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Energy from Waste: Policy Context and Future Prospects

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Introduction

In this presentation, I will describe the policy context surrounding the development of energy from waste (EfW) facilities.

I will also describe recent trends in waste growth and the management of residual waste and I will put these in the context of existing and potential EfW capacity in England.

Definitions and Acronyms

The following definitions and acronyms are relevant;

1. Residual waste = waste remaining after recycling;
2. EfW = Energy from Waste;
3. MSW = municipal waste;
4. C&IW = commercial and industrial waste;
5. AD = anaerobic digestion
6. MBT = mechanical and biological treatment;
7. RDF = refuse derived fuel;
8. CV = calorific value;
9. rWFD = revised Waste Framework Directive

Policy Context- Waste Policy Review 2011

The Government Review of Waste Policy in England, published in June 2011, flags up;

- That waste is a finite and diminishing resource;
- Qualified support for EfW;
- Considerable support for AD for food waste (above EfW);
- Potential landfill bans eg wood;
- The importance of the waste hierarchy

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Government Review
of Waste Policy in
England 2011



Policy Context- Waste Policy Review 2011

The Government's stated aim, in the 2011 Waste Review, is to decouple waste generation from economic growth and to move to a “zero-waste” economy.

The Review emphasises the need for a “*vibrant re-use and recycling sector*” and states that the Government’s aim is “*to get the most energy out of residual waste rather than to get the most waste into energy recovery*”.

The government pledges, in the Review, to support the role of energy recovery and to publish a guide on EfW to help decision makers.

Policy Context- Recycling & Recovery

The Waste Policy Review 2011 states that “*it is **clearly wrong** that we send so much material to landfill that is a potential resource*” and Caroline Spelman has talked of the objective of becoming a “zero waste to landfill society”.

In this context, the government re-affirmed the target of recycling 50% of MSW arisings by 2020 and has assumed that 60% of mixed C&IW arisings will be recycled at that stage.

Current recycling levels are 41% and 48% for MSW and C&IW respectively.

