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Consultation Document

Towards Zero Waste
One Wales: One Planet

Draft Industrial and Commerical Sector Plan

Date of issue: **28 March 2013**
Action required: Responses by **20 June 2013**

Overview

We want your views on this document to inform our final Industrial and Commercial Sector Plan. This plan covers all waste produced from commercial and industrial sectors. Its aims are to prevent and reduce waste and increase recycling from businesses and organisations in these sectors. It will do this as part of business sustainability criteria and influencing behaviour change through the supply chain and end users. The aims shall be addressed throughout the lifecycle of a product and packaging, from design of products /packaging to its use and end of life.

This plan supports 'Towards Zero Waste', the overarching waste strategy document for Wales. It does this by detailing outcomes, policies and delivery actions relevant for these sectors. These proposals seek to deliver sustainable outcomes. They contribute to the delivery of our commitments and targets.

This plan is being consulted upon in conjunction with the Waste Prevention Programme for Wales. Respondents may also refer to that programme for further details on the Welsh Governments proposals on waste prevention. Consultation questions addressed in this plan associated with waste prevention will be considered as part of the consultation response document for the Waste Prevention Programme.

We want your views on the consultation document and recommend that it is read in conjunction with the Sustainability Appraisal (incorporating the Strategic Environmental Assessment, the Health Impact Assessment (HIA) and Habitats Regulation Assessment (HRA) and the Waste Prevention Programme (also currently out for consultation).

How to respond

You may respond in a variety of ways – by sending your written response to the address below or by email to the email address provided.

Further information and related documents

Large print, Braille and alternate language versions of this document are available on request.

Contact details

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Sustainable Development
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Telephone: 0300 0603300 or 0845 010 3300

Data protection

How the views and information you give us will be used.

Any response you send us will be seen in full by Welsh Government staff dealing with the issues which this consultation is about. It may also be seen by other Welsh Government staff to help them plan future consultations.

The Welsh Government intends to publish a summary of the responses to this document. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. This helps to show that the consultation was carried out properly. If you do not want your name or address published, please tell us this in writing when you send your response. We will then blank them out.

Names or addresses we blank out might still get published later, though we do not think this would happen very often. The Freedom of Information Act 2000 and the Environmental Information Regulations 2004 allow the public to ask to see information held by many public bodies, including the Welsh Government. This includes information which has not been published. However, the law also allows us to withhold information in some circumstances. If anyone asks to see information we have withheld, we will have to decide whether to release it or not. If someone has asked for their name and address not to be published, that is an important fact we would take into account. However, there might sometimes be important reasons why we would have to reveal someone's name and address, even though they have asked for them not to be published. We would get in touch with the person and ask their views before we finally decided to reveal the information.

Ministerial Foreword

Towards Zero Waste, the overarching waste strategy document for Wales sets out the Welsh Government's high level policies and targets for the management of waste in Wales. Sector plans are the key delivery documents that identify specific objectives and actions for each sector in order to make the necessary contribution towards the delivery of Towards Zero Waste.

The policies and targets in Towards Zero Waste reflect the importance of the need to change our wasteful ways urgently and to fulfil our commitment to sustainable development and well-being which is at the heart of everything the Welsh Government does. Our Sustainable Development Scheme, 'One Wales, One Planet' shows clearly that our current levels of consumption are unsustainable. We have an obligation, to ourselves, to our children and to our fellow citizens to ensure that, proportionally, we use the resources of only One Planet - our "fair share". The planet on which we live, and the natural resources and economy that provide us with wealth, all depend on us using resources more wisely with the added benefit that we will become far more resource efficient in the process. This is an important issue of social justice - both for citizens in Wales and for citizens in the developing and emerging economies of the world. We have to change; when once we could afford to be wasteful, we can now no longer afford to continue this way.

This draft sector plan covers all products and wastes produced by the industrial and commercial sectors in Wales and contains a number of proposals for discussion about how we manage and treat this waste to achieve more sustainable and affordable outcomes. It focuses on the key role that sectors play in reducing these key waste streams both produced from their own premises and generated further along the chain, including by the ultimate consumer – the public. It will focus on the waste produced directly by the sectors (with a focus on waste prevention, and segregation at source ready for separate collection of recyclate) and products produced by the sectors. These sectors have an extremely influential role in transforming the behaviour of those they serve.

One of the most significant impacts of our current lifestyles on the planet and its resources is from the way we produce, package and consume possessions. Food contributes the highest ecological footprint of waste, hence this is covered in another sector plan, Food Manufacture, Service and Retail Sector Plan but other materials such as chemicals and metallic and non-metallic products also have their impact on the ecological footprint and efficiencies in their use need to be improved to ensure the overall sustainability of Welsh companies. Using resources efficiently makes excellent business sense – materials are becoming scarcer and raw material costs are continually increasing. Not putting material in a skip but finding another outlet for it can only be a sensible way of working and reducing costs.

As a Government, we are continuing our focus on developing a circular economy in Wales. An economy in which today's goods are tomorrow's resources, forming a virtuous cycle that fosters prosperity in a world of finite resources. That is a move away from the current linear model where materials

are fed in to the economy at the start and discarded at the end. It's about being more resource efficient, producing more value with less material, re-using wherever possible, developing the best possible recycling services and making the most of unavoidable waste. It includes a range of innovative approaches including the adoption of alternative business models to provide products and services in less resource-intensive ways. It's also about delivering environmental, social, and economic benefits.

EU estimates from the Ellen MacArthur Foundation, adapted for Wales by WRAP, estimate that net savings of a transition to a circular economy are between 0.9 billion pounds and 1.7 billion pounds a year.

This plan is broad and the actions proposed are visionary and robust. We recognise the importance of achieving common goals, and to enabling Wales to build towards an inclusive, resilient business economy we must ensure synergy with other Welsh Government strategies particularly the Economic Renewal Programme.

All stakeholders involved in this supply chain should recognise their own social responsibilities. Social responsibility in this current economic crisis also makes business sense. Those businesses recognising that linking environmental issues such as resource efficiency and waste prevention together with social inclusion and community integration lead to business benefits such as reduced costs of production and positive publicity. This draft sector plan together with the Waste Prevention Programme and the resulting actions have been written in order to ensure businesses can engage, and should want to engage, as part of an overall sustainable outcome for Wales.

I am proud to present this draft Industrial and Commercial Sector Plan to the stakeholders within this sector. Collectively, it is you who will contribute to a better, more sustainable economy in Wales, and you who will help Wales play its part in creating a better world; one where we can proudly say that industrial and commercial sectors have made their contribution towards the goal of zero waste and 'One Planet' living.

Alun Davies AM
Minister for Natural Resources and Food

Summary

What are main issues?

The Industrial and Commercial Sector Plan seeks to address issues in four key areas, focussing on priority materials:

i) Waste prevention:
- Reducing waste arisings produced by the sectors covered in the plan.
- Greening supply chains.
- Enabling ecodesign of products to become mainstream throughout Welsh businesses.

ii) Preparing for reuse:
- Encouraging businesses to consider preparation for reuse before items are sent for recycling or disposal.
- Encouraging businesses to store waste itemss correctly to enable preparation for reuse.

iii) Recycling:
- Encouraging businesses to source segregate priority materials that are currently arising in the mixed waste stream, and thus increasing their recycling rates.
- Providing a universal separate collection service for certain materials.
- Ensuring recyclate can be recycled closed loop or 'up-cycled', ideally in Wales.
- Ensuring food waste is sent to anaerobic digestion plants (where reuse, e.g. as animal feed, is not possible).
- Increasing the recyclability of products and packaging.
- Increasing the recycled content of products and packaging.

iv) Treatment and disposal
- Delivering sustainable treatment and disposal of this commercial and industrial waste in a cost effective way and work towards the targets set in Towards Zero Waste, including those that limit energy from waste and seek to reduce landfill to zero.

Reason for this Consultation

The purpose of this consultation is to seek the views of interested parties on this draft sector plan which covers products and wastes generated by business within these sectors. It will influence behaviour change in other end users such as householders and those sectors covered by other sector plans such as that for the public sector and construction and demolition, as well as the food and packaging waste covered in the Food Manufacture, Retail and Service Sector Plan. This draft plan forms part of a suite of documents that overall comprise the waste management plan for Wales in accordance with the plan-making requirements enshrined in UK and EU legislation.

It is also being consulted upon in conjunction with the Waste Prevention Programme, a legal requirement of the European revised Waste Framework Directive. Waste prevention actions included in this draft sector plan are taken from this programme and responses will be collated in one Waste Prevention Programme response document. Responses to other questions will be placed in a separate Industrial and Commercial Sector Plan response document.

Outline of Proposals

The proposals contained in this document seek to deliver the sustainable development outcomes identified in the Sustainable Development Scheme 'One Wales, One Planet' and in Towards Zero Waste (TZW). They contribute to the delivery of the Welsh Government's commitments (including targets) set under relevant EU Directives in a way that meets and delivers key overarching policies and strategies on sustainable development and climate change, as well as those set by other Welsh Government functions. As a Government, we are continuing our focus on developing a circular economy in Wales. An economy in which today's goods are tomorrow's resources, forming a virtuous cycle that fosters prosperity in a world of finite resources.

In order to achieve the proposals outlined in this draft sector plan, the Welsh Government recognises that stakeholders such as manufacturers, office based activities, local authorities, social enterprises, businesses, regulators, support providers as well Government need play a key role in taking forward specific actions. This draft sector plan provides further detail on the achievement of outcomes and milestones for the sector.

Contents

Consultation Questions

Consultation Question 1

Do you agree with the findings and conclusions of the Sustainability Appraisal? If no, please explain your reasons.

Consultation Question 2:

The proposed waste prevention targets for the industrial and commercial waste streams are:

A general reduction of 1.4% every year to 2050 based on 2006/7 baseline for industrial waste, with specific targets for the individual priority sectors (identified in sections 3.6 and 3.7 below):

- *Manufacture of basic metal and metal products*
- *Manufacture of paper and paper products*
- *Manufacture of chemicals, chemical products, pharmaceuticals.*
- *Food manufacture*

A reduction of 1.2% every year to 2050 based on 2006/7 baseline for commercial waste.

An implementation plan will be developed to deliver against these targets.

Do you agree with the targets that are proposed? Please give your reasons. What targets should be proposed for the priority industry sectors? Please give your reasons.

Consultation Question 3

We have described priority business sectors and areas for action.

(a) Do you agree with these priorities? Please give your reasons.
(b) Is there anything else that we should consider a priority? Why is it important?
(c) Do you agree with our proposed approach of voluntary action in the first instance, with mandatory measures under review in the longer term? Please give your reasons.

Consultation Question 4

It is proposed that the Welsh Government and retailers will build on the success of the introduction of carrier bag charge and UK wide action through the Courtauld Commitment and other initiatives, leading to retailers taking forward actions on

- Improving the environmental impact of their product portfolio by influencing growers, processors, manufacturers and distributors within Wales and internationally.
- Reducing the waste generated through its own activities.
- Supporting national and local initiatives such as food redistribution schemes.
- Providing clear information to consumers about the environmental performance of their products.
- Providing information and guidance on practical steps that consumers can take to reduce the impact of their products during use and at end of life.

What further actions and initiatives can be taken to enhance our current programme of work, and to support the actions above?

Consultation Question 5

How can the Welsh Government encourage businesses engagement in eco-innovation?

Consultation Question 6

A review of the UK wide and international evidence on the waste prevention barriers and measures specific to your sector can be found at:

http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17499

Do you agree with this evidence for your sector in Wales? If not, why not? What support does your business need to become more resource efficient and why?

Consultation Question 7

The Welsh Government is looking at how business attitudes and behaviours can be influenced so that businesses can become more resource efficient. We are using a competency framework approach to do this.

Do you agree that a competency approach is useful to benchmark performance and underpin any interventions? If not, why not?

Do you agree that a competency framework is a useful approach to underpin and target a potential future business support programme for SMEs in Wales? If not, why not?

Consultation Question 8
Do you agree that it is feasible for businesses to keep each of these four key waste streams separate at source (please indicate ‘yes or no against each waste stream)?
a) Paper and card,
b) Plastics and cans
c) Glass
d) Food
If not why not? Which types of business do you think will face the biggest challenges and why?

Consultation Question 9
Do you agree that the types of measures proposed will facilitate further collection from businesses, particularly SMEs to meet the targets in Towards Zero Waste? If not, why not? What other measures could be considered and why?

Consultation Question 10
We have asked a number of specific questions. If you would like to comment on anything else, or raise any issues which you feel we have not fully addressed, please do so here.

1 Setting the Scene

1.1 The role of 'Towards Zero Waste' and the Sector Plan

Towards Zero Waste (TZW) is the overarching waste strategy document for Wales. It is a long term high level strategic framework which describes the social, economic and environmental outcomes that resource efficiency and waste management will achieve and contribute towards a sustainable future. It also details our high level principles, policies and targets.

Sector plans are implementation plans that describe the role of the sector, the Welsh Government and others in delivering the outcomes, targets and policies in TZW.

The sector plans will be web based 'living documents' and there will be linkages between them, where the actions of one sector will affect and/or support those of another. They will be evidence based and link to case studies as far as possible.

1.2 Scope of the Sector Plan

The Industrial & Commercial (I&C) Sector Plan needs to provide policy interventions which will result in Wales meeting the aims and objectives of the 2008 Revised Waste Framework Directive and Towards Zero Waste for all of the industrial and commercial sectors. It will focus on the waste produced directly by the sectors (with a focus on waste prevention, and segregation at source ready for separate collection of recyclate) and products produced by the sectors. Products need to generate less waste at end of life, they need to be more recyclable, they need to have a higher recycled content, and the producer needs to take more responsibility for its management at end of life.

Commercial and Industrial sectors are based on NACE classification for the purposes of this plan. A commercial sector consists of business establishments that do not engage in transportation or in manufacturing or any other types of industrial activity for example agriculture, mining or construction. Industrial refers to manufacturing and energy and water supply. (Those companies involved construction and demolition, agriculture and forestry and fisheries or mining and quarrying are not included here)

Construction and Demolition waste is excluded from this draft sector plan as it is covered by a separate sector plan[1]. The Food Manufacture, Service and Retail (FMSR)[2] Sector Plan covers 144,300 tonnes of food and associated packaging waste from the food manufacturers, wholesalers and retailers and the service sector (this equates to on average 85-90% of the sector's total arisings). The Public Sector Plan (to be developed) will cover 365,000 tonnes (100%) of waste produced by that sector. With regards to sector specific plans it is important that this draft sector plan reflects their actions. For example with food and associated

1 http://wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/publication/canddsectorplan/?lang=en

2 http://wales.gov.uk/consultations/environmentandcountryside/foodsectorplan/?lang=en to be finalised 2013

packaging waste the FMSR Sector Plan can be seen to be working from the beginning of the food supply chain to one end user i.e. the service sector. This draft sector plan will cover other end users whose food and packaging waste will be reduced and/or influenced via the FMSR Sector Plan. The Public Sector Plan will also influence sectors in this draft sector plan through, for example, procurement and supply chain initiatives.

1.3 Who the Sector Plan is aimed at

This draft sector plan is primarily to guide action by the industrial and commercial sectors. It also identifies what the Welsh Government will do, including the delivery bodies that it funds.

It will also be of interest to other businesses, the public sector and householders because it will influence the quantity and type of waste that these parties generate, and its resultant management. It will help local authorities deliver the waste prevention and recycling targets.

Responsibility for delivery is identified for each sector involved in this plan, with the Welsh Government driving and overseeing its delivery in partnership with the delivery bodies.

1.4 Status of the Plan

This draft sector plan provides a record of the proposed objectives, targets and actions for commercial and industrial sectors in Wales. When finalised, following consultation, it will form part of the suite of documents that together comprise the statutory waste management plan for Wales as required by UK and European legislation.

1.5 Key Drivers

The key drivers for the more sustainable management of waste covered in this draft sector plan include:

- The Welsh Government's goal that sustainable development should drive everything that we do in Wales.
- The imperative to ensure that more sustainable management of waste helps contribute to the reduction of greenhouse gas emissions globally.
- The Welsh Government's stated goal to achieve 'One Planet' living within the lifetime of a generation.
- The need to become more resource self sufficient, in order to ensure resilience for our economy in terms of the security of supply of affordable material resources.
- The increasing costs of landfill, including the effect of the £8 per tonne per year increase in Landfill Tax (rising from £48 per tonne in 2010/11 to £80 per tonne for 2014/15.

- The desire of many customers for retailers to help them have less of an impact on the planet.
- The need to meet European Directive targets set for the recycling of waste from households and to reduce the landfilling of biodegradable municipal waste.
- The 2008 Revised EU Waste Framework Directive requirement for action to be focussed higher up the waste hierarchy, with far greater attention paid to waste prevention (including reuse), preparing for reuse and recycling.

1.6 Outcomes and Milestones

This section describes the outcomes that we are seeking to achieve in our overarching strategy document 'Towards Zero Waste' and through the sector plans. Building a sustainable future is fundamental to our approach. This means we will consider the environmental, social and economic implications of our actions. Each is considered in turn below.

Outcomes

A sustainable environment

Towards Zero Waste shows how we will reduce the impact of waste in Wales to within our environmental limits by focussing on reducing the ecological footprint of waste to 'One Planet' levels by 2050. This approach will reduce the impact of climate change from waste activities, achieve sustainable consumption and production, sustain our economy and manage and conserve the planet's resources.

To do this we need to:

- Focus on waste prevention, and more sustainable ways of consuming and producing.
- Focus on very high levels of recycling of the waste that is produced, and make sure that it is the right type of recycling (i.e. closed loop).
- Send food waste to anaerobic digestion plants to generate valuable renewable energy and fertiliser.

A prosperous society

Towards Zero Waste shows how our actions on resource efficiency and waste management will support the development of a prosperous society that:

- Provides more 'green' jobs within the waste and resource management industry across a range of skill levels in Wales and increase the number of high skilled, high value green jobs.
- Is resilient against future competing demands including rising costs and security of supply of global material resources, saving money and maintaining or increasing profit through more efficient resource management.

A fair and just society

The sector plans will implement the targets, actions and policies in Towards Zero Waste in a manner in which citizens can, through actions on waste prevention, reuse and recycling:

- Achieve their full human potential.
- Enrich their communities.
- Contribute towards the wellbeing of Wales.
- Improve their local environment.
- Actively improve the quality of their life.

There will be equality of opportunity for all citizens of Wales to contribute to waste prevention, reuse and recycling irrespective of where they live, their health and ability, mobility or personal circumstances.

Milestones

To implement our outcomes, Towards Zero Waste sets the following two key milestones.

2025 Towards Zero Waste

By 2025, there will be a significant reduction in waste (27%), and we will manage any waste that is produced in a way that makes the most of our valuable resources. This means maximising recycling and minimising the amount of residual waste produced, and achieving as close to zero landfill as possible.

This is an intermediate step on the way to our 2050 target of achieving zero waste and 'living within our environmental limits'[3]. This is needed because reducing the impact of waste in Wales to 'One Planet' levels will require big changes in the way that products and services are designed, and the actions that consumers and businesses take.

3 Environmental Limits – 'Our Vision of a Sustainable Wales is one where Wales: lives within its environmental limits, using only its fair share of the earth's resources so that our ecological footprint is reduced to the global average availability of resources, and we are resilient to the impacts of climate change' (Source: One Wales: One Planet: A new sustainable development scheme for Wales).

Towards Zero Waste will require:

Waste prevention - Waste arisings need to be reduced by around 1.5 per cent (of the 2007 baseline) each year across all sectors in order to achieve the One Planet goal for 2050. We will move from a product orientated society, to a service orientated society where products are leased / rented with repair centres being the norm. Citizens will be empowered to 'buy smarter' and they will take responsibility for the consequences of their purchases, avoid producing waste, and reuse products as far as possible. Reuse of unwanted items will be encouraged. As far as possible, items that are discarded as waste are 'prepared for reuse' and are able to continue to be a resource and reused by others. Retailers will sell products that generate significantly less waste and the lifespan of products will be increased.

A strong economy in resource management - This means that recyclates will be collected and managed with supply to Welsh manufacturing in mind. We will need:

- High levels of clean recyclates to drive the market - all sectors in Wales will be recycling at least 70 per cent of their waste – this includes businesses, households and the public sector.
- Waste collection systems will enable high levels of high quality recycling to be achieved, so that the recyclate can feed as far as possible into reprocessing facilities in Wales (retaining the economic value of recyclate within Wales).
- There will be a focus on serving local recyclate markets that are 'closed loop' recycling systems to achieve the best environmental benefits.
- Strong markets for recyclates and anaerobic digestion digestate.

Residual waste will be minimised - substantially less residual waste will be produced than at present, and it will be phased out of landfill sites to high efficiency energy from waste plants.

Landfill will be eliminated as far as possible - to reduce Wales' greenhouse gas emissions and make the most of our valuable resources we need to divert waste from landfill, and manage the emissions from existing landfill sites.

Legacy wastes will be tackled - alternative ways of treating these will be found, and efforts will be made to ensure that products are redesigned so that they do not become problematic legacy wastes in the future.

2050 – Achieving zero waste

By 2050, we will have reduced the impact of waste in Wales to within our environmental limits. Residual waste will have been eliminated and any waste that is produced will all be recycled. This means that the ecological footprint of waste in Wales will be at 'One Planet' levels. It will be achieved by continuing and enhancing our current efforts on:

- **Achieving 'One Planet' levels of waste – 'Living within our environmental limits'** - Greater effort will be made to challenge waste at all stages of its production. All products will use as little material as possible, with the majority of it sourced from recyclate, with as few virgin resources used as possible. Resources will be highly valued to a level that none will be wasted.
- **Aiming to phase out residual waste and achieve 'zero waste' through ensuring that all waste is reused or recycled** - Any waste that is produced, will be reused, recycled, composted (for green waste) or anaerobically digested (for food waste). All products and packaging will be designed for disassembly and reuse or recycling, and the collection services and facilities to recycle all of the material will be in place. All recycling operations will be 'closed loop', or employ 'upcycling'. As far as possible, recyclate will be used directly in Welsh manufacturing processes. This means there will be far less need for residual waste treatment facilities such as energy from waste plants with the number and/or capacity required progressively reducing from 2025 to 2050.

1.7 Approach

The approach being followed is to take forward actions in respect of the following elements of the waste hierarchy:

i. Waste prevention – to reinforce the important role of businesses in the commercial and industrial sectors to prevent and reduce their own waste arisings and reduce the impact of the products they produce. Companies also need to reduce waste generated through the supply chain and ultimately put out for collection, thus helping to meet environmental outcomes, increasing opportunities for enhancing social wellbeing through waste reuse and reducing the costs of waste collection and management.

ii. "Preparing for reuse" is a key element of the waste hierarchy. Increasing the preparation for reuse and recycling opportunities for I&C wastes by sectors and stakeholders.

iii. Recycling – to ensure that recycling targets can be achieved in a sustainable way by this sector. Included here is the collection of food waste for anaerobic digestion.

iv. Recovery - Increasing where relevant and appropriate other recovery methods for waste arising from I&C sectors.

v. Treatment and disposal – to ensure that this draft sector plan, and sectors involved, supports the Collection, Infrastructure and Markets Sector Plan with regards to supporting market development for recyclate and digestate and choice of waste management options.

Actions are included that will be further developed through further research to ascertain what programme of support needs to be developed together with sector engagement to ensure that Towards Zero Waste targets are met.

This draft sector plan will endorse whole supply chain approaches whereby large business with greater resources will partner smaller businesses to innovate and reduce waste. This will result in more informed decisions about the environmental implications of material choices, increased opportunity of using waste as a resource, a greater understanding of the challenges facing supply chain businesses, and the negative impacts of waste.

1.8 Links to other sector plans and progammes

A number of other sector plans are being developed by the Welsh Government to implement Towards Zero Waste. Each of the sector plans will be supportive of one another to maximise the opportunity for the common goals of Towards Zero Waste to be met. In addition, as a requirement of the 2008 Revised Waste Framework Directive, a Waste Prevention Programme for Wales is being developed.

Collections, Infrastructure and Markets Sector Plan

The Collections, Infrastructure and Markets (CIM) Sector Plan was published in July 2012. It outlines our approach to resource management by ensuring that services are set up in Wales to ensure the collection of a high volume of clean, source segregated recyclate that can then be delivered to reprocessors based in Wales as far as possible, and that closed loop end markets are developed for the recyclate (within Wales as far as possible).

The plan aims to ensure, as far as possible, that that the economic value of the recyclate is retained within the Welsh economy.

The evidence presented demonstrated that there are still significant amounts of recyclable material (including food waste) being sent to landfill, especially from the household and commercial sectors. There is also some evidence that some materials are accessing end markets which are not the most sustainable option for Wales. The quality of collected recyclate needs improving.

The plan identifies where improvements in recyclate collection are required and where opportunities to develop infrastructure exist. The plan aims to facilitate developments in infrastructure by demonstrating need for such investments.

This plan will support business in commercial and industrial sectors in ensuring that they have access to collection facilities that they require and need to assist their segregation and recycling.

The **Municipal Sector Plan** sets the agenda for the management of local authority municipal wastes for the next fifteen years and beyond.

This covers the waste collected specifically by “municipalities”, that is all of the Welsh local authorities. The sector plan does not cover other municipal waste that is not collected by local authorities, and which is collected instead by private or social economy waste management companies. The plan focuses on actions for:

- Waste prevention, including the role of local authority service provision to influence householder behaviours.
- Preparing for reuse, including opportunities to improve the reuse of bulky wastes.
- Delivering a recyclate collection service focused on quality and not just quantity, with kerbside sort being the preferred best practice option identified.
- Managing collected recyclate, food waste and residual waste in a sustainable way that maximises job creation in Wales and contributes to global and local environmental improvements.

The sector plan is accompanied by the publication of a ‘Collections Blueprint’ that identifies the most sustainable approach for the collection of recyclate from households – the kerbside sort system.

Products and materials produced by businesses covered by this draft sector plan, are used by those groups covered for example householders in the Municipal sector and ultimately end up in their waste streams.

The **Construction and Demolition Sector Plan** addresses waste generated by the Construction and Demolition (C&D) sector. It contains a number of actions to achieve more sustainable and affordable outcomes. It focuses on the key role that the C&D sector plays through working with their clients, customers, suppliers, trades people and the wider communities to achieve the twin goals of ‘One Planet living’ and zero waste.

Products and materials produced by I&C businesses are used by the construction sector and ultimately end up in their waste streams.

The draft **Food Manufacture, Service and Retail Sector Plan** addresses waste management and resource efficiency in the following three sectors:

- Food and drink manufacturing.
- Wholesale and retail.
- Services, including hospitality (e.g. restaurants, hotels, events).

The sector plan targets food manufacturers, retailers and the service sector to reduce and recycle more of their own food and packaging waste as well as influencing waste food and food packaging in the household and other commercial and industrial waste streams.

In addition, other products and materials produced by businesses covered by this sector plan, do affect the materials that are used by this sector and ultimately end up in their waste streams.

The **Public Sector Plan** will address how the public sector in Wales will manage resources efficiently, develop sustainable procurement activities and prevent waste production arising from provision of services in relation to health care, education, local government, justice administration and emergency response in Wales. It will set out a challenging action plan which will aid the public sector to provide leadership to all other sectors and become a driver of change.

Products and materials produced by organisations covered by this plan, are used by the public sector and ultimately end up in these waste streams.

The **Agriculture Sector Plan** will focus on wastes produced by the agriculture sector in Wales up until the “farm gate”. It will focus on primary food production. It will identify opportunities for waste prevention, preparing for reuse, recycling (including composting and anaerobic digestion) and sustainable residual waste management.

Products and materials produced by businesses covered by this plan are used by the agricultural sector and ultimately end up in their waste streams.

The **Waste Prevention Programme is a legal requirement of the 2008 Revised Waste Framework Directive**. It will consider all waste streams, including wastes from householders, private businesses and the public sector, and will provide evidence of the economic, financial and social impacts of waste prevention activities. It will describe and quantify actions to be undertaken in the short to medium term, and will provide a roadmap to the longer term aim of One Planet Living by 2050. The Directive requires the programmes of Member States to set out waste prevention objectives, describe existing prevention measures, and evaluate the usefulness of a range of measures with the aim of breaking the link between economic growth and the environmental impacts associated with the generation of waste.

Member States are required to have a Waste Prevention Programme in place by December 2013.

The Waste Prevention Programme is being consulted upon at the same time as this draft sector plan consultation (March 2013). Responses to the Waste Prevention Actions in Section 3 will be referred and assessed as part of the overall Waste Prevention Programme consultation**.** Responses will be collated in one Waste Prevention Programme response document. Responses to other questions in this draft sector plan will be placed in a separate Industrial and Commercial Sector Plan response document.

1.9 Evolution of this draft Sector Plan

This plan has been developed from evidence from the commercial and industrial survey undertaken in 2007 and other research undertaken for Welsh Government together with the waste prevention research undertaken for UK Government and devolved administrations[4]. Further liaison has been undertaken with current business support providers and Environment Agency Wales. The draft plan is currently out for a twelve week public consultation (March 2013). Following a review of the public consultation responses, appropriate amendments will be made and the final document will be published in 2013.

A Sustainability Appraisal (incorporating a Strategic Environmental Assessment), a Habitats Regulations Assessment and a Health Impact Assessment have been published to accompany this draft sector plan.

Consultation Question 1

Do you agree with the findings and conclusions of the Sustainability Appraisal? If no, please explain your reasons

This plan is being consulted upon in conjunction with the Waste Prevention Programme. All responses to the waste prevention actions in this draft sector plan will form part of the overall analysis of responses for the Waste Prevention Programme consultation.

4 http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17499

2 Current situation and future needs

2.1 Introduction

This section provides an analysis of the amount of waste produced by the industrial and commercial (I&C) sectors, together with how it is managed. It includes an assessment of what will be needed in the future in order to meet the waste management targets set in Towards Zero Waste and the CIM Sector Plan.

Data is based primarily on the survey of Industrial and Commercial Waste Arisings in Wales 2007[5], commissioned by Environment Agency Wales on behalf of the Welsh Government. The types of waste produced by businesses were described by the Substance Oriented Classification (SOC) codes to allow for comparison across business types. Businesses were grouped into one of twenty five sectors based in EU NACE codes, and into one of seven size bands determined by number of employees. All sectors are covered in this plan but other sector plans such as the Food Manufacture, Service and Retail and the forthcoming Public Sector Plan will address certain waste streams e.g. food and paper and card in more detail and these have been referenced where appropriate.

The waste survey, used to determine data on waste quantities did not discriminate between packaging and non-packaging components of different waste types.

In addition, an explanation of how priority wastes have been identified for the forthcoming Waste Prevention Programme has been included and where appropriate, reference to this programme has been incorporated into this sector plan.

The current situation regarding arisings and management of waste streams and predicted future requirements for prevention, collection and infrastructure is also covered in this section.

The actions needed to address future needs are provided in Section 3 ‘Actions’.

5 Industrial and Commercial Waste Survey Environment Agency Wales 2008

2.2 Waste prevention and identification of priority waste types for waste prevention action

2.2.1 Waste Prevention and the Ecological Footprint

'Prevention' means measures taken before a substance, material or product has become waste, that reduce:

a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
b) the adverse impact of the generated waste on the environment and human health; and
c) the content of harmful substances in materials and products.

In order to assess which wastes or sectors to prioritise for waste prevention activities, the Welsh Government must consider more than simply the quantity of waste being generated, but also how its generation impacts on the environment and human health and whether the waste has hazardous properties.

The Welsh Government uses ecological footprinting to estimate the impact that Wales has on the global environment. It has an aim of meeting 'One Planet' living by 2050, which equates to a reduction of 75% in the ecological footprint of Wales. In 2009, a study was commissioned to investigate the implications of this aim for waste generation and management[6]. The study provided evidence to support the development of waste policies in Towards Zero Waste.

Waste Prevention needs to contribute to **69% reduction in the footprint by 2050**. The waste prevention targets described in Towards Zero Waste are designed to achieve this reduction, and equate to **20,546 tonnes per annum of industrial waste** and **20,126 tonnes per annum of commercial waste**. This quantity represents the reduction required across all waste types based on the average ecological footprint of a tonne of industrial and commercial waste.

The situation is complex because each waste type has a different ecological footprint associated with its production. A tonne of non-ferrous metal has the highest impact, at an ecological footprint of over 4 gha per tonne, due to the energy intensive mining process associated with this material. Textiles and food are also relatively high due to the direct land area required for growing food and textiles (including that required to produce animal products such as leather), added to the impact of its manufacture and distribution. Glass has a very low ecological footprint of less than 0.3 gha per tonne.

In order to understand the impact of the different waste types from businesses, the impact per tonne is multiplied by the number of tonnes to give the total impact.

6 Ecological Footprint Impacts of the Welsh Waste Strategy, Welsh Assembly Government (2009)

2.2.2 Priority waste types identified

The results of the Ecological Footprint analysis demonstrates that **food and putrescible waste** has the largest impact of all materials (31% of the total ecological footprint) generated by the industrial and commercial sectors. This is followed by **paper and card** (16% of the impact) and **chemicals** (12% of the impact, despite only being 4% of the tonnage). Cumulatively these wastes constitute around 60% of the impact, but significantly less than 50% of the tonnage and are the priority wastes for waste prevention.

Priority waste types in respect of their management are metals, paper and card, where the emphasis is on increasing recycling, and food waste where the aim is to divert this waste type from landfill to anaerobic digestion. Packaging waste, residual mixed wastes, hazardous wastes including waste oils, end of life vehicles (ELVs), and batteries are priority materials either because they are covered under specific European Directives or because of their impact on the environment. Waste Framework Directive (Article 16) requires special attention to be paid to infrastructure for managing residual mixed waste.

2.2.3 Priority Areas for Ecodesign

Ecodesign is currently high on the policy agenda because a proportionally high degree of environmental and social impact and cost of products is determined at the design stage. Some studies suggest up to 80% of a product's impact is determined at the design. Ecodesign can assist in waste prevention through reducing the demand for consumption of resources and by using fewer resources to deliver any particular product or service. Ecodesign can also enable behaviour changes so that people can use products in more resources efficiently. Although waste prevention is not always a principle in every product strategy there are a number of broad ecodesign principles that have waste prevention as an intended outcome. These principles include:

- Lifecycle thinking.
- Service delivery or product leasing.
- Dematerialisation.
- Durability.

Ecodesign can be used to achieve waste prevention by changing the way that products are designed to reduce the amount and type of material in products (including hazardousness); improve longevity; design for reuse, remanufacture, separation and recycling.

The Welsh Government will initially focus on those sectors in which ecodesign can make a high impact. Taking the lead from existing and future European and International product policy and initiatives it is proposed to focus on these product sectors as a priority for action in ecodesign:

- electrical & electronic products;
- home & workplace products; and
- textiles (especially clothing).

These are considered priorities for action because:

- Buildings, electrical appliances and textile products together with food & drink account for between 45-75% of the product-related environmental impact across the EU25 countries[7].
- In Wales, textiles have the second highest impact in terms of ecological footprint[8]. Across the UK, only one quarter of textile waste is collected for recycling and reuse, and one half enters the waste stream destined for landfill[9].
- Clothing and electrical products are fast-growing waste streams reflecting a trend towards (inefficient) short product life, and many discarded items are still functional[10] – using them through to obsolescence would save ~£25 billion[11].
- Electronic products are at risk from future scarcity of resources such as rare earths.
- The supply of raw materials such as cotton is likely to become increasingly constrained, e.g. as water becomes scarcer and food and energy crops compete for resources in the face of population growth.

2.3 Arisings of Industrial and Commercial sectors and priority waste streams and scale of waste prevention required

This sub-section provides an overview of waste arisings and management for I&C waste produced in Wales. It also outlines the infrastructure and capacity needed to collect waste for preparation for reuse, and the collection, treatment and storage prior to recycling. Further detail is in the Collections, Infrastructure and Markets Sector Plan[12].

2.3.1 Total Waste arisings

Current position

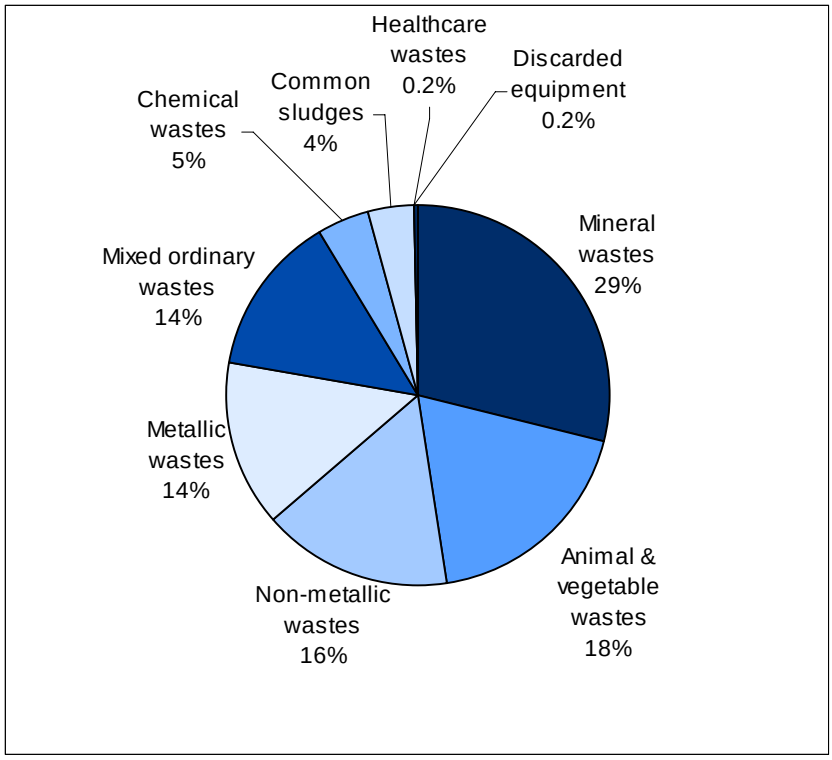
Around 3.6 million tonnes of I&C waste were produced in 2007 (the date of the last industrial and commercial waste survey for Wales). Industry produced 1.9 million tonnes and commerce produced 1.7 million tonnes.

