



**THE
STATE
OF THE
NATION**

**WASTE AND
RESOURCE
MANAGEMENT**



THE STATE OF THE NATION: WASTE AND RESOURCE MANAGEMENT

ABOUT ICE

The Institution of Civil Engineers (ICE) is an international membership organisation that promotes and advances civil engineering around the world. ICE is a leading source of professional expertise in transport, water supply and treatment, flood risk management, energy and waste and resource management. Established in 1818, it has over 80,000 members throughout the world, including over 60,000 in the UK. ICE's vision is to place civil engineers at the heart of society, delivering sustainable development through knowledge, skills and professional expertise.

ABOUT THIS REPORT

State of the Nation reports have been compiled each year since 2000 by panels of experts drawn from across the ICE membership.

Since 2008 ICE has published several State of the Nation reports each focused on a specific issue. These reports have focused on capacity and skills, transport, defending critical infrastructure and low carbon infrastructure. In June 2010 we also issued an overall assessment of UK infrastructure. These are available at ice.org.uk/stateofthenation

The aim is to stimulate debate and to highlight the actions that we believe are needed to improve the state of the nation's infrastructure and associated services.

The report has been compiled through a process similar to that of a select committee inquiry, with a wide range of stakeholders providing verbal and written evidence. The material was then reviewed in the light of the government's October 2010 Spending Review and National Infrastructure Plan 2010.

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WELCOME TO THE STATE OF THE NATION REPORT ON WASTE AND RESOURCE MANAGEMENT

There is an enormous amount of value locked up in the UK's waste. Our inquiry has shown that the battle to change perceptions of this material has been won. Every respondent embraced the concept of moving from waste to resource management, starting with waste reduction and then bringing ever increasing quantities of waste back into beneficial use as high quality materials.



it moves through our economy can also help us achieve 'value for carbon'. Recycled products can substitute for virgin materials with high embodied carbon, whilst energy from waste can make a contribution to replacing the high emission power stations that must be taken offline in the next decade.

Unlocking this value will require investment in infrastructure, at least £10-20bn in the period up to 2020. In its recently published National Infrastructure Plan, government has made a welcome commitment to creating an environment that will encourage large amounts of private investment in the nation's infrastructure.

In an age in which we will all have to do 'more for less' there is a compelling value for money case for this shift. However extracting more benefit from material as

This work will be vital in the waste and resources sector where a major PFI programme is drawing to a close and the political risk surrounding projects to develop new facilities has traditionally been high.

The engineering profession must also play its part and bring forward innovation. Over the next 40 years our waste and resources infrastructure will need to evolve to cope with the changing demands placed on it. This will require the roll out of technologies new to the sector. It also means that infrastructure built to meet the current priority of diverting material from landfill must be adaptable enough to cope with foreseeable challenges around energy security, carbon reduction and increasing global competition for materials.

I would like to thank all the contributors to the inquiry and look forward to working with them in taking forward the findings of this report.

**PETER HANSFORD, PRESIDENT,
INSTITUTION OF CIVIL ENGINEERS**

BACKGROUND: WASTE AND RESOURCE MANAGEMENT FACTS

The need to improve the quality of data relating to waste and resources is a key finding of this report. Here we use the information that is available to provide an indication of the current situation.

HOW MUCH WASTE DOES THE UK PRODUCE?

A recent estimate does however suggest that in 2008 the UK produced circa 334 million tonnes of waste.¹ In 2004 Defra produced an estimate of the breakdown of total UK waste by source sector (figure 1).

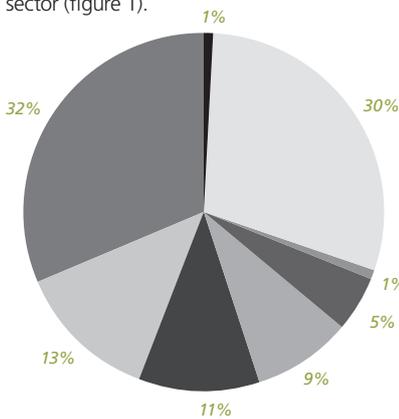


FIG.1 Annual waste arisings, England, by sector (2004)
Agriculture 1%, Mining and quarrying 30%
Sewage sludge 1%, Dredged material 5%
Household 9%, Commercial 11%, Industrial 13%,
Demolition and construction 32%

FOCUS OF THIS REPORT

This report is largely concerned with Municipal Solid Waste (MSW) and Commercial and Industrial (C&I) waste, which in 2004 was estimated to account for 34% of the total (MSW comprises household waste and some commercial waste). These waste streams have a similar composition. Much of this material has an economic value and with investment in collection, sorting and reprocessing infrastructure can be brought back into beneficial use.

Comprehensive data on MSW is collected on an annual basis. Figure 2 summarises total tonnages of MSW for the UK between 2001-02 and 2009-10 and levels of landfill and recycling/composting.

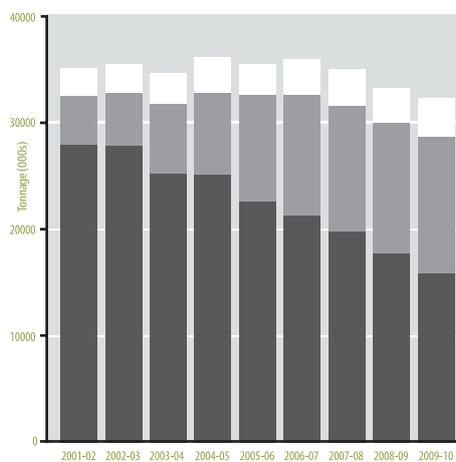


FIG.2 United Kingdom total MSW arising, landfill and recycling/composting breakdown 2001-02 to 2009-10
■ Landfill ■ Recycling / Composting □ Other

Data on C&I waste is not collected on a regular basis. In England, Defra have recently completed their first survey since 2003. Figure 3 sets out the headline findings of this survey and the equivalent figures for 2002-03.