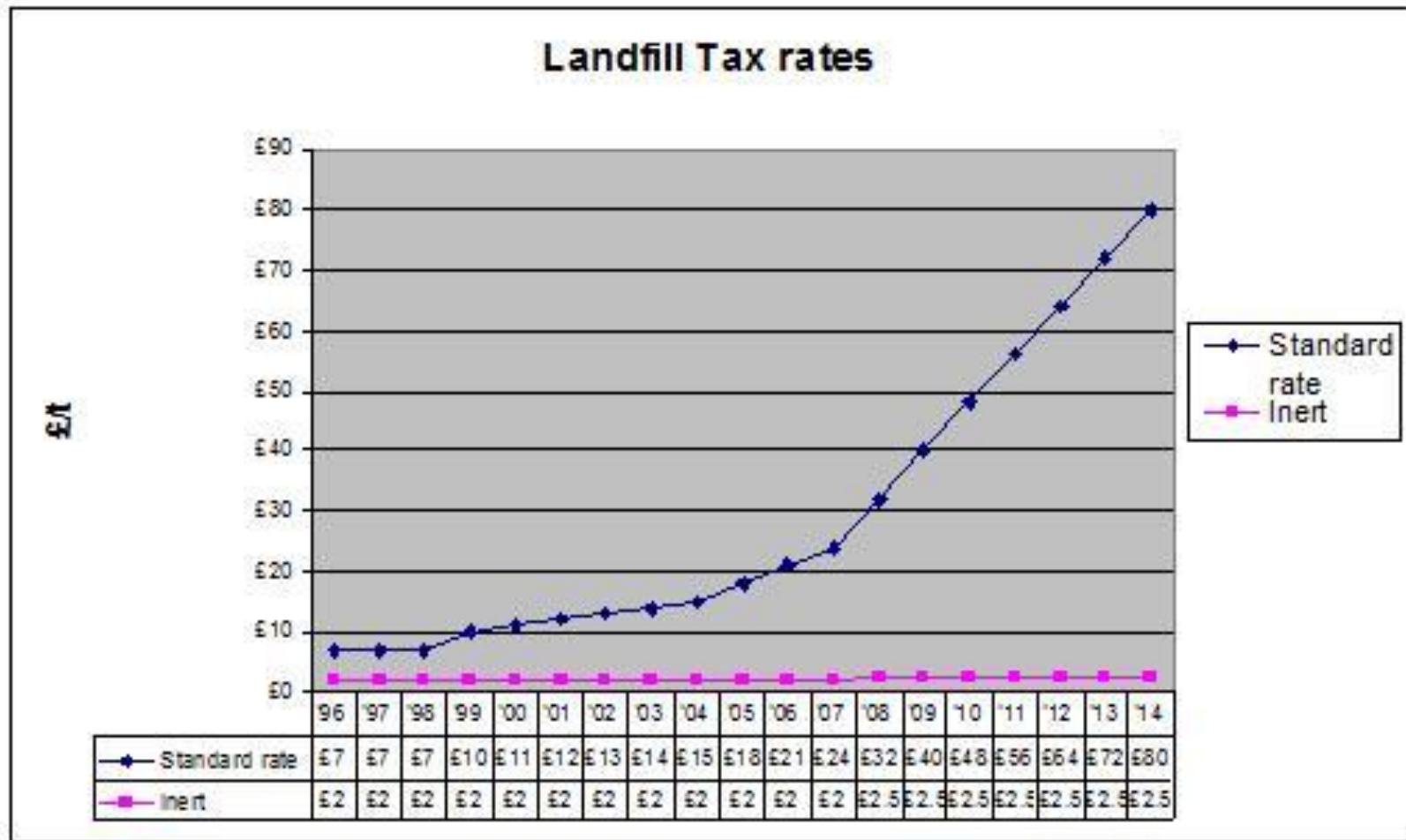
Policy Context- Fiscal Stimulii

The Waste Review 2011 indicates that the government intends to abolish the landfill allowance trading system (LATS) which gave local authorities a reducing allowance of biodegradable MSW that could be landfilled in order to meet the UK's EU Landfill Directive targets.

The government now recognises that Landfill Tax, which will reach £80/tonne in 2014, is the main driver of LA behaviour.

The House of Commons Environment, Food & Rural Affairs Committee has recommended that the landfill tax escalator should be extended until at least 2020.

Policy Context- Fiscal Stimulii



Policy Context- Renewable Energy Policy



National Policy Statement
for Renewable Energy
Infrastructure (EN-3)

Planning for new energy infrastructure

July 2011

The National Policy Statement for Energy (NPS, EN-1), June 2011, indicates a presumption in favour of large scale energy projects.

NPS EN-3 recognises waste as a source of renewable energy.

NPSs are also to be treated as material considerations in small scale (<50MWe) applications.

Policy Context- Overall Summary

The government appears to be committed to reducing the amount of waste that is being landfilled and has signalled its intent to use Landfill Tax as the key tool to achieve this end.

There appears to be strong policy support to the use of waste as a renewable resource in order to help the UK meet its renewable energy targets in the EU Renewable Energy Directive.

However, waste is a “*finite and diminishing resource*” and it is necessary to ensure that the waste hierarchy is not compromised. This means that energy recovery capacity has to be matched to realistic availability.

Local Politics

Despite what could be seen as a supportive policy context, not all residual waste will be treated in EfW facilities.

While some authorities have chosen and developed EfW as a treatment option (eg Nottingham, Hampshire and Kent), others (eg Cambridgeshire, Manchester and many of the London authorities) have opted for MBT technology.

MBT splits waste into recyclables, an organic fraction for AD treatment and a non-recyclable fraction, of about 50% of inputs, referred to RDF, which has to be combusted at WID compliant EfW facilities or to be landfilled.

The Impact of MBT on EfW Deployment

In the first 5 months of 2011, the EA has granted export licences to allow over 700,000 tonnes of RDF to be exported to EfW facilities and suitably permitted cement kilns in Europe.



In the UK, an RDF fueled CHP facility is being developed by INEOS in Runcorn and EoN has recently received planning permission to develop a CHP facility at Kemsley Paper Mill in Kent.

The Cost of Alternative Options

WRAP carries out an annual gate fees survey for waste treatment recovery and disposal options. The Spring 2011 survey suggests the following median gate prices;

- MRF - £15/t
- Landfill - £20/t + £56/t tax;
- AD/IVC -£43/tonne;
- MBT - £84/tonne; and
- EfW - £73/tonne


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a world without waste

Gate Fees Report, 2011
Comparing the cost of alternative
waste treatment options

Introduction

WRAP's fourth annual Gate Fees Report presents a summary of gate fees for a range of waste treatment, recovery and disposal options. The indicative gate fees reported here are based on survey information from local authorities, MRF operators, compost facility operators, waste management companies (WMCs) and other market intelligence.

The aim of this report is to disseminate information on gate fees, thereby increasing price transparency and, through improving the flow of information, enhancing the efficiency with which the waste management market operates. Providing local authorities with this market information will assist them in making informed decisions regarding waste treatment and disposal.

This survey of facilities and local authorities covers England, Scotland, Wales and Northern Ireland. Local authorities and waste management companies were contacted during December 2010 and January 2011.



