture, retail and distribution. The remaining 25% is from areas like the hospitality sector, prisons, schools, other public sector premises and other businesses.
- Much of this (>60% of household food waste) is 'avoidable', i.e. it could have been eaten at some point prior to disposal. However, some food waste (e.g. teabags, bones) is unavoidable.
- Emissions of 3.8tCO₂e are caused by the production, transport and disposal of each tonne of food waste. UK householders spend £12bn every year on food that could have been eaten but ends up being thrown away. Waste in the UK food industry is estimated at £5bn per year.

Textiles

- Around 2.1Mt of textiles (clothing, non-clothing and carpets) are discarded each year.
- Post-sorting prices for the highest quality graded reuse clothing can rise above £2000/t.
- It is estimated that £140m worth of used clothing goes to landfill each year.
- Extending the average life of clothes by 3 months of active use per item would lead to a 5-10% reduction in each of the carbon, water and waste footprints and around £2bn in resource costs.¹⁹
- Households can benefit by over £170m per year as a result of sale of items through reuse exchange and avoiding purchase of (more expensive) new items.²⁰

Construction and demolition wastes

- Accounts for 44% of waste produced in England (by weight).

Paper and Card

- Approximately 25% of C&I and 17% of Household waste is composed of paper and card. For each tonne of paper waste avoided, 1.5tCO₂e is avoided.

Chemical and healthcare sector wastes

- The chemicals and non-metallic minerals manufacturing sector³ accounted for 8% of the total C&I waste arisings in 2009, generating 3.8Mt of waste⁴. The chemicals sector alone generated 1.8Mt of waste, of which 703 thousand tonnes (kt) were estimated to be hazardous waste.⁵

Furniture and other bulky items (particularly from households)

- Only about 17% of sofas discarded each year are reused.
- Providing 1t of sofas for direct reuse e.g. second-hand shop or eBay can result in a net GHG saving of 1.45tCO₂e. This is approximately 55kgCO₂e per sofa.
- Households benefit by over £320 million per year as a result of sale of items through reuse exchange and avoiding purchase of (more expensive) new items.²¹

Waste electrical and electronic equipment

- Between now and 2020, the UK will dispose of 12Mt of waste electrical and electronic equipment (WEEE). A quarter of this will be IT equipment, consumer electronics and display devices which collectively contain around 63t (£1bn) of palladium, and 17t (£350m) of indium. The gold alone contained in all the electrical and electronic equipment purchased in the UK each year is worth around £350m.²²
- Research undertaken by WRAP shows that almost a quarter of the WEEE taken to household waste recycling centres each year has a reuse value, which could deliver £200m gross revenue each year.²³

Q2. Do you agree/disagree with the priority areas identified (para 34)? Please give your reasons.

Q3. Are there other sectors or waste streams you consider should be a priority area for action? Please provide supporting evidence.

³ For the purpose of the National Survey, waste statistics for the chemicals sector are incorporated within the following category 'Manufacturing of chemicals and non-metallic minerals'. This wider sector includes: manufacture of chemicals and chemical products, manufacture of other non-metallic mineral products, manufacture of rubber and plastic products and manufacture of basic pharmaceutical products and pharmaceutical preparations.

⁴ Approximately 60% of the waste generated by the chemicals sector is chemical waste. This comprises solvents, acids/alkalis, used oil, catalysts, wastes from chemical preparation, residues and sludges.

⁵ Figures exclude the North West region.

Measuring waste prevention

35. There are evident difficulties in measuring waste prevention. The European Commission has suggested a number of metrics which could be used by Member States to assess the current status of waste prevention and to evaluate future performance of their Waste Prevention Programmes:

- quantities of collected waste per person
 - quarterly data is available for local authority collected waste⁶, but not for C&I waste. Population estimates are available.
- quantities of hazardous waste generated per person
 - annual data is available for hazardous waste arising.
- public awareness of and declared actions for waste prevention
 - no regular system for collecting information on public attitudes for waste prevention
- use of waste preventing services e.g. repair and reuse centres
 - no regular system for collecting information on existence or use of waste preventing services
- consumption of ecolabelled products
 - no regular system for collecting information on consumption of ecolabelled products
- percentage of citizens covered by a pay-as-you-throw scheme
 - no citizens are covered by a PAYT scheme. If they were implemented by local councils this would be measurable.
- products covered by producer responsibility schemes
 - data is collected on products covered by existing producer responsibility regimes (packaging, end of life vehicles and batteries, WEEE)

36. Other metrics which could be used include:

- quantity of waste generated by unit of Gross Domestic Product, or Gross Value Added (GVA – a measure of economic output by sector)
 - GVA estimates available by sector. Quarterly data is available for local authority collected waste, but not for C&I waste. There are currently no planned future surveys.
- quantity of waste generated by unit Household Final Consumption Expenditure
 - Household Final Consumption Expenditure estimates available. Quarterly data is available for local authority collected waste, but not for C&I waste.

⁶ Local Authority Collected Waste is all waste managed by local authorities. Around 90 per cent of this is household waste, the rest being mainly from businesses and construction.

Q4. Do you support the use of any of the metrics proposed (para 35-36)? If so, which one(s)? Why? Please provide data sources.

Q5. Are there alternative metrics that you have considered and / or used to measure waste prevention, including at sector, product or material level? Please provide details.

Q6. What do you think it would be realistic to achieve over the next 10 years? Please provide details of the metrics you would use to measure this, and any supporting evidence.

Section Three: Business

37. The generation and management of waste represent an inefficient use of resources with economic implications; waste costs money, typically up to 4% of business turnover.²⁴ Undertaking actions or measures which minimise the amount of waste produced and make best use of resources makes business sense. Changing wasteful practices can make a significant financial contribution to businesses and can help increase their competitiveness. Implementing these measures will be key to moving to a more sustainable economy, and they have the potential to boost employment.

Waste arisings

38. Commercial and industrial waste generation amounted to 48Mt in 2009¹⁴, showing a decrease from 56Mt in 2008. Of this total, 52% was recycled or reused⁷ and 24% sent to landfill.

39. The figures below show the tonnage and carbon impact of C&I waste arisings by waste stream and a breakdown of waste arisings by business sector.

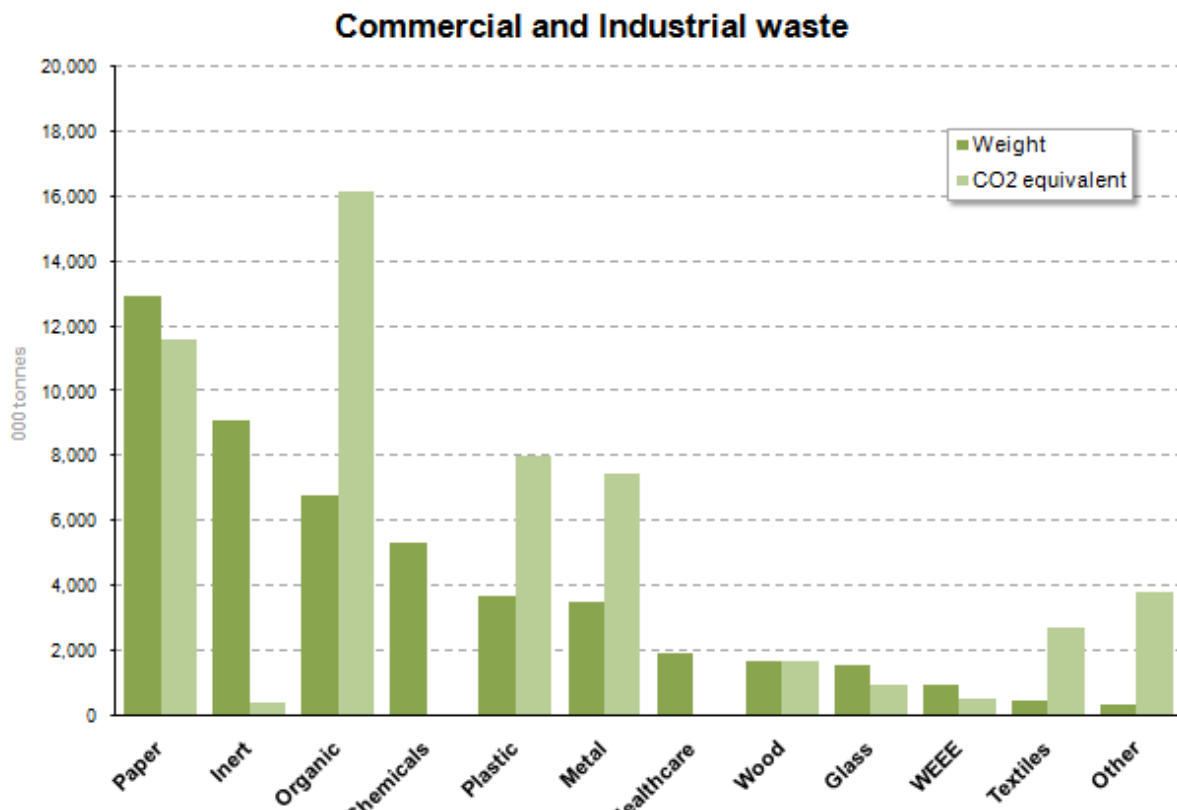


Figure 11: Composition of Commercial and Industrial waste by tonnage and carbon impact, Defra 2009

⁷ Data on reuse are being reviewed to account for inconsistencies between the methodology used in the Commercial and Industrial Waste Survey 2009 and the definition of reuse contained in the revised Waste Framework Directive.