FIG 3: ENGLAND C&I 2010 WASTE ARISING BY MANAGEMENT METHOD (MILLION TONNES)²

Year	Landfill	Recycling/ composting	Re-use	Total arisings
2009	6.8	24.7	2.1	48.1
2002-03	27.7	22.6	6.1	67.9

POLICY DRIVERS FOR WASTE AND RESOURCE MANAGEMENT INFRASTRUCTURE

A series of commitments by the UK Government are driving the development of Waste and Resource Management infrastructure for the MSW and C&I streams.

Under the EU Landfill Directive the UK is committed to reducing biodegradable municipal waste (BMW) sent to landfill. This requires reductions against 1995 tonnages of:

- 35% by 2010
- 50% by 2013
- 65% by 2020

In early 2010 BMW was redefined to include more material previously categorised as C&I. As a result the absolute tonnages to be diverted have grown substantially.

UK BMW LANDFILL DIVERSION TARGETS (MILLION TONNES)³

	2010	2013	2020
Previous targets	13.7	9.1	6.3
Revised targets	26.8	17.8	12.5

Under the EU Renewable Energy Directive the UK is committed to a target of 15% of energy from renewables by 2020. This target is equivalent to a seven-fold increase in UK renewable energy consumption from 2008 levels.

The Climate Change Act 2008 created a legally binding target to reduce the UK's emissions of greenhouse gases (GHGs) to at least 80% below 1990 levels by 2050.

In addition waste management is a devolved responsibility and each of the four nations of the UK has its own waste management strategy and targets.

CONSTRUCTION AND DEMOLITION WASTE

ICE is also working to help reduce Construction and Demolition (C&D) waste, and increase its recycling and reuse. The sector has made considerable progress. The last comprehensive survey of English C&D waste, estimated that 69% of the total was brought back into beneficial use.⁴



THE STATE OF THE NATION: ICE'S MAIN RECOMMENDATIONS

1:

CONTINUE TO INCREASE THE QUALITY AS WELL AS QUANTITY OF RECYCLED AND RECOVERED MATERIALS

Resource management means maximising the retention and recovery of the value inherent in materials as they circulate around the economy.

To achieve this goal, waste policy and systems for the collection, sorting, reprocessing and reuse of waste must be designed to drive the production of high quality recycled and recovered materials

Future targets and incentives should focus on delivering both quantity and quality. This will ensure that the UK maximises the environmental and economic benefits of recycling by meeting the increasingly stringent quality standards demanded by end users of materials.

2:

GOVERNMENT MUST FACILITATE PRIVATE INVESTMENT IN WASTE AND RESOURCE MANAGEMENT INFRASTRUCTURE

The completion of the current round of Private Finance Initiative (PFI) projects is likely to signal the end of government's role in providing direct financial support for the procurement of infrastructure for Municipal Solid Waste (MSW).

Central government and the Devolved Administrations must now focus on creating a policy, regulatory and commercial environment that encourages private investment in infrastructure serving all of the UK's waste streams.

3:

ENSURE THE UK HAS A WASTE AND RESOURCE MANAGEMENT INFRASTRUCTURE THAT CAN ADAPT TO THE CHANGING DEMANDS THAT WILL BE PLACED UPON IT

The UK's network of waste and resource management infrastructure will need to evolve over the next 40 years to deal with:

- A changing emphasis away from diverting material from landfill towards energy and materials security and ultimately climate change mitigation
- Changes to the quantity and composition of waste

Individual facilities and the wider network must be designed with the flexibility to adapt to these changing demands.

1. WASTE AND RESOURCE MANAGEMENT IN 2020 AND BEYOND

In the coming decades intense global competition for resources and the rising cost of emitting carbon and other greenhouse gases will reshape the waste and resource management industry and the infrastructure that supports it.

The UK will need to shift rapidly to a “circular economy” (see figure 4) in which the waste and resources sector continues to evolve from a disposal industry into a sector which collects surplus materials and reprocesses them into commercial quality products.

There are economic and environmental limits to our ability to recover and recycle materials to the standards required for commercial reuse. Evidence from elsewhere in western Europe suggests that, for at least the next decade, the proportion of waste that cannot viably be recycled could be in the region of 20% or more of UK municipal, commercial and industrial waste. It is important that the energy value of this ‘residual’ material is realised and to maximise the efficiency of energy generation, any expansion of Energy from Waste (EfW) should, wherever appropriate, incorporate Combined Heat and Power (CHP).

In the future the UK’s current practice of managing waste on the basis of its source in a municipal, commercial, industrial or construction stream will make little sense. Glass, paper, plastics and other materials will need to be managed on the basis of their physical properties and the commercial and industrial opportunities for their reuse.

To underpin the recovery of valuable material from our waste, the UK will need to continue and improve the last decade’s programme of investment in waste and resource management infrastructure. However, given the pressure on public finances, the focus will need to shift from public to private investment.

Much of this infrastructure, particularly for collection and initial treatment of waste, can be developed and operated on a local basis. However, a small number of larger regional facilities are likely to be required for final reprocessing or energy recovery.

