OFFICE OF FAIR TRADING

More competition, less waste

Public procurement and competition in the municipal waste management sector

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EXECUTIVE SUMMARY

This report aims to identify how the use of landfill to dispose of municipal waste in England could be reduced through the development of competitive markets. It also considers how competition could be enhanced for the municipal waste collection services. It draws primarily on research conducted as part of the Office of Government Commerce (OGC) Second Kelly Market (SKM) waste management project. The value of the municipal waste management services sector is estimated to be approximately £2 billion.[1]

Changing policy environment

Historically, the UK has been reliant on landfill for waste disposal. However, recent EU legislation, in particular the EU Directive on landfill waste (the Landfill Directive),[2] and government regulation, means this must change. This new legislation requires substantial reductions in the amount of biodegradable municipal waste (BMW) being landfilled.[3]

The Department for Environment, Food and Rural Affairs (Defra) is responsible for putting in place policies and support mechanisms that:

- ensure the diversion of municipal waste away from landfill, and
- help local authorities deliver around £300 million worth of efficiency gains in waste services.

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[1] Defra Local Authority Waste Recycling, Recovery and Disposal (LAWRRD) model. See: www.defra.gov.uk/corporate/consult/wastestratreview/partialRIA.pdf

[2] Council Directive 99/31/EC of 26 April 1999, entered into force 16 July 1999. www.europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31999L0031&model=guichett. This Directive has been implemented in England and Wales: The Landfill (England and Wales) Regulations 2002.

[3] EU obligations require the volume of BMW sent to landfill to be reduced to 75 per cent of the 1995 level produced by 2010; 50 per cent by 2013; and 35 per cent by 2020.

Government is committed to achieving landfill reduction targets, derived from European directives, and in order to meet Defra's statutory waste targets (and avoid the fines for exceeding the landfill allowances),[4] local authorities (LAs) will have to turn increasingly towards new waste treatment technologies to manage municipal waste. However, the infrastructure to meet the waste targets does not currently exist, with some estimating that 2,300 new waste treatment facilities will be required by 2020.[5] Evidence suggests that even if the currently planned treatment facilities were completed within the project timescales, there is a serious risk that the Landfill Directive targets would still not be met.[6]

The changing policy framework, sheer volume of legislation related to waste management and the burden of keeping up to date with changes in regulatory requirements is creating a climate of uncertainty. Defra, through its Waste Implementation Programme (WIP), already provide extensive support and funding to overcome this uncertainty and the aim of the Defra *Review of Waste Strategy*, due to be published later this year,[7] is to improve policy clarity and promote private sector investment in the treatment facilities the UK needs.

Why is competition important?

Competitive markets are vital to the delivery of Defra's objectives, to ensure the diversion of municipal waste away from landfill, and to help local authorities deliver around £300 million worth of efficiency gains in waste services.

Within competitive markets efficient firms grow and are rewarded for their investment and innovation. Procuring from such markets will therefore help ensure that cost effective capacity is put in place to meet Defra's objectives.

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[4] In order to incentivise local authorities to meet the targets, the Landfill Allowance Trading scheme has been introduced under the Waste and Emissions Trading Act 2003. This also includes fines of £150 per tonne for exceeding the allowance.

[5] *The State of the Nation 2004*, published by the Institute of Civil Engineers, June 2004.

[6] Based on evidence collected as part of the OGC SKM project.

[7] The review of the Waste Strategy is currently out for consultation. See: www.defra.gov.uk/corporate/consult/wastestratreview

In the waste management sector, competition is about the intensity of rivalry between bidders to provide both a quality service and a fair price, and about openness to new entrants. As the treatment sector grows it is vital that LAs avoid the pitfalls associated with over dependency on a limited number of suppliers. This paper sets out the issues they will face.

Key findings

Municipal waste collection

Unlike treatment, the collection of municipal waste is relatively easy for many firms to provide. Small firms are likely to be able to deliver waste collection contracts as efficiently as larger firms.[8]

Local authority in-house providers (known as Direct Service Operators (DSOs)) are currently the major players in the municipal waste collection sector, holding around 52 per cent of contracts by tonnage, and this prevalence does not appear to vary across regions. The remaining contracts are held by the larger waste management services suppliers and a number of smaller suppliers.

LAs may be able to make more of competition for municipal waste collection services by setting contract length to reflect the need for suppliers to be able to recover sunk costs: as the typical asset life is estimated to be around five years this may be an appropriate upper limit. In order to encourage more bidders, LAs should also avoid setting selection criteria requiring suppliers to have previous experience in the municipal waste collection sector. When including in-house providers in an invitation to tender LAs should take care to ensure fair competition so that private suppliers are not discouraged from bidding.

The following table summarises the OFT's recommendations for the procurement of municipal waste collection services.

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[8] This is in the absence of significant economies of scale and scope. The irrecoverable costs involved are not likely to be significant and entry barriers are relatively low. Average costs of collection will fall with rising output (economies of scale) to a limited extent, that is, only up to the size of the collection vehicle. More significant will be the cost advantages that firms with contracts to collect waste from closely located households possess over those firms having to travel greater distances between households to collect the waste (economies of density).

Table A: OFT recommendations for municipal waste collection

Recommendation	Reasons
• Let contracts of a length to enable suppliers to recover any sunk costs but no longer. As suppliers indicated that typical asset life is around five years, this may be an appropriate upper limit.	• Relatively short lifespan of assets and the ability to recover costs on exit through selling vehicles on the secondhand market, suggests contracts need not be more than a few years. • On average we found that collection contracts last seven years, but can last up to 26 years. The OECD[9] reports shorter contract lengths in other countries (for example, three - five years in Italy). • The longer the contract, the greater the risk of deterring other firms from bidding because the incumbent supplier has a more established position and detailed knowledge of costs; and the less flexibility local authorities have to adapt to changing circumstances.
• Use 'open'[10] procurement processes.	• Relatively simple nature of municipal waste collection suggests that there is less justification for 'restricted'[11] or 'negotiated' procurement processes.
• Care should be taken not to set overly restrictive selection criteria.	• Relative ease of specifying and monitoring collection services suggests previous experience of providing collection services is not vital. • Limited economies of scale suggest that small firms should be able to compete, so should not be excluded by the selection criteria.
• Arrange access or acquire sites where potential suppliers' access to facilities is difficult.	• Potential suppliers may be deterred from bidding for contracts if they do not have access to necessary facilities, such as vehicle depots or transfer stations.

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[9] Organisation for Economic Cooperation and Development (OECD) report, *Competition in local services: Solid waste management* 2000.

[10] 'Open' procurement is where all suppliers can tender.

[11] Restricted procurement is a two stage process where all suppliers may express an interest but only those suppliers (a minimum of five) selected from those who meet the client's minimum requirements for economic and financial standing and technical capabilities may tender.

• Consider carefully what services are aggregated and why when jointly procuring municipal waste collection with other waste management services.	• No evidence suggesting significant cost savings from the joint provision of collection and other waste management services. • Bundling collection with other waste management services, particularly landfill, may significantly restrict the number and type of bidders.
• Ensure fair competition between in-house and private sector bidders.	• Competition between DSOs and private sector will drive efficiency and improve value for money.
• Be aware of the risks of collusion, for example, monitor results.	• If contracts are tendered frequently and there are repeated interactions between firms there are opportunities for collusion. • OECD has cited evidence of anti-competitive behaviour in other countries.

Municipal waste treatment

The policy direction is clear – more waste in the UK will be treated or recycled rather than sent to landfill. Waste treatment is more capital intensive than landfill, due to the processing facilities required, and this raises the level of challenge in ensuring that a competitive market emerges.

When procuring municipal waste treatment services LAs often enter into a long-term contract with a supplier who will both build the facility and then treat the waste for a given number of years.

Currently larger private sector firms able to supply integrated waste management services[12] are prevalent in this sector. In some regions a single firm may hold a very high market share. This may be associated with the location of supplier's assets such as landfill sites as local authorities may aggregate treatment and landfill contracts. Therefore, particular care should be taken about aggregating municipal waste treatment and landfill contacts. Finding mechanisms to deliver bids from a number of suppliers, both within and outside the region, is a priority to mitigate the risk of regional monopolies developing and becoming entrenched. Disaggregation of contracts may be a way of achieving this aim. LAs should also take care to guard against the risks of

[12] Integrated contracts cover all waste management services - collection, treatment and disposal (landfill).

collusion. For example, information relating to 'deal flow' of waste management contracts may encourage bidding but care needs to be taken to avoid giving suppliers the ability to collude and share out contracts.

The table summarises the OFT's recommendations for the procurement of municipal waste treatment services.

Table B: OFT recommendations for municipal waste treatment

Recommendation	Reasons
• Weigh up carefully the costs and benefits of specifying inputs as opposed to outputs.	• Specification of which treatment technology a LA wants to procure risks restricting bidder participation and reducing scope for innovation.
• Arrange sites and planning permission prior to putting contracts out to tender where possible or share the risk with suppliers.	• Considerable risks relate to obtaining planning permission and it is often a lengthy, difficult process, which could deter bidders not best placed to manage these risks. • Many LAs have not identified sites for planned facilities and the lengthy planning process threatens delivery against statutory waste targets.
• Remain open to consortia bids, especially where smaller waste management companies and companies with relevant experience from other sectors are involved.	• Suppliers' previous experience in the waste management sector is often a prerequisite for LAs. • There may be potential suppliers with the relevant skill set (for example, from the construction industry) and smaller waste management companies who may be able to join a consortium, widening the supplier base.
• Consider carefully what services are aggregated and why. • Particular care should be taken about aggregating municipal waste treatment and landfill contracts.	• Aggregating treatment with landfill contracts can strengthen regional dominance of suppliers who own landfill sites. • Economies of scale may justify aggregation of contracts and larger contracts may attract more bidders. But they also potentially exclude smaller suppliers so the approach to aggregation must balance these risks.
• Encourage bids from suppliers active outside the region, for example, by ensuring that they will have access to landfill sites.	• Potential suppliers may be deterred from bidding for contracts if they do not have access to necessary facilities, such as landfill sites.

• Ensure fair competition between private sector bidders and LAWDCs.	• Some suppliers have indicated that they would rarely bid in direct competition with a LAWDC. • Fair competition between local authority waste disposal companies (LAWDCs) and private sector will drive efficiency and improve value for money.
• Consider building waste treatment facilities that can meet the needs of the industrial and commercial sector as well as LA demand.	• Limited anecdotal evidence suggests LAs may not be able to build treatment facilities with additional capacity to service private sector demand. • Competition for industrial and commercial waste may be adversely affected by LAs actions. Industrial and commercial waste accounts for a much more significant proportion of the waste stream. • Larger treatment facilities will be better able to realise economies of scale which means waste will be cheaper to treat.
• Be aware of the risk of collusion. • The results of competitive tendering at a regional/national level should be subject to independent monitoring. Defra and LAs should be aware of risks of market sharing.	• Certain characteristics of the municipal waste treatment sector may facilitate collusion: • Relatively few suppliers and few new entrants in the treatment sector; • Need for many new treatment facilities so scope for repeated interactions between suppliers; and • Current strong regional variation in presence of suppliers could provide a basis for collusion, for example, by regionally sharing markets.

CONTENTS

Note: [...][C]

Confidential information in the original version of this report had been redacted from the published version. Redacted confidential information in the text of the published version of the report is denoted by [...][C].

1 INTRODUCTION

1.1 The purpose of this report is to assess the impact of public sector procurement on competition in municipal waste management services[13] and to propose ways in which public procurers could further benefit from competition when procuring municipal waste management services.

1.2 This report forms part of the Office of Government Commerce (OGC) Second Kelly Market project (SKM), which aims to improve strategic procurement in the municipal waste management sector. The SKM project is part of the OGC's wider Kelly programme, which aims to increase competition and long-term capacity planning in markets where the Government possesses significant purchasing power.

1.3 The report is intended to inform the SKM project and Department for Environment, Food and Rural Affairs (Defra) officials in the Waste Implementation Programme and the Waste Strategy divisions. Defra are currently consulting on their Review of England's Waste Strategy[14] and this report may help advise on how waste procurement can be improved.

1.4 Preliminary findings of the OGC's study that are of particular relevance to this report are as follows:

- local authorities (LAs) are currently reliant on a few key suppliers in the treatment and disposal markets, and major projects are unable to sustain sufficient levels of competitive pressure throughout the bidding process

- there are very few new market entrants for waste disposal and treatment contracts, and

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[13] This includes the collection, recovery and disposal of household waste, civic amenity waste and street cleansing services.

[14] Defra Consultation on the Review of England's Waste Strategy. See: www.defra.gov.uk/corporate/consult/wastestratreview

- limited bid capacity means that suppliers are very selective about which projects they bid for.

1.5 These findings, together with the clear need for significant additional investment in treatment facilities as highlighted in paragraph 4.2, suggest that LAs will need to make concerted efforts to encourage both existing suppliers and potential new entrants to bid for their contracts, to enable them to achieve Best Value.

1.6 This report focuses only on the collection and treatment[15] of waste in the municipal waste management industry.[16] In addition, both this report and the wider SKM project are applicable to England only, although the OGC will share best practice with the devolved administrations on an on-going basis.

1.7 This report draws on:

- the OGC survey of local authorities, referred to as the SKM survey of local authorities in England (2005)[17]

- case studies of six local authorities carried out by OGC, and

- other evidence collected as part of the OGC SKM project.

1.8 In this chapter we start by setting out some background about the municipal waste management sector, including the main legislative requirements. We then outline how public procurement is organised and discuss the ways in which public procurement in this sector could affect competition.

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[15] Our report considers Energy from Waste (EfW) to be a waste treatment technology.

[16] Waste disposal by landfill and recycling are not covered.

[17] This survey had a response rate of 71 per cent of all municipal waste authorities in England. Local authorities were asked to provide details of contracts procured over the last three years. The data from the SKM survey referred to in the OFT's report has undergone statistical testing and the results found to be significant in all cases referred to.

Municipal waste management

1.9 Municipal waste is defined as **'waste from households, as well as waste which, because of its nature or composition, is similar to waste from households'.**[18] The demand for municipal waste management services is derived from the demand by consumers to have the waste that they create taken away.

1.10 In 2003-04, 29.1 million tonnes[19] of municipal waste was created in England alone: private households accounted for 87 per cent of this waste (with around 510kg of waste being collected per person). This accounts for less than 10 per cent of total waste generated in England in 2003-04. Approximately 68 per cent of municipal waste is biodegradable.[20] The value of the municipal waste management services sector is estimated to be approximately £2 billion.[21]

1.11 After municipal waste, whether biodegradable or otherwise, has been collected it is then either recycled, sent untreated direct to landfill or treated and then sent to landfill (see Figure 1.1).

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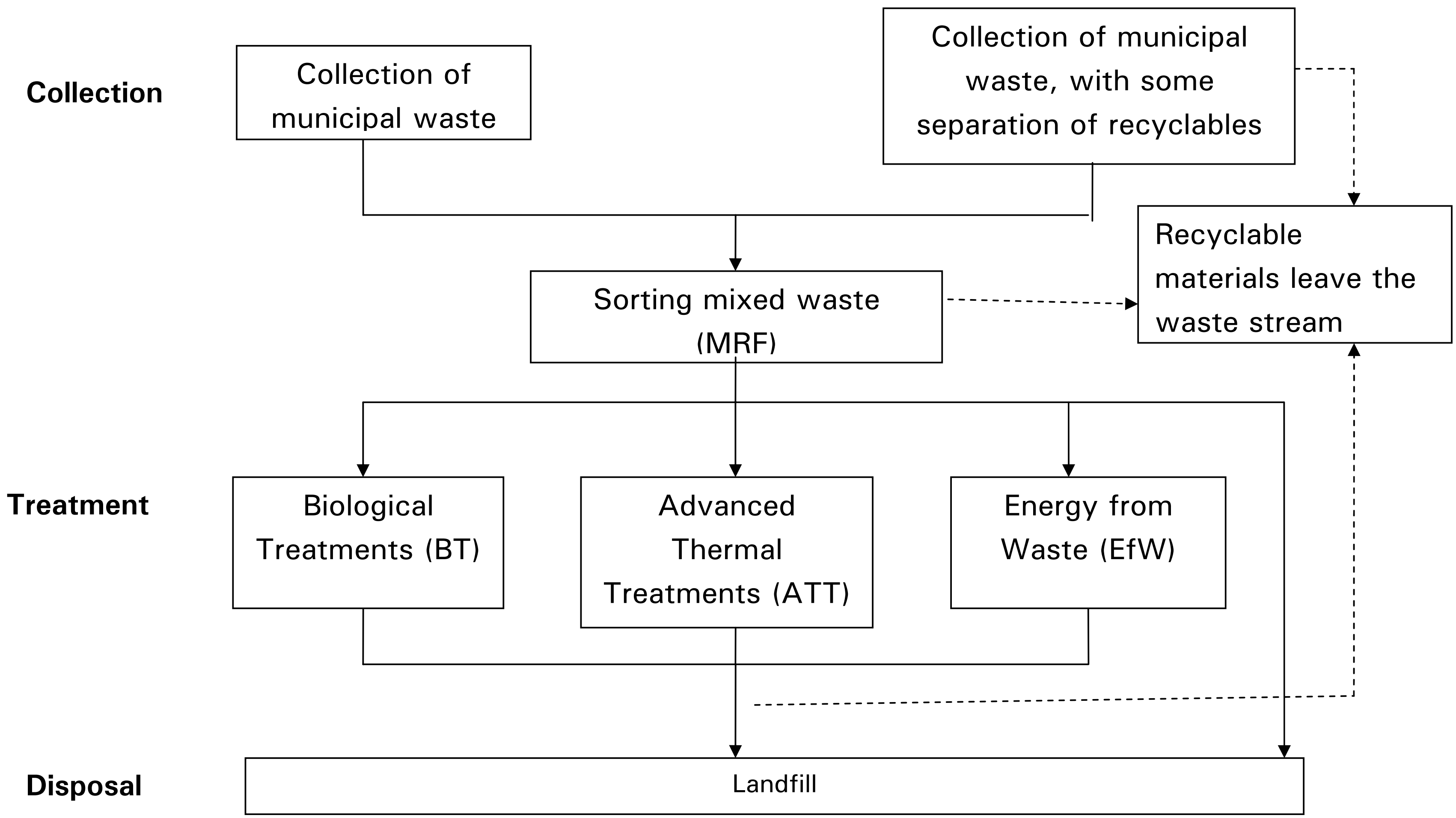
[18] As defined in Article 2(b) of the EC Landfill Directive.