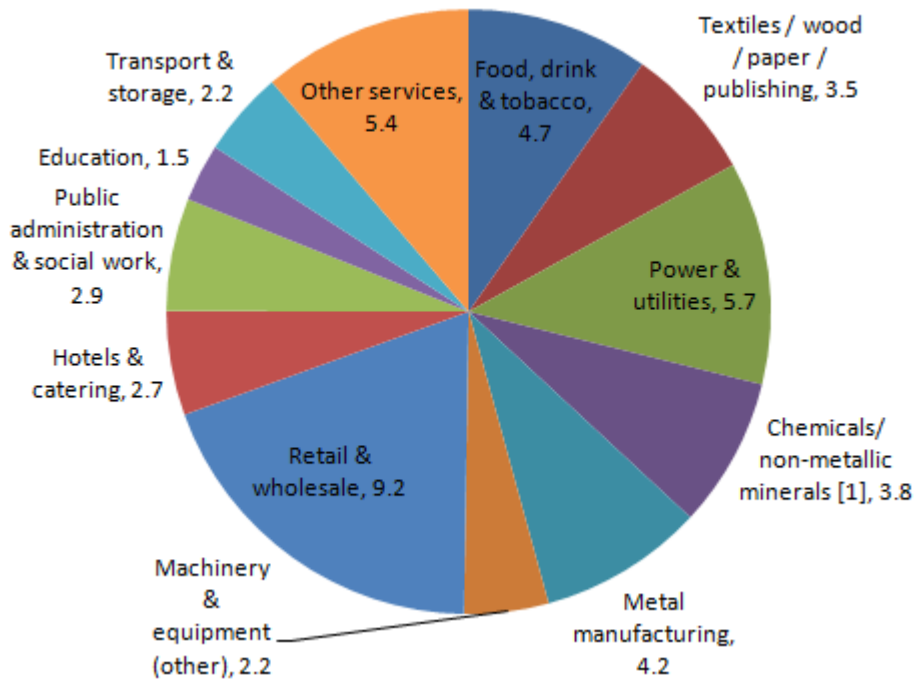


Figure 12: Breakdown of waste arisings by sector (Mt), Defra 2009

40. It is important to note that there are a number of limitations to the data available on C&I waste. Carbon factors are not available for all wastes, therefore the carbon impact of some wastes is not known. Some materials will show as zero. In addition, direct comparison between the business sector results of previous surveys and the results shown in the graph above is complicated by the fact that older surveys used a different business classification and subsequently some business types have moved between sectors in the scheme used in the 2009 survey²⁵.
41. The latest data available shows that 77Mt¹² of construction and demolition waste was generated in England in 2010. This represents a decline from 86.9Mt in 2008. Figure 13 shows tonnage and carbon impact for construction and demolition waste, by waste type based on 2010 data.

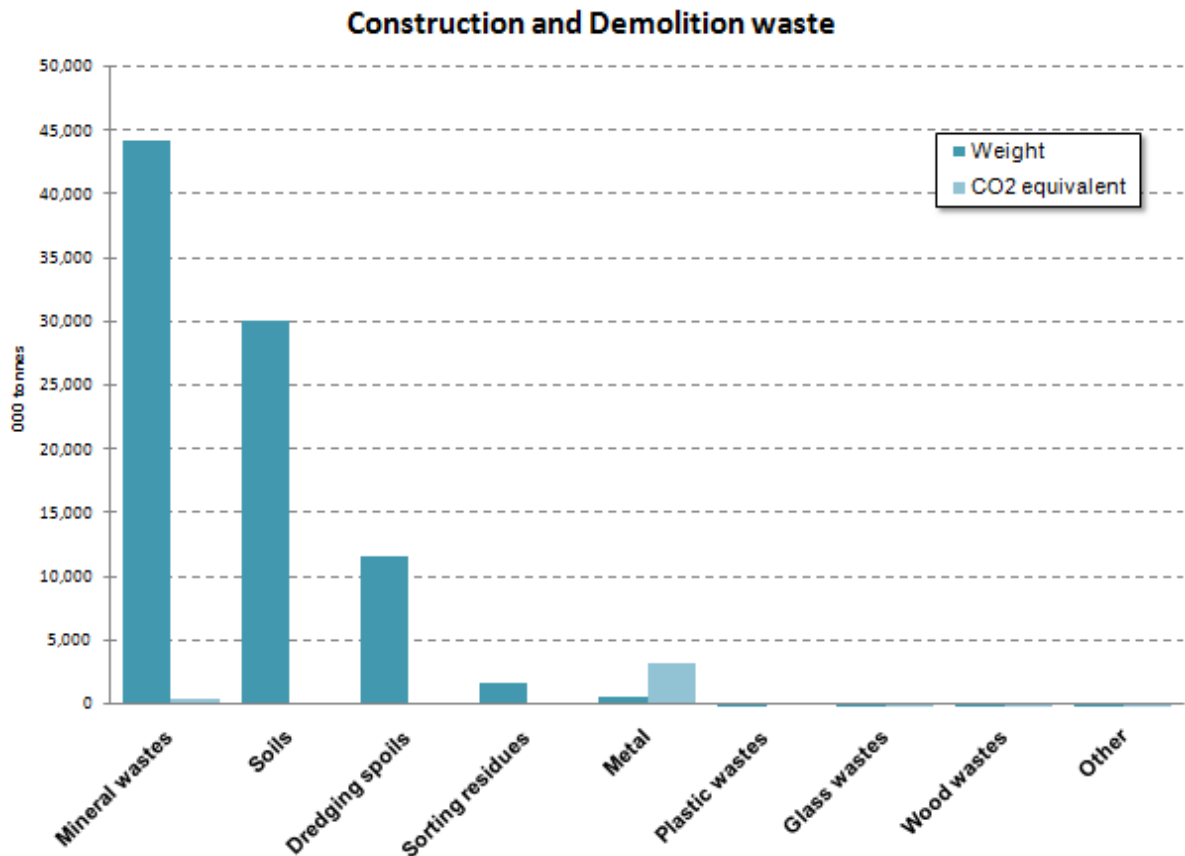


Figure 13: Composition of Construction and Demolition waste by tonnage and carbon impact, Defra 2010

Q7. Can you provide data for your business or, if possible, your sector on the following:

- a) the amount and composition of waste generated in past years; and/ or**
- b) future projections of waste arisings.**

Reuse, remanufacture and repair

42. Reuse and remanufacture can play an important role in preventing waste by extending useful life of products or materials, and recovering their value before they become classed as waste. A wide spectrum of activities can be pursued by businesses from simply exchanging surplus materials or end-of-life products (i.e. industrial symbiosis) with other businesses, rather than disposing of them, through to remanufacturing and the financial benefits that this activity can offer (including the higher profit margin that remanufactured goods can command over new goods).

43. Research recently commissioned by Defra²⁶ estimates the levels of material reuse and product remanufacture (including refurbishment) for 2012 in the commercial and industrial business sectors to range between 190kt to 330kt. This represents less than approximately 1% (ranging between 0.4% and 0.7%) of the total commercial and industrial waste generated in 2009. It is difficult to establish to what degree the overall contraction of the economy since 2008 would have affected businesses and waste flows to date. Nevertheless, tough commercial conditions tend to lead to efficiency improvements and lowering of costs by looking to alternative procurement options such as reuse. It is therefore likely that the overall waste streams have shrunk whilst the proportion that is reused has grown.

44. In 2009 a survey conducted by the Centre for Remanufacturing and Reuse (CRR)²⁷ attempted to identify and capture remanufacturing and reuse activity at a sectoral level in the UK. The total turnover for the sectors most relevant to remanufacturing and reuse was calculated to be £65bn. Figure 14 provides a breakdown of these sectors.

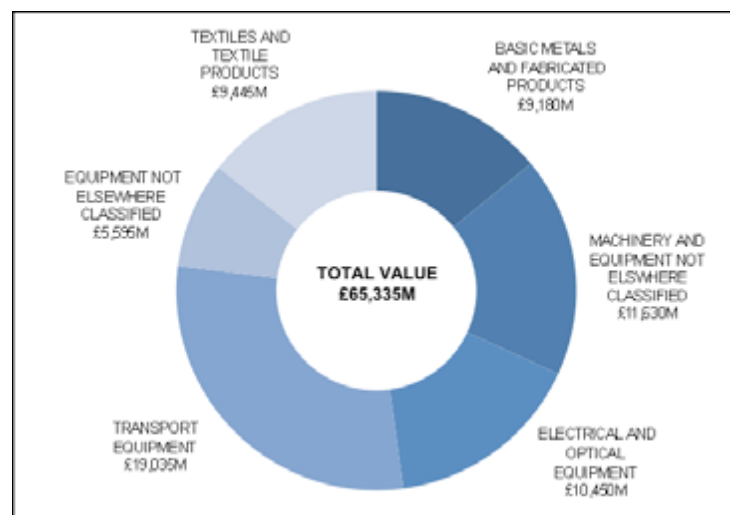


Figure 14: Turnover of the manufacturing sectors which have most relevance to remanufacturing (£m), CRR 2009²⁷

45. Defra commissioned research²⁶ to understand changes in reuse levels since the 2009 CRR survey choosing four sectors (tyre retreads, automotive, off-road equipment, and pumps, compressors and fans) as a focus. Indications from a small sample of interviews suggest a variable picture of change across these sectors, ranging from 15% decrease to 50% increase. In contrast to the manufacturing sector, remanufacturing appears to have been less affected during the economic downturn. The combination of closed loop products and product-service orientated business models may make it more resilient to economic fluctuations.

