



# The Real Economic Benefit of Separate Biowaste Collections

A business case



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# Foreword

Fergus

Food Waste & AD Director

Olleco

**“We are convinced that the economic case for mandatory separation of food waste is as strong as the environmental one”**



Biowaste is an important resource, and one that England seriously undervalues. Although garden waste collections are widespread, less than half of English local authorities offer a separate food waste collection service. And although many large food waste producing businesses have taken up food waste collection services, many others have yet to do so. As the increase in recycling rates has slowed, the target of 50% recycling by 2020 can look rather distant, but expanding food waste collection offers one of the biggest opportunities to increase recycling in England.

**Our vision at Olleco is 100% resource recovery for the food industry, and over the last decade we have invested in expanding our business to achieve this aim.** From our 23 depots, we now collect food and cooking oil from over 50,000 customer sites across the UK, and employ over 550 people. We are also leading the way in developing conversion technologies to extract the maximum benefit from the valuable resources we collect.

As the only national collector of food waste across the length and breadth of the UK, Olleco are uniquely placed to comment on the sector and the impact regulation has had upon it. When, in 2014, the Scottish government introduced legislation to make the segregation of food waste mandatory for councils and food businesses, we were there to see the difference it made to the take up of commercial food waste services. We had a hands-on appreciation of the transformation this has brought on the commercial food waste market, with collection costs falling as the growing number of customers naturally helps to improve collection efficacy. Now, new treatment facilities are coming on stream to support both local authority and trade waste collections. Businesses that take up food waste collections are saving money, both on the waste they produce and through the opportunity to prevent food waste from occurring.

**With similar legislation now in place in Northern Ireland, and with Wales poised to move in the same direction, we believe the time is right to introduce the same measures here in England.**

A major reason for the slow progress of separate food waste collection services in England to date is a concern about costs. We know that food waste treatment is cheaper than residual waste treatment, but government is naturally concerned about whether this is in itself enough to cover the costs of collecting food waste separately – both for businesses and councils.

This is what we set out to investigate with this report, and we are pleased to have had the opportunity to work with the Renewable Energy Association and Eunomia Research & Consulting in doing so.

As a result of the work, we are convinced that the economic case for mandatory separation of food waste is as strong as the environmental one. **It doesn't cost the earth to save the planet.**

Fergus Healy

# Executive Summary

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Biowaste, comprising food and garden waste, presents a significant opportunity to boost recycling and reduce the environmental impact of waste. Garden waste is widely recycled, both by households and the businesses that produce it. But despite significant policy developments in Wales and Scotland, the UK as a whole currently recycles just 10% of household food waste, and many food businesses do not recycle their food waste at all.

This study, funded by Olleco and commissioned by the Renewable Energy Association, examines the net costs of introducing measures to mandate source separation of food waste by councils and businesses. The aim of a mandatory requirement to separate biowaste would be to greatly increase the extent of separate collections in England, bringing both environmental and economic opportunities, and contributing to increasing the UK's recycling rate.

Separate food waste collection would also be likely to yield savings. These may be direct savings that come from lower treatment costs for separate food waste, or indirect savings that the introduction of separate collections allows, such as changes to residual waste collection frequency. The question is – would they offset the cost of collecting the material separately?

## E.1.0 Commercial Waste

There appear to be around 1.85m tonnes of UK commercial and industrial (C&I) food waste from relatively large producers that are currently being disposed of through thermal treatment or landfill, or whose fate is unknown. This is approximately 4% of all UK C&I waste.

While there may be a perception that food waste collections are expensive, this reflects the volume-based charging system for waste that has dominated in the past.

Examining the change in the waste management costs of four example businesses under different sets of assumptions shows that:

- Requiring food businesses to take up separate collections will increase the efficiency of food waste collection services, bringing down the costs and improving the business case for all food waste producers to take up separate collections.
- Under a mandatory separate collection system, a business that produces around 500kg of food waste per week will save over £900 per year compared with the expected cost of residual waste collections, based on approaches to pricing already widely used in the market.
- Within a system that uses pay-by-weight pricing, even small food producers will make savings by introducing separate food waste collections.
- In addition to the direct savings, there is evidence that separating food waste will help to increase and improve dry recycling, leading to further waste collection savings for businesses, as well as helping producers identify and prevent food waste.
- Market forces alone will not be quick or effective in producing these benefits compared with government intervention.

**“A mandatory requirement on food businesses to separate food waste will enable them to make savings, which are less likely to be achieved without legislation.”**

A mandatory requirement on food businesses to separate food waste will therefore enable them to make savings, which are less likely to be achieved without legislation.

## E.2.0 Household Waste

Biowaste is already a significant part of the England's municipal recycling. Of the 10,025m tonnes of household waste collected for recycling in 2014, garden waste (including mixed food and garden) accounting for 39%, while separately collected food waste comprised 3%.

However, there remains a substantial opportunity for this contribution to increase. Recent estimates indicate that food waste still comprises around 30% of household residual waste. Food waste collections are considerably less widespread than garden waste. Whilst over 90% of English local authorities offer a garden waste collection, 45% offer no facility to separate food waste from residual waste.

Councils can make direct savings by separately collecting food waste. The money saved by diverting waste from more expensive disposal or treatment options can significantly offset the costs of collection, but whether it does so fully depends on the collection system already in place, the collection system which is proposed, and the differential between the treatment costs. However, separate food waste collections also offer the opportunity to make far greater indirect savings.

Based on WRAP data, for authorities where weekly residual waste collections are currently in place, a move to weekly separate food waste collections and fortnightly residual waste appears to consistently lead to considerable savings – typically between £10-20 per household per year – without any other changes to the waste and recycling system.

Where councils already collect residual waste fortnightly, indirect savings offer the opportunity to implement food waste collections while maintaining or reducing councils' overall waste collection costs:

- Giving residents the opportunity to remove food waste from the residual stream may make it possible to reduce the frequency of residual waste services to three or four weekly, cutting collection costs and driving up recycling.
- Many councils that have already implemented fortnightly residual waste collections would be able to introduce separate food waste collections while saving money by changing to a recycling system that allows food waste to be collected more conveniently and economically.

Mandatory collections could be implemented so as to allow councils a sufficiently lead time to introduce food waste collections at the most economically advantageous point, taking account of the lifespan of vehicle fleets and the duration of any collection and treatment contracts. However, the opportunity for councils to make service improvements and savings should not be delayed unnecessarily. With support, there is scope to renegotiate contracts to allow service changes, without incurring substantial costs.

## E.3.0 Legislation

Whilst new regulations requiring source separation of food waste by councils and food businesses have proven to be an effective tool in Scotland, it may be possible to achieve the same benefit without the need for new law in England.

Legislation already in force appears to amount to a requirement to separate food waste. The waste hierarchy was introduced into law through the Waste (England and Wales) Regulations 2011, and requires that waste producers take "all reasonable measures" to ensure that it is applied. There is good reason to think that separating food waste is a "reasonable measure":

**"Councils can make direct savings by separately collecting food waste. The money saved by diverting waste from more expensive disposal or treatment options can significantly offset the costs of collection."**



Image: Eunomia



- **It is effective.** Separate collection has been shown to help prevent food waste and is a precondition of environmentally preferable treatment options, such as composting and AD.
- **It has already been shown to be feasible.** Separate collections are offered by around half of local authorities, and are taken up by a wide range of businesses across England and Wales.



If this is accepted, then the hierarchy places councils and businesses under an implicit requirement to separately collect food waste, unless they can justify not doing so.