Landfill site

Summary information on gate fees

Treatment	Grade / material / type of facility	Median ¹	Range ²
MRF	All	£15	-£36 to £85
	Contracts starting in 2010 or later	£4	-£30 to £63
Organics	Open-air windrow (OAW)	£24	£6 to £51
	In-vessel (IV), food & garden waste	£43	£29 to £82
	Anaerobic digestion (AD)	£43	£36 to £84
Landfill	Gate fee only	£20	£12 to £35
	Gate fee plus Landfill Tax ³	£76	£68 to £111
EfW⁴	Pre 2000 facilities ⁵	£54	£35 to £79
	Post 2000 facilities ⁵	£73	£54 to £97
MBT		£84	£57 to £100

¹ UK wide figures, regional estimates appear elsewhere in the report

² At the time of the survey the standard rate of landfill tax was £48 per tonne, it increased to £56 per tonne on 1 April 2011.

³ Incineration with energy recovery

⁴ Information from local authorities in the survey

⁵ Includes survey information from local authorities and information from Delta on planned LSW facilities in procurement through PFFVDF1.

Current EfW Capacity

Environment Agency statistics show that, in 2010, total permitted capacity at operational thermal waste treatment facilities in England was 9 Mtpa, of which 5 Mtpa was for MSW/C&IW.

Facility Type	Capacity/ktpa	Inputs 2010/kt
Animal By-Product	1,258	827
Clinical	215	120
Co-Incineration of Hazardous Waste	814	235
Co-Incineration of Non Hazardous Waste	1,172	399
Hazardous	210	139
Municipal and/or Industrial & Commercial*	4,960	4,028
Sewage Sludge	333	183
Totals	8,961	5,930

Future Trends in EfW Capacity

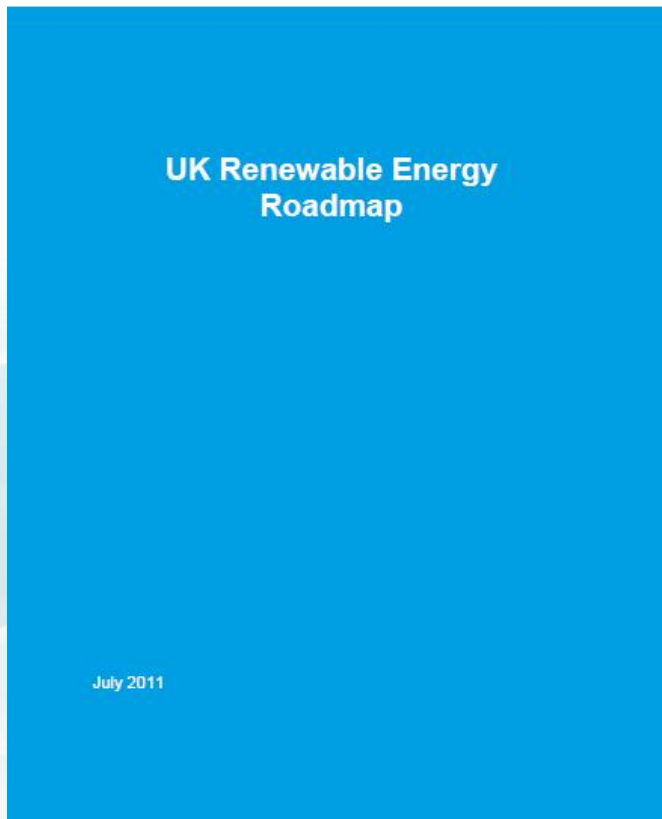
Government Review
of Waste Policy in
England 2011

The Government Review of Waste Policy in England, June 2011, indicates that *“waste derived renewable electricity from thermal combustion in England is calculated to grow from the current 1.2TWh to between 3.1TWh and 3.6TWh by 2020”*.

In effect this would be a trebling of the amount of waste from which energy is recovered by combustion, ie to c 13-14 Mtpa, an additional 8 or 9 Mtpa.