46. Within the construction business sector, the level of reuse is reported to have been declining over recent years. Research recently commissioned by Defra²⁸ (examining construction and demolition reclamation and salvage) estimates that 750kt of reclaimed construction products and materials were traded in 2011, compared to 1.79Mt for

England in 2007 and 2.37Mt in 1998. The continuing downward trend in reclaimed materials trading could be due to a number of factors. These include a reduction in construction activity due to the economic climate, a reduction in the waste produced, demolition products being recycled rather than reclaimed, reclamation companies going out of business or diversifying into reproduction products, construction industry reusing materials and products directly on site, growing numbers of community recycling schemes collecting reusable construction materials and changes to working practices which result in materials being recovered in a condition that hinders reuse⁸.

47. We are not aware of any existing published data on reuse of new surplus construction waste either on site or at the distribution centre. Figures may not be generated since this material never enters the waste stream. While there is anecdotal evidence that some reuse does occur, it is likely that the levels of reuse achieved are very low. The most recent estimate is that 11Mt of construction site surplus (worth £1.5 billion) is wasted each year. Research recently commissioned by Defra²⁶ suggests that at least 10% of this is suitable for reuse.

Q8. Can you provide examples of reuse activity or any other activity that fits within the definitions of reuse, remanufacturing or repair provided in paragraph 10 that you are undertaking, including start-up and running costs, savings and the scale of benefits (both monetary and non-monetary) where possible?

Q9. Can you provide data for your business or, if possible, your sector on any of the following:

- a) annual levels of reuse and/ or remanufacturing;**
- b) trends that have been recorded in the past;**
- c) future projections?**

Q10. What do you think are the factors that have influenced the levels and trends in reuse, remanufacturing or repair? Please make clear if this is from your own experience or from the information provided above.

Q11. Do you have any evidence of the current market value, and areas for growth of reuse, remanufacturing or repair in your business and/or sector? Where do key opportunities for expansion lie, by product category (e.g. furniture, WEEE)?

⁸ one example cited is the Work at Heights Regulations 2005

The benefits of waste prevention to businesses

48. For businesses themselves, waste prevention may represent financial opportunities, as set out in paragraph 26.
49. Given rising costs and supply concerns around a broad range of natural resources that are of importance to economic prosperity²⁹, it is in the interest of businesses to reduce their material requirements. Cost savings and reduced exposure to material supply risks are not the only benefits to businesses that act to prevent waste. Businesses can also benefit from a better brand image and a competitive advantage, for instance, from getting ahead of new environmental regulations. Potential business opportunities also include developing new products with extended lifetimes, or developing longer-term customer relationships through new business models which involve product leasing, long-term maintenance, or product take back schemes whereby products are returned for reuse and remanufacture.

Barriers and Behavioural Challenges

50. Evidence¹⁶ demonstrates that opportunities for increased productivity, efficiency and cost savings are the key drivers for waste prevention activity. The same evidence suggests that cost of waste disposal alone may not be enough to motivate all businesses (e.g. in some service sectors). In addition, the true costs of the waste produced (i.e. raw material and labour costs embedded in waste products) are not always obvious and so some of the drivers for change are reduced. By way of illustration, a study from WRAP has estimated cost **savings** from waste prevention within the UK food and drink supply chain of **£500 per tonne** in manufacturing, **£1088 per tonne** in distribution and **£1676 per tonne** in the retail sector compared with **£70 per tonne** from landfill diversion.³⁰
51. As noted earlier in the discussion on market failures, constraints on the availability of resources, such as finance, staff capacity (including management) and time represent key barriers to waste prevention. The business evidence review of waste prevention¹⁶ undertaken for Defra identified corporate culture that is unsupportive of waste prevention efforts, lack of leadership commitment and a failure to integrate waste prevention activities across business as important barriers to successful waste prevention.
52. This is likely to be particularly the case when changes from a sales-based to a service-based approach are considered. The adoption of a service-based approach requires a reorientation in thinking from the very top of the organisation and a redesign of the company's business model. Often, when ownership of products remains with the service provider a substantial capital investment in the inventory of products is needed. Lack of access to such investment can be a significant barrier particularly for small, innovative companies wishing to challenge the status quo. The review identified lack of certainty over security of payback of investment, or where the payback is likely to be over a long period of time as a significant issue.

53. The same report suggested a shift to a service-based approach could also affect how assets are recorded on a company's balance sheet which can have subsequent impacts on the ability of that business to secure external investment. Quality data are needed to make the business case for alternative or innovative business models, to overcome concerns about the risks associated with payback of investment or the likelihood of the model being successful.
54. Another barrier is represented by lack of customer demand. Although customer demand is starting to encourage businesses to pay attention to environmental performance, customers are rarely making demands for waste prevention specifically. Nevertheless, final consumers and business customers may be interested in businesses reducing the hazardousness of waste. Influence from upstream supply customers, for instance by specifying chemicals that cannot be included in any of their products lines can lead to manufacturers replacing hazardous substances and materials with non-hazardous alternatives.
55. There have been suggestions that with recycling for recovery and landfill diversion relatively widespread, it can become a barrier to investigating and acting on waste prevention at source.¹⁶ This is strongly evidenced within the construction sector where, for example, crushing hard-core and using it as backfill or aggregate on-site leads to a significant reduction in waste generation but at the expense of more sustainable and profitable business practices, such as reducing wastage of unused construction materials and deconstruction followed by preparation of reclaimed materials for reuse. In more general terms, competition with recycling and energy from waste may also be perceived as a barrier to the adoption of reuse practices.

Q12. What do you think are the factors that have influenced the uptake of waste prevention activities by your business and / or sector? Please provide examples.

Q13. Do you have any evidence or case studies of the impact on waste generated of preventative actions taken? Please provide details including costs and benefits.

Q14. Do you have any evidence that incentives help to drive waste prevention and/ or reuse behaviours?

Q15. Do you have any evidence of where targets have driven waste prevention and/ or reuse behaviours?

Q16. Do you agree with the barriers we have identified? Are there any other barriers that you have experienced to preventing waste that you consider to be of particular relevance to your business and/or sector? Please provide examples. (para 49-54)

Q17. Which barriers do you consider should be priority areas for action? Why?

What has already been done?

56. Over the last few years businesses and government, either alone or in partnership, have taken action to reduce waste generation. Concerted action has been paramount in addressing key waste streams, and moving towards realising the financial and environmental opportunities that preventing waste can offer.
57. Defra and WRAP have developed a number of voluntary agreements and responsibility deals with businesses to bring through successful changes in business practices. These have primarily aimed to support businesses in overcoming informational barriers in terms of the benefits of reducing waste, and in supporting joint action in individual sectors to drive a wholesale change. Those agreements have a track record of cost savings through reducing waste and efficient use of resources. For example:
- The Construction Commitment: Halving Waste to Landfill has successfully halved the amount of waste sent to landfill by 2012. It involves over 800 signatories and has encouraged waste prevention and diversion clauses into £43bn worth of construction contracts.
 - The Courtauld Commitment has been successful in reducing food and packaging waste in the grocery supply chain. It involves over 50 major retailers, manufacturers and brands in the food and drink sector. WRAP has recently published the results on progress for Year 2 (2011) of the second phase of the Courtauld Commitment. Those show that good progress has been made against all targets. The target for reducing product and packaging waste in the grocery supply chain has been exceeded, with an 8.8% reduction achieved against a target of 5%.
 - More recently, the Hospitality and Food Service Sector Agreement was launched in June 2012. This is a new voluntary agreement between the UK Government and the hospitality and food service sector, which includes restaurants, hotels, caterers and pubs to reduce food and packaging waste by 5% by 2015.
58. Government has been actively working to facilitate the take-up of waste prevention approaches, including helping businesses to overcome key barriers. In March 2012, Defra and BIS launched the 'Resource Security Action Plan: Making the most of valuable materials' (RSAP).²⁹ The RSAP looks at the business risks and financial / environmental opportunities of non-energy and non food materials (principally metals

and minerals) and sets out high level actions to build on the developing partnership between government and businesses. Most of the actions aim towards increasing material efficiency. Using resources more efficiently, innovating, reusing, remanufacturing or recycling materials will boost the resilience of UK businesses.

59. Defra and BIS commissioned a report that investigated the feasibility of applying the principle of Individual Producer Responsibility more generally to the WEEE system. Such a model could give producers an incentive to prevent waste through a more direct relationship between the costs of disposal and the individual product they produce. The report was published in August 2012³¹ and its findings will form part of the wider evidence base that will lead to the development of proposals for revised WEEE Regulations in the UK. These will be effective from 2014 and a consultation paper seeking the views of stakeholders will be issued in the first quarter of 2013.
60. Government has also taken action to help businesses overcome information and financial barriers. Through WRAP, we have developed waste prevention toolkits, training materials and illustrative case studies to enable businesses to make better informed decisions as they develop greater awareness of the benefits of waste prevention (e.g. guidance on how to design out waste³²). Most recently, the Technology Strategy Board (TSB) launched a design competition: **New Designs for a Circular Economy**³³. This initiative is intended to help businesses rethink the way products, components and systems are designed so as to retain or regenerate materials and components within the economy over several cycles of use. The TSB is to invest up to £1.25m in feasibility projects. The first round of the competition ended in December 2012, and the second round opened on 11 February 2013.
61. Behavioural change relating to waste prevention is also being aided through the Waste Prevention Loan Fund (WPLF)³⁴, a £1.5 million fund administered by WRAP on behalf of Defra. Although reducing waste at source will benefit businesses directly, there is a time difference between the investment and the time required to implement changes, and the flow of benefits. The WPLF is intended to help reduce the barriers to changing business practices due to initial costs by supporting organisations to introduce business models and processes which make more efficient use of material resources. The WPLF sits alongside a capital grant scheme designed to help support product reuse and repair for SMEs.³⁵
62. Many businesses have taken action to realise some of the potential savings available through the more efficient use of resources and minimising waste, including reuse. Evidence from a survey of businesses conducted on behalf of Defra in 2009 reports that 41% of SME reported taking actions to reduce their waste.³⁶ For example, businesses exchanging excess raw materials with others instead of disposing of them is a well documented practice (known as industrial symbiosis) in a number of sectors, including chemicals, automotive and construction and demolition.
63. There are also increasing numbers of examples of businesses adopting innovative business models. Examples over the years include the provision of a service based

upon delivering agreed levels of performance or outputs, or providing short and long-term hire and leasing of products. The latter type of model drives a longer term approach to product durability, with longer service life, lower maintenance load and lower use of materials and CO₂. Examples of businesses taking action and adopting business models that extend product life through remanufacture and reuse, and service-based approaches are provided below. A map showcasing a range of alternative or innovative business models³⁷ has been developed by WRAP.