[19] Municipal waste management statistics: www.defra.gov.uk/news/2005/050308b.htm

[20] This includes garden wastes, kitchen wastes, general household sweepings, soil, paper, wood and even some textiles.

[21] Defra Local Authority Waste Recycling, Recovery and Disposal (LAWRRD) model. See: www.defra.gov.uk/corporate/consult/wastestratreview/partialRIA.pdf

Figure 1.1: Structure of municipal waste management services



1.12 It should be noted that the different waste treatments are not wholly substitutable for each other and indeed some are complementary. Therefore, a LAs waste solution could encompass more than one treatment technology, although there is likely to be one main technology that is used. In addition, no combination of waste treatments will completely eradicate the need for landfill as some residue will remain which must be disposed of.

Changing policy environment

1.13 The prevalence of disused quarries in UK resulted in the widespread availability of potential landfill sites, and helped ensure that landfill has been a cheap option for waste disposal. As a result, the UK is currently very reliant on landfill as a means of disposal, with 72 per cent of municipal waste sent to landfill in 2003-04.[22]

1.14 However, this reliance is set to change due to government regulation and recent EU legislation, in particular the EU Directive on landfill waste[23] (the Landfill Directive). These require substantial reductions in the amount of biodegradable municipal waste (BMW)[24] being landfilled. As a result, the UK will have to reduce sharply its reliance on landfill.

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[22] Statistics taken from the *Municipal Waste Management Survey 2003-04*, National Statistics publication produced by Defra (2004).

[23] Council Directive 99/31/EC of 26 April 1999, entered into force 16 July 1999. www.europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31999L0031&model=guichett. This Directive has been implemented in England and Wales: The Landfill (England and Wales) Regulations 2002.

[24] The Landfill Directive defines BMW as 'waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard' www.defra.gov.uk/environment/waste/strategy/landfill/2.htm

1.15 In particular the Landfill Directive sets targets for the amount of BMW which can be sent to landfill:

- by 2010 to reduce BMW landfilled to 75 per cent (by weight) of that produced in 1995
- by 2013 to reduce BMW landfilled to 50 per cent (by weight) of that produced in 1995, and
- by 2020 to reduce BMW landfilled to 35 per cent (by weight) of that produced in 1995.[25]

1.16 To incentivise LAs to meet the above targets, the Landfill Allowance Trading Scheme (LATS) was introduced in April 2005.[26] Under this scheme, LAs will be allocated tradable BMW allowances for landfill each year, which will reduce year on year. The fine for exceeding the allowances is £150 per tonne but the LA has the option to borrow up to 5 per cent of the following year's allowances in certain years. The LATS scheme operates in a number of phases separated by target years. During these phases permits can be sold, banked or borrowed but deficits and surpluses cannot be carried forward across target years.

[25] The directive also requires that waste must be pre-treated before being landfilled and that landfill gas must be collected, treated and used to produce energy.

[26] Under the Waste and Emissions Trading Act 2003.

1.17 To comply with the Landfill Directive, the UK needs to divert a significant amount of municipal waste away from landfill, which will therefore force LAs to make greater use of alternative methods of waste treatment for the management of municipal waste. However, the statutory targets for diverting waste from landfill only apply to BMW and not apply to other forms of waste (for example, commercial and industrial waste).[27]

1.18 In contrast, the landfill tax escalator must be paid by all landfill site operators, who are likely to pass this cost on to customers wishing to dispose of all forms of waste (that is, commercial, industrial etc). The landfill tax is therefore another way of discouraging the use of landfill. The current standard rate of disposal is £18 per tonne and this is set to increase by at least £3 per tonne in future years, on the way to a long-term rate of £35 per tonne.[28]

1.19 To summarise, in the short term, the Landfill Directive, which applies to municipal waste only, is highly likely to divert demand from landfill to waste treatment, but in the medium to longer term, the landfill tax escalator will 'bite' and commercial / industrial waste is also likely to be diverted from landfill.

1.20 In addition to the Landfill Directive, each Member State in the EU has adopted a waste strategy to ensure that all LAs contribute to achieving targets set by the various EU directives, such as the EC Waste

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[27] All waste under the control of LAs will be subject to the requirements of the Waste and Emission Trading Act (WETA) 2003. Therefore, where LAs collect trade waste (for example, commercial and industrial), this will be covered by WETA. The aim of WETA is to make use of the most cost effective and economically sound way to reduce the amount of BMW that is sent to landfill for final disposal and so meet the Landfill Directive targets. It provides for the setting up of LATS and creates a requirement for LAs in two-tier areas to produce Joint Municipal Waste Management Strategies.

[28] www.hm-treasury.gov.uk/pre_budget_report/prebud_pbr02/press_notices/prebud_pbr02_presshmt2.cfm

Framework Directive, the EC Hazardous Waste Directive and the EC Packaging Waste Directive.[29] LAs are subject to statutory performance standards for household recycling which are at differing levels for different LAs but the UK Government's Waste Strategy 2000 sets national targets. The UK Government has recently issued a consultation document on the review of England's waste strategy. Among other proposals the document states that the Government is considering revised national targets to further increase the targets levels for recycling and composting of household waste. The proposed targets are set out below:

- by 2010 to achieve a level of household recycling and composting of 40 per cent and achieve municipal waste recovery[30] level of 53 per cent

- by 2015 to achieve a level of household recycling and composting of 45 per cent and achieve a municipal waste recovery level of 67 per cent, and

- by 2020 to achieve a level of household recycling and composting of 50 per cent and achieve a municipal waste recovery level of 75 per cent.

How waste management services are procured

1.21 LAs have responsibility for managing municipal waste (collecting, recycling, treating and disposing of the waste in a legal manner), which is funded by council tax receipts, Environment and Public Services

[29] Council Directive 75/442/EEC as amended by Council Directive 91/156/EEC; Council Directive 91/689/EEC; European Parliament and Council Directive 94/62/EC.

[30] The Defra Waste Strategy 2000 defines recovery as obtaining value from wastes through recycling, composting, other forms of material recovery (such as anaerobic digestion) and energy recovery (combustion with direct or indirect of energy produced, manufacture of refuse derived fuel, gasification, pyrolysis, or other technologies).

Committee (EPSC) allocations and Defra's Waste Performance and Efficiency Grants.[31] There are approximately 400 LA bodies in England that handle waste and these include:

- **273 waste collection authorities (WCAs)**, typically district councils, who have a statutory responsibility for the collection of municipal waste

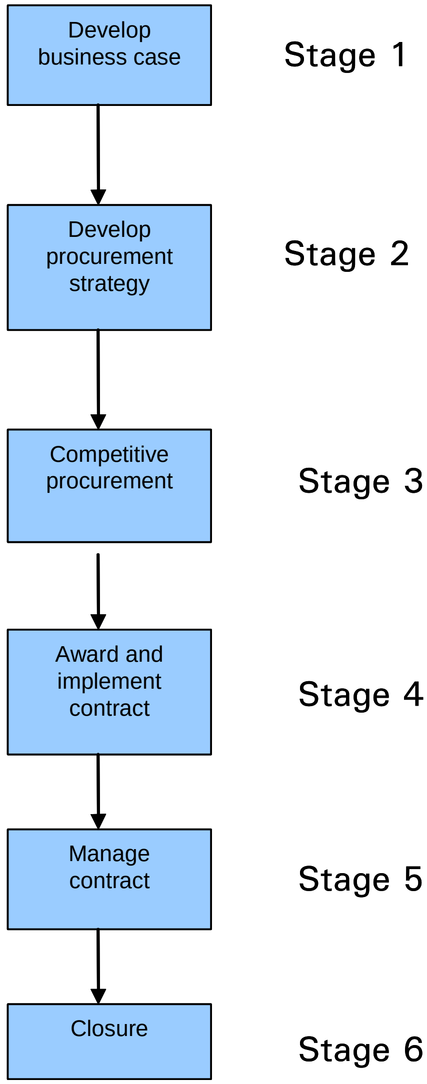
- **39 waste disposal authorities (WDAs),** typically county councils, who have a statutory responsibility for treating and disposing of municipal waste from their constituent WCAs, and

- **82 unitary authorities (UAs)**, typically large metropolitan boroughs and certain London boroughs, who have a statutory responsibility for the collection and subsequent treatment and disposal of municipal waste.

1.22 The different stages of the procurement process are outlined below in Figure 1.2.

[31] This grant will support new and more efficient ways to deliver waste reduction and increase recycling and diversion from landfill. For further details see: www.defra.gov.uk/environment/waste/localauth/funding/index.htm

Figure 1.2: Stages of the public procurement process[32]



[32] Based on OGC's Successful Delivery Toolkit: Evaluation Strategy document. See: www.ogc.gov.uk/sdtoolkit/deliveryteam/briefings/procurement/supplierassessment/evaluatstrategy.html

1.23 Both Defra and the Department for Communities and Local Government (DCLG) have a central role in setting waste policy and strategy; however, our focus is on LAs' development of waste procurement strategies (Stage 2) because this is the main stage at which public procurement can influence competition and it sets the scene for Stages 3, 4 and 5. For example, LAs will have to decide whether to specify inputs or outputs, choose the length of contract, selection criteria and how they will monitor performance. They will also have to decide whether to aggregate contracts for different waste management services and whether to collaborate with other LAs.

1.24 Local Authority (including WCAs, WDAs and UAs) procurement used to be based on 'Compulsory Competitive Tendering'. However in 1999, this was replaced by the concept of 'Best Value',[33] which requires LAs to deliver their waste management services to clear standards covering both cost and quality. It also encourages LAs to develop and interact with a diverse range of suppliers.

Effects of public procurement of waste management service on competition

1.25 Competition may be defined in most general terms as a process of rivalry between firms to sell their products or services to customers. Competition is not just about the number of suppliers in a market but about the intensity with which suppliers compete to meet the needs of their customers, and about the openness of new entrants. In the municipal waste management industry, competition is a means of achieving Best Value, and will typically be assessed on the basis of quality of service provision as well as price.

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[33] Under best value, local authorities will be required to make arrangements to secure continuous improvement in the way in which their functions are exercised, having regard to a combination of economy, efficiency and effectiveness. In deciding how to fulfil the duty, a LA must consult people who have an interest in the area.

1.26 In September 2004, the OFT published some preliminary research assessing the impact of public procurement on competition ('the DotEcon research').[34] This report identified a number of ways in which the public sector, by virtue of its buyer power, can restrict and distort as well as protect and promote competition. A key finding from the report is that the potential impact of procurement on competition depends on the market conditions; therefore, procurement practices need to be assessed on a case-by-case basis, taking into account the characteristics of the market in which the procurement takes place.

1.27 In waste management services, the main ways in which public procurement can affect competition appear to be through:

- actions which can restrict the number of bidders or create incumbency advantages
- contract aggregation and collaboration
- the level of in-house provision
- actions that may facilitate collusion, and
- actions that may have knock-on effects on other buyers.

[34] *Assessing the impact of public procurement on competition* (OFT742), report by DotEcon for the OFT, September 2004.

1.28 We describe the impact of these actions on competition in more detail below.

Actions which can restrict the number of bidders or create incumbency advantages

Specifying inputs

1.29 Should LAs specify which treatment technologies they want to procure? One of the principal advantages of output-based contracts is that they encourage innovation by suppliers and do not restrict the choice of suppliers. However, there may also be advantages from specifying inputs, such as increasing the certainty for bidders which can reduce bid costs and increase participation.

Contract length

1.30 Contracts should be of an appropriate length to allow suppliers to recover any sunk costs made when entering the market. Longer contracts can encourage participation by making contracts more attractive to prospective suppliers, whereas shorter contracts could deter participation. The longer a contract is, the greater the risk of creating an incumbency advantage because the incumbent supplier will gain a more detailed knowledge of the costs involved in providing a service and/or may have a better understanding of the requirements of the LA. This may dissuade rival suppliers from bidding for future tenders, especially where there are significant barriers to entry. Further, long contract lengths give LAs less flexibility to adapt to changing circumstances.

Procurement route

1.31 There are three main procurement routes that LAs use to procure waste management services:[35]

- open procurement - where all suppliers can tender
- restricted procurement - a two stage process where all suppliers may express an interest but only those suppliers selected from those who meet the client's minimum requirements for economic and financial standing and technical capability may tender
- negotiated procedure - a two stage tender where only those suppliers selected from those who meet the client's minimum requirements for economic and financial standing and technical capability may tender and the client may negotiate the terms of the contracts with these suppliers, and

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[35] Definitions taken from OGC's Successful Delivery Toolkit: Requirements definition and procurement strategy. See: www.ogc.gov.uk/sdtoolkit/deliveryteam/procurement/3_procstrat.html. In addition to these three main routes, a competitive dialogue procedure is likely to apply to PFI procurements in future. The EU directive defines 'competitive dialogue' as a procedure in which any economic operator may request to participate and whereby the contracting authority conducts a dialogue with the candidates admitted to that procedure, with the aim of developing one or more suitable alternatives capable of meeting its requirements, and on the basis of which the candidates chosen are invited to tender. (See: www.europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=en&numdoc=32004L0018&model=guichett)

- 'other' procurement routes including procurements with an existing supplier, for example, under a strategic partnering arrangement.[36]

1.32 It is likely to be more appropriate to use restricted or negotiated procedures where bid costs for suppliers are high relative to the value of the contract, the service being procured is quite complex and bids are difficult and time-consuming to evaluate. A further factor to consider is that where there is an incumbent supplier, or a firm with a clear advantage, it may benefit from, and therefore lobby for, a negotiated procedure.[37]

Selection criteria

1.33 To make the most of potential competition, it will be important for LAs to ensure that selection criteria, that is, prequalification and evaluation/assessment criteria, do not discriminate unduly in favour of incumbent providers.

1.34 Pre-qualification criteria provide a way for firms to demonstrate their competency and a way for LAs to objectively screen bids. However, prequalification criteria should be proportionate to the size and risk of the contract and if they are unnecessarily strict, they may limit participation significantly. For example, some prequalification criteria require suppliers to have previous experience: the rationale for this is strongest when a complex service is being procured, and where it will be difficult to monitor the quality of service provided by the contractor.

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[36] Partnering is a form of collaborative working between customers and suppliers and the aims of partnering arrangements are often expressed in terms of business outcomes rather than specific outputs or improvements. Partnering, however, is not likely to be appropriate for every situation; it is a long term relationship, usually over five years and often much longer, where customers and providers adopt long term rather than short term views. See: www.ogc.gov.uk/sdtoolkit/deliveryteam/briefings/businesschange/effectivepartnering.html

[37] See *Bidding Markets*, Paul Klemperer, (June 2005).

1.35 Evaluation criteria may, perhaps inadvertently, place more emphasis on short term benefits (for example, lower prices) than long term benefits (for example, a number of firms being capable of providing the service at the re-tender stage, which could ensure that prices and levels of quality are competitive). A strong focus on getting the lowest price can discourage existing firms or potential entrants to invest in R&D and quality improvements because such investments cannot be recouped through higher prices. Not only could this lead to less innovation and fewer choices in the longer term, but also to higher prices than otherwise, if incentives to invest in technologies that reduce production costs, but require firms to invest in assets that are only of use to a LA, are undermined. Even where a contract is not awarded explicitly on the basis of lowest price, bidders will form expectations about the relative weight given to price compared to other criteria. LAs can influence these expectations by being more explicit about how they weight different selection criteria.

Allocating planning permission risks

1.36 Waste treatment facilities require planning permission. Completely transferring the planning risk to the supplier can create uncertainty and increase costs for firms, which will affect their incentives to bid for contracts. LAs can instead approach this issue in different ways, for example, taking on this risk themselves by obtaining planning permission before going out to tender or sharing this risk with the supplier.

Contract aggregation and collaboration

1.37 The degree of aggregation and/or collaboration that is appropriate from an economic viewpoint will depend on factors such as the optimum scale of the facility (that is, the scale at which average costs are lowest) and whether there are significant economies of scope (that is, synergies or cost savings) between different services being procured together.

1.38 Contract aggregation[38] of different municipal waste services and collaboration where a contract goes out to tender for the same municipal waste service across LAs can have both positive and negative effects on competition.

Positive effects:

- It can increase participation by increasing the attractiveness of contracts, especially where bid costs are high

  - Contract aggregation and/or collaboration may increase the number of bidders where bid costs are high. This is because bid costs will be a lower proportion of the value of the contract and suppliers may believe that the high bid costs are worth incurring because of the size of the contract they may win.

Negative effects:

- It can restrict the number of suppliers that can bid for contracts

  - If a number of LAs pool their demand for a certain service and let a single, large contract, this could deter smaller firms who are not capable of producing the service on such a large scale. If a LA aggregates its demand for a number of services (for example, collection of waste and recyclables, waste treatment and disposal) this could deter firms from bidding who specialise in certain aspects of waste management only (for example collection services) and could not provide the full range of services required.

- It could affect the structure of the market

  - If contract aggregation restricts suppliers from bidding due to the specific areas of waste management they specialise in this may ultimately result in consolidation and a highly concentrated industry structure. Although in principle there could be effective

[38] For further information about aggregation see OGC's Aggregation Guide: www.ogc.gov.uk/embedded_object.asp?docid=1004178

competition amongst just a few integrated waste management. companies, the tendency towards industry consolidation may raise concern that there may be less competition in the long run, reducing pressure for lower prices and quality improvements. There does, however, remain scope for smaller players to be involved at a subcontractor level, even if the main contract itself is quite large.

- It could increase the vulnerability of the procurement process to collusion

  - With a reduced number of competitors, the vulnerability of the procurement process to collusion may increase because it is easier for suppliers to reach agreement and also to monitor and punish behaviour.

- It can remove the ability to benchmark contracts against each other

  - Contract aggregation and/or collaboration can also reduce the ability to carry out on-going benchmarking to monitor the quality and cost of services. Disaggregation of contracts, so that a LA has a number of different supplier rather than just a single supplier for an aggregated contract, enables LAs to benchmark and have fall-back options if there are underperforming suppliers. It can also guard against attempts by suppliers to re-negotiate contracts after they have been awarded.

- It can add to the complexity of contracts

  - More specifically in waste management, aggregation and/or collaboration can also increase the complexity of contracts and the potential interface issues between different public sector bodies. This seems to be a particular issue in waste Private Finance Initiative (PFI) contracts where two tier authorities often have to work together on projects.