7 Environmental impacts of products (EIPRO) report, EC JRC (2006)
8 Ecological footprint impact of the Wales Waste Strategy, Arup report for Welsh Government (2009)
9 Maximising reuse and recycling of UK clothing and textiles, OakdeneHollins report for Defra (2009)
10 According to data published in "Meeting the UK climate challenge: the contribution of resource efficiency, WRAP, 2009", around 50% of discarded textile products are still functional. WRAP also estimates a market potential to reuse an additional 100kt of electrical equipment, 200kt of furniture and 150kt of clothing each year (whether through new business models, more conventional repair, or reuse through waste collection and the Third sector).
11 Data published in "Meeting the UK climate challenge: the contribution of resource efficiency, WRAP, 2009".
12 http://wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/publication/cimsectorplan/?lang=en

Industrial waste arising by waste type and industry sector

Mineral wastes, animal and vegetable wastes, non-metallic wastes[13] and metallic wastes collectively account for 78% of the waste arising from industrial sectors (Figure 1). Most of the waste arises as discrete fractions, with only 14% arising as mixed waste.

Figure 1: Composition of industrial waste produced in Wales (2007)



Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency

550 thousand tonnes of **mineral waste** were generated by industrial sectors in 2007. 387 thousand tonnes of this was combustion waste, with 382 thousand tonnes from energy manufacture and supply, and 5,000 tonnes from the manufacture of other non-metallic mineral products.

350 thousand tonnes of **animal and vegetable wastes** were generated by industrial sectors in 2007, with approximately 348 thousand tonnes of this generated by the industry sector that manufactures food products, beverages and tobacco products. Animal waste of food preparation and products accounted for 257 thousand tonnes, animal and vegetal wastes for 91 thousand tonnes and animal faeces, urine and manure for the remaining 2,000 tonnes.

13 Non-metallic wastes include glass, plastic, paper and cardboard, textiles, rubber, wood and wastes containing PCBs.

307 thousand tonnes of **non-metallic wastes** were generated by industrial sectors in Wales in 2007, comprising the following waste types.

- 112 thousand tonnes of **paper and cardboard waste**, with 54 thousand tonnes generated by the industry sector Manufacture of paper and paper products, Printing and reproduction of recorded media and the remaining 58 thousand tonnes generated across all other industrial sectors.
- 110 thousand tonnes of **wood waste**, with 64 thousand tonnes generated by the industry sector Manufacture of wood and of products of wood and cork, except furniture, 15 thousand tonnes from the Manufacture of furniture, and the remainder generated across all other industrial sectors.
- 46 thousand tonnes of **plastic waste**, with 29 thousand tonnes generated by the industry sectors Manufacture of chemicals and chemical products, Manufacture of basic pharmaceutical products and pharmaceutical preparations, Manufacture of rubber and plastic products. The remaining 17 thousand tonnes was generated across industry sectors.
- 33 thousand tonnes of **glass waste**, with 28 thousand tonnes generated by the industry sector Manufacture of other non-metallic mineral products. The remaining 5,000 tonnes was generated across industry sectors.
- 7,000 tonnes of other non-metallic waste including 4,000 tonnes of rubber waste, 3,000 tonnes of textiles, and 160 tonnes of waste containing PCBs (polcychlorinated biphenyls).

267 thousand tonnes of **metallic wastes** were generated by industrial sectors in 2007, with 173 thousand tonnes generated by the sectors Manufacture of basic metals, Manufacture of fabricated metal products, except machinery and equipment. An additional 50 thousand tonnes are generated by the sectors Manufacture of computer, electronic and optical products, Manufacture of electrical equipment, Manufacture of machinery and equipment, Manufacture of motor vehicles, trailers and semi-trailers, Manufacture of other transport equipment. The remaining 44 thousand tonnes are generated across the other sectors.

256 thousand tonnes of **mixed ordinary wastes** were generated by industrial sectors in 2007, consisting of 202 thousand tonnes of mixed and undifferentiated materials, 35 thousand tonnes of household or similar waste, and 19 tonnes of sorting residue. Mixed ordinary waste was generated across all industry sectors.

The type and quantity of industrial waste produced in Wales is highly variable and heavily influenced by the sector type. The sectors that produce the greatest quantities of waste are the food manufacturers, the metals industry, and the supply of electricity and gas (Table 1).

Table 1: Arising of industrial waste in Wales by industry sector (2007)

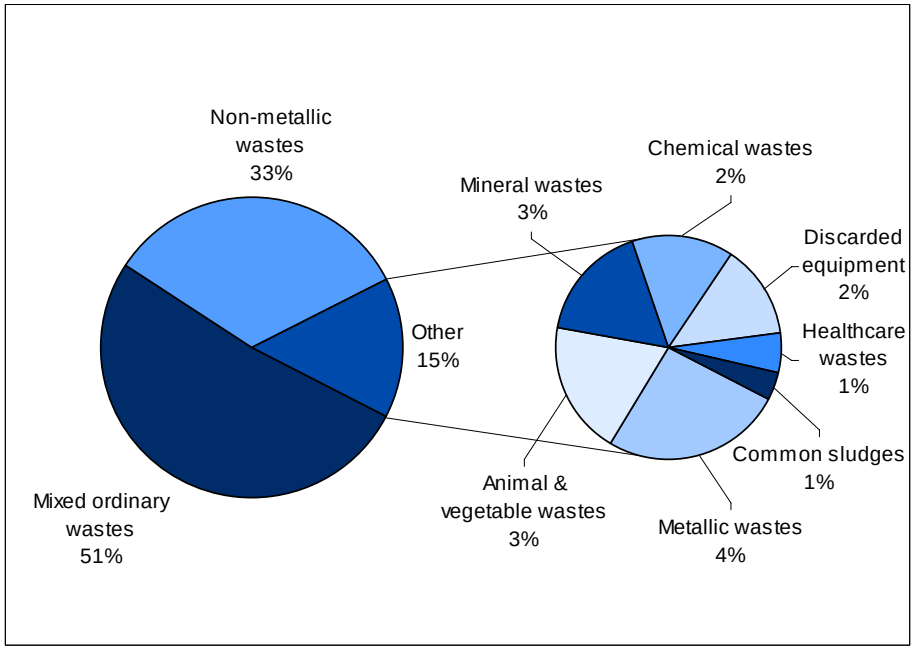
Industrial Sector	Quantity (thousand tonnes)	Percentage of total industrial waste arising (%)
Manufacture of food products, beverages and tobacco products	478.69	25.2
Manufacture of basic metals, Manufacture of fabricated metal products, except machinery and equipment	391.98	20.7
Electricity, gas, steam and air conditioning supply	391.46	20.6
Manufacture of computer, electronic and optical products, Manufacture of electrical equipment, Manufacture of machinery and equipment, Manufacture of motor vehicles, trailers and semi-trailers, Manufacture of other transport equipment	179.61	9.5
Manufacture of chemicals and chemical products, Manufacture of basic pharmaceutical products and pharmaceutical preparations, Manufacture of rubber and plastic products	114.66	6.0
Manufacture of paper and paper products, Printing and reproduction of recorded media	87.92	4.6
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plating materials	79.58	4.2
Manufacture of other non-metallic mineral products	78.60	4.1
Manufacture of furniture, Other manufacturing, Repair and installation of machinery and equipment,	57.80	3.0
Water collection, treatment and supply	14.89	0.8
Manufacture of coke and refined petroleum products	11.13	0.6
Manufacture of textiles, wearing apparel, leather and related products	9.85	0.5
TOTAL	**1896.17**	**100.0**

Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).

Commercial waste arising by waste type and business/organisation sector

51% of the waste arising from commerce was mixed waste, which contains valuable resources that can be recycled. 33% of the waste was non-metallic waste, and the remaining 15% consisting of the total of all other waste types. The composition of waste types generated by commercial business sectors in Wales is shown in Figure 2.

Figure 2: Composition of commercial waste produced in Wales (2007)



Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).

863 thousand tonnes of **mixed ordinary waste** was generated by commercial business sectors in 2007, consisting of the following:

- 565 thousand tonnes of **mixed and undifferentiated materials**. The business sectors generating the greatest quantities of mixed and undifferentiated materials were Wholesale and retail trade; repair of motor vehicles and motorcycles (217 thousand tonnes), Accommodation and food service activities (103 thousand tonnes) and Transportation and storage (49 thousand tonnes).
- 282 thousand tonnes of **household and similar wastes**. The business sectors generating the greatest quantities of household and similar wastes were Accommodation and food service activities (79 thousand tonnes), Education (57 thousand tonnes) and Wholesale and retail trade; repair of motor vehicles and motorcycles (48 thousand tonnes).
- 16 thousand tonnes of **sorting residues** generated across all business sectors.

557 thousand tonnes of **non-metallic waste** was generated by commercial business sectors in 2007, comprising the following waste types.

- 383 thousand tonnes of **paper and cardboard waste**, with 198 thousand tonnes generated by the sector Wholesale and retail trade; repair of motor vehicles and motorcycles and the remaining 185 thousand tonnes generated across all other business sectors.
- 66 thousand tonnes of **glass waste**, with 52 thousand tonnes generated by the Accommodation and food service activities sector and the remainder generated across all other business sectors.

- 43 thousand tonnes of **plastic waste**, with 31 thousand tonnes generated by the Wholesale and retail trade; repair of motor vehicles and motorcycles sectors and the remainder generated across all other business sectors.
- 31 thousand tonnes of **rubber waste**, with 24 thousand generated by the Wholesale and retail trade; repair of motor vehicles and motorcycles sectors and the remainder split between Administrative and support services activities and Transportation and storage.
- 30 thousand tonnes of **wood waste**, with 22 thousand tonnes generated by the Wholesale and retail trade; repair of motor vehicles and motorcycles sectors and the remainder generated across a number of other business sectors.
- 4,000 tonnes of **other non-metallic wastes** consisting of textiles and waste containing PCBs.

The sectors that produce the greatest quantities of commercial waste are the wholesale and retail sector, including repair of motor vehicles and motorcycles and accommodation and food services (Table 2).

Table 2: Arising of commercial waste in Wales by sector (2007)

Business Sector	Quantity (thousand tonnes)	Percentage of total industrial waste arising (%)
Wholesale and retail trade; repair of motor vehicles and motorcycles	649.10	38.7
Accommodation and food service activities	315.30	18.8
Education	138.44	8.3
Professional, scientific and technical activities	110.43	6.6
Public administration and defence, compulsory social security	107.16	6.4
Transportation and storage	106.11	6.3
Arts, entertainment and recreation	71.51	4.3
Administrative and support service activities	61.27	3.7
Human health and social work activities	47.92	2.9
Other services	29.27	1.7
Information and communication	23.02	1.4
Financial and insurance activities	12.20	0.7
Real estate activities	5.46	0.3
Total	**1677.18**	**100.0**

Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).

Hazardous waste arising from industry and commerce

The survey of industrial and commercial waste in Wales estimated that 260 thousand tonnes of hazardous waste was generated by industry and commerce during 2007.

An estimated 109 thousand tonnes of hazardous waste was generated by industry sectors in Wales in 2007, accounting for 5.7% of the total industrial waste stream. Of the hazardous wastes produced by industry, **mineral wastes** account for 42 thousand tonnes with the majority of this waste being classified as "other mineral waste" and generated by the sector Manufacture of basic metals; fabricated metal products, except machinery and equipment. **Chemical wastes** such as used oils, spent solvents and chemical deposits are also significant, accounting for 41 thousand tonnes of hazardous waste generated across a range of sectors. There were also approximately 8,000 tonnes of hazardous industrial sludges and 7,000 tonnes of hazardous metallic waste. The remaining waste types accounted for a combined total of less than 11thousand tonnes of hazardous waste.

An estimated 151 thousand tonnes of hazardous waste was generated by commercial sectors in Wales in 2007, accounting for 9.0% of the total commercial waste stream. Of the hazardous wastes produced by the commercial sectors, hazardous waste contained **within the mixed waste fraction** predominates, accounting for approximately 43 thousand tonnes. **Chemical wastes** (33 thousand tonnes) and **discarded equipment**, such as discarded vehicles, batteries, Waste Electrical and Electronic Equipment (WEEE) and other equipment (24 thousand tonnes), **rubber waste** (17 thousand tonnes), **healthcare and biological wastes** (15 thousand tonnes) and **common sludges** (10 thousand tonnes), are also significant. The remaining waste types accounted for a combined total of less than 9,000 tonnes of hazardous waste.

2.3.2 Priority wastes arisings

Food Waste

The detail of current arisings and management of food waste has been included here but actions associated with this are covered in more detail in the FMSR Sector plan (together with Environmental Permitting Actions covered in Section 3) and the forthcoming Public Sector Plan.

A total of approximately 595 thousand tonnes of food waste was produced by industrial (376 thousand tonnes) and commercial (219 thousand tonnes) business sectors.

Food waste within the mixed fraction

Food waste accounts for 11% of the mixed waste stream from industry and 19.8% of the mixed waste stream from commercial sectors. This equates to 28 thousand tonnes of food waste within mixed waste from industry and 171 thousand tonnes within mixed waste from commerce.

Food waste arising as discrete waste streams

There were approximately 396 thousand tonnes of food waste arising as discrete streams from industry and commerce.

Industrial Sectors: food waste as a discrete waste stream

Industrial sectors produce 348 thousand tonnes of animal waste of food preparation and products and animal and vegetal wastes, of which 346 thousand tonnes is produced by the Manufacture of Food Products, Beverages and Tobacco sector. **This single sector generates over 99% of this waste type.**

Approximately 30 thousand tonnes of food waste are produced by SMEs and 318 thousand tonnes are produced by large companies with greater than 250 employees.

Some of the larger food processors and manufacturers operate under the Environmental Permitting Regulations regime. The pollution inventory records reveal that the animal, vegetable and food industry produced 176,447 tonnes of waste during 2010. **Therefore by working with permitted industry it is possible to influence 69% of food waste being produced by industrial sectors.**

There are a number of large food processors and manufacturers in Wales which are economically important, and which the business department within the Welsh Government engages with and supports.

Commercial Sectors: food waste as a discrete waste stream

Commercial sectors produce approximately 49 thousand tonnes of animal waste of food preparation and products and animal and vegetal wastes, of which 18 thousand tonnes is produced by the Accommodation and Food Service sector, 15 thousand tonnes is produced by Wholesale and Retail and 6 thousand tonnes by Arts, Entertainment and Recreation. **These three sectors generate around 80% of this waste type.**

Approximately 41 thousand tonnes of food waste are produced by SMEs and 8 thousand tonnes are produced by large companies with greater than 250 employees. Therefore work **would need to be carried out with smaller businesses** in order to achieve significant reductions in food waste from commercial businesses.

Paper and Card

The detail of current arisings and management of paper and card waste has been included here but actions associated with this are covered in more detail in the FMSR Sector plan (together with Environmental Permitting Actions covered in Section 3) and will be covered in the Public Sector Plan.

A total of approximately 894 thousand tonnes of paper and card waste was produced by industrial (202 thousand tonnes) and commercial (691 thousand tonnes) business sectors.

Paper and card within the mixed fraction

Paper and card accounts for 35.4% of the mixed waste stream from industry and 35.8% of the mixed waste stream from commercial sectors. This equates to approximately 91 thousand tonnes of paper and card waste within mixed waste from industry and 309 thousand tonnes within mixed waste from commerce.

Paper and card as a discrete waste stream

Industrial sectors produce 112 thousand tonnes of paper and card, and commercial sectors produce 383 thousand tonnes. Therefore focus on commercial sectors will produce the greatest results.

Industrial Sectors: paper and cards as a discrete waste stream

The Manufacture of Paper Products sector produces 54 thousand tonnes, Manufacture of Food Products, Beverages and Tobacco produces 15 thousand tonnes, Manufacture of computer, electronic and optical products produce 14 thousand tonnes and the Manufacture of chemicals and chemical products produces 12 thousand tonnes. **These four sectors combined generate 84% of the paper and card from industrial sectors.**

91 thousand tonnes of paper and card waste are produced by SMEs within industrial sectors, with 21 thousand tonnes produced by large companies.

A number of the businesses producing paper and card waste, including those in the chemicals, food manufacture and paper and board producing sectors are permitted.

Commercial sectors: paper and card as a discrete waste stream

Of the 383 thousand tonnes of paper and card waste produced by commerce, 198 thousand tonnes is produced by wholesale and retail businesses, 44 thousand tonnes by accommodation and food services, 35 thousand tonnes by public administration and defence and social security and 33 thousand tonnes by professional scientific and technical activities. Wholesale and retail alone therefore accounts for 52%, and these four sectors combined generate 81% of the paper and card produced by commercial sectors.

305 thousand tonnes of paper and card are produced by SMEs and 78 thousand tonnes are produced by large businesses. Therefore in order to achieve a significant reduction there is a need to target the SMEs as these produce 80% of the paper and card waste.

Chemical waste

A total of 126 thousand tonnes of chemical waste was produced by industrial (88,500 tonnes) and commercial (37 thousand tonnes) business sectors.

Chemical waste within the mixed fraction

There was no detectable quantity of chemical waste within the mixed waste stream, therefore all data provided below relates to discrete chemical waste streams.

Chemical waste arising as discrete waste streams

Table 3 shows the types of chemical wastes were produced by industry and commerce in Wales in 2007.

Table 3: Types of chemical waste generated by industry and commerce in Wales (2007)

Type of chemical waste	Waste from Industry (thousands of tonnes)		Waste from Commerce (thousands of tonnes)		TOTAL (thousands of tonnes)
	Hazardous	Non hazardous	Hazardous	Non hazardous	
Spent solvents	6.34	0.11	12.48	0.10	**19.03**
Acid, alkaline or saline wastes	8.82	0.71	3.38	0.00	**12.91**
Used oil	5.66	6.01	12.43	3.90	**27.99**
Spent chemical catalysts	0.72	0.00	0.00	0.00	**0.72**
Chemical preparation wastes	9.33	14.33	1.29	1.15	**26.10**
Chemical deposits and residues	5.63	14.54	1.88	0.12	**22.18**
Industrial effluent sludges	4.22	12.12	1.11	0.01	**17.47**
Total	**40.72**	**47.82**	**32.59**	**5.28**	**126.40**

Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).

Industrial sectors: chemical waste as a discrete waste stream

Four industrial sectors are responsible for 75 thousand tonnes of the chemical waste produced by industry. They are Manufacture of Chemicals (25 thousand tonnes), Manufacture of Basic Metals (18 thousand tonnes), Manufacture of computer & electronic equipment and Manufacture of vehicles (18 thousand tonnes) and Manufacture of Food Products, Beverages and Tobacco (14 thousand tonnes). **By focussing effort on these four industrial sectors, waste prevention interventions would cover 85% of the chemical waste produced by industry.**

Approximately 46 thousand tonnes are produced by large companies with more than 250 employees, and approximately 43 thousand tonnes by SMEs.

The chemicals industry largely operates under the Environmental Permitting Regulations regime. The pollution inventory records reveal that the chemical industry produced 84 thousand tonnes of waste during 2010. Manufacture of basic metals and Manufacture of Food Products, Beverages and Tobacco are also sectors with a significant number of permitted facilities. **Therefore by working with permitted industry it is possible to influence the vast majority of chemicals being produced by industrial sectors.**

Commercial sectors: chemical waste as a discrete waste stream

Four industrial sectors are responsible for 34 thousand tonnes of the chemical waste produced by commerce. They are Wholesale and Retail (13 thousand tonnes), Professional, scientific and technical activities (12 thousand tonnes), Transportation and Storage (4 thousand tonnes) and Accommodation and Food Services (4 thousand tonnes). **By focussing effort on these four industrial sectors, waste prevention interventions would cover 91% of the chemical waste produced by commerce.**

Approximately 37 thousand tonnes are produced by SMEs, and only 2 thousand tonnes by large companies with more than 250 employees.

Other priority wastes

It is estimated that approximately 1,680 thousand tonnes of dry materials are produced annually in Wales (**Table 4**) outlines that for commercial and industrial only).

Table 4: Quantities of dry materials produced by Industrial and Commercial sectors and Wales's total

	Quantity arising (thousand tonnes)		
	Industrial	**Commercial**	**Total**
Paper/card	202.7	691.6	**894.3**
Metal	281.5	100.0	**381.5**
Plastic	90.5	171.0	**261.5**
Glass	35.3	108.0	**143.3**
Total dry recyclate produced in Wales	610.0	1070.6	**1680.6**

Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).

Packaging waste from the food, retail and service sector is covered in detail in the FMSR Sector Plan and from the public sector will be covered in the forthcoming Public Sector Plan.

2.3.3 The scale of waste prevention required

Industrial and Commercial Waste overall

Table 5 below shows the projected future quantities of industrial and commercial waste in 2024-25 according to two scenarios:

- Business as usual - no additional prevention activity[14];
- With additional prevention (ensuring that the prevention targets in Towards Zero Waste are met).

Projections for 2024-25 range from between 2.73 million tonnes and 3.40 million tonnes and compare with current total arisings of around 3.57 million tonnes. In order to meet the waste prevention targets set in Towards Zero Waste industrial waste will need to reduce by 478 thousand tonnes by 2024-25 from its 2007 figure (a 25% reduction) and commercial waste will need to reduce by 362 thousand tonnes by 2024-25 from its 2007 figure (a 23% reduction).

Table 5 Current and projected future quantities of industrial and commercial waste in 2024-25

Year	Scenario	Annual production of waste (thousands of tonnes)		
		Industrial	Commercial	Total
2007	**Current**	1,896	1,677	**3,573**
Projected for 2024-25	**Business as usual - No additional prevention activity**	1,418	1,979	**3,397**
	With additional prevention activity	1,418	1,315	**2,733**

Food Waste

Two scenarios have been modelled in order to predict the likely future arisings of food waste in 2024-25:

- Business as usual, no additional prevention activity[14].
- All recycling targets met, all prevention targets met.

The future quantities of total food waste arisings are predicted to be of the order of between 453 – 540 thousand tonnes (Table 6). If waste prevention targets are met between 143 thousand tonnes of food waste need to be prevented by 2024-25.

14 "Business as usual" includes the following anticipated changes in the quantities of the four main waste streams, expressed as a percentage of the 2006/7 arising: industrial waste – -1.4% per annum and commercial waste – +1.0% per annum.

Table 6 Current (2007) and projected future quantities of I&C food waste in 2024-25

Year	Scenario	Annual production of food waste (thousands of tonnes)		
		Industrial	Commercial	Total
2007	**Current**	376	220	**596**
Projected for 2024-25	**Business as usual, no additional prevention**	281	259	**540**
	With additional prevention	281	172	**453**

Dry Recyclates

Table 7 shows the projected future quantities of waste paper and card, plastic, metals, and glass that Welsh Government estimates will be produced in 2024-25 according to the scenarios used earlier (e.g. for food). Projections range from around 2.18 – 2.75 million tonnes and compare with current levels of around 2.74 million tonnes. For waste prevention targets to be met around 561 thousand tonnes of dry materials need to be prevented by 2024-25.

Table 7: Current and predicted annual production of waste paper and card, plastic, metals, glass and food in 2024-25

Year	Scenario	Current and Predicted Annual production of waste (thousand tonnes)				
		Paper & card	Plastic	Metals	Glass	Total
2007	**Current**	1,304	527	633	277	2,741
Projected to 2024-25	**Business as usual, no additional prevention**	1,372	525	564	287	2,748
	With additional prevention	1,046	421	486	227	2,180

Chemicals

Table 8 shows the projected future quantities of chemical waste that Welsh Government estimates will be produced in 2024-25 according to the scenarios used earlier (e.g. for food). Projections range from around 97 - 111 thousand tonnes and compare with current levels of around 126 thousand tonnes. For waste prevention targets to be met around 29 thousand tonnes of chemical waste needs to be prevented by 2024-25.

Table 8: Current and predicted annual production of chemical waste in 2024-25

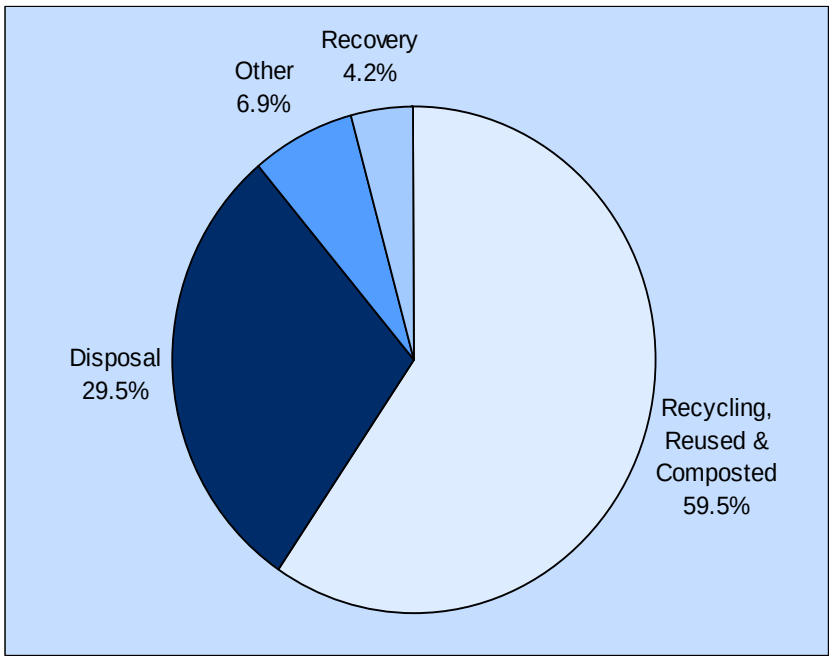
Year	Scenario	Current and Predicted Annual production of waste (thousand tonnes)		
		Industrial waste	Commercial waste	Total
2007	Current	89	38	126
Projected to 2024-25	Business as usual, no additional prevention	66	45	111
	With additional prevention	66	30	97

2.4 Management of Industrial and Commercial Waste, including priority wastes, produced in Wales and the scale of management options required

2.4.1 Management

Figure 3 shows how industrial waste produced in Wales was managed in 2007. Preparation for reuse was combined with recycling and composting in the 2007 survey. The rate of preparation for reuse/ recycling/composting was 59% in 2007. Around 550 thousand tonnes (29%) was disposed of to landfill, of which combustion wastes (around 220 thousand tonnes) and mixed wastes (around 213 thousand tonnes) were the dominant fractions.

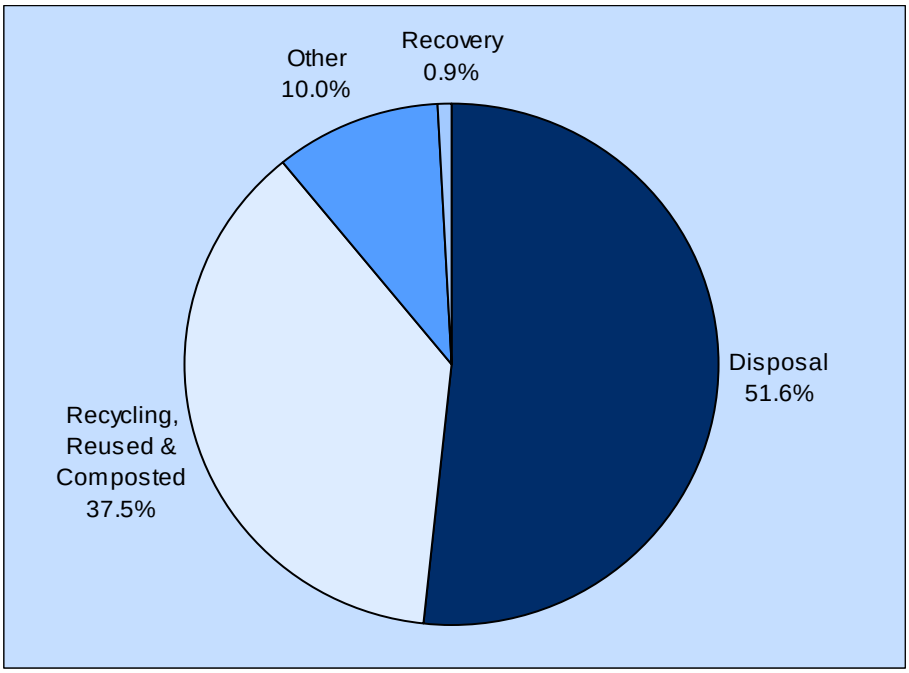
Figure 3: Management of industrial waste produced in Wales (2007)



Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).
Note: Other recovery includes land recovery & incineration with energy recovery.
Disposal includes land disposal and incineration without energy recovery.

Figure 4 shows how commercial waste produced in Wales was managed in 2007. The combined preparation for reuse/recycling/composting rate was 37% in 2007. Around 847 thousand tonnes (50.5%) was disposed of by landfill, and of that around 756 thousand tonnes were classified as mixed waste. Around 146 thousand tonnes of cardboard boxes and containers are landfilled in the mixed waste fraction.

Figure 4: Management of commercial waste produced in Wales (2007)



Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).
Note: "Other recovery" includes land recovery & incineration with energy recovery. "Disposal" includes land disposal and incineration without energy recovery.

2.4.2 Collection

Preparation for Reuse

There is a lack of comprehensive data on the scale of preparation for reuse of industrial and commercial wastes generated by Welsh businesses. There is considerable scope for preparing for reuse of discarded products and wastes from businesses will be considered by the Welsh Government in the production of the reuse, repair and preparation for reuse strategy (see section 3).

Recycling, composting and anaerobic digestion

The provision of recycling collection services to businesses in Wales is not uniform, with the result that some businesses are unable to realise the recycling potential of their waste. Separate food waste collection services are often not provided for small and medium sized companies. A survey of local authorities and 28 private waste companies[15] indicates that the bulk of industrial and commercial wastes collected from business premises for recycling in Wales are collected by private waste management companies rather than by local authorities (Table 9). The survey showed a considerable level of spare capacity for additional collections of recyclate from businesses and public sector bodies – at roughly an extra 100% over current usage.

Table 9: Collection of recyclate from businesses in Wales (2007-08)

Organisation type	Commercial (tonnes)			Industrial (tonnes)		
	Collected	Total capacity	Spare capacity	Collected	Total capacity	Spare capacity
Local Authority	18,580	31,660	13,080	0	0	0
Private Sector (28 companies)	190,148	363,303	173,155	46,708	164,483	117,775
TOTAL	**208,728**	**394,963**	**186,235**	**46,708**	**164,483**	**117,775**

Source data: Separately collected Commercial, Industrial and Agricultural Wastes in Wales 2007/08, WRAP (2011).
Note: that due to the limited number of replies from private waste companies this data should only be seen as indicative of the spare capacity to collect more waste in the future.

Local authorities are under no obligation to provide access to Civic Amenity (CA) sites/Household Waste Recycling Centres (HWRCs) for businesses. Where they do collect commercial waste, they are obliged to make a reasonable charge to cover their costs. Some local authorities have no firm policy on the use by businesses of bring banks, whereas others actively discourage commercial waste producers from using these facilities. 35 out of the 87 CA sites/HWRCs operated by Welsh local authorities offer local traders the option of using these facilities as disposal or recycling facilities. 18 of the CA sites/HWRCs require the trade users to purchase a permit to use the sites.

Residual mixed waste

The collection of residual waste is described in the later sub-section that specifically covers this waste stream.

15 Separately collected Commercial, Industrial and Agricultural Wastes in Wales 2007/08, WRAP (2011).

2.4.3 Infrastructure and Capacity

Introduction

This sub-section outlines the availability in Wales of waste management facilities to manage industrial and commercial waste in Wales. It summarises the key findings of the CIM Sector Plan and further detail is provided therein.

It describes the availability in Wales of waste management facilities to manage Wales' waste. Whilst this sector plan is confined to Wales only, it is important to note that waste facilities in Wales manage waste from other parts of the UK (especially from England), and, vice versa, some of Wales' waste is managed in facilities in other parts of the UK (particularly England). The latter is particularly the case for recyclates, where economies of scale mean that a significant amount of the recyclate produced in Wales is reprocessed in other parts of the UK. In some cases recyclate from Wales is reprocessed abroad.

Permitted and exempt facilities - overview

Table 10 shows a summary of permitted waste management facilities in Wales, the changes from 2001-02 to the end of 2010, and available capacity in 2009.

Table 10: Number and capacity of permitted waste management sites in Wales

Main types of waste management facilities		Capacity in 2009 (thousand tonnes per annum)			Number of facilities			
		Total available capacity	Total utilised (through put in 2009)	Unused capacity	2001-02	End of 2008	End of 2009	End of 2010
Civic amenity / household waste recycling centre		934	348	586	53	86	87	87
Transfer stations		3,056	1,512	1,544	89	136	174	215
Treatment		3,781	679	3,102	18	34	66	70
Material recovery facilities		655	305	350	2	25	23	21
Composting	*Total*	*344*	*91*	*253*	*0*	*11*	*11*	*11*
	In Vessel Composting	278	79	199	0	7	8	10
	Open Windrow	66	12	54	0	4	3	1
Metal recycling sites (including End-of-Life Vehicles)		751	585	166	42	100	145	147
Incinerators	*Total*	976	473	503	..	*4*	*4*	*5*
	with energy recovery	956	459	497	..	3	3	4
	without energy recovery	20	14	6	..	1	1	1
Total facilities (not including landfills)		***10,497***	***3,993***	***6,504***	***204***	***396***	***510***	***556***
Landfill	*Total*				*71*	*32*	*31*	*33*
	Non-hazardous				50	22	23	23
	Hazardous				..	1	1	1
	Inert				21	7	7	9
Total					**257**	**428**	**541**	**589**

Source: Number and type of facilities: Environment Agency Wales (REGIS database); capacities: Evaluation of the Capacity of Waste Management Sites in Wales 2009, Environment Agency Wales, 2010.
Note: = data not available. In 2001-02 there was no legislation requiring the separate disposal of hazardous waste in specialist landfill sites. The 50 non-hazardous landfills recorded here were classed as co-disposal sites, taking hazardous and non-hazardous wastes. The single hazardous waste landfill identified is a factory curtilage site, and is not a merchant facility.

In terms of the number of permitted facilities for recycling or composting, from 2001-02 to the end of 2010 CA sites/HWRCs have increased from 53 to 87, material recovery facilities (MRFs) have increased from 2 to 21 and composting plants have increased from 0 to 11. Over the same period the number of transfer stations has increased from 89 to 215 and the number of landfills has decreased from 71 to 33.

There are around 586 thousand tonnes of spare capacity in CA sites/HWRCs across Wales which could be accessed without the need to invest in additional staff or equipment (Table 11). However, the spatial provision of the sites is highly variable. Provision in terms of the number of residents served by each site in each local authority varies from 15 thousand residents per site (Ceredigion) to 140 thousand residents per site (Newport). In terms of site density across each local authority, this varies from one site per 35 km^2 (Cardiff) to one site per 866 km^2 (Powys).

Table 11: Capacity and quantity received at CA sites in the regions of Wales 2008

	Total capacity (tonnes per annum)	Throughput in 2008 (tonnes)	Spare capacity (tonnes per annum)
North	394,087	124,503	269,584
South East	257,393	108,055	149,338
South West	282,329	115,204	167,125
All Wales	**933,809**	**347,762**	**586,047**

Source: Environment Agency Wales - An Evaluation of the Capacity of Waste Management Sites in Wales, 2008 – 2009 (http://publications.environment-agency.gov.uk/pdf/GEWA0311BTOV-b-e.pdf).

A total of around 1.5 million tonnes of spare capacity exists in transfer stations in Wales without the need for additional investment in staff or equipment. These transfer stations accept segregated and mixed waste, and often carry out basic mechanical sorting and bulking up of waste.

MRFs process mixed waste or co-mingled (mixed) recyclable materials and separate those materials to be prepared for reuse, recycled or otherwise recovered. The spare permitted capacity for these sites is around 350 thousand tonnes.

The total permitted spare capacity for metal recycling in Wales is around 166 thousand tonnes.

Some waste facilities operating to physically prepare material for recycling are exempt from the need to operate under permit conditions, but register with the Environment Agency as exempt facilities. The types of activities covered include bailing, shredding and sorting. The Environment Agency estimates that in 2009 there were a total of approximately 418 thousand tonnes of spare capacity in Wales (Table 12).

Table 12: Capacity of exempted waste management sites in Wales[16]

Main types of waste management facilities	Capacity in 2009 (thousand tonnes per annum)		
	Total available capacity	Total utilised (throughput in 2009)	Unused capacity
Paragraph 7 - treatment of land for agricultural or ecological benefit	219	114	105
Paragraph 9 - reclamation, restoration or improvement of land	218	75	143
Paragraph 11 – treatment of waste for the purpose of recovery	243	219	24
Paragraph 12 – composting	30	29	1
Paragraph 13 - manufacture and treatment of construction materials	400	388	12
Paragraph 14 – manufacture of finished goods from waste	62	50	12
Paragraph 15 – beneficial use of waste	36	36	0
Paragraph 19 - use of waste in construction	276	155	121
Total at exempt facilities	**1,483**	**1,066**	**418**

Source: Evaluation of the Capacity of Waste Management Sites in Wales 2009, Environment Agency Wales, 2010.

2.4.4 Scale of preparation for reuse/recycling required

Table 13 shows the projected future quantities of recyclate (including for reuse) arising from industrial and commercial waste in 2024-25, assuming that the 70% recycling target set in TZW is met. Projections range from 1.91 million tonnes to 2.38 million tonnes and compare with 1.76 million tonnes that are currently reused / recycled. This represents an increase of around 158 to 622 thousand tonnes compared to current levels.

16 These 'paragraphs' refer to the old Waste Management Licensing Regulations, and these have now changed under the introduction of the Environmental Permitting Regime.

Table 13 Current and projected future quantities of recycled I&C waste in 2024-25.

