Qualitative research into drivers of diversion from landfill and innovation in the waste management industry

DATABUILD

Research & Solutions

DATABUILD
Research & Solutions

Qualitative research into drivers of diversion from landfill and innovation in the waste management industry

HM Revenue & Customs research report 316

Project Director: Charles Michaelis

Report Author: Adrian Talbot

Project Team: Karl King
Alison Radevsky
Chris Rainsford
Max Smith

Date: April 2014

Databuild Ltd 21 Graham Street Birmingham B1 3JR
tel 0121 687 1144 fax 0121 687 1155
email research@data-build.co.uk www.data-build.co.uk

Disclaimer

The views in this report are the authors' own and do not necessarily reflect those of HM Revenue & Customs.

Published by HM Revenue and Customs, June 2014
www.hmrc.gov.uk

Contents

DISCLAIMER **1**

CONTENTS **2**

ACKNOWLEDGEMENTS **3**

GLOSSARY **4**

EXECUTIVE SUMMARY **6**

1 INTRODUCTION **10**

1.1 Background and objectives 10
1.2 The landfill tax 10
1.3 Summary of approach 12
1.4 Limitations 13
1.5 This report 14

2 THE CURRENT STATE OF THE WASTE MANAGEMENT INDUSTRY **15**

3 DECISION MAKING AND THE ROLE OF THE LANDFILL TAX **18**

3.1 Factors influencing decision making 18
3.2 The role of the landfill tax 21
3.3 Whether the landfill tax supported the waste hierarchy 24
3.4 Who pays the tax and how costs are calculated 26
3.5 Prices charged for disposing of waste through alternatives to landfill 27
3.6 Exports 28
3.7 Other impacts of the landfill tax 29

4 DRIVERS OF INNOVATION AND INVESTMENT **31**

4.1 Importance of the landfill tax in driving investment and innovation 31
4.2 External investment within the industry 34
4.3 Evidence of job creation 35

5 FUTURE STRATEGIC CONSIDERATIONS **37**

5.1 An evolving industry 37
5.2 Challenges for the industry 37
5.3 The importance of certainty about landfill tax charges and the standard rate escalator 40

6 CONCLUSIONS **42**

APPENDIX ONE – HMRC RESEARCH QUESTIONS **45**

APPENDIX TWO – METHODOLOGY SUMMARY **47**

APPENDIX THREE – TOPIC GUIDES **51**

Master topic guide 51
Topic guide for discussions with investors in the UK waste management industry 55

APPENDIX FOUR – DOCUMENTS REVIEWED DURING PHASE ONE OF RESEARCH **58**

Acknowledgements

We would like to acknowledge the input of several people who helped with the delivery of this research. The support and assistance from Wendy Rogers and Corinne Wilkins from HMRC throughout the project was invaluable. Input from Chris Simons at HMRC and James Knipe from HMT helped shape the approach to ensure that the research would address their research questions and provide the depth of information they needed in the reporting process. We would also like to pay thanks to the Waste and Resources Action Programme (WRAP) for whom we have conducted research assignments and who kindly provided permission to refer to any findings of relevance to HMRC's research objectives within this study.

Glossary

C&I	Commercial and Industrial (waste) - controlled waste arising from the business and industrial sectors. This includes but is not limited to waste generated by shops, offices, catering establishments, factories and industrial plants. Due to the range of organisations producing this waste, its content can display a high degree of variability.
EfW	Energy-from-Waste - the process of generating energy in the form of electricity and/or heat from the combustion of waste. Traditionally conventional incineration has been employed, but more recent processes include the use of advanced conversion technologies (ACT) such as pyrolysis, gasification and plasma gasification.
HWRC	A Household Waste Recycling Centre (HWRC) is a facility run by the local authority where the public can dispose of household waste and which typically contains recycling points for a variety of materials – including metals, glass, plastics and paper. The materials offered for recycling are dependent on whether there is a recycling route for that material at local level.
FiT	The Feed-in-Tariff scheme (FiTs) is an environmental programme introduced by the government to promote the use of small-scale renewable and low-carbon electricity generation technologies. If a householder, community or business has an eligible technology, FiTs pay them a tariff for the electricity they generate and a tariff for the electricity they export back to the grid.
FiT CfD	Feed-in-Tariffs with Contracts for Difference are a new instrument that will replace the existing renewables obligation and will act by guaranteeing a fixed 'strike' price for generators supplying energy. The generators will then sell some energy to suppliers. The instrument will guarantee generators a stable premium over a 15 – 20 year timeframe.
LATS	The Landfill Allowances and Trading Scheme (run to the end of the 2012/13 financial year) set a limit on the amount of biodegradable municipal waste (BMW) that each unitary and waste disposal authority in England can send to landfill. Landfill allowances were tradable between authorities.
Landfill Communities Fund	Formerly the landfill tax credit scheme, this is a Government fund allowing landfill operators and environmental bodies to work in partnership to undertake projects which improve the lives of people in communities living near landfill sites, creating environmental benefits and job creation.
Landfill directive	The Landfill directive (99/31/EC) categorised landfill into three main classes; landfills for hazardous waste, landfills for non-hazardous waste and landfills for inert waste and introduced acceptance criteria for the waste received. The Directive furthermore laid down stands on the design, operation, pollution control closure and aftercare for existing and new sites. The Directive banned the landfilling of certain wastes, e.g. liquid waste, flammable wastes, healthcare and clinical waste and most used tyres.

MBT	A Mechanical Biological Treatment facility incorporates a sorting facility alongside a form of biological treatment, such as composting or anaerobic digestion. MBT plants produce various outputs, such as recyclates and compost-like outputs.
MRF	Materials Recovery Facility - A clean MRF accepts recyclable commingled materials that have already been source separated from waste generated. - A dirty MRF accepts a mixed waste stream and then separates out recyclable materials through a combination of manual and mechanical sorting
MSW	Municipal Solid Waste – the waste stream consisting of everyday general waste produced by the public.
PFI	The Private Finance Initiative is a method of creating "public–private partnerships" (PPPs) by funding public infrastructure projects with private capital.
PRN	A Packaging Recovery Note is a certificate to prove that one tonne of packaging waste in a certain material has been recycled.
PERN	A Packaging Export Recovery Note can be issued by an accredited exporter for each tonne of waste packaging material that has been exported overseas.
RDF	Refuse Derived Fuel is made from domestic waste and has a lower calorific value than solid recovered fuel (SRF) due to the fact it can contain moisture in biodegradable material. Refuse derived fuel is used as fuel in combined heat and power facilities and due to the processing involved can be more stable in composition than using untreated waste.
RO	The Renewables Obligation is designed to encourage generation of electricity from renewable sources. The obligation places a duty on licensed electricity suppliers to source an increasing proportion of electricity from renewable sources.
ROC	Renewables Obligation Certificates are green certificates issued to operators of accredited renewable generating stations for the eligible renewable electricity they generate. Operators can trade ROCs with other parties. ROCs are ultimately used by suppliers to demonstrate that they have met their obligation.
SRF	Solid Recovered Fuel is a higher quality than RDF and can be an alternative to fossil fuel. A low moisture content means a higher calorific value and makes this type of fuel suitable for use in cement kilns.
Waste arisings	Total volumes of waste produced.
Waste hierarchy	A hierarchy of options for managing wastes. Prevention, which offers the best outcomes for the environment, is at the top of the hierarchy, followed by preparing for re-use, recycling, other recovery and disposal, in descending order of environmental preference.
WEEE	Waste Electrical or Electronic Equipment. The WEEE regulations, which mean producers have to pay for the collection, treatment and recovery of waste electrical equipment, are designed to ensure that WEEE does not go to landfill. They are an example of a *material specific regulation*.

Executive summary

The UK landfill tax was introduced in 1996 with a standard rate of £7 per tonne for active wastes and a lower rate for less polluting or inactive wastes, set at £2 per tonne. In the 2007 Budget the then Chancellor announced the present standard rate escalator period would start in April 2008. Under this escalator, between 2008 and 2014 the standard rate increased by £8 per tonne per year.

In October 2013, Databuild was commissioned by HMRC to conduct qualitative research to explore the drivers of behaviour change and innovation in the waste management industry, and the role of the landfill tax in this. The research comprised 65 qualitative interviews with representatives from the waste management sector including waste management and skip hire companies, operators of specific types of facility e.g. Material Recovery Facilities (MRFs) and energy recovery plants, recyclers and reprocessors, landfill site operators and external investors in the industry. This report details the findings and conclusions of the research, which was conducted during November and December 2013.

Findings from the interviews across the key research questions of interest to HMRC are as follows:

The current 'state of play' of the waste management industry in the UK

- Respondents reported that the landfill tax has been a key influencing factor on the waste management industry in the UK and has been a driver for the fall in demand for landfill and rise in demand for alternatives. Across the last decade, respondents feel there has been:
    - A decrease in overall waste arisings for both municipal solid waste (MSW) and commercial and industrial (C&I) wastes.
    - A noticeable fall in demand for landfill and an increase in demand for waste treatment options that enable material to be diverted from landfill.
    - A significant increase in the amount of waste that is diverted from landfill to alternative treatment methods

  In this respect the views of our respondents agree with findings from previous research by Defra[1].

- Many respondents reported that the increase in demand for alternative waste treatment options, coupled with new legislation, increasing competition and changing attitudes towards waste disposal had led to diversification of activity within the waste management sector.

- There was also evidence of the sector experiencing a period of consolidation, with respondents reporting that small operators were frequently being bought out by larger firms or ceasing their operations due to trading conditions.

- Operators were not universally positive about the success of the tax, a minority of operators explained they felt that they were unaffected by the tax, so couldn't comment (for example, those for which material specific

[1] Defra, Statistics on waste managed by local authorities in England 2012/13 & Defra, Survey of commercial and industrial waste arisings 2010, Final Results

regulations are the key driver, e.g. waste electrical or electronic equipment reprocessors). Some smaller operators did not seem as attuned with the policy climate and sometimes struggled to see the purpose of the tax. For some operators, such as those operating landfills, the tax had meant a loss in their trade, which may have contributed to negative opinions regarding the tax.

How decision making operates within the industry

- The tax was generally identified by all audience types as having a significant impact on their business' decision making and how their costs are managed. Operating costs, such as fuel for haulage, were also identified as important factors for consideration. Overall, balancing operating costs/budgets was considered to be the primary concerns for the industry.

- The balance of different waste management activities that commercial organisations offered was said to be shaped primarily by whether arrangements were profitable or not. This was reported to depend on factors such as the level of competition, treatment options available, distances from waste source to treatment and subsidies available.

- Local authorities reported seeking the most cost-effective treatment options for waste collection and disposal. Several local authorities explained that they had entered into long-term arrangements for alternative treatments to landfill including some contracts with providers ranging from ten to twenty-five years, which it was thought would shield the authority from any further rises in landfill tax during that time.

- Across all audiences environmental sustainability was an important factor influencing decision making, but usually finances were the primary consideration.

- As well as the landfill tax, other regulatory and legislative factors were mentioned as important influences on decision making in relation to waste; these included the range of regulations for specific materials and, for local authorities, the now closed Landfill Allowance and Trading Scheme (LATS).

The role of the landfill tax in the current environment

- Respondents confirmed the landfill tax, and the current standard rate escalator period which began in 2008, had significantly increased the cost of disposing waste to landfill. Respondents explained that the landfill tax had fundamentally shaped the markets for waste and waste businesses as a result.

- By increasing the cost of disposal, respondents reported that the tax had created an opportunity for return on investment by stimulating demand for alternative waste treatment solutions. Among our respondents there was variation between businesses who responded quickly to investment opportunities arising from the tax, and others who were slower to react. Respondents from several audiences (including small waste management companies) felt that they would have ceased trading had they not diversified into other treatment options.

- The tax was said to encourage diversion of waste to whichever waste treatment option was the next cheapest and not necessarily to the option providing the best environmental outcomes in terms of the waste hierarchy. A common view from respondents was that most diversion has been to energy

recovery and recycling, but market effects had meant that other options such as reuse had not benefited to the same degree.

- Respondents reported conflicting views of the current market. Some felt that a lack of UK treatment capacity and lack of competition meant that operators of alternatives could set their charges just under the cost of landfill without fear of being undercut. Other respondents in differing locations described an increasingly competitive market, including those operating niche product treatments, where operators need to be economically minded in their charging.

- Exports of processed waste were sometimes the cheapest option for a waste management company and were perceived by respondents to have been encouraged by the tax, though these were also said to be driven by what was perceived to be a short-term demand for feedstock from energy recovery capacity in continental Europe.

Drivers of innovation and investment in waste management

- The landfill tax was seen as a primary driver for investment. The opportunities for profit from offering alternative treatments had driven significant investment in the industry. The opportunities were said to have arisen as the standard rate landfill tax escalator increased meaning those operating alternative treatments were able to charge more. For some organisations the cost of the tax had made alternatives to landfill viable as profit opportunities, for others (particularly in areas where there was less competition) the tax had created opportunities for greater profit from existing alternatives.

- Investment had been observed right across the supply chain, from improvements in collections, sorting and segregation, through to investments in infrastructure including the construction of new energy recovery facilities and facilities that produce refuse-derived fuel.

- Respondents explained that because of potential profit opportunities in alternatives that were not yet market ready, there has also been an impact on research and development in the sector – for example, the tax had promoted research into ways to recycle traditionally ‘hard-to-treat’ materials such as carpet and particular types of plastic.

- Investors in the industry noted that the tax has created opportunities for profit in alternative treatments, but explained they needed to balance this with other factors, such as the length of time for which feedstock contracts could be secured and whether a technology or process was proven.

- Other factors were also reported to influence innovation and change, including desires to deliver environmentally sustainable treatment options, material specific regulations and the availability of financial subsidies. Most individuals across all audiences identified the tax as the primary driver.