Future Trends in EfW Capacity

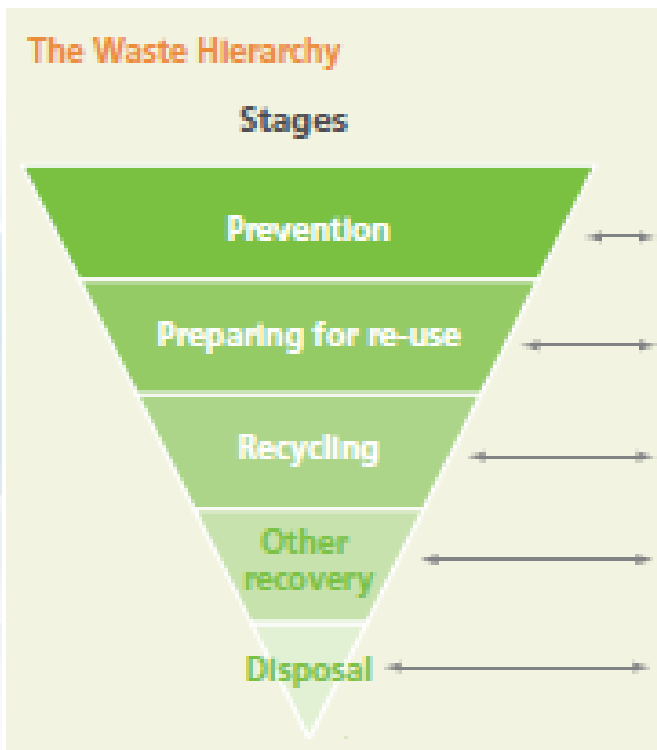


The UK Renewable Energy Roadmap, July 2011, indicates that the “pipeline” for energy from waste projects is about 0.9GW.

Assuming a typical CV of residual waste of about 9MJ/kg, this can be translated into an EfW pipeline, in the UK, with capacity of c 11.5 Mtpa.

Limits on Recovery Capacity- what we landfill at present.

The revised Waste Framework Directive (WFD) re-emphasises the importance of the waste hierarchy and this is reflected in the Waste (E&W) Regulations 2011.



Incineration with R1 efficiency of >0.65 is regarded as recovery, as is AD.

The crucial issue is that it is only waste that is being landfilled which represents a potential feedstock for new EfW facilities.

How Much Waste is There? Data Sources

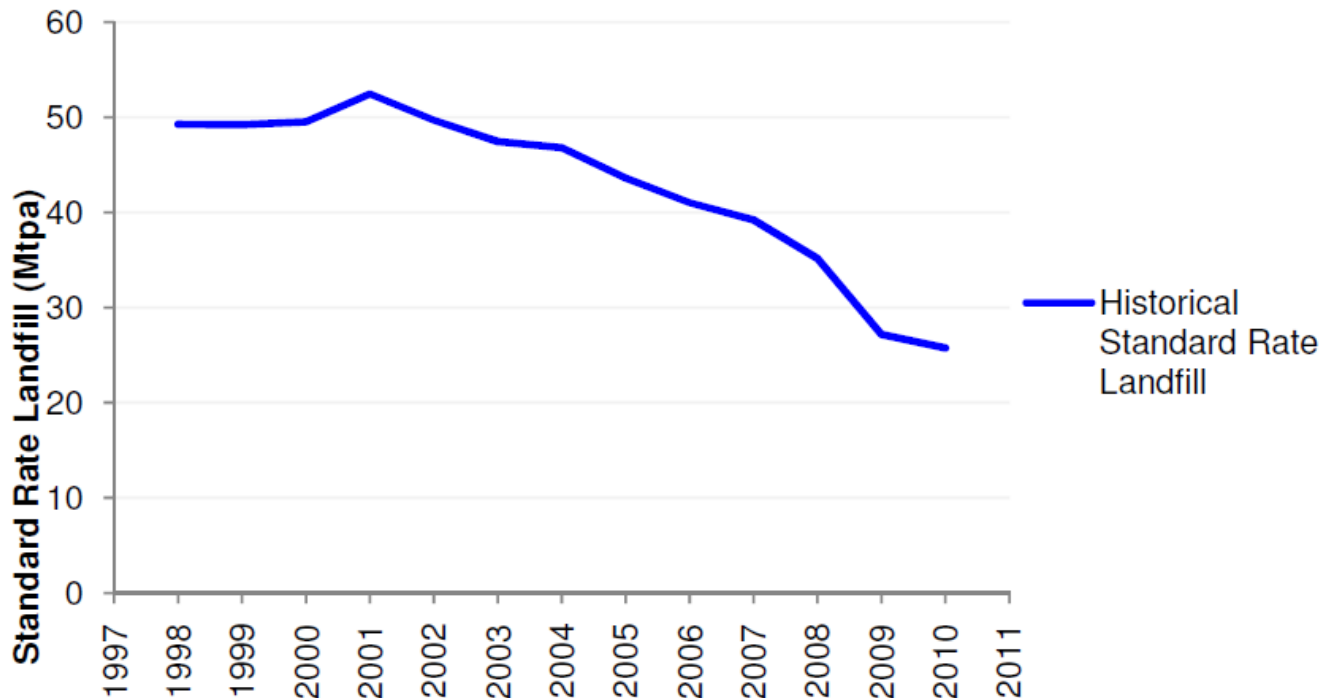
There are a variety of data sources on how much waste is being landfilled in the UK and the trends in that activity.