Year	Scenario	Annual production of recyclate from the major waste streams (thousands of tonnes)		
		Industrial	Commercial	Total
2025	**Target**	70% recycling	70% recycling	
2007	**Current**	1,128	628	**1,756**
Projected for 2024-25	**Business as usual - No additional prevention**	993	1,385	**2,378**
	With additional prevention	993	921	**1,914**

2.4.5 Predicting future needs for waste and recyclate collection and infrastructure

In terms of the future infrastructure needs for the collection and management of the major waste streams, the following are the key findings from the analysis carried out in the Collections, Infrastructure and Markets Sector Plan:

- The key to increasing preparation for reuse/recycling/composting rates is to ensure that adequate collection systems – kerbside, bring sites and CA sites/HWRC - are in place across the board for both household and business wastes, especially from the commercial sector.
- For industrial and commercial waste greatest effort needs to be applied to separate out reusable and recyclable wastes from the mixed residual waste stream. This is particularly the case for commercial waste where there is a major need for improved services to be put in place in order to collect the materials separately for recycling.
- There appears to be broadly enough spare capacity for the future treatment and storage of wastes prior to recycling, that is, sufficient to meet future 2024-25 recycling targets. However, it is likely that the spatial distribution of capacity is uneven, and that coverage of specific waste materials is variable. Further, there is likely to be a need for new and more innovative facilities to manage recyclates, especially as new waste materials are targeted to achieve higher recycling targets.
- There is likely to be a need to increase the infrastructure to aid the preparation for reuse of waste from both households and businesses.
- There is a need to ensure the adequate provision in Wales of infrastructure to recover and dispose of residual waste (for further details see below under “Priority waste materials).
- Whilst data and information included in the CIM Sector Plan is confined to Wales only, it is important to note that waste facilities in Wales manage waste from other parts of the UK (especially from England), and, vice versa, some of

Wales' waste is managed in facilities in other parts of the UK (particularly England). The latter is particularly the case for recyclates, where economies of scale mean that a significant amount of the recyclate produced in Wales is reprocessed in other parts of the UK. In some cases recyclate from Wales is reprocessed abroad.

2.4.6 Management of priority waste streams and future requirements for Collection and management

Food waste

This is also covered in the main in the FMSR Sector Plan.

Arisings and management

Current quantities and recycling rates are shown in Table 14.

Table 14: Quantities produced and recycling rates of food waste produced by major sector and current recycling rate

Parameter	Industrial	Commercial	Total
Total quantity produced (thousand tonnes)	376	220	**596**
Quantity recycled (thousand tonnes)	289	26	**315**
Recycling rate (%)	77	12	**53**

Source: Survey of Industrial and Commercial Wastes in Wales 2007, Environment Agency Wales, 2009 and Welsh Government.

Around 315 thousand tonnes of food waste is recycled, accounting for 38% of the total food waste arising in Wales:

- Industry recycles 77% of its food waste on average, and a rate of 82.5% is achieved when the waste is separated from other fractions. Around 230 thousand tonnes is recycled via inclusion in animal feed or by rendering. Around 28 thousand tonnes of food waste from industry is mixed with other wastes and only achieves a recycling rate of 2.5%.
- Commerce only recycles 12% of the food waste it produces. The majority of food waste from commercial sources (171 thousand tonnes) is mixed with other wastes and not recycled.

Thus, the majority of the food waste currently recycled in Wales is derived from the industrial sector where most of it is recycled through animal food manufacture or through rendering (rather than through in-vessel composting or anaerobic digestion (AD)). Around 5 thousand tonnes of food waste are used for energy recovery, and around 55 thousand tonnes of food waste are recovered via application to land. Food waste from food manufacturers, wholesale and retail and the service sector is covered in more detail in the FMSR Sector Plan, food waste from the public sector will be addressed in the forthcoming Public Sector Plan.

Collections

Food waste collection services are being increasingly provided for businesses across Wales but no detail is available at the present time.

Infrastructure and capacity for food waste

Food waste can recycled by Anaerobic Digestion (AD) or composting to produce a valuable natural fertiliser or soil improver. In addition, AD produces a valuable renewable fuel (principally methane gas).

At the end of 2011, there were 10 food waste treatment facilities operating in Wales with a total capacity of around 104 thousand tonnes per annum. Of these, 9 were in vessel composting operations with a combined permitted food waste capacity of around 79 thousand tonnes and 1 was an AD plant with a permitted capacity of around 25 thousand tonnes. South West Wales has the largest capacity (around 57 thousand tonnes) followed by North Wales (around 33 thousand tonnes) and then South West Wales (around 14 thousand tonnes).

The scale of preparation for reuse/recycling required

Table 15 shows the projected future quantities of food waste that need to be recycled to meet the targets for 2024-25. It is estimated that an additional 76 – 145 thousand tonnes will need to be recycled to meet targets. Excluding industrial food wastes that are likely to be recycled for animal feed or rendered, there is likely to be an additional 133 – 202 thousand tonnes of food waste that will need to be recycled by 2024-25.

Table 15 Predicted annual future quantities of waste food to be recycled in 2024-25

Year	Scenario	Preparation for reuse and recycling (including anaerobic digestion) of food waste (thousands of tonnes)					
		Industrial			Total Commercial	Total Recycling	Total recycling less animal feed / rendering
		Excluding recycling for animal feed / rendering	Animal feed / rendering	Total			
2007	**Current**	59	230	**289**	**26**	**315**	**85**
Projected to 2024-25	**Business as usual, no additional prevention**	80	173	**253**	**207**	**460**	**287**
	With additional prevention	80	173	**253**	**138**	**391**	**253**

Predicting future needs for food waste collection and infrastructure

The future needs for collection and infrastructure for the management of food waste in Wales were analysed in the CIM Sector Plan. The following are the key findings:

- Collections – Arrangements for the segregated collection of food waste from industry are thought to be mature. Current evidence suggests that segregated collection of food waste from the commercial sector needs to be improved in Wales. Most of it is currently disposed of as mixed waste that goes to landfill.
- Infrastructure – there is a projected need to develop between 296 – 390 thousand tonnes of further food waste treatment capacity by 2024-25 (this includes for food collected by local authorities from households and businesses). Planned new capacity (with planning permission) is around 125 thousand tonnes (noting there is no certainty that the plants will be developed). The Welsh Government supported municipal food waste treatment procurement programme is currently aiming to procure around 140 thousand tonnes per annum capacity (some of which may be located outside of Wales). There is a need for further food waste treatment infrastructure to be developed in Wales. It is also possible that existing in vessel compost capacity may in time be replaced by new AD facilities, reflecting evolution and innovations in this food waste treatment sector.
- Markets – there is a projected need to ensure between 320 - 396 thousand tonnes of market demand for the products arising for food waste treatment in Wales by 2024-25 (including current demand), depending on waste arising

scenario. Current indications are that potential demand will significantly exceed supply, with >2 million tonnes identified.

Dry priority materials - paper and card, metal, plastic glass and wood (including packaging waste)

Arisings and management

It is estimated that approximately 1,680 thousand tonnes of dry materials are produced annually in Wales (**Table 16** outlines that for commercial and industrial only).

Table 16: Quantities of dry materials produced by major sector and current recycling rate

Material	Parameter	Industrial	Commercial	Total
Paper/card	**Quantity arising (thousand tonnes)**	202.7	691.6	**894.3**
	Recycling rate (%)	50	49	**49**
Metal	**Quantity arising (thousand tonnes)**	281.5	100.0	**381.5**
	Recycling rate (%)	91	66	**84**
Plastic	**Quantity arising (thousand tonnes)**	90.5	171.0	**261.5**
	Recycling rate (%)	47	22	**31**
Glass	**Quantity arising (thousand tonnes)**	35.3	108.0	**143.3**
	Recycling rate (%)	87	55	**63**
Total dry recyclate	**Quantity arising (thousand tonnes)**	610.0	1,070.6	**1,680.6**
	Recycling rate (%)	70	46	**55**

It is estimated that overall around 55% of all dry materials arising from industry and commerce in Wales are recycled. The highest recycling rate is achieved by metal (around 84%) and the lowest by plastic (around 31%). The next lowest recycling rate is for paper/card (around 49%).

Packaging Waste from the food, retail and service sector is covered in detail in the FMSR Sector Plan and from the public sector will be covered in the forthcoming Public Sector Plan.

Collections

There is good provision of collection services for companies producing large quantities of segregated dry materials and there is evidence that additional capacity exists to collect dry materials from businesses (see Table 17). There is a lack of competitively priced provision for smaller businesses as they generally produce small quantities of waste and as a result are not in a position to negotiate waste management costs.

Infrastructure and capacity

The infrastructure and capacity required for the intermediate treatment of dry materials before they are reprocessed are covered in the sub-section on major waste streams above. This includes transfer/bulking stations for separately collected dry recyclates, and Material Recycling Facilities (MRFs) for co-mingled recyclates.

Dry materials are converted at reprocessors into new raw materials that are then either used directly at the site in a manufacturing process or dispatched for use in manufacturing operations elsewhere. This can be in Wales, in other parts of the UK, in Europe or elsewhere in the world. Table 17 shows the estimated capacity of the 25 major reprocessors in Wales in 2010 to handle a range of dry recyclate materials. Of the total estimated capacity of around 2.8 million tonnes, the majority is for metals (around 1.8 millions tonnes) and paper/card (around 809 thousand tonnes). Of the metal reprocessing capacity ferrous (e.g. iron and steel) predominates over aluminium, and for paper/card paper predominates. There are a relatively large number of plastics reprocessors although the capacity they can handle is rather modest (around 56 thousand tonnes). Only two glass reprocessors were recorded for 2010, handling around 127 thousand tonnes.

Table 17: Capacity of dry material reprocessors in Wales 2010

Waste type	Number of reprocessors	Estimated total capacity (tonnes per annum)	Notes
Paper & card	5	**808,500**	In excess of 700,000 tonnes of this is capacity for waste paper.
Plastic	12	**55,787**	The vast majority of this is for plastic bottles containing HDPE and PET.
Metals	6	**1,831,803**	Ferrous metal reprocessing capacity dominates due to the large steel works in Wales.
Glass	2	**127,022**[1]	This is primarily capacity for creating secondary aggregate.
Total	25	**2,823,112**	-

Source data: WRAP[17] for paper/card, plastic and metals. Environment Agency for glass
Note: 1: This figure represents throughput in 2010, not capacity.

In terms of each material there is a range of types of reprocessing carried out in Wales – including both closed and open loop. These require differing levels of quality for their recyclate feedstock. Some of the reprocessors working at the high quality end have reported their difficulties in obtaining high quality recyclate feedstock from Wales. This is especially the case for paper – including its use as an insulation material and for high quality magazine and newsprint. There have been similar problems reported with the quality of plastic bottle feedstock; sometimes loads have to be rejected because of the high levels of contamination. Most of the glass reprocessing capacity in Wales is for aggregate use – a low quality open loop recycling application. The size of the UK glass production market is around 4 million tonnes. 2.3 million tonnes of container glass and 1.1 million tonnes of flat glass were produced in 2007. The remainder was glass wool and other products. This capacity is easily accessible for Welsh glass waste. There is evidence that closed-loop glass recycling operations in the UK are suffering from a lack of supply because the glass is being used for aggregate production. This may be driven by the ability to claim Packaging Recovery Note (PRN) revenue for secondary aggregates.

17 "End Markets for Recyclate in Wales", WRAP, January 2011. See:
http://www.wrapcymru.org.uk/sites/files/wrap/Wrap%20Cymru%20Recyclate%20Study%20FINAL.pdf

The scale of preparation for reuse/recycling required

Table 18 shows the projected future quantities of waste paper and card, plastic, metals, and glass that will need to be recycled to meet the 2024-25 targets. Projections range from around 1.1 – 1.4 million tonnes and compare with current recycling levels of around 0.9 million tonnes. Paper/card and plastic are the materials that will need the greatest increase in quantities recycled to help meet the 2024-25 targets.

Table 18 Predicted annual production of dry recyclates (waste paper and card, plastic, metals, glass) that need to be recycled to meet the 2024-25 targets.

Year	Scenario	Predicted annual production of waste (thousand tonnes)				
		Paper & card	Plastic	Metals	Glass	Total
2007	**Current**	439	79	323	91	**932**
Projected to 2024-25	**Business as usual, no additional prevention**	753	180	383	133	**1,448**
	With additional prevention	541	138	277	97	**1,052**

Predicting future needs for waste and recyclate collection and infrastructure/markets

The future needs for collection, infrastructure and markets for the management of dry recyclates in Wales were analysed in the CIM Sector Plan.

The following are the key findings for dry recyclate collection:

- There is a need to extend the collections for paper, card, plastic, metals and glass from all waste streams, with a particular focus on plastics and paper/card.
- There is also a need to ensure the higher quality collection of dry recyclate materials in Wales, especially for paper, plastic bottles and glass.
- The key issues for recyclate reprocessing (including its use in manufacturing in Wales) are:
- There is a need to further explore markets in Wales for aluminium, including the location of facilities elsewhere in the UK with capacity to receive waste from Wales.
- There is a need to develop reprocessing infrastructure for plastic film and non-bottle dense plastics.
- For glass, there is a case to explore colour-separation technology to feed the UK market. Also, there is a need to minimise the use of glass recyclate in secondary aggregate applications which is taking glass away from meeting the demand for remelt and which is also a less environmentally beneficial management route for waste glass.
- There is a need to expand the reprocessing capacity for card in Wales.

Residual mixed waste

Introduction

This sub-section focuses on the collection and management of the “residual” fraction of waste that is predominantly collected in a mixed form separately from single waste material streams. It is commonly collected in bags, bins and/or skips, and is then sent for final recovery (termed “other recovery” under the Waste Hierarchy) or disposal (e.g. landfilled). Sometimes the residual waste is treated prior to final recovery or landfill (for example by mechanical biological treatment (MBT) or mechanical heat treatment (MHT)).

Arisings and management of residual waste

Residual waste forms currently a significant component of commercial waste (57% of the total commercial waste collected). It forms a less significant component of industrial waste (20%) and construction and demolition waste (5%). A total quantity of around 1.3 million tonnes of non-hazardous non-inert residual waste was produced in 2007, the last year for which we have waste arising data. At an all Wales level the predominant management route for the residual waste from industrial and commercial waste combined is landfill – accounting for around 79% of the total residual waste produced.

Collections

There is good provision for the collection of residual waste from all business sectors. All local authorities in Wales provide on request a residual waste collection service to the commercial sector through their trade waste collection arrangements (as part of their statutory duty to do so under section 45(1)(b) of the Environmental Protection Act 1990). However, looking at Wales as a whole the uptake of this is not that significant in terms of tonnage, with the collection of trade waste running at around 10% of the total collected tonnage of residual Local Authority Municipal Waste (LAMW).

Most residual waste from the commercial sector and almost all residual waste from the industrial sectors is therefore collected by private operators in Wales. This collection is generally undertaken by operators who are SMEs. Although larger national waste management companies are active within Wales, there is proportionately a greater coverage by local and regional operators. Historically, collection from all sectors has generally involved the collection of residual waste from producers on a round, and either direct consignment to landfill or indirectly via bulking up at a transfer station.

Infrastructure and capacity

The management of residual waste can be grouped into three broad processes, each of which requires infrastructure and land:

- Intermediary treatment – e.g. MBT and MHT.
- Other recovery – e.g. energy from waste and landspreading.
- Disposal – e.g. landfill.

There are a number of technologies which provide a level of treatment of residual waste. They are regarded herein as intermediary treatment processes as they produce a significant amount of residue that requires further recovery or disposal. The two main processes currently used in the UK are:

- MBT – with the non-recyclable residues going to either energy from waste, landfill and/or landspreading.
- MHT - with the non-recyclable residues going to either energy from waste, landfill and/or landspreading.

"Other recovery" for residual mixed waste, or fractions derived from it after intermediary treatment, covers the following main techniques:

- Energy recovery, including AD, co-incineration (e.g. in a cement kiln), incineration, pyrolysis, and gasification (including plasma gasification) with energy recovery, with residues (incinerator bottom ash and air pollution control resides) being recycled or landfilled.
- Landspreading on non-agricultural land of compost like output (CLO) as a waste under an environmental permit. The CLO will be produced as a result of an intermediary treated process such as MBT or MHT. Landspreading of untreated residual waste is not permitted under any circumstance.

There have been a number of technological developments over the last decade, with varying degrees of technological and commercial success. It is possible that new innovative technologies may emerge over the next decade that will establish themselves as deliverable, reliable and proven methods for treating residual waste.

The CIM Sector Plan looks in detail at current and planned residual treatment facilities in Wales. It identifies that there are 6 permitted facilities in place with a combined permitted capacity of around 578 thousand tonnes per annum. This is made up of three MBT plants (one with an incinerator generating energy from the refuse derived fuel produced by the MBT plant), two cement kilns and one small gasification plant. The current throughput of residual waste through these plants is around 165 thousand tonnes per annum.

Whilst these facilities are currently meeting a waste management need, it is considered that in the future they are unlikely to help achieve the aspirations contained within Towards Zero Waste (in terms of sustainability and landfill diversion) without further investment.

Given the quantities of residual waste produced in Wales and in each region, and the extent to which it is currently landfilled, there is currently insufficient capacity in "other recovery" facilities in Wales and each region if the 2025 goal of as close to zero landfill as possible is to be achieved.

To some extent the market is responding to this lack of current provision as over the last few years a number of planning applications have been made for new recovery facilities. The CIM Sector Plan shows the estimated maximum additional capacity with planning permission of residual mixed waste treatment (other recovery) facilities by facility type and region in Wales. On an all Wales level four MBT plants with planning permission have a combined capacity of 550 thousand tonnes per annum and five energy from waste plants with planning permission have a combined capacity of 850 thousand tonnes per annum. Of these, four are gasification plants and one is incineration with energy recovery.

The Welsh Government is supporting six local authority consortia to procure the necessary services to treat (through "other recovery") the residual municipal waste collected by local authorities. Current estimates are that a total treatment

capacity of around 660 thousand tonnes per annum will be procured. There are firm and funded steps in place to secure the development of the necessary capacity for the recovery of residual local authority municipal waste. The position for residual wastes from the industrial and commercial sector is at present less clear – much depends upon whether the plants with planning permission will actually be built.

"Disposal" includes incineration without energy recovery and landfill. There are no incinerators without energy recovery in Wales that are permitted to receive residual mixed waste. There are nineteen landfill facilities in Wales that are permitted to receive residual mixed waste on a merchant basis, and their distribution and the overall remaining void space by region is shown in the CIM Sector Plan. There were 27.8 million tonnes of remaining capacity at nineteen merchant landfill sites that accept non-hazardous waste as of 31 December 2010.

Environment Agency Wales has estimated that if waste deposits at landfill continue at 2010 rates, and no new landfills are developed, non-hazardous landfills across Wales as a whole would reach the end of their life in around 10 years, i.e. by 2022. Environment Agency Wales' analysis is based on current inputs to landfill and it assumes that these will not change with time. This is therefore a worse case scenario and assumes that the interventions put into place by the Welsh Government to decrease waste and increase recycling will have little effect. Environment Agency Wales' analysis identifies that North Wales has the least amount of remaining landfill life (around 7 years), followed by South East Wales (around 9 years) and South West Wales (around 13 years). It follows that remaining life will be extended if annual inputs continue to decrease, as is intended in respect of the 2025 goal of as close to zero landfill as possible.

Looking to the future

Future quantities of residual waste

The amounts of residual mixed I&C waste that will be produced in Wales in the future depend principally on the degree to which the production of I&C waste in Wales increases or reduces, and the degree to which recycling targets are met. These are both dependent upon a complex number of factors including:

- The success of Welsh Government initiatives to promote and secure waste prevention and reuse/recycling.
- The degree to which the Landfill Tax, resource constraints, and supply chain pressures drive businesses to reduce residual waste.
- The nature of future business and wider macro economic circumstances.
- Wider macro resource availability and cost circumstances.
- The future change in population and household numbers.

The CIM Sector Plan modelled a number of different scenarios in order to provide an indicative range of the likely future quantities of non-hazardous, non-inert residual mixed I&C waste that will require other recovery or landfill.

The modelling scenarios predicts the following trend in residual waste arising from industry and commerce: change from an estimated 1,230 - 1,355 thousand tonnes in 2012-13 to 467 – 1,405 thousand tonnes in the first Towards Zero Waste milestone of 2024-25 to 0 to 1,509 thousand tonnes in the second Towards Zero Waste milestone of 2049-50.

The key findings of the analysis in the CIM Sector Plan are as follows:

Collections

The need to continue with current collection arrangements for residual waste is clear, albeit to an ever diminishing level as long as all of the recycling targets are met.

Infrastructure

There is a need across Wales to develop more residual waste treatment and recovery facility capacity to manage waste from industrial and commercial sectors. The future needs for residual mixed waste treatment and recovery cannot be predicted with any complete certainty due to the variety of factors that will affect future tonnages and a variety of factors that affect actual existing capacity. A range of best estimate capacity requirements for Wales as a whole for 2024-25 is summarised as 467 to 1,405 thousand tones per annum. (This data excludes permitted Refuse Derived Fuel (RDF) capacity in cement kilns in Wales on the grounds that its current operational use is negligible, and it is considered unlikely under present circumstances that this situation will change. However, the situation will be kept under review and should this capacity become more usable then the Welsh Government will publish revised figures accordingly).

There are uncertainties about the long term viability and operational ability of some of the existing facilities that treat and recover residual mixed waste. Hence again no certainty can be placed on this capacity to help meet future needs.

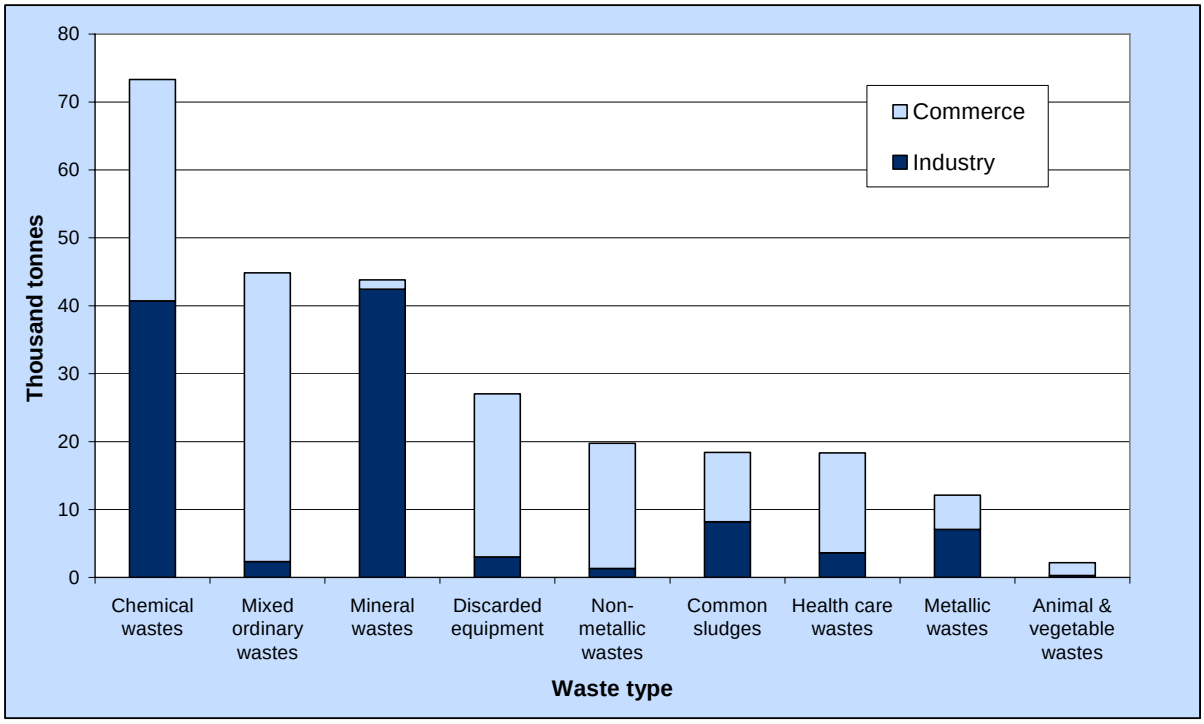
There are firm and funded steps in place to secure the development of the necessary capacity for the recovery of residual local authority municipal waste. The position for other residual wastes is at present less clear – much depends upon whether the plants with planning permission will actually be built.

Hazardous waste including chemicals

Arisings and Management

The survey of industrial and commercial waste arising in 2007 estimated the types and quantities of the 126 thousand tonnes of hazardous waste produced by industry and commerce (see Figure 5).

Figure 5: The composition of hazardous waste arising from industry and commerce in Wales by waste type (2007)

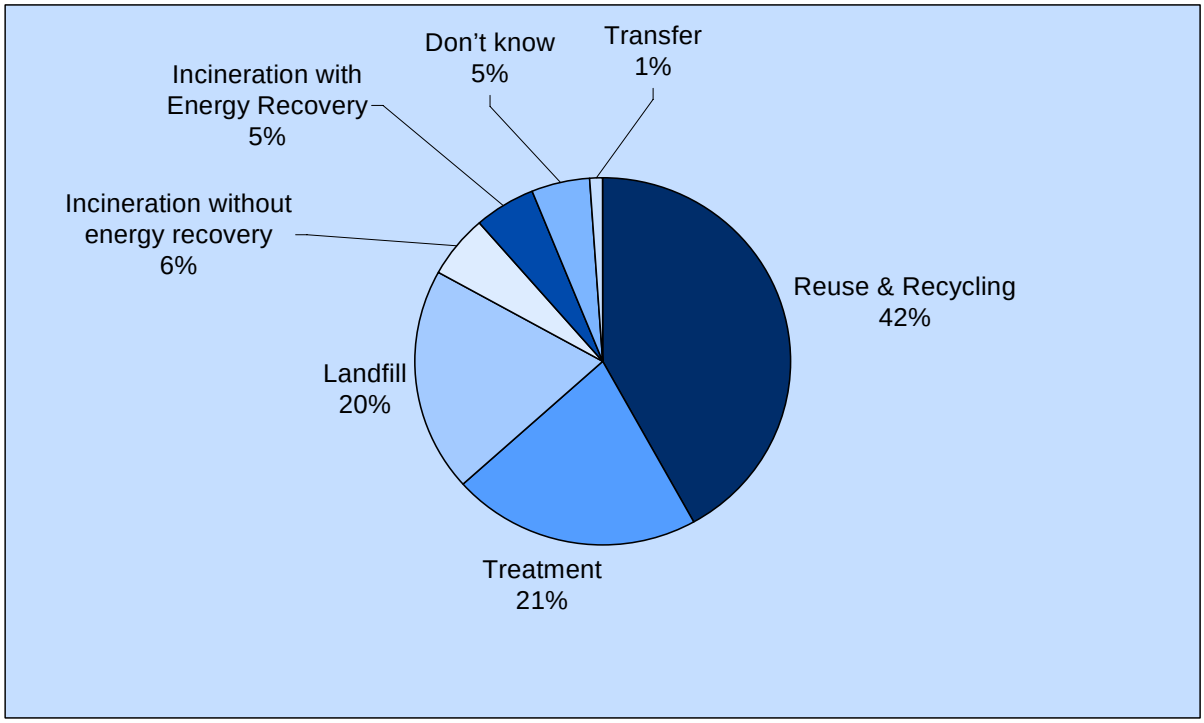


Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).

Chemical wastes, contaminated mixed waste, mineral waste and discarded equipment collectively account for 189 thousand tonnes, or 73% of the total hazardous waste generated by industry and commerce.

Figure 6 shows the range of options used to manage hazardous waste arising in Wales in 2007, as reported in the industrial and commercial waste survey. 42% of the hazardous waste was reported as being reused or recycled. Most of the remainder was either treated (21%) or disposed of to landfill (20%).

Figure 6: Management of hazardous waste generated by industry and commerce in Wales in 2007



Source: Survey of Industrial and Commercial Waste in Wales 2007, Environment Agency Wales (2009).

Collections

For businesses producing hazardous waste, the largest quantities of hazardous waste are produced by a small number of companies, and a much larger number of small producers produce small amounts. Two very different forms of collection are therefore apparent within the hazardous waste production sector. For the larger producers, it is common to have frequent repetitive loads that are transported to either a single or a small number of different management options, including recycling.

Oily waste producers are served by bulking and transfer operations, although for the larger producers this involves shuttle-runs between producer and management option, whereas for the smaller producers, this generally involves 'milk-run' collections and transfer to interim storage or treatment options prior to subsequent consignment to larger treatment or recovery installations.

Infrastructure and capacity

Wales is well served by facilities for the collection and temporary storage of hazardous waste materials prior to further management (including recycling), with around 168 facilities able to take at least one hazardous waste stream for bulking and temporary storage. Wales is also well served with a range of chemical, physical and physico-chemical treatment plant that together have a combined

capacity of around 1.8 million tonnes[18]. These treat a range of wastes including 810 thousand tonnes of chemical waste. These may result in the recovery of some materials. In other cases they are treated prior to disposal.

There are no dedicated merchant hazardous waste landfills operating in Wales. However, capacity exists in a number of strategic hazardous waste landfills in England to take hazardous wastes produced in Wales. The two nearest English hazardous waste landfill facilities to South Wales are within 25 miles of the Welsh border, and the same is true for North Wales. These facilities are therefore reasonably proximate for the small amount of Welsh hazardous waste arisings which are consigned to them (primarily asbestos wastes and contaminated soils).

Looking to the future

The scale of waste prevention required

Given the mainly downward trend in hazardous waste arisings over the last few years, and the likely drivers in terms of cost of dealing with hazardous waste, it is not thought that hazardous waste arisings will increase markedly in the future although the rising trend from 2009 to 2010 will be monitored closely to assess if any further action is needed for new capacity and infrastructure in future.

The scale of hazardous waste management infrastructure required

There is an identified gap in terms of landfill disposal options for hazardous waste, with no merchant disposal capacity in Wales (other than in a very small number of sites that accept limited amounts of asbestos). However, the tonnage of hazardous waste produced in Wales which is landfilled outside of Wales is small. There are also readily accessible hazardous waste landfills in England that are within 25 miles of the Welsh border in both North and South Wales. There is therefore little market incentive to develop extra hazardous waste landfill void in Wales.

With the exception of landfill, it must be considered that the current infrastructure in Wales forms an integrated and adequate network for the management of hazardous wastes.

18 Environment Agency Wales capacity survey (http://publications.environment-agency.gov.uk/pdf/GEWA0311BTOV-b-e.pdf)

Packaging waste

The Packaging and Packaging Waste Directive (more details on the Directive is contained in section 3) targets the following key packaging materials for collection and recycling and other recovery:

- Cardboard.
- Metal.
- Glass.
- Plastic.
- Wood.

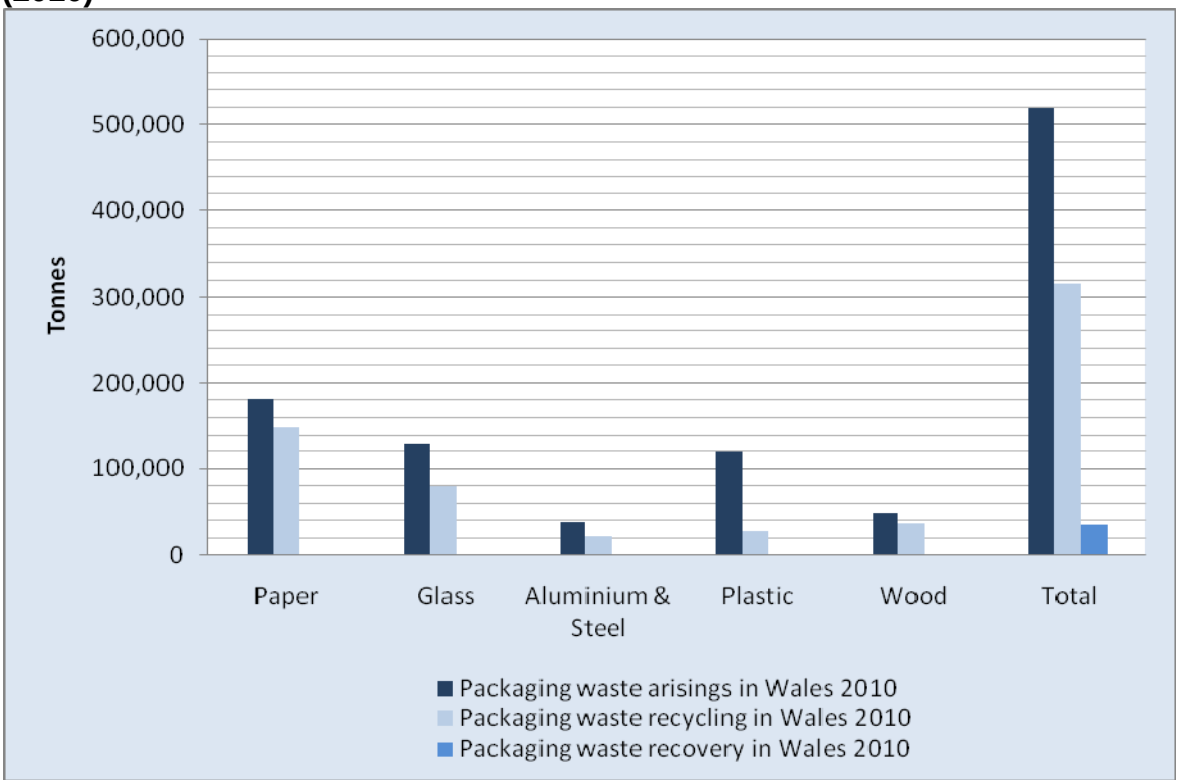
Arisings and management

It is estimated that there were around 520 thousand tonnes of packaging waste produced in Wales in 2010[19] (based of a pro-rate estimate derived from the figure of almost 11 million tonnes produced in the UK). Figure 7 shows the estimates of the main types of packaging materials and how they were recovered in Wales (based on the assumption that the performance in Wales is the same as the overall UK recovery and recycling rate). Overall around 61% of packaging was recycled in 2010, with total recovery being around 67%[20]. The UK has met the Directive target for 2010, but it is notable that glass and plastic packaging recycling rates exceed the target by less than 2%.

19 In 2010, there were 10,824,820 tonnes of packaging waste produced in the UK. The quantity of packaging waste produced in Wales in 2010 can be estimated using the UK published data and apportioning by population.

20 Source: Defra.

Figure 7: Estimates of packaging waste arisings and recovery in Wales (2010)



Source: Based on UK data and apportioning by population

Collections

The UK's arrangements to ensure that enough waste packaging is collected to meet the recycling requirements of the Packaging and Packaging Waste Directive consist of the setting up of Packaging Compliance Schemes and Accredited Reprocessors.

The compliance schemes purchase Packaging Recovery Notes (PRNs) from the Accredited Reprocessors sufficient to meet their recycling and recovery obligations as required under the Directive. The PRN revenue is intended to help fund the collection of recyclate. The packaging can be collected from either the LAMW or business (industrial and commercial) waste streams, usually both.

Infrastructure and capacity

The infrastructure and capacity required for the intermediate handling and treatment of packaging recyclate materials before they are reprocessed are covered in the section on major waste streams above.

Packaging waste materials are converted at reprocessors into new raw materials that are then either used directly at the site in a manufacturing process or dispatched for use in manufacturing operations elsewhere. In Wales there are 13 packaging reprocessors accredited by the Environment Agency under The Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (Table 19). Accredited reprocessors may receive payments from registered producers (or schemes acting on their behalf) for issuing:

- Electronic waste packaging recovery notes (ePRNs); or
- Electronic waste packaging export recovery notes (ePERNs).

Table 19 identifies the quantities of each of the packaging waste materials recycled or energy recovered in accredited reprocessors in Wales in 2010.

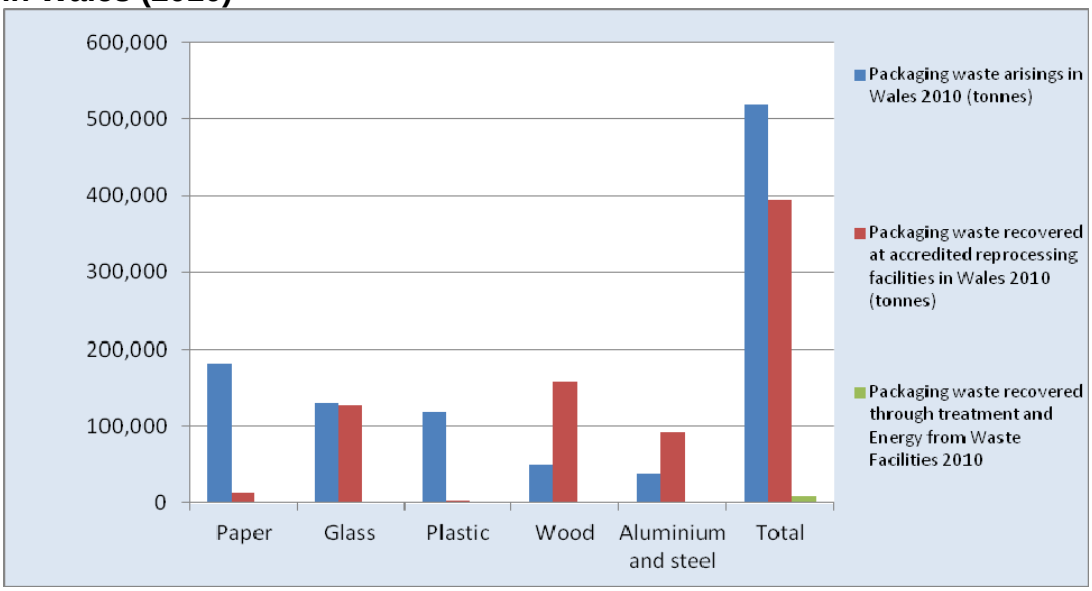
Table 19 Packaging recovered by accredited reprocessors in Wales 2010

Principal Material	Number of accredited reprocessors	Packaging waste recovered (tonnes)
Recycled:		
- Plastic	1	2,333
- Aluminium	1	7,029
- Paper/board	1	12,326
- Steel	3	85,874
- Glass – remelt to insulation	1	31,720
- Glass – to secondary aggregate	1	95,302
- Glass - total	2	127,022
- Wood	3	158,209
Recycled sub total	**11**	**392,792**
Energy recovery	2	8,139
Total	**13**	**400,931**

Source: Environment Agency

Figure 8 illustrates the degree of packaging reprocessing activity at accredited facilities in Wales compared to the estimated arisings of packaging in Wales in 2010. It must be stressed that the reprocessing activity identifies actual throughput only rather than maximum operational capacity. It appears to show that Wales has under activity in terms of accredited reprocessors for paper/board and plastic, and there is over provision in terms of wood and metal (in respect of steel, but not aluminium).