The European Commission’s recently published proposal for a revised directive on waste includes new requirements on bio-waste. Implementing the waste hierarchy more strictly could ensure that England also complies with this new requirement without new legislation. It would also help to ensure that the agricultural sector can be supplied with safe, sustainable fertiliser.

In order to facilitate progress, the government could consider taking other action to promote separate biowaste collection. This could include:

- requiring or encouraging collectors of commercial residual waste to apply an element of weight-based charging in their pricing system;
- addressing the co-ordination difficulties that can arise where two tier authorities seek to address biowaste, to enable Waste Collection Authorities and Waste Disposal Authorities to work together so both can save money;
- helping local authorities to renegotiate waste collection and treatment contracts that appear to act as a disincentive to separate collection of biowaste; and/or
- removing confusion regarding the status of anaerobic digestion by making it clear that, where the resulting digestate meets the AD Quality Protocol, AD is a form of recycling, not energy recovery.

Along with revised guidance on (and enforcement of) the waste hierarchy, these measures could help to deliver a substantial increase in separate food waste collection within the existing law.





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# 1. Introduction

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This study, funded by Olleco and commissioned by the Renewable Energy Association, examines the net costs of introducing measures to mandate source separation of food waste by councils and businesses.

While additional collection services come at a cost, separate food waste collection would be likely to yield savings. These may be direct savings that come from lower treatment costs for separate food waste, or indirect savings that the introduction of separate collections allows. The question is – would these savings offset the costs?

The benefits of recycling biowaste are well established,<sup>1</sup> and an essential contribution to a circular economy. It reduces carbon emissions, and transforms waste into compost or digestate that helps to nourish soil, avoiding the need for artificial fertilisers and / or other soil improvers. Anaerobic digestion also produces valuable biogas that can be used in place of natural gas for heat or electricity generation.

Where food waste is separately collected for recycling, it can:

- **motivate** prevention of food waste,
- **optimise** the collection service, and
- **increase** the capture of other targeted recyclable materials.

Separate collections of biowaste already have a considerable foothold in the commercial sector in England. Some high profile producers of food waste in the commercial sector, including food processors,<sup>2</sup> retailers<sup>3</sup> and food service businesses<sup>4</sup> have implemented separate food waste collections – but many others continue to dispose of food into the residual waste stream.

**Whilst garden waste collections are offered by the vast majority of councils, far fewer offer food waste collections. 45% of English councils do not collect food waste for recycling, and many large food businesses do not separate it for recycling. Despite significant policy developments in Wales, Northern Ireland and Scotland, the UK as a whole currently recycles just 10% of household food waste.**

It is widely recognised that increasing the amount of food waste that is separately collected has an important role to play in enabling the UK to reach its target of recycling 50% of municipal waste by 2020.<sup>5</sup> In Wales, where all local authorities now offer separate food waste collections to the great majority of residents, the household recycling rate reached 56.2% in 2014/15. Whilst other factors have played a role, the significance of food waste collections in contributing to this performance is well understood: indeed, where food waste is not separately collected, it can make up between 30-40% of residual household waste.

Improving the performance of existing council schemes has a contribution to make, but on its own this will not be enough. There is an urgent need to increase the number of councils that offer residents food waste collections, and to increase the number of businesses that take up collections. This is unlikely to happen without government action.

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1 See for example the EU's proposal for a revised Fertilisers Regulation: "Considering that processes for producing traditional fertilisers are often both energy consuming and CO2-intensive, easier market access for organic fertilisers can also bring environmental benefits." [http://europa.eu/rapid/press-release\\_MEMO-16-826\\_en.htm](http://europa.eu/rapid/press-release_MEMO-16-826_en.htm)

2 e.g. WRAP (2012) Anaerobic Digestion closes the loop for Staples Vegetables, 2012, <http://www.wrap.org.uk/sites/files/wrap/Staples%20Case%20study.pdf>

3 e.g. Organics Recycling Group (2010) Sainsbury's Becomes Largest Retail User of Anaerobic Digestion, <http://www.organics-recycling.org.uk/page.php?article=2102>

4 e.g. Mitchells & Butlers (2013) Waste not, want not, accessed 23 April 2016, <http://www.mbplc.com/responsibility/casestudy/waste/>

5 e.g. WRAP (2015) Minister Backs Industry's Plans to Tackle Food Waste Recycling, accessed 23 April 2016, <http://www.wrap.org.uk/node/46544>

Scotland has introduced new regulations requiring councils and food businesses to put food waste collections in place, which are already having a profound beneficial effect.<sup>6</sup> Northern Ireland has introduced a similar measure.<sup>7</sup> The principal obstacle to similar legislation in England has been concern about placing additional costs on businesses and local authorities.

The purpose of this report, therefore, is to examine whether making separate collection of biowaste (and in particular food waste) mandatory, much as it now is in Scotland and Northern Ireland, would, in fact, be costly. It looks first at the commercial sector, then the municipal sector, before considering whether new law is in fact required.

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<sup>6</sup> HM Government (2012) The Waste (Scotland) Regulations

<sup>7</sup> HM Government (2015) The Food Waste Regulations (Northern Ireland) 2015, 2015 No. 14



# 2. Commercial Biowaste Collections

This section examines whether the introduction of mandatory biowaste collections for such food businesses would increase their waste collection costs. Separate collections of biowaste already have a considerable foothold in the commercial sector in England, but progress remains slow and a large amount of food waste in particular is still disposed of in the residual waste stream. There is a persistent perception that food waste collections are an ethical rather than an economic choice, but the analysis below shows that this impression is down to how residual waste collections have been charged for in the past - something that is now changing.

## 2.1 Quantifying Commercial Biowaste

Data on waste in the UK commercial and industrial (C&I) sector is limited. The numerous studies looking at C&I biowaste have run into difficulties establishing reliable figures, whether in respect of the total arisings, or how the resulting material is managed. The best available estimates of current arisings are set out in Table 1.

Table 1: Estimates of Biowaste Arisings and Management Method

	Arisings (Mt)	Recycled (Mt)	Land Spreading (Mt)	Residual Waste/Unknown (Mt)
<b>Food Waste – Manufacturing</b> <sup>8</sup>	3.93	1.30	2.00	0.63
<b>Food Waste – Grocery Retail</b> <sup>9</sup>	0.43	0.02	0.00	0.41
<b>Food Waste – Hospitality</b> <sup>10</sup>	0.92	0.11	0.00	0.81
<b>Green waste</b>	~0.80 <sup>11</sup>	0.70 <sup>12</sup>	0.00	~0.10

It appears that more than three quarters of the ~0.8m tonnes of green waste produced by the C&I sector is already being recycled, and the scope to divert significant additional quantities of C&I green waste into recycling, therefore, might now be limited. However, in total, there appear to be around 1.85m tonnes of UK C&I food waste from relatively large producers that are currently being disposed of through thermal treatment or landfill, or whose fate is unknown. This is approximately 4% of all UK C&I waste,<sup>13</sup> and the estimate excludes the significant aggregate amount of food waste produced by non-food businesses, where staff refreshments will result in tea bags, coffee grounds, fruit peels and other food wastes arising.

<sup>8</sup> Oakdene Hollins (2013) Estimates of Waste in the Food and Drink Supply Chain, Report for WRAP, October 2013, [http://www.wrap.org.uk/sites/files/wrap/Estimates%20of%20waste%20in%20the%20food%20and%20drink%20supply%20chain\\_0.pdf](http://www.wrap.org.uk/sites/files/wrap/Estimates%20of%20waste%20in%20the%20food%20and%20drink%20supply%20chain_0.pdf)

<sup>9</sup> Ibid.