- The scale of opportunity was said to have attracted investors who may not otherwise have invested in the waste management sector to do so. The certainty provided by the escalation of the standard rate of landfill tax over a set period had allowed investments to take place in advance of the price rise that would make these investments viable - i.e. the visibility provided by the escalator meant that some investments happened sooner than would otherwise be the case.

- Investors wanted to see long-term contracts to support their projects. Local authority contracts were said to be useful in encouraging investment, though some investors noted limited opportunities in the immediate future as most municipal waste was already tied into contracts. Local authority contracts can be up to 25 years, and some investors wanted to see 10-15 year contracts at the least to underpin investment. C&I contracts, which tend to be shorter periods than this, were not seen as being so useful to secure investment.

Future strategic considerations for the industry

- Respondents expected that over the coming years the industry would continue to change and evolve, including continued consolidation and a fall in the number of landfill sites operating.

- They identified that challenges remained for the industry, such as access to funding and to the skills required for the continued evolution of the industry away from landfill towards alternatives.

- Some feared that the length of time it takes to complete infrastructure projects would mean that if demand for refuse derived fuel (RDF) in Europe fell, material could again end up in landfill.

- The certainty of the standard rate escalator was important in highlighting the opportunities for return on investment in alternatives. Those we spoke to in the industry now consider that certainty over future of the landfill tax post 2013/14 is needed for investment in alternatives to continue at such significant rates.

1 Introduction

1.1 Background and objectives

HMRC provides analytical support in areas of policy interest to HM Treasury as part of its role within the policy partnership that drives the development and implementation of tax policy in the UK. Databuild were commissioned through competitive tender by HMRC to undertake qualitative research exploring the drivers of change and innovation in the waste management industry and the role of landfill tax, specifically:

1. What drives innovation and behavioural change in the waste management industry to increase the amount of waste diverted from UK landfill?
2. How does the landfill tax influence current industry behaviour and innovation, and how has it influenced past behaviour?
3. What might drive innovation in the future?

This project was specifically intended to provide qualitative research to supplement HMRC's quantitative data and existing knowledge about behaviour in the industry and the impact of the landfill tax. Within the context of the overall objectives, HMRC identified a number of research questions that they wanted the study to address. These are grouped into the following five key areas:

1. The current 'state of play' of the waste management industry in the UK
2. The role of the landfill tax in the current environment
3. How decision making operates within the industry
4. Drivers of innovation and investment in waste management
5. Future strategic considerations for the industry.

Detailed sub-questions of interest within each area are provided in appendix one of this report.

1.2 The landfill tax

The UK landfill tax was introduced in 1996 with a standard rate of £7 per tonne for active wastes and a lower rate for less polluting or inactive wastes, set at £2 per tonne. In the 2007 Budget the then Chancellor announced that the present standard rate escalator period would start in April 2008. Under this escalator (which was extended in 2010) between 2008 and 2014 the standard rate increased by £8 per tonne per year. This escalator period ended in April 2014 when the standard rate reached £80 per tonne. The Government announced in 2010 that the standard rate will not fall below £80 per tonne until at least 2019-20.

The lower rate, set at £2 per tonne when the tax was introduced, increased by 50 pence in 2009-10 to £2.50 and remains at that rate[2].

Budget 2014 announced that both rates of tax will increase in line with inflation (rounded to the nearest 5 pence) to £82.60 and £2.60 per tonne from April 2015. It also announced that both rates will not be eroded in real terms between 2015-16 and 2019-20. Our research and interviews pre-date these announcements.

[2] Online data maintained by HMRC

In addition to the landfill tax, other legislative instruments have been introduced to influence the behaviour of the waste management industry. For example, the Landfill Directive (99/31/EC) was introduced in the UK from 2002. This Directive had two principal objectives: (i) to prevent or reduce the adverse effects on the environment from the landfilling of waste by introducing stringent technical requirements for waste and landfill, and (ii) diverting biodegradable and recyclable wastes from landfill. With the exception of the diversion targets the Directive's requirements were incrementally introduced between 2002 and 2009.

1.3 Summary of approach

During November and December 2013, Databuild completed the following research to provide answers to the research questions:

Phase 1:

- A literature review of policy, social and academic research papers pertaining to the landfill tax and its impact on the waste management industry.
- Ten initial scoping interviews with trade associations, industry experts and academics.
- Methodology development for phase 2, including the sampling approach and topic guides for use in the interviews[3].

Phase 2:

- A main phase of qualitative telephone interviews with 65 respondents operating across the waste management industry supply chain.

Table 1 presents the actual breakdown of the types of organisation interviewed within phase 2 of the research.

Table 1 – Number of interviews conducted in phase 2 and breakdown by sub-segment of the waste management sector

Group[4]	Sub-segment / target respondent		No. interviews
Large waste management companies (top 20 by turnover)[5]	Senior decision maker with responsibility for overall strategic direction of the company		9
Private sector organisations outside the top 20	Waste management companies offering a range of waste management solutions	Senior decision maker with responsibility for overall strategic direction of the company	5
	Waste carriers / skip operators & transfer stations		5
	Landfill site operators		5
	Incineration providers		5
	Materials Recovery Facilities		5
	Recycling/reprocessing companies		15
Local authorities	Unitary Authorities	Senior decision maker with responsibility for waste planning	4
	Waste Disposal Authorities		3
	Waste Collection Authorities		3
Investors	Interviews with senior individuals involved in making external investments in the waste management industry		6
		Total	**65 interviews[6]**

[3] The topic guides used in this research can be found in Appendix three of this report.
[4] It is important to note that divisions between the types of waste operators were known to be not as clear cut as the grouping shown in table 1 – for example, we typically interviewed what we understood was a particular type of operator to find they were also offering other types of services. The research suggested that the industry has been undergoing diversification meaning that companies may be starting to offer a range of other types of services than they would traditionally have done. The interview numbers in table 1 were used to ensure that we spoke to a minimum number of people offering particular types of services.
[5] This included five of the six largest UK waste management companies.
[6] 53 of these organisations were based in England, 6 in Scotland, 4 in Wales and 2 in Northern Ireland.

Further details on the research approach used are presented in appendix two of this report.

1.4 Limitations

The exploratory nature of HMRC's research questions supported the use of a qualitative approach, which allowed an understanding of the motives and influencing factors affecting the waste management industry. The sample was stratified by organisation type and interviews were conducted using structured topic guides but retaining the freedom for the interviewer to probe and ask questions without following the structure in a strict order. As this is qualitative research, the reader should be aware of the following limitations:

- We attempted to look for regional trends but found we had insufficient responses to draw any conclusions relating to regional differences with certainty. However, the qualitative sample structure has enabled us to report high-level similarities and differences for some other variables, such as the views of large multinational operators in comparison to Small and Medium Enterprise (SME) operators.
- Interviewing waste producers was outside the scope of this work, meaning that the factors influencing behaviour happening prior to material entering the chain (particularly around waste prevention) could not be explored directly. However, some waste management operators offered their view of how the tax (relative to other factors) may have influenced their customers.
- One of HMRC's research sub-questions related to the effect of the economic downturn on the industry. Within the scope of this research, the sample did not include organisations that ceased trading because of the downturn and so we cannot present a complete picture of the effects of the downturn on the industry. However, we were able to discuss the impact of the downturn on those interviewed and some operators were able to discuss the impact of the downturn on other businesses; for example, what the effect had been on their local competitors. We were also able to explore decision making with two landfill operators with plans to cease trading in the near future.
- In trying to interpret what was said by respondents, we have attempted to look for trends and believe that, for example, the operating environment (and the way that pricing works) may be different in areas where competition exists compared to where competitive forces are not as manifest. However, as this research is qualitative we are unclear on the exact reasons for differences we observed in interview. Where the data suggest reasons for differences arising, this has been stated but care should be taken in interpreting these findings as representative of the industry more widely.

1.5 This report

The following sections of this report detail the findings from the evidence collected across both phases of the research, and bring together conclusions for HMRC to consider.

Section 2 discusses the current state of the waste management industry in the UK.
Section 3 covers how decision making is made within the industry and the role of the landfill tax.
Section 4 outlines the drivers of innovation and investment within the industry.
Section 5 details the future strategic considerations for the industry.
Section 6 presents the conclusions from the research.

Where quotes from interviews are included, we have indicated the type of operator making the comment. Where comments were taken from interviews with the top 20 waste management companies we have indicated ‘large waste management company’. All other quotes are taken from interviews with operators outside of the top 20, but for companies offering a general range of waste treatment options we have indicated ‘small waste management company’ to avoid confusion.

Where findings from the research are presented in the narrative of the report, if a view was attributable to a particular audience we have presented the information to reflect this. If a view was given by operators across all audiences, we use the term ‘Some operators…’ to avoid unnecessary repetition.

2 The current state of the waste management industry

'15 years ago all waste used to go to landfill' – LANDFILL SITE OPERATOR

'20 years ago, waste companies were essentially large haulage organisations which collected waste and dumped it. Any recycling which was done was limited. Around [the year] 2000, there was an awakening, when suddenly costs started ratcheting up. The big corporates all woke up to the fact that a market was being created for recycling, especially cardboard and plastics' – INCINERATION PROVIDER

'10 years ago, recycling collections were nice if you could afford them' – LOCAL AUTHORITY

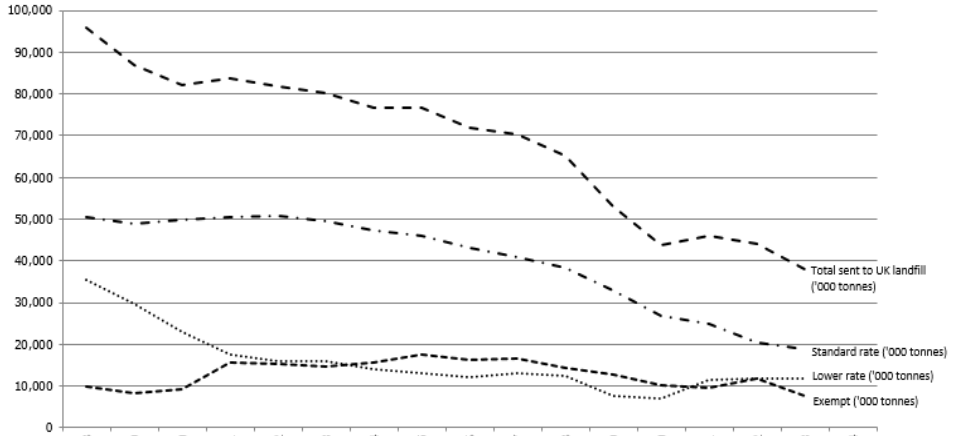
Defra publish a number of reports and publications outlining trends in waste arisings in England. Findings of contextual relevance to this research include:

- Household waste arisings in England have fallen 12% since 2006/07, down to 22.6 million tonnes in 2012/13.
    - Residual household waste arisings in England have fallen over 40% since 2002/03, down to 12.9 million tonnes in 2012/13.
    - The amount of household waste recycled, composted and reused in England was nearly 3.5 times as much in 2010/11 when compared to 2000 levels, and has remained stable at this level since[7].
- Local Authority managed waste going to landfill in England fell by 11% to 8.5 million tonnes in 2012/13 and has fallen over 60% in the last decade. Local authority managed waste sent to energy recovery in England has more than doubled in the past decade[8].
- Total commercial and industrial (C&I) waste generation in England, in 2009, is estimated to be 47.9 million tonnes. This is a decrease of 29% or 13.5 million tonnes of industrial waste and 6.5 million tonnes of industrial waste since 2002/03.
- A total of 25.0 million tonnes, or 52%, of C&I waste was recycled or reused in England in 2009, compared to 42% in 2002/3. A total of 11.3 million tonnes, or 24 per cent, of C&I waste was sent to landfill in 2009, compared to 41 per cent in 2002/3[9].
- Fly-tipping incidents in England have been decreasing in the six years for which data is available and are now 44 per cent lower than in 2007/08[10].

Figure one shows how volumes of waste sent to landfill have changed over time; the landfill tax rates for a corresponding 12 month period are provided in the table directly below.

[7] Defra, Statistics on waste managed by local authorities in England 2012/13
[8] Defra, Statistics on waste managed by local authorities in England 2012/13
[9] Defra, Survey of commercial and industrial waste arisings 2010, Final Results
[10] Defra, Fly-tipping statistics for England, 2012/13

Figure 1: Waste sent to landfill in the UK since 1997[11], by the standard and lower rate tax charged in that time period



	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Standard rate (£ per tonne)	7	7	10	11	12	13	14	15	18	21	24	32	40	48	56	64	72
Lower rate (£ per tonne)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5

'Before the crash our phone rang off the hook. The recession hit, it went straight out the window. Everyone was cutting costs. This is now turning round and people are starting to focus more on recycling' – SMALL WASTE MANAGEMENT COMPANY

'Because of the economic downturn, waste volumes overall have dropped, so the company is having to grow by developing into other areas' – LANDFILL SITE OPERATOR

Across the previous decade, the data above suggest a decrease in overall waste arisings for both Municipal Solid Waste (MSW) and C&I wastes, a decrease in treatment by landfill, and increases in quantities sent to recycling and other recovery. However, the waste management industry is at present recovering from the effects of the economic downturn; some respondents mentioned that a recovery to waste levels prior to the downturn (particularly for C&I and construction & demolition wastes) is still ongoing. The volume of waste is related to GDP, and as the economic downturn took hold less waste was produced, which accounts for some of the observed reduction in waste arisings. Because waste arisings have decreased, those we interviewed generally felt that more needed to be done and they had to work harder to maximise the value of waste.