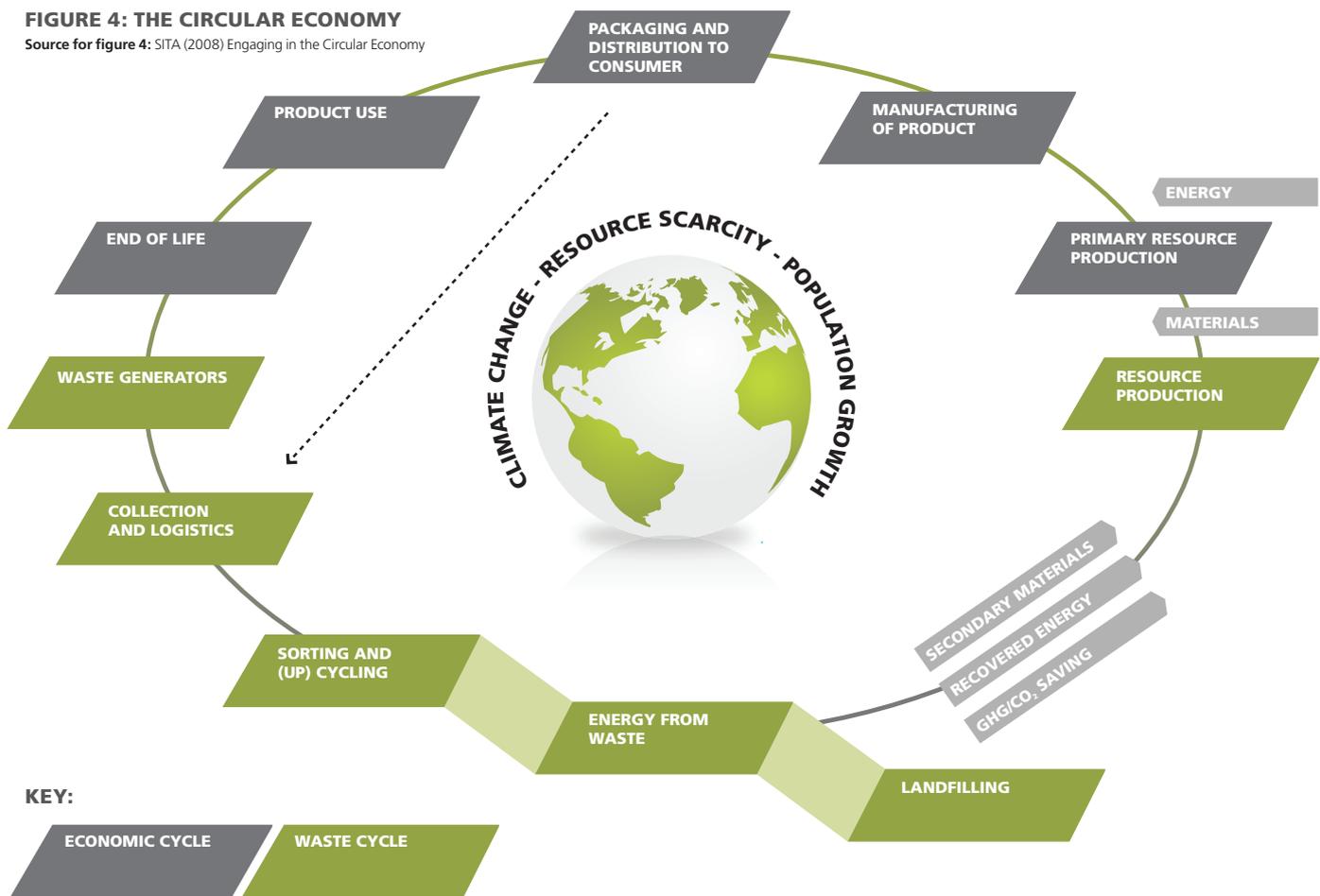
Infrastructure will need to be adaptable. Demands placed on this network will change substantially in the coming decades. In the last 10 years, local authorities have been procuring facilities to reduce their reliance on landfill and at the very least meet EU Directive requirements for diversion of biodegradable municipal waste. As we move towards 2020 energy security and the global competition for raw materials are likely to become increasingly important drivers. In the same period efforts to design waste out of products and changes in consumer behaviour will have significant but difficult to predict impacts on the quantity and composition of the UK’s waste. All of this will need to take place in the context of reducing carbon emissions by 80% of 1990 levels by 2050.





FIGURE 4: THE CIRCULAR ECONOMY

Source for figure 4: SITA (2008) Engaging in the Circular Economy





Every tonne of biodegradable municipal waste we are legally obliged to take out of our landfills, we are legally allowed to put back in through the C&I waste stream.

SITA

2. ROLE OF CENTRAL GOVERNMENT AND THE DEVOLVED ADMINISTRATIONS

The completion of the current round of Private Finance Initiative (PFI) projects is likely to signal the end of central government financial support for the procurement of waste and resources infrastructure.

Significant investment will still however be required to meet the UK's legal obligations and underpin a shift towards resource management. The Environmental Services Association have estimated that capital expenditure of £10-20 billion will be required over the next 10 years to fund new materials recycling and energy recovery infrastructure.⁵

Central government and the Devolved Administrations must help create a commercial, policy and regulatory environment conducive to investment in the right infrastructure, in the right places at an affordable price.

The publication of the UK's first National Infrastructure Plan (NIP) in October 2010, with its commitment to unlocking private investment in all of the UK's infrastructure, is a welcome signal of intent. However, in the waste sector much more needs to be done not least because some early actions of the incoming government, including the planned abolition of English Regional Spatial Strategies (RSS), have increased uncertainty and raised fears of lengthy delays to projects.

IN THIS FACILITATIVE ROLE, CENTRAL GOVERNMENT SHOULD FOCUS ON THE FOLLOWING AREAS:

SETTING CLEAR POLICY PRIORITIES

Waste management policy across all four nations of the UK is too narrowly focused on meeting EU targets for diverting biodegradable municipal waste from landfill. More attention needs to be paid to other larger waste streams and ensuring that collection, sorting, reprocessing and reuse deliver high quality recycled materials.