Levels of in-house provision

1.39 In the municipal waste management sector, there is some LA in-house provision of services. For municipal waste collection this is provided by Direct Service Organisations (DSOs) and the in-house provision of treatment (and disposal) services is by Local Authority Waste Disposal Companies (LAWDCs).

1.40 In-house provision can have a number of positive and negative effects on competition.

Positive effects:

- Competition between the in-house provider and private firms can lead to cost savings and quality improvements, and
- It reduces scope for collusion by in-house providers providing a credible fall-back option to the private sector and a much better understanding of likely costs of service provision.

Negative effects:

- Perceived or actual discrimination in favour of the in-house provider may discourage private sector from bidding for contracts, and
- In-house provision limits the size of the sector available to private suppliers. Where there are large economies of scale this will have a significant impact on the number of suppliers that the sector can sustain.

Access to facilities

1.41 Suppliers may need access to certain facilities in order to be able to bid for a particular waste management contract, for example, transfer stations or landfill sites. If the owners of such facilities are also bidding for this contract and it is difficult to open new facilities, perhaps because of difficulties in obtaining planning permission, suppliers without access to these facilities may be at a competitive disadvantage.

Actions that may facilitate collusion

1.42 Collusion – where suppliers agree to fix prices or share contracts or co-ordinate their behaviour in some other way– can clearly reduce or even eliminate competition between suppliers. It is more likely when:

- bidders are similar
- they interact repeatedly, for example, bid against one another for contracts on a regular basis
- it is easy to find out whether suppliers have stuck to the collusive agreement, for example, when information about winning and losing bids is publicly available, and
- where sectors are relatively mature with stable and predictable demand as the suppliers have more to gain from sticking to any collusive arrangement.

Actions that may have knock-on effects on other buyers

1.43 Actions taken by LAs could have knock-on effects in the supply of the services to other buyers which may be unintentional, for example, other buyers may be affected by the extent to which public procurement restricts the availability of waste treatment capacity in the longer term.

The structure of this report

1.44 The remainder of this report is structured as follows:

- Chapter 2 examines municipal waste collection services, including identifying the current suppliers and the scope for new entry
- Chapter 3 assesses the effect of public procurement on competition in the municipal waste collection sector
- Chapter 4 examines municipal waste treatment services, including the current suppliers in the sector and the scope for new entry and expansion, and
- Chapter 5 assesses the effect of public procurement on competition in the municipal waste treatment sector.

2 MUNICIPAL WASTE COLLECTION SERVICES

Background

2.1 Municipal waste collection comprises the collection of waste from households, civic amenity sites, bulky waste and street cleansing (87 per cent of total municipal waste) and some commercial and industrial wastes[39] (around 13 per cent of total municipal waste).[40] This chapter focuses on the collection of municipal waste directly from households, which accounts for the bulk of waste collection services.[41]

2.2 Waste can be collected from households in a single container,[42] or some of the 'recyclable materials',[43] such as paper, glass and garden wastes, can be separated and placed in one or more separate containers (see

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[39] WCAs have a duty under Section 45(1) of the Environmental Protection Act to arrange for the collection of commercial waste where requested to do so. Section 75(7) of this Act defines commercial waste as 'waste from premises... used wholly or mainly for the purpose of a trade or business or the purposes of sport, recreation or entertainment'. WCAs may recover a 'reasonable charge' for the collection of commercial waste, where appropriate, and any disposal costs it is obliged to reimburse the WDA (Sections 45(4) and 52(9) of the Act). The WCA can arrange for a private collection company to collect the waste, but even in this case, the waste is still under the LA's control and would therefore be referred to as municipal.

[40] Statistics taken from the *Municipal Waste Management Survey 2003-04,* National Statistics.

[41] In 2003-04 around 55 per cent of municipal waste was collected via the regular household collection rounds (*Municipal Waste Management Survey 2003-04,* National Statistics*).*

[42] This is unlikely going forward as The Household Waste Recycling Act 2003 amends the Environmental Protection Act 1998 and requires all waste collection authorities to provide kerbside collections for at least two types of recyclable waste from all households, where practicable, from 2010 (the relevant section of the Act applies from 31/12/2010).

[43] For the purposes of this report, 'recyclable materials' include all materials which are capable of being recycled or composted. It therefore includes materials such as garden and kitchen wastes (known as 'organics') as well as materials where there are more established end markets, such as glass (known as 'recyclables').

Table 2.3 for more details). The proportion of these materials separated before collection will differ for each LA.

Table 2.3: Alternative kerbside collection schemes:

Single material recyclable collections	The LA supplies a single container for the collection of each recyclable material. The materials will therefore require little, if no, further sorting before being reprocessed.
Co-mingled recyclable collections	This is where more than one type of recyclable can be placed in the same container. This will require a specialist facility to separate and sort the recyclables before reprocessing (known as a material recovery facility (MRF)).
Kerbside sort collections	More than one type of recyclable can be placed in the same container, but the materials are separated at the kerbside by the operatives of a specialist collection vehicle. There is no further need for sorting of the materials before reprocessing.
Mixed waste collections	This is where recyclables are extracted from regular mixed refuse through dedicated separation and treatment processes.

Source*: Defra Introductory Guide: Options for the Diversion of Biodegradable Municipal Waste from Landfill*, 2004. Available at: www.defra.gov.uk/environment/waste/wip/newtech/pdf/Introductoryguide_bmw.pdf

2.3 Where some of the recyclable materials have been separated by households and placed into a separate container, collection of both the separated recyclable materials and the 'residual' waste (the leftover mixed waste) could be carried out by different firms using different vehicles[44] or at the same time, by the same firm, using the same vehicle.[45] In practice, stakeholders have told us that they are in many cases carried out by the same company.

Provision of municipal waste collection services

2.4 Municipal waste collection is a relatively simple economic activity: households leave their refuse at some agreed location, usually outside their house, and the supplier collects it, usually once a week, and either drives it straight to a treatment / disposal site or to a transfer station (for subsequent transfer to a treatment / disposal site).[46]

2.5 To provide a municipal waste collection service, a firm would need loaders and drivers, collection vehicles and a vehicle depot.[47] Some LAs will own a transfer station, but others may ask the collection service provider to arrange access to a transfer station as part of their contract.

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[44] Note that if they were carried out separately, increased household separation of 'recyclable materials' would increase revenue for the firm collecting them, but decrease revenue for the firm collecting the residual waste.

[45] *Waste Management – Market report*, Key note, 2003.

[46] The DotEcon research found that in smaller towns and rural areas, the collection vehicle may take the waste directly to the treatment / disposal site, without there being a separate transfer service. However, often transfer of waste from the collection vehicles to the disposal / treatment site represents a separate activity from collection and disposal. In London for example, some of the collected waste is reloaded from the collection vehicles onto barges and transferred by water to the disposal site.

[47] It is unlikely that firms operating in other sectors could easily switch production and provide waste collection services, as they would need to obtain an appropriate vehicle.

2.6 If waste is collected from households which are all located close to one another (that is, on the same street), the average costs of providing waste collection services will fall quite significantly as the number of households from which waste is collected increases (economies of density).[48]

2.7 OECD research[49] indicates that the average costs of providing municipal waste collection services will fall as the quantity of waste collected increases (economies of scale), but only up to the size of the collection vehicle.[50] Therefore, it is unlikely that large firms would have any large cost advantages over smaller firms operating in this sector. There may however, be some cost savings from the centralisation of vehicle maintenance, for example. Firms with contracts to collect waste from households which are located close to one another (that is, in a city) are likely to have cost advantages compared to firms collecting waste from households in less densely populated areas as they will have less distance to travel when making waste collections. The OECD concluded that the geographic scope of waste collection contracts should be no larger than is necessary for economies of scale to be realised in order to encourage bids from smaller suppliers.[51]

2.8 These characteristics mean that competition 'for' the market, that is competitive tendering, rather than competition 'in' the market may be a more efficient way for LAs to provide these services. This is so that a single firm can reap the benefits of economies of density and of scope.

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[48] OECD report, *Competition in local services: Solid waste management* 2000.

[49] OECD report, *Competition in local services: Solid waste management* 2000.

[50] In the US, this has found to be up to a city size of around 50,000 inhabitants, but other research has found this to be up to 20,000 inhabitants (*Collusion in the Dutch waste collection market,* E. Dijkgraaf & R.H.J.M Gradus, January 2005).

[51] OECD report, *Competition in local services: Solid waste management* 2000, DAFFE/CLP(2000)13.

This explains why LAs find it more efficient to procure a single contract to serve a local area, rather than have more than one supplier serving the same local area or even letting households negotiate individual contracts with a number of different suppliers in the area.[52]

2.9 Internationally, it appears that many countries including the UK have taken this approach. In Ireland, which has up to now relied on competition 'in' the market, the Irish Competition Authority recently concluded that competition was not working well for consumers and has recommended moving to a system of competitive tendering.[53]

2.10 The procurement of waste collection services may be viewed by LAs in the context of achieving wider environmental aims, rather than solely achieving Defra's landfill diversion targets. This may influence their procurement strategies. Anecdotal evidence suggests that LAs are working towards a more strategic approach and hence procuring their municipal waste collection services alongside other services (such as park management and street cleaning) in order to fulfil their wider environmental objectives.

[52] The 1997 survey of the association of municipalities in Finland showed that the price of collection services, where there is a single contract to serve a local area, are 20-25 percent lower than areas where households had individual contracts with service providers (OECD report, *Competition in local services: Solid waste management* 2000).

[53] The Competition Authority, *Alleged excessive pricing by Greenstar Recycling Holdings Ltd in the provision of household waste collection services in northeast Wicklow*, Case COM/108/02, August 2005.

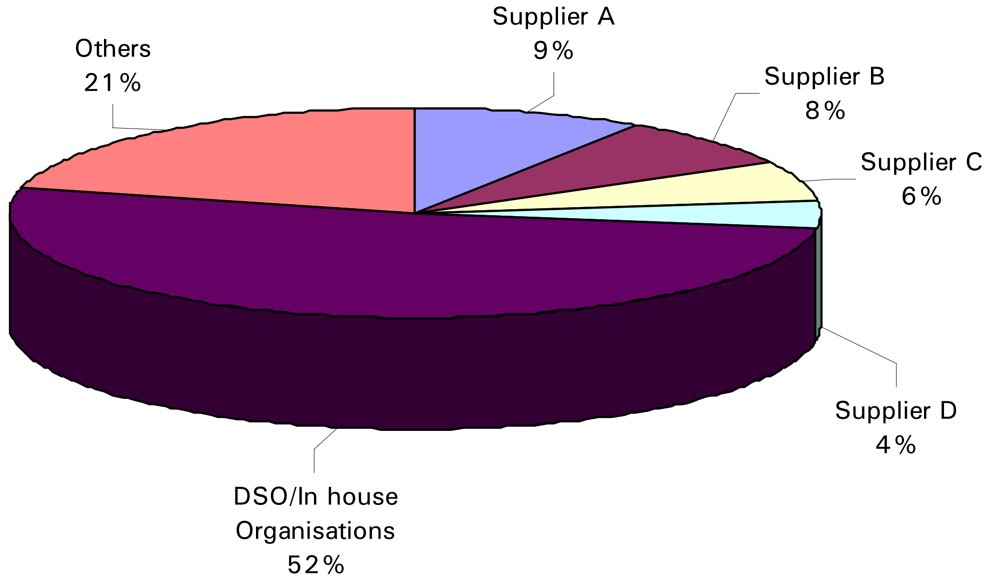
Current suppliers

2.11 LAs can procure municipal waste collection services from:

- 'in-house' service providers (DSOs)[54]
- private firms, and
- the voluntary and community sector.

[54] These were established in 1988 in response to the requirement that local authorities divest themselves of any direct role in waste collection allowing them to bid under Compulsory Competitive Tendering. This is also known as 'self-supply'.

Figure 2.4: Suppliers of current waste collection contracts by total contracted tonnage in England, 2005[55]



Note: Confidential information about suppliers in the original version of this report has been anonymised in the published version.

[55] The data referred to is from the SKM survey of local authorities in England (2005) which had a 71 per cent response rate. The data requested was for contracts procured over the last three years, however, in some cases LAs may have reported contracts dating back over a longer time period. The data shown came from LAs (that is, the demand side) only and has not been verified by suppliers.

In-house providers

2.12 Until recently, waste collection was carried out almost entirely by DSOs.[56] Based on the data collected from the survey of LAs, currently, around half of all LAs still use DSOs for their waste collection services.[57] Among WCAs, DSOs account for approximately 72 per cent of the number of collection contracts.[58]

2.13 The data suggests that the prevalence of DSOs does not appear to vary markedly between different regions. DSOs hold 76 per cent of collection contracts in the East Midlands (the region with the largest number of DSO contracts) in comparison to 73 per cent of contracts in the Yorkshire and Humber region (the region with the smallest number of DSO contracts).[59]

Private suppliers

2.14 Apart from in-house suppliers, the other key players for collection contracts are Onyx UK Ltd, Cleanaway Ltd, SITA UK Ltd, and Biffa UK Ltd, with the tonnage of their contracts accounting for [...][C] per cent, [...][C] per cent, [...][C] per cent and [...][C] per cent respectively of all collection contracts.[60]

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[56] *Assessing the impact of public sector procurement on competition* (OFT742), report by DotEcon for the OFT 2004.

[57] SKM survey of local authorities in England (2005).

[58] SKM survey of local authorities in England (2005).

[59] SKM survey of authorities in England (2005).

[60] SKM survey of authorities in England (2005).

2.15 In addition to these firms there are three other larger suppliers[61] and a number of SMEs who currently provide waste collection services. Many smaller firms frequently hold just one collection contract with a single local authority.[62] Collectively, these smaller firms hold approximately one million tonnes worth of contracts, out of LAs reported approximate 7.3 million tonnes worth of collection contracts.

The voluntary and community sector

2.16 Although the UK community waste and recycling sector comprises between 850 and 1000 organisations,[63] ECT Recycling and Furniture Now! appear to be the only entities in the voluntary/community sector currently involved in collection services. They hold [...][C] and [...][C] contracts respectively, handling approximately [...][C] tonnes of recyclables between them.[64] ECT Recycling provides both recyclable and residual waste collection services, and holds [...][C] per cent of collection contracts, equivalent to around [...][C] per cent of contracted tonnage.[65] Furniture Now!, however, provides recyclable waste collection services only.

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[61] Shanks, Viridor and Waste Recycling Group.

[62] SKM survey of authorities in England (2005).

[63] www.defra.gov.uk/environment/waste/community/index.htm

[64] SKM survey of local authorities in England (2005).

[65] SKM survey of local authorities in England (2005).

Scope for new entry

2.17 This section considers the (non procurement-related)[66] factors that could deter a new supplier from entering the waste collection sector. In general, existing suppliers are likely to compete more intensely for contracts if new entry is relatively easy.

2.18 As mentioned previously, a new supplier would need collection vehicles and access to a vehicle depot if it wanted to provide municipal waste collection services. Typically, there is some form of second-hand market for collection vehicles,[67] reducing the costs of entry, and enabling firms to sell their vehicle(s) when they leave the sector. In addition, it is often possible to lease a vehicle depot.

2.19 Since the main investments are likely to be fully or partially recoverable if a supplier decides to stop providing collection services, they should not represent a substantial barrier to firms who are interested in entering this sector.

2.20 In addition, a supplier of commercial waste collection services should be able to bid fairly easily for the municipal waste collection contract when it comes up for re-tender because much of the equipment used for commercial waste collection is the same.

2.21 In some cases a supplier may also be asked to provide access to a transfer station either directly through their own transfer station or by contracting with a transfer station owner. Suppliers that do not currently own a transfer station could be disadvantaged if local transfer station owners also want to bid for collection contracts. This would give providers (including incumbents) with waste transfer facilities an

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[66] Factors that might deter a firm from entering this sector that are procurement-related, are dealt with in Chapter 3.

[67] OECD report, *Competition in local services: Solid waste management* 2000. Available at www.oecd.org/dataoecd/34/51/1920304.pdf

advantage, particularly if it is difficult to get planning permission to set up new transfer sites. We do not know whether this has proved to be a significant problem in practice.

2.22 In contrast to the waste treatment sector, the regulatory burden of operating in the waste collection sector is low. However, the profit margins on waste collection contracts are generally lower than other waste services contracts, with collection contracts typically achieving margins of between 3 per cent and 7 per cent, occasionally for high value contracts up to 10 per cent. This is in comparison to typical margins for treatment and disposal contracts of around 7-10 per cent and up to 15 per cent.[68] This may reduce the attractiveness of the sector to new entrants.

2.23 Taking all these factors into consideration, it appears that there are few (non procurement-related) factors that should deter a firm from entering the municipal waste collection sector, although margins are not particularly high.

2.24 We have very little evidence on recent entry and exit in the waste collection services sector. During the early 1990s a number of firms began to enter the UK waste services market, including the French firms SITA and Onyx and the US firms Waste Management and Browning Ferris Industries. These firms concentrated principally on municipal waste collection. But both the US companies who entered the market during the 1990s have since sold their UK operations and the French companies SITA and Onyx have reportedly found profit growth more difficult than anticipated.[69]

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[68] Based on evidence collected as part of the OGC SKM project.

[69] Based on evidence collected as part of the OGC SKM project.

Local authority procurement

2.25 The procurement of municipal waste collection is very fragmented, with responsibility divided between 273 WCAs and 82 UAs in England. However, LAs are the only purchaser of municipal collection services in any one area and so they do have the ability to affect competition through the way in which they procure, for example, contract aggregation, using in-house suppliers rather than the private sector. This is discussed in more detail in the following chapter.

3 EFFECTS OF PUBLIC PROCUREMENT ON COMPETITION IN THE MUNICIPAL WASTE COLLECTION SECTOR

3.1 In Chapter 1 we outlined the key ways in which public procurement could affect competition in the municipal waste management sector. Here we discuss these issues in the specific context of municipal waste collection services. The primary routes through which procurement can affect competition are by:

- restricting entry and/or creating incumbency advantages through procurement design
- contract aggregation and collaboration
- in-house provision, and
- facilitating collusion.

3.2 This chapter examines the evidence gathered in the SKM project to assess what effect these issues are having in waste collection in practice.