64. Product standards have also been used by businesses to set requirements for the aspects of product design and production which can contribute to waste prevention, e.g. reduction in hazardousness of materials used, ease of disassembly and expected product lifetime. Businesses use a wide range of voluntary and mandatory product standards including ISO, CEN and BS, EU Ecolabel and Ecodesign, and independent standards like FSC and MSC. Some of these include specific criteria aimed at reducing waste.

Innovative Business Models – Case studies

- Caterpillar (CAT), the world's largest maker of off-road vehicles, construction and mining equipment, is a high profile pioneer of remanufacturing. CAT not only makes new products but also takes back old components, cleans and remanufactures them, and sells them again. The Caterpillar remanufacturing business model is based upon incentivising customers to return worn out products via its dealer network through a financial deposit system. (Sources - Business Waste Prevention Evidence Review, Defra November 2011; RSAP, Defra and BIS March 2012)
- Ricoh, provider of managed document services, production printing, office solutions and IT services, has committed to reduce its overall input of new resource by 25% by 2020 by maximising reuse of parts and products, extending product lifetimes through remanufacturing and substituting with lower risk materials. The company operates a 'Comet Circle' to embed the practice of closed-loop resource use and believes that all products should be designed for reuse (Source – RSAP, Defra and BIS March 2012).
- Over the last decade, a solid business has developed in the provision of Chemical Management Services (CMS). CMS involves a supplier of chemicals taking substantial responsibility for the specification, use, recovery and even reuse of those chemicals by the customer. This is typically sold as a financial opportunity for both parties, with performance incentives linked to a baseline consumption which reduces overtime. CMS has made substantial inroads in heartland engineering such as automotive, aerospace, electronics, food and drink and machine shops sectors, where the application of chemicals is not a core competence and may safely be outsourced to a third party without threat to operations. (Sources - Business Waste Prevention Evidence Review, Defra November 2011)

Q18. Do you have any evidence or case studies of alternative / innovative business models that have been adopted, both those that have or have not been successful? Please provide information on the scale of costs and benefits of these business models if possible.

Q19. Do you have any evidence of where in the supply there is the greatest potential to reduce waste arisings?

Section Four: Consumers and Communities

Waste arisings

65. Household waste accounts for 13% of total England waste arisings. In 2010 household waste generation³⁸ was 24Mt, continuing the year on year fall since 2007/08 when it was 25.8Mt. Figure 15 shows tonnage and carbon impact for local authority collected waste, by waste type, based on 2010 data.

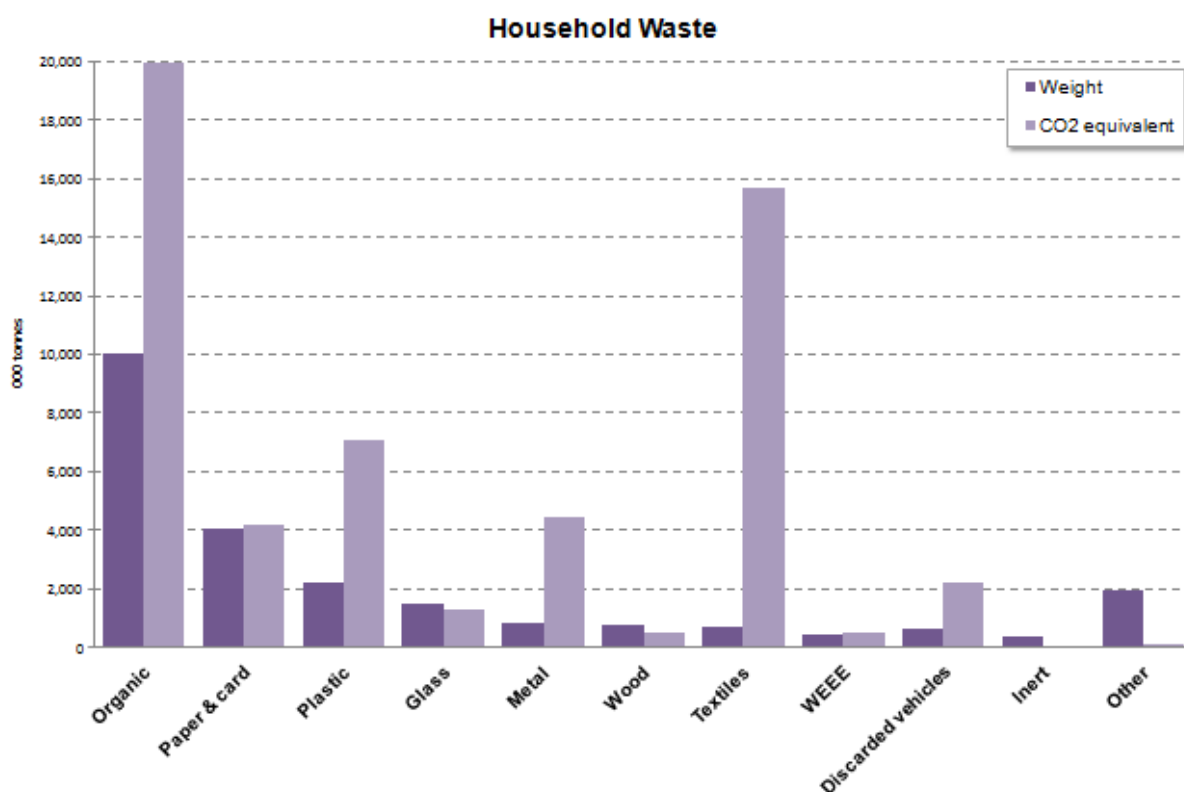


Figure 15: Composition of Household waste by tonnage and carbon impact, Defra 2010

Consumption patterns

66. The way we consume goods and services in the UK has changed considerably since the 1950s. At this time, mass market household electrical goods first became available to the average householder; today, on average, each person buys 3 new electrical items each year.³⁹ The way in which consumers purchase goods has also changed over a short time. Since 2000, the amount Britons have spent shopping on the internet has risen from a yearly total of £0.8bn to an estimated £58.8bn in 2010.⁴⁰

69. Understanding the way in which householders purchase goods and deal with their possessions at home is important when considering how household waste arisings can be reduced in the future. A survey commissioned by Gadget Show Live Christmas⁴¹ found that households in the UK have £320 worth of unused gadgets in their homes. 41% of those questioned have previously traded in old mobile phones for money, but less than a quarter have traded in other gadgets. At the same time, research¹⁹ shows

that the average UK household owns around £4,000 worth of clothes, 30% of which hasn't been worn for at least a year.

70. Evidence⁴² demonstrates that there are several considerations behind the decisions consumers make when purchasing goods. These include:

- price - a key driver
- whether the price represents good value for money
- product desirability and whether they allow the purchaser to keep up with trends, fashion and/ or peer pressure
- social standing
- quality and durability
- practical need versus impulse purchase
- confidence and trust in the seller (e.g. if things go wrong)
- credit terms
- ethical and environmental reasons
- aesthetic or technical obsolescence

71. Recent research indicates that consumers are keeping households goods for longer before they replace them.⁴³ There has been an increase in sharing cars, machinery, and even articles of daily use (i.e. collaborative consumption).⁴⁴ Second hand purchases have increased, and it has been reported that UK Internet searches for second hand goods increased by 22% over the 12 months of 2007-2008, while Classifieds websites experienced a 47% increase in traffic over the same period.⁴⁵

Waste prevention, reuse and repair patterns

72. Research commissioned by Defra⁴⁶ shows that waste prevention is not one but many, varied behaviours. The most popular activities are donating goods to charity and undertaking small reuse behaviours around the home.

73. Activities which prevent the generation of waste tend to be focused around the use of reusable items in place of disposable items (e.g. carrier bags) which are not always recognised as a waste prevention action, or those which result in less waste of food.

74. There are two main reasons for throwing away food – it is not used in time or too much is cooked or prepared. The most wasted foods include bread (32% of all edible purchases wasted), followed by vegetables (24%) and potatoes (24%). UK annual household food waste had decreased by 13% or 1.1mt since 2006/7. This is likely to be partly due to current food price inflation. Consumers can take simple steps like planning shopping and meals carefully, using up leftovers, measuring portion sizes properly so they don't cook too much, and making use of their freezer to reduce their food waste. Factors cited by WRAP as to why food is wasted include; food gone past its use by or best before date, tempted by special offers, made too much food, buying too much and tempted by multi-packs.