In addition, it is hard to discern the relative priority of a range of other policies affecting the sector including greenhouse gas reduction, energy security and creating green jobs. Responsibility for these policies is spread across a range of government bodies blurring accountability. Conflicting timescales and poor co-ordination mechanisms mean that decisions on priorities and trade-offs are too often evaded. As a result infrastructure developers are left unclear on what basis planning authorities and public sector clients will assess the benefits of their proposals. Ultimately this situation risks creating an infrastructure that is not fit-for-purpose.

The second edition of the NIP, promised for 2011 should include a single, easy to understand explanation of the government's goals, timelines and deliverables in the areas of waste management, renewable energy generation, CO₂ reduction and materials strategy. Areas of interdependency and conflict should also be highlighted, with an explanation of how they will be managed and/or resolved.

It will therefore also be important for the NIP to set out how central government will work with the Devolved Administrations. Waste management is a devolved responsibility and separate strategies exist for England, Wales, Scotland and Northern Ireland – albeit all within the context of the UK's EU level commitments.

IMPROVING DATA

The UK suffers from poor data on tonnages and composition of waste and the capacity of existing and planned waste and resource management infrastructure.

Defra and the Devolved Administrations publish regular statistics on MSW tonnages. However figures for the much larger Commercial & Industrial (C&I) and Construction & Demolition (C&D) streams are only produced irregularly, Defra's recently published C&I survey⁶ being the first since 2003.

Data held by the Environment Agency do not include the real operational capacity of sites and are insufficient to build up a picture of existing capacity in England. The Agency will however shortly release an updated dataset of facilities covered by environmental permitting. This is intended to provide decision makers with key information on the activities and locations of existing facilities. It may also provide the basis for other organisations with access to information to fill this data gap.

5. Environmental Services Association (2010), *Driving Change – Policy Proposals for a Greener Government*

6. Defra/Government Statistical Service (2010), *Survey of Commercial and Industrial waste arisings 2010 – interim results*



The lack of reliable data makes it extremely difficult to assess the scale of the national need for new infrastructure. It is also a factor in the widely reported difficulty faced by private developers in raising funds for C&I only projects or local authority infrastructure reliant on receiving some C&I waste.

The National Infrastructure Plan 2010 acknowledges that the quality of information available on UK infrastructure needs to be improved. The promised work programme to address this problem should commit Infrastructure UK to work with Defra, all the relevant environment agencies and the Devolved Administrations to provide robust data on:

- Location and capacity of existing and planned resource management infrastructure
- Credible data for waste from all streams

UNLOCKING NEW SOURCES OF FUNDING

The Waste Infrastructure Delivery Programme (WIDP) within Defra, working with Partnerships UK and 4PS has been instrumental in developing the Waste PFI programme. It is highly unlikely that any new PFI schemes will be added to the programme and the October 2010 Spending Review withdrew PFI credits from seven schemes already in progress.

As it withdraws from direct financial support for new infrastructure procurement, government should act as a focal point for developing new thinking on mechanisms to encourage and de-risk investment in appropriate infrastructure. There is also a strong case for waste to be included in the remit of the Green Investment Bank.

Government is already committed to investigating if the Regulatory Asset Base (RAB) model of economic regulation currently used for water and energy networks could be extended to other infrastructure sectors.⁷

Utilities regulated in this way do typically benefit from a lower cost of capital as a return on investment is effectively guaranteed. A RAB for waste and resources infrastructure would also deliver the benefit of providing a comprehensive asset register for the sector. However, further work is required to make the case for applying this approach to waste and resources infrastructure. Government itself acknowledges that if applied to competitive markets such as waste and resources, the RAB model can undermine the benefits of competition on efficiency, optimal operation and innovation.⁸

ESTABLISH AN OFFICE FOR RESOURCE MANAGEMENT

In 2007, ICE argued for the creation of an "agent" with a role centred on "leadership, communication, data management, strategic direction, planning and capacity building" which could work with local government and the private sector to deliver a resource management agenda.⁹

This need still exists. In England an Office for Resource Management (ORM) should be created. This would increase government effectiveness and provide greater coherence by drawing together functions currently spread across Defra, DECC, CLG and the Environment Agency. The ORM could also be responsible for liaison with Devolved Administrations where UK wide action is required.

The Office for Nuclear Development (OND) within DECC provides a model. OND acts as a focal point for government activity around the construction of a new generation of nuclear power stations. OND also provides a bridge between government and the investment community.

“ We should be thinking of this as a 360 million tonnes per year opportunity comprised of material streams.

PETER CALLIAFAS

7. HM Treasury/Infrastructure UK (2010), National Infrastructure Plan 2010
8. HM Treasury/Infrastructure UK (2010) *ibid*
9. ICE (2007) How to deliver a resource management strategy



There has been a headlong dash in the UK from major reliance on landfill to a future position of near universal use of treatment and processing. The speed of this change means that new technologies have insufficient time to develop a level of reliability that can be financed with the level of risk acceptable to the financial institutions. Only proven technologies are “bankable” at present... generally banks are unwilling to invest in new, unproven technology.

COSTAIN

3. INFRASTRUCTURE, TECHNOLOGY AND END MARKETS

INFRASTRUCTURE

The UK's waste and resource management infrastructure will need to go through several stages of evolution over the next 40 years. This will reflect a switch in emphasis from diverting material from landfill towards energy and material security, all within the context of stringent CO₂ reduction targets. Infrastructure will also have to adapt to changing composition and quantities of waste, driven by changing consumer behaviour and the designing out of waste from many products.

In the short term, however, there remains a case for the construction of a limited number of larger energy from waste facilities.