<sup>10</sup> Oakdene Hollins (2013) Overview of Waste in the UK Hospitality and Food Service Sector, Report for WRAP, November 2013, <http://www.wrap.org.uk/sites/files/wrap/Overview%20of%20Waste%20in%20the%20UK%20Hospitality%20and%20Food%20Service%20Sector%20FINAL.pdf>

<sup>11</sup> See Enviros Consulting Ltd (2009) Commercial and Industrial Organic Waste Arisings - A Gap Analysis, Report for WRAP, June 2009, <http://www.wrap.org.uk/sites/files/wrap/Gap%20analysis%20-%20technical%20report%20-%20Aug%202009.pdf>. This estimated 4.3m tonnes of green waste, including municipal green waste, based on Environment Agency site returns data from 2007. Municipal green waste is generally in the region of 3.5m tonnes per year, leaving ~0.8m tonnes of C&I material not being dealt with on the site where it arises.

<sup>12</sup> Urban Mines and Walker Resource Management Ltd (2013) A Survey of the UK Organics Recycling Industry in 2012, Report for Report for WRAP, August 2013, <http://www.wrap.org.uk/sites/files/wrap/ASORI%202012.pdf>

<sup>13</sup> Defra (2015) UK Statistics on Waste, December 2015, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/487916/UK\\_Statistics\\_on\\_Waste\\_statistical\\_notice\\_15\\_12\\_2015\\_update\\_f2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/487916/UK_Statistics_on_Waste_statistical_notice_15_12_2015_update_f2.pdf)

WRAP estimates that 3 million tonnes of food waste arises from other sectors in the UK, including “food thrown away by consumers out of home (e.g. from home-made lunches at work, as litter, in litter bins) and the pre-factory gate stages of the food supply chain.”<sup>14</sup> Based on both population and economic activity, ~85% of the UK’s commercial biowaste arisings can be expected to occur in England.

Since food waste makes up the great majority of C&I biowaste, the focus of this section will be on whether measures to increase the diversion of C&I food waste into composting and anaerobic digestion are likely to lead to additional costs to businesses; and if not, to examine the case for Government action to ensure that more businesses take steps to increase their recycling of food waste.

## 2.2 The Savings Potential of Food Waste Collections

Delivering savings through C&I food waste collections is, at root, straightforward. Food waste is considerably cheaper to process when separately collected than it is to treat it as part of residual waste.

When the savings on residual waste treatment are greater than the additional costs of food waste collection and treatment, separate collection of food waste will reduce waste management costs.

As residual waste treatment costs have increased due to Landfill Tax, while the cost of food waste processing has come down, this simple equation is gradually coming to favour separate food waste collection. However, mandatory food waste collections have the potential to transform the market, bringing down the unit cost of food waste collections by increasing the number of customers that can be reached on each round. Under a mandatory food waste collection system, food businesses are likely to save money on waste services.

### 2.2.1 Modelling Approach

Given the lack of good quality data on C&I food waste and the wide variety of different producers, no meaningful analysis can be given of the impact of the separate collection across the board. The clearest way to show the costs and benefits of change is to consider four example businesses. By applying different assumptions about the cost of residual waste collection and the efficiency of food waste collections, we can see the likely effect of mandatory food waste collections on food businesses in England.

These example businesses are chosen to reflect variation in a key factor that affects the relative costs of introducing separate food waste collections into the overall waste management service (i.e. the quantity of food waste being generated by the business). The key assumptions regarding these businesses are set out in Table 2.

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<sup>14</sup> WRAP (2015) Estimates of Food and Packaging Waste in the UK Grocery Retail and Hospitality Supply Chains, October 2015, [http://www.wrap.org.uk/sites/files/wrap/UK%20Estimates%20October%2015%20%28FINAL%29\\_0.pdf](http://www.wrap.org.uk/sites/files/wrap/UK%20Estimates%20October%2015%20%28FINAL%29_0.pdf)

Table 2: Four Business Examples

	Large Producer	Medium Producer	Small Producer	Non food business
<b>Weekly 1100L residual bin lifts</b>	8	5	1	1
<b>Annual waste (tonnes)</b>	61.8	38.6	5.5	4.0
<i>Of which food waste (by weight)</i>	70%	70%	50%	20%
<i>Of which food waste (by volume)</i>	33%	33%	16%	4%
<b>Food waste (Kg/week)</b>	831.48	519.67	52.61	15.43

For simplicity, we look only at the residual waste and food waste produced by businesses. We have assumed that the quantity being collected remains constant before and after the introduction of food waste collections. This might well be conservative:

- although food waste collection does not automatically result in food waste reduction, the two can often go hand in hand. Relatively small reductions in waste can result in environmental benefits, and savings in financial terms, that are more significant than effect of separating food waste for recycling.
- many businesses will separate dry recyclables, and this can be facilitated, or enhanced, by the introduction of separate food waste collection. Indeed, once food waste is removed from the residual waste bin, the great majority of what remains will be dry recycling, offering additional opportunities to make savings on the management of residual waste.

However, for the sake of simplicity our focus is on the direct costs and savings associated with food waste collections. Any indirect benefits around food waste prevention and additional dry recycling will result in savings that are even greater than modelled.

**Key assumptions regarding the weight of different types of waste are shown in Appendix 1.0. The modelled collection costs are shown in Appendix 2.0.**

## 2.2.2 Obstacles to Achieving Savings

In the past, achieving savings from food waste collections has proved difficult. A wide range of efforts has been made to implement commercial food waste collections over the past decade. Hitherto, in the absence of subsidy, many of these have ended in failure, and food waste collections have been provided at an additional cost.<sup>15</sup> The reason for this is the way that residual waste collections have historically been charged for, something which has become increasingly obsolete and is now changing.

Until recently, bin prices have been based on the volume of waste a customer produces, with standard prices for bins of various sizes. When disposal was cheap, and weighing bins was difficult, this approach made sense. The majority of the cost of waste collection arose from the vehicles and crews, so what mattered was how quickly the vehicle was filled up – high volume customers were high cost ones.