There are several reliable sources of information:

- HMRC (from Landfill Tax data);
- Defra (MSW statistics and C&IW surveys); and
- EA (landfill returns data from operators)

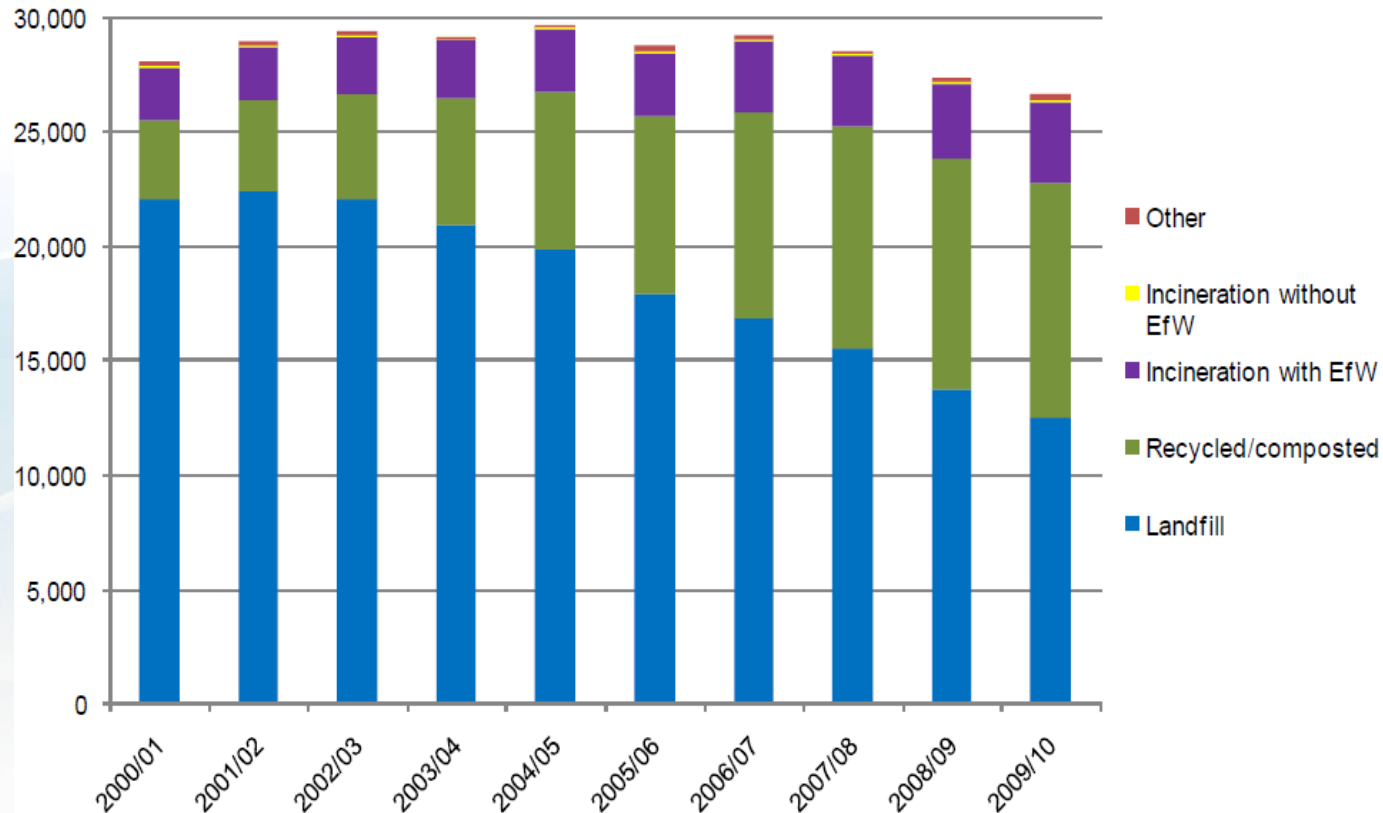
What we landfill at present- Landfill Tax Data

HMRC data show a steady decline in the amount of active waste that has been landfilled in the UK to 25.7 Mt in 2010. This will include hazardous wastes & wastes unsuitable for energy recovery.