In December 2010, Defra published a report to support its decision to withdraw PFI credits from seven waste infrastructure projects on the basis that they were no longer required to meet UK Landfill Diversion obligations.¹⁰ This analysis identifies considerable uncertainty around future treatment capacity for post recycling “residual” waste, reflecting the challenges of securing planning consent and financing for facilities discussed elsewhere. These findings are similar to an independent assessment made by Tolvik Consulting earlier in 2010.¹¹

This suggests that an expansion of EfW would only crowd out recycling in the coming decades if the UK continues to manage MSW and C&I as separate streams. Under a resource management approach, spare capacity in facilities originally procured to deal with residual MSW creates an opportunity for the management of material of similar composition from other waste streams. In the longer term, well designed EfW plants could be converted to other fuels.

To improve the efficiency of energy recovery EfW, plants should, where possible, be in the form of Combined Heat and Power (CHP). In the short term the focus should be on integrating CHP into new industrial and residential developments. In the longer term, rising costs of carbon and economies of scale may make retrofit more attractive.

CHP has large upfront costs and its financial viability rests on finding long-term customers for the heat produced. Government is committed to creating a National Planning Framework, setting out basic priorities for the system. These priorities should include encouraging the co-location of energy plants and large users of heat.

Government should also indicate that it will provide a consistent level of support to CHP via the Renewables Obligation and the Renewable Heat Incentive.

TECHNOLOGY

As the UK's infrastructure evolves to cope with new demands, the performance of existing technologies will have to be improved. Furthermore, technologies that are new to the waste and resources sector will also need to be developed at a commercial scale. Unfortunately, due to the high level of risk associated with such technologies, it is currently extremely difficult to secure financial support for infrastructure reliant on them.

The Green Investment Bank (GIB) has a role in addressing this problem. The GIB is to “have an explicit mandate to take on risks that the market currently cannot adequately finance, catalysing private sector investment and facilitating the entry of new investors into green infrastructure”.¹² Support for emerging and smaller scale waste technologies meet these criteria. There is also a case for some of the proceeds from Landfill Tax, £842 million in 2009-10,¹³ to be used to help capitalise the GIB. The tax was originally intended to be revenue neutral. However, since the demise of the Business Resource Efficiency and Waste (BREW) programme in 2008, there has been no transparent mechanism for proceeds from the tax to be directed towards its intended goal of diverting waste from landfill.

Research and development will also play an important role in de-risking technologies. Defra's New Technology Demonstrator programme (2003-2010) saw seven demonstration projects completed. This has provided some useful information to the industry but further work is required if technologies are to be developed at a commercial scale. Given the constraints on Defra's budget it will be important that the Technology Strategy Board (which supports research and development and commercialisation) continues to support the sector. The Engineering and Physical Sciences Research Council must also support academic research in this area.

Industry must also play its part. In the last decade the sector has moved from being based largely around landfill to operating a range of complex process engineering equipment, whilst maintaining its traditional focus on environmental protection and public health. To ensure this continuing change is delivered with maximum effectiveness, industry should:

¹⁰. Defra (2010) Spending Review 2010 – Changes to the Waste PFI Programme

¹¹. Tolvik Consulting (2010) 2010 Briefing Report Residual Waste in England and Wales

¹². HM Treasury/Infrastructure UK 2010 *ibid*. ¹³. HM Revenue & Customs (2010) Landfill Tax Bulletin



- create an industry-owned research and information organisation to capture advances in technical and business practices and codify them into codes, standards and guidance
- continue to work with the Chartered Institution of Wastes Management (CIWM) and other relevant bodies to drive up standards of technical competence

END MARKETS

The economic viability of all waste and resource recovery technologies is dependent on sustainable demand for the outputs they produce.

Established markets are functioning for most materials currently recovered from UK waste streams including metals, paper, plastics and glass. The markets for these materials have become increasingly global. Many materials recovered in the UK are currently shipped abroad to meet demand from the large manufacturing sector in China and other emerging economies. This means that in the short-term, there is no guarantee that increased recovery rates will lead to the establishment of a large reprocessing and remanufacturing sector in the UK. Economic growth is however, likely to lead to higher levels of domestic consumption and greater quantities of post consumer waste being available in these countries. This may reduce international demand for UK recovered materials over the coming decade.

Beyond changes in the global market, intervention to stimulate a larger UK reprocessing sector can be justified on the basis of its contribution to improving energy and materials security, rebalancing the economy and the generation of exportable intellectual property.

Any intervention should address both supply and demand for materials.

On the supply side the key task is to meet market requirements for quality and performance of materials. The importance of collection and source separation is discussed elsewhere in this report. Other measures that could contribute to driving up the quality of recycled and recovered materials include:

- A rolling review of product standards to reduce the use of composite materials in key sectors e.g. plastic packaging
- Wider use of design codes requiring new housing and industrial developments to incorporate facilities for collection and source separation of waste, for example, ICE's Planning for resource sustainable communities: waste management and infrastructure – code of practice.¹⁴

Measures to stimulate demand for materials could include:

- Further work to incorporate minimum levels of recycled content into product standards
- Incorporating requirements to favour secondary and recycled materials into procurement codes and guidelines, building on work such as WRAP's 2009 guidance for construction projects¹⁵ and ICE's Demolition Protocol.¹⁶
- A Recycled Content Obligation, with tradable certificates, for major procurers of key material streams

POSSIBLE EVOLUTION OF WASTE INFRASTRUCTURE 2010-2050

2010-2020: Continued reduction in landfill, continued expansion of open windrow and in-vessel composting, systems in place to reach 60% recycling, mechanical and biological treatment (MBT), anaerobic digestion (food waste) incineration with energy recovery (other residual waste) including EfW with CHP at the centre of resource recovery parks.

2020-2030: Growth of community-scale decentralised EfW with CHP, small scale gasification and pyrolysis, integration of water and waste industry anaerobic digestion.

2030-2050: The circular economy is a reality and the waste industry has fully converted into a materials supply sector. Significantly lower quantities of residual waste lead to some infrastructure being decommissioned or converted to use other feedstocks. Fully developed gasification and pyrolysis and other technologies that provide fuel for transport and local residents.