Figure 8: Estimated packaging waste material arisings and the quantities of waste packaging materials recovered at accredited packaging reprocessors in Wales (2010)



There is a range of types of reprocessing carried out in Wales – including both closed and open loop. These require differing levels of quality for their recyclate feedstock. Some of the reprocessors working at the high quality end have reported their difficulties in obtaining high quality recyclate feedstock from Wales. This is especially the case for paper – including its use as an insulation material and for high quality magazine and newsprint. There have been similar problems reported with the quality of plastic bottle feedstock; sometimes loads have to be rejected because of the high levels of contamination. Most of the glass reprocessing capacity in Wales is for aggregate use – a low quality recycling application.

Looking to the future

The scale of waste prevention required

It is difficult to estimate future arisings and types of packaging, and the scale of waste prevention required. Future quantities of packaging will depend upon, amongst other factors, changes in consumption patterns and the amount of packaging used per unit of product. Future types of packaging will depend upon a number of factors including the price and availability of packaging materials and innovations in packaging design. If waste prevention activities succeed then it would be expected that overall quantities of packaging will decrease at a commensurate rate.

The scale of preparation for reuse/recycling required

In terms of recycling rates laid down under the Packaging Waste Regulations, the four UK Nations have agreed to increase the overall recovery targets at 1% per annum from 74% in 2012 to 79% in 2017. Over the same period the overall recycling target will increase from 68.1% to 72.7%. Individual packaging material recycling targets are planned to increase substantially for plastic (from 32% to 57%) and aluminium (from 40% to 55%). Targets are planned to increase slightly for steel and not at all for paper/card and glass. For glass, the aim is that by 2017 glass recycling will be 64% by re-melt.

Collections

In terms of collections, more effort will need to be applied to collect more plastic and aluminium packaging for recycling. Effort will also need to be applied to ensure that glass is collected in a way that facilitates its use via re-melt.

The key issues for the collections of packaging for recycling are:

- There needs to be increased collections of plastic and aluminium packaging;
- There needs to be a focus on ensuring higher quality collections for paper/card, glass and plastic bottles.

The key issues for packaging recyclate reprocessing are:

- There is a need to further explore the market for aluminium, including the location of facilities elsewhere in the UK with capacity to receive waste from Wales.
- There is a future need to develop reprocessing infrastructure for plastic film and non-bottle dense plastics.
- For glass, there is a case to explore colour-separation technology in order to feed the UK market. Also, there is a need to discourage the use of glass recyclate in secondary aggregate applications, a less environmentally beneficial management for waste glass.
- There appears to be a need to expand the reprocessing capacity for card in Wales.
- There is a need to ensure that high quality waste paper remains within Wales to support local reprocessing companies, and that the correct quality of waste paper is delivered to the reprocessors.

2.4.7 Summary of current and future needs for waste electrical and electronic equipment (WEEE) End of life vehicles (ELV), and batteries

a) Waste electrical and electronic equipment (WEEE)

There is scope to significantly increase the amount of WEEE that is reused or prepared for reuse, and a need to significantly increase the amount of WEEE collected separately and recycled in order to meet revised WEEE Directive targets.

The infrastructure for managing, treating and recycling WEEE may have to expand accordingly.

b) End of life vehicles (ELV)

Wales is well served to manage its ELV arisings, and it currently has adequate capacity, including meeting the new higher targets for 2015. However, there may be scope for improved spatial coverage and the development of new, innovative facilities for the management of ELV and their components.

c) Batteries

Significant effort and further investment in the collection and management infrastructure now needs to take place for future targets to be achieved. This may include exploring household collections at the kerbside.

2.5 Materials resource efficiency of the industrial and commercial sectors in Wales

a) Chemicals Sector

Chemical products include fertilisers, pesticides, plastics, adhesives, paints, soaps, detergents, cosmetics and pharmaceuticals and the industry can be split on the following basis:

- Commodity chemicals: large tonnage, made on dedicated continuous operation plants.
- Speciality chemicals: smaller tonnages, higher unit values, typically made in multi-stage operations on shared batch plants, properties tailored to individual customers' needs.
- Fine chemicals: complex molecules (eg pharma intermediates) share some features of specialities.

There are approximately 580 permitted installations across 535 sites in the chemicals sector in the UK. In Wales there are 49 permitted plants, including 14 organic, 22 inorganic, 3 pharmaceutical, 1 biocide and 9 low impact installations.

The industry produces a high percentage of waste to landfill, and uses a lot of resources. The environmental consequences of chemical industry activity include:

- resource extraction (raw materials, energy and water);
- waste generation (from manufacturing and also from use and final disposal of products).

The sector's production of hazardous waste is decreasing, but still typically accounts for about a sixth of all hazardous waste in England and Wales.

b) Cement and Minerals Sector

The main activities in this sector are cement, lime, mineral and glass fibres, glass frit, asbestos, ceramics, tar & bitumen coating and crushing & grinding. The cement sector is a big net consumer of waste. Against the 1.2 million tonnes of waste and by-products used as fuel or raw materials, it disposed of only 46k tonnes of waste. A key issue is the sustainable use of resources (including natural raw materials and waste), although there has been much progress on this as a sector and the following has already been achieved:

- Use of substitute raw materials increased by 20%.
- Substitute fuels now represent 35% of all kiln fuels burned (15% in 2006).

Cement and Lime sites dominate the sector. In the UK, there are 38 permitted sites (Cement 13, Lime 8, Other 17). In Wales there are 7 regulated sites (2 cement, 0 lime, 2 glass frit/fibre, 1 mineral fibre and 2 'other').

c) Paper, Pulp and textiles

The paper industry provides a number of essential products to society including newsprint, paper and packaging, hygiene and various speciality products.
It also plays a pivotal role in recovering value from waste paper and has strong associations with the waste recovery sector. Approximately two-thirds of mills use recovered paper as a raw material (in 2009 72% (3.4 mtpa) of the fibre used by UK mills was recovered paper and board). According to the Confederation of Paper Industries, in 2009 the UK consumed 12.1 Mt of paper and board. Paper consumption has fallen over the last few years as a result of the recession. There is likely to be some rebound in paper consumption as the UK emerges from recession, but the long-term trend in consumption is likely to be downward.

In Wales there are 5 Paper & Pulp mills permitted as A(1) activities in Wales. (1 newsprint; 4 tissue mills; 0 packaging/board and 0 speciality mills).

3 Actions

3.1 Introduction

This section covers existing and proposed new actions in respect of changing behaviour within the commercial and industrial sectors to consider: waste minimisation and prevention at all stages of activity; instilling the principle of ecodesign; promotion of and preparation for reuse and reuse opportunities; and encouraging better segregation of waste to facilitate higher recycling rates. Actions are organised in accordance with the relevant parts of the waste hierarchy and requirements to deliver 'Towards Zero Waste'. The first section details the overarching objectives and actions which are common to more than one element of the waste hierarchy and which derive from the 2008 Revised Waste Framework Directive and Towards Zero Waste.

The proposed actions in this plan have been developed based upon the analysis and evidence in Section 2 and with reference to waste prevention research undertaken by Welsh Government as part of the Waste Prevention Programme. Consideration has been made of where specific gaps need to be filled and market failures addressed in order to meet future targets and the sustainable development policies and outcomes laid down in Towards Zero Waste.

Responses to consultation questions for the Waste Prevention Programme actions will be assessed as part of the current consultation of the Waste Prevention Programme.

3.2 Roles and Responsibilities

In achieving waste prevention, increased preparation for reuse and recycling within commercial and industrial sectors, each of the identified sectors has a role to play, not only individually but as a concerted effort through the supply chain:

Welsh Government has

- Full devolved responsibility for waste, with primary legislative powers in relation to waste.
- A strong role at a national and international level to drive:
- waste prevention using instruments available to it to overcome market failures and drive change
- preparing for reuse. This includes setting targets, providing funding support and advice, commissioning research, supporting innovation and ensuring national awareness raising and behavioural change campaigns.
- environmentally beneficial means of managing all wastes generated in Wales.
- Responsibility for meeting European Directives, including producing waste plans and ensuring compliance in Wales.
- A strong role to drive the creation of a high recycling society for Wales using instruments available to it to overcome market failures and drive change.

- A strong role to drive waste up the hierarchy in order to achieve zero waste (no residual requiring other recovery or disposal) using instruments available to it to overcome market failures and drive change.

Local authorities are required to

- Enforce Packaging Essential Requirements Regulations.
- Develop local prevention regimes using a range of tools such as business support.
- As collectors of municipal waste, ensure that as much as possible is prepared for reuse. Many items disposed of by householders (especially in the "bulky waste" stream) could be reused if collected and handled in a way that does not damage them beyond repair or reuse.
- Continuously improve the service and, in doing so, have regard to inter alia sustainable development (in accordance with their duty under Section 2 of the Local Government (Wales) Measure 2009).
- Comply with all relevant laws governing waste, particularly in a way that does not endanger human health or the environment (including living organisms and biodiversity).
- Meet statutory recycling and reduction in landfilling of biodegradable municipal waste targets.
- Provide, from 2015, a separate collection service for paper, glass, metal and plastic for households and businesses.

Business waste producers (industrial and commercial) should

- Reduce their own waste arisings.
- Ensure that products are stored for preparation for reuse rather than sent for landfill and passed on in a state that someone else can use them.
- Ensure that the workplace culture allows for behaviour change to facilitate waste prevention.

Businesses must

- Comply with all relevant laws governing waste, particularly in a way that does not endanger human health or the environment (including living organisms and biodiversity).
- Declare on Waste Transfer Notes that they have taken the waste hierarchy (and hence reuse) into account and have taken into consideration government guidance on the practical application of the waste hierarchy[21].

21 This is a requirement of Article 15 of the revised Waste Framework Directive. Draft regulations transposing the Directive in England and Wales were consulted on 8 July 2010 – see http://www.defra.gov.uk/corporate/consult/waste-framework-revised/index.htm

Industrial businesses are encouraged to

- Bear a significant responsibility for products they manufacture to be more durable, and longer lasting with the potential for reuse or easy to repair or upgrade.
- Produce products and packaging with minimal materials, design for longevity, design for recycling and sustainable waste management treatment with out compromising the integrity of the product itself.
- Engage with the various waste prevention approaches.

Manufacturers

- Are encouraged to ensure products are designed for recyclability.
- Have a producer responsibility for the products and packaging they put on the market. Some are obligated under the Producer Responsibility Regulations.

Commercial

Wholesale and Retailers are encouraged to:

- Be responsible for the end of life of product and packaging waste in households.
- Influence the behaviour of their customers.
- Engage with the various waste prevention approaches. Wholesalers and Retailers will for example play a vital role in the development of products services and leasing.
- Bear a significant responsibility for products they sell to be manufactured to be more durable, and longer lasting with the potential for reuse or easy to repair or upgrade.
- Have a ‘producer responsibility’ for the items they sell. Some are legally obligated under Producer Responsibility Regulations.

Waste Management Industry are requested to

- Provide a holistic service to the sectors covered in this plan that includes advice on waste prevention and recycling and a holistic service that facilitates preparing for reuse.
- Provide a separate collection service for paper, glass, metal and plastic, from 2015.
- Ensure that waste is treated via the most environmentally beneficial means as far as possible.

The Waste Management Industry must

- Comply with regulations and carry out operations in a manner which does not endanger human health or the environment (including living organisms and biodiversity).
- Declare on Waste Transfer Notes that they have taken the waste hierarchy into account and have taken into consideration Government guidance on the practical application of the waste hierarchy.

Regulatory Agencies such as Environment Agency

- Implement specific environmental regulation, working to 'better regulation' principles.
- Act as an independent adviser to devolved government in developing legislation and policy on environmental matters.
- **Regulate compliance of the key producer responsibility regulations.** The Environment Agency needs to continue to robustly monitor and regulate compliance of the producer responsibility regulations covering packaging, ELV, WEEE and batteries in order to ensure that the requisite recycling services are in place and are delivering the targets. The approach to regulation is explained on the Environment Agency's website[22].

As of 1st April 2013, Environment Agency Wales (along with Forestry Commission Wales and Countryside Council for Wales) will be incorporated into the new environmental body, Natural Resources Wales.

Support providers (for example - WRAP and Ecodesign Centre)

- Help deliver the aspirations of Towards Zero Waste.

The Welsh Government has core funded the Ecodesign Centre for 6 years and the Centre has been successful in obtaining many high profile European funded programmes and projects. The Welsh Government funds the Centre in order for it to promote ecodesign to Welsh industry through a range of channels including communications and workshops and to inform the Welsh Government.

WRAP UK is the UK's main business support provider for resource efficiency. WRAP Cymru is a regional office providing local support to Welsh businesses. It has been funded as a separate regional office since 2002. It the other main delivery partner for support for the industrial and commercial sectors.

Social enterprise sector is encouraged to

- Promote messages – the social enterprise sector is involved in many community food groups such as food co–operatives and Health Challenge Wales. These are mechanisms for disseminating message and reducing food waste.
- Take action – for example, FareShare UK is an established charity that redistributes surplus 'fit for purpose' food and drink products to community organisations, tackling food poverty as well as reducing food waste.

Preparation for reuse businesses (including social enterprises) to

- Ensure that pre-used items are valued and used again. This sector has developed a furniture recycling network to promote the reuse of furniture and other bulky items (especially electrical). This is likely to increase in the future.
- Comply with all relevant laws governing waste, particularly in a way that does not endanger human health or the environment (including living organisms and biodiversity).

[22] http://www.environment-agency.gov.uk

Consumers are encouraged to

- Let businesses know when packaging goes beyond what they regard as normal or acceptable. They can do so by choosing alternative products, bringing it to the attention of the retailer or manufacturer, or asking Trading Standards to investigate.
- Be responsible with regards to their purchasing and production of waste.
- Engage with the various waste prevention approaches. Consumers will for example, play a vital role in the adoption of products services and leasing.
- Ensure that items discarded are cared for and passed on in a state that someone else can use them. Items that are wasted can have a monetary value, and materials thrown away may have been reused or their life extended thus avoiding or delaying the purchase of new products.

Producer Responsibility Compliance Schemes are required to

- Register obligated producers and discharge their collection, treatment and recycling obligations and provide evidence of this to the Environment Agency.
- Prioritise the reuse of whole appliances (in respect of Waste Electrical and Electronic Equipment).
- Provide evidence of this to the Environment Agency/Natural Resources Wales.

Planners have

- A role to play in the development of waste management infrastructure and systems for Wales, this should include infrastructure for the preparation for reuse.
- To be aware of waste activities in their area and how the waste hierarchy should be promoted by their decisions.

3.3 Overarching Objectives and Actions

3.3.1 Introduction

To take into account that some objectives and actions will cover more than one element of the waste hierarchy, these have been grouped under the catch all heading ‘overarching’.

3.3.2 Overarching Objectives

1. To ensure that the products use fewer resources (reducing especially those that are non-renewable), are more durable and/or have an extended life, are more reusable and/or refurbishable/upgradeable and that opportunities are taken to deploy the products more efficiently through leasing and/or “collaborative consumption”. Products should also generate less waste at end of life, be more recyclable, and have a higher recycled content. The producer should take more extended responsibility for the product’s management at end of life, including in respect of the costs of end of life management. Producers will also be expected to play a role in promoting behavioural change to customers/consumers.
2. To explore and implement the use of sectoral agreements, consumer/producer panels and/or sectoral negotiations in order that the relevant businesses or sectors set their own resource efficiency plans or objectives for the supply the production site, and in respect of product waste (to include waste prevention, increasing reuse and recycling, and increasing recycled content where feasible).
3. To ensure that the management of waste is guided by the waste hierarchy as a priority order (unless a life cycle assessment guides otherwise) as follows:
    - prevention;
    - preparing for reuse;
    - recycling (encompassing composting and anaerobic digestion);
    - other recovery, e.g. energy recovery; and
    - disposal.
4. To ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:
    - without risk to water, air, soil, plants or animals;
    - without causing a nuisance through noise or odours; and
    - without adversely affecting the countryside or places of special interest, including in respect of conservation status.
5. To make an overall net positive impact in Wales on areas of special conservation status, taken as a whole, and biodiversity in general through the more sustainable management of waste leading to reductions in greenhouse gas emissions that will help contribute to reducing the scale of climate change and its associated impact on native flora and fauna.
6. To meet obligations for Wales under European and UK waste legislation, including the Habitat Regulations, especially in relation to the impact of waste facilities on areas of special conservation status.

7. To generate more ‘green’ jobs within the waste and resource management industry across a range of skill levels in Wales and to increase the number of high skilled, high value green jobs.
8. To enable business in Wales to become more competitive in the world market through more efficient resource management ensuring that they are more resilient against future competing demands including, rising costs and security of supply of global material resources, thus saving money and maintaining or increasing profit.
9. To ensure that public and corporate procurement includes the integration of environmental and resource efficiency criteria in calls for tenders and contracts (in line with the Handbook on Environmental Public Procurement published by the European Commission on 29 October 2004).
10. To ensure the initiation and promotion of research and development into resource efficiency, including achieving cleaner and less wasteful products and technologies, and the dissemination and use of the results of such research and development.
11. To ensure that the management of waste will change in a way that contributes towards a more fair and just society through enabling all citizens of Wales to contribute to waste prevention, reuse and recycling irrespective of where they live, their health and ability, mobility or personal circumstances in order to:
    - Achieve their full human potential;
    - Enrich their communities;
    - Contribute towards the wellbeing of Wales;
    - Improve their local environment; and
    - Actively improve the quality of their life.
12. To deliver integrated and consistent behaviour change campaigns to secure resource efficiency at both the production and consumption stages, including campaigns that are specifically aimed at, and adapted to, small sized enterprises, including working through established business networks.
13. To ensure all collection and management infrastructure for waste is capable of adapting to, and is resilient, in respect of the impacts of climate change, including the need to maintain business continuity during extreme weather and avoid public nuisance during routine operations. This will also need to include the need to take into account any areas of ‘managed realignment’ along the Welsh coastline when siting new waste facilities.
14. To obtain more reliable, accurate and up-to-date data in relation to waste generation and waste management methods in order to monitor trends, progress in meeting targets and to help formulate better strategic plans.

3.3.3 Overarching Actions

a) Overarching EU Initiatives and Directives

Examples of relevant EU initiatives already underway include:

- The **EU Waste Framework Directive** (WFD) lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste, and by reducing the overall impacts of, and improving the efficiency of, resource use. Revisions of the WFD (2008/98/EC) were adopted in December 2008 and have been transposed in Wales via the Waste (England and Wales) Regulations 2011.

In respect of aspects of the revised Directive that apply to the prevention of waste, the Directive includes requirements for member states to:

- Apply the waste hierarchy in waste management legislation and policy with waste prevention as a top priority.
- Take measures, as appropriate, to promote the re-use of products and preparing for re-use activities, notably by encouraging the establishment and support of re-use and repair networks, the use of economic instruments, procurement criteria, quantitative objectives or other measures;
- Establish Waste Prevention Programmes[23] describing existing prevention measures, evaluating the usefulness of other measures and determine benchmarks for measurement of adopted prevention measures.
- Promote the high quality recycling of waste materials as part of the overall aim to make the EU a 'recycling society'.
- Ensure that separate collection is set up for at least the following: paper, metal, plastic and glass by 2015 (for all waste producing sectors).
- Ensure that the preparation for reuse and the recycling of waste materials such as at least paper, metal, plastic and glass from households is increased to a minimum of overall 50% by weight by 2020[24].
- Encourage the separate collection of bio-waste with a view to the composting and digestion of bio-waste, the treatment of bio-waste in a way that fulfils a high level of environmental protection and the use of environmentally safe materials produced from bio-waste.
- Ensure that the preparation for reuse, recycling and other material recovery of non-hazardous construction and demolition waste is increased to a minimum of 70% by weight in 2020.
- Establish an integrated and adequate network of waste disposal installations and installations for the recovery of mixed household waste.
- Ensure that waste management is carried out without endangering human health and without harming the environment.
- Consider the resource efficiency aspects of hazardous waste production and management – including waste oils.

23 See references to Welsh Government's Waste Prevention Programme through this sector plan.

24 With the agreement of the European Commission, the UK will be applying the 50% target to all wastes from households, and not just the materials specified.

- Establish waste management plans.
- Ensure that the plan making requirements of Article 5 of the Landfill Directive (in relation to the landfilling of all biodegradable waste, not just municipal) and the Packaging and Packaging waste Directive are met in the plan.

- **The recast of the WEEE Directive has ended with the publication of the new Directive 2012/19/EU Waste Electrical and Electronic Equipment (WEEE).** It which aims to address the environmental impacts of WEEE and to encourage its separate collection and subsequent treatment, reuse, recovery, recycling and environmentally sound disposal.

A “recast” of the WEEE Directive is in the final stages of development, with the text of revised Directive agreed between the Council of the EU and the European Parliament.

A new collection target has been agreed, 85% of WEEE generated .This will ensure that around 10 million tonnes, or roughly 20kg per capita, will be separately collected from 2019 onwards. The existing binding EU collection target is 4 kg of WEEE per capita, representing about 2 million tons per year, out of around 10 million tonnes of WEEE generated per year in the EU. By 2020, it is estimated that the volume of WEEE will increase to 12 million tons.

The new WEEE Directive will give EU Member States the tools to fight illegal export of waste more effectively. Illegal shipments of WEEE disguised as legal shipments of used equipment, in order to circumvent EU waste treatment rules, are a serious problem. The new Directive will force exporters to test and provide documents on the nature of their shipments when the shipments run the risk of being waste.

A further improvement is the harmonisation of national registration and reporting requirements under the Directive. Member States' registers for producers of electrical and electronic equipment will now have to be integrated more closely. The Commission will adopt a harmonised format to be used for the supply of information. Administrative burdens are consequently expected to decrease significantly.

- **The Batteries and Accumulators and Waste Batteries and Accumulators Directive (2006/66/EC)** aims to improve the environmental performance of batteries and accumulators and minimise the impact that waste batteries and accumulators have on the environment. The Directive places requirements on the design of all new batteries, and requires the separate collection, treatment and recycling of waste batteries and accumulators, reducing the disposal of batteries and accumulators in the municipal waste stream. It bans or restricts the use of 2 heavy metals (mercury in all batteries and cadmium in portable batteries with certain exemptions).
- **Directive 94/62/EC on Packaging and Packaging Waste, as amended by Directive 2004/12/EC)** first came into force at the end of 1994 and has both environmental and single market objectives. It aims to harmonise the management of packaging waste in the EU and tackle the impact that packaging and packaging waste have on the environment. Although the primary objective is to increase the recovery and recycling of packaging waste in a consistent way in all Member States of the EU (so as to avoid barriers to trade), priority is also given to reducing the amount of packaging used and the reuse of packaging. The Directive sets Member States mandatory recovery. It also bans the use of 4 heavy metals, with some exemptions (crystal glass or plastic crates and pallets). Also includes provisions aiming at decoupling economic growth and packaging generation. This Directive provides for measures aimed at limiting the production of packaging waste and promoting recycling, re-use and other forms of waste recovery. Their final disposal should be considered as a last resort solution.
- **End-of-life Vehicles Directive 2000/53/EC**: Four amendments have been made to show a reduction in the use of hazardous substances in new vehicles where their use is no longer necessary and consequently an improvement in the quality of the waste produced is achieved.
- **Ecodesign Directive (2009/125/EC).** The original aims of the Ecodesign Directive included an improvement on the energy efficiency and wider environmental impacts of Energy Using Products (EuPs). While there was scope for the directive to include a full life cycle perspective of environmental impacts the practice was that it focused on energy use. This is primarily due to the nature of the target products within the directive. The directive was recast in 2009 and now refers to energy related products (ErP).
- **The Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2011/65/EC)** aims to minimise the environmental impact of waste electrical and electronic equipment, by restricting the quantities of four heavy metals and two brominated flame retardants that it may contain. The Directive was reviewed in 2010, with a new Directive published in July 2010. The new Directive was transposed into UK Regulations by the transposition deadline of 2 January 2013.

- **Directive 2005/64/EC on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability and amending Council Directive 70/156/EEC** established that vehicle manufacturers and their suppliers should include reusability, recyclability and recoverability of component parts "at the earliest stages of the development of new vehicles, in order to facilitate the treatment of vehicles at the time when they reach the end of their life". The focus shifted to the recyclability and recoverability of the vehicles before being produced and commercialised. Vehicles have to be constructed as to be: reusable and/or recyclable to a minimum of 85% by weight, and reusable and/or recoverable to a minimum of 95% by weight. In addition the Commission is currently working to encourage the development of clean and energy efficient cars, including facilitating recycling of car batteries.
- **EU Sustainable Materials Management**: The EU's Environment Council in December 2010[25], concluded the EU's extensive use of resources and its high dependence on the import of resources combined with worldwide population growth and economic development threatens future supply and access to resources for Europe. It therefore requires action under a new initiative on Sustainable Materials Management. The Council has identified that the shift towards a sustainable and resource-efficient European economy will require, in addition to technological innovation, innovation at the socioeconomic level, i.e. new business models (e.g. product-service schemes, industrial symbiosis and integrated chain management), new consumption patterns and new governance models geared towards the sustainable management of materials throughout the life-cycle.
- **Europe 2020 Strategy** is the EU's growth strategy for the coming decade. It states that in a changing world, the EU should become a smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion. The Union has set five ambitious objectives - on employment, innovation, education, social inclusion and climate/energy - to be reached by 2020. Each Member State is to adopt its own national targets in each of these areas. Actions at EU and national levels will underpin the strategy. There is a flagship initiative to support strategy and the shift towards a resource-efficient, low-carbon economy to achieve sustainable growth. Increasing resource efficiency is key to securing growth and jobs for Europe. It will bring major economic opportunities, improve productivity, drive down costs and boost competitiveness. It provides a long-term framework for actions in many policy areas, supporting policy agendas for climate change, energy, transport, industry, raw materials, agriculture, fisheries, biodiversity and regional development. This is to increase certainty for investment and innovation and to ensure that all relevant policies factor in resource efficiency in a balanced manner.
- **Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan** includes a series of proposals on sustainable consumption and production that will contribute to improving the environmental performance of products and increase the demand for more

25 Council conclusions on sustainable materials management and sustainable production and consumption: key contribution to a resource-efficient Europe, 20 December 2010

sustainable goods and production technologies. It seeks to encourage EU industry to take advantage of opportunities to innovate. Several policies at EU and national level already foster resource efficient and eco-friendly products and raise consumer awareness. The proposals complement these policy instruments and provide measures where gaps exist.

- **Eco-Innovation Action Plan** (EcoAP) launched in 2012. Eco-innovation is crucial to delivering the Europe 2020 strategy for smart, sustainable and inclusive growth. The EcoAP will boost innovation that reduces pressure on the environment, and bridge the gap between innovation and the market. Eco-friendly technologies are good for business and help create new jobs, so eco-innovation is crucial to the economic competitiveness of Europe. The EcoAP is one of the commitments of the Innovation Union Flagship Initiative, building on the 2004 Environmental Technologies Action Plan (ETAP). It expands the focus from green technologies to the broader concept of eco-innovation, targeting specific bottlenecks, challenges and opportunities for achieving environmental objectives through innovation. The EcoAP includes actions both on the demand and supply side, on research and industry and on policy and financial instruments. The Plan recognises the key role of environmental regulation as a driver of eco-innovation and foresees a review of environmental legislation. It also stresses the importance of research and innovation to produce more innovative technologies and bring them to the market. The Plan also puts emphasis on the international aspect of eco-innovation, and on better coordination of policies with international partners. Implementation of the plan will be via partnership between stakeholders, private and public sector, and the Commission. The upcoming mid-term financial review will provide a good opportunity to assess the achievement of the goals set in this Action Plan. New efforts will focus on product development and demonstration activities to fill the gap between technology and market uptake.

Other EU International Initiatives

In addition to those initiative already listed, it will be important to retain an active and watching brief on other key international initiatives such as:

- UNEP/SETAC Life-Cycle Initiative.
- European Platform on Life Cycle Assessment.
- UNEP Product Service Systems and Sustainability.
- UNEP's Sustainable Building & Construction Initiative (SBCI0).
- European Roundtable for Sustainable Consumption and Production (ERSCP).
- Asia Pacific Roundtable for Sustainable Consumption and Production (APRSCP).
- Network Sustainable Consumption Research Exchange.
- Thematic Strategy on the Sustainable Use of Natural Resources.
- Environmental Technologies Action Plan.

- **UN 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns: The Marrakech Process**. The 10 year programme has initiated a series of task forces including the Marrakech Task Force for Sustainable Products. This task force has been focusing on:
- raising awareness of product policy as means of achieving international development and environmental objectives;
- seeking common priorities and opportunities for cooperation in encouraging more innovation on product eco-design;
- establishing and participating in open and transparent processes for improving product performance.

b) Overarching UK Regulations

Legislation is one of several interventions that are available to Welsh Government to encourage a more sustainable approach to waste and resource management along the supply chain.

- **Eco-Design for Energy-Related Products Regulations 2010** (SI 2010 No.2617) transposed the Ecodesign Directive/ It aims to improve the environmental performance of products throughout the life-cycle, by integration of environmental aspects at a very early stage in product design. The original Directive was recast in 2009 and was previously known as the Energy-Using Products (EuP) Directive 2005/32/EC. This was transposed into UK law under Statutory Instrument (SI 2007 No.2037) which is now revoked.

- **Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (amended 2009)** implement Article 6(1) of Council Directive 94/62/EC on packaging and packaging waste and section 93(3)(a) of the Environment Act 1995 applies. The Directive is transposed into a series of UK targets for businesses handling packaging which reflect the UK packaging market and waste arisings; certain businesses are obligated depending on turnover (£2m) and quantity of obligated packaging handled per annum (50 tonnes).

  Minimum recovery (60 per cent) and recycling (55 per cent) targets were set for packaging waste to be met by 31st December 2008 as well as material – specific recycling targets. After 2008, Member States had to continue to meet these minimum targets but now have freedom to set higher targets.

  UK Packaging waste recovery and recycling targets for 2013-17

  New packaging targets for 2013-17 have been agreed and amendments made to the Regulations (the Producer Responsibility Obligations (Packaging Waste) (Amendment) Regulations 2012 No. 3082).

  The targets will deliver environmental and economic benefit, as well as ensure that the UK continues to meet EU Directive targets over the next five years (Table 20).

Table 20 Percentage Recycling and Recovery Targets 2013 to 17 compared to 2012

Year/ Material	2012	2013	2014	2015	2016	2017
Paper/card (%)	69.5	69.5	69.5	69.5	69.5	69.5
Glass (%)	81	81	81	81	81	81
Aluminium (%)	40	43	46	49	52	55
Steel (%)	71	72	73	74	75	76
Plastic (%)	32	37	42	47	52	57
Wood (%)	22	22	22	22	22	22
Total recovery (%)	**74**	**75**	**76**	**77**	**78**	**79**
Of which recycling (%)	**68.1**	**69**	**69.9**	**70.8**	**71.8**	**72.7**

As these targets only apply to obligated businesses, the overall level of recycling and recovery will be lower.

From 2013, there will also be split targets for glass. The targets for individual businesses with an obligation in glass is outline in Table 21.

Table 21 Glass Remelt Percentage targets

Year	2013	2014	2015	2016	2017
% of which glass must come from remelt	63	63	64	64	64

- **Batteries and Accumulators (Placing on the Market) Regulations SI 2008/2164** sets out requirements for the placing of new batteries and accumulators on the European Union market including substance restrictions, labelling of new batteries and design of appliances so that waste batteries can be readily removed. In addition, the Waste Batteries and Accumulators Regulations SI 2009/890 establishes a framework for the separate collection, treatment and recycling of waste industrial, automotive and portable batteries. Applies to all types of batteries, subject to exemption. The Department for Business Innovation and Skills publishes guidance every 12-24 months and recent guidance was published in May 2011[26]. The UK has nearly met its first mandatory battery recycling target for 2012. In December 2012, Environment Agency data showed that the UK has achieved a battery collection rate of 24.45% for the first three quarters of 2012, with 8,795 tonnes of waste portable batteries collected by compliance schemes for recycling. Member States must collect 25% of the average number of portable batteries placed onto the market over the three preceding years, rising to 45% in 2015. The 25% target is the first mandatory collection target.

- **The Waste Electronic and Electrical Equipment (WEEE) Regulations 2006 (as amended)** transpose the WEEE Directive. The Directive sets targets for reuse and recycling. Recovery, reuse and recycling targets, range from 50% to 80% depending on the material and treatment method. The Regulations require the operators of compliance schemes set up under the Regulations to ensure that schemes prioritise the reuse of whole appliances. **Environmental Permitting (England and Wales) Regulations SI 2010/675** provides a consolidated system for environmental permits and exemptions for certain business activities including repairing, storing and treating WEEE. At the time of publication of this document, the UK was achieving 7.8Kg per head against a target of 4Kg per head.

- **Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations SI 2011/65** bans the placing on the market of new electrical and electronic equipment containing more than specified levels of lead, cadmium, mercury and other hazardous substances.

- **End-of-Life Vehicles Regulations SI 2003/2635 (as amended)** requires producers of vehicles to set up collection, treatment and disposal systems to make sure that components in vehicles can be recovered, reused and recycled at the end of their life. Also provides powers of entry and inspection for the enforcement authorities. In addition, the regulations require producers to register responsibility for vehicles placed on the market and apply for approval of their vehicle collection system. Introduces reuse, recovery and recycling targets for End-of-Life Vehicles treated at authorised treatment facilities and the requirement to report details of reuse, recycling and recovery rates.

26 (http://www.bis.gov.uk/assets/biscore/business-sectors/docs/w/11-850-waste-batteries-and-accumulators-regulations-guidance)

The targets are:

- From 2006 until 31st December 2014:

(a) at least 85% reuse and recovery by an average weight per vehicle and year; and

(b) at least 80% reuse and recycling by an average weight per vehicle and year.

The latest figures are for 2010 and the UK met these targets for 2010 (85.6%).

- From 2015 the targets are:
  (a) at least 95% reuse and recovery by an average weight per vehicle and year; and

  (b) at least 85% reuse and recycling by an average weight per vehicle and year.

c) Waste Hierarchy

The management of waste in Wales must be guided by the waste hierarchy as laid down in Article 4 (1) of the Waste Framework Directive; this will deliver the best overall environmental outcomes for waste in Wales. This first gives priority to waste prevention. For wastes that cannot be prevented, preparation for reuse should be undertaken where feasible. For the remaining wastes as much recycling as possible should be undertaken. For wastes that it is not practical to recycle then other recovery (e.g. of energy) should take place rather than landfill. Landfill is the last resort for wastes that cannot be recycled or recovered in any other way. However, it is recognised that landfill will still be necessary in Wales until levels of prevention, preparation for reuse, recycling and other recovery increase to the levels of the targets set in 'Towards Zero Waste'. Also, there are some waste streams for which landfill is currently the only practical option – e.g. asbestos.

When applying the waste hierarchy, Member States are required to take measures to encourage the options that deliver the best overall environmental outcome. The Directive allows that the management of specific waste streams can depart from the hierarchy where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste.

Article 15 of the revised EU Waste Framework Directive requires that waste producers or other holders of waste ensure that the waste is treated in accordance with the waste hierarchy.

The 'duty of care' Code of Practice is a statutory document which explains how all holders, producers, carriers, importers, brokers, dealers and processors of waste can meet the legal duty of care set out in the Environment Act 1990 Section 35 to manage that waste correctly to enable its safe recovery or disposal without harming the environment. All waste holders will still have to have regard to their statutory duty of care, in addition to the waste hierarchy. The Code of Practice will be revised to refer to the waste hierarchy, which will remain a separate document because of is different scope and level of details.

Guidance on applying the waste hierarchy has been provided by the Welsh Government for any business or public body which generates, handles or treats waste[27]. This guidance provides advice in relation to individual waste streams on the circumstances in which the Welsh Government considers that departures from the Article 4(1) waste hierarchy may be justified by life-cycle thinking. The advice is based on life cycle assessment studies that have taken account of the available evidence in relation to ecological and carbon footprint impact modelling for different waste management options. The guidance therefore identifies where departures can be made from the hierarchy presented in Article 4(1) of the Directive.

There are a number of materials discussed in this plan that are not specifically covered in the guidance. In these instances, the waste hierarchy as specified in Article 4(1) of the Directive should be adopted unless robust life-cycle evidence on the overall impact of the waste management activity in question justifies deviating from the standard hierarchy.

Dissemination of the new waste hierarchy guidance

The Welsh Government has published waste hierarchy guidance for producers and holders of waste. It puts particular emphasis on the importance of waste prevention. A revised 'duty of care' Code of Practice is to be produced to reflect the new requirement on the transfer note.

All producers of waste will be encouraged to take note of this guidance and in particular the advice on what, in relation to individual waste streams, are the circumstances in which the Welsh Government considers that departures from the Article 4(1) waste hierarchy may be justified by life-cycle thinking and so on.

d) Legislation, regulation and enforcement

Legislation is an important tool for Welsh Ministers to implement policy to the benefit of the citizens of Wales. The purposes of regulation are to protect public interests and to create a level playing field in which business can thrive. Citizen interests must be the primary focus of both. These interests are broad and will include interests as diverse as protection of the environment, protecting and improving the health of the wider public, job creation, creation of markets for environmental goods and services, increased innovation, reduced business risk and increased confidence of the investment markets, all of which can be enhanced by the right type of legislation.

The Government of Wales Act (GoWA) 2006 enables the Welsh Government to bring forward its own programme of legislation. Following the 'Yes' vote in the 3rd March 2011 referendum on further law making powers for the National Assembly

27 http://wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/publication/hierarchyguide

and the commencement of Part 4 of GoWA 2006, the legislative programme is made up of Assembly Bills. If passed, Bills then receive Royal Assent from HM the Queen and become Acts of the Assembly.

The Welsh Government also has the following additional legislative vehicles enabling it to take forward policies:

- Subordinate legislation (e.g. regulations).
- Transfer of Function Orders.
- UK Parliamentary Bills.
- Designations conferred by section 2(2) of the European Communities Act 1972.

Different types of legislation put forward by the Welsh Government are subject to different procedures which may require scrutiny and approval by the National Assembly for Wales. In most cases legislative proposals will be subject to full public consultation.

Waste is one of the 20 areas in which the National Assembly for Wales has legislative competence, as listed in Schedule 7 to GoWA 2006. Welsh Ministers are also designated so that they may exercise the powers conferred by section 2(2) of the European Communities Act 1972 in relation to the prevention, reduction and management of waste.