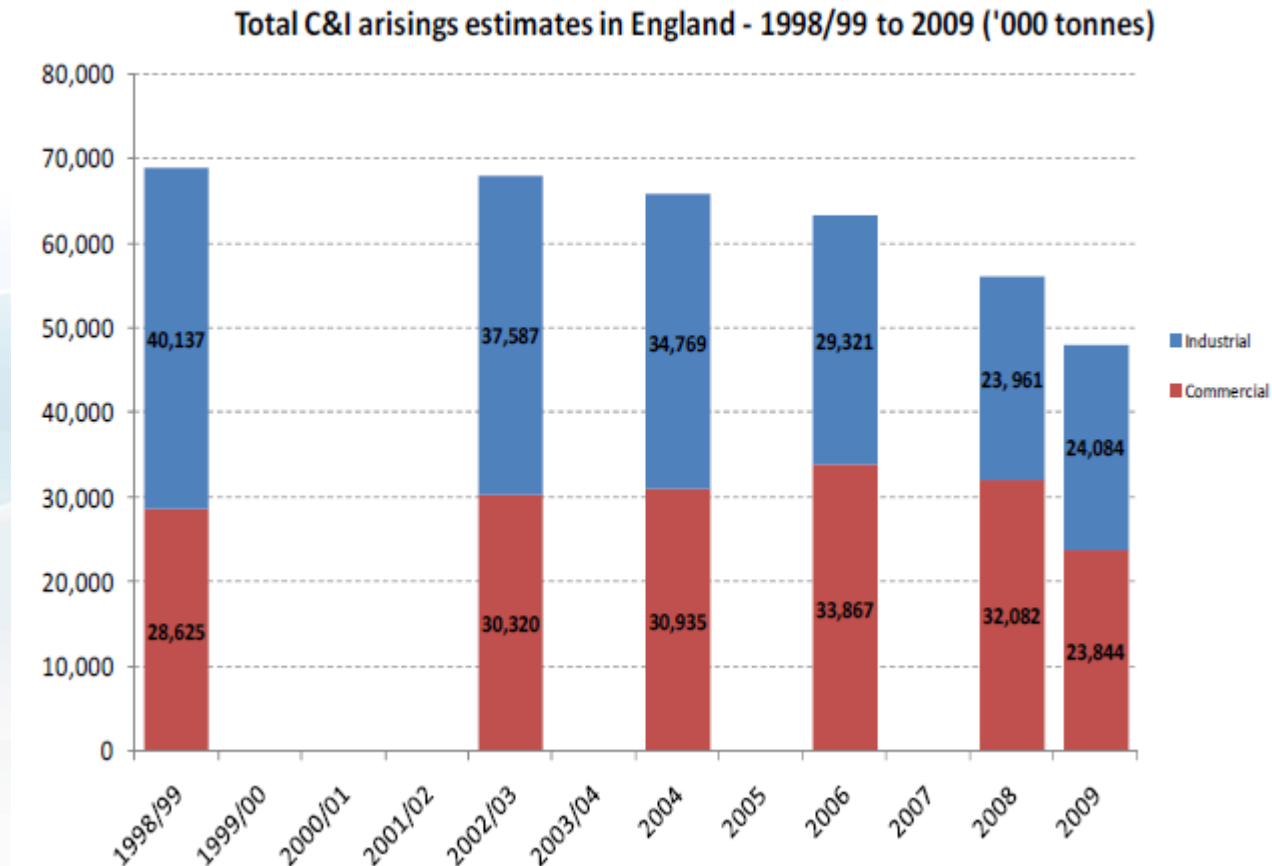
What we landfill at present- Defra Data on MSW

Defra data show a steady decline in the amount of MSW that has been landfilled in England to 12.5 Mt in 2009/10, down from 22.4 Mt in 2001/02.



What we landfill at present- Defra Data on C&IW

Defra data show a steady decline in C&IW arisings but the amount of C&IW landfilled is less well understood.



Defra Data on C&IW Arisings & Management

JACOBS



Commercial and Industrial Waste Survey 2009
Final Report
May 2011



The May 2011 Defra report on C&IW indicated that the amount of C&IW in England;

- dropped from 68 Mtpa to 48 Mtpa between 2002/3 and 2009;
- produced by industry and commerce was equal;
- landfilled dropped from 27.8 Mt to 11.3 Mt between 2002/3 and 2009.

What we landfill at present- EA Data

The Environment Agency aggregates data on landfill inputs in England and Wales. This suggests that C&IW inputs to merchant sites in England in 2010 were 11.7 Mt and 13.5 Mt in total.

EA Data for English Landfills/ '000 t

	Merchant Sites		Restricted sites		Total
	Non-haz	Haz	Non-haz	Haz	
2006	33,798	298	2,199	9	36,304
2007	32,939	315	1,951	19	35,223
2008	29,524	280	2,161	26	31,991
2009	24,865	252	2,051	88	27,255
2010	23,266	172	1,515	42	24,995

Availability of Residual Waste for Energy Recovery

This analysis suggests that the 23.2 Mt of residual MSW and C&IW that was landfilled in 2010 could be used as a starting point to determine the future availability of waste which could be the feedstock for EfW facilities.