¹⁴. Available at <http://www.ice.org.uk/Information-resources/Document-Library/Planning-for-resource-sustainable-communities-Was>, accessed 14 December 2010 ¹⁵. WRAP (2009) Construction Procurement Guidance Delivering higher recycled content in construction projects ¹⁶. Institution of Civil Engineers (2008) The Demolition Protocol 2008



During the recent economic downturn... Hampshire was able to successfully continue to sell its recyclable materials to these markets as a result of their quality.

HAMPSHIRE COUNTY COUNCIL

4. LOCAL GOVERNANCE AND DELIVERY

Local authorities are responsible for the collection and treatment of MSW and issue planning consent for all but the largest waste and resources infrastructure. They also have responsibilities in areas such as transport planning and local economic development that are central to the resource management agenda.

Local authorities also sit at the heart of their communities and can facilitate the development of a consensus on the future needs of their areas, a role which may be enhanced by the advent in England of Local Economic Partnerships.

When these roles are used effectively and authorities promote the benefits of resource management, the results are impressive. Local authorities can go well beyond the traditional waste disposal authority role and drive the creation of infrastructure networks that produce products that meet the demands of local and national markets.

However, there remain too many incentives for authorities to think narrowly in terms of “waste”. Even ostensibly resource management friendly policies, such as the setting of recycling targets, are often not ideal as they lead to increases in the quantity but not necessarily the quality of material recovered and recycled.

At the level of individual facilities, proposals often face sustained and well organised opposition, leading to a protracted and highly uncertain decision making process, which in turn make projects riskier and costlier.

ACTION IS NEEDED IN THREE AREAS:

BENEFIT TO COMMUNITIES

Local authorities have a vital role in engaging communities and promoting the benefits of resource management not least the fact that inactivity may lead to higher costs for Council Tax payers. But it is also important to improve the proposition they can put to the communities they serve. Councils should be fully empowered to negotiate with developers to deliver wide benefits to communities affected by facilities. An obvious example would be the provision of heat for community facilities such as swimming pools sited near CHP plants. Any mechanisms will need to be transparent, and clearly illustrate to the local community the benefits on offer. The Associate Parliamentary Sustainable Resource Group's recent research into community level action to overcome planning objections to new waste infrastructure¹⁷ provides a useful starting point for developing policy in this area.

CO-OPERATION BETWEEN LOCAL AUTHORITIES

There is a widely held perception that strategic and land use planning arrangements for waste and resource management are confusing, particularly in England. In two tier areas, county councils procuring reprocessing and recycling infrastructure are not necessarily able to define the collection regimes put in place by districts. There are also a range of strategic planning documents affecting waste and resource management infrastructure. This can be challenging for developers seeking to identify sites for new infrastructure and optimise its operation.

Local authorities also serve relatively small populations within bureaucratically defined boundaries. Each authority developing its own network of facilities makes little sense and leads to missed opportunities to realise economies of scale. Reinforcing the existing incentives and support for councils to develop partnerships and deliver efficiencies should be a priority in Defra's current review of English waste policy and any future waste strategy reviews across the UK.





QUALITY OF MATERIAL PROTOCOLS

Driving up the quality of recycled materials emerging from UK reprocessing infrastructure is central to achieving a sustainable shift to resource management. How materials are collected and sorted before they are sent for reprocessing is the single most important factor driving the quality of recycled and recovered materials. It also affects the viability of many reprocessing technologies.

A “one size fits all” approach to collection and sorting of materials is unlikely to be successful given the diversity in housing type, existing processing infrastructure and producers of waste across the UK. It is also important to avoid stifling innovation or undermining local ownership of solutions. Nevertheless, local and central government should work with all interested parties to produce a series of output-based protocols, designed to ensure that collection systems help drive up the quality of recycled materials. Research by WRAP on the benefits of different systems could form a starting point for this work.¹⁸

CASE STUDY: HNRI

The Hampshire Natural Resources Initiative (HNRI) has seen the County Council actively promote the concept of waste as a resource. This philosophy is encapsulated in a shared vision, with a series of recommended actions to manage waste across all sectors (domestic, commercial and industrial, construction and demolition, and hazardous waste). This approach involved a stakeholder-led community engagement process and supports intervention at each stage of the supply and consumption chain in the most efficient and effective way, rather than focusing purely on ‘end of pipe’ solutions.

◀◀ There is no evidence that there is a lack of demand for recyclates so long as the quality is sufficiently good.

FRIENDS OF THE EARTH

CASE STUDY: PROSIECT GWYRDD (PROJECT GREEN)

Five local authorities in south east Wales, Caerphilly, Cardiff, Monmouthshire, Newport and the Vale of Glamorgan have joined together to deliver a solution for their residual municipal waste – material left after recycling and composting has been maximised. This is the biggest partnership of its kind in Wales. The partnership will let a contract to deal with all non recyclable waste, with a new residual waste treatment plant coming on line in April 2016. The five authorities are committed to hitting the Welsh Assembly Government’s 70% recycling target but need a solution for the remaining 30% as landfill is no longer an option. All the solutions short listed are for EfW plants which will have to meet strict operational and environmental criteria. An estimated 160,000 tonnes of waste will require treatment every year, the project is slated to receive support of up to £9.2m per year over 25 years from the Welsh Assembly Government.

17. APSRG (2010) Waste management infrastructure – Incentivising community buy-in
18. WRAP (2008) Kerbside recycling – indicative costs and performance



Recycling aluminium reduces net greenhouse gas emissions compared to virgin production. However, the savings are international in nature since bauxite, the ore from which aluminium is extracted, is not mined in the UK.

WRAP

5. CARBON AND BEYOND

The shift to a circular economy must be achieved in the context of efforts to meet the UK's commitment to reduce CO₂ emissions by 80% by 2050. This means that deciding how we should measure and manage carbon and other environmental impacts is vital to developing a fit-for-purpose infrastructure network.