The need for new legislation should be evidence based and should consider whether the desired outcome can be addressed practically by any other means (e.g. through voluntary action).

Inspection, compliance assessment and enforcement are also a key part of helping to implement and monitor waste policies. In line with the Welsh Government's "Inspection, Audit and Regulation in Wales Policy Statement" (September 2009) [28] inspection, audit and regulation should be proportionate – to risk, scope for improvement, likely benefit and the interests of citizens. The concept of proportionality must apply – visibly – in how much activity takes place and where it is directed.

In particular, waste regulation, inspection, compliance assessment and enforcement should:

- Ensure the cradle to grave management of waste in a way that protects human health and the environment by preventing or reducing any adverse impacts caused by the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.
- Establish minimum operating standards (including for emissions) below which poor performance will not be tolerated.

28 http://wales.gov.uk/docs/dpsp/publications/inspectionpolicystatement/090930inspstatementen.pdf

- Be proportionate to the risk posed and applied consistently, reflecting the needs of the very different businesses and sectors operating with waste.
- Be implemented in a way which makes compliance as easy and cost-effective as possible.
- Drive waste producers and the waste management industry to take ownership of waste from cradle to grave and responsibility for legal compliance by developing and sharing adequate and appropriate standards, tools, guidance, and codes of practice appropriate to a given business sector or environmental practice.
- Help Wales achieve its goal of using only its fair share of the world's resources ("One Planet living") and reducing its impact on the global environment through achieving the more efficient use of resources and avoiding the export of problematic wastes.
- Eliminate wilful non-compliance and illegal operation by targeting in a consistent manner those who flout the law – so that legitimate businesses can operate on a level playing field.
- Be reviewed periodically to assess its appropriateness and effectiveness using appropriate evidence.
- Complement and support other interventions to drive beneficial change and meet the outcomes detailed in 'Towards Zero Waste'.
- As far as possible be consistent with the regulatory approach taken in the other UK nations, although the Welsh Government reserves the right to develop different legislation in Wales should the need arise in order to meet the outcomes set in Towards Zero Waste.
- Deliver in Wales any obligations outlined in EU Directives towards member states, e.g. Waste Framework Directives, Industrial Emissions Directive, etc.
- Benefit business by overcoming market failure, encouraging innovation and providing certainty for would-be investors.

The revised Waste Framework Directive requires appropriate and periodic inspection of waste operations. There is therefore a need for a baseline level of supervision such as inspection of facilities but enforcement also needs to focus on those operating outside the law and those with a poor track record of compliance.

The responsibility for the regulation of waste management is shared between a number of bodies including Environment Agency Wales (and any successor body) and local authorities.

Key actions to improve waste regulation, compliance assessment and enforcement in Wales in respect of wastes produced by businesses and public sector bodies covered by this plan are as follows:

e) Better regulation

The Welsh Government subscribes to the principles of the Hampton review[29] and the "Better Regulation" initiative led by the UK Government. Environment Agency

[29] Philip Hampton: Reducing administrative burdens: effective inspection and enforcement. HM Treasury, March 2005.

Wales and local authority regulatory services are both included in the scope of this initiative. Both are expected to follow in Wales the principles of the Regulators' Compliance Code[30] (2007).

The Welsh Government will work with the UK Government to promote a consistent approach to better regulation across the UK. The drive to rid business of excessive bureaucracy is fully consistent with the Welsh Government's aim of stimulating enterprise and business growth; the principles of citizen-centred services, of promoting a healthy future, a fair and just society and a sustainable environment mean that drive must be properly balanced with the promotion and protection of the interests of citizens as consumers and residents.

The Welsh Government will work with the regulatory bodies to integrate and simplify regulation where appropriate to allow businesses to understand and fulfil their obligations more effectively and to develop better integrated regulatory controls which maintain the best interests of people and the environment.

The Welsh Government will continue to liaise with Defra and the other UK administrations to ensure as much consistency as possible in waste legislation across the UK. Where different legislation or different enforcement responses are applied, the consequences of such an approach will be considered and discussed with the other UK administrations and the waste industry to ensure that any potential perverse outcomes are minimised or avoided.

Environment Agency Wales' enforcement approach through "better regulation" is to encourage individuals and businesses to put the environment first and to combine good environmental practice with normal working methods. Offering advice and guidance first is a key step to make sure business takes appropriate action to protect the environment, to comply with regulations which prevent pollution and to secure better outcomes for the environment, people and business.

Environment Agency Wales has a range of enforcement options available to it to achieve environmental outcomes and more specifically to:

- Stop offending.
- Restore and/or remediate.
- Bring under regulatory control.
- Punish and/or deter.

Environment Agency Wales applies a proportionate offence response to the environmental risk and other factors (e.g. operator attitude and public interest) in line with its enforcement and sanctions guidelines. The Agency applies checks and balances (e.g. using Area and Regional Enforcement panels) to ensure a consistent approach is adopted.

[30] http://www.berr.gov.uk/files/file45019.pdf

Environment Agency Wales expects full voluntary compliance with relevant legislative requirements and permit provisions but applies compliance assessment resources taking a risk-based approach (OPRA) to audit/inspect/review operator performance. Offence responses are made following its Enforcement and Sanctions Guidelines.

f) Tackling illegal waste management

Managing waste properly can come at a cost, and it is important that the “polluter pays” principle is adhered to through robust regulation and enforcement. The annual Landfill Tax escalator is increasing waste disposal costs. Whilst recycling is becoming more profitable for many waste materials, there is still, in most cases, a net cost for collecting and managing it. There is always a temptation for waste producers to avoid costs by circumventing waste laws, especially in relation to the Duty of Care. Also, waste management has always attracted criminal elements who seek to gain financial benefit from circumventing the law – either through operating illegal sites, or through fly-tipping.

Environment Agency Wales resources are targeted at persistent offenders using an intelligence-led approach to ensure illegal activity is quickly detected and stopped to prevent pollution, harm to human heath or undermine legitimate business.

The Environment Agency Wales is using a waste stream approach to:

- Target high risk hazardous waste streams (targeting audit and inspection effort accordingly).
- Reduce risks from High Impact wastes identified in the corporate strategy.
- Understand the movement of waste sufficiently to identify and use effective intervention, improve material quality and tackle illegal activity - for example, waste exports.
- Deliver producer responsibility compliance activities based on intelligence led and risk based profiling, to ensure obligations are properly reported and contribute to an upwards trend in the national obligations across Packaging, WEEE and batteries.
- Target effort into prevention of illegal activity, in particular high impact waste streams as informed by the enforcement strategic assessment and take swift and decisive enforcement action taken wherever serious illegal activity is identified.

A high priority is tyre waste, where there are significant concerns that illegal activity is taking place.

The Welsh Government will work with regulatory bodies to keep under review the prevention, detection and enforcement of illegal waste sites and fly-tipping, particularly keeping under review suitable penalties and influencing sentencing guidelines, encouraging collaborative working and providing comprehensive guidance to business.

Measures to be taken by the Welsh Government to ensure that sanctions that are available act as a real deterrent to those responsible for waste crime and who operate to a significant extent outside of the regulatory regime include:

- Supporting Environment Agency Wales to take robust, targeted enforcement action to eliminate as far as possible illegal waste management sites, many of which cause damage to the environment (in December 2011 the Environment Agency set up the Illegal Waste Site Task Force (IWSTF) to support the Agency's ambition to reduce the number of illegal waste sites by half by 2013).
- Encouraging the UK enforcement agencies to work closely together to share intelligence and best practice in order to reduce waste crime.
- Working with the Police, the Home Office and Environment Agency Wales in particular to help deliver a more strategic national intelligence-led approach to tackling serious waste crime.
- Working with Environment Agency Wales and local authorities to examine how to strengthen enforcement of the waste carrier regime, including revocation of registration, against those businesses who repeatedly flout the waste carrier registration rules and, in doing so, undermine legitimate businesses.
- Encouraging Environment Agency Wales to exercise its new powers under the Civil Sanctions regime[31].
- Supporting Environment Agency Wales' efforts to use its powers under the Proceeds of Crimes Act 2002 to ensure that those profiting from the illegal management of waste surrender their proceeds for society's benefit.

In addition, the Welsh Government will work with Defra and Environment Agency Wales to:

- Examine lessons learnt from previous cases of enforcement to see if they can be taken on board.
- Look to roll out more widely of the pilot run by the Environment Agency and the Probation Service in which offenders, including some waste crime offenders, are involved in environmental projects, including cleaning up fly-tipping.
- Examine how the Welsh Government can raise awareness among businesses, particularly small and medium sized enterprises, of their obligations under the Duty of Care to pass their waste to a legitimate and registered waste carrier so as not to inadvertently facilitate fly-tipping.
- Reduce the risk of fly-tipping on private land, for example by working with landowner organisations such as the NFU Cymru, FUW, CLA and the National Trust to increase reporting of fly-tipping incidents and sharing best practice on how to reduce the risk of fly-tipping.
- Consider extending the environmental civil sanctions available to regulation authorities.

[31] Under the Regulatory Enforcement and Sanctions Act 2008. For further details of the Environment Agency's civil sanctions powers see: http://www.environmentagency.gov.uk/business/regulation/116844.aspx

- Consider better ways of partnership working and intelligence sharing e.g. a national shared database for local authorities of all successful prosecutions, linked to the police and Environment Agency Wales.

Specific actions in Wales to tackle fly-tipping include:

- The Welsh Government has been funding Environment Agency Wales to lead on the co-ordinated approach to tackling fly-tipping being undertaken by Fly-tipping Action Wales (FtAW). FtAW brings together 40 partner agencies to reduce the number of incidents of fly-tipping and associated clean up costs. FtAW takes a collaborative, holistic approach to tackling this issue. This approach is guided by the findings of the Jill Dando Institute of Crime Science, University College London and on the past and current work of partners. Partners include Keep Wales Tidy, Countryside Council for Wales, 3 National Park Authorities, Forestry Commission, Network Rail, Dwr Cymru, Fire Services and Police Forces. More recently its partnerships have been widened to include SUSTRANS, Social Housing organisation Constructing Excellence, and educational establishments.

FtAW are working hard to remove excuses for fly-tipping through;

- Education and awareness raising of Duty of Care responsibilities for legal waste disposal by businesses and members of the public.
- Producing campaign literature such as “Make Waste your Business” to reduce this anti-social behaviour problem”. These are a series of information leaflets spelling out the duty of care for the legal safe disposal of the most significant waste products (construction and demolition waste, waste tyres, electrical and electronic equipment and hazardous waste).
- Coordinating initiatives with its partner agencies to maximise resources and outcomes.
- Partner agencies sharing information and intelligence.
- Undertaking research to help explain why and where fly-tipping occurs which will lead to more success in reducing fly-tipping incidents.

An example of this work in action is given by the Valleys Regeneration Partnership. This fly-tipping initiative uses a 3 part approach to fighting fly-tipping on the ground – Enforcement, Engagement and Education, delivered through ‘Total Focus Campaigns’. Working with key stakeholders (local authorities, the police and fire services, Keep Wales Tidy, Groundwork Wales etc) target areas are selected to tackle fly-tipping. The ‘Total Focus’ campaigns aim to show that partners are working together to fight fly-tipping. They demonstrate that the regulatory authorities, businesses and residents are pulling together to clean up an area and fight environmental crime.

Actions implemented so far have played a role in delivering a year on year decline in the number of fly-tipping incidents and in turn a reduction in the amount of taxpayer’s money being spent on cleaning up these illegal fly-tips.

g) Export Controls

The Welsh Government is committed to cracking down on illegal waste exports. There are clear controls and restrictions on what waste can be exported. For example, under the Transfrontier Shipment Regulations waste cannot be exported for disposal such as landfill or incineration without energy recovery and no hazardous waste may be exported to developing countries. These controls are in place to protect the environment and human health, and to ensure that waste is managed in an environmentally sound manner.

The Welsh Government also recognises the important role that waste producers can play in reducing illegal waste exports. Some waste types, such as waste electrical and electronic equipment and mixed dry recyclables, are at particular risk of illegal export. Waste producers should exercise extra vigilance to ensure the waste they produce, or are responsible for collecting, is treated in a responsible manner throughout the chain of management and the risk of subsequent illegal export is minimised. Government departments, local authorities and other public sector organisations are well-placed to be exemplars of best practice.

Most exports of Welsh waste occur via transfer to sites in England. There is a need to establish the holistic regulation of a waste stream approach so that movements of waste from Wales are treated correctly at the various transfer and treatment points before export.

Actions to prevent the illegal export of waste are as follows:

- The Welsh Government expects the Environment Agency to prioritise combating the illegal trade in waste using their pioneering techniques and an intelligence-led approach to target effort and resources onto suspected illegal operators. This will help to prevent and disrupt illegal activity and prosecute offenders. In taking this work forward, the Agency will work closely with UK customs authorities and other environmental agencies, the shipping lines and overseas regulators, and UK Government will assist with the provision of a necessary legal gateway to enable the sharing of information between the authorities.
- In line with our aim to be an international leader on environmental issues, Wales will continue to give strong support to the Basel Convention on the Control of Transboundary Movements of Wastes.
- At the global level electronic waste or e-waste has been identified as a growing waste stream requiring priority action and better management. The UK will continue to play an important role in the Partnership for Action on Computing Equipment (PACE), established under the Basel Convention, which is a unique global partnership between Governments, industry and NGOs, developing tools, guidance and projects to help promote the environmentally sound management, refurbishment, recycling and disposal of used and end-of-life computing equipment throughout the world. The recast of the WEEE Directive also introduces minimum monitoring requirements for the shipment of WEEE/EEE to address concerns of illegal exports and dumping.

The Welsh Government has worked closely with DEFRA on the recast of the WEEE Directive.

- The Environment Agency's Waste export controls tool will be promoted to help producers determine the regulatory controls that apply to the exports of wastes for recovery to specific countries from England and Wales. (see http://www.environment-agency.gov.uk/business/sectors/124357.aspx). The Welsh Government will consider whether this guidance needs to be disseminated fully within the public sector in Wales to ensure that it sets an example of good practice.
- Support will be given to sharing intelligence with the police, Her Majesty's Revenue and Customs (HMRC), the Borders Agency, local authorities and countries world wide through the INTERPOL Global E-waste Crime Group and work with other European and US competent authorities and regulators. Using this intelligence, other organisations are able to further prevent and disrupt illegal waste exports using their powers. For example, shipping lines have refused to accept bookings from operators they regard as 'high risk'.

h) Regulate waste collection

The Environment Agency registers waste carriers and regulates compliance with the Duty of Care that is designed to ensure that the collection, transportation and onward management of waste are carried out responsibly in a way that prevents harm to human health or the environment.

All waste producers should use registered waste carriers as part of their duty of care.

i) Updating Waste Arisings and Management Data

To update the current waste data from that of the Industrial and Commercial Waste Survey of 2007 that the current situation of this sector plan is based upon, a survey will be undertaken of waste arisings and management of wastes in Wales. The survey will comment in 2013 and data will be reported in 2014. This survey has been commissioned by Welsh Government and will be project managed by the Environment Agency Wales.

3.4 Waste Prevention (including reuse)

3.4.1 Introduction

Waste prevention would be seen as a priority step with regards to resource efficiency and is a requirement of the aforementioned 2008 Revised Waste Framework Directive. This section covers details on approaches and findings that have been undertaken as part of the development of Wales' Waste Prevention Programme with regard to the Industrial and Commercial Sectors.

3.4.2 What is "prevention"

What is "prevention"?
The 2008 Revised Waste Framework Directive states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy

- **Prevention**
- *Preparing for reuse*
- *Recycling*
- *Other recovery – e.g. energy recovery, and*
- *Disposal*

The 2008 Revised Waste Framework Directive defines waste prevention as:- 'Measures taken before a substance, material or product has become waste, that reduce the quantity of waste, including through reuse of products or the extension of lifespan of products the adverse impacts of generated waste on the environment and human health or the content of harmful substances in materials and products'.

The Organisation for Economic Co-operation and Development (OECD) breaks down waste prevention into three components:

- Strict avoidance involves the complete prevention of waste generation by virtual elimination of hazardous substances, or by reducing material or energy intensity in production, consumption and distribution
- Reduction at source involves minimising the use of hazardous substances and/or minimising material or energy consumption
- Product reuse involves the multiple use of a product in its original form, for its original or alternative purpose, with or without reconditioning. This includes refurbishment and repair. Reuse is important, and is the part of the waste hierarchy most often overlooked. Not only does it move material use up the waste hierarchy, but it also provides social and economic benefits to Welsh communities, such as opportunities for jobs and increasing skills.

Article 29 of the Directive also requires that Member States shall establish, in accordance with Articles 1 and 4, waste prevention programmes no later than 12 December 2013.

3.4.3 The impact of the economy and business activity on waste generation and the benefits of waste prevention

Benefits of waste prevention

The true benefits of waste prevention are often huge, based on saving the embedded investment in raw materials, labour, production and distribution costs required to bring a product to the point in the supply chain where the decision is made not to sell it but rather consign it as waste. Waste is often perceived as a relatively small and unimportant cost to businesses because consideration is only given to the direct waste management/disposal cost (say around one hundred pounds per tonne) and not these other embedded factors, which amount to many thousands of pounds per tonne.

WRAP provided the Welsh Government with the following estimates of financial benefits to businesses in the supply chain, and to retailers, of avoiding waste for a selection of products (see Table 22).

Table 22 Benefits of waste prevention to business for a variety of product types

Product Type	Benefits of waste prevention (£ / tonne)	
	Supply Chain	Retailer
Food	1,200	2,727
Electrical & Electronic Products	4,800 – 7,100	11,000 – 13,000
Furniture	2,900	5,000
Clothing	-	27,000

Source: WRAP

The following summary of cost benefits to businesses is presented in a review of the evidence on business waste prevention, published in Waste Management & Research[32].

A report published by WRAP in 2010 on material-saving potential of resource efficiency[33] identified a range of opportunities for no- and low-cost resource efficiency savings. This was used to identify that of the total potential financial benefit to business of resource efficiency of £23 billion per annum, £17 billion is a result of waste prevention, with £1 billion a result of recycling and landfill diversion[34]. Further analysis shows that 70% of these shorter-term waste-prevention savings could be attributed to reduced material inputs into production processes, through the design of lighter and leaner products, while 80% comes from just four industrial sectors - chemicals and non-metallic minerals, metal manufacturing, power and utilities, and construction. Longer-term savings increased the total savings to £55 billion per annum, of which £40 billion was a result of waste. These longer term investments are more costly, but the benefits can be several orders of magnitude greater than the investment required.

32 *Business Waste Prevention: a review of the evidence*. Wilson et al (2012). Waste Management & Research.

33 *Securing the Future: The Role of Resource Efficiency* . WRAP (2010)

34 *The Further Business Benefits of Resource Efficiency*, DEFRA (2010)

Several major reports on the global benefits of resource efficiency or a 'circular economy' have been published recently[35], with estimates of a global saving of $3 trillion or more by 2030[36] and of savings across the EU of $600 billion per annum by 2025[37].

Impact of the economy and business activity on waste

It stands to reason that the size of the economy and the types of businesses will impact heavily on the types and quantities of wastes that are generated. However the lack of regularly reported, comprehensive data on waste generation makes an assessment of historic de-coupling impossible. Businesses are becoming increasingly influenced by rises in the cost of resources and some have responded by action, resulting in resource efficiency and waste prevention. The precision and frequency of waste data will make the future assessment of de-coupling difficult, but by working towards absolute prevention targets we can measure these through data from periodic business surveys.

3.4.4 Targets and measures for waste prevention

Sustainable Development is the central organising principle of the Welsh Government, and all policies are developed within this context. In developing initiatives, the social and financial sustainability will be assessed alongside environmental considerations.

Towards Zero Waste established the broad objectives for waste prevention and sustainable waste management. It sets out the goal of achieving "one planet living" by 2050, and the speed of travel required to get there is indicated through waste prevention and recycling targets for each waste stream.

The target for industrial waste proposed in Towards Zero Waste is a reduction of 1.4% every year to 2050 based on 2006/7 baseline. We indicated that a target would vary according to each sector.

The target for commercial waste proposed in Towards Zero Waste is a reduction of 1.2% every year to 2050 based on 2006/7 baseline.
This equates to 20,129 tonnes per annum of commercial waste.

35 *A Global Redesign. Shaping the Circular Economy*. Preston F (2012). Chatham House briefing paper.

36 *Resource Revolution: meeting the world's energy, materials, food and water needs*. McKinsey (2011).

37 *Towards the Circular Economy -Economic and business rationale for an accelerated transition*. Ellen MacArthur Foundation (2012). www.thecirculareconomy.org

Consultation Question 2:

The proposed waste prevention targets for the industrial and commercial waste streams are:

A general reduction of 1.4% every year to 2050 based on 2006/7 baseline for industrial waste, with specific targets for the individual priority sectors (identified in sections 3.6 and 3.7 below):

Manufacture of basic metal and metal products
Manufacture of paper and paper products
Manufacture of chemicals, chemical products, pharmaceuticals.
Food manufacture

A reduction of 1.2% every year to 2050 based on 2006/7 baseline for commercial waste.

An implementation plan will be developed to deliver against these targets

Do you agree with the targets that are proposed? Please give your reasons. What targets should be proposed for the priority industry sectors? Please give your reasons.

3.4.5 Evaluation of waste prevention measures

A piece of work has been carried out by AMEC Environment and Infrastructure Ltd[38] to evaluate a range of measures which could be used to tackle waste prevention.

This identified the following measures that lead directly to waste prevention:

Eco-design

Eco-design is a strategic way of thinking about the design process, incorporating considerations around the sustainability impacts of product, processes and packaging across the entire life cycle of the product, from extraction of raw materials to disposal at end of life. Its broad ethos ensures that waste prevention and resource use is considered among a wide range of criteria and across the life cycle, thereby ensuring the best sustainability outcomes and avoiding negative unintended consequences.

Eco-design can be used to achieve waste prevention by changing the way that products are designed to reduce the amount and type of material in products (including hazardousness); improve longevity; design for reuse, remanufacture, separation and recycling.

38 *Evaluation of a range of Waste Prevention Initiatives for Industrial and Commercial wastes produced in Wales to support the Waste Prevention Programme*, AMEC (2013)

Resource Efficient Business Models

Resource efficient business models can result in significant environmental and economic benefits, and take a number of forms including service systems, hire and leasing and incentivised return systems. New business models often require strong innovative leadership from within the business, as they are a departure from the traditional model of product manufacture and sale. The rise in the financial value of resources linked to an increase in awareness of sustainability issues, has led to innovation among a limited number of businesses, but there is a need to stimulate greater innovation if the full sustainable development benefits are to be realised.

Products with high environmental impact, including clothing and other textiles, home and workplace furniture, chemicals, and electrical and electronic equipment, have potential in the context of resource efficient business models.

Green procurement and supply chains

Supply chain measures and green procurement is an important director of change in the I&C sector, where often businesses are driven by the needs and wants of those further up the supply chain. The ability of big business and the public sector to implement top-down approaches and influence businesses in their supply chain is important in encouraging waste prevention.

An organisation's procurement can influence waste in two ways; as a tool for internal change - whereby products they choose to buy are changed (such as reductions in office paper or the use of re-usable packaging materials); or as a tool for external change whereby they influence suppliers and stakeholders[39].

3.4.6 Supporting Measures

The AMEC report also identified the following measures that could be used to support implementation of the primary measures above, either on their own or as a basket of measures:

Enabling Measures - these support the primary measures:

- Awareness and Guidance Documents.
- Grants and Loans.
- R&D promotion and development.
- Use of Networks.
- Taxes.
- Legislation.
- Training programmes.
- Voluntary Agreements.
- Funded business programmes.
- Integrated Resources and Tools.

[39] Oakdene Hollins (2011)' Business Waste Prevention Evidence Review'. Available from http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17499

Measures which show less promise in respect of waste prevention:
These measures should not be relied on in isolation to effect change, but could be used as complementary measures (e.g. eco-labelling to inform businesses during purchasing) or be used to publicise success (e.g. awards):

- Awards.
- Eco-labelling.
- Environmental Management Systems.

A full description of all measures is included in Annex 1.

3.4.7 Programme Proposals

Priority Areas for Action and Priority Sectors
The Welsh Government has identified *priority areas for action,* and *priority sectors* for the programme proposals. These are based on the high impact materials and products identified in section 2, measures which lead directly to preventing waste in section 3.4.5, and sectors which have the greatest potential to prevent waste, either directly through its own operations or through influence over other businesses and sectors.

Priority Areas for Action
Our priority areas for action are:

- Working with large retailers.
- Promoting Eco-innovation in Wales.
- Public sector as an exemplar.

The outline programme and indicative timeline is shown in Figure 9 below. These are the 'supply side' which also influence household waste. In the short term, we propose to continue to support eco-design through voluntary approaches. In the longer term, measures under review will be mandatory measures as part of Extended Producer Responsibility for influencing producer and retailer behaviour.

Figure 9 Outline measures and indicative timeline for the programme

	2013	2014	2015	2016	2017	2025	2050
Enable – SCP, eco-design and optimising product lifetimes							
Support eco-design through voluntary measures							
Mandatory EPR measures to support consumer product information							
Mandatory EPR measures on products							
Support for eco-innovation in Welsh businesses							
Encourage – regulation on waste producers							
Landfill bans							
Exemplify							
Public sector procurement and sustainable consumption campaigns							
Engage							
Promote the message that 'waste prevention can save your business money'							
Changing attitudes and behaviour							

Key

Implementation	
Review	
Feasibility	
Pilot	

Priority Business Sectors

Our priority business sectors are:

- Office based services, food and accommodation, and small retailers.
- Food manufacturing sector.

The accommodation and food services sector is a priority because it is the second largest commercial waste generating sector in Wales in terms of total tonnage, and its contribution to segregated food waste and priority materials in the mixed fraction is very high. There is a significant reduction potential within the sector, and the Welsh Government is working with the sector due to its economic importance in Wales. The financial benefit of each tonne of food waste prevented by the hospitality sector is around £1,800. The vast majority of waste

generated by this sector comes from SMEs, and any programme of work will need to reflect this waste generation profile.

Office based services don't represent a single sector, but the sort of office based activities carried out in almost all of the service sectors and public sector functions, and to a lesser extent in other industry sectors. Most of the service sectors produce small quantities of waste individually, but have good potential to reduce the waste they generate and collectively contribute a reasonable quantity of waste to the commercial totals. It is proposed that a thematic approach to reducing paper and other typical office based wastes, (such as office furniture, IT equipment, floor coverings and window dressings), is taken to instigate best practice.

The food manufacture sector is a priority because it produces almost all of the food waste - a priority waste type from industry. It also contributes significantly to the arising of chemicals and paper and card, and generates a quarter of all industrial waste by tonnage. Approximately 80% of the waste arises from companies with over 250 employees. Work by WRAP[40] suggests that waste reduction of around 10 – 15% is possible from making relatively simple, low cost changes at food manufacturing facilities, with a saving of approximately £1,200 per tonne of waste prevented.

Consultation Question 3

We have described priority business sectors and areas for action.

(a) Do you agree with these priorities? Please give your reasons.
(b) Is there anything else that we should consider a priority? Why is it important?
(c) Do you agree with our proposed approach of voluntary action in the first instance, with mandatory measures under review in the longer term? Please give your reasons.

We have not proposed an outline programme yet for our priority business sectors. This will follow on from our stakeholder consultation exercise during this consultation period and form part of the final Waste Prevention Programme.

3.4.8 Working with large retailers

Retailers and wholesalers provide a vital link between the businesses that manufacture goods and the consumer. Their product buying criteria can be used to influence the growers, manufacturers and processors and distributors who supply them. They also generate large quantities of waste from their own operations, including priority waste types.

There is significant opportunity for impact reduction, and WRAP has estimated the financial value of waste prevention at the retailer stage in the life cycle (see Table 22) for a number of products. The values range from £2,727 per tonne of food waste prevented, to £27,000 per tonne of clothing.

[40] *Waste arisings in the supply of food and drink to households in the UK* (2010) WRAP

Retailers and wholesalers have a role to play in:

- Improving the environmental impact of their product portfolio by influencing growers, processors, manufacturers and distributors within Wales and internationally through ecodesign, resource efficient business models, green procurement and green supply chains.
- Reducing the waste generated through its own activities.
- Supporting national and local initiatives such as food redistribution schemes.
- Providing clear information to consumers about the environmental performance of their products.
- Providing information and guidance on practical steps that consumers can take to reduce the impact of their products during use and at end of life.

Products with high environmental impact include clothing and other textiles, home and workplace furniture, chemicals, and electrical and electronic equipment.

Current initiatives

Funded activity – Sustainable Futures Directorate

To support the delivery of Towards Zero Waste and the associated sector plans, the Welsh Government funds a number of organisations to deliver specific waste prevention initiatives on its behalf.

The main delivery organisations for industrial and commercial waste are WRAP Cymru and Ecodesign Centre Wales. The directorate also funds food redistribution services, accepting surplus food from businesses and distributing it to people who need it.

WRAP Cymru is funded by the Welsh Government to deliver support to help businesses in Wales to use fewer resources and save on production and manufacturing costs, and to manage the wastes produced in an environmentally sustainable way. WRAP are funded by all four UK governments and co-ordinate UK level action where appropriate. Programmes that included action on waste prevention and resource efficiency in the retail sector during 2012/13 are:

- The Product Sustainability Forum.
- Home and Workplace Products.
- Resource Efficient Business Models and Service Delivery.
- Resource Efficient Clothing.

The Product Sustainability Forum (PSF)
The Product Sustainability Forum (PSF) provides a platform for WRAP, the Welsh Government, business and other stakeholders to:

- Provide the evidence, data and tools that help businesses and governments to prioritize their work to reduce the environmental impacts of everyday products;
- Help businesses to work together to quantify, reduce and communicate the environmental impacts of the products they make and / or sell; and,
- Test the feasibility of using this body of work to underpin any potential future voluntary agreements or actions and other policy instruments as agreed with the UK Governments.

The current focus of the forum's work is on the life cycle environmental impacts of grocery and home improvement products, and it acts as a knowledge hub to support other programmes.

Home and Workplace Products (HWP)
The purpose of this programme is to make resource efficiency an integral part of product specification and distribution for the HWP products that offer the greatest potential for reductions in their resource impacts; particularly electrical and electronic equipment (EEE) and furniture. This objective is being delivered through:

- The Home Improvement Sector Commitment (HISC) and associated targets.
- Evidence for the prioritisation of action and consensus among stakeholders through the Product Sustainability Forum, and
- Involvement of Welsh supply chains to reduce product damage and increase product lifetimes through dissemination of information and targeted engagement.

Resource Efficient Business Models and Service Delivery
This programme is focused in three areas. It will demonstrate the case for alternative business models with a focus on high-impact products including electrical and electronic products, clothing and furniture, and the services that use them.

Resource Efficient Clothing
This programme will make resource efficiency an integral part of the specification process for clothing by 2015, reducing the carbon, waste and water footprints across the clothing life cycle. It will encourage businesses to push for behaviours which are inherently resource-efficient as part of their consumer messaging.

This will be delivered through publishing data and resources, issuing guidance for retailers, designers and buyers, and facilitating UK-wide collective sector action involving the major players in Wales.

Courtauld Commitment
The Courtauld Commitment is a voluntary agreement between UK governments and the British retail grocery and manufacturing sectors, managed by WRAP on

behalf of the UK Governments. The aim of the Commitment is to prevent food and packaging waste and WRAP works with industry signatories to agree and implement actions that contribute towards meeting collective targets.

The targets and overall results for phase 1 and 2 (which ended in December 2012) of the Courtauld Commitment are set out below. Phase 3 is expected to be launched in spring 2013 with new targets for 2013 to 2015.

Courtauld 1 targets (5 years: 2005 to 2009):

	Target	**Outcome (absolute)**	**Outcome (relative)**
Consumer Packaging	To design out packaging waste growth by 2008.	Achieved.	1.2 million tonnes of food and packaging waste prevented over the five years.
	To deliver absolute reductions in packaging waste by 2010.	Not achieved. Packaging levels stayed roughly the same.	
Household Food Waste	To help reduce the amount of food the nation's householders throw away by 155,000 tonnes by 2010, against a 2008 baseline.	Achieved. 270,000t food waste avoided.	

Courtauld 2 targets and progress to date (3 years: 2010 to 2012):

Objective	**The Courtauld Commitment Phase 2 targets (2009 – 12)**	**Year One reduction (2009-10)**	**Year Two cumulative reduction (2009 – 11)**
Packaging – to reduce the weight, increase recycling rates and increase the recycled content of all grocery packaging, as appropriate (%)	10	4.7	8.2
Household food and drink waste – to reduce UK household food and drink waste (%)	4	3	Results are not collected annually.
Supply chain product and packaging waste – to reduce traditional grocery product and packaging waste in the grocery supply chain (%)	5	1.2	8.8

Welsh Government Carrier Bag Charge
Since 1 October 2011, there has been a minimum charge of 5p on all single use carrier bags in Wales. This charge was introduced to dramatically reduce the number of carrier bags used in Wales. It affects all retailers in Wales, not just those who sell groceries.

During 2009 in Wales we took home an estimated 350 million carrier bags from the major supermarkets alone. This is a staggering 273 bags per household, and does not include the bags we pick up when shopping at high street stores and smaller shops. Single-use bags have not been around forever, but they have become part of our everyday life. The problem is that we tend to only use them once for shopping, which means they are wasted and can become a litter problem.

Since the charge was introduced in October 2011, carrier bag use in Wales has reduced by as much as 96% in some retail sectors, and a recent survey of attitudes indicated that the charge is now supported by around 70% of people in Wales.

The charge has also resulted in more money for charities and not for profit organisations as the Welsh Government has called on retailers to pass proceeds from the 5p charge onto environmental or good causes.

- Latest figures from RSPB and Keep Wales Tidy show that collectively they have already received more than £800K in donations as a direct result of the charge. This money has come from the proceeds of bag sales at major retailers including Tesco, McDonalds, Argos, Asda and Wilkinson, and RSPB and Keep Wales Tidy are just two of many good causes to benefit.

- Co-op are donating proceeds from the charge to environmental causes across Wales, and in April they pledged £75,000 to the Vincent Wildlife Trust to support a three-year project to protect Pine Martens, a rare species living on the south west Wales and in Snowdonia.

Consultation Question 4

It is proposed that the Welsh Government and retailers will build on the success of the introduction of carrier bag charge and UK wide action through the Courtauld Commitment and other initiatives, leading to retailers taking forward actions on

- Improving the environmental impact of their product portfolio by influencing growers, processors, manufacturers and distributors within Wales and internationally.
- Reducing the waste generated through its own activities.
- Supporting national and local initiatives such as food redistribution schemes.
- Providing clear information to consumers about the environmental performance of their products.
- Providing information and guidance on practical steps that consumers can take to reduce the impact of their products during use and at end of life.

What further actions and initiatives can be taken to enhance our current programme of work, and to support the actions above?

3.4.9 Promoting eco-innovation in Welsh businesses

The Welsh Government proposes to promote and encourage the implementation of eco-design among Welsh manufacturing companies serving domestic and international markets. Effort will be targeted to address resource intensive products where there is evidence that it is possible to reduce the products' impact through changes to their design. These companies will benefit commercially from producing market-leading products and in future-proofing against increases in the cost, and reduction in the availability, of input materials.

Eco-innovation means the 'introduction of new or improved product (good or service), process, organisational change or marketing solution that reduces the use of natural material resources'.

In terms of new or improved products, eco-innovation (eco-design) means 'changing the way that products are designed to reduce the amount and type of material in products (including hazardousness); improve longevity; design for reuse, separation and recycling. This includes new business models that reduce the consumption of goods through leasing, producing more durable goods and enabling repair and reuse.

Options for developing and delivering eco-innovation support may include:

- Eco-innovation Vouchers/Credits.
- Eco-innovation knowledge transfer partnerships.
- Research, Development and Innovation funding.
- Green Procurement.
- Enhanced Value Chain.

Consultation Question 5

How can the Welsh Government encourage businesses engagement in eco-innovation?

3.4.10 Public sector

The public sector is a very significant employer in Wales, and also procures goods and services from private sector businesses and individuals. It can therefore act as an exemplar in its working practices and its procurement activities. Improving the material resource efficiency of the education sector also has the benefit of engaging with children and young adults to embed sustainable behaviours at an early age.

Sustainable development is the central organising principle of the Welsh Government, and there are proposals within the Sustainable Development Bill consultation to roll out this approach across all public sector bodies in Wales. Waste prevention and resource efficiency measures adopted by public sector organisations, would demonstrate their commitment to environmental sustainability, and would send a clear signal to the workforce and suppliers that their obligations in terms of SD are taken seriously.

In Wales public procurement accounts for around 10% of GDP, therefore it could have a significant role to play in encouraging waste prevention and acting as a driver for the uptake of resource efficient products and eco-design.

Green public procurement and the use of Government buying standards and clauses in public sector contracts to encourage waste prevention is viewed as a key measure of generating external change. In fact a recent study noted that using procurement for external change is a key driver in waste prevention and one that offers the greatest potential when one or more organisation (such as a local authority) apply a common strategy.

Value Wales have developed a Sustainable Procurement Assessment Framework (SPAF) in Wales which will address environmental concerns as part of sustainable public procurement in the round.

The Welsh Government will build on this work to ensure that all public sector organisations in Wales are in a position to introduce resource efficiency and waste prevention clauses into their contracts, and will lead by example in its own procurement activities.

A separate document – the Public Sector Plan, will take forward these actions and is currently being scoped.

3.4.11 Priority Business Sectors

We propose to enhance our programme of support for businesses in Wales to incorporate resource efficiency and waste prevention into their business practices. In particular, we propose to focus on the following sectors, and with SMEs:

- SMEs in the Retail and Wholesale sector and Accommodation and Food Services.
- Office based services.
- Food manufacture.

a) Current initiatives

Funded support programmes

Targeted delivery on waste prevention is funded by the Sustainable Futures directorate of the Welsh Government. The main delivery organisations for industrial and commercial waste is WRAP Cymru and Ecodesign Centre Wales.