Restricting entry and/or creating incumbency advantages through procurement design

3.3 Data from the SKM survey of local authorities reveals that a significant number of municipal waste collection contracts are won by the incumbent provider when the contract is re-tendered. 42 per cent of collection contracts were won by the incumbent provider which indicates that there may be some incumbency advantage. Only 27 per cent of collection contracts were not won by the incumbent service provider, with no data or no previous contract to compare providers for, for the remaining 31 per cent of LAs' collection contracts.[70]

[70] SKM survey of local authorities in England (2005).

3.4 When considering how procurement design may restrict entry and/or create incumbency advantages, the factors we consider here are:

- length of contracts
- procurement route / types used
- selection criteria, and
- access to facilities.

Length of contracts

3.5 For municipal waste collection services it is unlikely to be necessary to have long contracts to earn a return on investments, because these are typically recoverable upon exiting the market. Further, the typical lifespan of the assets is likely to be much shorter for waste collection in comparison to treatment services where the facilities have much longer lifespans and require greater levels of investment. Long contract lengths may therefore needlessly give LAs less flexibility to adapt procurement requirements to changing circumstances, such as changes in regulation, and may make them less able to achieve best value over time. Additionally, the longer the contract, the greater the risk of deterring other firms from bidding because incumbent supplier has a more established position and detailed knowledge of costs.

3.6 In practice we find that the average contract length of a municipal waste collection contract is seven years,[71] which is shorter than the average length for aggregated collection and treatment contracts and for integrated contracts but longer than the average length of aggregated collection and disposal contracts.[72] These are illustrated in Figure 3.5.

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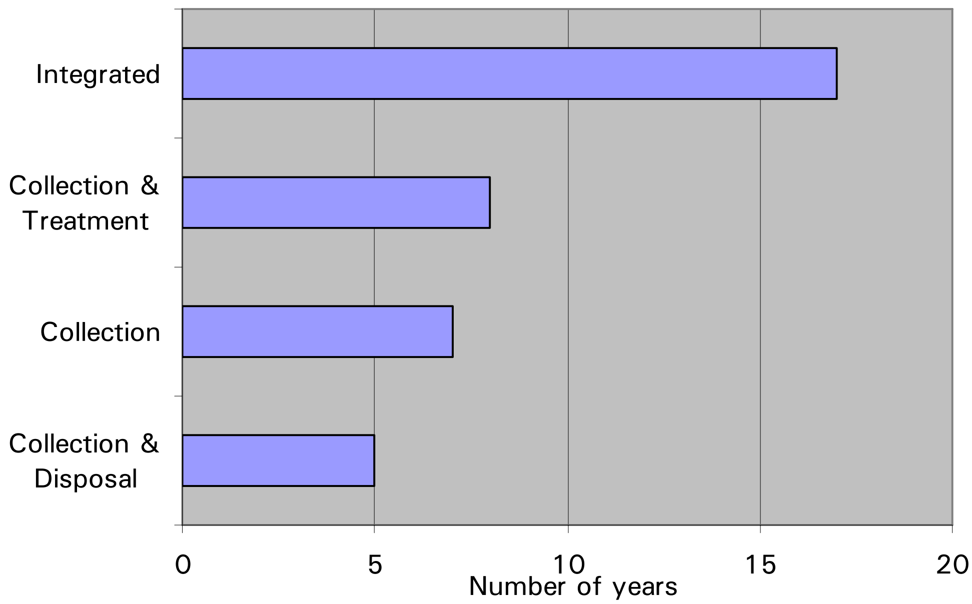
[71] SKM survey of local authorities in England (2005).

[72] SKM survey of local authorities in England (2005).

Figure 3.5: Contract length by type of service[73]



3.7 It is not clear why municipal waste collection only contracts are longer on average than municipal waste collection and disposal contracts (seven years compared to five years). The table below shows the average, median and range of contract lengths for collection services. Interestingly, the data from the SKM survey of LAs reveals a collection-only contract which is 26 years long. This maximum length is well in excess of the average and it is difficult to see how such a long contract could be justified.

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[73] Source: SKM survey of local authorities in England (2005). Collection contracts cover the service dealing with mixed and co-mingled waste collection, kerbside sorting and separation. Treatment contract service types include those waste treatment technologies described in Chapter 4. Integrated contracts cover all waste management services - collection, treatment and disposal (landfill).

Figure 3.6: Municipal waste collection contract length[74]

	Average	Median	Minimum Length[75]	Maximum Length
Contract Length *(years)*	6.5	7	1	26

3.8 We note that average contract lengths for municipal waste collection services appear to be shorter in some other countries: the OECD reports that in the US city of Seattle, for example, tenders for waste collection services are for a five year period and in Italy waste collection services contracts last on average three to five years.[76]

3.9 However, suppliers interviewed as part of the SKM project have indicated that they view contracts of less than five years with suspicion because this is shorter than the life of a typical asset, that is, collection vehicles. Further, the suppliers indicated that they would consider this to be a market testing exercise or a way of providing the in-house provider of collection services with a competitive advantage and therefore, they would be reluctant to bid. As indicated in paragraph 3.10 below, we consider that contract length should be related to the ability of suppliers to recover their investments rather than simply the lifespan of the required asset.

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[74] Source: SKM survey of local authorities in England (2005).

[75] The shortest contract length reported by a respondent to the SKM survey was the procurement of a collection contract which was 0 years in length. Therefore, the next shortest contract length was used.

[76] OECD report, *Competition in local services: Solid waste management* 2000.

3.10 Overall, based on the limited evidence that we have, it is difficult to judge whether, on average, LAs are currently setting contract lengths that are too long with the risk of creating undue incumbency advantages, or too short, which might discourage suppliers from bidding in the first place. However, a contract length of 26 years (the maximum from the SKM survey of local authorities) is very unlikely to be justified. Given the relatively short lifespan of assets and because investments are recoverable on exit from the market, LAs should take care to set contract length which is only sufficiently long to allow suppliers to recover any sunk costs. As suppliers have indicated that they view the typical life of the assets to be approximately five years and evidence from the OECD[77] finds that five years is approximately the period necessary to amortise equipment used for waste collection, this may be an appropriate contract length and it is unlikely that contracts need to be longer than this.

3.11 To the extent that LAs have already set long contracts, additional efforts will need to be made when the contract is re-tendered to encourage other suppliers to bid. For example by using more open procurement routes, through careful choice of selection criteria (see paragraph 1.34) and by giving thought to how new suppliers would access the necessary facilities (see paragraph 1.39).

Procurement route / types used

3.12 We described the different types of procurement routes – open, restricted, negotiated and 'other' routes - in Chapter 1. 40 per cent of collection contracts were procured through an open tender, while 23 per cent were procured through a restricted tender and 14 per cent through a negotiated tender.[78]

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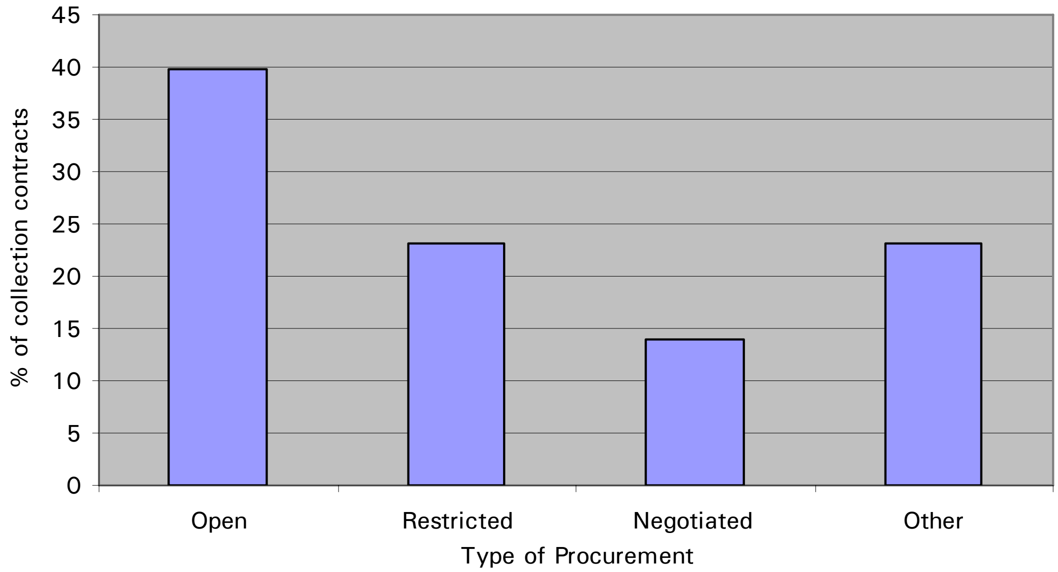
[77] OECD report, *Competition in local services: Solid waste management* 2000. This evidence relates to findings in Phoenix.

[78] Source: SKM survey of local authorities in England (2005).

Figure 3.7: Type of procurement for collection only contracts[79]



3.13 Given that collection is a relatively simple economic activity, contracts should be reasonably easy to specify and evaluate, making it easier to go for an open procurement process. This is particularly true given that, on average, the contracts are re-tendered on a relatively frequent basis, facilitating fairly rapid learning by doing by LAs.

3.14 It is therefore difficult to understand why almost a quarter of LAs still choose the restricted or negotiated procurement routes. These are more likely to be appropriate when the service being procured is quite complex and bids are difficult and time-consuming to evaluate, which is more likely to be the case for treatment contracts.

3.15 Data collected for the SKM survey, shows that for all the collection contracts included in the responses from local authorities, the average number of formal bids received for a contract procured through an open route was 3.3, compared to an average of 3.2 and 2.3 for contracts

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[79] Source: SKM survey of local authorities in England (2005).

procured through restricted and negotiated routes, respectively. This is shown in the table below, together with the median, minimum and maximum number of formal bids by procurement type for collection contracts. It seems that using a negotiated procurement route may limit the number of formal bidders for a collection contract, compared to using an open process. Whilst there is no difference in the median number of bids when using an open or restricted procurement route, as one would expect, the maximum number of bids for contracts is affected by the procurement type used, with negotiated procurement routes having significantly fewer bidders at the maximum than open procurements and using negotiated procurement routes risks seeing no bids at all. As discussed in paragraph 3.13 the nature of collection services suggests that an open procurement process is appropriate. Overall, the evidence suggests that by opting for alternative procurement processes, for example, negotiated or restricted, LAs may be unduly restricting competition for the market.

Table 3.8: Number of formal bids for collection contracts by type of procurement[80]

Type of Procurement	Average No. Formal Bids	Median No. Formal Bids	Minimum number of formal bids	Maximum number of formal bids
Negotiated	2.26	2	0	5
Open	3.33	3	1	12
Restricted	3.24	3	1	7
Other	2.50	1	0	12

[80] Source: SKM survey of local authorities in England (2005).

Selection criteria

3.16 To make the most of potential competition, it will be important for LAs to ensure that selection criteria do not discriminate unduly in favour of incumbent providers.

3.17 We do not have much information about the pre-qualification criteria that LAs use for collection contracts. However, one trade association commented that LAs sometimes require firms to have previous experience in this sector. This presents a 'catch 22' situation as it is impossible for a new entrant to establish itself because it is unable to win initial contracts. It also impedes the ability of some firms in the voluntary/community sector who are already supplying recycling collection services to expand into the collection of municipal household waste.

3.18 The rationale for requiring previous experience is strongest when a complex service is being procured, and where it will be difficult to monitor the quality of service provided by the contractor. But it appears to be reasonably easy for LAs to monitor the performance of firms providing collection services using indicators such as: the frequency of collection; services provided; levels of customer complaints; and the percentage of missed collections. The relative transparency of the collection services should also make the monitoring of suppliers fairly uncomplicated, and not too costly to measure.

3.19 As the discussion in Chapter 2 highlighted, economies of scale in municipal waste collection services are unlikely to be significant. This suggests that small firms could be as well placed as large firms to supply collection services. Small firms should be capable of playing an active role in the municipal waste collection sector; therefore, size-related selection criteria, which anecdotal evidence suggests are currently used in some cases as a pre-qualification criterion, are unlikely to be justified.

Access to facilities

3.20 There are two main facilities that providers need access to so that they can provide collection services: vehicle depots and, where appropriate, transfer stations. If securing access to local facilities is difficult for new entrants, perhaps because of difficulties getting planning permission, or in obtaining access to existing sites on reasonable terms from existing providers, there may be scope for LAs to take positive steps to facilitate new entry.

3.21 For example, the DotEcon research reported that Westminster City Council has in the past been concerned about the difficulty new collection companies would face in acquiring land for vehicle depots.[81] As a result, it acquired two sites itself, for use by the collection contract winners, to reduce the incumbency advantage of the previous contractor and encourage new suppliers to bid for the collection contracts.

Conclusions on factors restricting entry/creating incumbency advantages

3.22 The previous paragraphs highlight a number of issues that LAs should take into account when procuring waste collection services, to ensure that they are able to make the most of potential competition amongst suppliers to obtain best value:

- Contracts should be of a length which enables suppliers to recover any sunk costs of entry. As some suppliers indicated that typical asset life is around five years, this suggests that it is unlikely contracts need to be longer than this. Letting longer contracts may risk deterring other firms from bidding because the incumbent supplier could have a more detailed knowledge of costs when the

[81] *Assessing the impact of public sector procurement on competition* (OFT742), report by Dotcon for the OFT 2004, Vol II paragraph 6.44
www.oft.gov.uk/Business/Market+studies/procurement.htm

contract is re-tendered. Longer contracts also may needlessly restrict flexibility in adapting procurement strategies to changing circumstances.

- The relatively simple nature of collection services suggests that there is little justification for using restricted or negotiated, rather than open, procurement processes.

- Care should be taken not to set overly restrictive selection criteria. For example, the relative ease with which collection services can be specified and performance monitored suggest that previous experience of collection services is less relevant here compared to more complex services. In addition, economies of scale are not significant, suggesting that small firms should be able to provide collection services as well as large firms. Therefore, selection criteria should not exclude smaller firms from the tender process.

- If potential suppliers would find it difficult to bid against existing incumbents because of lack of access to vehicle depots or transfer stations, LAs may be able to acquire sites or access to sites themselves to encourage new suppliers to bid.

Contract aggregation and collaboration

3.23 LAs may collaborate to procure more strategically.[82] They may choose to do so by for example aggregating waste collection contracts across boundaries or co-ordinating when they put their contracts out to tender to encourage a smooth deal flow. LAs may also choose to aggregate collection with other waste management services. In principle the former could bring lower prices if it better enables bidders to capture economies of scale or density, and the latter if it better enables bidders

[82] At present, Unitary Authorities (UAs) collaborate on 25 per cent of their contracts while Waste Collection Authorities (WCAs) collaborate on just 9 per cent on their contracts. More is planned in future with 54 per cent of local authorities planning to collaborate for collection contracts and 11 per cent for collection and treatment contracts.

to capture economies of scope. Both could facilitate more intense competition if they help avoid collusion,[83] but could reduce competition at the re-tender stage if they create strong incumbency advantages.

3.24 **Aggregation of collection services only**: As noted in Chapter 2, the appropriate geographic scope for waste collection contracts should enable economies of scale and density to be realised. Whether in practice this means that it would be economically sensible for LAs to collaborate by aggregating their demand will depend on the size and density of their collection areas. The OECD suggested that collection area did not need to be geographically large for such economies to be reached, suggesting that this is not a strong driving factor behind contract aggregation.[84]

3.25 There may be advantages in aggregating waste contracts beyond this if larger collection contracts, in terms of the amount of waste to be collected, would increase the number of bidders relative to smaller collection contracts (see Chapter 1).

3.26 **Aggregation of collection and other services:** Some LAs currently aggregate collection services with:

- treatment services only, or
- with all waste management services including collection, treatment and disposal to form a so-called integrated waste management contract.[85]

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[83] Another potential advantage of contract aggregation could be to encourage new entry or new investment as larger contracts may attract more suppliers and be more profitable. These two factors are unlikely to be relevant to municipal waste collection services.

[84] OECD report, *Competition in local services: Solid waste management* 2000.

[85] LAs may also procure municipal waste collection services alongside other services (such as park management and street cleaning) to fulfil their wider environmental objectives.

3.27 The number of formal and credible[86] bidders for integrated contracts is generally lower than when collection and treatment are aggregated (see Table 3.9). This lower number may reflect the fewer number of suppliers able to supply the full range of services, as only the larger private suppliers of waste management services are capable of doing this and the importance of access to the right facilities (see Chapter 5) . However, there are still on average more credible bidders for integrated contracts compared to collection-only contracts (see discussion of the effects of letting in-house providers bid at paragraphs 3.31 - 3.41, which may affect the number of bidders for collection only contracts).

Table 3.9: Formal and credible bids by service type[87]

Service	Average number of formal bids	Average number of credible bids	Median number of formal bids	Minimum number of formal bids	Maximum number of formal bids
Collection	3.08	2.57	3	0	12
Collection & Treatment	4.66	3.09	2	1	12
Integrated services	3.67	2.83	3	2	6

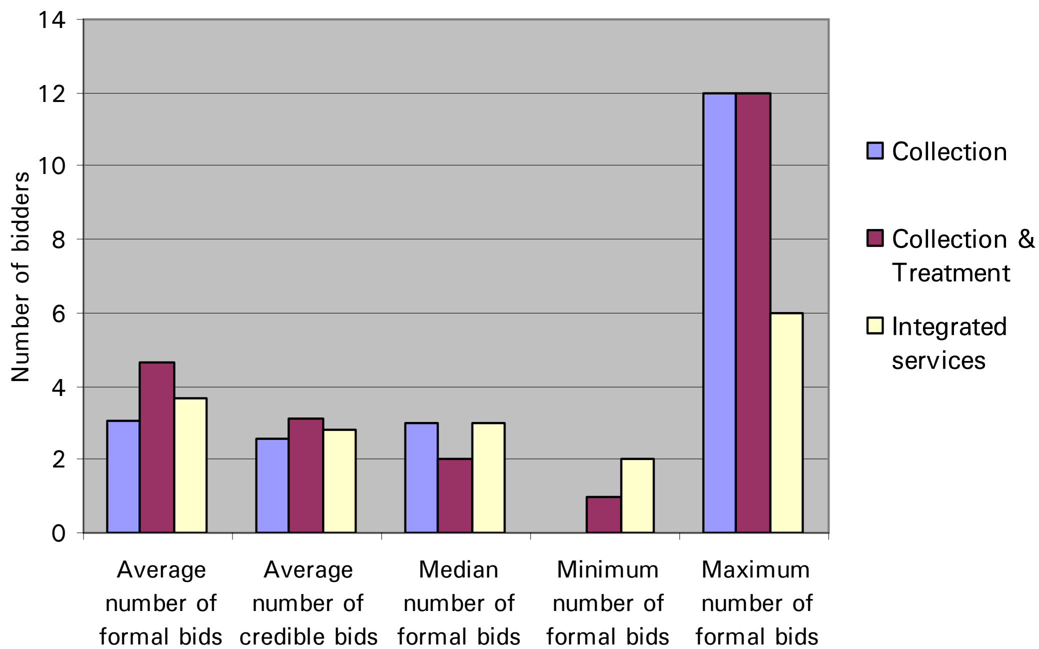
3.28 Figure 3.10, below, shows that while the average number of bidders for municipal waste collection and treatment contracts is higher than the number for both collection and integrated services contracts, the median number of bidders is actually lower. Further, it can be seen that the maximum number of bidders for an integrated services contract is

[86] This is the number of bids deemed credible by the LA when responding to the SKM survey.