75. The reuse of products extends their life, reducing the speed at which an item becomes waste. Where the reused item displaces the purchase of a new item, this reduces the amount of waste produced. Figure 16 below provides an illustration of the different routes used to dispose of an item.

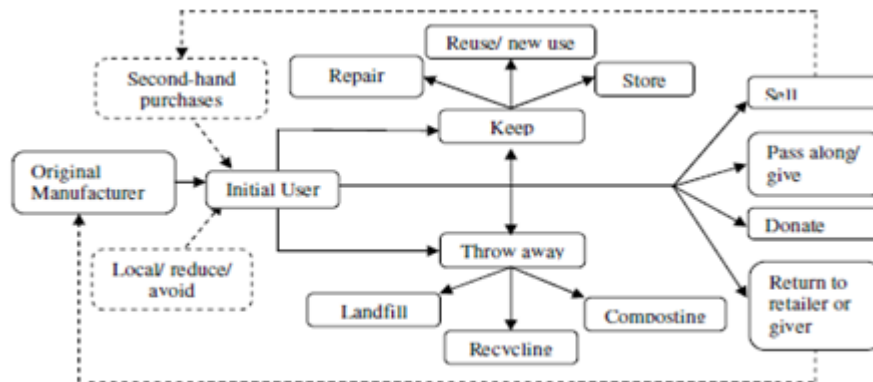


Figure 16: The extended disposal cycle

76. Reusing goods encompasses a wide range of diverse activities. Consumers currently reuse goods in many different ways: in the home, through friends and families, and through 3rd parties (e.g. Charity shops or eBay). Many of these activities may not be thought of as reuse by those taking part. For instance, many people buy second-hand cars or pass on children’s clothes to friends and family without considering it as a reuse activity. Other everyday examples include the purchase of retreaded tyres or the hire of occasionally required items such as cars or DIY equipment. When asked to think of reuse activities, many people think of charity shops, car boot sales or jumble sales. Other simple waste prevention measures which are considered “normal” can include buying reusable products or having shoes and clothes repaired. These factors will affect the reliability of data in this area.

77. Recent research commissioned by Defra⁴⁷ shows that most people are using charity shops (66%), friend, family, colleague or acquaintances (52%) and door to door collection (46%) to sell or donate at least a proportion of their unwanted items. It also estimates that 68% of people use on line auction sites (e.g. EBay) to buy a product or item, 60% use on line retail sites which sell second hand items (e.g. Amazon or ASOS) and 53% buy second hand items from charity shops. The research identified clothing, media and toys being the most likely second hand items to be acquired. Based on a 2006 survey, 1 in 7 objects in the UK home is from a second-hand source.⁴⁸

78. It is clear however that products are not always used for their full life. WRAP estimates that only 7% of WEEE disposed of at Household Waste Recycling Centres (HWRCs) is reused, despite the fact that 23% of the total WEEE collected is still working.⁴⁹

Q20. Do you have any evidence of the types and quantities of waste prevented by individual or community action? Please provide details where possible.

Q21. Do you have evidence on the impact of purchases of pre-owned/ second hand goods on the level of displacement*?

*** In this document displacement is intended as the avoidance of the purchase of a new item or product as a result of the purchase of a second hand item or product**

Q22. Do you have any evidence of the level of repair being undertaken by consumers, either through DIY repair, or through access to commercial/voluntary services?

Q23. Do you have any evidence of areas for growth for demand of second hand/ pre-owned goods? Where do key opportunities for expansion lie, by product category (e.g. furniture, WEEE), and/ or channels (e.g. charity shops)?

The benefits of waste prevention to consumers and communities

79. Financial savings achievable for consumers through waste prevention have not been fully explored. Work undertaken by WRAP provides examples of the scale of savings that can be made, for example £12bn is spent by households on food which is wasted.¹⁸
80. As discussed above, almost a quarter of all WEEE taken to HWRCs is still working, and could be reused. This represents a gross revenue opportunity of **£200m** each year. WRAP's estimates also show that the reuse market potential for textiles is likely to be over **£250m** each year.
81. Overall, estimates show that increasing the reuse of key household products, such as clothes, household appliances and electrical equipment could reduce UK greenhouse gases (GHGs) emissions by an average of 4MtCO₂e between now and 2020. The reuse of products could save households £1bn and also create jobs⁵⁰.
82. Actions taken by households that result in a reduction in the amount of waste that needs to be collected also have the potential to benefit local councils through a corresponding reduction in disposal costs.

83. Communities and community groups will receive different benefits to those felt by individual consumer from waste prevention and reuse actions. Although more difficult to quantify, these are likely to include volunteering, training and job opportunities through community based reuse and repair services. These social enterprises and charities involved often aim to support disadvantaged groups rather than just promote reuse. Involvement in the reuse sector is one of the activities which supports these broader aims. The provision of greater quantities of goods for reuse will allow those with limited disposable incomes to gain access and is likely to play a role in social inclusion.

Q24. Do you have any evidence of the benefits to consumers and communities through waste prevention and reuse actions. Please provide details or economic, social or environmental benefits where possible.

Barriers and behavioural challenges

84. There are many factors which impact on how we behave. These include both situational factors and behavioural factors. The interaction between these will be different for each individual. The figure below provides a summary of these.

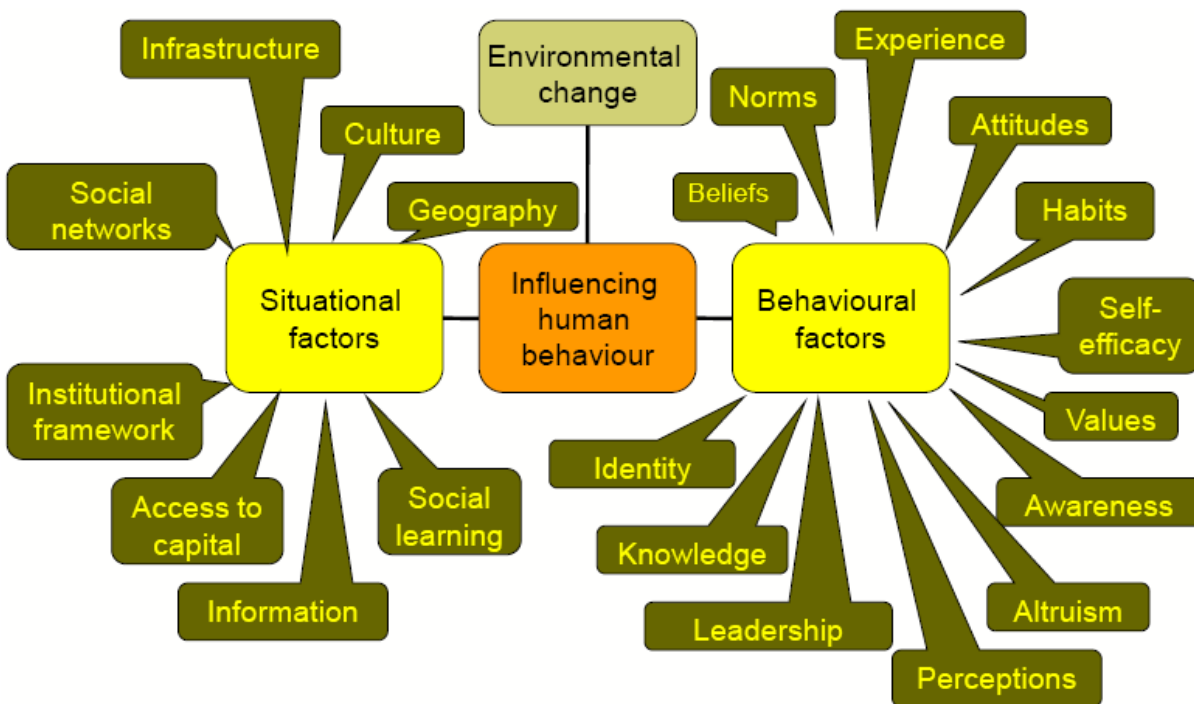


Figure 17: Factors contributing to human behaviour⁴⁶

85. Generally, behaviours which deliver, or hinder waste prevention activities are based on ingrained habits, as well as a lack of conscious awareness, with cost likely to be a motivator of such behaviours. Impacts may not be as intended (e.g. buying second-hand goods gives people access to mainstream products at lower price). The lack of

visibility of waste prevention behaviours may inhibit action as they are less likely to become a 'social norm'. Reuse in particular remains a hidden activity. It is difficult to record and is rarely recognised as such by householders. As explained above, individuals may not consider 'normal' actions like the passing on of items to family and friends as reuse.⁵¹

86. A review of the evidence base on understanding and influencing behaviour, drawing on research from academics, Defra and other organisations identified four key areas to waste prevention behaviours:

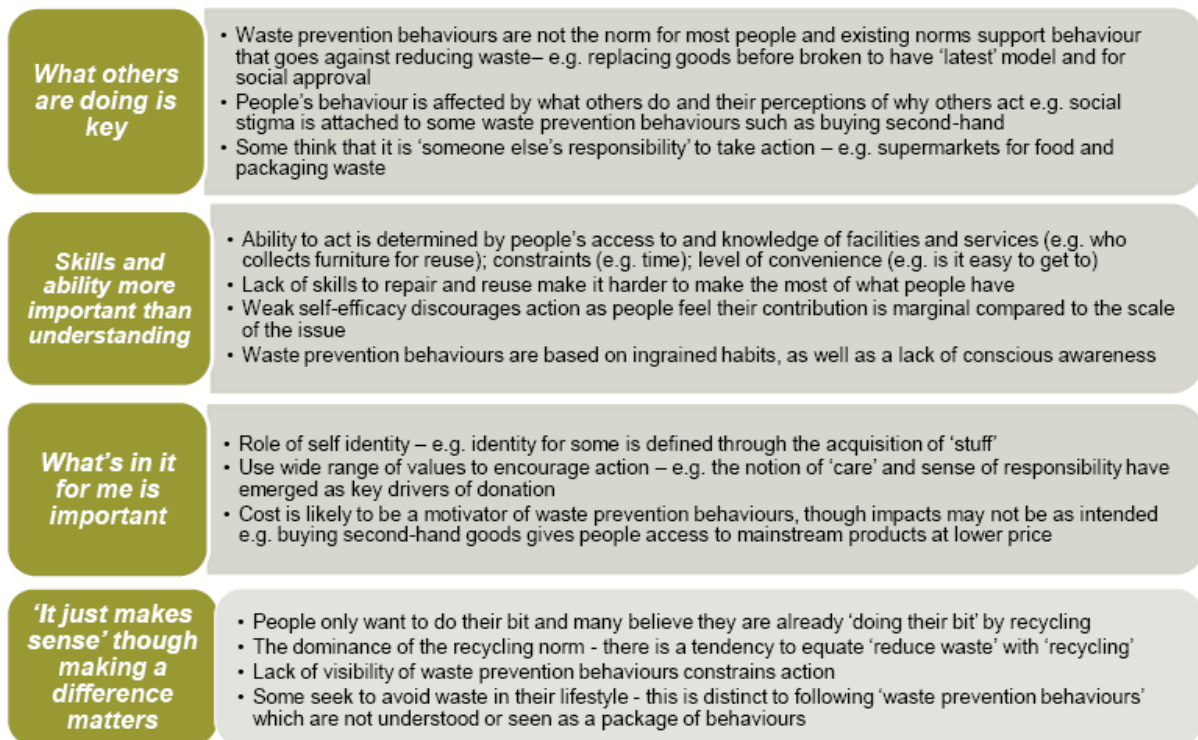


Figure 18: We know why people are acting and why they are not

87. Consumer behaviour is affected by what others do and their perceptions of why others act (e.g. the social stigma that is attached to some waste prevention behaviours such as buying second-hand). Some think that it is 'someone else's responsibility' to take action (e.g. supermarkets for food and packaging waste). Others want to take practical action whilst many believe they are already 'doing their bit' by recycling. In addition, action may be discouraged as people feel their contribution is marginal compared to the scale of the issue. Anecdotal evidence also shows that there is genuine confusion over whether recycling is a waste prevention activity; there is a tendency to equate 'reducing waste' with 'recycling'.

88. The ability to undertake waste prevention types of actions, as well as having the necessary understanding and skills to underpin such actions is paramount. The ability to act is determined by a number of factors including:

- people's knowledge of the issue and what actions they can take (e.g. confusion over food date labels, concerns over food safety)

- people's access to and knowledge of facilities and services (e.g. who collects furniture for reuse; where to buy reused goods)
- constraints (e.g. time)
- level of convenience (e.g. whether it is easy to get to or do)
- lack of skills to undertake self-repair or reuse to make the most of what people have.

89. The low cost of new items may provide little incentive for many to acquire used goods, or the cost of a replacement product may be relatively low compared with repair costs. Findings from recent research projects⁵² have shown that nowadays people have a range of motivations for purchasing second hand goods. These include:

- financial pressure
- the availability of items and the chance to get a bargain
- the opportunity to purchase unique and distinctive items at a reduced price (e.g. vintage)
- positive environmental reasons and supporting a charity and supporting local businesses
- occasional need for an item rather than hiring it.

90. However, research indicates that one of the main reasons why consumers do not buy second hand goods is because of their (perceived) risk of unreliability, and that consumers do not have any confidence in the product or trader if things go wrong. This is an indication that there is little understanding and confusion about the rights both consumers and traders have or the problems they need to be aware of when purchasing items via different routes.

91. Standards, guarantees or warranties may help increase consumers' confidence. For example, BIS has developed, in partnership with industry, a new process management specification for the reuse of electrical and electronic equipment (PAS141). In part, it aims to encourage the reuse of WEEE, reduce the amount of WEEE sent to landfill and assure consumers that used equipment has been tested, is prepared and safe to use, is functional, free of protected data and backed by a warranty.

Q25. Do you agree/ disagree with the barriers to prevention, reuse and repair we have identified? Why? (para 83-90)

Q26. Do you have any evidence of the impact that the economic downturn has had on consumer attitudes or behaviours?

Q27. Do you have any evidence of consumer attitudes to alternative consumption models, e.g. leasing, hiring?

What has already been done?

92. Over the last few years household waste arisings have shown a clear downwards pattern. This has been catalysed by a number of initiatives that have been taken by local and / or central government, householders, communities, third sector organisations, businesses and others, often working in partnership to maximise benefits achieved.
93. One role central government has taken has been to provide information, enabling consumers and others to make informed choices, for example, through the 'Love Food, Hate Waste' (LFHW)⁵³ campaign on food waste. LFHW has established a respected, credible and effective brand, materials and messages, working in partnership with a broad range of organisations (e.g. local councils, retailers and the food supply chain). Through LFHW, consumers have been helped to save money and waste less food by a combination of innovations such as resealable salad bags, meal planning, leftovers recipe ideas, and smaller size loaves of bread.
94. There are also many community schemes that are helping reduce waste arisings, as well as providing economic, environmental and social benefits. Two examples are highlighted in the box below.

Community Action – Case studies

- Community RePaint collect reusable, leftover paint and re-distribute it to individuals, families, communities and charities in need, improving the wellbeing of people and the appearance of places across the UK. In 2012, the Community RePaint national network saved over 380,000 litres of paint, donated by householders and businesses, going to waste with a market value of over £1.8m and redistributed over 218,000 litres of paint to community groups, charities, voluntary organisations and people in social need. (Source - www.communityrepaint.org.uk)
- The London Reuse Network collects and sells unwanted household items, giving them new homes in the capital. The Network has been set up to provide an integrated network of public and commercial reuse and repair facilities across London in partnership with local and national reuse organizations. It provides London residents with access to good quality affordable reused furniture, appliances, and various household items. In doing so, it aims to help support waste prevention goals, as well as creating job opportunities and supporting skills development and training, particularly for the underprivileged and long term unemployed. (Source – www.londonreuse.com)

95. Consumers themselves can also have an influencing role in changing supply chains. For example, in 2009, Easter egg packaging was cut by 25% and, in some cases, by as much as 50% by leading confectionery brands, manufacturers and retailers under the Seasonal Confectionery Working Group, partly in response to consumer pressure.⁵⁴

Q28. Do you have examples (case studies) of initiatives to encourage consumers and communities to take action to prevent waste or increase reuse, both those that have worked and those that have not? Please provide the evidence, inclusive of start-up costs and running costs, savings and the scale of benefits (both monetary and non-monetary) where possible.

Q29. What do you think are the factors that have influenced the uptake of waste prevention activities? Please provide examples.

Q30. Do you have any examples where repair of products has been promoted? Please provide the evidence, inclusive of start-up costs and running costs, savings and the scale of benefits (both monetary and non-monetary) where possible.

Section Five: Government and the public sector

96. Government can help facilitate a shift to practices which support waste prevention across the economy by providing a long term, clear policy framework for business, highlighting the benefits of resource efficiency through waste prevention and supporting collective action and leading by example.
97. National and local government have undertaken a variety of actions to support increasing waste prevention and reuse. These actions are outlined below.

National Government

98. Government is committed to leading by example in the way we manage our operations; driving efficiency and value for money, while reducing our impact on the environment. The Greening Government Commitments aim to significantly reduce the impact the government has on the environment: reducing waste and water usage and making procurement more sustainable. As part of this government has committed to reducing the amount of waste we produce by 25% by 2015 from a 2009/10 baseline.
99. Our performance in 2010/11 indicates a 5% reduction in waste across government. Five out of 21 departments met or exceeded the 2015 target of cutting waste arisings. A reduction in paper consumption of 24% in one year has also been seen, exceeding the target of a 10% cut so far. 2011-12 waste figures represent estimated savings of almost £4.7 million across Government against 2009-10 figures.⁵⁵
100. Public procurement can also play a powerful role. Procurement standards can be used to drive waste prevention, signalling market demand and driving innovation, for instance via Forward Commitment Procurement, which looks at purchasing from the outcome based specification need instead of purchasing for the immediate perceived need. This provides the market pull to create the conditions needed to deliver innovative, cost effective products and services and unlocks investment to deliver the requirement.
101. Defra develops products standards known as the [Government Buying Standards](#) (GBS) for a number of commonly procured items including construction, furniture, IT etc. The minimum standard within each GBS is mandatory for central Government and voluntary for the wider public sector. Increasingly, where possible, standards include waste prevention measures e.g. encouraging reuse through in-house swop-shop schemes, limiting hazardousness of materials used, reducing quantities of materials used, and increasing recycled content, recyclability, ease of disassembly and product lifetime (including upgradability and reparability). For example, the current Buying Standard for laser printers requires the easy separation of parts for reuse, and limits the use of halogens and flame retardant substances.