WRAP's Programmes that included action on waste prevention and resource efficiency in these sectors during 2012/13 are:

Food and Drink Supply and Consumption
The food and drink programme is segmented into the following areas:

- Courtauld Commitment 3 (CC3) will be launched in spring 2013, signatories will be working to prevent food, drink and associated packaging waste both in the supply chain and in the home via set UK agreed targets. Support guidance and tools will be available. The Courtauld Commitment is a voluntary deal that has been in place since 2005 with phase 1, phase 2 ran from 2010 to 2012. CC3 is building on the result of the previous commitments and introducing further carbon based reduction targets.

- Hospitality and Food Service (HaFS)
  The overarching objective is to prevent food and packaging waste arising within the HaFS sector. Where waste does arise, the objective is to increase recycling and recovery rates, thereby reducing waste being sent to landfill. The principal route to deliver this objective across the UK is through the launch and delivery of an agreed Voluntary Agreement (VA) with the HaFS sector, and there is specific associated action in Wales including grant programmes such as recycling on the go and Hospitality and Food Service Sector grant programme.

To support the delivery of Towards Zero Waste, the Food Manufacture, Service and Retail Sector Plan has been developed and consulted on. This plan addresses waste management and material resource efficiency related to food and its associated packaging in the following three sectors:

- Food and drink manufacturing.
- Wholesale and retail.
- Services, including hospitality (e.g. restaurants, hotels, events).

The plan targets food manufacturers, retailers and the service sector to reduce and recycle more of their own food and packaging waste as well as influencing waste food and food packaging in the household and other commercial and industrial waste streams. The final plan will be further informed through this consultation and stakeholder engagement workshops.

The Business Enterprise Technology and Science directorate also support businesses on resource efficiency, environmental issues and sustainable business practices. There are also a number of European funded programmes operating in Wales, such as Innovation vouchers, Astute, Institute of Sustainable Design, WISE Network. They offer support to SMEs to incorporate resource efficiency and waste prevention into their business practices.

Business Enterprise Technology and Science Directorate support on Resource Efficiency

The Welsh Government's Directorate for Business, Enterprise, Technology and Science is responsible for delivering the economic agenda and promoting the sustainability of agriculture, fisheries and food and their associated supply chains across Wales. In addition to the Department for Business, Enterprise, Technology and Science, the Directorate also includes the Department for Rural Affairs, the Department for Tourism and Marketing and the Welsh European Funding Office.

The Economic Renewal Programme sets out the role the devolved government can play in providing the best conditions and framework to enable the private sector to grow and flourish.

Nine key sectors have been identified for support.

- Creative industries.
- Information, Communication and Technology (ICT).
- Energy and Environment.
- Advanced materials and manufacturing.
- Life Sciences.
- Financial and Professional services.
- Food and Farming.
- Construction.
- Tourism.

Individual companies have also been identified as they are economically important to the communities in which they sit, or they are key to supply chains in Wales. They are classed as Anchor and Regionally Important Companies (RICs).

The Department provides the following services to help businesses:

- Business Wales service (network of eleven offices across the country will be delivered by a consortium comprising of Business in Focus, Centre for Business, Antur Teifi,and Menter a Busnes).
- Enterprise Zones Wales.
- Wales Economic Growth Fund.
- Support for business start-up.
- Business Mentoring, Advice and guidance through the One Stop Shop (business mentoring and business Wales website).
- Entrepreneurship and Responsible business - Corporate Social Responsibility programme with Anchor and Regionally Important Companies (identified through renewal programme).
- Innovation Voucher Scheme (Managed by Enterprise Consulting).
- Academia for Business.
- Development of an Innovation Strategy for Wales.

b) Future initiatives

Business resource efficiency programme for support for SMEs
We propose to enhance our programme of support for SMEs in the retail and wholesale, and accommodation and food services sectors, along with office based services.

To do this we would like your views on what the barriers are to your business becoming more resource efficient, and what measures can be put in place to help you prevent your waste.

Consultation Question 6

A review of the UK wide and international evidence on the waste prevention barriers and measures specific to your sector can be found at:

http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17499

Do you agree with this evidence for your sector in Wales? If not, why not? What support does your business need to become more resource efficient and why?

We are evaluating a 'competency framework' approach to help develop a programme of support. This framework will help benchmark resource efficiency in businesses in Wales and target action and support.

A competency framework helps us to find out more about a business' attitude and behaviour towards waste prevention, and may be particularly relevant to SMEs. It looks at aspects such as those in Table 23: Conceptual Framework for Categorising Behaviours below.

Table 23 Conceptual Framework for Categorising Behaviours.

	Ethos	Roles and relationships	Resources	Contextual
Individual	Attitudes, values, personal norms.	Roles, habits, responsibilities, accountabilities, leadership.	Skills, knowledge, understanding, awareness, agency, tools.	Workplace environment, incentives.
Organisational	Corporate culture, group identity, share norms and values, business priorities.	Corporate policies, management structures, governance.	Finances, time, skills, tools, equipment.	Business size, location, sector, market share, processes, products.
Institutional	Consumer values, social norms, political environment.	Relationships and interactions with customers, suppliers, peers, community.	Business support.	Legislation, economy, incentives.

Source: Brook Lyndhurst

In identifying the connections between the different factors in the table above, a competency framework could be developed and used in planning initiatives, to consider the motivations a particular type of initiative could capitalise upon, and which barriers it is able to overcome, and to identify other motivations that could also be harnessed and other barriers which may require addressing. We are evaluating what these interconnects are for SMEs in Wales, to develop a competency framework from which a business resource efficiency programme could be built. A 'competency' for your business could mean a measure your business has in place to help become resource efficient, such as:

- Are your staff trained in resource efficiency?
- Does your business set targets, and report and communicate resource efficiency performance?

Further details can be found as at:

http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17499

Consultation Question 7

Do you agree that a competency approach is useful to benchmark performance and underpin any interventions? If not, why not?

Do you agree that a competency framework is a useful approach to underpin and target a potential future business support programme for SMEs in Wales? If not, why not?

Food manufacture

It is proposed that an enhanced programme be developed with this sector in Wales to build on the existing work to extend the scope beyond food and its associated packaging to incorporate all the priority materials, such as chemicals and non packaging paper and card. It will also increase the range of interventions and their associated impact. It is of interest that an estimated 37% of the food waste is generated by businesses operating with the benefit of an environmental permit, and each permit contains a condition requiring waste minimisation plans.

i. Further research: Permitted Industry

A number of other areas are worthy of further investigation in the short term, and they are as follows.

The industry sectors covered in this section operate with the benefit of an Environmental Permit, which sets out conditions including the requirement for a waste minimisation plan. The industries are:

- Manufacture of basic metal and metal products.
- Manufacture of paper and paper products.
- Manufacture of chemicals, chemical products, pharmaceuticals.

A number of food manufacture also operate within the permitting regime, but the waste generation and reduction potential is well understood for this sector, and therefore the focus is on implementation rather than further research.

The true degree of resource efficiency across the breadth of activities covered by these sectors is not known. The cost and supply issues around some feedstock materials, together with the high value of the products, has driven process efficiency to a degree. The Welsh Government would like to work with industry, process efficiency experts and the regulator to better understand the degree to which industry has optimised its processes. It will also review the regulator's role in monitoring the performance of permitted industry.

ii. Regulation on waste producers

The Welsh Government is considering including a number of legislative proposals intended to increase recycling and recovery in its Environment Bill. The proposals currently include landfill and incineration restrictions for certain recyclable and recoverable wastes, mandatory source segregation for recyclable and recoverable wastes; and the extension of the revised Waste Framework Directive separate collection requirement to collect glass, metal, plastic and paper to include card, food and waste.

iii. Further development of the programme

The Welsh Government also proposes to develop the Waste Prevention Programme outlined above through consultation, including focused stakeholder engagement workshops. The workshops will be used to enhance our understanding of the business sectors, to explore barriers and motivations for change, to develop a framework for assessing potential impacts, value for money and feasibility of implementing waste prevention within the sectors.

3.4.12 Monitoring Progress

Progress against the national target

The proposed waste prevention target for industrial waste is an absolute reduction of 1.4% of the 2007 baseline each year to 2050. Further targets will be developed for our priority industry sectors.

For commercial waste, the proposed target is a reduction of 1.2% of the 2007 baseline each year to 2050.

Data for these targets are currently collected by periodic waste generation surveys, the most recent of which was in 2007. There is a data strategy in place which assesses the means of collecting waste data in the short, medium and long term. There will be a survey of businesses waste generated in 2012, which will report in early 2014.

Indicators of strategic progress

The following indicators are proposed, which will be used to monitor progress at a strategic level, particularly against the objective of decoupling waste generation from economic growth. They have been chosen because they are good indicators and the data is easy to collate at regular intervals.

- Waste generation against Gross Value added (GVA).
- Waste generation against number of employees.

Monitoring progress of individual implementation projects

There is currently a lack of comprehensive evidence on the efficacy of waste prevention measures, so by monitoring our implementation projects we will not only be able to assess progress internally but also contribute to the evidence base in the public domain.

Alongside the development of each implementation project there will be an associated monitoring plan, target or indicator(s) as appropriate. The Welsh

Government will collate outputs from the monitoring plans and will report progress in its annual monitoring report, and periodically evaluate and review the impact and value for money.

3.5 Preparation for reuse

3.5.1 Introduction

The waste hierarchy also includes 'Preparing for Reuse' and ranks it above recycling but just below prevention (see box below). Increasing the reuse of items discarded as waste – to ensure that a far greater proportion of wastes collected are "prepared for reuse", helps meet environmental outcomes, increases opportunities for enhancing social wellbeing through involvement in reuse activities and reduces the costs to businesses of waste management.

3.5.2 What is "preparing for reuse"?

What is "preparing for reuse"?

The revised **Waste Framework Directive** states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy

- *Prevention*
- ***Preparing for reuse***
- *Recycling*
- *Other recovery – e.g. energy recovery, and*
- *Disposal*

"Preparing for Reuse" means checking, cleaning or repairing recovery operations, by which products or components of products that have been collected as waste are prepared so that they can be reused without any other pre-processing. It is distinguished from reuse which means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived. Reuse is therefore counted as waste prevention under the waste hierarchy. For example a donation of an item to a charity is "reuse"; if the same item had been put out for collection as waste, and was then subsequently reused – this is known as "preparing for reuse".

Many businesses are likely to landfill significant amounts of reusable items.

For wastes produced by businesses, "preparing for reuse" would encompass redundant, but working (or repairable), items of equipment that businesses put out for collection as waste, and which are prepared for reuse rather than being recycled or landfilled. This could include items such as carpets, office furniture, IT equipment, other electrical equipment, redundant stock, and protective clothing.

3.5.3 Benefits of preparing for reuse

Preparation for reuse has many benefits in terms of reducing the ecological and carbon footprints of waste, as well as reducing landfill and potentially saving costs to businesses (and local authorities).

In the pursuit of sustainable development, the Welsh Government would like to see further progress in the reuse of items. This is also a requirement of the 2008 Revised Waste Framework Directive.

3.5.4 Key Objectives

In order to meet the key milestones and key social, economic and environmental outcomes identified in 'Towards Zero Waste', the following preparation for reuse objectives are set:

1. To provide preparation for reuse services in a way that promotes sustainable development and offers the opportunity for lower overall whole system costs.
2. To ensure that as far as possible all of the waste that cannot be prevented is prepared for reuse as a priority, and, if this is not possible, for all the remaining waste to be either recycled, composted or anaerobically digested.
3. To take measures, as appropriate, to promote the reuse of products and preparing for reuse activities, notably by encouraging the establishment and support of preparation for reuse and repair networks, together with the use of economic instruments, procurement criteria, quantitative objectives or other measures (including alternative business models).
4. To develop waste collection systems which protect waste products or materials in a way that maximises their potential for preparation for reuse by the social economy and other companies. This should include enhancing opportunities for architectural salvage / reclamation, including for items of cultural heritage.
5. To ensure adequate markets for reusable items collected by the waste management industry in Wales.
6. To ensure that preparation for reuse affords opportunities for job creation and training and offers extended opportunities for the social economy to be involved in the waste management infrastructure.
7. The 'preparing for reuse' targets for municipal waste collected by local authorities, and that the preparing for reuse, recycling and other material recovery targets for construction and demolition waste in 'Towards Zero Waste' are met cost effectively.

3.5.5 Targets

Municipal Waste

Table 24 shows preparation for reuse target is set in Towards Zero Waste for Municipal Waste collected by Local Authorities.

Table 24: Preparation for Reuse Targets for the Municipal Sector as detailed in Towards Zero Waste

Year	12-13	15-16	19-20	24-25
Minimum levels of preparing for reuse (excluding WEEE) (%)	0.4	0.6	0.8	1.0

Other business waste

Separate reuse targets have not been set for the commercial and industrial (nor construction and demolition waste) sectors because of the lack of data available on the potential for reuse in these streams.

Following consultation on this plan the Welsh Government has now decided to include “preparation for reuse” as counting towards the recycling targets set in Towards Zero Waste for industrial and commercial waste.

3.5.6 Actions

In order to increase the amount of waste prepared for reuse, and to assess the potential for a reuse and repair network, understanding the barriers in collecting materials is key. Where items need preparation before they can be reused, such as cleaning, repair or upgrading, there are significant collection issues to address to ensure that items arrive in a repairable condition. There are also economic barriers where the cost of assessment and repair may exceed the value which can be achieved for a second hand item.

Business waste

In respect of wastes produced by businesses, “preparing for reuse” would encompass redundant, but working (or repairable), items of equipment that businesses put out for collection as waste, and which are prepared for reuse rather than being recycled or landfilled. This could include items such as carpets, office furniture, IT equipment, other electrical equipment, redundant stock, and protective clothing.

- **Segregation and storage of waste by waste producers**

Waste producers should consider the hierarchy when considering the disposal of their waste. Products (and/or components of products) should not become waste unless this is not appropriate or achievable.

If products (and/or components of products) are to become waste, then preparation for reuse should then be considered. They should be stored in a manner that can facilitate this process i.e. stored where no further damage can occur for example, through weather or knocks.

- **Support for preparing for reuse by the WEEE compliance schemes**

The Welsh Government wishes to see WEEE collection schemes in Wales operating to maximise the preparation for reuse and reuse of WEEE. For example, careful storage of large WEEE in many civic amenity sites needs to be undertaken to minimise damage to collected appliances. This should involve provision for the separation at the collection point of WEEE that can be prepared for reuse from other separately collected WEEE destined for recycling. Improved collection systems and associated preparation for reuse facilities would help operators of compliance schemes meet their obligations under the above Regulations. The Welsh Government will explore the scope for a greater level of reuse and preparation for reuse of WEEE in Wales.

- **Improved facilities for the collection of waste items for preparation for reuse from businesses**

Anecdotal evidence suggests that many businesses already partake in reuse and preparation for reuse activities through the selling on for further use of items of equipment that they no longer require. There is a flourishing auction market for such items, including bankruptcy stock. For redundant items where it is less easy to realise a monetary income, then it is believed that there is scope for items discarded as waste to be "prepared for reuse" after collection. Here, the avoided cost of landfill could be significant.

The Welsh Government has asked WRAP to investigate business models which promote the reuse of items from businesses; this may include the use of Household Waste Recycling Centres for the collection of these items. It could also include an investigation of opportunities for partnership working between local authorities, the social economy sector and the private sector.

The list below outlines other actions for these stakeholders and actions are explained in the CIM Sector Plan.

- Increased action from local authorities on preparing for reuse.
- Investigate mechanisms to establish enhanced reuse and repair networks.
- Enhancing markets for items that have been prepared for reuse.

3.5.7 The need for additional evidence

Current waste analysis does not capture the potential of 'preparing for reuse' as a waste management option, especially in industrial and commercial wastes. This requires periodic compositional analysis studies that include potentially reusable items as distinct categories of wastes recorded.

There is also very limited data on the quantities of waste items that are put to reuse. Although the Cylch[41] '*Let's Prove It'* report collects some reuse data, this is limited to the Cylch members only. Standardised data collection will improve understanding of the current reuse activities as well as allowing more robust

41 http://www.cylch.org/sites/default/files/documents/Lets_Prove_It_Report_09-10.pdf

monitoring and calculation of environmental benefits. Extending the existing systems will provide a starting point.

The Welsh Government will explore ways to build on its existing evidence base, drawing, as appropriate, on studies carried out elsewhere, and commissioning, as necessary, and with others as appropriate, new research. Areas where additional evidence in respect of preparation for reuse needs to be sourced or commissioned includes:

- Baseline Data – quantities and types of waste in the waste stream that can be reused, including in the commercial and industrial waste streams.
- Developing social/economic and environmental indicators for preparing for reuse.
- A market study of the supply and demand of items for reuse, including the identification of any barriers to preparing for reuse, and how these could be overcome.
- Further mechanisms for encouraging preparing for reuse.

3.5.8 Indicators and review of progress

Monitoring and measuring

The following indicators are proposed (Table 25).

Table 25: Proposed indicators for preparing for reuse

What will be monitored	How	By whom
Other non-household waste prepared for reuse.	The extent of the reuse of items by survey or other sources will be measured.	Welsh Government

Review

It is accepted that preparation for reuse will become an increasing priority as we seek to drive a higher proportion of waste up the hierarchy. Consequently, the Welsh Government will carry out an ongoing review of how much waste can be prepared for reuse, what guidance is required to assist with preparing a higher proportion of waste for reuse. This review will include progress towards the preparation for reuse target for the municipal sector and the preparation for reuse targets set for other sectors when appropriate.

3.6 Recycling (encompassing composting and anaerobic digestion)

3.6.1 Introduction

Recycling is further up the waste hierarchy than landfill but not by much. It still should be viewed as a last resort after waste prevention and preparation for reuse options have been exhausted. Consideration also needs to be given to closed loop versus open loop and the detrimental effect open loop recycling can have for some materials.

3.6.2 What counts as recycling?

The 2008 Revised **Waste Framework Directive** states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy

- *Prevention*
- *Preparing for reuse*
- **Recycling**
- *Other recovery – e.g. energy recovery, and*
- *Disposal*

The 2008 Revised **Waste Framework Directive** defines recycling in Article 3(17) as being:
Any recovery operation by which waste materials are reprocessed into **products, materials or substances** whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

3.6.3 The benefits of recycling and anaerobic digestion

Reducing our ecological footprint

The closed loop recycling of quality materials from all waste streams is of fundamental importance and is a key aspect of the sustainable development led approach of Towards Zero Waste. Delivering high quality recycling can make significant reductions in the ecological footprint of waste for the different sectors (based on modelling zero annual growth in arisings) as shown in Table 26:

Table 26: Percentage reduction in Ecological Footprint of waste achieved by 70% recycling

Sector	Ecological Footprint reduction resulting from 70% recycling
Commercial and Industrial	3 – 9% (depending on technology)

Source: Ecological Footprint Impacts of the Welsh Waste Strategy. ARUP. May 2009

Recycling organic matter back into the soil

It is the Welsh Government's policy that biowaste that cannot be prevented or reused should be recycled back into the soil where beneficial. Compost and AD digestate (bio-fertiliser) are natural, safe and environmental alternatives to inorganic fertilisers. They also provide significant long term benefits for the soil – and financial benefits for farmers and growers.

The financial benefits of using compost and AD digestate in agriculture include:

- Higher yields - compost and AD digestate increases organic mater in soil and improves soil structure and fertility and can increase a crop's yield potential. The organic action of compost can help to inhibit pests and diseases within the soil.
- Fertiliser substitution – compost and AD digestate contains crop-available nutrients which will help save costs. Slow release of useful P and K content can improve your soil indices and reduce or remove the need for additional fertilisers.
- Better water management – compost and AD digestate can prevent heavy soils becoming water logged by increasing water infiltration. It will also help light soils hold on to water, making it available for crop growth during dry periods.
- Fuel savings and traffic tolerance – compost and AD digestate improves soil structure, making it easier to work whilst using less fuel. Improving soil structure will make it more resistant to compaction from traffic and will extend the conditions in which it can be worked.

And in addition to the above there are the following benefits for landscaping and regeneration:

- Topsoil can be difficult and expensive to source and is a precious, finite resource.
- Compost offers a financially competitive and sustainable alternative to the importing of topsoil. BSI PAS 100 compost can be mixed with recycled inert materials such as surplus low quality soils or even crushed stone. The inert material provides a consistent, stable material and the compost provides the nutrients and minerals required for root development. The mixture of compost with existing indigenous soils can improve soil structure, reduce compaction in the surface layer, improve water holding capacity, improve soil drainage and significantly reduce the loss of nutrients into the groundwater.

Bio-fertiliser (AD digestate) can be used as a whole liquid digestate or a fibre fraction; it has the advantage of significant amounts of highly crop available nitrogen and useful amounts of potassium and phosphorous also. It can be used to reduce or

replace chemical NPK fertilisers which are a finite resource and currently cost approximately £300 / tonne.

Generation on renewable energy

In addition to delivering the key policy aim to recycle the organic matter and nutrients in biowaste back into the soil, anaerobic digestion also generates a valuable renewable fuel in the form of biogas. This can be used as follows:

- To generate renewable electricity.
- As a vehicle fuel.
- For injection into the natural gas grid.

The use of the biogas as a renewable fuel displaces the use of fossil fuels, with all of the greenhouse reduction benefits that this brings.

Jobs and Skills

In terms of job creation, research[42] shows that recycling creates approximately ten times more jobs than incineration or landfill per tonne of material processed.

It is estimated there are currently:

- 4,630 people employed in the waste collection, sorting and disposal businesses in 2008, and
- 10,000 people currently employed in the waste management industry in Wales[43.]

Research shows that implementing a 70% recycling rate by 2025 would potentially create new jobs in Wales in the order of

- 3,600 new jobs across municipal, commercial and industrial (including construction and demolition) sectors
- 2,600 new jobs in the municipal sector alone

Many of the jobs created (1,947) occur from 2008 to 2015.

3.6.4 Key Objectives

In order to meet the key milestones and key social, economic and environmental outcomes identified in 'Towards Zero Waste', the following recycling objectives are identified for the sectors covered by this plan.

1. To achieve the waste recycling targets set in EU Directives and in 'Towards Zero Waste' in a cost effective manner.

42 More Jobs Less Waste' Friends of the Earth Report September 2010

43 EU Sector Skills Sector Skills Agreement Stages 1 and 2.

2. To ensure high quality recycling, ensure the development of separate collections of waste to meet the necessary quality standards for the relevant recycling sectors (with a high priority to closed loop recycling or 'upcycling'), and to ensure that separate collection is developed for at least the following: paper, metal, plastic and glass (as required by Article 11 of the Waste Framework Directive). To also encourage the development of separate collection systems to include the collection of food waste, wood and card in Wales.
3. To ensure adequate markets for recyclate, compost and AD digestates produced by the waste management industry in Wales through encouraging manufacturers in Wales to use more secondary materials (recyclate) rather than primary raw materials.
4. To ensure the collection and delivery to reprocessors / end users of high quality recyclate meeting relevant end-of-waste criteria (or Quality Protocols) and that the recyclate is used in closed loop applications (ideally in Wales) that maximise the reduction in ecological footprint and carbon footprint, with as much use as possible in Welsh manufacturing operations.
5. To ensure the source segregation of recyclable wastes by all businesses in Wales, with a focus on food, paper, card, wood, metal, plastic, glass, textiles, WEEE and batteries.
6. To achieve the separate collection of biowastes for the composting of green waste and anaerobic digestion of food waste, with priority given to recycling the treated biowastes by returning them back to the soil as a product meeting relevant end-of-waste criteria or Quality Protocols.
7. To send food waste to anaerobic digestion plants to generate valuable renewable energy and fertiliser.
8. To encourage businesses to recycle their wastes on site, where feasible, especially in respect of processing recyclable biowastes on site.
9. To ensure a focus on the reuse and recycling of packaging waste, including making packaging more recyclable and increasing recycled content.
10. To ensure collection and sorting systems are flexible enough to cope with all likely future changes in waste composition.
11. To ensure recycling operations are as sustainable as possible; this means a focus on local, closed loop systems where appropriate. Sending material to end markets which down-cycle the material should be avoided where possible.
12. To ensure that the waste industry is developed to benefit Wales economically by retaining the value of Welsh recyclate/compost/AD digestate and the potential reprocessing of these materials in Wales wherever possible.

Although this plan examines all wastes in Wales, it should be noted, as stated earlier, that the plan focuses on the recycling of specified priority materials which are: food waste, metals, paper/card, plastics, glass and hazardous wastes.

3.6.5 Targets for recycling

Targets in Towards Zero Waste

Towards Zero Waste sets 70% recycling targets by 2025 for commercial and industrial waste. Specific targets, including those for intervening years, are below in Table 27.

Table 27: Towards Zero Waste Recycling targets for Commercial and Industrial Waste (extract from Towards Zero Waste)

Targets for	Years		
	2015/16	2019/20	2024/25
Commercial waste –Preparation for reuse and recycling (including composting and AD) (%)	57	67	70
Industrial waste recycled – Preparation for reuse and recycling (including composting and AD) (%)	63	67	70

In order to achieve the overall targets identified in Table 27, the more easily recyclable materials – such as paper, metal and glass – need to be recycled at higher rates.

Targets in European and UK legislation

Targets have also been set via European Directives which are transposed into UK regulations. Refer to Overarching Regulations for more detail.

3.6.6 Recycling Actions

The evidence obtained by the Welsh Government has identified that significant amounts of potentially recyclable material are still being sent for disposal, particularly from the commerce sector. Actions in this section will look to increase the quantity of material diverted from landfill to the preferred management method.

In addition, reprocessors in Wales cite inappropriate quality of the provided recyclate as a reason for sourcing material from outside Wales, again indicating that the development of a collection system providing a large quantity of high quality material is key to achieving the objectives defined in ‘Towards Zero Waste’.

Delivery of a high quality recyclate stream will mean that a greater range of markets is available for Welsh recyclate and the option to access more environmentally beneficial management routes (closed loop recycling) is available.

For wastes produced by businesses and the public sector there remain a number of barriers and market failures in place that affect the likelihood of recycling levels increasing. There are indications that some form of intervention is required by the Welsh Government to ensure there is an efficient and effective collection system in place to increase the volume and quality of recyclates from business. Meeting the 70% recycling targets will be particularly challenging in respect of commercial waste.

The Environment Agency's industrial and commercial waste surveys for Wales show that the recycling rate for commercial waste is currently 37% (as of 2007), and has remained at this level since 2002-03. Industrial waste recycling is higher at 59%. Additionally, surveys show that commercial waste arisings have been increasing.

Too much waste that can be recycled is still being landfilled. A study commissioned by Environment Agency Wales[44] indicates that half a million tonnes of waste (worth £30 million) that could have been recycled was sent to landfill in 2005. The vast majority of this waste is 'mixed' waste that is not segregated and which contains a mixture of wastes very similar in composition to household waste. The majority of this waste – up to 77% - can be prepared for reuse, recycled or composted if it is separated at source. Cardboard boxes and containers are the largest component of the business waste making up 15% (or 100,000 tonnes) of the total. Kitchen waste made up 13% (90,000 tonnes).

A recent study was commissioned by the Welsh Government on 'Market Failures in the Collection of Commercial and Industrial Waste in Wales'. This study evaluated the level of recycling performance (compared against the recycling targets in 'Towards Zero Waste' and the material recycling targets in this plan) that would be expected to be achieved in the absence of interventions over and above the landfill tax escalator. For commercial waste, the study indicated that the 2015 recycling target will only just be met by the Landfill Tax escalator alone.

For industrial waste, the study indicated that the 2015 target will also only just be met by the landfill tax escalator alone. Thereafter there is a shortfall and the targets will not be met.

Having established that the some of the targets will not be met through the Landfill Tax escalator alone, the study then evaluated the key market failures as the basis for further work on possible interventions. The report identified that the issue of collection is the more significant one for commercial wastes. Where industrial wastes are concerned, it is the availability of treatment capacity which is likely to have been the more pressing constraint.

In addition to increasing the collection of business recyclate across the board, attention also needs to be paid to glass, plastic, card and food for the following reasons:

- Glass is mainly prepared for recycling as secondary aggregate. This is not the best environmental option for glass. Colour separation is essential to improve the end destination of this material, and there is insufficient capacity to colour-separate glass in Wales, either by separate collections or by use of specialist separation technology.
- Plastics should be separated by type and polymer to ensure that quality, closed loop recycling can take place. There is currently insufficient capacity to separate mixed plastics in Wales.

44 Determination of the Biodegradability of Mixed Commercial and Industrial waste landfilled in Wales. SLR on behalf of Environment Agency Wales.

- Card is present in large quantities in mixed residual waste in the commercial waste stream and this needs to be separated out at source for recycling.
- Food similarly is present in significant quantities in the mixed residual commercial waste stream. It needs to separated out at source to facilitate collection for AD.

Actions will focus on the key recycling objectives that have arisen from the earlier analysis of the current situation and which are key to delivering Towards Zero Waste, as follows:

- Businesses source segregating food and packaging materials that are currently arising in the mixed waste stream, and thus increasing recycling rates on site.
- Provision of a universal separate collection service for packaging and food waste.
- Recyclate to be recycled closed loop or 'up-cycled', ideally in Wales.
- Food waste to be sent to anaerobic digestion plants (where reuse, e.g. as animal feed, is not possible).
- Increasing the recyclability of packaging.
- Increasing the recycled content of packaging.

The following actions will be implemented in relation to the recycling of industrial and commercial wastes.

<u>Increasing the recyclability of wastes</u>

a) Increasing the recyclability of products and packaging

Currently there are a large number of products and packaging formats on the market, some of which are difficult to recycle. This variety can make recycling more difficult not only in terms of separating different materials from each other, but also for members of the public to recognise and recycle appropriately. In addition, some of the products and packaging formats are not recyclable in their current form. A rationalisation of these materials (where appropriate) could simplify recycling systems.

The Welsh Government wishes to see manufacturers developing products which are more sustainable throughout their lifetime – seeking voluntary "extended producer responsibility". WRAP is already working with a number of manufacturers of packaging and products to investigate the development of more easily recyclable items.

Collection of recyclate

b) Mandatory provision of a separate collection service for paper, metal, plastic and glass

Article 11(1) of the Waste Framework Directive includes requires Member States:

- To "take measures to promote high quality recycling and, to this end," to "set up separate collections of waste where technically, environmentally and economically practicable and appropriate to meet the necessary quality standards for the relevant recycling sectors"; and
- To set up separate collection "for at least the following: paper, metal, plastic and glass" by 2015.

The specific obligation to collect at least the four materials by 2015 is subject to Article 10 (2) of the Directive which states:

- Where necessary to comply with paragraph 1 and to facilitate or improve recovery, waste shall be collected separately if technically, environmentally and economically practicable and shall not be mixed with other waste or other material with different properties."

In addition "Collection" and "separate collection" are defined respectively at Articles 3(10) and 3(11) as:

- the gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a waste treatment facility".
- 'separate collection' means the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment".

This Article in turn has referred to Article 10 (1) which states:

- Member States shall take the necessary measures to ensure that waste undergoes recovery operations, in accordance with Articles 4 and 13.

The Waste (England and Wales) Regulations 2011 transpose the revised Waste Framework Directive in England and Wales. Regulation 8 sets out the requirement for waste management plans, and includes that these plans must include the matters set out in Part 2 of Schedule 1. Included within Part 2 of Schedule 1 is paragraph 8, which provides:

- Policies in relation to separate collection of waste: "Measures to promote high quality recycling including the setting up of separate collections of waste where technically, environmentally and economically practicable and appropriate to meet the necessary quality standards for the relevant recycling sectors".

Regulation 13 of the Waste (England and Wales) Regulations 2011 implements the Article 11(1) requirement of the Waste Framework Directive to set up separate collection for paper, metal, plastic and glass by 2015. This applies to wastes from businesses and public bodies as well as from householders. It places a new requirement on local authorities, private waste companies and the social economy

enterprises that collect waste materials to offer separate collections of paper, metal, plastic and glass by 1 January 2015. The governments of England and Wales are currently reviewing Regulation 13 and plan to amend it. Guidance on the separate collection requirement will be provided by the Welsh Government in due course.

c) *Further interventions to secure greater recycling of industrial and commercial waste, especially for food and cardboard waste.*

There is market failure in terms of the adequate provision across the whole of Wales of a comprehensive recyclate collection service from businesses. This needs to be addressed to ensure that the recycling targets set in 'Towards Zero Waste' are met. This market failure will be partly addressed through the requirement on all waste collection undertakings to provide from 1st January 2015 a separate collection service for paper, glass, metal and plastic for householders and businesses. However, this, and the planned increase in Landfill Tax are likely to go only part of the way to ensuring that the recycling targets are met. Just because a recyclate collection service is in place does not mean that all businesses will use it. It is also possible that for some businesses the increase in Landfill Tax will have little direct impact on their bottom line. Also, the separate collection service requirement under Article 11 of the Waste Framework Directive only covers four recyclate materials, and does not cover others such as food, card, wood and garden waste. All of these will need to be collected and recycled in order for the recycling targets for business to be met.

In securing additional recycling of business waste, collections need to focus on the priority waste materials identified in 'Towards Zero Waste'. Food waste has been identified as a priority material for reduction and recycling in 'Towards Zero Waste' because of its significant contribution to the ecological and carbon footprints of waste. It is also a component of the municipal biodegradable waste that needs to be diverted from landfill in order to meet the Article 5 Landfill Directive targets (in this context "municipal" waste also includes most commercial waste). A key priority is to remove it from landfill by collecting it separately, and recycling back to the land following AD that also generates a valuable renewable fuel.

There is an imperative to make a step change in the amount of food waste collected separately from businesses, changing from a very low rate of separation at present to a level of at least 80% capture in the commercial waste stream and 90% capture in the industrial waste stream by 2025. Action is needed now so that the network of AD facilities currently being procured for the food waste collected from households by local authorities can also be sized appropriately for the food waste generated by the industrial and commercial waste sectors. Timing is critical in order for economies of scale to be achieved, and the most favourable financial position attained for all parties.

Cardboard is also a priority waste stream and the need to recycle more from the business waste stream has been identified in section 2.

The Welsh Government has conducted a study which considers instruments that could be used to facilitate businesses recycling their waste. The study examines a number of new interventions:

- The extension of the revised Waste Framework Directive requirement for all waste collection companies to provide a separate collection service for paper, metal, plastic and glass by 1 January 2015 to include food, cardboard and wood.
- A requirement placed on waste producers to keep recyclable materials separate at source to facilitate their collection and recycling to a high quality.
- The introduction of landfill bans for specific recyclable materials using provisions under the Waste (Wales) Measure 2010).
- The introduction of energy-from-waste bans for specific recyclable materials.
- The provision of a Local Government tendered recyclate collection service.

The Welsh Government is currently considering these options and will consult on some or all of them in 2013.

In addition it is considering whether the above options could be enhanced by a ban on the use of food waste disposal units, which dispose of food waste to foul sewer. This may be consulted on alongside the above in 2013.

d) Supporting business to secure high quality recycling of business waste.

'Towards Zero Waste' emphasises the need for high quality collections of recyclate to achieve the required sustainable development outcomes. This is reinforced by the requirement of the Waste Framework Directive for member states to take measures to promote high quality recycling, and to achieve this via separate collections of waste where technically, environmentally and economically practicable (TEEP) and appropriate to meet the necessary quality standards for the relevant recycling sectors (Article 11(1, sub-paragraph 2)).

Businesses, especially SMEs, will need to understand the requirements of the Waste Framework Directive and the policies, outcomes and targets laid out in Towards Zero Waste (and the sector plans) and the practical steps that they need to take. The Welsh Government will ask WRAP to identify and communicate best practice on the segregation and separate collection of high quality recyclable materials from businesses and the public sector. This will identify how high quality recyclable materials can most cost effectively be collected separately from businesses, and in a way that minimises contamination. The aim will be to try to achieve the same high quality outputs as obtained by the kerbside sort method that is preferred for the collection of recyclables from households. The Welsh Government will also ask WRAP to provide guidance to businesses on how to segregate biowastes.

Consultation Question 8
Do you agree that it is feasible for businesses to keep each of these four key waste streams separate at source (please indicate 'yes or no against each waste stream)?
a) Paper and card,
b) Plastics and cans
c) Glass
d) Food
If not why not? Which types of business do you think will face the biggest challenges and why?

e) Increasing awareness and behaviour change towards business waste recycling.

The Welsh Government, in conjunction with its delivery partners, will evaluate the need for an awareness raising and behaviour change campaign on the benefits of recycling.

f) Support and encourage 'recycling on the go' collection systems

On Welsh Government's request WRAP has established a 'recycling on the go' initiative in Wales. 'Recycle on the go' is an initiative developed by DEFRA and WRAP in England that is designed to establish recycling bin schemes alongside general litter collection in places visited by the public. These include shopping centres, leisure centres, public buildings, airports, parks, and public events, including those run privately (e.g. at sports stadia) – all of which are within the scope of this sector plan.

The scheme:

- Provides recycling opportunities for separated key waste streams along with provisions for the correct disposal of non-recyclable waste.
- Adopts standard signage on all recycling receptacles.
- Maintains and upkeeps the infrastructure.
- Allows for the reuse, prepare for reuse, recycle and/or compost/anaerobically digestion of the materials collected.

The focus is on the collection of litter in a way that facilitates high quality recycling, instead of it being sent straight to landfill. WRAP should adopt and work with relevant businesses and public sector organisations to ensure that recycling on the go initiatives are developed widely across Wales, using the guidance on recycling on the go that has already been developed for England by DEFRA and WRAP, and which can be found on the Recycle Now website[45], tailoring it for Wales as appropriate.

'Recycling on the go' is addressed as an action in CIM Sector Plan, the FMSR Sector Plan and will be addressed in the forthcoming Public Sector Plan.

45 http://www.recyclenowpartners.org.uk/local_authorities/download_area/recycle_on_the_go /index.rma

g) Provision of a directory of recycling companies

The Environment Agency provides an online directory of waste companies that collect and/or manage recyclate[46].

h) Recycling business support.