Respondents noted key changes they had experienced in recent years:

- A very noticeable fall in demand for landfill and rise in demand for other waste treatment options; particularly recycling and energy recovery. Respondents said the motivation for this was that the waste management operators increasingly wanted to maximise the value from waste, and were employing better segregation and treatment techniques in order to do so. The landfill tax was said to have been a key driver for the fall in demand for landfill and rise in demand for alternatives, and its effect is discussed in more detail in section 3 of this report.
- Local authorities seeking to enter into contracts for alternatives to landfill – either greater utilisation of their own alternative facilities or entering into

[11] Data sourced from HMRC Landfill Tax Bulletin, October 2013

agreements to construct additional facilities. Some said they were transporting waste across local authority boundaries so that other authorities or private operators could treat residual waste.

- A process of consolidation in some areas – in areas where there was more competition some respondents suggested smaller operators were frequently being bought out by larger firms, and that some had exited the sector due to recent trading conditions. These respondents noted that falling quantities of waste available for treatment and increased competition for these quantities have driven these changes. They felt that sometimes smaller operators are in competition from larger operators who are able to undercut their prices, and it was noted that these larger organisations sometimes go on to acquire the smaller organisations, to increase their share of the market. In another example from interview, one company had bought out their competitor, as the competitor had various equipment for processing plastic waste (e.g. shredding/granulating machinery) and the buyer did not own these types of equipment prior to the buyout.
- An increase in diversification, in response to competition, legislation and changing attitudes. Companies that historically offered particular treatment options or handled particular materials said they had begun to offer additional services – particularly as customers were increasingly requesting complete service solutions and the cost efficiencies in collection and treatment that these can offer.

In the present climate of increased competition for smaller amounts of waste, respondents explained that while there may be value in providing advice and education to customers on ways to become more resource efficient, sometimes this type of activity had to be scaled back or ceased to remain cost-competitive. A similar phenomenon was highlighted by local authorities, who explained that budgetary constraints meant that householder engagement activities – communication activities designed to encourage recycling - were a target for cost savings.

In terms of contracts that organisations entered into with their customers, it was explained that across the board long term contracts have historically provided certainty in demand for particular waste treatment options and that this formed the core of the business case for investments in new facilities and services. At present, local authorities seem able to enter into long-term contracts which can range from eight to ten years right up to 25 year arrangements. Commercial and industrial organisations tend to seek short contract lengths (six months to two years) to allow them to regularly review their arrangements and look for the best value contract. Investors tend to view long-term local authority contracts as useful to underpin investment, where short-term C&I contracts are felt to be not so useful for investment.

3 Decision making and the role of the landfill tax

'The number one pressure is cost, and the biggest driver is landfill tax' – LARGE WASTE MANAGEMENT COMPANY

While this research was qualitative, the findings from some businesses suggested that the market was competitive; for example where some respondents discussed the fact that there was consolidation taking place within the industry. Other respondents did not feel that the market was quite so competitive and suggested that providers of alternatives to landfill did not need to be so economically minded – some felt that where competition was not so fierce, operators were able to charge more without the fear of being undercut. The research therefore did suggest that the market is working differently for some compared to others, but from a study of this nature we cannot be clear exactly why these differences were identified; for example, they could be due to businesses operating in different geographical areas or in different parts of the supply chain.

The following sections describe the factors that influence decision making within the industry, where landfill tax fits within this decision making, and how those we interviewed felt that pricing works, from differing perspectives.

3.1 Factors influencing decision making

This section discusses the general factors influencing decision making in the waste management industry. The role of landfill tax as a specific driver is discussed in section 3.2.

Across all of the organisation types interviewed, respondents explained that managing the cost of waste treatment and prices charged were the most important factors:

- Local authorities looked for the most cost-effective treatment options within the budgets they had available for waste collection and disposal.
- The balance of activities that commercial organisations offered was shaped primarily by whether arrangements were profitable or not. Profitability was determined by factors including the level of competition, treatment options available, distances that the organisation has to travel to collect or treat waste, subsidies available (e.g. for energy recovery) and the landfill tax. Their charges were said to determine whether they got a job or won a contract. Their charges reflected the cost of disposal, and these costs depended on treatment options that were used. If the organisation expected there to be future demand for particular treatment options and the charges for these options to be attractive to customers, this provided the case for investment.

These messages were consistent right across the supply chain:

'Money, or not having it is the biggest influencing factor. Waste management is a statutory obligation' – LOCAL AUTHORITY

'Everything is driven by money' – LARGE WASTE MANAGEMENT COMPANY

'Cost is the biggest factor – once a customer has defined what they need then it's all down to cost' – RECYCLER/ REPROCESSOR

The landfill tax was identified as having had a significant impact on cost considerations within the industry, as will be discussed in section 3.2. Operating costs were important factors for consideration within business' decision making on what waste treatment options they offered.

As well as the landfill tax affecting decision making, respondents highlighted a variety of ways in which the economics of waste management affected their decision making. For example:

- Transport costs are included in the total cost of waste treatment and affect cost effectiveness; one large waste management company explained that they will only enter into a contract with a new customer if they are on an existing collection route. One waste management company in the South East explained that waste wood was exported to the continent, simply because it was closer and cheaper to get to than their nearest suitable UK outlet in North Wales.
- Competition for general waste and/or specific waste streams affects the price they can charge to customers; the effects ranged from operators who explained they had few competitors, to operators who explained they worked in a very crowded marketplace. This research found that this did not appear to be linked to a particular part of the waste market or particular size of business; even some operators dealing with less commonly recycled materials explained they had seen an increase in competition in recent years while others had not. This may be somewhat linked to location and the catchment area in which they operate; in some areas there is more competition than others, but we were unable to find clear patterns in the responses when looking at competition for particular material types.
- Subsidies available affect the return on investment – support mechanisms such as the renewables obligation and feed-in tariffs were mentioned, in particular by those involved in investment within energy recovery markets (thermal treatment and anaerobic digestion).

'If we are approached by a customer we will check where they are based and whether they are on an existing collection route. If they aren't we will need to think carefully about whether we can offer them services based on additional fuel charges' – LARGE WASTE MANAGEMENT COMPANY

Although financial considerations were identified as the primary driver influencing decision making, some organisations explained that they did consider the environmental impacts of treatment options they offer, and that customers are increasingly interested in the sustainability of practices employed to treat their waste. Some of these respondents (including a waste management company and local authority) ranked environmental sustainability on a par with cost consideration, but for most it was stressed that although they would try and offer more sustainable solutions, they would only do this if such solutions were profitable and cost was the ultimate factor:

'It boils down to costs but we are committed to environmental protection where possible – as an organisation we are working towards ISO accreditation and this is good for our customers to see' – SMALL WASTE MANAGEMENT COMPANY

Some energy recovery developers/ operators interviewed explained that they used or were planning to use processes such as gasification instead of conventional incineration. Respondents reported this was because these processes were thought to be more environmentally sustainable, and were sometimes perceived to be a more acceptable treatment solution than conventional incineration (socially as well as environmentally). However, there are a number of factors that influence whether this desire to invest translates into investment. In order for investment to be made, the business case needed to stack up both:

- Operationally, in that the technology needed to be more efficient than conventional treatments and suitable for the expected composition of waste that needed to be treated, and that the technology was proven in a UK setting; and
- Financially, in the operator being able to demonstrate that there is sufficient certainty in terms of demand for the facility.

As well as financial and environmental considerations, legislation was also identified by several respondents as having an important impact on behaviour and decision-making. As well as the landfill tax, some respondents mentioned other regulatory factors impacting on decision-making:

- Respondents interviewed in Scotland explained that the Zero Waste Regulations (coming into force January 2014) were requiring them to look at helping customers completely segregate different waste streams and offer solutions for food waste recycling.
- For local authorities and waste management companies working in partnership with them to manage municipal waste, the Landfill Allowances and Trading Scheme (LATS) was identified as having had a significant effect on decision making and whether landfill diversion targets would be met when it was operating. LATS aimed to reduce the amount of biodegradable municipal waste sent to landfill.
- For particular types of materials, respondents said that material specific regulations had an effect on decision making – the most commonly mentioned being the Packaging Regulations and Waste Electrical and Electronic Equipment (WEEE) directive.

Respondents reported that another factor influencing their decision making was the availability of advice, support and incentives to innovate and/or change behaviour. Some explained that organisations like the Waste and Resources Action Programme (WRAP) influenced behaviour and helped reduce the risk around making investment. Respondents mentioned the value of the research that WRAP supports (e.g. for hard to treat materials, such as carpet). They reported that WRAP produce guidance and case studies which help people understand the opportunities and risks involved to help them make balanced investment decisions. WRAP was also reported by a few respondents to have supplied direct funding; for example in one case to help an organisation establish a Materials Recovery Facility (MRF). They were thought to have shouldered some of the risk involved with this project because the area had been identified as having a lack of recycling infrastructure.

3.2 The role of the landfill tax

'Landfill tax is the main driver – looking at what is happening around the country it's the main driver, so that there are investments occurring which would not otherwise have been commissioned' – TRADE ASSOCIATION

'It's a huge factor in the way our business works – it has a massive impact' – SKIP OPERATOR

'Landfill tax has meant that operators who would be sending waste to landfill are looking to extract the maximum amount of recyclables, so what is sent to landfill tends to be very light' – LANDFILL SITE OPERATOR

'Without the tax, diversion from landfill to energy recovery wouldn't happen. And if landfill tax was lifted, everything would go straight back into landfill' – ENERGY RECOVERY OPERATOR

Respondents interviewed for this research indicated that the landfill tax increased the cost of waste disposal by landfill and therefore:

- Improved the investment case for alternatives to landfill
- Reduced demand for landfill, so made landfill sites less profitable
- Extended the lives of existing landfills as sites are filled slower than anticipated
- Increased the attraction of other types of waste disposal, and provided headroom for more expensive processes
- Allowed alternative treatment methods to raise costs to levels just below the level of the landfill gate fee and tax

The landfill tax was said to have fundamentally shaped the markets for waste and waste businesses. Across all audiences, most respondents interviewed identified the landfill tax as a significant driver influencing their decision making and service offering – for many of these it was listed as the most important consideration, tying in closely with organisational priorities; as described in section 3.1 the biggest of these priorities tended to be how the organisation managed its operating expenses and charges offered to customers. Waste management companies explained that the landfill tax had driven significant changes in the attitudes of customers in terms of them now going to great lengths to explore every avenue for alternative solutions.

'The landfill tax was the rationale behind plans to expand the business – to offer recycling collections for new materials' – SMALL WASTE MANAGEMENT COMPANY

'I would suggest that if it wasn't for the landfill tax that this plant would not be viable' – ENERGY RECOVERY OPERATOR

Respondents usually identified the tax as being the biggest driver for creating demand for alternative waste treatment solutions in the UK; it facilitated investment because it allowed other treatment solutions to charge more and therefore made them economically viable. The development of markets for recycled materials within the UK was felt by some respondents to be linked to the landfill tax. For example, one respondent felt that the landfill tax had driven increased demand for recycling services from waste producers. Better sorting and collections (e.g. source segregation) meant that the quality of recycled material was higher than historically had been the case. The availability of recycled material combined with the fact that better quality material was available had influenced the development of markets for

these recycled materials. The certainty created in them having routes for recycled material was key for this business' decision to put in place recycling services for other materials. Outside of recycling, one energy recovery operator interviewed was clear that his plant would not have been built without the tax.

Some respondents did mention their organisation faced particular challenges within the industry; however, even these respondents tended to explain objectively that the tax has been a key driver in diverting waste from landfill. These challenges faced by respondents are discussed in section 5.2 but some of those cited included:

- Difficulties securing contracts with customers, and securing contracts of sufficient length to underpin investment
- Difficulties with access to funding and skills
- Issues with the packaging regulations and the current Packaging Recovery Note (PRN) and Packaging Export Recovery Note (PERN) system

Local authorities all identified the tax as being a significant driver of finding waste alternatives to landfill. Some of these suggested it was the biggest driver for seeking alternative treatment arrangements to landfill, while others suggested that European landfill diversion targets and LATS had been the bigger driver, or ranked equally in terms of importance. Some explained that the tax had previously had an effect on them but did not anymore – for example where they were now locked into a long term contract for an alternative to landfill and had minimum tonnage commitments, this meant that any additional increases to the rates of the tax would not affect them. Some had ceased sending any material to landfill and so consider the tax to have completed its task.

All of the largest waste management companies interviewed within this research identified the landfill tax as a key consideration for their business. Within the overall sample of organisations interviewed, most identified the tax as a key consideration. Those who did not agree with this either tended to be:

- Smaller operators whose responses suggested they were not as attuned to the policy and regulatory environment as larger operators. For example, one smaller waste management company did not seem aware of the real purpose of landfill tax and did not think it was important for his organisation at all. When probed, he did acknowledge that it could be important to his customers.
- Recyclers/reprocessors specifically handling particular waste streams where they could not see the impact on their operations because material would not have gone, or only very limited quantities of material would have gone, to landfill anyway – e.g. WEEE recyclers. These respondents suggested that bans for particular materials being sent to landfill can be 'fast-acting' and therefore positive if an immediate treatment solution is needed, creating business opportunities for alternatives very quickly. In comparison instruments like the landfill tax were seen to act more slowly with the effect building up over a number of years. There was recognition, however, that provision can't change instantaneously and these measures can be helpful to ensure the market keeps up.

For waste management companies there was a gradation of responses from organisations that saw opportunity from the tax (e.g. providing the case to invest in alternatives) to those who felt it was creating a problem for their organisation. Some operators explained that they were quick to see the opportunities and began investing in alternatives quickly. One operator explained the landfill tax was at least part of the reason they had moved into UK markets.