[87] Source: SKM survey of local authorities in England (2005).

significantly lower than the maximum for the other contracts, which suggests that fewer firms may be capable of providing all of these services.

Figure 3.10: Formal and credible bids by service type[88]



3.29 We note that in Defra's *Waste Strategy 2000*[89] the importance for WDAs and UAs to take an integrated approach to waste management is highlighted. At present it is likely that use of PFI contracts in waste will lead to more contract aggregation. The Public Private Partnerships Programme (4Ps) Waste Management Procurement Pack[90] recommends procuring integrated services to minimise 'interface' risks between different suppliers. This is view shared by Shropshire County Council,

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[88] Source: SKM survey of local authorities in England (2005).

[89] www.defra.gov.uk/environment/waste/strategy/cm4693

[90] Published in 2004.

which believes that in more traditional contracts the interfaces between the WCAs and WDAs result in the potential for conflict relating to the quality and quantity of material delivered to the WDA supplier's facilities.

3.30 When considering the aggregation of contracts, these interface risks need to be balanced against the potential negative effect on the number of suppliers able to bid for integrated contracts. We have seen no evidence to suggest that suppliers enjoy large cost savings from providing both collection and treatment (or other) services and there do not appear to be convincing reasons why 'interface' risks could not be managed through appropriate contractual obligations. While this may require the LA to spend more time managing contracts the benefits in terms of increased flexibility and competition may outweigh these costs, particularly given the large differences in the nature of services provided. Aggregation of contracts is discussed in further detail in Chapter 5.

In-house provision

3.31 A key feature of municipal waste collection highlighted in Chapter 2 is the continued prevalence of in-house providers of waste collection services. We discuss here what the available evidence suggests about the likely impact of in-house supply on competition.

3.32 There have been a number of empirical studies on the effectiveness of in-house collection providers but there is no consensus on this issue. (This was not an issue covered by the SKM review itself).

Table 3.11: Empirical findings from studies on the cost effectiveness of in-house provision[91]

Study	Country	Findings
Ohlsson (2003)	Sweden	Public production 6% cheaper than private production
Dijkgraaf and Gradus (2003)	Netherlands	Contracting out reduces price but no significant difference between public and private provision.
Call and Thomas (2001)	US	Contracting out reduces price but no significant difference between public and private provision.
Reeves and Barrow (2000)	Ireland	Private provision cheaper than public provision.
Szymanzski (1996)	UK	Contracting out reduces price by 20% with private firms and by 10% with in-house providers.

3.33 According to best value principles, an in-house provider (that is, DSO in the case of collection contracts) should not have any inherent advantage over a private sector bidder for a waste collection contract because LAs must demonstrate that the DSO supplier offers as good as or better value than a private sector supplier.

3.34 However, some suppliers have expressed concerns that when competing for a contract where a DSO is present they are not competing on a level playing field. For example, suppliers have argued that local authorities sometimes set very short contract lengths to provide the DSO with a

[91] Source: Bel, G. and Costas, A., *Do Public Sector Reforms get Rusty? An Empirical Analysis on Privatisation of Solid Waste Collection* September 2004.

competitive advantage.[92] Suppliers also expressed concerns that market testing[93] does not compare like with like where the true overhead of providing services in-house is not used.[94]

3.35 Evidence from the SKM local authority survey suggests that the presence of a DSO does have a negative impact on the average number of bids from private suppliers but actually has a positive impact on the overall average number of bidders (that is, private bidders plus the DSO bidder). Where a DSO bids for a collection contract the average number of credible bids was 2.57 (including the DSO) compared to 2.06 credible bids when the DSO was not present.

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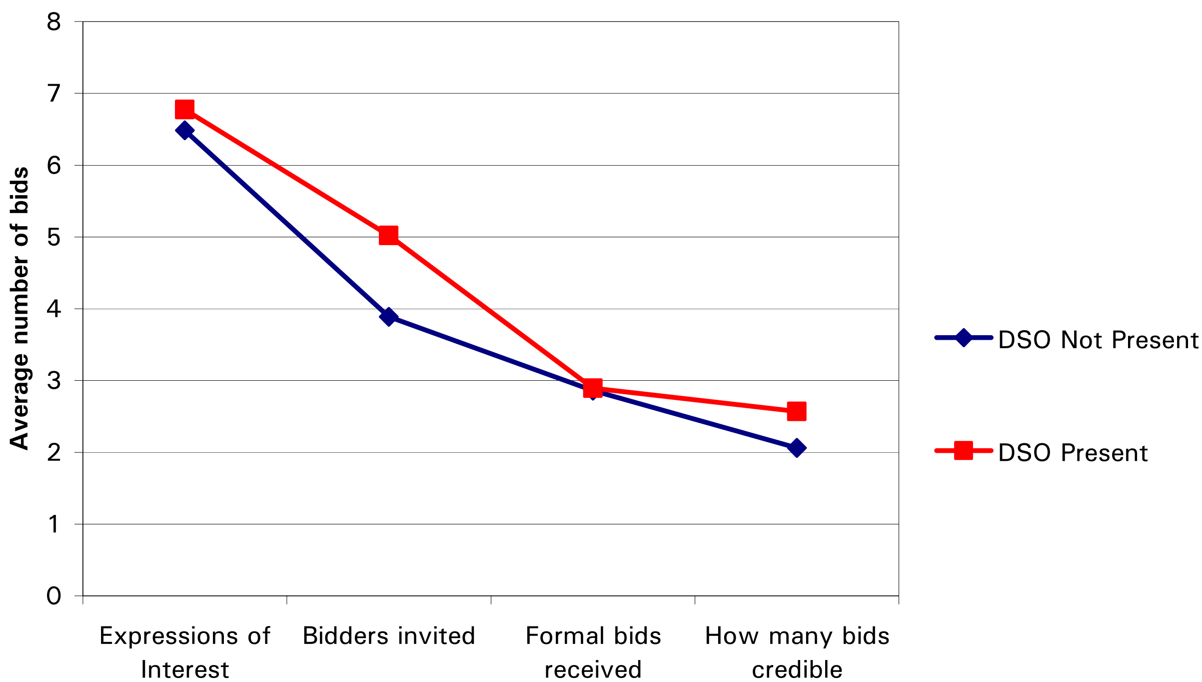
[92] As noted earlier, suppliers have argued that contract lengths should not be less than five years in length as this is the typical asset life.

[93] Market testing in this sector works via early market engagement/ market sounding. For example, a LA may have an 'industry workshop' to outline their plans and get a picture of likely market response and share and obtain views from industry.

[94] Based on evidence collected as part of the OGC SKM project.

Figure 3.12: Supplier interest for WCA contracts at each stage of the procurement process, by DSO presence[95]



3.36 From this data, it appears that the presence of a DSO in the tender can lead to a higher average number of bids at each stage except the formal bids received stage.

3.37 While appearing to have little impact on the average or median number of bidders, there is a difference in the maximum number of bids for collection contracts at both the formal and credible bid stages by DSO presence.

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[95] Source: SKM survey of local authorities in England (2005).

Table 3.13: Minimum and Maximum numbers of formal and credible bids for collection contracts by DSO presence[96]

	Median number of formal bids	Minimum number of formal bids	Maximum number of formal bids	Minimum number of credible bids	Maximum number of credible bids
DSO present in bidding	3	0	6	0	6
DSO not present in bidding	3	0	12	0	8

3.38 As can be seen from Table 3.13 above there are cases where there are no formal (and hence also no credible) bidders for municipal waste collection contracts. However, where there is only one private sector bidder in addition to the DSO (that is, two bidders in total) having the DSO as an outside option may be valuable, providing an alternative option for LAs and giving them an additional bid to benchmark bids against. Data from the SKM survey of local authorities, where the relevant data was available, indicates that for 23 per cent of collection contracts[97] there was only one other private sector bidder in addition to the DSO.

3.39 Data from the SKM survey of LAs also seems to indicate that where the DSO is the incumbent provider they are more likely to win the contract when it is re-tendered compared to when there is a private sector

[96] Source: SKM survey of local authorities in England (2005). The figures included in the table include the bids from the DSO where appropriate.

[97] This 23 per cent of contracts only covers 20 contracts as the relevant data is only available for 86 of the total 252 collection contracts.

incumbent. This data covers all types of waste services contracts but still shows that whilst 48 per cent of contracts are won by the incumbent provider when it is a DSO provider, only 30 per cent of contracts were won by the incumbent provider when it was a private company.

3.40 Overall, based on the limited evidence it is difficult to judge the effect of in-house provision on competition. Certainly, suppliers seem concerned about the lack of a level playing field and there is some evidence that there are fewer private bidders (that is, the number of bidders excluding the DSO) when a DSO is present at the formal bid stage (see Figure 3.12 above). Also, they appear to have a greater incumbency advantage compared with private sector incumbents.

3.41 It still remains difficult to judge the overall impact of DSOs on competition for waste collection contracts but the evidence available suggests that sufficient care should be taken when including in-house providers to ensure that there is an actual and perceived level playing field so private suppliers are not dissuaded from bidding.

Facilitating collusion

3.42 According to the OECD some countries have experienced anti-competitive behaviour in tenders for waste collection services.[98] No LAs raised collusion as an issue during this project but one supplier asserted that collusion did take place, although no evidence was provided to substantiate this claim.

3.43 Collusion may be a risk, particularly where collection services are tendered separately from other services. If contracts are tendered frequently and there are repeated interactions between suppliers there are opportunities for collusion. Therefore, it would be best practice to actively take steps to reduce this risk, for example, not reveal

[98] OECD report, *Competition in local services: Solid waste management* 2000.

information about the price of the winning bid and to monitor the outcomes of tenders, for example, whether contracts appear to rotate systematically between suppliers.[99]

Conclusion

3.44 As we mentioned in paragraph 1.25, competition is not just about the number of bidders for contracts but about the intensity of rivalry between bidders to provide a quality service at a good price, and about the openness to new entrants. Unfortunately, much of the data we have relates to numbers rather than the more qualitative aspects of competition.

3.45 Where LAs are concerned about potential lack of interest in their collection contracts we think that there are steps that they can take to increase participation. The main points highlighted to help achieve this are as follows:

- Contracts should be of a length which enables suppliers to recover any sunk costs of entry. As some suppliers indicated that typical asset life is around five years, this suggests that it is unlikely contracts need to be longer than this. Letting longer contracts may risk deterring other firms from bidding because the incumbent supplier could have a more detailed knowledge of costs when the contract is re-tendered. Longer contracts also may needlessly restrict flexibility in adapting procurement strategies to changing circumstances.

- The relatively simple nature of collection services suggests that there is little justification for using restricted or negotiated, rather than open, procurement processes.

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[99] For further information on the factors that might contribute of the formation, maintenance or detection of cartels see the OFT report *Predicting cartels* (OFT773): www.oft.gov.uk/nr/rdonlyres/4e9ffdc4-31f4-4f7d-896e-ffe635a136f3/0/oft773.pdf

- Care should be taken not to set overly restrictive selection criteria. For example, the relative ease with which collection services can be specified and performance monitored suggest that previous experience of collection services is less relevant here compared to more complex services. In addition, economies of scale are not significant, suggesting that small firms should be able to provide collection services as well as large firms. Therefore, selection criteria should not exclude smaller firms from the tender process.

- If potential suppliers would find it difficult to bid against existing incumbents because of lack of access to vehicle depots or transfer stations, LAs may be able to acquire sites or access to sites themselves to encourage new suppliers to bid.

- Consider carefully what services are aggregated and why when jointly procuring municipal waste collection with other waste management services. We have seen no evidence to suggest that there are significant cost advantages from jointly providing collection and other waste management services. There is, however, evidence to suggest that integrated contracts may restrict participation.

- LAs should ensure that there is both a perceived and actual level-playing field for competition between in-house and private sector bidders.

- Collusion may be a risk, particularly where collection services are tendered separately from other services. If contracts are tendered frequently and there are repeated interactions between suppliers there are opportunities for collusion. Therefore, it would be best practice to actively take steps to reduce this risk, for example, not reveal information about the price of the winning bid and to monitor the outcomes of tenders, for example, whether contracts appear to rotate systematically between suppliers.

4 MUNICIPAL WASTE TREATMENT SERVICES

4.1 The Landfill Directive should encourage LAs to divert a significant amount of municipal waste away from landfill[100] and will lead to greater use of alternative methods of waste treatment being used for the management of municipal waste.

4.2 There is a pressing need for LAs to procure more treatment facilities to meet the landfill diversion targets. Even if all the planned waste management facilities are built within current projected timelines, there is a serious risk that the Landfill Directive targets will not be met and estimated penalties of £2.8 billion could be incurred.[101] The Institute of Civil Engineers (ICE) has estimated that up to 2,300 new waste treatment facilities costing up to £30 billion will be required by 2020 to supplement the current landfill system.[102] Currently the bulk of waste is handled through approximately 360 very large landfill sites, each of which will require replacement by between five and ten (more localised) energy, composting or recycling facilities.[103] The creation and development of this sector is therefore being driven in the short- to medium-term by legislative targets requiring the diversion of biodegradable municipal waste from landfill.

4.3 In the medium to long-term, the development of this sector is also likely to be driven by the landfill tax escalator, which may divert commercial and industrial waste away from landfill to waste treatment technologies.

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[100] It is important to note that although waste treatment processes reduce the reliance on landfill, there is no combination of waste treatments which completely eradicate the need for it; all combinations will result in some proportion of waste still requiring landfill.

[101] Based on evidence collected as part of the OGC SKM project.

[102] *The State of the Nation* 2004, published by the Institution of Civil Engineers, June 2004.

[103] *Future Perfect: an analysis of Britain's waste production and disposal account, with implications for industry and government for the next 20 years*, Biffa, October 2002. See: www.biffa.co.uk/content.php?name=publications/futureperfect.html

In the past, the UK has been very reliant on sending the vast majority of its waste to landfill and, with the exception of Energy from Waste (EfW), there is limited experience of alternative waste treatment technologies in the UK. In all, municipal waste treatment is not a well developed sector within the UK.

Waste treatment processes

4.4 As Figure 1.1 in Chapter 1 indicates, there are a number of alternative waste treatment options available to local authorities:

- mechanical treatments
- biological treatments
- thermal treatments, and
- hybrid treatments/mechanical biological treatments.

4.5 These treatments and their ability to process different materials, past UK experience, implementation timescales, costs / economies of scale and outputs are described in more detail below.[104] The geographical location of all treatment facilities will be largely determined by the collection area that the facility must support.

Mechanical treatments

4.6 The basic objective of mechanically treating collected municipal waste is to sort it prior to further treatment. Mechanical sorting and processing techniques are therefore used, to some extent, in conjunction with other waste treatment technologies. Mechanical techniques may be used to

[104] This detail is provided where information is available. The background material in this section is based on: discussions held with the Associates in Industrial Ecology, the Defra introductory guide: *Options for the Diversion of Biodegradable Municipal Waste from Landfill* 2004; and the Cabinet Office background paper on the *Role of Alternative Technologies* 2002.

process mixed waste or co-mingled recyclables and the degree of sorting required will depend on the kerbside collection scheme which the local authority has in place (for more information on this see Table 2.3). There appears to be little substitutability between the facilities used to treat mixed waste and co-mingled recyclables.

Sorting and processing mixed waste

4.7 There are a number of techniques which may be used to separate mixed waste streams into different fractions. The preferred technique will depend on the purpose of sorting material, for example whether the sorting is intended to:

- extract recyclable material
- separate out a biodegradable or organic rich fraction for biological processing, or
- produce a high calorific fraction which may be used as a fuel.

4.8 Even if a complex mechanical sorting system is used to split a mixed waste stream into each three of these fractions, there will still usually be a remaining fraction that needs to be sent to landfill.

Sorting and processing co-mingled recyclables

4.9 The sorting of co-mingled recyclables, for example where cans and paper are collected in the same container from the household kerbside, requires a different type of mechanical processing facility to that used for mixed waste. The purpose of this operation is to sort the recyclables into different material fractions (for example, paper, aluminium cans, steel cans etc). This requires a facility known as a materials recycling facility (MRF).

4.10 MRFs are commercially proven in the UK and they are probably the easiest facility for which to secure planning permission, perhaps as they have less environmental impact compared to an Energy from Waste facility, for example.

4.11 There are cost advantages associated with larger plants (the costs associated with sorting a tonne of waste will fall as the quantity of waste which is sorted, increases).[105]

Biological treatments

4.12 Biological treatment technologies can only process biodegradable (also know as organic) waste which represents about 68 per cent of municipal waste[106]. In addition, biological treatment does not fully eradicate all biodegradable waste. As a result of this, the remaining waste must either be sold into a market for end-products or sent to landfill.

4.13 It is difficult to estimate implementation timescales for biological treatment facilities due to limited experience in England to date. Implementation timescales for biological treatment facilities should be shorter compared to other types of treatment facilities as they are less capital intensive and perceived to be more environmentally friendly so that gaining planning permission should be less problematic.[107] However, this is not always the case: Norfolk County Council spent three years trying to get planning permission for a composting plant due to public opposition.

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[105] Cabinet Office background paper on the *Role of Alternative Technologies* 2002.

[106] www.defra.gov.uk/environment/waste/strategy/landfill/2.htm

[107] Cabinet Office background paper on the *Role of Alternative Technologies* 2002.

4.14 The three main biological treatments are:[108]

- windrow composting[109]
- in-vessel composting, and
- anaerobic digestion.[110]

Windrow composting

4.15 Windrow composting[111] is an established technology and is by far the most prevalent composting technique used in the UK. This type of biological treatment facility exhibits a clear fall in average costs as the quantity of waste being treated increases[112] and it appears relatively easy to increase the capacity of a windrow composting plant.