Support for recycling companies in Wales is provided through two main routes. General support is provided through the Welsh Government's Department of Business, Enterprise, Technology and Science (BETS) under its "Energy and Environment Sector" support programme, and more targeted support is provided through schemes run by the WRAP with Welsh Government funding support.

i) Allowing businesses to use household waste recycling centres(HWRCs) or Civic Amenity (CA) sites (for recyclate only)

Local authorities are encouraged to allow businesses to deposit recyclable wastes at HWRC or CA sites, for a charge that would fully recover costs. Potentially HWRCs and CA sites could play an important future role within Wales as there is sufficient unused potential capacity for HWRC and CA sites to take in recyclable materials from businesses. The Welsh Government is working with the Welsh Local Government Association to undertake an investigation to examine the potential to utilise these facilities to receive business waste for recycling and also become centres for receiving items for reuse and preparation for reuse from businesses.

j) Extending kerbside recycling services for business wastes

Local authorities are encouraged by the Welsh Government to extend kerbside recyclate collection services for businesses. Recycling collection from businesses varies widely dependent on the type of business and its proximity to other waste producers. The Welsh Government will ask WRAP to explore with local government in Wales the potential for enhanced trade waste recycling collection services to be introduced where the private waste management sector does not provide a sufficient service.

k) Reporting on recycling performance by expanding the network of Waste Management Organisations inspected to PAS402:2009 via Green Compass Scheme

PAS 402:2009 is a BSI published specification for waste management organisations to demonstrate their performance. Sponsored by Constructing Excellence in Wales with funding from Welsh Government the specification was developed with the waste management industry to provide guidelines for the reporting of performance. It requires waste resource management organisations to make an assessment of their performance and calculate their achieved landfill diversion and materials recovery rates against a defined methodology.

46 http://wastedirectory.netregs.gov.uk/index.aspx

The accredited Green Compass Scheme provides the inspection framework for PAS 402, enabling waste management organisations to obtain independent third party inspection to verify their performance data.

Constructing Excellence in Wales has received funding from the Welsh Government and Welsh European Funding Office to provide support to Welsh waste management organisations to achieve PAS 402 via the Green Compass Scheme.

The Welsh Government wishes to see all waste management companies in Wales operating to PAS 402:2009 Waste Resource Management – Specification for performance reporting and waste producers using these companies.

Determining end of waste for recycled wastes

I) Waste Protocols Project

End of waste protocols are in place regarding the minimising of wastes such as pulverised fuel ash and furnace bottom ash. The Waste Protocols Project is a joint Environment Agency and WRAP initiative which involves working with industry to provide regulatory clarity for recyclers and end users on the point waste is fully recovered. The initiative removes layers of unnecessary regulation, easing the burden on businesses while significantly benefiting the environment. It:

- bolsters business by reducing costs associated with regulation;
- simplifies legislation and regulatory compliance obligations;
- increases demand for recyclates; and
- reduces volumes to landfill.

Since the project began in 2005, waste protocols have been established for:

- Aggregates from inert waste.
- Biodegradable waste (source segregated) for compost.
- Biodegradable waste (source segregated) for anaerobic digestate.
- Cooking oil and rendered animal fat.
- Glass – flat.
- Lubricating oils.
- Plasterboard.
- Plastics (non-packaging).
- Pulverised fuel ash and furnace bottom ash in bound and grout applications.
- Tyre-derived rubber material.

Draft quality protocols have been published for the following waste material:

- Poultry Litter Ash.

The following waste protocols are currently under review or are in UK public consultation:

- Aggregates from inert waste (public consultation complete).
- Biodegradable waste (source segregated) for compost.
- Wood.

Quality protocols for the following waste materials are currently being considered by the project:

- Glass – CRT.
- Incinerator bottom ash.
- Paper sludge ash.
- Pulverised fuel ash and furnace bottom ash (unbound).
- Steel slag.
- Tyres – tyre bales.

The following materials have been assessed but end-of-waste criteria could not be established:

- Marine-dredged materials.
- Soil – contaminated.
- Soil – uncontaminated.

Blast furnace slag was assessed and subsequently successfully proven to be a by-product rather than a waste, when new guidance was issued from Europe. The Welsh Government will ask Environment Agency Wales to ensure that the relevant waste protocols are promoted within the commercial and industrial sectors, to make better use of waste as a resource.

m) Development of markets for recyclates in Welsh manufacturing

'Towards Zero Waste' sets an objective that the waste industry in Wales maximises carbon and ecological footprint reduction via the most effective outlet for the dry recyclates and digested food waste. This means a focus on developing closed loop recycling within Wales wherever possible. This requires investment in reprocessing infrastructure, including the use of the secondary raw material in Welsh manufacturing and agriculture (for AD digestate). Provision of a consistent, high quality recyclate and biowaste stream to supply these businesses will help create the environment for this investment in Wales.

Currently the amount of recycled material being incorporated into products and packaging produced and consumed in Wales is variable. Products such as newspapers and metals already have a high recycled material content. However, this is less true for other materials such as plastics, magazines and glass. Development of recycled content specifications for these materials will create a more stable market for these products facilitating investment in these reprocessing industries.

Another barrier to the incorporation of recycled content into products and packaging is that of perception. Manufacturers may consider that by incorporating recycled material into their products and packaging, their goods may be perceived as poorer quality and not fit for purpose.

In terms of developing recyclate markets within Wales, there are a number of materials which are currently either being exported from Wales for recycling. While the Welsh Government recognises there is an environmental benefit in ensuring that these materials are recycled outside of the UK rather than landfilled in Wales, the value of this recyclate is not being fully realised and the potential benefits in reprocessing this material (jobs; resource efficiency) have been lost to the Welsh economy. The development of increased recycled content incorporation into products and packaging could provide alternative markets for these materials.

A number of collected waste materials are being recycled in and outside of Wales unless environmentally beneficial end markets (such as glass into aggregate; plastics into composite products; untreated food waste being spread to land; paper and card being composted). In some cases the ecological footprint of these options is worse than landfill – for example the recycling of glass into aggregate. Action needs to be taken to ensure market distortions do not perpetuate these undesirable markets.

The existence of end markets which have less rigorous quality requirements has already been discussed. These environmentally less beneficial markets can provide an important outlet for materials which are not of suitable quality for closed loop markets. However, from an environmental perspective, it is important that recyclate is sent to closed loop applications whenever possible. Where recyclate is sent to lower value markets, it is important that this is due to the material not being suitable for closed loop applications rather than simply inadequate collections or infrastructure providing material of insufficient quality. Improving the quality of collected recyclates in Wales will result in a wider range of markets being available for these materials and will help further encourage closed loop markets enabling Welsh recyclate to be recycled with greater environmental and financial benefit.

A similar situation exists when materials are exported from Wales. Often these markets require a lower quality of recyclate and are seen as an easier option requiring less robust collection systems. Research[47] into the export of materials from UK shows that UK recyclate exported to China is seen as of average quality. However this may change if other countries continue to develop collection systems delivering high quality material or the situation in China changes. This situation is more pertinent to the recycling of paper and plastic, although some metal and glass are also recycled overseas.

[47] http://www.wrap.org.uk/content/report-china-market-sentiment-survey

Actions to develop recyclate markets in Wales are as follows:

n) Further interventions for other specific materials

Paper and card

Evidence suggests that there is considerable scope to improve the recycling of cardboard in Wales, but that local markets for waste cardboard are limited. The Welsh Government will commission a detailed investigation into where and why enough cardboard is not being collected for recycling in Wales. The study will determine where cardboard collected for recycling is being reprocessed and what the barriers are to recycling this material in Wales. If appropriate, the project will also examine the case for intervention by the Welsh Government.

Plastic

In view of the gap which has been identified in the CIM Plan between the amount of plastic available in the waste stream, and the reprocessing capacity available in the Welsh market, the Welsh Government commissioned a detailed market study which reported end of 2012. This study examines the recycling capacity for different forms of plastics in Wales and makes recommendations for intervention as appropriate.

Metals

The Welsh Government has commissioned a detailed market study on the collection and recycling of metals. This study examines the recycling capacity for ferrous and non-ferrous metals in Wales and makes recommendations for intervention as appropriate.

Glass

Given the surplus of glass available in Wales and the challenge involved in creating new glass melting capacity, the Welsh Government will investigate the business case for investment in further glass colour sorting plants in Wales to improve the economic and environmental benefit which can be achieved from Welsh glass.

o) Working with Welsh manufacturers to increase the amount of recycled content for the target materials

WRAP provide support to manufacturing companies to assist them in increasing the recycled content of their products or packaging (See waste prevention actions).

WRAP is also researching barriers to the recycling and recyclability of key materials; aluminium, plastics and glass. These projects include:

- Development of a food grade recycling process for polypropylene.
- Categorisation of plastics based on their recyclability, similar to the categories established for PET bottles.
- Development of a road map for PET recycling in the UK.
- Promotion of a recycled content protocol for plastics.

p) Promotion of agreements to incorporate recycled content into products and packaging

Agreements to incorporate greater amounts of recycled content into products and packaging should create greater demand for Welsh recyclate for example the Courtauld Commitment mentioned previously.

Guaranteed end markets for recycled materials (especially plastics) may also promote investment in plastics infrastructure and remove the need for Government intervention to create markets for this material. This creation of a requirement for recycled content level for packaging and products where appropriate may facilitate this. The Welsh Government will discuss this further with the other UK administrations.

q) Development of standards for the incorporation of recycled content into packaging and products

In order of overcome the perceived issue that recycled content may not be “fit for purpose” the Welsh Government will work (via WRAP) with other UK Governments and trade bodies to develop standards for the incorporation of recycled content into products and packaging where appropriate.

r) Demonstration of recycled content incorporation into products and packaging

WRAP have already developed a number of case studies illustrating the successful incorporation of recycled content into products and packaging formats. The Welsh Government will continue to support WRAP in the development of these case studies and good practice guidance to encourage businesses to use recycled content in their manufactured goods, thus developing markets for Welsh recyclate.

s) Recycled Content Procurement

The Welsh Government will further stimulate demand for recyclate by investigating the development of a requirement for public bodies in Wales to procure products with high levels of recycled content. It will also ask WRAP to support public sector bodies in Wales to sustainably procure items with a high recycled content. The Welsh Government (via WRAP) will work with large organisations to do likewise for their own supply chains by facilitating responsibility deals where appropriate.

t) Support Changes to the PRN system

In the case of glass, there is a market distortion that results in a large quantity of glass being used as an aggregate – an "open loop" recycling operation that has undesirable environmental outcomes (a low embedded energy material – stone – is being replaced by a high embedded energy material – glass). This does not comply with the closed loop objective laid down in Towards Zero Waste. Nor does it comply with the high quality recycling objective of the Waste Framework Directive. The market distortion results from the use of the Packaging Recovery Note (PRN), issued under the Producer Responsibility Obligations (Packaging Waste) Regulations 2007). The PRN system enables companies to pay for the recovery and recycling of an equivalent amount of packaging to that used in their production operations and so offset their obligations under the Regulations. It is currently possible to claim PRN revenue for recycling glass into aggregate making this end market a viable option of glass recyclate. The availability of this end market, its perceived low cost (because of the PRN subsidy) and less rigorous quality requirement of recycled glass used as an aggregate has meant that collection schemes have not been designed to produce a high quality closed loop glass recyclate stream.

Around 30% of glass in the UK is recycled as aggregate and in Wales around 75% of the glass handled in accredited packaging reprocessors in Wales was recycled as aggregate. The amount of recovered container glass destined for uses other than re-melt, including aggregates, has more than doubled in the UK since 2005.

To achieve the best environmental outcome, there is a need to encourage more glass to go to closed loop re-melt applications and reduce the amount of glass going into aggregates over time.

At the end of 2011 the UK Government and Devolved Administrations consulted on next phase of packaging recycling targets for the proposed period 2013 – 2017. Following the consultation, the four UK Nations have agreed to that for glass a new target should be set that by 2017 glass recycling will be 64% by re-melt. This change would ensure that the increased amount of material recycled by this new target will achieve a better environmental outcome.

Consultation Question 9
Do you agree that the types of measures proposed will facilitate further collection for wastes from businesses, particularly SMEs to meet the targets in Towards Zero Waste? If not why not? What other measures could be considered and why?

3.6.7 The need for additional evidence

The Collaborative Waste, Resources & Sustainable Consumption Evidence Programme is a new collaborative initiative between Government Departments for Environment, Food and Rural Affairs (Defra) and Energy & Climate Change (DECC) the Environment Agency, WRAP and the Welsh Government.

This programme provides a platform for evidence-based policy-making, and for selecting and implementing the most appropriate interventions for use in the delivery of policies, on waste, resource management and sustainable consumption in England and Wales. It provides evidence to support the needs of the Defra and DECC; the Welsh Government; and associated delivery bodies, the Environment Agency for England and Wales, and WRAP.

Evidence requirements for the evolution of this sector plan will be taken forward through this programme. The programme has 5 themes, the following of which are relevant to this chapter:

Products Theme

The purpose of this theme is to meet evidence requirements related to product policy, for example in establishing minimum standards for products such as energy efficiency or recycled content, end-of-waste criteria (i.e. when waste becomes a product) and interventions to improve the impacts of products such as the Eco-design Directive. It also covers evidence on identifying and improving the overall life-cycle impacts of products and product packaging, through product design, encouragement of product reuse and recycling, and Producer Responsibility. This theme includes work on consumer and business behaviours with relation to products as well as evidence-gathering related to design to improve waste prevention, recyclability and reusability of products.

Waste Collection and Sorting Theme

This theme will cover evidence on the collection, sorting and preparation for reuse of packaging, products and materials (including food) once they have entered the waste stream, and will cover all waste streams. The cross-cutting nature of this work is reflected by close coordination with other areas of policy (e.g. Food Policy and Environmental Behaviours). It therefore excludes evidence relating to waste prevention and direct re-use (covered by Themes 2 and 3), but covers other work relating to the development of the recyclates market. Work captured under this theme will include attitudinal, economic and behavioural evidence.

3.6.8 Monitoring and measuring

The following indicators are proposed (Table 28):

Table 28: Proposed Indicators to measuring progress on recycling, composting and anaerobic digestion

What will be monitored	How	By Whom
Quantity of recycling by sectors	Via waste arisings surveys	Welsh Government

3.7 Other recovery of source separated wastes

3.7.1 Introduction

This section covers a part of the waste hierarchy that is of less significance than the other parts, hence it is dealt with in less detail. But nonetheless, there is some important issues that need consideration, and this section focuses on these.

3.7.2 Definitions

Other recovery of source separated waste streams

Waste hierarchy

The revised **Waste Framework Directive** states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy

a. *Prevention*
b. *Preparing for reuse*
c. *Recycling*
d. **Other recovery**, and
e. *Disposal*

The revised **Waste Framework Directive** defines recovery in Article 3 (57) as being:

- 'recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery operations.

Annex II includes the following recovery operations which can apply when a separated waste stream has been used in an application where it has either not met the relevant end of waste criteria, or national quality standard, and is thus still a waste.

- R 1 Use principally as a fuel or other means to generate energy – for example the use of contaminated waste wood as a fuel
- R 10 Land treatment resulting in benefit to agriculture or ecological improvement – for example where green or food waste is applied directly to land without prior biological treatment (composting or AD).

3.7.3 Benefits

For certain separated wastes, optimised energy recovery options offer the best environmental option due to their mixed nature or the lack of preparation for reuse or recycling options. These include (but are not necessarily limited to):

- Treated, coated or composite wood and wood products which cannot be feasibly prepared for reuse or recycled – e.g. chipboard, melamine, certain furniture items.
- Mixed and composite low-grade plastic residues.
- Mixed textiles and fabrics. (i.e. low grade flooring materials, mattress flock etc).
- Low grade or contaminated paper and card (i.e. food packaging etc).
- Mixed low-grade combustible waste streams (i.e. vehicle fragmentation fluff).

When considering such wastes, the efficiency of the energy recovery facility is key to ensuring that the material is managed in the most appropriate manner, and each waste stream needs to be considered on its own merits.

As well as the recovery of energy, “other recovery” also includes activities such as the spreading of biowastes to land, for agricultural or ecological benefit. The materials are spread as waste and are subject to the controls of the Environmental Permitting Regulations 2007 (as amended). This is only allowed if agricultural/ecological benefit can be proven, and no environmental harm occurs.

3.7.4 Specific Objectives

In order to meet the key milestones and key social, economic and environmental outcomes identified in ‘Towards Zero Waste’, the following other recovery objectives are set:

- To ensure that source separated waste streams that cannot feasibly be recycled are recovered in an environmentally and economically beneficial way.
- To ensure that the recovery of source separated waste streams only takes place where this is the preferred route for these waste streams taking into account the waste hierarchy and a life cycle approach.

3.7.5 Actions

In order to ensure that the best sustainable development outcomes occur for certain wastes, including biowastes and “difficult” wastes that cannot easily be recycled, the following actions are set.

Applying the waste hierarchy

a) Provision of guidance on deviations from the waste hierarchy

The waste hierarchy places recycling above other forms of recovery. However, where life cycle thinking demonstrates that other recovery yields better environmental outcomes than recycling for specific materials then a deviation from the hierarchy is justified. The Welsh Government has produced guidance on the waste hierarchy[48] and this will be updated periodically.

Other recovery of untreated food waste

b) Land spreading of untreated food waste

Historically, significant tonnages of untreated food waste have been recovered via land spreading. There are potential environmental risks associated with spreading untreated food waste. It also means that the additional benefits which would be realised through AD (principally the generation of renewable energy) are being lost. This land spreading activity is now more stringently controlled than it has been in the past and it is not suitable for all food wastes.

The Welsh Government is promoting AD as the recycling route for food wastes in preference to land spreading as identified in 'Towards Zero Waste'. The more stringent permitting requirements for land spreading these materials may make this route less economically attractive.

The Welsh Government will work with the food manufacturing industry via the Food Manufacturing, Services and Retail Sector Plan to encourage the AD of food waste as a more sustainable way of managing this waste, rather than land spreading it in an untreated fashion.

c) Sink disposal of food waste

Food waste disposal units (FWDUs) are macerators or grinders which are usually installed in the kitchen sink outlet (in both domestic and commercial catering operations). Most foods are reduced to small particles and are flushed via the sink drain into the public sewer. As an alternative to kerbside collection of food waste, the use of FWDUs offers an opportunity for the diversion of food waste to sewer for co-treatment, through anaerobic digestion or composting (where in place), with sewage. It avoids the vehicle transportation of the food waste. The food waste from the FWDUs ends up mixed with sewage, which often contains trade effluent discharges. The output from a compost or AD plant processing sewage cannot comply with the relevant Quality Protocols, and the application to land of the resulting compost or digestate will be classified an "other recovery" process rather than as a recycling

[48] http://wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/publication/hierarc hy guide

process. The recovery of food waste via FWDUs and the land spreading of the resultant sewage sludge thus comes below recycling in the waste hierarchy.

Concerns about the use of FWDUs for the disposal of food waste via the sewage system have been raised by the water industry (Water UK). There are various concerns about the extra loading on the sewerage system and sewage treatment works, and the possible problem of the impact of additional fats, oils and greases. There is also a concern that flushing the food waste down the sink perpetuates the "out of sight out of mind" attitude that is not conducive to influencing waste prevention behaviours by either householders or businesses. It also appears to be the case that often the water companies are unable to extract payment for the discharge of FWDU effluent into their sewers because of difficulties in identifying those carrying out this activity. As a result the "polluter pays" principle is not being adhered to.

A modelling study recently carried out by Defra concluded that there is no discernable difference between the lifecycle environmental emissions of managing food waste via FWDUs and by kerbside collection. A number of other potential environmental impacts of FWDUs were not examined and would need to be investigated before developing positive policy options. The Welsh Government considers therefore that there is no justification to deviate from the waste hierarchy which promotes the recycling of separately collected food waste to land (via either composting or AD) over "other recovery" (via the use of FWDUs with the resultant sewage sludge land spread).

The Welsh Government will work with the water companies to ensure the appropriate use of FWDUs for the disposal of food waste.

Energy recovery

d) Energy recovery for "difficult" wastes

The Welsh Government will encourage the development of appropriate energy from waste routes for separated combustible wastes that are difficult to recycle where this is the best environmental option as determined by life cycle thinking. Guidance on allowable deviations from the waste hierarchy has been published by the Welsh Government[49].

[49] http://wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/publication/hierarchyguide/?lang=en

The need for additional evidence

e) Addressing evidence gaps

The Collaborative Waste, Resources & Sustainable Consumption Evidence Programme is a new collaborative initiative between Departments for Environment, Food and Rural Affairs (Defra) and Energy & Climate Change (DECC), the Environment Agency for England and Wales, WRAP and the Welsh Government.

This programme provides a platform for evidence-based policy-making, and for selecting and implementing the most appropriate interventions for use in the delivery of policies, on waste, resource management and sustainable consumption in England and Wales. It provides evidence to support the needs of the Government Defra, DECC; the Welsh Government; and associated delivery bodies, the Environment Agency for England and Wales and WRAP.

Evidence requirements for the evolution of the CIM Sector Plan will be taken forward through this programme. The programme has 5 themes, the following of which is relevant to this chapter:

- Waste Treatment and Technologies Theme This theme covers evidence on all methods of waste treatment (recovery and disposal) relating to design and choice of treatment. It will therefore include energy from waste, anaerobic digestion, landfill, application of materials to land and their efficiency and environmental impacts. Work under this theme will also cover waste exports and imports, hazardous wastes, evidence to support interventions (regulatory and otherwise), and the consequences of waste management, across waste streams. This theme will also capture evidence required on emerging issues in waste treatment practices, so that it is possible to take an evidence-based view on the potential impact and regulatory requirements of new technologies in the marketplace. This may also include monitoring the balance of differing technologies across the waste and resources market, economics of the waste industry, shifts in trends and their consequences, to highlight emerging risks to the environment.

3.7.6 Monitoring and Measuring

Monitoring and measuring

The indicators are identified in Table 29 below.

Table 29: Indicators for other recovery of source separated wastes

What will monitor be monitored	How	Who
Waste arisings and how they are managed in Wales will be monitored and measured. This includes landspreading of untreated food waste, and the maceration of food waste.	Comprehensive, reliable and up to date data and information on the production of waste in Wales and its management will be obtained and reported. This will be obtained via surveys for commercial and industrial waste.	Welsh Government.

3.8 Recovery and Disposal of residual wastes

3.8.1 Definitions

Waste hierarchy (definitions)
The revised Waste Framework Directive states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy

a. *Prevention*
b. *Preparing for reuse*
c. *Recycling*
d. **Other recovery**, and
e. **Disposal**

Article 12 of the rWFD requires Member States to ensure that, where recovery in accordance with Article 10(1) is not undertaken, waste undergoes safe disposal operations in compliance with Article 13 (protection of human health and the environment). This requirement is fulfilled by means of the proposed transposition of Article 13 Protection Of The Environment And Human Health.

3.8.2 The benefits of diverting residual waste from landfill sites and recovering energy

Reducing the landfill of biodegradable waste

In accordance with the hierarchy, waste that cannot be prevented, reused, prepared for reuse or recycled should be subjected to another form of recovery rather than being landfilled. Diverting biodegradable waste from landfill significantly reduces greenhouse gas emissions.

Both ‘Towards Zero Waste’ and the Climate Change Strategy commit Wales to reducing direct greenhouse gas emissions from the waste sector, by diverting biodegradable waste from landfill through:

- Diversion of all biodegradable municipal waste (collected by local authorities) from landfill by 2020;
- Diversion of other biodegradable waste (from ‘other’ municipal, commercial, industrial and construction and demolition sectors) from landfill by 2025.

It is estimated that this will deliver direct savings of 0.66 million tonnes of carbon dioxide equivalents (CO2e) by 2020, against a 2007 baseline of 1.31 million tonnes of CO2e as a result of the reduction in landfill methane emissions.

Landfill also has the potential to cause pollution via landfill leachate, and amenity problems in the case of smells, although both are strictly controlled through the setting and enforcement of environmental permits by the Environment Agency.

The benefits of High Energy Efficiency EfW Plant, and heat mapping

Evidence gathered by the Welsh Government[50] indicates that the treatment method most likely to deliver best the sustainable development outcomes identified in One Wales, One Planet and in 'Towards Zero Waste' for residual waste is the "Use as a fuel of the residual municipal waste left after recycling in energy recovery plants with high energy efficiency".

Treatment of residual waste in high efficiency energy from waste facilities yield significant reductions in greenhouse gas emissions as compared to other treatment options that include an element of landfilling, as verified by life cycle assessment studies.

The evidence obtained by the Welsh Government referred to above indicates that the best performing residual waste options are combustion facilities operating in 'heat only' or combined heat and power (CHP) modes, and pyrolysis/gasification options operating in CHP modes. For both cases, the greater the process efficiency, the better the environmental return. The report outlines the fact that maximum efficiencies on gasification and pyrolysis plants are lower than for combustion facilities – but that more electricity can be produced in CHP mode by these facilities. In order to achieve these levels of efficiencies a use needs to be found for heat generated.

3.8.3 Specific Objectives

In order to meet the key milestones and key social, economic and environmental outcomes identified in 'Towards Zero Waste', the following recovery and disposal objectives are set:

1. To reduce significantly the amount of residual waste generated.
2. To eliminate the landfilling of waste, with a particular focus on biodegradable waste and hazardous waste.
3. To meet targets and ceilings (including maximum levels) set for recycling, EfW and landfill in 'Towards Zero Waste' and the Sector Plans.
4. To ensure an adequate collection system for residual waste, including for hazardous waste.
5. To encourage businesses to treat their own residual wastes on site.
6. To deliver good carbon reduction outcomes from residual waste treatment plants (e.g. high energy efficiency EfW plants).
7. To ensure access to an adequate network of facilities for the treatment and disposal of hazardous waste.

50 'Modelling of Impacts for Selected Residual Waste Plant Options using WRATE' – a report to the Welsh Government. AEA plc, September 2009.

3.8.4 Targets

European Landfill Limitation Targets

EU Landfill Directive

The Landfill Directive (1999/31/EC) sets targets for Member States to reduce the amount of biodegradable municipal waste sent to landfill. This was in line with its overall objective to prevent or reduce as far as possible the negative effects of landfilling on the environment, including reducing the production of methane gas from landfills, as well as any resultant risk to human health. The Directive includes a definition of municipal waste (Article 2) as:

"waste from households, as well as other waste which, because of its nature or composition, is similar to waste from households."

It defines 'biodegradable waste' as:

"any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard."

These definitions are used as the basis for the landfill diversion targets included in Article 5(2) of the Directive. The UK's targets (with the 4 year derogation as the UK stated that it landfilled more than 80% of its municipal waste in 1995) are to reduce the amount of biodegradable municipal waste (BMW) sent to landfill to:

- 75% of the total amount produced in 1995 by July 2010.
- 50% of the total amount produced in 1995 by July 2013.
- 35% of the total amount produced in 1995 by July 2020.

Member States may be subject to Infraction (with subsequent fines) if they fail to meet their targets.

In respect of the targets set in the Directive and the "municipal" waste covered, the UK's approach is based on waste classified using the List of Wastes Decision (or the 'European Waste Catalogue'. It means that a significant proportion of commercial and (some) industrial waste is included within the definition.

Table 30 shows the target for the amount of biodegradable municipal waste (BMW) that can be landfilled in Wales; these form part of the UK's figures that have been agreed with the European Commission.

Table 30: Amount of BMW that can be landfilled each year according to the collection route

Category of BMW	Amount of BMW that can be landfilled in each target year (tonnes)		
	2010	2013	2020
BMW collected by local authorities	710,000	470,000	330,000
BMW collected by others (mostly commercial waste)	668,000	449,000	313,000
Total BMW	**1,378,000**	**919,000**	**643,000**

There is a requirement to ensure that the requisite reduction is made in the landfilling of BMW not collected by local authorities – this will largely affect commercial waste collected by private waste management companies. Compliance is monitored via quarterly landfill site returns that are reported by landfill operators to the Environment Agency. There will be a need to periodically determine the biodegradability of this landfilled commercial waste – ie. compositional analysis surveys at an all Wales level undertaken at suitable intervals.

In terms of compliance against the 2010 target, the BMW landfilled figure for Wales for 2009 has been estimated by the Environment Agency to be 781,007 tonnes, significantly within the maximum allowed of 1,378,000 tonnes.

Landfill targets for industrial and commercial waste

Following consultation on the CIM Sector Plan the Welsh Government has set a cap for limiting the amount of landfill of industrial and commercial waste in Wales (Table 31).

Table 31: Landfill targets for industrial and commercial waste*

Year	09-10	12-13	15-16	19-20	24-25
Maximum level of landfill of industrial and commercial waste (%)	-	-	-	10	5

*The 30% target will be for the waste produced, rather than waste managed.

Energy from waste ceiling

Industrial and commercial waste

As there is a target of 70% recycling for 2024/25, the maximum proportion of industrial and commercial waste that can go to EfW is 30%. Table 32 identifies the new Energy from Waste ceiling for industrial and commercial waste that has now been set in the CIM Sector Plan.

Table 32: Energy from Waste ceilings for the industrial and commercial waste

Year	09-10	12-13	15-16	19-20	24-25
Maximum level of energy from waste of industrial and commercial waste (%)	-	-	-	-	30

The Welsh Government proposes to allow the recycling of processed Incinerator Bottom Ash (IBA) to count towards recycling targets as long as it meets an appropriate Quality Protocol (if one is agreed; work is underway to determine whether one can be developed) or relevant End of Waste criteria as agreed on a case by case basis with the Environment Agency. If the recycling of IBA is counted as recycling, then the ceilings on energy from waste would be net of any recycling of IBA.

3.8.5 Actions

Introduction

The Welsh Government recognises that in the medium term (until all products are designed in way that can be recycled and the markets are available to recycle all of them) there will be waste arisings in Wales which cannot be recycled easily or cost effectively. These residual wastes need to be collected appropriately and treated in a sustainable way in Wales as far as possible, in accordance with the waste hierarchy which places priority to “other recovery” over disposal.

Studies undertaken by the Welsh Government and the Wales Regional Waste Groups determined that high efficiency energy from waste (EFW) options are the optimal management route for these wastes that cannot be prevented or recycled.

In order to ensure that the recovery of residual waste activities in Wales deliver the key sustainable development outcomes identified in ‘Towards Zero Waste’, that they deliver the objectives identified in Section 3.6.3 above, and that the gaps in provision identified in Section 2 are addressed, effort needs to be focussed on the following actions in respect of collecting residual waste, infrastructure to recover it and markets to use the outputs from the recovery process.

Collections

There is an adequate collection system in place in Wales for residual waste provided by local authorities and the private waste management sector. The key action is to ensure that waste producers use this collection system, that they follow the Duty of Care, and that they do not fly-tip their waste. Actions to address fly-tipping in Wales are covered previously in section 3.

Infrastructure for residual waste

The CIM Sector Plan identifies that additional infrastructure is required for the recovery of residual waste in Wales in order to meet the Towards Zero Waste and EU Directive targets. The future needs for residual mixed waste treatment and recovery cannot be predicted with any great certainty due to the variety of factors that will affect future tonnages and a variety of factors that affect actual existing capacity.

In addition, adequate landfill capacity is required for the landfill of residual waste until the new recovery facilities are in place and the 2024-25 goal of zero landfill is attained. Whilst 2024-25 is a key milestone in this regard, 2019-20 targets set in Towards Zero Waste and the EU Landfill Directive to substantially reduce landfill are important drivers for accelerating the development of the residual recovery infrastructure.

Notwithstanding the above, with landfill prices, including landfill tax (due to rise to £80 per tonne in the short term in April 2014), and the annual increases in landfill operator prices driven by increased environmental, health and safety and operations costs, means that the total cost of disposing on waste to landfill will outstrip treatment prices by 2014-15 for residual waste. As such the economic argument for the necessity for appropriate recovery infrastructure and its early delivery is also inescapable.

Actions to ensure the development in Wales of the new residual waste recovery plants and landfill capacity required for the sectors covered under this plan to meet Welsh Government policies are now described.

a) Support for the treatment of industrial and commercial residual waste

The analysis in the CIM Sector Plan identifies that for non-municipal residual wastes market forces would need to provide by 2025 annual treatment capacity of between 0.5 to 1.4 million tonnes (if recycling targets are met). Early indications are that the market is responding.

Through the Welsh Government supported Residual Waste Treatment Procurement Programme for local authority municipal waste, bidders are encouraged to provide additional capacity for residual industrial and commercial waste for the market where this will provide better value for money for the local authorities through economies of scale.

The Welsh Government will keep a watching brief on the market as it should provide the additional capacity as long as the planning system facilitates this and the plants actually are built and operated. The Welsh Government will also monitor gate fees for EfW, and will make comparisons with the cost of recycling. Should it become apparent that EfW costs start to undermine recycling, then appropriate action may need to be taken in order to ensure that the waste hierarchy is not breached.

b) Achieving high efficiency for Energy from Waste facilities in Wales – the use of heat

As discussed in the benefits section, it is important to ensure that residual waste treatment is as sustainable as possible and that the best options for residual waste management are promoted over less appropriate options. This includes obtaining high energy conversion efficiency levels for energy recovery options, and promoting the use of Combined Heat and Power (CHP) and heat only options. 'Towards Zero Waste' identifies the Welsh Government's policy that EfW should be conducted at high energy conversion efficiency.

The Environment Agency currently require that EfW plants should be "heat enabled", i.e. that there is provision to draw off heat should a user be found who can use it beneficially. The Agency also requires that a 'heat plan' is provided as part of the permit application.

Under its Residual Waste Treatment Procurement Programme the Welsh Government provides funding support to local authority consortia. It is a condition of such funding, that: 1) where the solution chosen is an energy from waste plant, the facility shall achieve, as a minimum, the R1 designation for recovery; and 2) the overall plant efficiency shall be as high as possible as can be demonstrated to be value for money and, where possible, the facility should operate or be capable of operating in combined heat and power mode.

In order to achieve the levels of energy efficiency for EfW facilities, a use needs to be found for heat generated at energy recovery installations as well as for any electricity generated. As electricity sales are to the grid, and are guaranteed, then the sale of electricity presents few technical problems beyond the provision of local grid connections and negotiating an arrangement with the regulators.

The sale of heat, however, can be more difficult. Heat can be used for a number of applications, some of which are all year round, and sometimes up to 24 hours a day – for example cooling for data equipment centres, refrigeration, heating for leisure centre swimming pools, use to manufacture food on an industrial scale, and use in chemical plants There are two distinct mechanisms for finding a market for the heat. The first is to match up heat producers with heat users – for example by locating an energy recovery facility next to a large industrial heat user. This has the advantage that heat distribution costs are kept to a minimum and the presence of the energy recovery plant offers a low-cost heat option for the industrial user. However, the disadvantage is that the energy recovery plant is entirely reliant on the industrial user to take the available heat – and the efficiency of the energy recovery plant is therefore a function of how much heat is taken to run the process.

The second option is to feed the heat into a larger district-wide network, supplying a mixture of domestic, commercial and industrial processes. This has the advantage that, sized correctly, the energy recovery plant can act as base load (that is not seasonally dependent), and offload all of the available heat energy to the network – and therefore operate at maximum efficiency. The disadvantage is that a large

network has to be developed, and a large number of customers serviced, with potentially higher distribution costs.

A 2009 study[51] established that there is a clear excess demand by industry for process heat in Wales compared to the potential to meet this demand from the use of heat generated by the combustion of residual municipal waste. 37 significant potential heat users were identified, and it was calculated that, if residual municipal waste was used to displace natural gas (the default fuel for process heat supply), then the carbon savings from optimising the combustion of residual municipal waste alone would exceed 180,000 tonnes of carbon per annum.

There are clear environmental benefits to be obtained from optimising the use of heat, and evidence commissioned by the Welsh Government demonstrates the potential.

The Welsh Government will work with planning authorities to explore the possibilities to encourage the development of facilities which offer the best options for the utilisation of maximum heat recovery through the planned revision of TAN21 (Planning and Waste) and supplementary guidance.

The Welsh Government will also work with developers to ensure the creation of heat markets through the actions of its economic development functions in working to encourage local and inward investors to co-locate with energy recovery facilities to utilise synergies. The Welsh Government is already working with the Carbon Trust to help deliver this action with the creation of a toolkit to help develop costings for potential CHP development opportunities. It is expected that this work will be completed during Spring 2011. Local authorities are currently in the process of procuring residual treatment facilities through the actions of a number of procurement consortia. The procurements are technology neutral. However, the reference technology against which the procurements are assessed in each instance is mass burn energy recovery plant with CHP at a gross efficiency of 60%. The Welsh Government has specified that local authority procurement of energy recovery options should be 'heat enabled' to allow the development of CHP for these plants[52].

c) Consultation on the Introduction of Restrictions on the Landfilling of certain wastes

The Welsh Government has obtained powers under the Waste (Wales) Measure 2010 to enable Welsh Ministers to introduce Regulations banning or restricting the disposal of materials in landfill. In 2010 the Welsh Government and DEFRA jointly consulted on the introduction of landfill bans for a variety of wastes including food, paper and card, plastic and metals.

[51] 'The barriers to, and the potential for, EfW CHP in Wales – WSP Consulting for Carbon Trust Wales and the Welsh Government'.

[52] The Residual Waste Treatment Procurement Programme is outlined in Section 3.6.5.3 Infrastructure for residual waste.

In September 2011, the Welsh Government issued the Programme for Government 2011-2016[53]. In this, the Welsh Government set out its intention to introduce regulations to restrict biodegradable materials going to landfill. Biodegradable waste is one of the major causes of methane from landfill. One tonne of biodegradable waste produces between 200 and 400 cubic metres of landfill gas and as such diverting it from landfill disposal is of major importance in meeting the one planet objectives set in Towards Zero Waste.

The Welsh Government will consult on introducing a ban on the landfilling of biodegradable wastes and may, in due course, consult on detailed proposals for the introduction of landfill bans of other materials as well.

d) Remaining landfill need

Landfill is bottom of the waste hierarchy and Towards Zero Waste aims for as close to zero landfill as possible by the 2025 milestone. However, until recycling rates increase as planned, and the necessary residual recovery plants are in place, there is a continuing need for landfill at least until 2024-25. Thereafter there may still be a need for a small amount of landfill capacity for any wastes that cannot practically be recycled or recovered, although this is likely to be very small, i.e. less than 5% of all wastes produced as per the targets set in Towards Zero Waste and in this sector plan.

All wastes that are landfilled have to be pre-treated under the requirements of Article 6 of the EU Landfill Directive. This is implemented via the Environmental Permitting Regulations 2010, and enforced by the Environment Agency.