'It was useful that there was an escalator – useful to know how much it's going up each year. There were no surprises, we didn't have a situation where the price jumped by £25 in one go' – SMALL WASTE MANAGEMENT COMPANY

'We all remember when it went up to £8 per year increase' - ENERGY RECOVERY OPERATOR

Conversely, one organisation explained that they had been slow to understand the implication of the tax for their business model, which had historically relied on landfill. This meant that they now felt like they were running to catch up and invest in alternatives. The respondent interviewed explained that the annual £8/tonne rises in the standard rate of tax was somewhat unexpected for them.

The phenomenon of some responding quickly whilst others more slowly was also observed by local authorities, with some telling us the implications of the tax and / or current escalator sank in relatively quickly (these respondents suggest this occurred 5-8 years ago); they recognised the direction that policy was moving and the effect of the landfill tax combined with the effect of LATS meant they were fast to enter into long term contracts for alternatives to landfill. Other authorities did not take these decisions quite so quickly and reported that they were currently sending residual waste to landfill and/or relying on the treatment capacity of other authorities or private operators.

The introduction of the standard rate escalator was acknowledged by most to be helpful in enabling organisations to change their waste practices over time – many explained that investment in alternatives (including planning, securing finance and commissioning) could take several years. The tax meant that local authorities were prepared to contract for a longer term because they knew the tax would keep rising. When decisions to invest in alternatives were made, these might have been more expensive than landfill at the point of the decision, but knowing the tax would keep rising meant they could see their alternative would be the cheaper option in the long run.

When asked about whether there was a 'tipping point' at which the tax started having a real effect on behaviour, respondents presented a range of responses. A few suggested that this occurred seven to nine years or more ago and that they were already looking at alternatives to landfill at this point. Others stated that the tipping point was in the past one to three years when the standard rate reached a point that alternatives such as recycling became attractive in terms of cost (when the rate reached a level of £56-64 per tonne). Others said that the tipping point was when the standard rate reached around the £40-50 per tonne mark. In terms of respondents' views regarding the tipping point for recycling becoming economically viable in comparison to the cost of landfill, this was seen to depend on the type of material and the demand for a recycled alternative to virgin, but respondents tended to suggest this has occurred in the last one to two years. Some recyclers and investors we interviewed suggested that if the tax continued to increase this would help recycling of particular materials by making cost intensive treatment processes that are currently not commercially viable possible.

Although this research did not engage directly with any waste producers, over several years of conducting research for Defra and Waste and Resources Action programme (WRAP) we have observed sentiments that support what waste management companies told us within this work: that the landfill tax and the resultant rising cost of landfill are an important driver for producers. Research with the industry

conducted for WRAP also supports the finding that the tax has helped make the business case for alternatives more attractive[12].

3.3 Whether the landfill tax supported the waste hierarchy

'It supports the hierarchy pretty well, it's targeted at the bottom and is a big stick to divert waste' – ENERGY RECOVERY OPERATOR

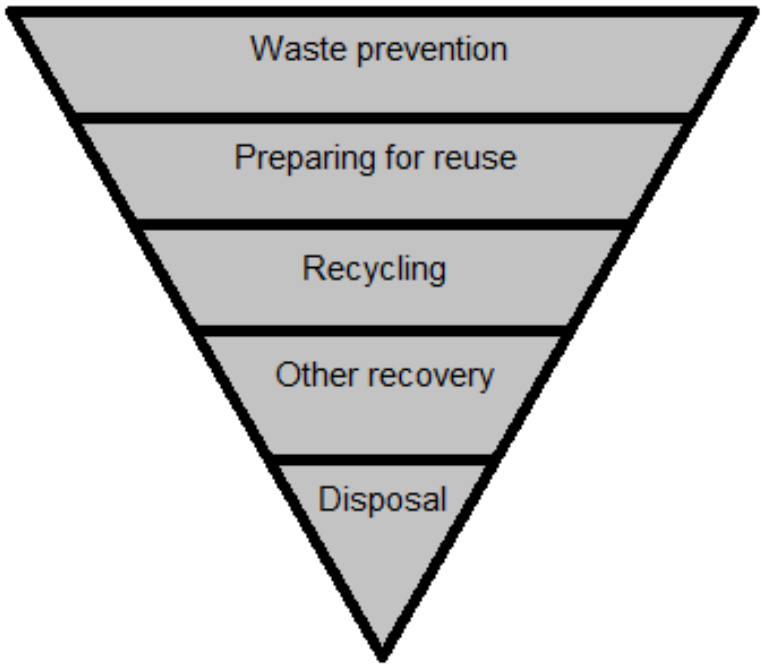
'Tax supports material moving a step or two up the hierarchy, regulations are needed to move all the way up' – SMALL WASTE MANAGEMENT COMPANY

'The tax supports the hierarchy to a degree. [But] It does not drive material to reuse' – RECYCLER/REPROCESSOR

'It supports anti-landfill – it doesn't quite support recycling' – RECYCLER/REPROCESSOR

The waste hierarchy presents a variety of options for managing wastes in descending order of environmental preference; prevention, which offers the best outcome for the environment, is at the top of the hierarchy, followed by preparing for re-use, recycling, other recovery, and finally disposal - which is where landfill sits as a treatment option.

Figure 2 – The waste hierarchy



[12] Most of this work is unpublished, but studies that contained interview data suggesting the tax is influencing waste producers include: Annual impact evaluation work since 2008, MRFs research in 2013, and a study into suitability of C&I waste for energy recovery in 2012.

There was a consensus that the landfill tax has supported the hierarchy in that it had moved waste up the hierarchy from the bottom, but there was not a clear consensus across all audiences as to how far the tax moved material up the hierarchy:

- Some felt that the tax supports material moving up the hierarchy to the most environmentally sustainable alternatives – they explained that it was most certainly increasing levels to recycling and other forms of recovery, and believed that customers would be looking at prevention and reuse to lower the cost of waste treatment.
- Some explained that the tax diverted material from landfill (which is the worst environmental outcome) to the cheapest alternative, and this was not necessarily mapped to the best outcomes in terms of the hierarchy. For example much waste is diverted from landfill one or two steps up the hierarchy to energy recovery or recycling (whichever is the cheapest option available) and some respondents felt that better alternatives such as reuse were not explored due to cost. Reuse was noted by some respondents to be resource intensive compared to other treatment options – there are higher labour costs involved because much repair and refurbishing work needs to be done manually.

A few organisations did not feel that the tax supported the hierarchy at all at present. Some recyclers and reprocessors felt that in particular the landfill tax had taken material out of landfill but there were issues at present with the quality of recyclate that was available for reprocessing. Some organisations felt that the tax is not supporting the hierarchy in that waste is being diverted from landfill but to illegal dumps. Though Defra data indicate that fly-tipping in England has decreased across the lifetime of the standard rate escalator, nevertheless some respondents felt that illegal dumping they had observed at a local level or that was mentioned in the trade press was influenced by the landfill tax. Some felt that practices such as these were undercutting the gate fees of legitimate operators.

Waste producers were not interviewed within this research, but some waste management companies commented on how the tax was affecting their customers. Many presented the direct link that to reduce costs, customers were increasingly asking them how landfill tax affected the charges they paid and what they could be doing to lower their overall waste bills. Customers tended to be happy with the cheapest treatment options offered to them, but some, particularly organisations, were also increasingly interested in the sustainability of waste treatment.

Some of the waste management companies interviewed explained they gave advice to their customers on how to reduce waste bills, but others did not consider this to be important to their business; a few pointed out that the industry would suffer from reducing quantities of waste as less is available to treat. This meant they felt there was no benefit in spending money on encouraging customers to be more resource efficient which would then result in less business. Anecdotally, some companies explained that their customers would be looking to the very top of the waste hierarchy, to waste prevention, whilst others were unable to comment on whether customers were taking any action to prevent material becoming waste. One local authority MRF operator felt that recent decreases in waste arisings were only due to the economic downturn and unrelated to the tax, and now that the economy was recovering they were starting to see an increase in waste arisings again.

3.4 Who pays the tax and how costs are calculated

Landfill tax is paid to HM Revenue and Customs by landfill operators. How this tax is passed on to other parts of the supply chain and waste producers was found to be variable. One trend noted across all audiences was that most of the operators interviewed (but not all) was that the landfill tax component of a charge does not have to be itemised separately on invoices/bills. For example, one SME waste management company explained they send their mixed residual waste to a MRF and pay a flat fee – they expect that some of this residual waste might need to be landfilled but were not exactly sure of the quantity. The landfill tax component of charges was not known, but the flat fee they paid was cheaper than a landfill gate fee and tax, suggesting (and acknowledge by respondents) that a proportion of their waste was being recovered rather than landfilled.

Some waste management companies explained that landfill tax is passed on directly to the customer – so rises in the tax will not affect how much they themselves receive, but will increase the cost to the customer for treating residual waste.

Several respondents involved in collections (including small general waste management companies and skip operators) noted that the economic downturn has meant that the industry is unable to pass on rises in landfill tax to customers. Therefore the profitability of mixed general C&I waste collections in particular has been eroded during the period of the escalator. Others explained they have actually reduced their gate fees to absorb some of the rises in landfill tax internally and pass on less of the increase to customers. In addition, the economic downturn has reduced production of both domestic and C&I waste, so the volume of waste has reduced. The fact that some operators pass on all of the rises in landfill tax to customers, but others have to absorb some of the rises by lowering their gate fees, appear to be linked to the level of competition that an organisation faces in their locale.

A few organisations involved in waste collections (e.g. small waste management companies, skip operators) explained that they charge a set fee, allowing for some landfill tax charges, but that not all of this material is necessarily then landfilled. They will attempt to remove recycled material from this stream (meaning they would be liable to pay less landfill tax and can also generate revenue from the sale of this recycled material), but prefer to err on the side of caution in their charging in case the material is unsuitable for recycling. They suggest the tax creates an incentive for the waste management sector to find ways of diverting waste from landfill and that for some this will allow them to increase their profits – particularly where there is less competition and they have less fear of charges being undercut. Sending material to a MRF isn't necessarily cheaper than landfill for the producer, and pricing seems to depend on the level of localised competition. One of the organisations we interviewed stated that they send waste to a MRF even though the treatment cost is the same as if all waste was landfilled. Although no cheaper than landfill, they explained that sending material to the MRF was justified as the MRF had needed to make costly investments in sorting and segregation capacity, and also that using a MRF gives their customers a better environmental outcome[13].

Other organisations who carried out collections explained that they will try to make sure of what is in a consignment of waste before they calculate the cost to the

[13] As explained in section 3.1, motivations driven by the environmental concern before cost were not encountered as the norm in this research

customer. They noted this reduced the risk that waste would not be what they expected and also ensured that costs to the customer were based on the actual costs of the treatment options that will be employed. Inspections of waste can be done visually, though it was noted that the exact composition of waste cannot be known until it is sorted and segregated – for example within a skip, various layers can exist that are not visible at initial inspection.

'If material is a lot worse than we were sold then we can reject the load. But in general the overall contamination levels have gone up over the years so we just have to stomach a certain amount of it' - RECYCLER

Other operators who carried out collections said they just made an assumption on what proportion of the material they accepted would need to be landfilled. One operator noted that no two loads were ever the same and the balance of waste streams can vary hugely, but everything evens out in the end – one load may contain a bit more residual waste that would need landfilling, another a bit less. One skip-hire company explained that the price they charged goes up every April and they recalculated it based on the average percentage of the contents which went to landfill the previous year and will assume this to be a safe assumption for the next 12 months.

Some smaller skip and general waste management operators interviewed did not have well developed pricing structures and mechanisms. One waste management company explained they charged a set fee for a skip, based on size. To ensure prices are competitive, rises are calculated annually by looking at how much competitors are charging and this operator did not explicitly look at rises in landfill tax themselves.

A few skip operators and smaller waste management companies explained that they would make one charge for a regular customer (or offer a fixed charge for a period of time) and a different charge for new customers. A lower charge might be made for existing customers to maintain their business and because they are known to be reliable. Newer customers might be charged a slightly higher charge to counter the risk of not being able to predict the composition of the waste and how much could be recovered / how much would need to be landfilled.

3.5 Prices charged for disposing of waste through alternatives to landfill

Respondents explained that charging structures for recycling can be variable. Depending on how confident the collection organisation can be in knowing the degree of contamination within a consignment, some collection operators (including waste management companies, skip operators and recyclers) feel they need to build in a component of their price to cover the risk that some material will not be suitable for recycling. One recycler explained that inevitably there will always be some material that needs to go to landfill and that they charge approximately 10% more to cover this risk.

'We include that in our price. We get the odd bit of plastic mixed in which is all included in our price' - RECYCLER

Generally charges for recycling services will depend on demand for a particular recycled material and the price of virgin raw material in comparison. Some materials like metals possess considerable value and recycling collections may be offered for free or at nominal costs – one MRF operator explained they charged £5 per tonne to offset the cost of collection. For other materials, the recycler will charge both a gate fee for collection from the company supplying the recyclate and then charge a fee for the material to a customer who is looking for this recyclate as raw material. Operators across all audiences we interviewed explained that gate fees vary for the type of waste and are set in individual contracts.

In considering energy recovery, some providers explained that their charges were unrelated to landfill tax, while others suggested that the gate fees they charge have risen in line with the landfill tax. It was explained that there will always be some degree of linkage as following thermal treatment there will remain an incineration bottom ash that needs to be disposed of – but this waste is only eligible for the lower rate of the tax anyway, for which increases have not been as steep. In areas where there seemed to be less competition between operators, some operators explained that they set their gate fees to be just competitive with the cost of the landfill gate fee and tax. This meant that charges they now make can in some cases be considerably higher than the charges that may have been envisioned (on which business cases were made) when plants were commissioned.