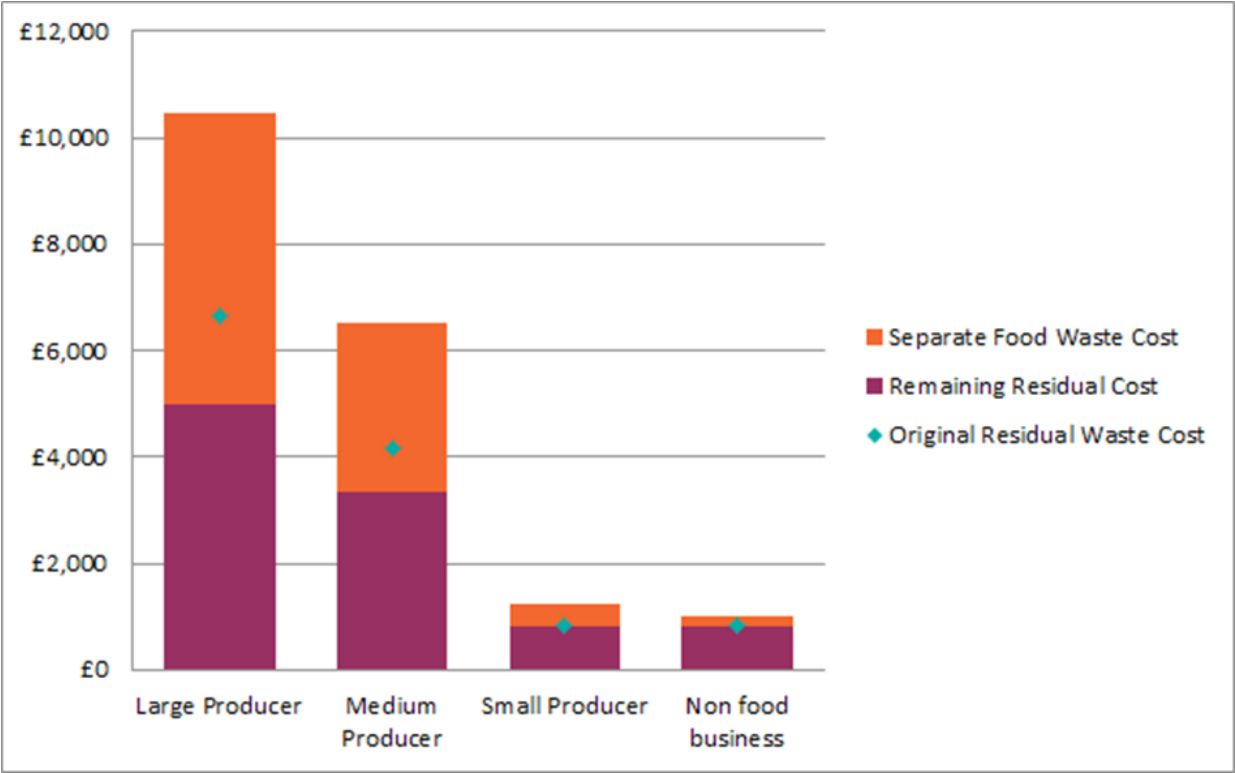
This “pay by volume” system is blind to weight. That makes it difficult to save money by taking food waste out of the residual waste bin. As well as being relatively dense compared with other materials, food can occupy the gaps in a residual waste bin left by other, rigid materials. Even where its weight is significant, therefore, food may not add much to the volume of waste. A business that separates it out has to pay for a food waste collection, but will not greatly reduce the volume of residual waste it generates. As a result, so long as residual waste collections are charged by volume, separating out food waste yields little saving.

**“The way that residual waste collections have historically been charged for has become increasingly obsolete and is now changing.”**

<sup>15</sup> Antony Quinn (2011) Commercial food waste collection – has the time finally come?

Figure 1 illustrates this difficulty. The original cost of residual waste collections for each business is shown by the blue diamond. In each case, the total of the costs the business would incur from food waste collections (the orange bar) and the remaining residual waste cost they would incur (the purple bar) is higher.

Figure 1: Annual Collection Costs – Scenario 1: Volume Based System





Larger food waste producers that introduce separate food waste collections are able to cut back the number of containers they need for residual waste, and, therefore, make a small saving on their residual waste. Despite this:

- the volume-based charging system means that the savings on the residual waste collections are small; and
- the resulting savings are insufficient to offset the additional costs of food waste collections.

Smaller food businesses produce too little food waste to enable separate collection of food to alter their residual waste capacity needs significantly, and so:

- their residual waste costs are likely to remain largely unchanged, and
- introducing the food waste collection therefore incurs an additional cost, with no offsetting savings.<sup>16</sup>

As a result, Figure 1 shows each customer type incurring significant additional costs – more than 35% extra for both the large and medium producer. It is evident that the persistence of volume-based pricing has made it difficult to increase food waste recycling – despite the widening differential in treatment costs (per tonne) between residual and food waste.

No matter how much cheaper composting and anaerobic digestion are than landfill, MBT or incineration, under a volume-based charging system, it remains cheaper for businesses to mix food waste with other material in the residual bin.

Unsurprisingly, relatively few businesses take up food waste collections under this charging system. Those that do may be driven by concerns other than purely financial ones, or might be in a position to negotiate favourably with service providers. In turn, this low level of service take-up makes it difficult for food waste collectors to run efficient rounds, or spread their overheads across a large number of customers. This makes food waste collections more costly than they need to be.

## 2.3 Changing the Waste Market

### 2.3.1 Tiered Pricing

Fortunately, waste collectors are moving away from the volume based model. The rising costs of disposing of / treating residual waste are now at least as important as the volume-related collection costs. The weight of a residual waste bin can vary considerably depending on the type of material it contains, and one weighing 100kg is no longer as attractive a commercial prospect as one weighing 50kg.

Furthermore, ever since landfill tax was introduced customers have been showing a heightened interest in understanding how their efforts to move waste up the hierarchy – whether through prevention, (preparation for) reuse, or recycling – are reflected in the costs they are being asked to pay. They want to see the effects of their efforts on the costs of dealing with waste.

Few collectors have gone so far as to adopt an approach where part of the charge is directly related to the weight of the bin.

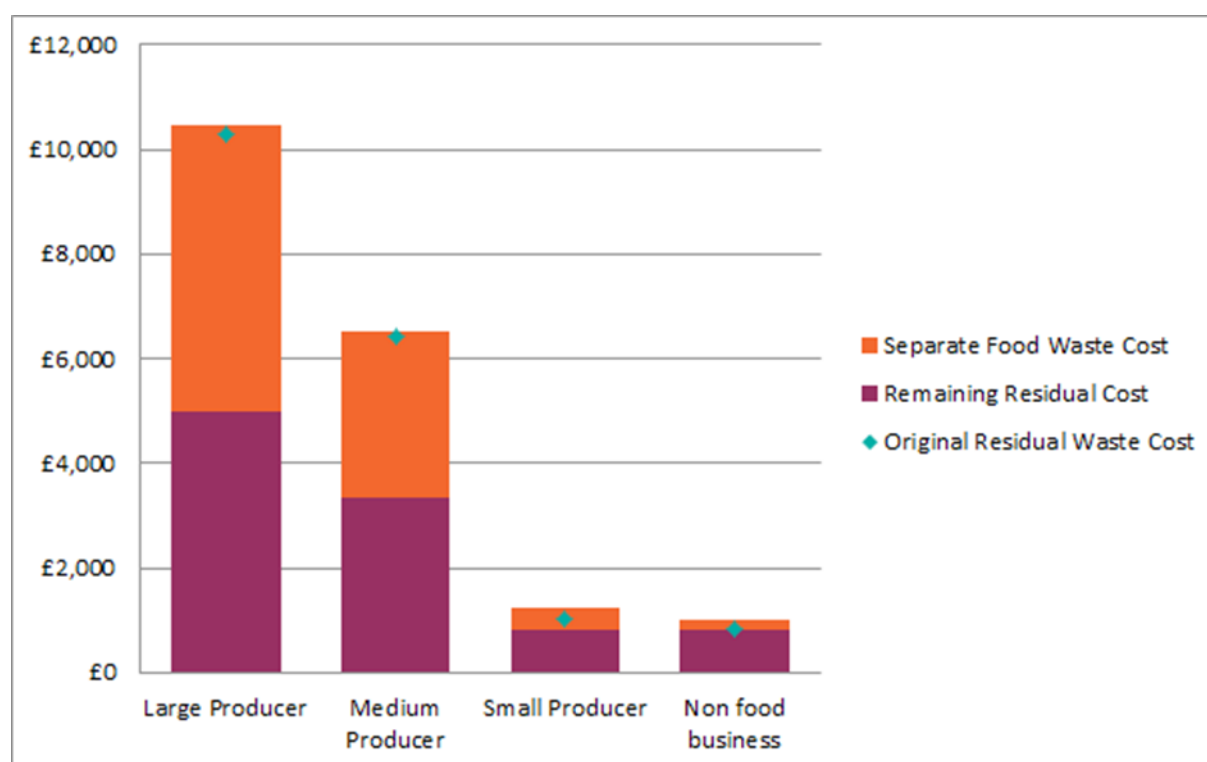
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<sup>16</sup> Note that this assumes that the business has already ensured that its existing service is at least optimised with respect to volume. Whenever services are reviewed, there may be savings to be made through reconsidering the best configuration, so there may be savings to be gained through this route.