The scenario modelling carried out in Section 2 for the remaining landfill life in each region delivers the following worst case / best case outcomes:

- **North Wales:** Worst case - landfill void runs out in 2016-17; best case - landfill void will last indefinitely (assuming all targets are met for all waste streams and all IBA is recycled).
- **South East Wales:** Worst case - landfill void runs out in 2019-20; best case landfill void will last indefinitely (assuming all targets are met for all waste streams and all IBA is recycled).
- **South West Wales:** Worst case - landfill void runs out in 2021-22; best case landfill void last indefinitely (assuming all targets are met for all waste streams and all IBA is recycled).

From this analysis it is clear that close attention needs to be paid to the landfill capacity situation in North Wales, although the planning permission for a new site in Flintshire will help this situation if the landfill is constructed and used.

[53] Welsh Government Programme for Government 2011-2016: Annex – Delivery Programme Manifesto Commitments.

In terms of the spatial distribution of landfills and over reliance on a small number of facilities in some areas, it would appear that the following areas are under served in terms of landfill provision:

- **North West Wales:** limited capacity at two sites.
- **Mid Wales:** served by one facility (although the amount of residual waste generated in mid Wales is relatively small and other facilities exist on the borders of Mid Wales, particularly to the south east and south west).

The Welsh Government intends to consult early in 2012 on revisions to Planning Policy Wales (PPW) and TAN21 that will include clarification on the future approach to landfill in Wales in respect of land use planning.

e) Treatment of hazardous waste

The treatment of hazardous waste is stringently controlled under the Hazardous Waste (England and Wales) Regulations 2005. The responsibility for declaring a waste as hazardous lies with the waste producer, but once the declaration has been made; it has to be managed in accordance with the provisions of the above Regulations.

The management of hazardous waste needs to be undertaken in a manner that ensures compliance with the revised EU Waste Framework Directive and the above Regulations. There are general prohibitions on the mixing of hazardous wastes with other hazardous wastes or non-hazardous wastes (i.e. to dilute wastes) in non-permitted facilities, and there is a general duty on the producer to segregate hazardous wastes from non-hazardous wastes where possible. Hazardous waste can only be landfilled in a specifically permitted hazardous waste landfill, and it all has to be treated prior to landfill.

As identified in the CIM Sector Plan, the data suggests that there is considerable capacity for the treatment of hazardous waste in Wales – there are 33 identified treatment facilities.

There is an identified gap in terms of landfill disposal options, with little disposal capacity in Wales. However, the tonnage of hazardous waste produced in Wales which is landfilled outside of Wales is small. There is therefore little market incentive to develop extra hazardous waste landfill void in Wales. The two nearest hazardous waste landfill facilities to South Wales are within 25 miles of the Welsh border, and the same is true for North Wales. These facilities are therefore reasonably proximate for the small amount of Welsh hazardous waste arisings which are consigned to them (primarily asbestos wastes and contaminated soils).

Given the downward trend in hazardous waste arisings over the last few years, and the likely drivers in terms of cost of dealing with hazardous waste, it is not thought that hazardous waste arisings will increase markedly in the future. Therefore it must be considered that the current infrastructure forms an integrated and adequate network for the management of hazardous wastes.

The Welsh Government will monitor capacity provision for the management of hazardous waste as part of its commitment to the annual monitoring of waste infrastructure. Planning guidance for Wales already encourages the development of the necessary infrastructure in Wales to manage hazardous waste. If it becomes apparent in the future that Wales has inadequate capacity for hazardous waste then the Welsh Government will consider what interventions may be required.

The need for additional evidence

The Collaborative Waste, Resources & Sustainable Consumption Evidence Programme is a new collaborative initiative between the Welsh Government and Defra and DECC; the Environment Agency and WRAP.

This programme provides a platform for evidence-based policy-making, and for selecting and implementing the most appropriate interventions for use in the delivery of policies, on waste, resource management and sustainable consumption in England and Wales. It provides evidence to support the needs of the Government Departments Defra and DECC; the Welsh Government; and associated delivery bodies, the Environment Agency for England and Wales, and WRAP.

Evidence requirements for the evolution of the CIM Sector Plan will be taken forward through this programme. The programme has 5 themes, the following of which is relevant to this chapter:

Waste Treatment and Technologies Theme
This theme covers evidence on all methods of waste treatment (recovery and disposal) relating to design and choice of treatment. It will therefore include energy from waste, anaerobic digestion, landfill, application of materials to land and their efficiency and environmental impacts.

Work under this theme will also cover waste exports and imports, hazardous wastes, evidence to support interventions (regulatory and otherwise), and the consequences of waste management, across waste streams. This theme will also capture evidence required on emerging issues in waste treatment practices, so that it is possible to take an evidence-based view on the potential impact and regulatory requirements of new technologies in the marketplace. This may also include monitoring the balance of differing technologies across the waste and resources market, economics of the waste industry, shifts in trends and their consequences, to highlight emerging risks to the environment.

Monitoring and Measuring

The following indicators are identified (Table 33)

Table 33 Indicators for the treatment of residual waste collection service

What will be monitored	How	Who will monitor it
We will measure and monitor waste arisings and how they are managed (including recovery and disposal).	Comprehensive, reliable and up to date data and information on the production of waste in Wales and its management will be obtained and reported. This will be obtained via surveys for commercial and industrial waste.	Welsh Government.
The quantity of biodegradable waste diverted from landfill.	To monitor compliance with the Landfill Allowance Scheme, WasteDataFlow and mass balance calculations will be undertaken for local authority municipal waste. For other municipal waste from the commercial sector, it is likely that compliance will be monitored via quarterly landfill site returns and a periodic survey of the biodegradability of landfilled commercial waste. A separate indicator to monitor and measure the diversion of biodegradable waste from landfill for the climate change strategy is referred to in the Collections Infrstructure and Markets Sector Plan.	Environment Agency Wales.
Development of markets for heat from EfW plant and IBA	The heat utilisation and efficiency of energy from waste plants in Wales will be monitored and reported . The utilisation of IBA from energy from waste plants in Wales will be monitored and reported.	Welsh Government.

4 Monitoring, Measurement and Evaluation

The final plan will contain a detailed final action plan identifying actions, milestones and responsibilities. Progress will be reported periodically. Progress will also be reported against targets.

ANNEX 1: Description of measures evaluated for the waste prevention programme

The Waste Framework Directive (article 29) requires Member States to evaluate the usefulness of a range of measures for waste prevention, and suggests some measures which may be evaluated. This Annex describes the measures which the Welsh Government has evaluated to comply with this requirement.

The waste prevention programme will draw on a basket of measures, and the Welsh Government will undertake stakeholder engagement for business wastes during the consultation period to assess the barriers to business for waste prevention then match the most appropriate measure(s) to the priority sector(s) or waste types.

Below is a description of each measure and our current thinking on how they may be used, together with the UK Research on waste prevention in business sectors, to inform the stakeholder consultation exercise to achieve waste prevention in Wales. The final shape of the plan, and the application of the measures, will be described in the post-consultation, final draft of this programme.

- The promotion and implementation of eco-design

Eco-design is a strategic way of thinking about the design process, incorporating considerations around the sustainability impacts of product, processes and packaging across the entire life cycle of the product, from extraction of raw materials to disposal at end of life. Its broad ethos ensures that waste prevention and resource use is considered among a wide range of criteria and across the life cycle, thereby ensuring the best sustainability outcomes and avoiding negative unintended consequences.

Eco-design can be used to achieve waste prevention by changing the way that products are designed to reduce the amount and type of material in products (including hazardousness); improve longevity; design for reuse, remanufacture, separation and recycling.

The Welsh Government will promote and encourage the implementation of eco-design among Welsh manufacturing companies serving domestic and international markets. Effort will be targeted to address resource intensive products where there is evidence that it is possible to reduce the products' impact through changes to their design. These companies will benefit commercially from producing market-leading products and in future-proofing against increases in the cost, and reduction in the availability, of input materials.

The offering of environmentally sustainable products to Welsh consumers and businesses is also a priority of the Welsh Government. Work with retailers will identify resource intensive products, investigate improvement opportunities, trial the implementation of actions and roll out information. Welsh retailers will be able to work with their suppliers to improve the environmental sustainability of their product

ranges, and provide information to customers to enable them to make good purchasing choices.

As eco-design is a broad concept, its implementation typically requires a range of supporting initiatives to encourage its uptake. The Welsh Government will explore a range of initiatives to embed the principles of eco-design, including:

- Research and development.
- Information and awareness raising.
- Guidance documents.
- Toolkits.
- Design standards.
- Product specifications.
- Green procurement.
- Financial support (such as grants, loans and prizes).
- Funded business support.

- Information, Awareness and Communications : Information campaigns

Communication and engagement plays a key role in the promotion of waste prevention, and is inherently linked to other measures such as eco-design or green procurement, where the awareness campaign plays a role in highlighting opportunities and increasing interest among the target audience.

Communications and engagement can be undertaken in very different ways, and for different purposes; the Welsh Government has considered information campaigns, toolkits and interactive resources, guidance documents, awards and networks/knowledge transfer as options for providing information about waste prevention.

The behaviour of individuals in the consumption, use and disposal of goods and services have significant impact on the environmental sustainability of our economy. A behaviour change campaign will be implemented which will focus on food and consumer products with a high environmental impact. Clear and precise messages will be developed which will provide consumers with the necessary information to understand the positive impact that simple changes in behaviour can have on the environment, and which also frequently save consumers money. The Welsh Government will work with local authorities, retailers and suppliers of consumer goods, and other stakeholders to deliver mutually reinforcing messages. Local delivery will support the strategic, national programme to achieve maximum impact.

Basic information or awareness raising campaigns are one of the most widespread of measures for the prevention of waste from businesses. These campaigns often have low implementation costs, but it can be difficult to assess their relative impact by a formal evaluation. There is a heavy reliance on the audience to read, understand and act on the information provided; the recipient of information may need to access further information, guidance or support in order to make the necessary changes. The Welsh Government will work with local authorities, retailers and other organisations to develop and deliver this information.

The value of information campaigns can be in supporting other measures. The campaign can raise general awareness of an issue, and signpost to sources of further support, tools and techniques to address the problem.

The Welsh Government will not rely on basic information campaigns for businesses and construction companies as there is little evidence that waste prevention can be effected by information alone, but they will be used to raise awareness of specific issues, waste streams or behaviours. Messages will be developed carefully so that they have the greatest impact, and they will be delivered at the appropriate level. The Welsh Government will work with trade bodies and other organisations to develop and deliver this information; the messages will be tested on a sample of the target audience to make sure that they are fit for purpose.

- Information, Awareness and Communications: Toolkits

Toolkits are an effective way to engender change because they don't only highlight issues by simple messages but are more interactive; at their most sophisticated they allow the user of the tools to investigate options and develop bespoke solutions. They enable the user to focus on appropriate activities to prevent waste most effectively, and their impact can be very high.

A number of effective tools already exist to address some wastes, and the Welsh Government will maximise their use before developing new tools. An assessment will be made of the existing range of tools to determine whether they address the waste prevention priorities of Welsh businesses and consumers, whether they are user-friendly and accessible, and the potential to incorporate them into a suite of tools targeted at different target audiences, or at addressing specific wastes. Where there is a deficiency or a gap in the existing tools, the Welsh Government will work with resource efficiency and waste prevention experts to develop appropriate tools and associated materials.

Having identified or developed suitable tools, they will be hosted or signposted on publicised, easily accessible websites. An example of such a website would be the Welsh Government's Business Wales site, which provides a central hub for information and support for new and established businesses based in Wales, and those looking to invest in Wales.

- Information, Awareness and Communications : Guidance documents

Guidance documents can be useful where there is a need to describe waste prevention activities to an audience as simple instructions. They are not as interactive as toolkits, but provide more detailed information than simple awareness raising campaigns. They are useful for tackling cross-sector issues, such as ways of preventing paper waste in office based businesses.

The Waste and Resources Action Programme (WRAP) has reviewed existing guidance documents, including the suite of documents produced under the Envirowise programme. They have consolidated guides and case studies, tools and interactive resources, into one area on their website – the Business Resource

Efficiency Hub. The Welsh Government will work with WRAP to regularly review and update this information to ensure that it remains current and fit for purpose.

Similar guidance documents exist for the construction industry, and the Welsh Government will work with its delivery agents to ensure that they are accessible, current and regularly reviewed.

The Welsh Government and regulatory bodies will produce guidance documents so that businesses and individuals are clear about their responsibilities under the regulatory regimes, and to provide practical steps to ensure compliance. This will include guidance on the application of the Waste Hierarchy, which clearly indicates that waste prevention is at the top of the hierarchy.

The content of the Business Wales website and supporting information is being developed, and the Welsh Government will look to maximise the links to existing resources.

- Information, Awareness and Communications: Awards

A number of awards schemes promote best practice in waste prevention, and can be a relatively inexpensive way of highlighting forward thinking organisations or innovative solutions to waste problems.

The Welsh Government will review its support of awards events and divert resources to measures with greater environmental benefit. Events or awards which highlight organisations or initiatives which have resulted in significant and demonstrable environmental outcomes in priority areas may receive some support, but not to the detriment of other measures.

- Information, Awareness and Communications: Networks and Knowledge Transfer

Groups and networks can support knowledge growth and transfer among businesses, and between academic or research organisations and businesses. Typically they cover wider sustainability issues, or waste management, rather than only waste prevention. Some are sector specific (e.g. North West Construction Knowledge Hub in England), others are cross-sector. Geographic clusters, hubs and forums are valuable networks for exchanging information and ideas, and for gaining industry perspective (including the views of small and medium sized enterprises) on topical issues.

Through its economic renewal programme, the Welsh Government has identified key sectors for the economy of Wales and has set a vision and priorities for each, together with the creation of sector panels made up of business people from the field and academic experts. These panels, and their wider contacts, will be used to share knowledge and gain industry input and feedback.

Resource efficiency support for existing clusters and hubs in Wales could be positive, especially those supporting rural communities, linked to the development of enterprise zones and the existing economic renewal programme and innovation strategy in Wales. The Welsh Government will identify the networks that are widely

used by Welsh businesses and third sector organisations, with a focus on products and associated sectors with a high resource intensity or waste production impact. It will work with those existing networks, using them as conduits for knowledge transfer on best practice for waste prevention and resource efficiency.

- Standards, Environmental Certification and Assessment

Standards are a key initiative for waste prevention, but it is a complex area that can cover many products and processes. An example from within the construction sector is the Welsh Housing Quality Standard, which the Welsh Government intend to 'green' in future revisions by including specifications for the use of sustainable material sand products for all refurbishments.

Certification schemes aim to standardise high quality sustainability management among business sectors. Examples from the construction sector include BREEAM, LEED and the Code for Sustainable Homes (CSH). The Code has been adopted by the Welsh Government as the preferred tool to assess how sustainable development is being implemented in new homes in Wales. These schemes aim to reduce the environmental impact both from construction and production of construction materials, and the impact due to the operation of buildings.

The most significant standard that may result in waste prevention for other businesses is ISO14001, which ensures the establishment of Environmental Management Systems within organisations. They can be used to implement waste prevention through the encouragement of wider environmental improvements, providing a methodological framework within which to implement waste prevention initiatives.

Product standards can be used to indicate that efforts have been made to improve environmental sustainability. When applied to consumer goods, they are often accompanied by a labelling scheme to influence consumer choice. They are also used by businesses and organisations as criteria in their procurement of goods, and they can also be used by the suppliers to ensure that their products are used in a specified way (for instance in a way which generates a minimum quantity of waste). Generally, however, standards focus on the quality of the product or on safe design and use.

The Welsh Government will not develop any new standards for waste prevention, but will encourage the uptake of product standards and environmental management systems. The application of management standards such as ISO14006 standard on managing ecodesign will be promoted to suitable businesses.

- Legislation and regulation (excluding Site Waste Management Plans)

The Welsh Government has powers to make laws on specific devolved issues, including waste management. The drafting, implementation and regulation of legislation can take a lot of time and may be costly. Therefore this is usually an option used only where a market failure has been identified and when other measures have been unsuccessful. Its advantage is that all individuals or

businesses covered by the legislation must comply (i.e. there is a level playing field) and when drafted carefully the impact can be very high.

The Welsh Government are proposing two pieces of legislation that have the potential to impact on waste prevention - the Sustainable Development Bill and the Environment Bill. The white paper consulting on proposals for a Sustainable Development Bill is undergoing public consultation from 03 December 2012 until 04 March 2013. The aim of the bill would be to build on the achievements of the Welsh Government in embedding sustainable development as its central organising principle by extending the duty to all public sector bodies.

The Welsh Government is proposing to introduce new waste management legislation through the Environment Bill that would divert significant quantities of waste from landfill and energy from waste facilities. There may be some impact on waste production as a result of this legislation, although the greatest impact is likely to be the diversion of waste to recycling operations.

Voluntary measures for waste prevention will be monitored and evaluated, and if necessary the Welsh Government will scope options for introducing legislation in the medium to longer term, such as extended producer responsibility and direct and variable charging of waste services.

The Welsh Government will continue to implement European and UK legislation, and will work with regulatory bodies to deliver outcomes for people and the environment.

Planning for waste prevention is a condition of permits for industrial processes operating with the benefit of an Environmental Permit. The Welsh Government is working with Environment Agency Wales to evaluate how the requirements of the Environmental Permitting Regime could be used to take forward waste minimisation within permitted industries in Wales. This may take the form of increased regulatory scrutiny of operators compliance with waste minimisation requirements, coupled with improved guidance or standards for obligated industry.

- Legislation to mandate Site Waste Management Plans

Site Waste Management Plans (SWMP) legislation is a measure specific to the construction industry and its clients. The purpose of the SWMPs is to help companies in the C&D sector to think and plan to prevent, minimise and recycle the waste being produced and divert waste away from landfill. They are an important tool, which provides a framework that encourages resource efficiency and waste reduction, recycling and re-use both on-site and off-site. The Welsh Government is scoping the consultation proposals for SWMP regulations and aim to issue a consultation in early 2012.

Through conducting a SWMP, companies can begin to assess the true cost of waste generation. In particular, the introduction of the Landfill tax escalator and the increasing capacity of the waste management industry to recover waste have made it more cost effective to divert waste from going to landfill.
The preparation of SWMPs will help the C&D sector achieve a more sustainable approach to waste management by:

- Designing out waste at the design stage, making it easier for companies to work to specification. In turn this will also reduce the potential of waste on-site;
- Improving waste management practices and making it easier to process waste and reduce at source, thus avoiding the high costs of waste disposal;
- Measuring the amount of waste produced (and benchmarking);
- Ensuring compliance with existing waste management legislation, reinforcing the Duty of Care;
- Recycling and re-use of materials, reducing primary demand for primary materials and increasing take-up of secondary / recycled C&D materials;
- Ensuring building materials are managed more efficiently, and
- Ensuring that waste is disposed of legally.

A fees and charging scheme is proposed so that effective enforcement of the legislation is possible.

- Green Procurement and Supply Chain Initiatives

Green procurement can be used by an organisation as a measure to influence waste in two ways. It has an internal influence, changing the products or services that the organisation procures, and can also have an influence over the procedures and practices of their suppliers and stakeholders.

Green public procurement and the use of Government buying standards and clauses in public sector contracts that encourage waste prevention is a key measure for driving change in the supply chain. Public sector contracts are very attractive to the private sector suppliers, and therefore the measure is likely to be far reaching. In Wales, Value Wales have developed a Sustainable Procurement Assessment Framework (SPAF) in Wales which will address environmental concerns as part of sustainable public procurement in the round. The Welsh Government will build on this work to ensure that all public sector organisations in Wales are in a position to introduce resource efficiency and waste prevention clauses into their contracts, and will lead by example in its own procurement activities. Monitoring the use of these clauses, and measuring their impact, will build case studies and best practice which can be shared among the public sector. Evidence of successful initiatives will also be used to inform private organisations of the benefits of green procurement.

Green procurement by the private sector has the potential to result in high levels of waste prevention, and by sharing successful procurement clauses with private sector the Welsh Government will be supplying businesses with a tool to improve their environmental sustainability.

Supply chain initiatives can be very effective in changing the behaviour of suppliers in line with the expectation of their customer. A number of large retailers and businesses use training, mentoring and guidance as a means of improving the environmental performance of its product portfolio through influencing change in the procedures and practices of its suppliers. This can be highly effective as it fosters a strong working relationship between supplier and client, resources are often shared, and all parties frequently benefit from the initiative.

The Welsh Government will encourage retailers, businesses and public sector organisations to engage their supply chain to achieve sustainable development outcomes for Wales. These initiatives would support Welsh suppliers, including SMEs, to react to changes in procurement criteria.

- Reuse and repair networks (including resource exchanges)

Reuse and repair networks are a highly effective mechanism for extending the total life of a material or product once its first owner decides not to retain it. There is potential for third sector involvement in a network, and the measure is generally viewed favourably by businesses and individuals as there are financial and social benefits to be gained. Repair activities have been in decline in recent years, due in part to the reduction in the cost of new consumer good, but many items that are discarded could be functional with some simple repairs; repair activities should therefore be considered as an integrated part of the network.

Resource or materials exchanges are online or physical forums for the buying and selling of materials and products. There are some general exchanges such as ebay, and also sector specific exchanges such as Recipro for the construction industry. Free exchanges such as Freecycle also offer opportunities to extend the life of products through reuse.

The Welsh Government is assessing three options for a reuse and repair network. A high level assessment of the environmental, social and financial costs and benefits will inform the final chosen option and supporting initiatives which the Welsh Government will take forward.

The three options are:

1. Continue current level of activity.
2. Meet the current market demand.
3. Meet the maximum feasible/technical potential (which requires work to develop the market beyond current maximum).

- Products Registers

Registers of products are a popular means of monitoring and controlling the hazardous and critical materials within products, with the aim of phasing out the use of the most environmentally harmful. This is reasonably passive measure, simply providing and updating information on the products and relying on consumers and businesses to act on the information found within the registers.

An example of a product registers for businesses is the Eco-product Directory, produced by the University of Tokyo for the Asian Productivity Organization, which includes over 700 examples of products and services with improved environmental performance. Examples from the UK include the Reusable Packaging Supplier Directory produced by WRAP, and Green Book Live produced by BRE Global with a focus on construction and home improvement products.

The Welsh Government, through its communications and support programmes, will signpost to appropriate registers and directories to encourage the purchase of environmentally sustainable products.

- Eco-labelling

Eco-labelling is not a specific waste prevention measure but one which reflect environmental sustainability more widely. The aim of eco-labels is to help consumers identify products and services that have a reduced environmental impact throughout their life cycle, from the extraction of raw materials through to production, use and disposal.

There are a large number of eco-labelling schemes and the fragmented landscape is confusing to businesses, buyers and consumers. The confusion is compounded by competing claims on what constitutes a 'green' product, and the existence of two or more competing schemes for the same sector or product. One of the most established and widely used is the EU Eco-label, which certifies overall low environmental impact.

The Welsh Government does not feel it appropriate to develop a new eco-label for Wales specifically dealing with waste and resource issues. It will, however, monitor international schemes and advise on the most suitable for use by Welsh sectors as necessary. Due to its international use and acceptance, the EU Eco-label will be the preferred eco-label if it is proven to adequately consider waste and resource management issues.

- Voluntary Agreements

Voluntary agreements are commonly used to encourage waste prevention. They include codes of conduct and commitments by individual companies or collaboratively by groups of companies or industry sectors. There are benefits from whole sector action in that any issues of competitive advantage is eliminated, and there can be a sharing of best practice and case studies among the participating businesses. Certain collective voluntary agreements also have the advantage of flexibility for signatories to choose the most appropriate actions for their businesses to help meet the collective target.

In Wales, the Sustainable Development Charter is a voluntary charter for businesses and organisations operating in Wales. The Charter sets out a vision of a sustainable Wales, but there is no specific reference to waste prevention. However work on resource efficiency and waste prevention by a company or organisation would be good evidence that they are taking action in line with the vision.

Three examples of UK wide voluntary agreements which the Welsh Government has supported include:

The Courtauld Commitment : This commitment involves retailers and brands producing and selling grocery products. There are three targets on household food waste, packaging waste, and waste within the supply chain.

The Home Improvement Sector Commitment : This is a commitment for companies producing and retailing home improvement products. There are three targets on reducing packaging, reducing the amount of waste disposed of to landfill and helping consumers to recycle.

The Hospitality and Food Services Sector Commitment : This commitment involves a wide range of stakeholders offering food and hospitality, including large contract caterers, hotels, pubs, restaurants and fast food retailers, and B&Bs. There are two targets associated with this commitment , one to reduce food and associated packaging waste, and the other to increase the quantity of food and packaging being recycled, composted or treated by anaerobic digestion.

The Welsh Government will review the UK voluntary agreements to determine their impact in Wales and evaluate what further opportunities there may be to do more. Where appropriate it will support these initiatives, including renewals of existing commitments and new deals. There is no intention to develop formal voluntary agreements for use only within Wales, but businesses will be encouraged to sign up to the Sustainable Development Charter. The Welsh Government will also work with retailers to carry out further voluntary initiatives in Wales which will contribute to the waste prevention targets by building on their work within the UK agreements.

- Funding and financial measures: Funded Business Support Programmes

Funded business support programmes that stimulate direct contact with industry can have huge benefits, and can be a popular delivery mechanism. However one to one business support needs considerable financial and staffing resources. It can also be difficult to convince a business to engage in a programme of support around a narrow subject area such as resource efficiency or waste prevention, as businesses don’t immediately see the fit with their core activities.

The Welsh Government will investigate options for the provision of targeted support to businesses that have a high resource intensity or waste production impact. It will also look at opportunity to highlight waste prevention and resource efficiency issues through the general business support that it provides.

- Funding and financial measures: Grants, Loans and Challenge Funds

Grants, Loans and Challenge Funds are all means of supplying funds directly to businesses in order to facilitate change. They are well supported by industry, although SMEs can find the application process, and the conditions attached to the funding application, difficult.

Grants are generally used to help a company in making a change where there is a clear environmental benefit, but there may be little or no proven financial benefit to the recipient. The recipient carries none of the financial risk in this scenario.

Loans can be useful where significant investment is needed, for instance in capitol investment in new plant or in changing existing processes, but where there is demonstrable financial benefits to the recipient from the changes being proposed. Loan systems have an additional benefit to the funding body in that the investment is

returned and can be used again by re-investing in the same loan scheme or in support of other initiatives.

A number of initiatives already exist at a European, UK and Wales level for which Welsh businesses are eligible. The Welsh Government will investigate the opportunities that exist for Welsh businesses to access these funds for waste prevention and resource efficiency initiatives, and will put steps in place to promote their uptake in Wales. If the existing opportunities fail to address the priorities, the Welsh Government will investigate the adaptation of existing programmes or the establishment of new programmes. There will be steps in place to ensure that eligible Welsh organisations are aware of the opportunities offered by these initiatives, and encouraged to engage with them.

- Funding and financial measures: Innovation Vouchers

Innovation vouchers enable organisations to access specialist support, usually in the form of consultancy advice or academic expertise. There are advantages in this scheme in that it encourages closer working between academia and industry, which benefits both parties and can lead to novel approaches and truly innovative solutions. The system also offers access to advisors who are specialists in their field, providing greater value to the recipient, whereas standard business support requires generalist knowledge.

As with the grants and loans, there are existing schemes which offer opportunities to fund resource efficiency and waste prevention action by organisations. Following the mapping of existing initiatives, if there are gaps the Welsh Government will investigate ways of supplementing them with targeted schemes.

- Funding and financial measures: Taxes, Charges and Levies

The Silk Commission recently reported its findings on the devolution of fiscal powers. The key recommendations are that certain tax raising powers that meet the policy objectives in devolved areas (such as Land Fill, Stamp Duty and the long haul rate of Air Passenger Duty) should be devolved; and that the Welsh Government should share responsibility for income tax. There is general consensus that the recommendations should be taken forward.

The Welsh Government will investigate the opportunities for improving environmental sustainability (including impact on waste prevention) by obtaining responsibility for the taxes suggested in the report. It will also investigate the opportunities and benefits that could be derived from building on the success of the carrier bag charge by extension to other products and packaging. There is no intention to introduce any new charges in the short term, but if they were deemed necessary after assessing the impact of voluntary measures, they may be considered in the medium to longer term.

- The promotion of research and development

The Welsh Government supports the use of research and development to address the challenges faced by people, businesses and organisations in Wales. Its use of evidence to inform and evaluate its policies exemplifies this approach.

The Science Strategy, Science for Wales, outlines the Welsh Government's vision and direction for science in Wales. It introduces a new initiative, Star Wales, comprising funding for new academic stars and three National Research Networks in life sciences and health; low carbon, energy and environment; and advanced engineering and materials. It also proposes a new innovation strategy, which is currently in development.

The Welsh Government also have a programme of activity linking academics with the business community – Academic Experise for Business. Activities within the programme include:

- Information provision - Academic Expertise for Business newsletters.
- Collaborative Industrial Research.
- Commercialisation of Academic intellectual property.
- Knowledge Exchange activities.
- Knowledge Transfer Centres.
- Revenue/capital funding for Knowledge Exchange activities.
- Knowledge Transfer Partnerships.

The Welsh Government will investigate the opportunities for addressing Wales' waste and resource efficiency issues through research and development, and to forge greater links between academics with expertise in this area with the businesses that have the greatest potential to reduce their waste and resource use impact.

- Training and education programmes

Formal and informal training has a role to play in developing the skills that people need to understand and manage resources use and minimise the production of waste. As resources become more expensive and difficult to obtain, businesses will need the skills to adapt and manage this risk. Designers of products and buildings should be equipped to meet future challenges. Our children need to understand the impact that purchasing choices can have on the environment now and in the future.

The infrastructure exists to deliver much of this training, but materials should be made available for use by educators and trainers. There will also be opportunities to use business to business mentoring and supply chain workshops to train and up-skill our manufacturers and suppliers. The Welsh Government will investigate the opportunities for maximising the use of these training initiatives and where appropriate will develop bespoke workshops or training events to target high impact waste types or specific business sectors.

- Support for the development of resource efficient business models

Resource efficient business models can result significant environmental and economic benefits, and take a number of forms including service systems, hire and leasing, and incentivised return systems. New business models often require strong innovative leadership from within the business, as they are a departure from the traditional model of product manufacture and sale. The rise in the financial value of resources linked to an increase in awareness of sustainability issues has led to innovation among a limited number of businesses, but there is a need to stimulate greater innovation if the full sustainable development benefits are to be realised.

Products with high environmental impact, including clothing and other textiles, home and workplace furniture, chemicals, and electrical and electronic equipment, have potential in the context of resource efficient business models.

The Welsh Government will identify suitable innovations and will support manufacturers, suppliers and retailers based in Wales to develop business cases, implement changes, trial different approaches and monitor their impact. There will also be a need for changes in consumer and business purchasing behaviour away from traditional to new resource efficient models. The Welsh Government will review the evidence on consumer and business attitudes and expectation around the purchase and use of products, and will include the promotion of new business models in future behaviour change campaigns, and in its work on public and private sector procurement.

A similar suite of supporting initiatives are required to that for eco-design including research and development, guidance and tools, funded business support, financial support, and communication and behaviour change campaigns.

ANNEX 2: Glossary

Anaerobic digestion - A biological process where biodegradable wastes, such as kitchen or food waste, is encouraged to break down in the absence of oxygen in an enclosed vessel. It produces carbon dioxide, methane (which can be used as a fuel to generate renewable energy) and solids/liquors known as digestate which can be used as fertiliser.

Biodegradable waste - means any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard.

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

Biowaste - This includes biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants.

Closed loop recycling - Recycling where recycled materials are being used continually for the same purpose, for example a glass bottle recycled into new glass product rather than downgraded, for example being used as an aggregate.

Commercial and industrial waste - Commercial waste is waste arising from any premises which are used wholly or mainly for trade, business, sport recreation or entertainment, excluding household and industrial waste. Industrial waste is waste from any factory and from any premises occupied by an industry (excluding mines and quarries).

Composting - An aerobic, biological process in which organic wastes, such as garden and kitchen waste, are converted into a stable granular material which can be applied to land to improve soil structure and enrich the nutrient content of the soil.

Dematerialisation considers, beside waste, natural resources involved in the products' life-cycle. It literally means the use of less materials. Dematerialisation is defined by UNEP as "the reduction of total material and energy throughput of any product and service, and thus the limitation of its environmental impact. This includes reduction of raw materials at the production stage, of energy and material inputs at the use stage, and of waste at the disposal stage."

Ecodesign - A strategic design management process that is concerned with minimising the impact of the life cycle of products and services. Approaches include life cycle analysis, design for disassembly and reducing the negative impact of a product on the environment (for example by removing hazardous chemicals or materials without compromising the design).

Ecological footprint - The ecological footprint methodology calculates the land area needed to feed, provide resource, produce energy and absorb the pollution (and waste) generated by our supply chains.

Energy from waste - Technologies include anaerobic digestion, direct combustion (incineration with energy recovery), use of secondary recovered fuel (an output from mechanical and biological treatment processes), pyrolysis and gasification. Any given technology is more beneficial if heat and electricity can be recovered. The Waste Framework Directive considers that where waste is used principally as a fuel

or other means to generate electricity it is a recovery activity provided it complies with certain criteria, which includes exceeding an energy efficiency threshold.
Environmental Product Declaration (EPD) - An internationally standardized (ISO 14025) and LCA based method to communicate the environmental performance of a product or service.
Global hectares - One global hectare is equal to one hectare of biologically productive space with world average productivity. Global hectares are the unit of measurement for ecological footprinting.
Household Waste Recycling Centre (HWRC) - Site provided by the local authority for the recycling of household waste including bulky items such as beds, cookers and garden waste as well as other recyclables, free of charge.
Kitchen waste - This term refers to the organic component of household waste e.g. vegetable peelings, tea bags, banana skins. Often also referred to as “food waste”.
Landfill sites - Any areas of land in which waste is deposited. Landfill sites are often located in disused mines or quarries. In areas where they are limited or no ready-made voids exist, the practice of landraising is sometimes carried out, where waste is deposited above ground and the landscape is contoured.
Life cycle - Consecutive and interlinked stages of a product system, from raw material extraction, through production of materials and intermediates, parts to products, through product use or service operation to recycling and/or final disposal.
Life Cycle Assessment (LCA) - is a process of compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle.
Life Cycle Cost (LCC) - Two different uses for this term exist: a) The total cost linked to the purchase, operation, and disposal of a product (equivalent to "Total Cost of Ownership" (TCO)) b) The cost of a product or service over its entire life cycle including external costs.
Life cycle thinking (LCT) - The concept of LCT integrates existing consumption and production strategies towards a more coherent policy making and in industry, employing a bundle of life cycle based approaches and tools. By considering the whole life cycle, the shifting of problems from one life cycle stage to another, from one geographic area to another and from one environmental medium or protection target to another is avoided.
Municipal waste - For the purpose of this sector plan, municipal waste means ‘municipal waste as collected by local authorities’. It includes household waste and any other wastes collected by a Waste Collection Authority (WCA), or its agents, such as municipal parks and gardens waste, beach cleansing waste, commercial or industrial waste and waste resulting from the clearance of fly-tipped materials. WCA - A local authority charged with the collection of waste from each household in its area on a regular basis. They can also collect, if requested, commercial and industrial wastes from the private sector.
NACE – European Union classification system for economic activities.
Open loop recycling - Where the end product of recycling is used to replace something else, e.g. glass is recycled into aggregate which replaces virgin aggregate.
PAS100 - The British Standards Institution's 'Publicly Available Specification for Composted Materials' (PAS 100) sets out a minimum compost quality baseline, upon which composters should build as appropriate to the product types and markets targeted.

PAS110 - The purpose of this PAS is twofold: to ensure that digested materials are made using suitable inputs and effectively processed by anaerobic digestion (AD) for sufficient time; and to ensure that the process has been well managed and monitored so as to produce digested material that meets market needs and protects the environment.
Preparing for reuse - Means 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.
Producer responsibility - A 'producer responsibility' approach is intended to require producers who out goods or materials onto the market to be more responsible for these products or materials when they become waste. In some cases, producers will also be asked to reduce the level of hazardous substances in their products and to increase the use of recycled materials and design products for recyclability.
Recycling - Involves the reprocessing of wastes, either into the same product or a different one. Many non-hazardous industrial wastes such as paper, glass, cardboard, plastics and scrap metals can be recycled. Special wastes such as solvents can also be recycled by specialist companies, or by in-house equipment.
Reduction - Achieving as much waste reduction as a priority waste action. It can be accomplished within a manufacturing process involving the review of production processes to optimise utilisation of raw (and secondary) materials and recirculation processes. It can be cost effective, both in terms of lower disposal costs, reduced demand for raw materials and energy costs. It can be carried out by householders through actions, such as home composting, reusing products and buying goods with reduced packaging.
Reprocessor - A person who carries out one or more activities of recovery or recycling.
Residual waste - this is waste collected from households, commerce and industry (including certain construction and demolition activities) which has not been separated at source.
Resource efficiency – Managing raw materials, energy and water in order to minimise waste and thereby reduce cost.
Reuse - Using a product again for the same or different use.
SOC codes Substance Oriented Classification describe wastes by materials only, regardless of their origin. The European Waste Classification (EWC) coding system describes waste both by its physical properties, and by the sector from which it was generated. SOC codes reflect only the material type of the waste, regardless of the source sector. This allows easier interpretation of the results, as several different EWC codes relating to similar materials which require the same treatment methods, can be grouped together.
Social enterprise - A social enterprise is a business with primarily social objectives whose surpluses are principally reinvested for that purpose in the business or in the community, rather than being driven by the need to maximise profit for shareholders and owners.
Sustainability appraisal - Single appraisal tool which provides for the systematic identification and evaluation of the economic, social and environmental impacts of a proposal.
Treatment - Physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.

Upcycling - Upcycling happens where high embedded energy raw materials are substituted by lower embedded energy secondary raw materials that can be subsequently be closed loop recycled.
Waste arisings - The amount of waste generated in a given locality over a given period of time.
Waste hierarchy - Sets out the order in which options for waste management should be considered based on environmental impact. It is a useful framework that has become a cornerstone of sustainable waste management.
Zero waste – 'Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.' (Zero Waste International Alliance www.zwia.org).