3.6 Exports

Respondents explained that in the last few years the levels of exports of processed residual waste and recyclate have grown noticeably:

- **Exports of processed residual waste (e.g. RDF) to continental Europe:** This was said to be driven by under-capacity at continental energy recovery facilities due to the economic downturn, and the landfill tax meaning more residual waste is available for alternative treatments. Because of this demand for feedstock, continental operators have been charging a low gate fee such that the cost of transport and gate fee for processed waste combined is lower than the cost of sending residual material to landfill in the UK. Also, it was said that there was not sufficient capacity within the UK for this material to be treated at UK energy recovery facilities (but some respondents noted investment in this area and additional capacity becoming operational in the next five years).
- **Exports of recyclate to Europe and countries in the Far East, particularly China:** Landfill tax was thought to have created the drive for better sorting and segregation within the UK. However, it was said that there was insufficient reprocessing capacity at a national level to process recyclate that was collected, so material was being exported – contributing to a growth of recycling and reprocessing within the importer countries off the back of more UK recovery and segregation. In addition, some UK reprocessors considered that the quality of material was too low for treatment within the UK, which stifled investment in UK capacity. However, it was noted that some Chinese importers have tightened their specification and some material that would have been exported is not of high enough quality to meet their criteria.

Some respondents felt that waste exports were an obvious consequence where a tax was affecting one waste treatment route but where insufficient capacity for alternatives meant that not all waste could be treated domestically. They suggested

however that perhaps the scale of exports and development of associated infrastructure was unexpected. These respondents attributed the growth in recent years of facilities that treat residual waste and process it into a fuel directly to the landfill tax. It was expected by respondents that once the economic recovery on the continent gathers impetus, export will no longer be cost effective for UK companies – i.e. export of RDF was believed to be a short-term phenomenon. It was expressed by some that when European demand for refuse-derived fuel (RDF) falls, unless UK infrastructure was in place to treat this waste there was a risk that more material may return to landfill in the short term.

It was thought that the landfill tax had led to more recyclate being available. What happens to this depended on whether the UK infrastructure existed to treat it, whether there was demand for material of this quality (e.g. food grade, non-food grade), and whether there was demand for the raw material that recycled material would replace. It also depended on location, as one recycler explained why they were exporting segregated material to Europe:

'We are in the South-West, the reprocessor is in the North-East, and a lorry can only carry a certain tonnage. There wouldn't be enough lorries to drop it and the cost would be astronomical. But a boat can carry 3,500 tonnes' – RECYCLER

One investor explained that they were being consulted on projects to refinance plants as there were issues with some 'dirty' MRFs that are not reaching the recycling levels they were expecting. Investors felt that the landfill tax encouraged these operators to establish MRFs knowing that there would be a need to reduce the weight of material being sent to landfill (and reduce exposure to the tax), and that extracting recyclate from general waste streams would provide an additional income stream. However, increases in source segregation (for example, the offering of recycling containers to households for various different materials by collection authorities) meant that the waste stream itself had changed and that general waste contained less material that can be extracted for recycling, and a higher proportion of the waste was residual. This meant the facilities' charges were higher as they needed to landfill more of this material, and the material that could be recovered was generally of low quality. This investor believed that this would continue to drive export of waste; the tax was perceived to have encouraged the initial investment but the waste stream had changed in composition more quickly than anticipated. They felt that this was an opportunity missed for recycling providers, as without facilities to maximise the extraction of recyclate from general waste streams then some valuable recyclable material could be lost.

3.7 Other impacts of the landfill tax

Respondents perceived the following to be wider impacts of the tax:

- In some places, they felt there was a corresponding rise in price for alternatives to landfill, often tracking just below the cost of landfill itself. It might be expected that increasing the cost of landfill (through rises in the tax) would allow providers of alternatives to charge more, but over time these should become more competitive. Some, however, mentioned that behaviour was influenced by the level of local competition and that in areas where there wasn't much competition prices could go up in line with the tax (or come in at a higher price if entering the market) and there wasn't the incentive to improve the efficiency/sustainability of treatment practices.

- Across all audiences, some respondents explained that illegal mixing of waste streams to utilise and abuse the lower rate of the tax had negatively affected the industry – some operators were able to undercut their competitors by disguising active waste (charged at the standard rate) as inert waste (charged at the lower rate).
- Some operators, particularly smaller waste management companies and landfill operators mentioned a link between a rise in landfill tax and a perceived increase in illegal waste treatment practices. Though other sources of data suggest fly-tipping as one such practice has decreased[14], some respondents gave specific examples of illegal activity at the local level.
- Some respondents felt that the tax was stifling infrastructure projects. For example, one landfill operator mentioned that in their area, where they felt the infrastructure for alternatives to landfill was under-developed, construction and infrastructure projects are put on hold due to the costs of waste treatment.

[14] Defra, Fly tipping Statistics for England, 2012/13

4 Drivers of innovation and investment

4.1 Importance of the landfill tax in driving investment and innovation

'At the moment we have a number of large energy from waste investments coming to fruition. Without the landfill tax, none of this investment would have happened' – LARGE WASTE MANAGEMENT COMPANY

'Without the escalator it is hard to be cost effective in delivering recycling. We can now demonstrate cost savings by recycling. Before this the financial incentive [it] wasn't so clear' – SMALL WASTE MANAGEMENT COMPANY

The broad consensus from respondents across all audiences was that the tax had been a significant instrument in facilitating investment in alternatives. In the scoping interviews for this research one trade association told us that the landfill tax had facilitated £5bn of investment.

We have summarised what respondents felt the tax meant for particular points in the supply chain in the table below:

Table 2 – Effects of the tax on investment and innovation at different points of the supply chain

Area of supply chain	Effect of the landfill tax on investment and innovation
Collections	The tax had 'revolutionised' how waste was seen – as a resource rather than waste. Households and businesses now had multiple bins/containers for general waste and ranges of recyclable materials – in some areas this included food waste. Organisations had been encouraged to introduce collections for recycling in addition to general waste, which may not have been profitable without the tax ensuring there was demand for recycled material in place. In contrast to those who were happy to tolerate some risk and based their charges on sometimes very crude estimates, some respondents felt that this approach didn't work and that more rigour was needed when establishing volumes and quantities of waste that they were accepting. They explained that they were not comfortable relying on operatives saying a bin was half or a quarter full (as may have historically been the case), and to charge the correct amount of tax the exact weights of waste needed to be known, which also meant any customer disputes could be resolved more quickly and with accurate information. These respondents felt that before the landfill tax there was less importance in knowing accurate weights, but that for them the tax had driven more accurate measurement processes so they would not face the risk that their charges to customers would not cover the landfill tax component which needed to be paid. They felt that better weigh bridges and equipment for weighing bins now existed than before the current standard rate escalator period began.

Sorting, segregation and pre-treatment	The rise of both clean and dirty MRFs was attributed at least in part to the landfill tax, and the driver to maximise the value from waste streams. MRFs had improved sorting processes by introducing processes and technologies that had not traditionally been used in the waste industry. One company explained that to help customers see their waste and improve sorting, they offered see-through refuse sacks. Some companies (including landfill operators and general waste management companies) explained that they had been driven to invest in technology to shred residual waste and used electromagnets to extract metals. Several respondents noted that the tax had driven investment in processing capacity to produce Solid Recovered Fuel (SRF) and RDF. Some local authorities had opted to invest in Mechanical Biological Treatment capacity, and this would not have happened without the tax encouraging them to look for alternatives.
Waste treatment – overall	The tax had created the appetite for alternatives to landfill, and respondents noted that growth in recycling collections and energy recovery was the result. Alongside LATS, it was the key investment driver for local authorities entering into long-term private finance initiative (PFI) arrangements for alternatives to landfill. Some respondents felt that the tax had led to collaboration; where two or more companies pooled finances and brought certainty in terms of contracts to bring about big, long-term investments that either would not have happened or would have taken longer if a single company was trying to finance them. In one example we were given by respondents, two companies entered into a joint venture to build a large conventional energy recovery plant. These companies did not have sufficient material from their individual collections in the specific area to feed a plant, but when pooled they gave the certainty of level of feedstock that such a plant requires to operate. The tax had led to diversification. One small company explained that they were now trying to find specialist niches (e.g. secure destruction and disposal) and targeting specific waste streams (e.g. local authorities which collect/separate in a particular way) so they could invest and grow in specific areas. They were also investing in a facility to produce SRF.
Landfill	For some, the tax had led to landfill operators diversifying in the types of services they offered; for example, one operator had established a transfer station to sort recyclables from residual waste prior to landfilling, another chose to invest in a composting plant to reduce dependence on the landfill side of their business. Though site operators explained that the tax had not in itself driven methane capture, these practices made more sense in a climate of reduced input volumes and falling gate fees resulting from tax rises.
Other recovery	Several respondents felt that the tax had been responsible for a number of completed and planned investments in energy recovery. Some felt that the tax had encouraged operators to look at technologies

	for smaller scale applications (rather than large conventional energy recovery facilities). These would allow alternatives to landfill in areas that might not be able to supply the feedstock requirement for a larger facility. Some felt that although energy recovery was competitive or cheaper than landfill, the current climate encouraged them to look at investment in other ways to improve the efficiencies of operation and ensure they were competitive in the future: - Some operators were looking at selling heat generated to end users in the geographic locale of the plant. - One operator explained they had recently made investments to improve efficiencies, such as making improvements to their cooling systems to ensure the plant worked efficiently in the warmer periods of the year and that energy generation is at optimum level.
Recycling and reprocessing	Respondents explained that the tax: - Made existing traditional recycling cost competitive against landfill, encouraging investment in UK reprocessing capacity (though others felt quite strongly that this wasn't the case). - Encouraged research and development of recycling and reprocessing techniques for new materials; for example carpets, hard to treat plastics and printed circuit boards. Some operators who had traditionally been collection companies had been encouraged by the tax to diversify into this sector – for example, one company explained that they had made the decision to purchase a granulator to increase the fee they could charge for the plastic they collect (by cleaning and shredding it).
Reuse	Limited data was collected, but one organisation involved in reuse in London explained that the tax had led to more reuse services being set up as local authorities, particularly, were looking to ensure that furniture and appliances were repaired or refurbished so that these don't become waste. One company noted that the landfill tax had also benefited food and homeless charities, as food that would historically have become waste is passed on to feed those less fortunate.

A minority felt that the tax had not always been successful in driving innovation. For example, for thermal recovery, some respondents noted that although there has been research in advanced conversion technologies, most of the diversion from landfill was to conventional facilities.

Some respondents felt that the tax had resulted in investment, but not necessarily innovation – for example, in discussion of sorting and segregation within MRFs, they explained that the technologies and sorting processes were not new themselves, but were in new applications within an overall process for sorting waste.

4.2 External investment within the industry

'If landfill tax was taken away tomorrow, you'd see the drivers for investment disappear' - INVESTOR

The factors that were considered by investors when making investment decisions included:

- The level of experience/capability of the people involved in a project
- The certainty of the supply of feedstock, which was influenced by the landfill tax
- The prices for energy generated (for particular types of projects exporting energy generation)
- Whether the technology was proven; for one organisation it would be acceptable if a technology was operational outside of the UK, but others felt there needed to be a working UK application. New technology is often difficult to finance.
- International pricing of recyclates, which it was noted can be volatile as the markets are yet to mature.
- The size of the organisation seeking to secure investment. Some noted that investing in SME businesses was riskier than investing in projects run by large waste management companies.

Investors wanted to see long-term contracts to support the project. Local authority contracts were generally much longer than C&I ones so were perceived to be more desirable to potential investors. They noted that existing PFI contracts can last up to 25 years. One investor explained that they would need contracts of at least 10-15 years to fund sizeable projects. They noted that outside of PFI arrangements local authorities were not keen to go beyond seven to ten years, so this could represent a risk for them in agreeing to finance. Investors noted that large amounts of municipal solid waste were now tied into long term contracts, meaning that the remaining opportunities were with C&I waste, but the concerns with short term contracts needed to be addressed; C&I contracts may last just a year and no more than two to three years, so were felt by respondents to be of limited use in obtaining investment.

Other support in the form of renewables obligation certificates (ROCs) and feed-in tariffs (FiTs) (and FiT contracts for difference (CfD), to follow) were thought to be valuable, but some investors felt, especially recently, that they may be unreliable. One noted that there may be a rush to complete investments before the end of the current renewables obligation because they felt that the CfD looked less advantageous. Investors will look at all the cash flows associated with the project and how risky they are. They will then look for a return that properly compensates them for the risk. Historically they suggested that investors had been less keen to take the higher risk associated with C&I projects.

Investors noted that it was approximately four or five years ago that the level of the landfill tax meant that the industry began to really identify the opportunity for energy generation (beyond merely the landfill gas capture) and that investment could be supported by the fiscal instruments (ROCs and FiTs) which were contributing subsidies. Two of the investors we spoke to explained that this was the time that they entered into waste markets.

Respondents explained that 10 years ago the waste sector was UK based and financed, but now some of the biggest investments were made by overseas investors

attracted by the UK's potential waste management sector growth profile. This includes European waste management companies.

Respondents noted that investment was, at present, somewhat discouraged by the absence of certainty and difficulties with regulation. Investors interviewed explained that their capital was movable, and they would move out of the UK and into other countries if these provided a greater degree of certainty – better return on investment and less risk. One investor noted that recent Government statements distancing themselves from consumer subsidised investment in renewable energy was of concern to them.

Some investors felt that the future was in small-scale investments. Small scale facilities (technologies mentioned included anaerobic digestion and advanced conversion technologies) could provide landfill alternatives to more rural communities without requiring significant bulking and transport to facilities further away, which at present can sometimes mean that landfill is still viable. They felt it was important that waste solutions were offered close to source.