Instead, some operators rely on their sales staff to take an informed view of the correct price to charge; others use a two tier pricing system, with a strict maximum bin weight, above which their normal charges no longer apply.

Under a two tier system, producers for whom food waste is a larger proportion of residual waste are likely to pay more for their residual waste collections. The heavy food waste increases the average bulk density of residual waste, which means the price they are charged better reflects the costs of dealing with their waste. This, in turn, improves the economic case for food waste collections, as shown in Figure 2.

Figure 2: Annual Collection Costs – Scenario 2: Maximum Bin Weight System



Under the maximum bin weight system, the large and medium producers incur minimal additional costs as a result of introducing separate food waste collections (around 1.5%). This is because removing food waste from the residual waste bin reduces both:

- the volume of residual waste that remains; and
- the bulk density, and hence the price, of the remaining residual waste, which now falls into the waste collector's standard price bracket.

The small food business still requires the same volume of residual waste capacity, but can access a cheaper residual bin price once its food waste is removed. However, this is still not enough to offset the food waste collection costs. Only the non-food business makes no saving on residual waste: the smaller proportion of food waste in residual waste means that its bin was already in the lower weight category.

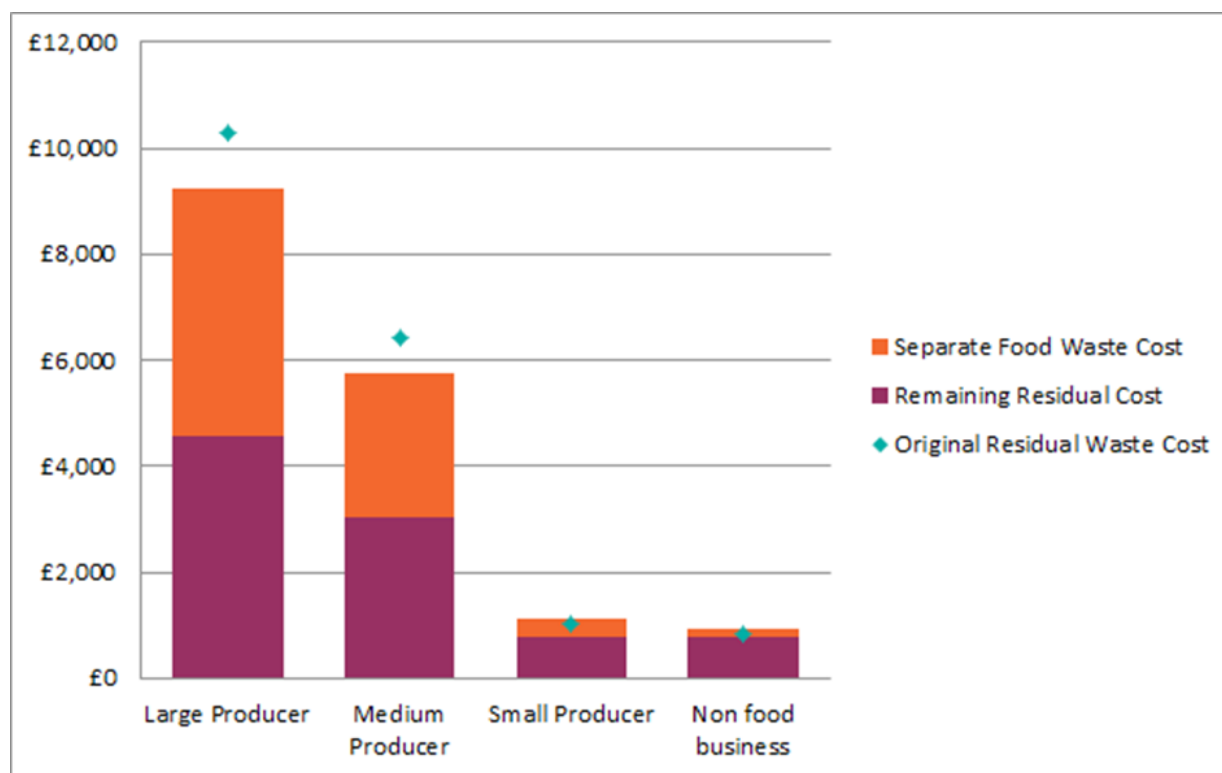
Figure 2 can be regarded as reflecting the developing trend within the commercial waste market in England. Some large food waste producers now make use of separate food waste collections, seeing this as an opportunity to reduce their environmental impact at little or no cost. However, the business case is far from compelling.

### 2.3.2 A Requirement to Sort

The recent experience of Scotland shows that placing a clear legal requirement on businesses to separate food waste can increase the number of food waste customers and the resulting food waste captured.

This in turn has a significant impact on the cost of food waste collection. Furthermore, it changes the expectations of residual waste collectors regarding the weight of the residual waste they will collect, allowing competition to drive down cost of this service. This scenario is illustrated in Figure 3.

Figure 3: Annual Collection Costs – Scenario 3: Requirement to Sort for Large Producers



Under this scenario, the number of businesses from which a collector picks up food waste on each given round increases significantly, from 25 to 35, although there is a fall in the average number of bins emptied at each site as smaller producers come on board. This allows collectors to develop more efficient rounds, with less distance between pick-ups; and to spread the costs of each round (e.g. the vehicle and crew) across more customers. This reduces the amount that each customer needs to be charged for food waste collections (see Appendix 2.0). Meanwhile, residual waste collectors begin to offer prices based on the expectation that bins will be more or less free of food waste, and much lighter than previously as a result.

**Thanks to the reduced food waste collection costs, both the large and medium food waste producers now make a saving by separating their food waste. The small producer's additional costs fall to only £97 per year out of a total annual cost of £1,108.**

The pattern seen in Figure 3 develops further if the market for food waste collections is widened still further by requiring smaller producers to separate this material. The larger number of clients allows for a further increase in the number of containers emptied on each round, allowing collection costs to be spread over a still larger number of customers. A scenario in which collectors are able to reach 40 customers on each round is illustrated in Figure 4.

## Food waste regulations in Scotland

Scotland's performance on household and commercial food waste collection has moved forward dramatically as a result of the Waste (Scotland) Regulations 2012. The regulations created a duty on food businesses that produce controlled waste to "take all reasonable steps to ensure the separate collection of food waste produced by the business."

Food businesses include any public or private undertaking that carries out "any activity related to the processing, distribution, preparation or sale of food."

The requirement was introduced in two phases, with food businesses that produce more than 50kg of food waste a week having to comply from January 2014, and those producing more than 5kg per week from January 2016. There is also an exemption for food businesses in rural areas.