Emissions from waste and resource management are a small proportion of the UK total. In 2008, the industry was responsible for 22.7 million tonnes CO₂ equivalent of greenhouse gases (mtCO₂e). This compares to 220 mtCO₂e from energy supply and 132 mtCO₂e from transport.¹⁹

Emissions from this "narrow" waste sector have also been declining steeply, down 58% since 1990.²⁰ This is primarily due to a reduction in methane emissions from landfills, a decline that is likely to continue as methane continues to be captured and Landfill Tax and threats of fines for failing to divert MSW continue to drive the growth of alternatives.

However, the impact of the "wider" waste and resource sector is more significant. On the one hand, there are emissions related to waste collection, segregation, transport and treatment. On the other hand, recycling and reprocessing can deliver significant carbon savings,²¹ by reducing demand for virgin materials and fossil fuels and cutting emissions from extraction and manufacturing.

As an example, the Environmental Services Association reports that in 2008 its seven largest members were responsible for 8.8mtCO₂e but saved 5.3mtCO₂e through their material and energy recovery activities, resulting in net emissions of 3.5mtCO₂e.²²

This highlights the importance of designing carbon reduction policies that reward operators of waste and resources infrastructure for the carbon savings they help deliver elsewhere in the economy.

A single, simple carbon assessment system operating across the UK and ideally the EU would be of great benefit in the implementation of this lifecycle approach. The sector protocol created by France's *Entreprises pour l'Environnement* and/or the Environment Agency's WRATE (Waste and Resources Assessment Tool for the Environment) tool could form a basis for a common system. However, for any system three challenges will need to be overcome.

WHAT SHOULD BE MEASURED?

A system based around emitted CO₂ (or CO₂ emissions equivalent) would have the virtue of creating a single metric for measuring the impact of a wide range of activities. It would also allow waste and resources to be incorporated into the Carbon Reduction Commitment (CRC) and the EU emissions trading scheme (EU ETS). Finally, it is also relatively easy to monetise, providing policymakers with the option of steering markets through measures such as a carbon tax.

However, focusing solely on carbon may have unintended consequences and knock-on effects for the use of other resources.

In Wales this concern has been acknowledged in the Assembly Government's *Towards Zero Waste* strategy. It uses a broader ecological footprint measure based on the land required to produce energy and absorb pollution generated by supply and material chains.



The CompPod at Imperial College – a world first. An in-vessel composter which treats all of the College's food waste to deliver PAS 100 compost, used on site.

HOW EMISSIONS SHOULD BE ALLOCATED

Any system should account for both emissions created and saved by waste and resource management. This approach could be delivered by allowing the waste sector to issue carbon credits to manufacturers receiving recycled materials, with the credits based on carbon saved relative to virgin materials. Such a scheme would also provide an additional incentive for recycling and recovery over energy from waste.

GEOGRAPHICAL BOUNDARIES

The global market for materials presents a challenge for managing carbon or other measures of resource efficiency. A focus on national emissions will lead to perverse consequences. For example the UK's carbon "account" may benefit from incineration of plastics manufactured in other countries despite a greater overall carbon saving being available through recycling.

 The UK must adopt an industrial strategy which goes beyond carbon to address critical resource efficiency challenges in all areas of the economy... there will be a need for some form of physical accounting for the use of key resources on an economy wide basis.

ALDRSGATE GROUP

ENVIRONMENTAL BENEFITS OF RECYCLING

- Recycling glass saves 315kg CO₂ equivalent per tonne
- Recycling aluminium saves 9,000kg CO₂ equivalent per tonne

Source: WRAP (2006) Environmental Benefits of Recycling (updated 2010).



6. PLANNING AND DEVELOPMENT CONTROL

The process for securing planning approval for waste and resources infrastructure is widely seen as lengthy, costly and unpredictable, creating a significant barrier to delivering new infrastructure. Action is required in three areas:

NATIONALLY SIGNIFICANT INFRASTRUCTURE PROJECTS

The government's commitment to maintaining a fast-track system for Nationally Significant Infrastructure Projects (NSIPs) is welcome but currently will only affect a small number of larger EfW and hazardous waste projects. Given the strategic importance of the waste and resources network there is a strong case for putting more of it under the NSIP regime. This would also have the benefit of requiring Ministers to create a National Policy Statement (NPS) for waste and resources, setting out the national "need" for infrastructure. An NPS would provide much needed clarity for all concerned with the development of infrastructure.

UNCERTAINTY AROUND GOVERNANCE AND DECISION-MAKING PROCEDURES

The planned abolition of English Regional Spatial Strategies and the government's wider localism agenda has created uncertainty around future decision-making for waste and resources infrastructure that does not fall within the Nationally Significant category. The Decentralisation and Localism Bill published as this report went to press must create a system for projects that fall outside the NSIP framework that meets the commitment in the National Infrastructure Plan for a "transparent planning and consents regime which is able to respond quickly to the need for new infrastructure at both the national and the local level."





Image of Phase II of Runcorn EfW Plant, Cheshire, UK © Greater Manchester Waste Disposal Authority (GMWDA), INEOS ChlorVinyls and Viridor



“LARGER THAN LOCAL” PLANNING

The UK government has made it clear that as part of its policy of devolving power to localities, formal tiers of English regional government will be dismantled. This does not preclude local authorities, the emerging Local Economic Partnerships, and other interested groups voluntarily coming together to tackle issues at the “larger than local” level. Across urban England there are examples of pre-existing waste authorities covering several Local Authority areas. Greater Manchester Waste Disposal Authority (GMWDA) is one such partnership widely viewed as being highly successful.