There was not a consensus on the rate of return that investors look for, and this depended on whether funding was debt or equity based. One investor explained that they looked for 10-20% return on big infrastructure projects but others were unable to present a typical rate of return as they explained this would be variable by project, risk, and the balance of debt and equity. Respondents noted that debt funding could be shorter term, but equity depended on longer term contracts.

External investors explained that the certainty of the landfill tax escalator had provided sufficient incentive for the development of alternative treatment infrastructure and did attract investors who would not typically have invested in waste to identify those opportunities. Although other drivers were identified as influencing the case for investment (e.g. desire to improve sustainability, LATS) the key thing encouraging investment was thought to be the landfill tax.

4.3 Evidence of job creation

As has been explained, respondents felt that the tax had resulted in investment in the industry. The trade associations we interviewed generally noted huge investment and growth in the industry, and associated job creation, but this research has not tested these assertions or generated quantitative data on the scale of job creation. Some noted that investment in the industry as a result of the tax did not necessarily translate to an increase in employment; for example, one MRF operator noted that automating his facility and better sorting processes had allowed him to reduce his workforce.

Qualitative evidence that we captured included:

- One waste management company currently investing in energy recovery explained that there would be associated job creation – landfills were also being closed as investments commence operation, but there would be a net growth in employment as landfills are not staffed by many people.
- Two smaller companies we interviewed mentioned in particular that job creation and helping the local economy was a big focus for them – they had seen the landfill tax as an opportunity and had created jobs in segregation and sorting plants.

- One investor noted that there were real benefits to increasing the number of UK alternatives to landfill. Investment in energy recovery plants was felt to be key to further increasing employment.

5 Future strategic considerations

5.1 An evolving industry

Respondents generally felt that the industry is at present in a state of transition between a reliance on landfill and a move towards alternatives – and in the interim that waste exports had arisen. Respondents were probed for their views on how they thought the industry would change in coming years. Some general themes included:

- **Continued consolidation** – some felt that the landfill tax had pushed out some of the small operators, as larger organisations could afford to drop gate fees. Respondents explained that this was due to economies of scale and the fact that larger organisations often owned their own facilities (whereas smaller operators may need to send material to facilities operated by others). Some smaller companies explained that if they could not access alternatives to landfill, or invest in their own, that they would sell their business to other operators in the industry. This would mean that in future there would be fewer but bigger operators.
- **Landfills will close and those that don't will take longer to fill** – some landfill operators expected to cease trading in the near future, and those that continue may not be filled as quickly as initially anticipated.
- **Waste that would have been landfilled will continue to be diverted to alternatives** - without support for the most environmentally favourable treatment options the diversion of material away from landfill will continue to whichever alternative is cheapest; respondents expected a continued growth in the amount of RDF produced and exported until the UK addresses treatment capacity shortfalls.
- **Greater opportunities for waste to contribute to energy security** - commodity prices for fossil fuels were expected to continue to rise, meaning that things like energy recovery and anaerobic digestion will be increasingly important.
- **Changes to the nature of waste in future** -for example, some respondents thought that due to the nature of how people are accessing information, consumption of materials like paper will drop and less will be present as waste.
- **Few new collection schemes -** some local authority respondents explained that food waste collections were perhaps the last segregated collection they believed they could offer, and felt that no other collections would be added in future.

5.2 Challenges for the industry

Respondents were asked what they thought were the key future challenges for their organisations. A range of challenges were given by respondents, including:

- **Continued competitive pressure.** If waste volumes continue to decrease, operators will be competing for a share of a smaller market. Several operators noted that tender processes were making it more difficult to win work; requirements were more detailed and both small and large operators explained more work was required to complete them. Some local authorities and private companies mentioned that as local authorities need to make cost savings, some will look to reduce frequency of collections and this would have

a negative impact on jobs and work available. Several organisations mentioned that there have always been rogue operators undercutting legitimate businesses, and this was expected to continue.

- **Difficulty getting customers into contracts, and for sufficient time to underpin investment.** As mentioned previously, a lack of long term contracts for C&I waste was seen as a barrier to investment. Some local authorities had entered into long term contracts (e.g. PFI) for waste treatment, but some operators noted that their local authority contracts had changed in nature in recent years. Where they used to be able to rely on getting a contract for three to five years, now they were on six monthly rolling extensions as budgetary pressures mean that councils need to be responsive if circumstances change. As mentioned previously it was also seen to be more difficult to get customers into contracts where technologies are new to the UK.
- **A lack of visibility of the cost of waste disposal at household level.** Waste management companies explained that there was a visible link for their commercial and industrial customers between improving resource efficiency and reducing costs. This link is not visible for municipal waste management. The householder is not incentivised to reduce their waste or increase recycling (though waste collection authorities can get recycling credits from disposal authorities) and do not see their council tax bill come down if they improve their behaviour.
- **Access to funding**. Smaller operators in particular cited a continued challenge in accessing funding for investment. This also extended to wider funding needs, such as access to business mortgages; one operator explained that they had the balance sheet and assurances of future business to demonstrate they could repay a mortgage but could not secure one from their bank. Instead they were having to make rent payments greater than mortgage repayments and this is reducing their profitability and ability to invest their own funds in business growth in future. They explained that the landfill tax in itself was not enough for their lenders. Several respondents mentioned that there needed to be improved access to the landfill communities fund for investment in diversion and remediation projects. For example, one local authority respondent felt that the only thing that had disappointed him about the landfill tax as a whole was that he envisaged more tax money would go back to local communities, but that the amount of money available for this has progressively reduced. Respondents expected that funding would be available for very visible projects helping communities immediate to the location of landfills, but that sometimes funding was given to projects where this visible link was not clear.
- **Access to skills required for industry expansion.** Some operators explained that the industry shift from landfill to alternative treatment methods required a certain level of skills and qualifications and there were concerns at present over a lack of the requisite knowledge and skill sets in prospective employees. Others noted that the waste industry generally struggles with issues of staff churn. Some private investors also suggested that a shortage of skilled and experienced enough people in the waste industry, to both manage and operate new facilities, posed a challenge.
- **Planning restrictions.** Some waste management companies and energy recovery operators mentioned that the length of time for the planning process was inhibiting their plans. It was noted that it can take on average several years for plans to be approved and a plant to become operational. Some respondents noted this process could take longer than this – sometimes up to 10 years. This contributed to a drive in waste exports in the interim, which, respondents felt, meant the UK was losing a valuable resource. Respondents

were not prompted to discuss planning issues, but these were mentioned at least in passing by all groups apart from the private investors.

- **A lack of demand for quality recycled material in the UK.** This was particularly mentioned by plastic reprocessors who explained that current packaging regulations promoted export of material, by making it cheaper for waste producers to export waste than for it to be used as an alternative to virgin raw material domestically. They felt this resulted from differences in criteria on which different types of recovery note were awarded. A Packaging Export Recovery Note (PERN) was felt to be easier to obtain than a Packaging Recovery Note (PRN) – the latter of which require a UK reprocessor to achieve a high yield. In contrast contaminated or otherwise low quality material can be awarded a PERN and then be exported legally. Some respondents felt that this had created a focus on quantity rather than quality. They noted that there was a lack of demand for UK recycled material as there were no binding commitments for manufacturers to source recycled material in their products. This was partly due to a perception that UK material was low quality and an unsuitable substitute for virgin material.
- **Getting the most sustainable outcome for waste.** One operator noted that competition can also be perverse – for example, food with expired sell by dates that could be redistributed through charities (such as those for the homeless) being sought as feedstock by facilities like anaerobic digestion. If there was a financial pull for material or if a treatment avenue was particularly convenient for a producer then this would override what would be best for waste in terms of sustainability and the waste hierarchy. One respondent noted that the WEEE directive has gone some way to helping reuse, but that the potential for reuse was limited due to the value of scrap metal which was driving WEEE more towards recycling.

Landfill operators noted some challenges unique to their part of the industry. One landfill operator explained that there would be a challenge in meeting their ongoing maintenance and monitoring costs when their landfill closes. They noted that when this happens, their site will not be generating gate fees and methane gas production will not offset their monitoring and maintenance costs sufficiently, so money will need to be found from other areas of their business. This would be the situation anyway irrespective of the tax, but the tax prompts less demand for landfill in the first instance and this can lead to a decision to close a site earlier than expected; which means that assumptions underpinning revenues from landfill are changed. The original business plan for the site may have been based on the site being open (and generating revenue) for longer before the costs of ongoing maintenance and monitoring would have been needed.

In addition one smaller site operator noted that during the economic downturn and since, they were facing challenges in ensuring their customers were paying invoices on time. They were required to pay their landfill tax quarterly, but if customers fail to pay invoices they have to find this money from their own funds. They explained that larger organisations had the financial reserves to mean this was not a problem, but it was an issue for smaller operators like themselves.

5.3 The importance of certainty about landfill tax charges and the standard rate escalator

'I think it's increasingly important that they tell us what's going to happen next. You know, how can we make investment decisions in the absence of knowledge?' – LARGE WASTE MANAGEMENT COMPANY

'None of our current investment would have happened without landfill tax' – SMALL WASTE MANAGEMENT COMPANY

Respondents explained that the certainty that the landfill tax standard rate escalator being set in stone and planned to increase in £8 per tonne increments until 2014-15 was of huge importance for investment. This helped senior decision makers with business cases for investing in alternatives to landfill, and provided certainty for private investors that there would be a continually growing demand for alternatives. There was agreement that the reaffirmation in 2010 that the escalator would continue was also a positive message for investment.

'There is around £10m of potential investment which the company has put on the back burner, and has probably been discounted because of the uncertainty surrounding the landfill tax at the moment' – LARGE WASTE MANAGEMENT COMPANY

A common theme from respondents, particularly those discussing their plans for investment, was that they needed the certainty of knowing what will happen following the end of the current standard rate escalator in 2014-15. The Government has announced that the level of the standard rate of landfill tax will not fall below a floor of £80 per tonne until 2020[15]. However, respondents said that not knowing whether the tax will continue to rise meant that they were now facing difficulties in securing investment, as both senior managers and investors were waiting to see what would happen next. Some respondents also mentioned, for investment in energy recovery, there needed to be clarity on the support regime for renewable energy generation, such as the RO post-2017. As discussed in section 4.3, certainty was also cited as very important for investors, because it permits investment of long-term capital.

We haven't made any assumptions about the tax. We have a target for zero waste to landfill because we want to ensure we meet our minimum tonnage commitments to the energy recovery facility. It doesn't matter if it goes up' – LOCAL AUTHORITY

'Assume that the tax will stay at £80 for a while – it would be dangerous to assume anything else' – INVESTOR

'We have been trying to look at both scenarios – if it stops at £80, but also we have tried to look at what happens if it continues to rise as well' – LOCAL AUTHORITY

Respondents were asked what assumptions they were making as a business about the future of the landfill tax. The industry was mostly aware that the £80 standard rate reached in 2014 would act as the floor for the standard rate of tax, though some small operators were not aware of this. Respondents typically fell into two camps – either they were not making assumptions as they considered this too risky and were holding off making investments, or they expected the tax to continue. Where the tax was expected to continue, some expected the standard rate to stay at £80, but others

[15] At Budget 2014 it announced that both rates will not be eroded in real terms 2019-20 although this announcement was made after our research.

saw no reason for it not to continue increasing. Where organisations have looked at projections for the future, they have typically looked at scenarios where either the tax remained static, increased in line with inflation, or continued to increase by annual £8 increments.

Investors were generally modelling scenarios based on stopping the standard rate escalator at £80, but some see it continuing to escalate, and making technologies which are currently unviable a possible investment. They explained that any projects that are considered for investment would be subject to rigorous sensitivity testing, and any assumptions about the rates of landfill tax will be challenged to see whether a project will still work at different rates.

6 Conclusions

During this research Databuild engaged with sixty-five organisations in a variety of organisation types across the waste management industry as well as with investors. The common findings from those discussions are summarised in this chapter.

The landfill tax is thought to have significantly increased the cost of treating waste through disposal to landill. Our respondents felt that the landfill tax is paid to HM Revenue and Customs by landfill operators but passed down the supply chain to the waste producer. The industry has seen a noticeable fall in demand for landfill as a treatment avenue, and a rise in demand for alternatives to landfill. The landfill tax and instruments like LATS were also said to have encouraged local authorities to look for long term solutions for the waste that they collect. Waste contractors felt they had been driven to seek cheaper alternatives to landfill.

The certainty of the standard rate escalator was felt to be important in highlighting the opportunities for profit through investment in alternatives. The respondents we interviewed explained that the industry now considers that renewed certainty over the future of the landfill tax is important. Some respondents noted that investments are on hold, and some hope for further increases to make the business cases for investment in other alternatives viable. Respondents explained that when demand for residual material in Europe falls, there will need to be infrastructure in place for the UK to treat this material. Particularly larger operators mentioned that they had alternative treatment facilities in the pipeline, but as development and construction of facilities can be lengthy processes, it was unclear to them whether UK domestic capacity would be able to handle a surge in residual material if European demand falls. There was concern amongst some respondents that unless UK capacity is operational (e.g. demand from new EfW facilities for RDF in the UK), this material could revert to being landfilled in the short term.

Contract length is thought to be an important consideration for investors. Our respondents felt that the landfill tax has meant that local authorities are comfortable to enter into long term contracts for alternatives. Investors want to see these long-term contracts to support their projects, and these can be up to 25 years; some investors would like to see 10-15 year contracts at the least to underpin investment. Short-term C&I contracts, which tend to be shorter periods than this, are not so useful to secure investment.

There was no overall consensus on when the 'tipping point' for the tax was reached (when the tax first reached a level at which it noticeably influenced behaviour): Most respondents suggested that the tipping point was reached in the last five years. However others suggested that this tipping point was reached at an earlier stage – some suggested up to ten years ago, while yet others thought the tax started having a marked effect right from when it was originally introduced. In terms of respondents' views regarding the tipping point for recycling becoming economically viable in comparison to the cost of landfill, this was seen to depend on the type of material and the demand for a recycled alternative to virgin material, but respondents that provided a view tended to suggest this has occurred in the last one to two years.