However, feedstock availability will be determined by;

1. The composition of the residual waste being landfilled;
2. Changes in the amounts of waste being generated; and
3. The effect of improved recycling and the use of other waste treatment methods

Composition of Residual Waste being Landfilled

The composition of residual MSW is well understood but that of the residual C&IW that is being landfilled is not.

However, Defra's 2009 C&IW Survey indicates that C&IW being landfilled is dominated by mixed waste (58%) and mineral waste (36%), as follows (in kt);

Animal & Vegetable Wastes	Chemical Wastes	Common Sludges	Discarded Equipment	Healthcare Wastes	Metallic Wastes	Mineral Wastes	Mixed Wastes	Non Metallic Wastes	Total C&I Waste
83	369	13	3	61	4	4,007	6,549	170	11,259
0.7%	3.3%	0.1%	0.0%	0.5%	0.0%	35.6%	58.2%	1.5%	100.0%

Changes in Waste Arisings- Defra's Latest Forecast

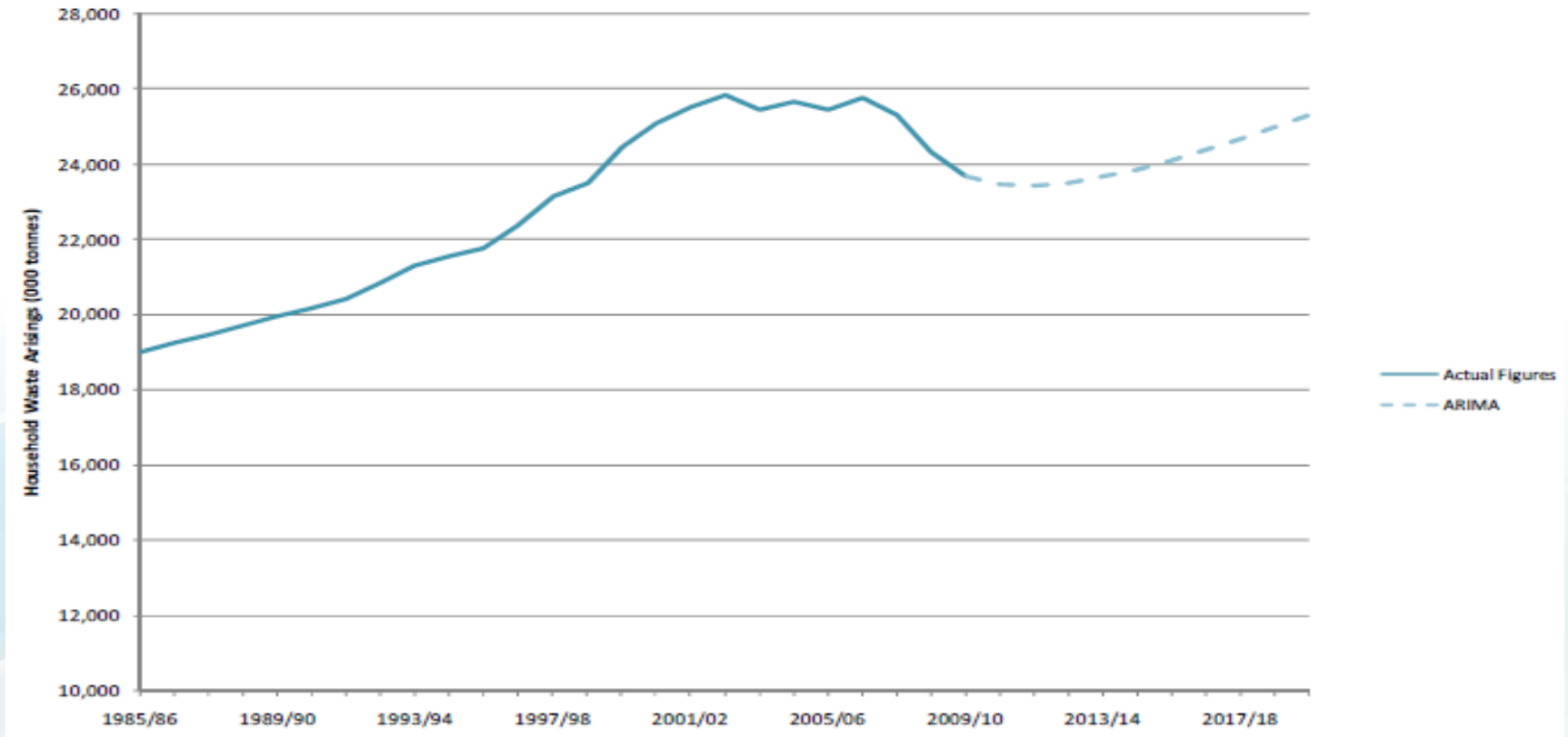


Defra has recently presented a review of the Economics of Waste and Waste Policy (June 2011).