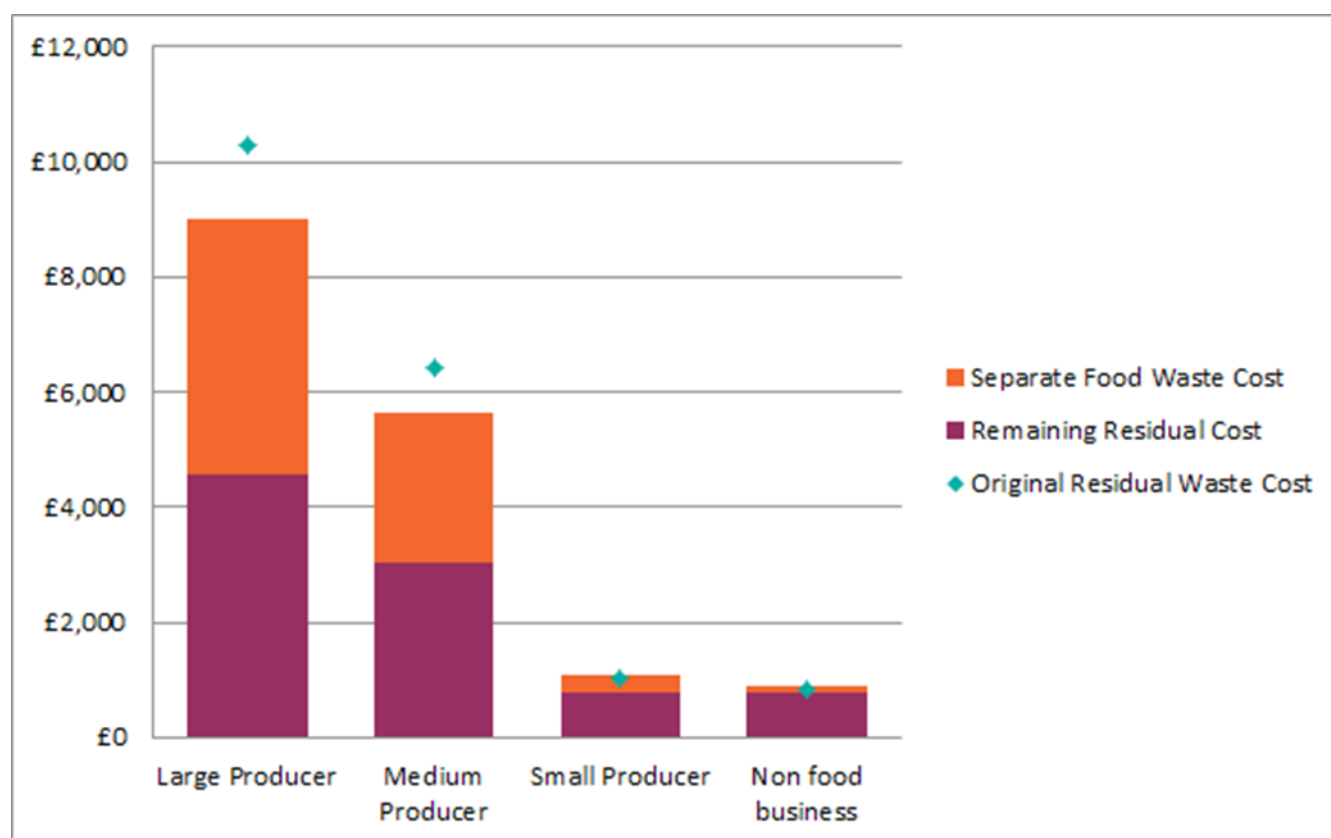
Government has worked to raise awareness of the new rules, but has received considerable support from waste collectors keen to secure a share of the new market. Collectors have also expanded their services, and collection costs appear to be falling. The success of the legislation can be seen in the growing need for new AD capacity in Scotland to meet the additional demand. A temporary shortage has pushed up gate fees, but once new capacity is in place, gate fees are expected to fall back towards their long-term levels.

A further interesting finding is that, in practice, the two stage implementation may not have been necessary. Many of the businesses that thought they produced less than 50kg of food waste per week actually find they produce more when they come to separate it.

The lower food waste collection costs further improve the business case for change for all business types. The savings made by the large and medium producer increase, while the additional cost for the small producer falls to only £58 per year, out of a total cost of £1,068. Even the additional costs to the non-food business would be only £61 per year, if it were willing to receive food waste collections fortnightly. A weekly collection from a smaller container would be likely to cost more.



Figure 4: Annual Collection Costs – Scenario 4: Requirement to Sort for All but the Smallest Producers



Scottish-style legislation would not therefore be expected to lead to significant additional costs for businesses. Instead, large and medium food businesses would make savings, while small producers would pay only a very small amount extra.

In fact, requiring more businesses to take up food waste collections will change the waste collection market, building on developments that are already in train as a result of higher residual waste treatment costs. The result will be cheaper food waste collections, and savings on residual waste prices.

**“Requiring more businesses to take up food waste collections will change the waste collection market.... The result will be cheaper food waste collections, and savings on residual waste prices.”**

### 2.3.3 Increasing Price Transparency for Customers

The examples above, however, rely on the tiered residual waste price system; while this helps to make prices reflect the true costs of handling waste, it only approximates a “pay by weight” system. Were businesses to be charged based on:

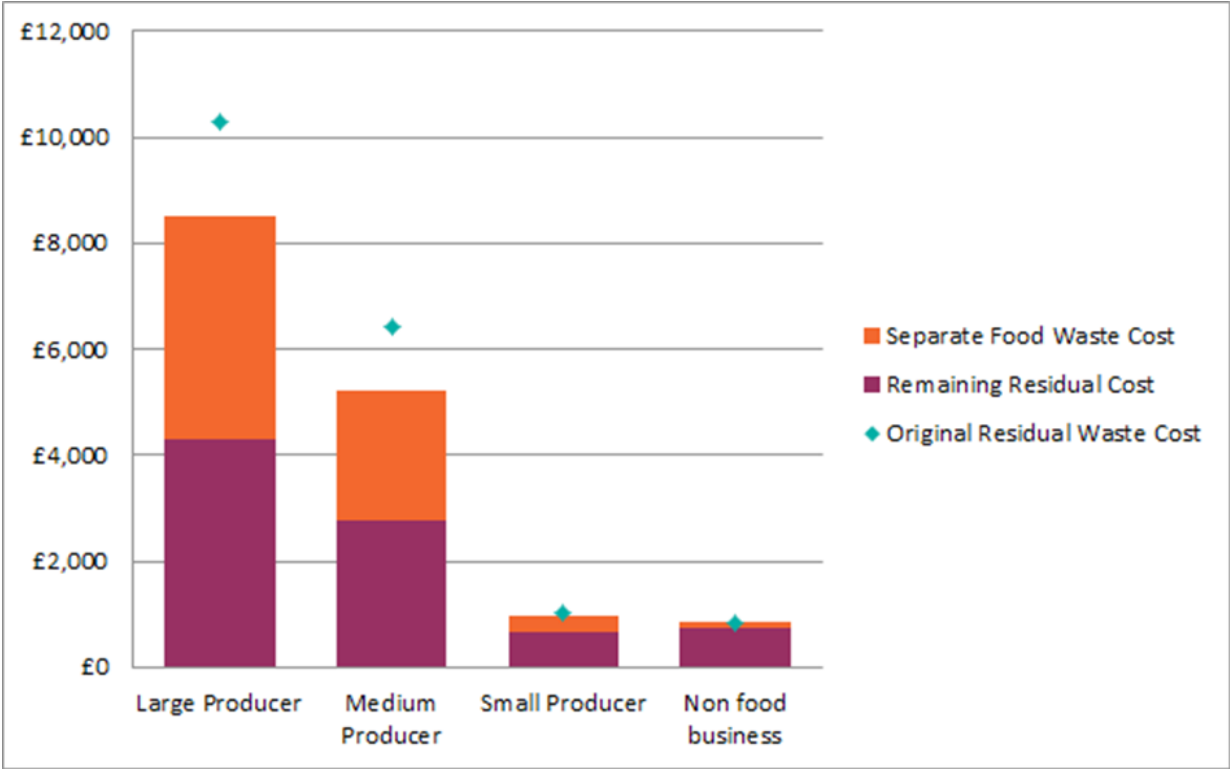
- a flat fee for each collection, reflecting the costs of the logistics; and
- a variable fee, reflecting the weight of the material collected,

it would have a still more profound impact on the business case for food waste collections. Pay by weight systems of this kind have been introduced in other countries, including Ireland, where it is already widely used for household waste.