A CIWM study on Lessons Learned from Europe²³ identified that an effective tier of sub-national governance was a common factor in countries that had successfully delivered large amounts of new waste and resources infrastructure. This sub-national role took several forms including:

- A sub-national body taking the role of identifying sites for strategic facilities
- An aggregation of local authorities determining the quantities of waste required to trigger the creation of new facilities – and then planning their delivery
- A national waste management council made up of representatives of national and local government creating a waste infrastructure plan by consensus

The “Duty to Co-Operate” included in the Decentralisation and Localism Bill should be used to drive this kind of activity.



23. SLR/CIWM (2005) Delivering Key Waste Management Infrastructure: Lessons Learned from Europe

THE STATE OF THE NATION: SUMMARY OF RECOMMENDATIONS

1. ACTIONS FOR CENTRAL GOVERNMENT AND WHERE APPROPRIATE DEVOLVED ADMINISTRATIONS:

AT THE STRATEGIC POLICY LEVEL:

- Use the English waste policy review, any future reviews of strategy in Wales, Scotland and Northern Ireland and the second edition of the National Infrastructure Plan expected in 2011 to set clear priorities and provide clarity on trade-offs between waste, energy and climate change policy
- Use the English waste policy review and any future reviews of strategy in Wales, Scotland and Northern Ireland to improve the integration of the management of MSW and C&I waste
- Use the second edition of the National Infrastructure Plan expected in 2011 to set out how central government will work with the Devolved Administrations in relation to the waste and resource management infrastructure network
- Infrastructure UK's commitment to improve the quality of data available on UK infrastructure should encompass waste tonnages and the capacity and location of existing facilities
- Stimulate new thinking on the financing of waste and resources infrastructure
- Bring together activity spread across Defra, DECC, CLG and the Environment Agency into a single Office for Resource Management (ORM). This body should:
 - a) create a timeline of actions (e.g. legislation, regulatory reform, planning reform) to facilitate infrastructure delivery and report regularly on progress
 - b) liaise with the Devolved Administrations on UK wide issues

IN RELATION TO PLANNING AND DEVELOPMENT CONTROL:

- Consider placing more waste and resources infrastructure under the regime for Nationally Significant Infrastructure Projects
- Create a National Policy Statement setting out "need" for waste and resources infrastructure
- Acknowledge the role of "larger than local" planning in the delivery of new waste and resources infrastructure and use the planned "duty to co-operate" to encourage groups of local authorities to lead in this area
- Use the Localism and Decentralisation Bill to end the uncertainty around governance and decision making procedures for non nationally significant infrastructure

TO SUPPORT TECHNOLOGICAL DEVELOPMENT:

- Use some Landfill Tax receipts (total 2009-10 £842 million²⁴) to help capitalise the proposed Green Investment Bank (GIB) on the understanding that the GIB will support new and emerging low carbon technologies in the sector
- Ensure that the funding strategies of the Engineering and Physical Sciences Research Council and the Technology Strategy Board continue to support research into waste and resources technologies

TO SUPPORT COMBINED HEAT AND POWER:

- Use the forthcoming National Planning Framework and other planning mechanisms to ensure that planning authorities are encouraged to facilitate the siting of energy from waste infrastructure near large users of heat and vice versa

IN RELATION TO CLIMATE CHANGE MITIGATION:

- Ensure that carbon reduction policies reward operators of waste and resources infrastructure for the carbon savings they facilitate elsewhere in the economy

TO STIMULATE A UK RECOVERY AND REPROCESSING SECTOR:

- Encourage voluntary agreements with manufacturers to incorporate minimum levels of recycled content into products
- Consider incorporating requirements to favour recycled and recovered materials into public sector procurement codes
- Examine the viability of a Recycled Content Obligation for some categories of products

2. ACTIONS FOR LOCAL GOVERNMENT:

- Work with business and the wider community to identify local demand for materials and build support for waste and resource infrastructure that can produce products to meet that demand
- Co-operate with neighbouring authorities to improve the integration of collection, treatment and reprocessing infrastructure, realise economies of scale and reduce overheads

LOCAL AUTHORITIES SHOULD ALSO:

- Be fully empowered to negotiate with developers to secure significant benefits to communities affected by major new infrastructure
- Lead the development of material quality protocols for waste collection and sorting systems

3. ACTIONS FOR INDUSTRY:

- Establish an industry-funded and owned research and information organisation to capture advances in technical and business practices and codify them into codes, standards and guidance
- Create sector-wide voluntary agreements to reduce waste through product standards and specifications
- Continue to work with the Chartered Institution of Wastes Management (CIWM) and other relevant bodies to drive up standards of technical competence in the sector

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ACRONYMS USED IN THIS REPORT:

APSRG: Associate Parliamentary Sustainable Resource Group, **C&D:** Construction and Demolition, **CHP:** Combined Heat and Power, **C&I:** Commercial and Industrial, **CIWM:** Chartered Institution of Wastes Management, **CLG:** Communities and Local Government, **CO₂:** Carbon Dioxide, **CRC:** Carbon Reduction Commitment, **DECC:** Department for Energy and Climate Change, **Defra:** Department for Environment, Food and Rural Affairs, **EFW:** Energy from Waste, **EU ETS:** European Union Emissions Trading Scheme, **GIB:** Green Investment Bank, **GMWDA:** Greater Manchester Waste Disposal Authority, **HNRI:** Hampshire Natural Resources Initiative, **MSW:** Municipal Solid Waste, **NIP:** National Infrastructure Plan, **NPS:** National Policy Statement, **NSIP:** Nationally Significant Infrastructure Project, **OND:** Office for Nuclear Development, **ORM:** Office for Resource Management, **PFI:** Private Finance Initiative, **RAB:** Regulatory Asset Base, **RHI:** Renewable Heat Incentive, **WRAP:** Waste and Resources Action Programme.

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