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[108] A further biological treatment is fermentation (for example ethanol production), which can be used in the longer term. However, this is still being tried and tested in the US and is therefore not considered further in this report.

[109] Composting is a biological process in which biodegradable wastes are decomposed in the presence of air. Composters have an average facility lifespan of approximately 20 years.

[110] Anaerobic digestion (AD) is a biological process where biodegradable wastes are decomposed in the absence of air. It will only decompose biodegradable material. Anaerobic digestion facilities have an average lifespan of approximately 27.5 years.

[111] This deals with green, or garden derived wastes.

[112] Cabinet Office background paper on the *Role of Alternative Technologies* 2000.

In-vessel composting

4.16 There is limited experience of in-vessel composting[113] in the UK to date but, due to the need to meet both landfill diversion and statutory recycling and composting targets, stakeholders feel it is likely that this will be a growing area. For in-vessel composters, average costs per tonne of waste treated will fall, but only up to a point; in other words, there are fewer economies of scale compared with windrow composting.[114]

Anaerobic digestion

4.17 While there is limited experience of anaerobic digestion (AD) in the UK, AD plants have been in operation elsewhere in Europe for much longer.

4.18 Anaerobic digestion results in the production of a digestate,[115] which can be used a biofertilizer, subject to quality and market availability. It also results in the production of a biogas (mostly carbon dioxide and methane), which can be burnt as a fuel to produce electricity and which will be eligible for Renewables Obligations Certificates (ROCs).[116] As with in-vessel composting, there are some economies of scale but not to the same extent as windrow composting.

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[113] This is a more contained process and there are some examples of it being used to process both garden and kitchen/catering derived organic wastes (subject to regulatory approval).

[114] Cabinet Office background paper on the *Role of Alternative Technologies* 2002.

[115] Digestate is the solid and/or liquid product resulting from anaerobic digestion.

[116] The Renewables Obligation was introduced by the Department of Trade and Industry in 2002. This system created a market in tradable renewable energy certificates (ROCs) for which each supplier of electricity must demonstrate compliance with increasing Government targets for renewable energy generation. See: www.dti.gov.uk/renewables/renew_2.2.1.htm

Thermal treatments

4.19 Thermal treatments include:

- energy from waste (EfW) incineration, and
- advanced thermal technologies (ATT), such as pyrolysis, [117] and gasification.[118]

Energy from waste

4.20 Energy from waste (EfW) (or 'incineration with energy recovery') is the most developed waste treatment technology in the UK.[119] It involves the combustion of waste under controlled operating conditions to reduce its volume and hazardous properties and convert the input material into energy for power and/or heat recovery. Currently, EfW plants are able to process most municipal waste, with no need to pre-treat or sort the waste beforehand, although energy can only be recovered from the biodegradable elements. Going forward, however, Defra recommend that a targeted level of segregated material recycling and/or composting should be carried out first. [120]

4.21 Implementation timescales for EfW facilities are particularly long due to the public opposition to incinerators, which causes delays to the planning process: implementation timescales of five to eight years are

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[117] Pyrolysis is a medium temperature thermal process where organic derived materials in the waste are broken down under heat and in the absence of oxygen.

[118] Gasification is the thermal breakdown of waste into a gas, using high temperatures and oxygen to partially combust the waste.

[119] Cabinet Office background paper on the *Role of Alternative Technologies* 2002.

[120] Defra introductory guide: *Options for the Diversion of Biodegradable Municipal Waste from Landfill*, 2004.

not unusual. EfW facilities have an average lifespan of approximately 26 years.[121]

4.22 The average cost of treating a tonne of waste in an EfW plant will fall significantly as the quantity of waste being treated increases. Larger EfW plants therefore exhibit clear cost advantages compared to smaller plants.

4.23 As with biological treatments, thermal treatments do not eliminate all waste. There are two principal solid residues from EfW plants: the bottom ash; and the flue gas residues from the air pollution control process.[122] The bottom ash may be recycled into appropriate construction applications or sent to landfill. Energy, as well as heat, are significant outputs of EfW plants, but it is unclear whether this energy will be made eligible for ROCs.[123] It is necessary, however, for all new EfWs to produce electricity and utilise the heat where possible (for example, district heating).

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[121] Source: SKM survey of local authorities in England (2005).

[122] EfW plants require process control measures for emissions and extensive flue gas cleaning equipment. Some of the residues from the flue gas treatment process are classified as hazardous waste and will require specialist treatment.

[123]DTI 2005/06 review of the renewables obligation statutory consultation document - www.dti.gov.uk/renewables/policy_pdfs/ROreviewstatutoryconsultation.pdf In January 2000, the government announced their aim for renewables to supply 10 per cent of UK electricity in 2010 (subject to the costs being acceptable to the consumer) www.dti.gov.uk/renew/condoc/policy.pdf. This target then became known as the 'renewables obligation', which was introduced in 2002, with ROCs being introduced as the means of demonstrating compliance with this obligation. As a result of this, electricity generators will demand energy sources that are eligible for ROCs. www.dti.gov.uk/renewables/renew_2.2.1.htm

Advanced thermal treatments

4.24 Advanced thermal treatments (ATTs) involve the limited conversion (in comparison with mass-burn incineration) of waste into intermediate materials (such as a gas or a fuel) allowing more flexibility for material recycling or energy recovery.[124] In contrast to EfW, ATT technologies are unproven for municipal waste on a commercial scale in the UK and overseas experience is patchy. This makes it very difficult to estimate implementation timescales. Although there is limited experience of ATT plants in the UK, it appears that there aren't large economies of scale associated with this technology.

4.25 Both the pyrolysis and gasification processes in ATTs produce a gas and residue which may require disposal or additional treatment. The energy produced by both pyrolysis and gasification is eligible for ROCs. Defra is hoping to encourage the use of ATTs via its New Technologies programme,[125] however, this has had no positive results so far.

Hybrid treatments/ mechanical biological treatments

4.26 Hybrid treatments or mechanical biological treatments (MBT) as they are often referred to comprise the integration of several processes commonly found in other treatment technologies such MRFs and AD plants. In its simplest form, an MBT dries the waste in order to make separation of recyclable materials easier and then bulks up mixed waste prior to being sent to landfill. A more complex MBT process can:

- separate recyclables for re-processing
- separate biodegradable waste for biological treatment

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[124] See footnotes 117 and 118 for more detailed descriptions of types of ATTs.

[125] This programme is intended to help overcome the perceived risks of implementing new technologies in England. See: www.defra.gov.uk/environment/waste/wip/newtech/index.htm

- separate a highly calorific fraction, which is made into an energy derived fuel (EDF) for energy recovery, and

- separate a reject fraction to send to landfill.

4.27 In general, when choosing a treatment facility to serve local needs, a local authority will need to consider both economic and environmental factors.[126] Economic factors go far beyond the cost per tonne of treatment, and include the costs of disposing of the residues, either by further treatment or landfill.[127] A key challenge associated with MBT is finding a viable use for the solid outputs from the process; as it does not meet the UK industry's voluntary quality standard it is unlikely to find significant usage as a compost. Challenges associated with using the output as a fuel are also significant.[128]

4.28 On average, MBT facilities have a lifespan of approximately 24 years,[129] but this will vary depending on the processes involved.

4.29 Implementation timescales for MBT facilities will depend on whether an EfW facility is integrated into the process and it is likely that larger MBT plants will face lower average costs for treating waste compared to smaller ones.[130]

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[126] A LA will also need to consider the kerbside collection scheme already in place (as this will determine how much additional sorting of waste materials is required).

[127] As a general rule, markets for most residue streams (with the notable exceptions of power purchase agreements for electricity and some compost sales) are not revenue generating, and more often than not, treated as balance sheet neutral. In some cases, it may actually cost the provider to sell the end product. (Associates in Industrial Ecology).

[128] *MBT: A Guide for Decision Makers - Processes, Policies and Markets*, Juniper Consultancy, March 2005.

[129] Source: SKM survey of local authorities in England (2005).

[130] Cabinet Office background paper on the *Role of Alternative Technologies* 2002.

4.30 Overall, some types of treatment technologies are complementary whilst others are substitutable. For example, biological treatments can only be used to treat biodegradable municipal waste and so would not be able to serve all the waste treatment needs of an authority. Additional treatments would also need to be used.

Current suppliers of waste treatment services

4.31 Local Authorities typically procure treatment services by entering into a long-term contract with a supplier who will build the facility and treat the collected municipal waste over a specified number of years.

4.32 A LA can procure waste treatment services from LA-owned waste disposal companies (LAWDCs), or from private firms. The range of treatment suppliers holding contracts with LAs in England is shown in Figure 4.14 below.[131]

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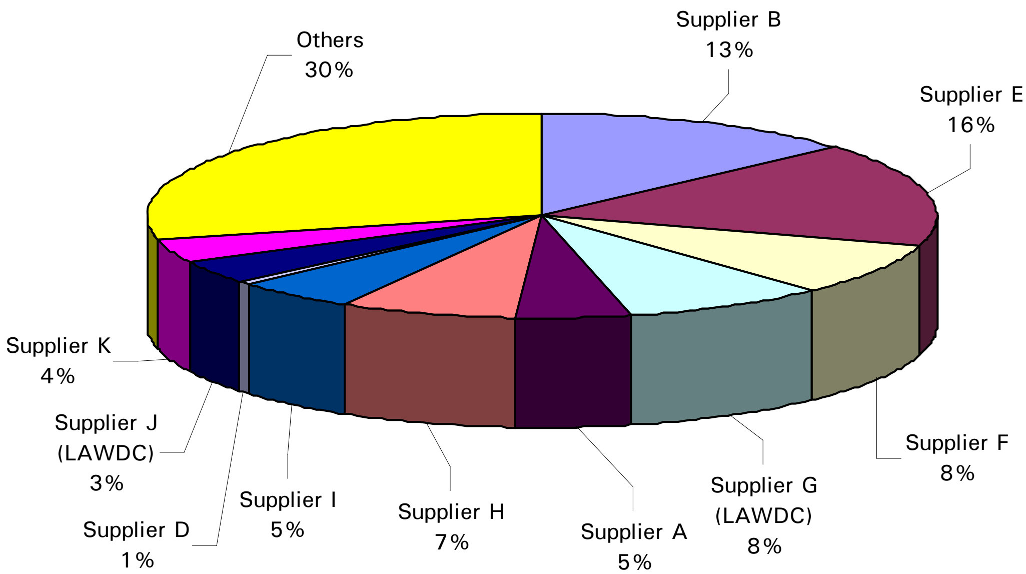
[131] The data referred to is from the SKM survey of local authorities in England (2005) which had a 71 per cent response rate. The data requested was for contracts procured over the last three years, however, in some cases LAs may have reported contracts dating back over a longer time period. The data shown came from LAs (that is, the demand side) only and has not been verified by suppliers.

Figure 4.14: Waste treatment contract suppliers in England by total contracted tonnage[132]



Note: Confidential information about suppliers in the original version of this report has been anonymised in the published version.

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[132] Source: SKM survey of local authorities in England (2005). This data covers contracts let by LAs over the last three years. However, in some cases LAs may have reported contracts dating back over a longer time period.

LAWDCs

4.33 LAWDCs operate at arms length from LAs.[133] There are currently only nine LAWDCs remaining in England,[134] as many were sold off to private sector waste management companies, usually as part of the procurement process for managing the municipal waste of the WDA. Historically, they have focused on providing waste disposal services, but are now in principle able to provide a wide range of the services.[135]

4.34 Specifically, we are aware of two separate LAWDCs that each hold [...][C] treatment contracts; together they handle a total of approximately 140,000 tonnes. One of these is [...][C], which was established in [...][C] after the introduction of the Environmental Protection Act 1990 (EPA 90), and now holds four per cent of total treatment services contracts by tonnage.[136]

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[133] There are two models for LAWDCs: collaboration with a private sector company holding 80 per cent and the LA holding 20 per cent of the company's equity; and a company wholly owned by the LA, but operated at arms length. When the relevant section of the Clean Neighbourhoods and Environment Act 2005 comes in to force, then Section 32 of the Environment Protection Act 1990 will cease to have an effect and LAs will have the option of taking the waste management services provided by LAWDCs back in-house.

[134] The nine LAWDCs are: Cornwall County Environmental Services; Coventry & Solihull Waste Disposal Company; Cumbria Waste Management; Greater Manchester Waste Group; Mersey Waste holdings; Norfolk Environmental Waste Services; Premier Waste Management (Durham & Darlington); Wyvern Waste Services (Somerset); and Yorwaste (North Yorkshire & York).

[135] *Defra report: Review of Local Authority Waste Disposal Companies and their Role in Future Procurement* September 2005.

[136] Based on evidence collected as part of the OGC SKM project and the SKM survey of local authorities in England (2005).

Private suppliers

4.35 There are currently eight major firms offering municipal waste treatment services in England. A number of these suppliers are also able to provide integrated municipal waste management services but these are not necessarily the largest suppliers of waste treatment only services. These suppliers include SITA UK Ltd; Biffa UK Ltd; Cleanaway Ltd; WRG Ltd, Shanks Group PLC, Viridor Waste Management; and Onyx UK Ltd.

4.36 There are also two medium sized firms offering municipal waste treatment services: Grundon Waste Management Ltd and Hills Minerals and Waste Ltd.

4.37 There are a large number of smaller players in the provision of waste treatment services; collectively holding 30 per cent of total contracted tonnage.[137]

4.38 Figure 4.15 illustrates the top suppliers by region as simply looking at the national shares of supply gives a misleading picture of the structure of this sector. Different suppliers are much more prevalent in some regions than others, as Figure 4.15 illustrates. The main suppliers in some regions are not active at all in other regions or have a much smaller share of contracts. For example, although […][C] Supplier B has a large share of supply in England it does not have a large presence in London, the Eastern region and the West Midlands. This large regional variation in shares of supply may be due to the location of suppliers' assets such as landfill sites. It is also noteworthy that many regions seem to be dominated by one or two large suppliers, with the top one/two suppliers having a much greater share of contracts than the other suppliers active in the region. For example, in the North East […][C] appears to have a near monopoly position.

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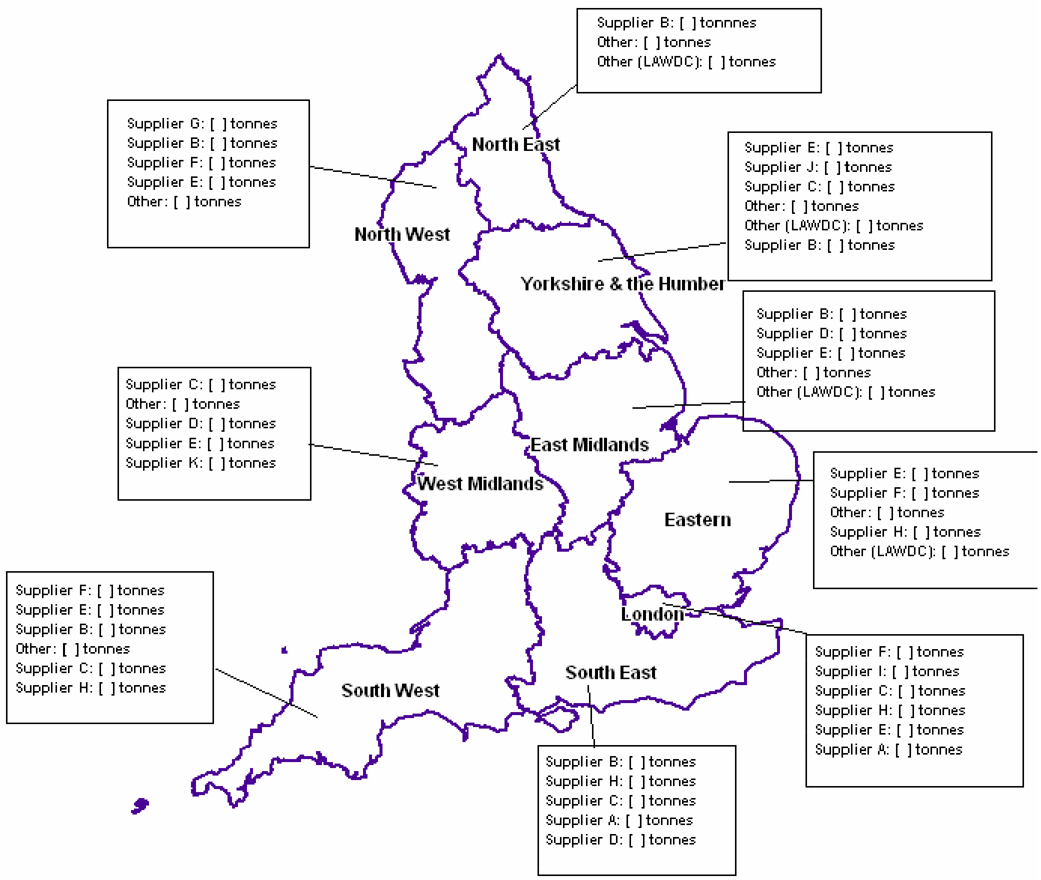
[137] Source: SKM survey of local authorities in England (2005).

Figure 4.15: Top treatment/disposal suppliers by region, by tonnage[138]



Note: Confidential information about suppliers in the original version of this report has been anonymised in the published version.

4.39 Many waste treatment technology providers are small companies and they may be unable, in their own right, to underwrite the technology risk required for larger local authority contracts. As a result, larger waste

[138] The data referred to is from the SKM survey of local authorities in England (2005) which had a 71 per cent response rate. The data requested was for contracts procured over the last three years, however, in some cases LAs may have reported contracts dating back over a longer time period. The data shown came from LAs (that is, the demand side) and in most cases has not been verified by suppliers.

management companies usually bid for LA contracts and then sub-contract out work to technology providers and construction firms (who build the plant) as they don't have the in-house technical expertise themselves. Anecdotal evidence suggests that there may be cases where WDAs have procured specific treatment technologies from smaller suppliers but there are no cases where large contracts have been won by suppliers other than the larger private sector firms.

4.40 The large waste management suppliers are able to offer all the different treatment technologies but may have technologies that they prefer to use. For example, one stakeholder commented that a certain supplier appears to prefer biological technologies and thermal technologies for smaller plants, while other suppliers seem to prefer MBT or thermal technologies.[139] So a LA that specifies a particular technology in its contract is not necessarily limiting its choice of suppliers. Whether or not a supplier bids will depend on the attractiveness of the contract and the strength of a suppliers' preference for different technologies.