This forecasts that MSW arisings may rise slowly with increased population and that C&IW arisings will remain static going forward despite continued GDP growth.

MSW Arisings- Defra's Latest Forecast

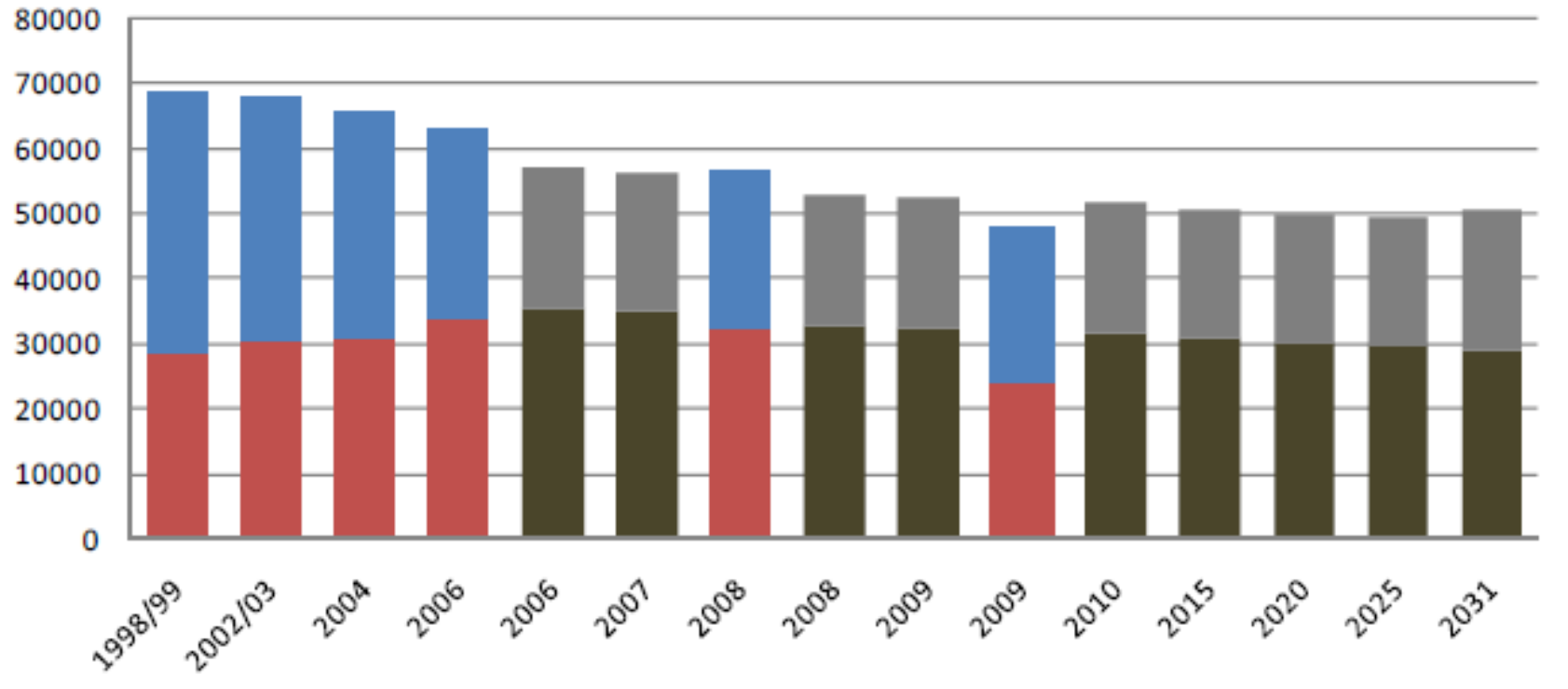
Household Waste Arisings Projections



Defra is projecting a gradual increase in MSW arisings over the remainder of this decade.

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C&IW Arisings- Defra's Latest Forecast



Defra is projecting that there will be no significant change in C&IW arisings over the next two decades.

Conclusions

1. There is strong policy backing and fiscal stimulus to divert waste from landfill to energy recovery where $R1 > 0.65$;
2. Local political considerations sometimes favour the development of MBT facilities that reduce, but do not do away with, the demand for EfW facilities;
3. MSW and C&IW arisings have been reducing & residual waste landfilling has halved in 10 years but 23 Mt of MSW and C&IW was landfilled at merchant sites in 2010;
4. Although government forecasts expect MSW & C&IW arisings to stabilise, increased recycling could reduce the amount of residual waste available for energy recovery; and
5. Government forecasts of a trebling of energy recovery from waste, by combustion, appear credible.

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