102. The BREEAM methodology for assessing the sustainability of new-build and refurbished buildings (which is referenced in the GBS for construction) also promotes resource efficiency via the effective management and reduction of construction waste. It gives credit for both construction resource efficiency and diversion of resources from landfill.
103. It is also possible to use new business models such as service agreements to try and reduce waste and encourage reuse. WRAP are carrying out some work to explore the potential for use of these models, and some departments such as Defra in respect of IT equipment have begun to use lease agreements.
104. All central government departments are supporters of the Hospitality and Food Services Voluntary Agreement which supports action to reduce food waste⁵⁶. Other Department specific initiatives include ongoing work within the NHS and Department of Health (DoH) as part of the NHS Carbon Reduction Strategy⁵⁷.

Q31. Do you have any evidence of the impact that Government procurement has had in delivering waste prevention? Please quantify the impact where possible.

Q32. Do you have any views on additional products/sectors Government should be taking action on to reduce its own waste?

Local Government

105. The role of local councils is broad in supporting waste prevention action. For example, in their own operations they can reduce waste through participation in the Government Buying Standards referenced above which are voluntary for local councils.
106. With their local businesses and householders, they can provide facilities and information to make it easier for them to reduce waste and reuse more items. Local councils can provide facilities for reuse at HWRCs, or special reuse events in addition to supporting local community action. Many local councils provide information on waste prevention and reuse to consumers and businesses. Some illustrative examples are provided in the box below.

Provision of information by local authorities – Case Studies

- The York and North Yorkshire Waste Partnership has a website which sets out ideas for reducing waste at an individual level as well as providing information on reuse and links to reuse organisations. They are running a campaign in partnership with a number of organisations called Choose2Reuse which promotes reuse as a way of saving money and the environment. (www.letstalklessrubbish.com)
- The North London Waste Authority produces a three yearly Waste Prevention Plan which sets out their strategy and actions. They provide a website with information on business waste reduction including a free guide, Reduce Waste Save Money.

(www.nlwa.gov.uk/docs/nlwa-general-documents-and-plans/2012-14-waste-prevention-plan-final.pdf, www.nlwa.gov.uk/waste-resources/businesses)

107. Local councils can incentivise local reuse and repair. Through the recycling and reuse credit scheme, third sector not for profit groups, charitable institutions and community groups can claim funding for items collected and repaired/reused (usually within the local communities) rather than being sent to landfill. Many types of council take part in these schemes and rules can vary including those determining what type of items attract reuse credits.

Q33. Aside from the examples outlined above, do you have any examples / case studies of initiatives undertaken by local government to encourage consumers, communities and businesses to take action in reducing waste generation, including reuse? Please provide evidence, inclusive of costs incurred and benefits derived where possible.

Q34. Reuse and recycling data are frequently reported together at local government level, do you have any evidence of the split between the two activities?

Q35. Do you have any evidence where incentives have encouraged reuse and /or waste prevention activities and behaviours? Please provide details of the incentive provided and impact seen.

Next Steps

108. Defra will consider the responses to this Call for Evidence and will use them to help inform the development of the Waste Prevention Programme for England.

How to respond

This Call for Evidence opens for responses on **11 March 2013** and will run for seven weeks. The Call will close on **29 April 2013**. Responses should be sent by email if possible to wasteprevention@defra.gsi.gov.uk

Or by post to:

The Waste Prevention Team

Defra

Area 6C

Ergon House

Horseferry Road

London SW1P 2AL

Any queries should be addressed to the Waste Prevention team as above.

Respondents are requested to explain who they are and, in the case of representative groups, to give a summary of the people and/or organisations they represent.

We may not be able to consider your response if it arrives after the deadline. Please contact the Waste Prevention team to discuss an extension if you think your response will be late.

Information provided in response to this Call for Evidence, including personal information, may be published or disclosed in accordance with the access to information regimes. These are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004.

If you want the information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals with, among other things, obligations of confidence. In view of this, it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding.

We will process your personal data in accordance with the DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

Publication of responses

If you do not consent to this, you must clearly state that you wish your response to be treated confidentially. Any confidentiality disclaimer generated by your IT system in email responses will not be treated as such a request. Please be aware that there may be circumstances in which Defra will be required to communicate information to third parties on request, as set out above.

Annex A: List of questions

Q1. Do you have evidence or case studies where the benefits from managing material resources more efficiently have been measurably achieved (para 29)? Please provide examples.

Q2. Do you agree/disagree with the priority areas identified (para 34)? Please give your reasons.

Q3. Are there other sectors or waste streams you consider should be a priority area for action? Please provide supporting evidence.

Q4. Do you support the use of any of the metrics proposed (para 35-36)? If so, which one(s)? Why? Please provide data sources.

Q5. Are there alternative metrics that you have considered and / or used to measure waste prevention, including at sector, product or material level? Please provide details.

Q6. What do you think it would be realistic to achieve over the next 10 years? Please provide details of the metrics you would use to measure this, and any supporting evidence.

Q7. Can you provide data for your business or, if possible, your sector on the following:

- a) the amount and composition of waste generated in past years; and/ or**
- b) future projections of waste arisings.**

Q8. Can you provide examples of reuse activity or any other activity that fits within the definitions of reuse, remanufacturing or repair provided in paragraph 10 that you are undertaking, including start-up and running costs, savings and the scale of benefits (both monetary and non-monetary) where possible?

Q9. Can you provide data for your business or, if possible, your sector on any of the following:

- a) annual levels of reuse and/ or remanufacturing;**
- b) trends that have been recorded in the past;**
- c) future projections?**

Q10. What do you think are the factors that have influenced the levels and trends in reuse, remanufacturing or repair? Please make clear if this is from your own experience or from the information provided above.

Q11. Do you have any evidence of the current market value, and areas for growth of reuse, remanufacturing or repair in your business and/or sector? Where do key opportunities for expansion lie, by product category (e.g. furniture, WEEE)?

Q12. What do you think are the factors that have influenced the uptake of waste prevention activities by your business and / or sector? Please provide examples.

Q13. Do you have any evidence or case studies of the impact on waste generated of preventative actions taken? Please provide details including costs and benefits.

Q14. Do you have any evidence that incentives help to drive waste prevention and/or reuse behaviours?

Q15. Do you have any evidence of where targets have driven waste prevention and/or reuse behaviours?

Q16. Do you agree with the barriers we have identified? Are there any other barriers that you have experienced to preventing waste that you consider to be of particular relevance to your business and/or sector? Please provide examples. (para 49-54)

Q17. Which barriers do you consider should be priority areas for action? Why?

Q18. Do you have any evidence or case studies of alternative / innovative business models that have been adopted, both those that have or have not been successful? Please provide information on the scale of costs and benefits of these business models if possible.

Q19. Do you have any evidence of where in the supply chain there is the greatest potential to reduce waste arisings?

Q20. Do you have any evidence of the types and quantities of waste prevented by individuals? Please provide details where possible.

Q21. Do you have evidence on the impact of purchases of pre-owned/ second hand goods on the level of displacement*?

*** In this document displacement is intended as the avoidance of the purchase of a new item or product as a result of the purchase of a second hand item or product**

Q22. Do you have any evidence of the level of repair being undertaken by consumers, either through DIY repair, or through access to commercial/voluntary services?

Q23. Do you have any evidence of areas for growth for demand of second hand/ pre-owned goods? Where do key opportunities for expansion lie, by product category (e.g. furniture, WEEE), and/ or channels (e.g. charity shops)?

Q24. Do you have any evidence of the benefits to consumers and communities through waste prevention and reuse actions. Please provide details or economic, social or environmental benefits where possible.

Q25. Do you agree/ disagree with the barriers to prevention, reuse and repair we have identified? Why? (para 83-90)

Q26. Do you have any evidence of the impact that the economic downturn has had on consumer attitudes or behaviours?

Q27. Do you have any evidence of consumer attitudes to alternative consumption models, e.g. leasing, hiring?

Q28. Do you have examples (case studies) of initiatives to encourage consumers and communities to take action to prevent waste or increase reuse, both those that have worked and those that have not? Please provide the evidence, inclusive of start-up costs and running costs, savings and the scale of benefits (both monetary and non-monetary) where possible.

Q29. What do you think are the factors that have influenced the uptake of waste prevention activities? Please provide examples.

Q30. Do you have any examples where repair of products has been promoted? Please provide the evidence, inclusive of start-up costs and running costs, savings and the scale of benefits (both monetary and non-monetary) where possible.

Q31. Do you have any evidence of the impact that Government procurement has had in delivering waste prevention? Please quantify the impact where possible.

Q32. Do you have any views on additional products/sectors Government should be taking action on to reduce its own waste?

Q33. Aside from the examples outlined above, do you have any examples / case studies of initiatives undertaken by local government to encourage consumers, communities and businesses to take action in reducing waste generation, including reuse? Please provide evidence, inclusive of costs incurred and benefits derived where possible.

Q34. Reuse and recycling data are frequently reported together at local government level, do you have any evidence of the split between the two activities?

Q35. Do you have any evidence where incentives have encouraged reuse and /or waste prevention activities and behaviours? Please provide details of the incentive provided and impacts seen.