4.41 As outlined above there are currently a number of firms operating in the municipal waste treatment services sector and evidence from the SKM survey of LAs indicates that there are an average of four formal bidders for contracts. However, 29 per cent of treatment contracts received only one or two bidders at the invitation to tender stage, which suggests that some authorities face very limited competition between suppliers for their contracts.[140]

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[139] Based on evidence collected as part of the OGC SKM project.

[140] Source: SKM survey of local authorities in England (2005).

Scope for new entry and expansion[141]

4.42 As in Chapter 2, this section considers the (non procurement-related)[142] factors that could deter a new firm from entering the waste treatment sector.

4.43 Based on a study by Defra[143] of how foreign suppliers view the UK treatment sector and on views of existing waste treatment suppliers in the UK, there appear to be five main factors that deter entry in the treatment sector:

- regulatory issues
- large minimum viable scale
- for foreign suppliers, lack of a track record in the UK
- lack of skilled workforce, and
- high bid costs.

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[141] Usually scope for new entry will include factors that confer the incumbent firm an advantage (which is not somehow related to their superior efficiency) and which will therefore deter new entrants from entering / expanding into this sector. However, as the government is trying to create the market for alternative waste treatment technologies, there are no established incumbents currently, so this section considers factors that could deter (all types of) firms from entering the sector.

[142] Factors that might deter a firm from entering this sector, which are procurement-related, are dealt with in the following chapter.

[143] Defra study into *Barriers to Entry into the UK Waste PFI Market,* May 2004.

Regulatory issues

4.44 There are three factors associated with the regulatory framework that may deter firms from bidding for work in this sector. They are:

- the burden of keeping up to date with changes in regulatory requirements
- the delays caused to the planning process as a result of public opposition, and
- regulatory barriers preventing the use of end-products produced as a result of treatment processes.

Regulatory changes

4.45 This is a sector driven by regulation which can raise costs for suppliers in keeping up to date with regulatory developments. This may deter new suppliers from bidding for a contract. An Institute of Civil Engineers report[144] states that the sheer volume of legislation relating to waste management and the mixed messages coming from government is creating a climate of uncertainty. This climate may deter the private sector investment in the very facilities the UK needs.

4.46 In addition, there appears to be a degree of uncertainty about public policy towards some treatment processes. Defra have recently noted that many LAs remain sceptical about the role of energy from waste.[145]

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[144] *The State of the Nation 2004*, Institute of Civil Engineers, June 2004.

[145] Defra *consultation on criteria for Waste PFI projects*, October 2005 www.defra.gov.uk/corporate/consult/waste-pfi/wastepfi-consultation.pdf

The planning process

4.47 A waste facility can lead to: increased traffic around the local area; increased noise pollution (both from the facility and the traffic); (perceived) reductions in property prices; and (perceived) health implications. In order to obtain planning permission to build a waste facility, either the local authority or the successful contractor, must put their plans out to public consultation. This is usually met with substantial public opposition, which leads to significant delays and increased costs, which in turn, will reduce the expected profit associated with winning the contract.[146]

4.48 The original three-month public consultation for the proposed EfW incinerator in Belvedere, which had the support of planning inspectors, took place in 2003. As a result of public opposition, the decision was then referred to the Secretary of State who early in 2005 decided to defer the final decision until after the May 2005 election. Not long after this, the government decided to re-open the public inquiry, which will add further delays and costs to the project.

4.49 While there is a limit to what can be done in the short-term, both central and local government have taken action to alter the public perception of waste.

4.50 For example, in 2004 Defra published a review of the health effects associated with different forms of waste treatment.[147] This concluded that, on the evidence available, the treatment of municipal solid waste has at most a minor effect on health, particularly when compared with

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[146] Waste management is often referred to as a 'not in my backyard' (NIMBY) issue for a variety of reasons and it is unclear whether it is the responsibility of industry or the government to improve the image of treatment facilities. Industry stakeholders believe it is in their interest to simply wait for government to tackle the issue as it is the public sector who needs waste treatment facilities to a greater extent in the shorter-term in order to fulfil the requirements of the Landfill Directive.

[147] *Review of Environmental and Health Effects of Waste Management: Municipal solid waste and similar wastes*, report published by Defra, May 2004.

other health risks associated with ordinary day-to-day living. This should give LAs more objective evidence for use in gaining planning permission and help change public views on the health implications of waste facilities.

4.51 In another case, following heavy objection to its proposed incineration plant from vested interest lobby groups and local residents, Sheffield County Council (SCC) managed to get planning permission by commissioning an independent environmental impact study to investigate the concerns that had been raised.

4.52 DCLG and Defra also published a new planning policy statement (PPS10) in July 2005 which aims to give LAs a better decision-making framework for obtaining planning permission. This guidance indicates that LAs are bound by the planning inspector's recommendations[148] and therefore, they cannot in future refer decisions to the Secretary of State (as in the Belvedere example). The guidance also encourages LAs to identify sites and go out to consultation to obtain outline planning permission as far as possible well before going out to tender. If local authorities follow this advice, this could lead to substantial reductions in planning delays (and cost escalations).[149] Given the recent publication date, at this stage we are not able to assess whether PPS10 will address the delays associated with obtaining planning permission.

Regulatory barriers preventing the use of end products

4.53 Many of the markets for end products of treatment processes (for example, Refuse Derived Fuel (RDF)) are relatively volatile as they are quite new and relatively undeveloped. This has been exacerbated by two factors:

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[148] www.planninghelp.org.uk

[149] Paragraph 64 of the full RIA for PPS10 states that 'completion of the OFT's competition filter suggests only a limited competitive impact from the proposal. To the extent that PPS10 has any significant impact on competition it should tend to increase it, by lowering a barrier to entry and/or expansion through enabling a clearer and more manageable planning process.'

- Uncertainty over whether RDF from EfW plants will be eligible for ROCs. This uncertainty surrounding the end-market for RDF has been a key issue for the Greater Manchester WDA contract.

- EU principles of self-sufficiency (that is, that waste should be dealt with in the country it originates) imply that waste currently cannot be exported for the purpose of disposal, only for the purpose of 'recovery'.[150] This may make it difficult to increase demand for end products to sell in the EU.

Large minimum viable scale

4.54 As highlighted earlier in this chapter there are economies of scale with many of the alternative waste treatment technologies. High costs associated with bidding and obtaining planning permission will also increase fixed costs and further enhance economies of scale.[151] Significant economies of scale can deter suppliers from entering a sector as it may mean that a firm has to enter a sector on a large scale in order to compete with other firms. In addition there are likely to be high sunk costs in providing waste treatment facilities (that is, costs which are not recoverable upon exiting the market), associated with entering on a large scale, which may deter entry.

Lack of a track record in the UK

4.55 Given the UK's historical reliance on landfill as a means of disposal, it is not surprising that many alternative or new technologies are as yet untested in the UK. This lack of a 'proven business case' appears to make it very difficult to obtain funding from banks. Anecdotal evidence

[150] The definition of waste recovery is a contentious issue, which is the subject of current debate in the EU. Recovery basically involves changing the properties of the product. Hence it covers, for example, when recyclables are exported and products such as paper are 'recovered'. However, there is some disagreement over whether RDF is, or should be, legally defined as disposal or recovery.

[151] OECD report, *Competition in Local Services: Solid Waste Management* 2000.

suggests that technological uncertainty is a major concern of banks considering financing waste PFI projects and, in many cases, means that they are unwilling to fund treatment projects. In addition, volatile markets for waste products can reduce the expected revenues associated with operating a waste treatment facility. This will reduce the expected returns associated with entry and could deter suppliers from bidding for municipal contracts. Many stakeholders agree that this is one of the biggest barriers the sector faces.

4.56 As a result of this Defra have invested £30m in a 'new technologies demonstration scheme', the objective of which is to demonstrate the technical and commercial viability of some of the alternative treatment technologies that have been used successfully abroad. The ten demonstration plants selected by Defra cover technologies such as anaerobic digestion, MBT, in-vessel composting, pyrolysis and gasification. Five projects were planned to be up and running by the end of 2005, with a further five coming on-line in 2006.[152] Once operational, Defra will initiate a visit programme for local authorities, funders and other relevant decision makers and make available independent data by 2007-08 on each type of technology.

Lack of skilled workforce

4.57 There is limited operational experience of many of the alternative waste technologies in the UK which has resulted in shortages of appropriately skilled workers.

4.58 However, some stakeholders believe that the skill set required to operate treatment plants using alternative technologies is actually very similar to that associated with operating plants in the process engineering sector.[153] Defra have also launched an education and training

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[152] www.defra.gov.uk/news/2004/040901b.htm

[153] *Associates in Industrial Ecology* (AiIE) briefing note 2005.

programme[154] so that individuals can become qualified in alternative waste treatment technologies.

High bid costs

4.59 Whilst not all treatment facilities are PFI projects, for those that are, like PFI projects in other sectors, bid costs are very high. Bid costs are generally high in the sector, however, and broadly similar for comparable services financed through a PFI or non-PFI route. Bid costs for PFI contracts may be slightly higher however, reflecting the need for additional legal and financial expertise in bidding for the contract. For PFI waste treatment contracts, suppliers have indicated that it costs £250,000 to get to the invitation to tender stage and around £4 million to financial close, if they are successful. To get to preferred bidder stage it costs £1-2 million, which cannot generally be recovered by the losing bidder, except if it wins future contracts, over which it can spread these costs.[155] Anecdotal evidence however, suggests that bid costs have been falling in recent years as experience in the market has developed and as there is now more standardised documentation which can be used to assist the process.

4.60 There is some evidence of recent market consolidation in the waste treatment sector. For example, in June 2003 Biffa acquired Hales Waste Control and RMC Environmental Services. This acquisition gave Biffa greatly increased coverage in London and East Anglia and increased Biffa's operational landfill void in the south of England. Viridor has also made a number of acquisitions over the last two years, primarily with the aim of strengthening its position in key operational regions and increasing its landfill capacity. Cory Environmental Group has also expanded through the purchase of Waste Hire Services in November 2004 and also the purchase of transfer stations in London.

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[154] For more information: www.defra.gov.uk/environment/waste/wip/newtech/training.htm

[155] Based on evidence collected as part of the OGC SKM project.

Local authority procurement

4.61 The procurement of waste treatment is very fragmented, with responsibility divided between 39 WDAs and 82 UAs in England. But due to the requirement to meet the Landfill Directive targets, the government is trying to create and stimulate the sector for alternative waste treatment facilities and is therefore currently responsible for the majority of demand.

4.62 In the medium to longer-term, commercial and industrial waste is likely to be diverted from landfill to alternative waste treatments as the landfill tax escalator 'bites'. In light of this, government may adopt a strategic position in terms of the wider waste industry: if firms are able to win LA contracts and build alternative waste treatment facilities now, they may be in an advantageous position when commercial and industrial waste is diverted away from landfill.

4.63 As LAs are currently the only purchasers of municipal waste treatment services in any one area they are likely to have the ability to affect competition through the way in which they procure, for example, contract aggregation, how they approach obtaining planning permission etc. This is discussed in more detail in the following chapter.

5 EFFECTS OF PUBLIC PROCUREMENT ON COMPETITION IN THE MUNICIPAL WASTE TREATMENT SECTOR

5.1 As we noted earlier in Chapter 1, LA procurement in this sector is very fragmented as responsibility is divided between 121 WDAs and 137 UAs. However, we have identified a number of ways in which public procurement could have an effect on competition in the waste treatment sector by:

- restricting the number of bidders and/or creating incumbency advantages
- contract aggregation and collaboration
- facilitating collusion
- in-house supply, and
- creating knock-on effects on private buyers.

5.2 This chapter examines the evidence gathered in the SKM project to assess what effect these issues are having in waste treatment in practice.

Restricting the number of bidders or creating incumbency advantages

5.3 The issues we consider here in relation to municipal waste treatment are:

- specification of inputs rather than outputs
- planning permission risks
- pre-qualification and selection criteria, and
- access to facilities.

Specification of inputs rather than outputs

5.4 Some LAs specify which treatment technology they wish to purchase because they believe that this provides certainty to bidders which reduces bid costs and increases participation.[156] This could, however, restrict participation because some suppliers prefer to use, or can only offer, certain technologies. It also reduces the opportunity for private sector innovation as suppliers are not able to develop their own solutions. The potential for innovation is a key benefit of specifying outputs rather than inputs. In PFI contracts, HM Treasury recommends specifying outputs for precisely this reason, although it believes that LAs will still need to give prospective bidders some clarity about the types of services that will best meet their needs.[157]

5.5 Existing suppliers had strong but divergent views on the impact of this issue in practice. Some felt that a tender specifying one technology would reduce the number of bidders. Others indicated that they would prefer a specified but not prescriptive process but did not clarify what they meant by this. Other suppliers were concerned that specifying a particular technology would have a damaging effect in the long term, by preventing the best solution from emerging.[158]

5.6 As noted in Chapter 4, waste treatment is an evolving sector, where many technologies do not yet have a proven business case in the UK. Therefore, there is likely to be a relatively high level of uncertainty about the most appropriate form of technology for a given situation.

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[156] SKM Local Authority case studies.

[157] See: www.hm-treasury.gov.uk/media/648B2/PFI_604.pdf

[158] Based on evidence collected as part of the OGC SKM project.

5.7 Where a number of different options are open to LAs, it may be advisable to consult widely at an early stage, before firming up tender requirements. A key part of this is the need to weigh up carefully the costs and benefits of specifying inputs as opposed to outputs, taking into account the points raised by suppliers above, to avoid unnecessarily restricting which suppliers are able to bid.

Planning permission risks

5.8 In any waste treatment contract, all the relevant risks should be apportioned to the party that is best placed to manage them at the outset of the contract. In sectors where there may be technological or regulatory changes such as waste management, the contract needs to be structured flexibly to deal with this.

5.9 One of the key issues in waste treatment is appropriate allocation of risk for obtaining planning permission. With regard to planning, suppliers have indicated that they are more likely to bid where there are clearly identified sites, preferably owned by the LA and a commitment to ease the planning process. The following examples provide more detail on how some LAs have dealt with planning risks.

Examples: LA approaches to planning risks

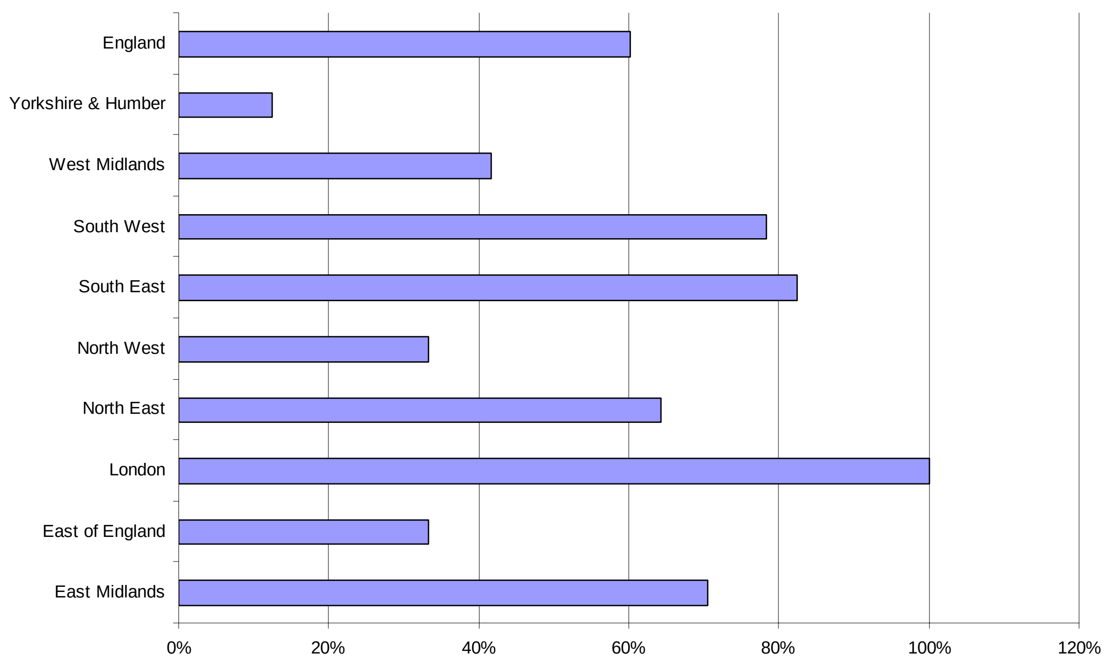
Case study evidence suggests that some LAs recognise and deal with the planning risk.

For example, The East London Waste Authority (ELWA)/Shanks partnership has widely been regarded as a success in planning terms, with two waste treatment facilities very near to completion. Planning applications were submitted in the months after the contract start date. The ELWA contract stipulated that planning was a shared risk with a sum of money set aside for planning costs at the outset. If costs exceeded this sum, then both parties would share the expense.

For example, Manchester WDA already had a good portfolio of sites pre-procurement with 70 – 80 per cent of required sites already in place (equivalent to around 45 sites; only around five – ten new sites are required).

5.10 At present, there is a large regional variation in the proportion of planned facilities with identified sites, as Figure 5.16 below shows. Given that suppliers have said they are more likely to bid for contracts when sites have been identified, this suggests that there is scope for improvement in some regions and it may have a beneficial impact on competition.

Figure 5.16: Proportion of planned facilities with identified sites by region[159]



[159] Source: SKM survey of local authorities in England (2005).

5.11 The fact that there is a much lower incidence of identifying sites in some regions may not necessarily be a problem however and regional variation may simply be a sign that procurers have already factored into their plans such considerations as the ease of identifying sites and obtaining planning permission in their locality. In London, for example, it may be that due to the lack of available sites, early site identification is more crucial; therefore it takes place at an early stage of the procurement process. However, in other areas, such as the North West, where there may be many more available sites, early identification of sites may be less of an issue; as a result it may be less crucial to identify sites early, perhaps explaining why there are fewer planned facilities with identified sites in this region. The regional variation of identified sites for planned facilities shown by the data, therefore, is not inevitably a problem and the evidence is not clear cut. Further, it is recognised that early site identification may not always be feasible if LAs are specifying outputs when procuring waste treatment services rather inputs as this may affect where facilities can be located and hence the ability of LAs to plan ahead.