Falling waste quantities alongside lower net gate fees are thought to have made operating a landfill site less profitable. Some of the operators we interviewed have exited the sector and the remaining operators that plan to continue

trading expect the life of their sites to extend as they fill more slowly. Landfill is only used where waste cannot be treated cost effectively at a cheaper alternative.

There is a consensus within the industry from those we interviewed that significant investment has resulted from the landfill tax. Our respondents explained that the cost of waste disposal has risen in line with the tax, making alternatives more competitive as a result. The sales and profit opportunity through alternative treatment has, in their view, driven further investment and research into alternatives than would otherwise be the case. Investment has ranged right across the supply chain, from collections and sorting of waste right through to treatment. Our respondents suggest that companies in the industry have recognised the increase in demand for alternatives created by the tax and have invested in the lowest cost alternatives. They felt that the increase in demand for alternatives has also given rise to more R&D activity than would be the case in the absence of the tax – to deal with more wastes and/or to make existing alternatives more profitable.

The landfill tax was felt to have provided incentives for private investment within the industry. Our respondents explained that by increasing the cost of disposal, the tax has created an opportunity for profit. Although other drivers were identified as influencing the case for investment (e.g. desire to improve sustainability, LATS) the opportunity to profit was the key factor encouraging investment. The scale of opportunity has attracted investors who may not otherwise have invested in the waste management sector to do so. However, investors need to balance other risk factors such as contractual risks, supply of feedstocks, technology risks and demand for recycled materials. Some of these factors still pose a barrier to investment (e.g. to investment in particular technologies). The standard rate escalator has allowed investments to take place in advance of the price rise that would make it viable - i.e. the visibility provided by the escalator meant that some investments happened sooner.

Waste contractors are thought to look for the lowest cost alternative to landfill. Our respondents suggested that the tax stimulates waste contractors to divert waste from landfill to the next cheapest alternative. Depending on waste treatment options available this means most waste diverted from landfill by waste contractors has gone to energy recovery and recycling, or export for these treatments overseas. It should be noted however that some contractors said the rising cost of disposal had influenced their customers to look at opportunities for reuse and waste prevention. As cost is the key driver, they felt that markets can act counter-intuitively to sustainability and the hierarchy – for example, there may be opportunities for re-use that are not explored because it makes more sense economically for the material to be sent for energy recovery (which is only one step above landfill in the hierarchy).

Respondents felt that in some areas the tax doesn't necessarily drive improvements in the efficiency of alternative treatments. Some of our respondents suggested that in some locations, charges for alternatives to landfill have risen in line with the tax. These respondents suggest that this is due to a lack of competition for individual material streams / material types and that some operators can therefore make charges only slightly cheaper than the cost of landfill. These businesses were perceived to not have an incentive to improve the efficiency of their operations while there was no competitive pressure for them to do so. It was felt that in time as capacity for alternatives increased that competition will improve efficiencies and lower costs but that the current lack of competition in some areas meant that this wasn't happening at present. Respondents who said that they operated in places where there seemed to be more competition explained that they already need to be

more economically minded in their charging.

Respondents felt that the tax has meant there is more demand for alternatives to landfill than there is capacity in the UK to satisfy, and combined with an excess of capacity in Europe this has resulted in export markets for waste materials. Overseas demand for materials for recycling and energy recovery has meant that often the most profitable option for waste management companies has been to export. If the capacity in Europe was not there other routes might have been viable in the UK. Domestic infrastructure for treating and processing waste into a fuel has grown. Excess capacity in Europe is expected to be a short term phenomenon.

Respondents explained that low quality recyclate is imported by countries such as China and as importer countries continue to tighten their specifications, overseas demand for this material is expected to fall.

Other challenges were thought to remain for the industry to overcome in coming years. Our respondents suggested that, for example, access to funding is an ongoing concern for many operators. Some consider a lack of access to the skills needed to operate alternatives to landfill (e.g. energy recovery facilities) is a barrier to growth.

Appendix one – HMRC research questions

1. **The current state of play of the waste management industry in the UK**
   - General views on the waste management industry at the moment.
     - What changes has the industry been going through?
     - What is/is not working well in the industry overall?
   - How has the waste management industry/ market for waste/ demand for services/ competition within the waste industry evolved over the last decade and through the recent economic downturn?
   - How well does the current fiscal environment support the DEFRA waste hierarchy? (i.e. prevention, reuse, recycling, other recovery, disposal)
   - Have material specific regulations (e.g. WEEE) resulted in a more significant change in waste handling and treatment options being offered for these waste streams than for general waste?

2. **The role of the landfill tax in the current environment**
   - What role does landfill tax play in the current waste management environment?
     - Has the landfill tax and associated escalator shaped the market for waste / waste businesses?
     - Has it driven change in the industry?
     - How will this change when the escalator finishes?
   - Have different parts of the industry differed in their response to changes in landfill tax and regulation? If so, how?
   - Is it possible to pass the cost of the landfill tax to other parts of the supply chain (e.g. producers, carriers, transfer stations)?
     - Has this changed over time?
   - How do businesses calculate the fees charged in relation to landfill tax?
     - How do they change with changes to the tax itself?
     - How are the charges recovered from customers delivering waste to landfill?
   - Are there are any unintended consequences of landfill tax or regulation upon the waste management industry?

3. **How decisions within the industry are made**
   - What influences decisions about how to dispose of waste? (I.e. landfill, incineration, export?)
     - What drivers influence decisions about waste disposal?
     - Management companies/disposal authorities: Who makes the decisions about where and how to dispose of the waste collected? Is this consumer driven?
     - Landfill sites/recycling centres: How do they make decisions about the type of waste they accept?
   - How does the current fiscal environment drive decisions as to which option the industry takes in terms of the DEFRA waste hierarchy?
     - What are the current incentives and disincentives of disposing of waste at the different stages of the hierarchy?
   - Has the export market for waste increased in recent years? What have been the main drivers of determining what waste is exported?

4. Drivers of innovation and investment in waste management

- What are the main drivers for diverting waste away from landfill?
    - What is the relative importance of these drivers compared with landfill tax? How might these change over time?
- How does the fiscal environment influence the decisions about the future of waste management, innovation and investment activities?
- What is the importance of the landfill tax in incentivising waste management companies to innovate their industry? E.g. recycling and more environmentally friendly waste disposal processes.
    - What are the other influences that drive innovation?
- What are the time horizons over which businesses in the sector make investment decisions?
    - What are the drivers of those investment decisions?
    - How important is the certainty over the future of landfill tax post 2014?
- What is the relative importance of domestic and international policies in driving investment and innovation in the UK?

5. Future strategic considerations for the industry

- How do stakeholders see the waste management industry / their business changing in the future?
- Is there flexibility in their business models to adapt to using different waste disposal methods in the future?
    - How far ahead are businesses planning decisions made?
    - How important is the certainty over the future of landfill tax after the escalator comes to an end?
- What are the main future challenges for the industry?

Appendix two – methodology summary

A staged approach was used for this research. Scoping interviews were conducted with sector experts, academics and trade associations, along with a review of relevant literature. The literature review was particularly useful for historical context. These elements helped confirm the rationale for the approach used in the main phase of interviewing. The views of respondents interviewed during scoping interviews have been analysed alongside the findings from phase 2.

To develop the database for phase 2, Databuild used a number of sources:

- The top 20 waste management companies by turnover were known, and the identities and roles of respondents we wanted to engage in the research was collated from desk research.
- For skip operators, smaller waste management companies and MRF operators, we used a database provided by HMRC including organisations eligible for tax purposes within specific SIC codes associated with waste management. A random sample of these organisations was taken. Records were checked online to ensure that the organisation had not ceased trading and the services that they offered were accurate. MRF operators were supplemented with details from the municipal MRF directory maintained by the Waste and Resources Action Programme (WRAP)[16].
- HMRC produce a list of landfill site operators. This list was reviewed through further desk research to remove closed sites and ensure that organisations were not included multiple times. Specialist landfills – e.g. hazardous landfills belonging to industrial producers only for their own hazardous waste – were removed.
- Incineration providers were compiled from desk research, using sources including the Defra report 'Incineration of Municipal Solid Waste' (2013)[17] and our own understanding of the key developers involved in advanced conversion technologies
- A random sample of waste collection authorities, disposal authorities and unitary authorities was produced, and the list was reviewed to ensure a spread of geographic locations within the sample (by looking for areas that were under represented in the random selection).
- Desk research was conducted to develop a database of recyclers and reprocessors – sources used included the MRW[18] and Let's Recycle[19] directories. The lists of attendees and Exhibitors to RWM 2013[20] were reviewed to ensure that new entrants and innovative operators were included in the sample[21].
- A list of investors was produced using our knowledge of the sector, and supplemented through further desk research.

16 http://www2.wrap.org.uk/local_authorities/research_guidance/online_recycling_information_system_oris/municipal_mrf.html

17 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221036/pb13889-incineration-municipal-waste.pdf

18 http://www.mrw.co.uk/

19 http://www.letsrecycle.com/directory/directory-search

20 http://www.rwmexhibition.com/

21 These lists were also used for reviewing the databases for other audiences.

Phase 2 interviews were completed across the following breakdown of respondents:

Table 3 – phase 2 interviews achieved across the research

Group	Sub-segment / target respondent		Number of interviews
Large waste management companies (top 20 by turnover)	Senior decision maker with responsibility for overall strategic direction of the company		10
Private sector organisations outside the top 20	Waste management companies offering a range of waste management solutions	Senior decision maker with responsibility for overall strategic direction of the company	5
	Waste carriers / skip operators & transfer stations		5
	Landfill site operators		5
	Incineration providers		5
	Materials Recovery Facilities		5
	Recycling/reprocessing companies		15
Local authorities	Unitary Authorities	Senior decision maker with responsibility for waste planning	4
	Waste Disposal Authorities		3
	Waste Collection Authorities		3
Investors	Interviews with senior individuals involved in making external investments in the waste management industry		5
Total			**65 interviews**[22]

The research was conducted with individuals in strategic roles with some or all responsibility for decision making within their organisation. For the commercial organisations interviewed, decision making was typically carried out by one director or a team of directors. The exact structure depended on the size of the organisations – smaller organisations tended to make decisions through one managing director, whereas larger organisations could have a team of directors within a more complex management structure. Within local authorities, those we interviewed were involved in making business cases to support investment decisions, or changes to services, before these were reviewed by senior managers and passed to elected members.

We originally intended to interview operational heads at the largest companies in addition to senior strategic decision makers. We established in the early stages of the research that the strategic decision makers would be best placed to answer HMRC's research questions rather than operational heads. Some of HMRC's research questions are strategic and it was recognised that operational staff would not necessarily be best placed to explain all of the reasons behind investment decisions and the role and influence of the landfill tax on that process.

[22] 53 of these organisations were based in England, 6 in Scotland, 4 in Wales and 2 in Northern Ireland

Originally fewer interviews were planned with recyclers/reprocessors, but the spread of diversity in the types of materials that operators were dealing with and practices used suggested more value in further interviews.

Letters were sent to approximately 300 organisations inviting them to participate in the research – an example of which can be found in figure 3 below. Overall, the research was well received and several organisations sent letters of support and expressed an interest in participating[23].

Interviews ranged from approximately fifteen minutes to over an hour, with the average interview taking approximately 35-40 minutes to complete. This depended on the depth of information that respondents were able to contribute to answering the research questions.

On completion of interviews, the findings by audience were analysed alongside each other to identify trends within audience groups and between different audiences.

Overall, qualitative research is useful in exploring themes, phenomena and opinions in detail. The limitations of such research is that research findings cannot be extended to wider populations with the same degree of certainty that quantitative analyses can, as findings are not tested for statistical significance. Within this report, where possible we have denoted where an opinion arose from one or a small number of respondents, or was held by many of those we interviewed. Care however must be taken in interpreting the findings as representative of the industry more widely.

Figure 3 – example of letter sent to businesses

Dear X,

HM Revenue & Customs (HMRC) has commissioned Databuild, an independent research agency, to conduct research into the drivers of waste diversion from landfill and innovation in the waste management industry.

HMRC wish to collect valuable insight from the waste management industry to improve our understanding of the drivers of innovation in the waste management industry, and the relevance of landfill tax in relation to other factors that encourage innovation. We will <u>not</u> be seeking opinions on the future of landfill tax policy, or discussing issues relating to the administration or collection of the tax (so would not be covering any litigation issues).

We would like to invite your company to take part in this research. We are looking to speak with a senior member of staff with knowledge of the strategic direction of your company, preferably someone who is responsible for investment decisions. If another member of your organisation would be more suitable, we would be grateful if you could pass this letter on to them.

As part of this work, Databuild would like to conduct a telephone interview with the senior decision maker at your organisation to feed into this research. Once completed, the report produced for the research will be published on the HMRC website and we will be happy to keep any interested participants notified about when the report will be available.

Representatives of Databuild may be in touch during November to arrange a convenient time to discuss the research objectives with your company via telephone. If you have any questions or

[23] Care was taken to limit the capacity of respondents using the interviews for lobbying purposes. Databuild were clear to address research objectives closely during interview and ensure that topic guides were followed. In selecting respondents, particularly with the largest waste management companies, although some letters of support were received we were careful to ensure that all organisations in the top 20 were invited to participate.

would prefer to opt-out of this research please contact XXXXXXXX. If you want to verify the authenticity of this research, please contact XXXXXXXX.

Thank you for your support and co-operation.