Annex B: Data tables

Waste Generation, England 2010

Sector	Million tonnes
Construction	77
Commercial	25
Industrial	24
Household	24
Mining	16
Other	11
Total	177

Household Waste, England 2010

Material	Tonnes (000s)	Tonnes CO₂ equivalent (000s)
Organic	10,075	21,400
Paper & card	4,111	4,181
Plastic	2,240	7,120
Glass	1,488	1,332
Metal	869	4,443
Wood	790	526
Textiles	703	15,681
WEEE	464	532
Discarded vehicles	661	2,262
Inert	402	0
Other	1,986	120

Commercial and Industrial waste, England 2009

Material	Tonnes (000s)	Tonnes CO₂ equivalent (000s)
Paper	12,938	11,561
Inert	9,060	367
Organic	6,767	16,154
Chemicals	5,323	0
Plastic	3,674	7,997
Metal	3,448	7,461
Healthcare	1,873	0
Wood	1,665	1,633
Glass	1,538	941
WEEE	905	475
Textiles	409	2,703
Other	328	3,792

Construction and Demolition waste, England 2010

Material	Tonnes (000s)	Tonnes CO₂ equivalent (000s)
Mineral wastes	44,320	488
Soils	30,091	0
Dredging spoils	11,637	0
Sorting residues	1,681	0
Metal	695	3,316
Plastic wastes	28	88
Glass wastes	14	12
Wood wastes	6	4
Other	21	47

Annex C: References

- ¹ Government Review of Waste Policy in England 2011 <http://www.defra.gov.uk/publications/files/pb13540-waste-policy-review110614.pdf>
- ² Waste Framework Directive <http://ec.europa.eu/environment/waste/framework/index.htm>
- ³ OECD environmental outlook to 2050 <http://www.oecd.org/environment/indicators-modelling-outlooks/49910023.pdf>
- ⁴ Food and Agriculture Organisation of the United Nations, World Agriculture Towards 2030/2050: The 2012 revision http://www.fao.org/fileadmin/user_upload/esag/docs/AT2050_revision_summary.pdf
- ⁵ International Energy Agency <http://www.iea.org/newsroomandevents/pressreleases/2012/november/name,33015,en.html>
- ⁶ National Population projections, ONS (03/2012) <http://www.ons.gov.uk/ons/rel/npp/national-population-projections/2010-based-reference-volume--series-pp2/results.html>
- ⁷ Resource Revolution: Meeting the world's energy, materials, food and water needs. McKinsey Global Institute 2011 http://www.mckinsey.com/features/resource_revolution
- ⁸ <http://www.dailymail.co.uk/news/article-2174669/As-rain-falls-price-sun-creams-rise-Cost-UV-blockers-soars-75-despite-slump-demand.html?ito=feeds-newsxml>
- ⁹ ONS Environmental Accounts <http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Environmental+Accounts>
- ¹⁰ Resource flows Sankey Diagram <http://www.wrap.org.uk/content/wraps-vision-uk-circular-economy-2020>. The waste arisings data is calculated from a variety of data sources and models and covers waste generated in the UK only. Management figures come from regulatory returns and covers waste managed in the UK, including any imports and excluding exports. WRAP note that the materials flows on the 2010 Sankey diagram is not completely consistent because the datasets used are not completely consistent with each other.
- ¹¹ Defra statistics <http://www.defra.gov.uk/statistics/environment/green-economy/scptb01-ems/>
- ¹² Defra waste statistics <http://www.defra.gov.uk/statistics/environment/waste/>
- ¹³ Municipal waste generation per capita <http://www.eea.europa.eu/data-and-maps/figures/municipal-waste-generation-per-capita-in-western-europe-eu-15-new-member-states-eu-12-eu-countries-eu-27-and-total-in-europe-eu-27-turkey-croatia-norway-iceland-switzerland-4>
- ¹⁴ Jacobs for Defra (2010), Commercial and Industrial Waste Survey 2009, Final Report <http://www.defra.gov.uk/statistics/files/ci-project-report.pdf>
- ¹⁵ Further benefits of Resource Efficiency 2011 http://randd.defra.gov.uk/Document.aspx?Document=EV0441_10072_FRP.pdf
- ¹⁶ Oakdene Hollins (2011), WR1403: Business Waste Prevention Evidence Review. <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17499>
- ¹⁷ Kahneman, D., et al. (1991). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. Journal of Economic Perspectives
- ¹⁸ WRAP food waste data <http://www.wrap.org.uk/content/new-estimates-household-food-and-drink-waste-uk>
- ¹⁹ WRAP Valuing our clothes <http://www.wrap.org.uk/sites/files/wrap/VoC%20FINAL%20online%202012%2007%2011.pdf>
- ²⁰ WRAP Benefits of reuse Case Study: Clothing http://www.wrap.org.uk/sites/files/wrap/Clothing%20reuse_final.pdf
- ²¹ WRAP Benefits of reuse Case Study: Domestic Furniture http://www.wrap.org.uk/sites/files/wrap/Domestic%20Furniture%20chapter_final.pdf
- ²² WRAP data <http://www.wrap.org.uk/content/product-re-use-could-hold-key-issues-resource-security-says-wrap>
- ²³ WRAP Benefits of Reuse Case study: Electrical Items http://www.wrap.org.uk/sites/files/wrap/Electricals%20reuse_final.pdf
- ²⁴ Business benefits from reducing waste <http://webarchive.nationalarchives.gov.uk/20060214060402/envirowise.gov.uk/uk/business-benefits-from-reducing-waste.html>
- ²⁵ SIC 2007 business classification
- ²⁶ Establishing a Baseline for Reuse and Repair, 2012. Report being prepared for publication, Defra.
- ²⁷ Remanufacturing in the UK <http://www.remanufacturing.org.uk/pdf/story/1p342.pdf>
- ²⁸ C&D Reclamation Survey 2011. Report being prepared for publication, Defra
- ²⁹ Resource Security Action Plan: Making the most of valuable materials, Defra and BIS 2012 <http://www.defra.gov.uk/publications/files/pb13719-resource-security-action-plan.pdf>
- ³⁰ Waste arisings in the supply of food and drink to households in the UK <http://www.wrap.org.uk/sites/files/wrap/Waste%20arisings%20in%20the%20supply%20of%20food%20and%20drink%20oUK%20households,%20Nov%202011.pdf>

-
- ³¹ Individual Producer Responsibility in a UK context.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43453/12-1007-waste-electrical-and-electronic-wEEE-regulations-individual-producer-ipr-responsibility.pdf
- ³² WRAP Design out waste <http://www.wrap.org.uk/category/role/designer>. Additional information on toolkits, training materials and case studies is available on the WRAP website at: <http://www.wrap.org.uk>
- ³³ Resource Efficiency: Design for a circular economy <http://www.innovateuk.org/content/competition/resource-efficiency-new-designs-for-a-circular-eco.ashx>
- ³⁴ Waste Prevention Loan Fund <http://www.wrap.org.uk/content/wplf>
- ³⁵ Grant support for reuse and repair <http://www.wrap.org.uk/content/grant-support-re-use-and-repair>
- ³⁶ Environmental behaviours carried out by small and medium enterprises
http://data.defra.gov.uk/env/scptb12_SME_201004.csv
- ³⁷ Innovative business model map <http://www.wrap.org.uk/content/innovative-business-model-map>
- ³⁸ Defra waste statistics <http://www.defra.gov.uk/statistics/environment/waste/wrfq23-wrmsannual/>
- ³⁹ http://www.recyclenow.com/how_is_it_recycled/electricals.html
- ⁴⁰ <http://www.imrg.org/ImrgWebsite/User/Pages/PressReleases.aspx?pageID=85&parentPageID=0&itemID=8493&pageTemplate=7&isHomePage=false&isDetailData=true&specificPageType=5>
- ⁴¹ <http://www.develop-online.net/printer/press-releases/93202>
- ⁴² A Report for the Centre for Remanufacturing and Reuse Author: Matt Watson March 2008 (Reformatted October 2009)
- ⁴³ Retail: Electrical Goods trends. Microsoft advertising May 2011
- ⁴⁴ Towards a Circular Economy, Ellen MacArthur Foundation 2012
<http://www.ellenmacarthurfoundation.org/business/reports>
- ⁴⁵ Second hand goods gain popularity as UK Internet users look to beat the credit crunch
<http://press.experian.com/United-Kingdom/Press-Release/second-hand-goods-gain-popularity-as-uk-internet-users-look-to-beat-the-credit-crunch.aspx>
- ⁴⁶ Waste prevention: why people are acting and why they are not
<http://www.defra.gov.uk/environment/economy/products-consumers/influencing-behaviour/>
- ⁴⁷ LRS for Defra . Report being prepared for publication, Defra
- ⁴⁸ A Review of literature and research on public attitudes, perceptions and behaviour relating to remanufactured, repaired and reused products
http://www.remanufacturing.org.uk/pdf/report_on_public_attitudes_perceptions_and_behaviour_relating_to_remanufactured_repaired_and_reused_products.pdf 2008
- ⁴⁹ Realising the reuse value of Household WEEE
<http://www.wrap.org.uk/sites/files/wrap/WRAP%20WEEE%20HWRC%20summary%20Sheet.pdf>
- ⁵⁰ Reuse opportunities <http://www.wrap.org.uk/content/re-use-new-research-shows-so-fa-so-good-so-many-more-opportunities>
- ⁵¹ Defra Household waste prevention evidence review
<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=16161>
- ⁵² Public Understanding of Product lifetimes and durability
<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17254>
- ⁵³ Love Food Hate Waste www.lovefoodhatewaste.com
- ⁵⁴ Easter Egg Packaging <http://www.wrap.org.uk/content/information-sheet-reducing-easter-egg-packaging>
- ⁵⁵ The Greening Government Commitments Annual Report on Government Departments' Progress against 2015 Targets in 2011-12 <http://www.defra.gov.uk/publications/files/pb13846-greening-government-commitments.pdf>
- ⁵⁶ Hospitality and Food Service Agreement <http://www.wrap.org.uk/content/hospitality-and-food-service-agreement-3>
- ⁵⁷ NHS Carbon Reduction Strategy <http://www.sdu.nhs.uk/corporate-requirements/nhs-carbon-reduction-strategy.aspx>