5.12 Unfortunately, we do not have evidence from the SKM survey of local authorities to compare the average number of bidders for contracts where sites have been identified and where not. However, anecdotal evidence seems to suggest that if LAs share planning risks with suppliers and obtain outline planning permission in advance of going out to tender, then this can encourage more suppliers to bid for contracts.

Pre-qualification and selection criteria

5.13 Pre-qualification criteria provide an objective way for LAs to screen bids but they should be proportionate to the size and risk of the contract.[160] As with waste collection, it will be important for LAs to ensure that selection criteria do not discriminate unduly in favour of incumbent providers.

5.14 Evidence from LA case studies suggests that some LAs require previous experience in the waste management sector, whilst others would accept consortia bids (including involvement of suppliers who have no previous experience in the sector):

- Sheffield County Council indicated that key factors when deciding the winner bidder is their level of experience and size so it would be unlikely to award a contract to a new entrant. It did point out, however, that a consortia bid between a smaller waste company and a large company from another sector seeking entry (that is, without previous experience) would have been welcomed.

- Northumberland County Council would consider a consortium approach where the lead bidder was not a waste management company (that is, a civil engineering contractor), but only if the consortium included a waste management company that would be involved in the design and subsequent operation and management of the waste facilities.

[160] For Official Journal of the European Union (OJEU) tenders, the extent of the information that can be requested from each Bidder is, however, limited by the Procurement Regulations. However, as the Public Private Partnerships Programme (4Ps) note in their Waste Procurement Pack, LAs are left with considerable discretion to decide upon the precise details of how to conduct the pre-qualification evaluation and appear to be given the right to set minimum standards of financial and economic standing/technical capacity and ability.

- However, another LA indicated that it was not willing to even consider consortia bids, even if this included a waste management service firm, because it believed it was too risky.

5.15 Clearly, restricting bidders to those with previous experience in the waste sector will limit potential competition for contracts. Consortia bids including perhaps small waste management companies and potential suppliers with the relevant skill set (for example, from the construction or process engineering sectors) appear to be one way of encouraging new entry while mitigating the risk of dealing with a supplier without previous experience in the waste sector.

Access to facilities

5.16 As discussed in Chapter 1, access to necessary facilities, such as transfer stations and landfill sites, may restrict new entry. The OECD[161] identified access to landfill sites as a potential barrier for new entrants in the waste collection sector where waste collection and landfill contract are aggregated. Similar arguments may apply for new entrants in the waste treatment sector if treatment and landfill contracts are aggregated. If access to landfill sites is difficult to obtain, suppliers without access to landfill sites may be at a competitive disadvantage. However if aggregation of contracts across local authorities widens the number of potential sites for waste disposal facilities this may mitigate problems in particular areas.

5.17 There may therefore be scope to enhance competition if LAs can ensure access to landfill sites. For example, Northumberland County Council was concerned that because its incumbent supplier owned almost all the landfill sites in the area this would limit competition for its PFI contract so it sought to level the playing field by securing landfill capacity for

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[161] OECD report, *Competition in local services: Solid waste management* 2000.

bidders that did not have access to their own facilities within Northumberland.

Contract aggregation and collaboration

5.18 As with waste collection, LAs may collaborate and aggregate their demand for waste treatment services. They may also choose to aggregate treatment with other waste management services.

5.19 **Aggregation of treatment services only**: Some treatment technologies are relatively capital-intensive. Where the minimum efficient scale of a treatment plant is much larger than the foreseeable demand within an individual LA area, aggregation could bring efficiency benefits. In particular, it could enable waste to be treated for a lower cost per tonne, (although this will also depend on transport costs). A larger contract (in terms of the amount of waste to be treated) may be more attractive to a wider range of bidders. Clearly, there will also be other issues, such as persuading planning authorities (and residents in the area who may oppose the facility) that a large treatment plant which also serves neighbouring areas is in their interests that also need to be taken into account (see Chapter 4). Additionally collaboration and aggregation of treatment contracts across LAs may lead to over dependency on one supplier.

5.20 Collaboration across authorities and co-ordination in timing of their bidding processes may also help to ensure a smooth deal flow and raise supplier participation.

5.21 **Aggregation with other waste management services**: At present it appears that treatment services are usually procured by LAs separately, but this is likely to change over time. The 4Ps waste management procurement pack[162] recommends procuring integrated services to

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[162] Available at: www.4ps.gov.uk/Documents/publications/Waste Management Procurement Pack.htm

minimise 'interface' risks between different suppliers and a study by Defra[163] found that foreign suppliers thought that the UK preferred to procure integrated waste management services. As discussed in Chapter 1, contract aggregation has implications for competition.

5.22 Aggregation appears to increase the duration of the procurement process: on average, treatment contracts take 9.5 months to procure, compared to 12.5 months for collection and treatment contracts and 14.2 months for integrated contracts.[164]

5.23 However, suppliers have indicated that bid costs do not vary with the size of contracts, which may suggest that larger aggregated contracts could increase participation.[165] Table 5.17 shows the average number of formal and credible bids received for different types of contracts. This table suggests that aggregating treatment services with other waste management services in the form of an integrated services contract reduces the average number of formal and credible bids compared to a treatment only contract.

Table 5.17: Average number of formal and credible bids by service type[166]

Service	Average number of Formal Bids	Average number of credible bids
Treatment	4.00	3.58
Integrated services	3.67	2.83

[163] Defra study into *Barriers to entry in to the UK waste PFI market*, May 2004.

[164] Source: SKM survey of local authorities in England (2005).

[165] Based on evidence collected as part of the OGC SKM project.

[166] Source: SKM survey of local authorities in England (2005).

5.24 Additionally, a recent report by Defra[167] found that LAWDCs were unlikely to be able to be a main contractor in PFI bids for integrated contracts but that acting in partnership or joint venture could be an option. It also found that disaggregation of integrated waste management contracts could increase competition by enabling LAWDCs to bid.

5.25 If LAs decide to tender for integrated waste management services and access to landfill sites is difficult because only a limited number of suppliers can offer this and it is difficult to obtain planning permission, then bundling contracts for treatment and landfill together will restrict who can bid for these integrated contracts. At present, the larger waste management suppliers enjoy strong regional positions where they have landfill contracts. In the future, if LAs bundle treatment and landfill contracts this position is unlikely to change. Therefore, we would strongly recommend that treatment should not be aggregated with landfill contracts.

5.26 Offering firms the flexibility to bid for parts of the requirement specified in a tender is one possible way to enable the public sector to obtain the benefits of aggregation without necessarily jeopardising the ability of smaller firms to participate. An alternative to multi-sourcing is to award a contract to a different supplier on re-tendering but this might be difficult to achieve under EU procurement rules.

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[167] *Review of Local Authority Waste Disposal Companies and their Role in Future Procurement*, report by Jacobs Brabtie for Defra, September 2005.

Facilitating collusion

5.27 No stakeholders raised any concerns about collusion. However, there are certain characteristics of the municipal waste treatment sector that could facilitate collusion:

- There are currently relatively few suppliers and new entrants in the municipal waste treatment sector.

- Due to the need for many new treatment facilities it is possible that in future there could be frequent interactions between suppliers bidding for new treatment contracts.

- At present, the larger waste management suppliers enjoy strong regional positions. In the future, if local authorities bundle treatment and landfill contracts this position is unlikely to change. However, if they don't, these strong regional positions may be eroded over time as suppliers bid for contracts to build new treatment facilities outside of the regions where they do not also have access to the landfill sites. It is possible that suppliers could seek to maintain their strong regional positions by agreeing not to bid for treatment contracts outside these regions.

5.28 LAs should keep an eye out for this type of behaviour and encourage bids from suppliers active outside their region. The results of competitive tendering should perhaps be subject to independent monitoring at a regional/ national level; LAs and Defra should be aware of the risks of market sharing.

5.29 There is evidence to suggest that at least some local authorities are aware of the risk of collusion and are taking steps to minimise the risks of it occurring. Northumberland County Council, for example, requires all prospective bidders to complete an Anti Collusion Certificate as a mandatory part of their tender submission and sets out the actions and activities that a bidder must not engage in. It also benchmarks contract values against other similar contracts secured by other local authorities.

5.30 Suppliers would like the deal-flow of waste management contracts to be more transparent, to enable them to plan and prepare better. This information will have benefits for competition if it increases the number of suppliers able to bid for contracts, but this should be weighed against the opportunities it may give suppliers to collude and share out contracts.

In-house supply

5.31 There is much less in-house provision of waste treatment services compared to collection services as there are only nine LAWDCs in England. As a result, we do not have data that would allow us to consider the effect of LAWDCs on the number of credible bidders for treatment contracts. Nor do we have any information on the likely impact of the repeal of the divestment provisions of the EPA 1990.[168] The major waste management service suppliers have indicated that they would rarely bid in direct competition with a LAWDC, but would consider bidding if the LAWDC was part of the bid (that is, for sale), as they are likely to have the best, and sometimes the only, asset base (that is, landfill site) in the area.[169]

Creating knock-on effects on private buyers

5.32 Local Authorities are creating demand for new treatment technologies. Limited anecdotal evidence suggests that LAs may not be able to build treatment plants with additional capacity to service private demand because banks do not want to fund waste streams that are not guaranteed.

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[168] See footnote 133.

[169] Based on evidence collected as part of the OGC SKM project. Suppliers' views covers treatment and disposal (landfill).

5.33 At present, for private buyers who are not subject to the targets in the Landfill Directive, using landfill to dispose of waste is still a preferred option. However, due to the landfill escalator tax, the price of landfill may in the future increase and the availability of landfill capacity may decrease to a level where alternatives such as waste treatment become a viable option for these buyers. Given municipal waste is less than 10 per cent of total waste, the majority of demand for treatment plants may in the future come from private industrial and commercial buyers. Currently there is little or no speculative building of waste treatment facilities: in the future, factors that inhibit this will lead to a lack of capacity to meet private demand. As a result, due to the lower level of supply of the services for private buyers, they could face reduced competition and higher prices for waste treatment services.

5.34 Due to the potential knock-on effects on private sector buyers, we would recommend that LAs should consider building waste treatment plants with the capacity to meet industrial and commercial waste treatment demand in future.[170]

Conclusions

5.35 As we mentioned in paragraph 1.25, competition is not just about the number of bidders for contracts but about the intensity of rivalry between bidders to provide a quality service at a good price, and about the openness to new entrants. Unfortunately, much of the data we have relates to numbers rather than the more qualitative aspects of competition, therefore, we do not have a complete picture of the intensity of competition covering factors such as the quality of service and levels of innovation.

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[170] Defra also recognises the need to deal with integrated waste streams and state that their review of the waste implementation programme will consider how to encourage LA contracts to allow, where appropriate, for larger facilities that can serve the non-municipal sector. See: Defra Consultation on the Review of England's Waste Strategy, www.defra.gov.uk/corporate/consult/wastestratreview

5.36 Where LAs are concerned about potential lack of interest in their treatment contracts, steps that they can take to increase participation include the following:

- Carefully weighing up the costs and benefits of specifying inputs as opposed to outputs. Specification of inputs (that is, which particular treatment technology a LA wants to procure) risks restricting bidder participation and reducing the scope for innovation.

- Where possible, arrange sites and planning permission in advance of putting contracts out to tender. If this is not possible, do not simply transfer this risk to the supplier but think about sharing the risk.

- Remain open to bids from consortia, especially where smaller waste management companies or suppliers with relevant experience from other sectors are involved.

- Think carefully about what services are aggregated and why. It may make sense to collaborate with other local authorities where the expected demand for treatment services is low; but be careful about aggregating treatment contracts with landfill contracts in particular as this will risk restricting participation to only those bidders who have access to landfill sites.

- Encourage bids from suppliers active outside the region, for example, by ensuring that they will have access to landfill sites.

- LAs should be aware of the risk of collusion and consider taking steps to minimise the risk of collusion, for example, requiring bidders to complete an Anti Collusion Certificate, monitoring the outcomes of tenders at a regional/national level to see whether contracts are rotating between different suppliers. While revealing information about deal-flow will help suppliers to plan and could increase participation, this should be weighed against the opportunities it may give suppliers to collude and share out contracts. Defra and LAs should be aware of risks of market sharing.

- Some suppliers have indicated that they would rarely bid in direct competition with a LAWDC; therefore it is important to ensure that there is fair competition between private sector bidders and LAWDCs. Fair competition between LAWDCs and private sector will drive efficiency and improve value for money.

- Consider building waste treatment facilities that can meet the needs of the industrial and commercial sector as well as LA demand. Competition for industrial and commercial waste may be adversely affected by LAs actions and this accounts for a much more significant proportion of the waste stream. Larger treatment facilities will be better able to realise economies of scale which means waste will be cheaper to treat.

6 GLOSSARY

Anaerobic digestion (AD)	A biological waste treatment process where biodegradable wastes are decomposed in the absence of air. It will only decompose biodegradable material. The material is placed in an enclosed vessel and in controlled conditions the waste breaks down, typically into a digestate, liquor and biogas.
Biodegradable municipal waste (BMW)	The component of municipal solid waste (MSW) capable of being biologically degraded. Biodegradable Municipal Waste includes paper and card, food and garden waste, and a proportion of other wastes, such as textiles.
Biological treatments	Waste treatment technologies for the processing of biodegradable (organic) waste. These treatment technologies include windrow composting, in-vessel composting and anaerobic digestion.
Digestate	The solid and/or liquid product resulting from Anaerobic digestion.
Direct Service Organisations (DSOs)	Local authority in-house providers of municipal waste collection services. These were established in 1988 in response to the requirement that LAs divest themselves of any direct role in waste collection allowing them to bid under Compulsory Competitive Tendering. This is also known as 'self-supply'.

Energy from Waste (EfW)	A thermal waste treatment technology. This process involves the combustion of unsorted municipal solid waste (MSW) under strictly controlled conditions, converting input material into energy (for power and/or heat recovery) and ash. The process results in the bulk reduction and stabilisation of BMW.
EU Directive on landfill waste (the Landfill Directive)	The Landfill Directive entered into force 16 July 1999 (Council Directive 99/31/EC of 26 April 1999). It requires Member States to put in place a national strategy for reducing the volume of biodegradable waste going to landfill. It also sets specific reduction targets for biodegradable municipal waste.
Gasification	A treatment process involving the thermal breakdown of waste into a gas, using high temperatures and oxygen to partially combust the waste.
Hybrid treatments	An alternative name for mechanical biological treatments. They comprise the integration of several treatment processes and it is a generic term used for mechanical sorting/separation waste treatment technologies used in conjunction with biological treatment processes, such as composting.
In-vessel composting	A waste treatment process involving the aerobic decomposition of organic waste within an enclosed container.

Landfill Allowance Trading Scheme (LATS)	LATS is a scheme whereby LAs will be allocated tradable BMW allowances for landfill each year. These allowances will reduce year on year and LAs will be fined for exceeding them. The fine for exceeding the allowances is currently £150 per tonne but the LA does have the option to borrow up to 5% of the following year's allowances in certain years.
Landfill tax escalator	A tax on the landfill of industrial and commercial waste which increases year-on-year to encourage greater diversion of wastes from landfill. The current standard rate of disposal is £18 per tonne and this is set to increase by at least £3 per tonne in future years, on the way to a long-term rate of £35 per tonne.
Local Authority Waste Disposal Companies (LAWDCs)	Local authority in-house providers of municipal waste treatment services. LAWDCs operate at arms length from LAs either as a collaboration with a private sector company holding 80% and the LA holding 20% of the company's equity; or as a company wholly owned by the LA, but operated at arms length. When the relevant section of the Clean Neighbourhoods and Environment Act 2005 comes in to force, then Section 32 of the Environment Protection Act 1990 will cease to have an effect and LAs will have the option of taking the waste management services provided by LAWDCs back in-house.

Materials recycling facility (MRF)	A waste treatment technology dedicated to the sorting/separation of recyclable materials into separate streams for subsequent reprocessing.
Mechanical biological treatments	Also known as hybrid treatments. They comprise the integration of several treatment processes and it is a generic term used for mechanical sorting /separation waste treatment technologies used in conjunction with biological treatment processes, such as composting.
Negotiated procurement	A two stage tender where only those suppliers selected from those who meet the client's minimum requirements for economic and financial standing and technical capability may tender and the client may negotiate the terms of the contracts with these suppliers.
Office of Government Commerce (OGC) Second Kelly Market project (SKM)	As part of the wider Kelly Programme the SKM project aims to improve strategic procurement in the municipal waste management sector.

OGC Kelly Programme	A programme set up following the publication of OGC 2003 report *Increasing competition and improving long-term capacity planning in the government market place* (known as the Kelly report). The Kelly Programme aims to take this work forward with the aim of increasing competition and long-term capacity planning in markets where the Government possesses significant purchasing power.
Open procurement	A procurement route where all suppliers can tender.
'Other' procurement routes	Alternative procurement routes including procurements with an existing supplier, for example, under a strategic partnering arrangement.
Pyrolysis	A medium temperature thermal waste treatment process where organic derived materials in the waste are broken down under heat and in the absence of oxygen.
Refuse Derived Fuel (RDF)	A fuel produced from combustible waste that can be stored and transported or used directly on site of the waste treatment facility to produce heat and/or power.

Renewables Obligations	Introduced by the Department of Trade and Industry in 2002, this scheme creates a market in tradable renewable energy certificates (ROCs), for which each supplier of electricity must demonstrate compliance with increasing Government targets for renewable energy generation.
Restricted procurement	A two stage procurement process where all suppliers may express an interest but only those suppliers selected from those who meet the client's minimum requirements for economic and financial standing and technical capability may tender.
Thermal treatments	Treatment technologies involving the combustion of municipal solid waste under controlled operating conditions. Thermal waste treatment technologies include energy from waste (EfW) incineration and advanced thermal technologies (ATTs), such as pyrolysis and gasification.
Unitary authorities (UAs)	Typically large metropolitan boroughs and certain London boroughs, who have a statutory responsibility for the collection and subsequent treatment and disposal of municipal waste.
Waste collection authorities (WCAs)	Typically district councils, who have a statutory responsibility for the collection of municipal waste.

Waste disposal authorities (WDAs)	Typically county councils, who have a statutory responsibility for treating and disposing of municipal waste from their constituent WCAs.
Windrow composting	A waste treatment technology involving the aerobic decomposition of biodegradable waste using open linear heaps known as 'windrows'. This results in a bulk-reduced, stabilised compost residue.

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