Appendix three – topic guides

Master topic guide

Interview topic guide:
The topic guide below is intended as a guide for the interviewer in exploring the research questions of interest to HMRC and HM Treasury. The overarching topic areas are highlighted in bold. These are followed by a series of areas of questioning under each broad topic heading that support the interviewer in ensuring that the discussion is effective in answering the research questions. Suggested lines of questioning will not be read word for word, and will only be covered where they are applicable to the respondent organisation.

1. **Background to respondent, the activities of their organisation and general views on waste management industry**

   Guide for interviewer:
   - Confirm understanding of role of respondent from initial telephone conversation and their key responsibilities
   - Briefly touch on their background [e.g. number of years working in the industry, what they were doing before that, how they came to work in their current role] to get the respondent talking, build rapport and provide context for understanding their response
   - Confirm understanding of main business activities from desk research prior to interview (what the organisation does, when it was established, geographical areas in which they operate, scope of activity – UK only or outside UK as well)
   - Encourage the respondent to discuss their general views of the waste management at the moment; probe what they think is/isn't working well at the moment

2. **Where and how has the organisation changed over the last decade in terms of the services it provides / its activities? What factors prompted the decision to change?**
   We're specifically interested in changes that ultimately support a reduction in the amount of waste sent to landfill.

   Guide for interviewer:
   - How have the organisation's activities evolved over time *[in terms of how they dispose of waste and steps they take to divert material from landfill where relevant]*; ask for a brief overview. Touch on impact of the recent economic downturn
   - What factors generally influence decisions about how to dispose of waste (i.e. landfill vs. incineration vs. recycling vs, export etc.)? Who
   - makes the decision? To what extent is this customer led?[24] Are there any exceptions (in terms of the factors that generally influence decisions); probe for details

[24] This section will be tailored for some respondents e.g. for landfill sites: How do they make decisions about the type of waste they accept? What factors influence the decision, what impact the landfill tax has on the decisions and relative importance of other factors compared to the landfill tax.

    - For landfill sites/recycling centres: how do they make decisions about the type of waste they accept?
- How has the balance of what they do changed over time and why; think about innovations and behaviour change in terms of:
    - What they do to avoid disposal – i.e. how much goes to Recovery, Recycling, Re-use / waste prevention (if relevant)
    - What they do with residual waste (e.g. landfill in UK vs. export) and why?
    - *(if not mentioned)* Is any waste disposed of outside of the UK? How much?
- What prompted these changes? Is the landfill tax and escalator an influencing factor? If so, how did it influence the change? If not, why not?

  Encourage the respondent to talk about actions in terms of changes that were primarily/solely led by landfill tax increasing the cost of waste disposal, others where it played a more secondary role and actions not influenced at all by the landfill tax.

  Probe to understand the relative importance of each factor prompting the change other than the landfill tax in comparison to the importance of the landfill tax and escalator. Are there any other fiscal factors influencing their operation and decision making?

- Probe to explore what dictates the current balance of the activities that they carry out (with reference to the waste hierarchy) to understand disincentives as well as incentives for change. Are there any reasons they can't or won't carry out certain types of activity (or increase the scale of that activity)? Why? Cover disincentives and incentives for disposing of waste at different stages of the hierarchy.
- *(If not already covered)* How well does the current taxation environment support the (Defra) waste hierarchy? (Prevention, reuse, recycling, other recovery, then disposal).

3. What recent changes/innovations have they made? We're specifically interested in changes that ultimately support a reduction in the amount of waste sent to landfill. What factors prompted the decision to change?

Ask the respondent to discuss recent developments in more depth and the factors that influenced the decision to invest/innovate/change what they do

Guide for interviewer:

- What prompted them to consider the change in the first place (could be multiple reasons) – rising cost of disposal due to landfill tax, customer demand, actions taken by competitors, policy changes, general regulatory changes, material specific regulations (e.g. WEEE) etc.
    - *(if not covered)* What is the relative importance of domestic and international policies in driving their investment and innovation in the U.K?
- Where multiple reasons, what was the relevant importance of each?
- How important was the landfill tax and certainty of the escalator in the decision making? Again, encourage the respondent to talk about

actions in terms of things that were primarily/solely led by landfill tax increasing the cost of waste disposal, others where it played a more secondary role and actions not influenced at all by the landfill tax

- (HMRC suggestion) To what degree did the reaffirmation of the escalator by the current Government in 2010 provide further certainty?

- Where decisions are influenced by customers; probe to understand how the customer influenced the decision (e.g. nature and frequency of interaction with customers) and the factors that underpin the customer demand (including the role of landfill tax)
- Were there alternatives to the course of action they took? Why did they ultimately decide to take the action they took?
- How does the decision making process work in terms of the investment decision, and factors they took into consideration – probe to understand timeframe, how the landfill tax was factored in. Try to understand what assumptions they've made about the future of the landfill tax

  (If timeframe not discussed) How far ahead are business planning decisions made? What are the time horizons over which they make investment decisions?

4. Wider influence of the landfill tax on their organisation [to ensure prompted discussion if landfill tax isn't discussed/cited above]

Guide for interviewer:

- How has / are there any other ways in which the landfill tax has affected their organisation (if at all and if not obvious from earlier discussion)? How has it affected the wider industry?
- Probe to understand what difference it has made to the industry and their situation in general. For companies dealing with waste – try to understand impact[25] Do they talk about any emerging markets or new industries dealing with waste in response to the landfill tax? Be alert to capturing any unexpected consequences of the tax (e.g. mixing of waste streams)
  - Are there any unintended consequences of landfill tax or other regulation on the waste management industry?
- How do they deal in practice with the landfill tax? If they pay landfill tax, how do they calculate the fees charged in relation to landfill tax? Do they pass this cost to other parts of the supply chain? How? Has there been any change over time?
- [where relevant] How does the landfill tax affect their customers and their demands/needs? How do they know? Do they provide advice to their customers on waste disposal / how to reduce their disposal costs by avoiding landfill?
  - [where relevant] Does waste intended for one treatment option e.g. recycling ever prove unsuitable (due to e.g. contamination) and needs to be landfilled anyway? Is this

[25] e.g. in terms of number of competitors, type of competition, innovation, their priorities, financial pressures, services they offer, types of material that they handle, quality of materials that they handle (e.g. levels of contamination), value of recycled materials etc.

communicated to customers? How does this affect the pricing of different treatment options?

- (If not already covered) Has the export market for waste increased in recent years? For what materials?

5. Plans for the future

Guide for interviewer:

- What are their plans for the future? Why? What changes are they expecting to their business activity / the wider industry over the next five years? Is there flexibility in their business model to accommodate changes e.g. to the waste disposal solutions they offer?
- What are the main future challenges facing their organisation [and the wider industry if they are in a position to comment]? How are they planning to tackle those challenges?
- Is there anything they would like to be able to do, but have yet to do so? Why? What's stopping them?

Topic guide for discussions with investors in the UK waste management industry

1. Background to respondent and organisation.

- Confirm understanding of role of respondent from initial telephone conversation and their key responsibilities
- Briefly touch on their background [e.g. number of years working in the industry, what they were doing before that, how they came to work in their current role] to get the respondent talking, build rapport and provide context for understanding their response
- Confirm understanding of their main business/ investment activities (from desk research prior completed prior to interview):
    - What the organisation does, when it was established. Do they specialise in waste management investment or is that just part of their business activity?
    - Geographical areas in which they invest, scope of activity – UK only or outside UK as well
    - How long have they been investing in the UK waste management industry?
    - Scale of activity in terms of approximate number and type of investments in the waste management industry; total value of current investments if willing to divulge
    - What prompted them to make their first investment in the industry (if respondent is able to discuss this)?

2. **How they make decisions about the type and scale of investment they make in the waste management industry.**
We're particularly interested in investments that ultimately support a reduction in the amount of waste sent to landfill, the factors that affect their decision making process and the role of the landfill tax.

- How does the process typically work? Who makes the decisions? Over what timescale are investment decisions made?
- What factors generally influence decisions about what they invest in / the scale and type of investment? Ask the respondent to describe the factors; probe as required to understand as much as possible about the influences on their investment decisions and relative importance of particular influences:
    - How do they decide where and how to invest?
    - To what extent do their clients/stakeholders influence where and how they invest? What assurances do they need to provide to their shareholders/clients?
    - Do they look for a particular rate of return / payback period from investments in waste management infrastructure or does it vary? Probe for details.
    - Has the landfill tax affected the type and scale of investment they've made in the waste management sector? If so, where and how does it feed into their decision making process. If not, why?
    - What other factors influence investment decisions; for example:
        - Policy and regulation:
            - Material specific regulations (e.g. WEEE)
            - Wider domestic policy and regulation
            - International policy and regulation

  - Wider benefits of investment – environmental, social etc.
  - The economic climate
  - Anything else that influences the decision
- To what extent and how is the type of activity/infrastructure they invest in influenced by each of the factors discussed above? Encourage the respondent to comment on the relative influence of each factor compared to the landfill tax. Can the respondent comment in terms of areas of investment primarily driven by the landfill tax, areas where the landfill tax played a role but was a secondary influence and areas where the landfill tax was not influential?

3. Where and how has the organisation changed over the last decade in terms of the type and scale of investment that it has made in the waste management industry? *We are specifically interested in investments that ultimately support a reduction in the amount of waste sent to landfill. What factors prompted the decision to invest?*

- How have the organisation's investment activities evolved over time [in terms of the type and scale of investments made to divert material from landfill]; ask for a brief overview. Touch on impact of the recent economic downturn
- How has the profile of their investments changed over time (if at all) and why; think about innovations and behaviour change in terms of different levels of the waste hierarchy – incineration, recovery, recycling, re-use/ prevention (if relevant)
- What prompted these changes? Is the landfill tax and escalator an influencing factor? If so, how did it influence the change? If not, why not?

  Again, encourage the respondent to talk about changes in the type/ scale of investment in terms of changes that were primarily/ solely led by landfill tax increasing the cost of waste disposal, others where it played a more secondary role and actions not influenced at all by the landfill tax. Probe to understand the relative importance of each factor prompting the change other than the landfill tax in comparison to the importance of the landfill tax and escalator.
- Is there any type of activity or organisation in the waste management industry that they don't / wouldn't currently invest in? Why?

4. **Discussion of current/recent investments.**
Ask the respondent to discuss recent investments in more depth and the factors that influenced the decision to invest.

- What prompted them to consider the investment in the first place (could be multiple reasons) – rising cost of disposal due to landfill tax, customer demand, actions taken by competitors, policy changes, general regulatory changes, material specific regulations (e.g. WEEE) etc.
  - Where multiple reasons, what was the relevant importance of each?
- How important was the landfill tax and certainty of the escalator in the decision making? Again, encourage the respondent to talk about investments in terms of areas of investment that were primarily/ solely led by landfill tax increasing the cost of waste disposal, areas where it played

a more secondary role and investments not influenced at all by the landfill tax
- Were there alternative investment options open to them at the time? Why did they decide to invest in the way they did rather than pursuing alternative investment opportunities?
- How did the decision making process work in terms of the investment decision, and factors they took into consideration – probe to understand timeframe, how the landfill tax was factored in. Try to understand what assumptions they've made about the future of the landfill tax beyond 2014.

5. Plans for the future.

- What are their plans for the future? Why? What changes are they expecting to their investment activity / the waste management industry over the next five years?
- What are the trends in the waste management industry (e.g. emerging markets or new industries dealing with waste) and what is driving change?
    - How are these expected to impact on their investments or the types of projects they invest in?
- Is there any type of activity they would like to be able to invest in, but have yet to do so? What and why? What's stopping them?
- [If not covered above] What assumptions have they made regarding the landfill tax post-2014?
- How [if at all] is the lack of certainty over the future of the landfill tax affecting their investment decisions?
- What do they consider to be the main future challenges facing their organisation [and the wider industry if they are in a position to comment]? How are they planning to tackle those challenges?

Appendix four – documents reviewed during phase one of research

- Addressing the economics of waste – Davies & Doble, OECD, 2004
- Defra C&I survey 2009 (Produced by Jacobs Engineering)
- Defra economics of waste and waste policy 2011
- Defra government review of waste policy 2011
- Environmental taxes – within the Mirrlees review, 2011
- Eunomia Research:
    - Impact assessment of the landfill tax escalator 2008
    - Residual Waste Infrastructure review May 2013
- Finnveden, G., Bjorklund, A., Reich, M.C., Eriksson, O. & Sorbom, A (2007). Flexible and robust strategies for waste management in Sweden. *Waste Management, 27(8),* S1-S8.
- Martin, A., Scott, I (2003). The Effectiveness of the UK Landfill Tax. *Journal of Environmental Planning and Management, 46(5),* 673-689.
- Morris, J. R. & Read, A. D. (2001). The UK landfill tax and the landfill tax credit scheme: operational weaknesses. *Resources Conservation & Recycling, 32(3),* 375-387.
- Morris, J. R., Phillips, P. S. and Read, A. D. (1998) The UK Landfill Tax: an analysis of its contribution to sustainable waste management. *Resources, Conservation and Recycling. 23(4),* 259-270.
- Pires, A., Martinho, G. & Chang, N (2011). Solid waste management in European countries: A review of systems analysis techniques. *Journal of Environmental Management, 92(4),* 1033-1050.
- The assessment of social costs and benefits of waste disposal. CSERGE Working Paper WM 1994-06
- The Chartered Institution of Wastes Management Research into SRF and RDF Exports to Other EU Countries, 2013
- The Effects of the landfill tax and Aggregates Levy by an analysis of aggregates markets since 1990. BDS research for the British Aggregates association
- WRAP gate fee report 2013

DATABUILD

Research & Solutions

Databuild Ltd 21 Graham Street Birmingham B1 3JR

tel 0121 687 1144 fax 0121 687 1155

email research@data-build.co.uk www.data-build.co.uk