The effect of a “pay by weight” system on the costs of collections for the four example businesses is shown in Figure 5. The result is a further reduction in collection costs for each of the food businesses when they introduce separate food waste collections, while the additional costs for even a non-food business become minimal.

There is a clear case for examining the practicability of more widespread use of business models that make greater use of pay-by-weight approaches, preferably combined with incentives to maintain presentation rates for residual waste at low levels. This provides the clearest incentive to businesses to remove material – especially heavy materials such as food waste – from the residual waste stream to enable them to be recycled, and to keep the costs of residual waste collection down to a minimum.

Figure 5: Annual Collection Costs – Scenario 5: Pay by Weight



2.4 Additional Benefits of Separate Food Waste Collection

Businesses that introduce separate food waste collections are likely to find there are additional benefits to doing so. Removing food waste from the residual waste stream will mean that, even for businesses that already recycle, a great deal of the waste that remains is dry recycling. Some will be able to greatly reduce their need for residual waste collections, and cut the risk of food waste contaminating their recycling. This will lead to further waste collection savings.

In addition to the potential to make waste collections cheaper, there are numerous case studies showing that separating out food waste reveals opportunities to make savings through waste reduction. The scale of these savings is likely to be much greater than food businesses anticipate – one example shows a reduction of 41% in waste per meal served. The savings from this level of waste reduction is likely to dwarf any financial benefit from waste management changes, but are far more likely to be realised when food waste is separated.<sup>17</sup>

2.5 Why Market Forces Alone are Not Enough

Market forces are moving in support of increased separation of food waste, but the above analysis suggests that the opportunity to capture a greater share of food is not being adequately seized, and that further change will be slow in the absence of intervention.

<sup>17</sup> e.g. WRAP (2015), Measuring food waste: manual and smart meter based approaches. <http://www.wrap.org.uk/sites/files/wrap/Sodexo%20smart%20and%20manual%20monitoring%20Case%20Study.pdf>

So long as unsophisticated, volume based charging remains available in the market, then businesses will experience a set of price signals which do not reflect the underlying costs that should be driving the market. Those drivers may even become less clear in future:

- The Landfill Tax is now increasing only in line with inflation, and there is increased competition in the residual waste treatment market, suggesting that the cost of treating residual waste can no longer be relied upon to rise significantly year on year.
- The withdrawal of support mechanisms for the price of energy from AD facilities may lead to an increase in the price for food waste treatment in the medium-term.

As things stand, the market has reached something of an impasse. It is evident that moving food waste out of the residual waste stream could lead to savings on disposal, resulting in reduced waste management costs to businesses – as well as improved environmental outcomes. Yet the complexities of the waste system mean that no agent within the market is in a position to drive forward change. **Government action is needed in order to trigger changes that will help many food businesses to save money.**

## 2.6 Summary

The findings of the modelling described above are summarised in Table 3.

The analysis shows that the perception that food waste collections are expensive is an artefact of the way that waste services have been charged for in the past, and the consequent low take-up of food waste collections.

For larger food waste producers, emerging charging practices are already making food waste collections an option that saves money, although perhaps not a significant amount.

However, were food waste collections to become more widespread through a mandatory requirement on food businesses to separate their food waste, it would have a significant impact on the amount businesses can expect to pay for this service. Even relatively small producers of food waste could then expect to make savings on the overall cost of their waste collections through source separation. Food waste collections would also become more affordable for organisations that do not produce large amounts of food waste.

The analysis shows that:

- the perception that food waste collections are expensive is an artefact of the volume-based charging system for waste (Scenario 1) that has dominated in the past;

Table 3: Summary of Food Waste Collection Costs (+) and Savings (-)

	Large Producer	Medium Producer	Small Producer	Non food business
Scenario 1	£3,817	£2,365	£414	£185
Scenario 2	£160	£79	£234	£185
Scenario 3	-£1,059	-£667	£97	£81
Scenario 4	-£1,531	-£942	£58	£61
Scenario 5	-£1,785	-£1,207	-£28	£34

- the system is already beginning to change with more tiered pricing (Scenario 2), which is helping to make food waste collections competitive – if not compelling – for larger food waste producers;
- so long as the take-up of food waste collections remains low, its costs are relatively high;
- requiring larger food businesses to take up separate collections has increased the efficiency and reduced the costs of food waste collection (Scenario 3), which enhances the business case for all producers;

- when the requirement is extended to all food businesses, the costs of collection come down still further (Scenario 4);
- within a system that deploys pay-by-weight pricing, even small food producers will make savings through introducing separate food waste collections; and
- in addition to the direct savings, there is evidence that separating food waste will help to promote dry recycling and food waste prevention.

**“Requiring larger food businesses to take up separate collections has increased the efficiency and reduced the costs of food waste collection, which enhances the business case for all producers”**

Market forces alone will not be as effective as they would be if supported by legislation because:

- some residual waste collectors still favour simple, volume- based charges, making more progressive companies reluctant to move further towards pay by weight, and undermining the case for separate food waste collections;
- food waste collectors are unable to achieve high collection efficiencies due to small client numbers;
- no matter how low the gate fee offered by AD plants and IVCs, the price incentive will not be fully passed on to waste producers; and
- regulations will set a clear direction of travel for producers and collectors of waste.

Government intervention is clearly required in order to break this unfortunate log jam and allow food waste collectors to attract more customers and make collections more efficient. Placing a “requirement to sort” food waste on food businesses can be expected to cut the cost of separate collections. Doing so can be expected to foster a move to pricing mechanisms that help to make them convenient and cost-effective for a still wider cohort of potential clients.

# 3. Household Biowaste Collections

Biowaste already makes a significant contribution to household recycling in England, comprising 42% of the material that councils recycle (see Table 4).<sup>18</sup> Despite this, there remains a substantial opportunity for this contribution to increase. Recent estimates indicate that food waste comprises around 30% of household residual waste over all, a figure which is likely to be higher in areas where no separate food collections are in place.<sup>19</sup>

Table 4: Composition of Recycling in England, 2014 (Thousands of Tonnes)

Collection type	2010	2011	2012	2013	2014	% of Total 2014 Recycling
<b>Total Recycling</b>	9,112	9,596	9,684	9,523	10,025	
<i>of which:</i>						
<b>Dry Recycling</b>	5,557	5,618	5,652	5,675	5,807	57.9%
<b>Separately Collected Food Waste</b>	118	172	230	273	290	2.9%
<b>Other Organics</b>	3,437	3,807	3,802	3,575	3,928	39.2%

Source: Defra

Councils can make direct savings by separately collecting food waste. Avoided disposal costs can significantly offset the costs of collection, but whether they do so fully depends on the collection system already in place, the collection system which is proposed, and the differential between the treatment costs. However, separate food waste collections also offer the opportunity to make far greater indirect savings.

This section examines whether the savings will offset the collection costs.

## 3.1 Prevalence of Household Biowaste Collections

The diversity of local authority waste collection systems has been the subject of much recent debate, and efforts are currently underway to increase consistency between different councils.<sup>20</sup>

The approach currently taken by authorities to the collection of biowaste is no exception to this wider phenomenon of varied approaches to collection, as can be seen from WRAP's local authority statistics.<sup>21</sup>

Table 5 shows that the vast majority of local authorities operate some form of kerbside organic collection scheme, although many are garden waste only. The few that do not collect such waste are principally inner city councils, few of whose residents have substantial gardens, but will nevertheless generate significant quantities of food waste.

<sup>18</sup> Defra (2015) Statistics on Waste Managed by Local Authorities in England in 2014-2015, December 2015, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/481771/Stats\\_Novice\\_Nov\\_2015.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/481771/Stats_Novice_Nov_2015.pdf)

<sup>19</sup> Resource Futures (2013) National Compositional Estimates for Local Authority Collected Waste and Recycling in England, 2010/11 (Summary Report), Report for Defra, February 2013, <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18237#RelatedDocuments>

<sup>20</sup> WRAP (2016) Opportunities for Greater Consistency in Collections – Work Begins on Phase Two, accessed 28 April 2016, <http://www.wrap.org.uk/content/opportunities-greater-consistency-collections-%E2%80%93-works-begins-phase-two>

<sup>21</sup> The data used in Table 5 to Table 8 are sourced from WRAP's Local Authority Portal, 2014/15 available at: <http://laportal.wrap.org.uk/Statistics.aspx>

Table 5: Prevalence of Biowaste Collections

	Operate an organic scheme	Charge for the organic scheme
England	94%	42%
Wales	95%	36%

Source: WRAP

The scope to extend garden waste collections is therefore limited. However, councils are increasingly implementing charging schemes for garden waste, which, whilst delivering savings tends to reduce the amount of biowaste that is collected for composting. While the financial imperatives facing local authorities are clear, charging has the potential to further imperil the UK's prospects of reaching a 50% recycling rate by 2020.

Table 6 shows that food waste collections are considerably less widespread than garden waste, with almost half of English local authorities offering no facility to separate this material from residual waste. By contrast, every council in Wales already collects food waste separately, principally for anaerobic digestion.

Table 6: Prevalence of Food Waste Collections

	Separate food waste	Food mixed in garden waste	Both scheme types	No food collection
England	31%	17%	8%	45%
Wales	86%	5%	9%	0%
Scotland	56%	19%	6%	19%

Source: WRAP

Of those English councils that do collect food waste, around a third collect it mixed with garden waste, rather than as a separate stream. The latter approach offers the benefit of very low collection costs, but also results in lower yields than separate food waste collections.

This study is concerned with the question regarding the costs that the 45% of councils in England that do not offer food waste collections would incur if they were to introduce them, and the savings that might arise from doing so.

At its simplest, collecting food waste has the potential to remove a substantial amount of waste from the residual stream, allowing it to be diverted to lower cost, and more environmentally beneficial, forms of treatment. The savings arising from avoided disposal can significantly offset the costs of collection, but whether they do so fully depends on the collection system already in place, the collection system which is proposed, and the differential between the treatment costs.

From the perspective of this study, the variety of starting points, both in respect of collection systems, and the arrangements for treatment / disposal of residual waste, poses challenges in presenting a definitive case regarding the costs and savings resulting from introducing separate biowaste collections.

We recognise from the outset that certain authorities will be exceptions to the analysis set out below, perhaps due to low residual treatment costs or particular local factors (e.g. housing stock, geography) that may make a collection system particularly problematic.

The approach adopted is to examine, across a range of collection systems, geographies and demographics, the likely costs of collection, and the extent to which this can be offset by direct and indirect savings.

**“Collecting food waste has the potential to remove a substantial amount of waste from the residual stream, allowing it to be diverted to lower cost, and more environmentally beneficial, forms of treatment.”**



## 3.2 Collection System Diversity

One dimension in which local authority collection systems vary is the frequency with which residual waste is collected. Councils have been moving away from weekly residual waste collections, driven by the need to make financial savings, and by the widely recognised association between restricting the volume of residual waste containment capacity and increasing recycling.<sup>22</sup> Table 7 shows the proportion of authorities offering weekly and fortnightly collections (NB. Some authorities offer different collection frequencies to different types of property so that the columns do not sum to 100%).

Table 7: Prevalence of Weekly Residual Waste Collections

	More Than Weekly	Weekly	Fortnightly
England	4%	57%	72%

Source: WRAP

The reduction in residual waste collection frequencies has given rise to concerns – though with limited evidential backing – regarding odour and vermin issues associated with biodegradable waste being left in the bin for extended periods. Some authorities are now moving towards residual waste collections once every three, or even four, weeks as a means to enhance performance and cost effective service delivery: this is leading to such concerns being raised again.



Photo: jbloom (CC BY 2.0), via Flickr.

The removal of food waste from the residual waste bin through offering a weekly separate food waste collection can be an important element of an overall waste collection service that meets householders' needs, and addresses concerns that people may have about less frequent waste collections.

Each local authority also collects dry recycling at the kerbside, using three main collection systems, generally operated either on a weekly or fortnightly basis.

<sup>22</sup> Resource Futures (2010) Analysis of Kerbside Dry Recycling Performance in the UK 2008/09, Report for WRAP, September 2010, [www.wrap.org.uk/local\\_authorities/research\\_guidance/collections\\_recycling/benchmarking.html](http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/benchmarking.html)

The proportion of authorities using each type of system is shown in Table 8. (NB. Some authorities offer different collection systems for different types of property).

**Table 8: Prevalence of Recycling Systems**

	<b>Multi-Stream</b>	<b>Co-mingled</b>	<b>Two Stream</b>	<b>Other</b>	<b>Single Material</b>
<b>England</b>	25%	51%	33%	1%	1%

Source: WRAP

The type of dry recycling collection system, its frequency, and how this interacts with the residual waste collection service, can all influence the costs that are incurred when a separate food waste collection is introduced. In some authorities, food is co-collected with garden waste, which affects the treatment options that are likely to be feasible for this material. To reflect the diversity of collection systems, the following systems (shown in Table 9) have been modelled.

**Table 9: Collection Systems Modelled**

<b>System</b>	<b>Descriptor</b>
<b>Fortnightly Co-mingled (Pod)</b>	<ul style="list-style-type: none"> <li>Fortnightly co-mingled dry recycling;</li> <li>Fortnightly residual waste;</li> <li>Food co-collected weekly with both dry recycling and residual (on alternate weeks in a separate compartment of the same vehicle)</li> </ul>
<b>Fortnightly Co-mingled (Sep)</b>	<ul style="list-style-type: none"> <li>Fortnightly co-mingled dry recycling</li> <li>Fortnightly residual waste</li> <li>Food collected in a separate vehicle</li> </ul>
<b>Fortnightly Two Stream F/C (Sep)</b>	<ul style="list-style-type: none"> <li>Fortnightly Two Stream dry recycling (fibres: containers) on split vehicle</li> <li>Fortnightly residual waste</li> <li>Food collected in a separate vehicle</li> </ul>
<b>Weekly Multi-Stream</b>	<ul style="list-style-type: none"> <li>Weekly multi-stream dry recycling (co-collected on same vehicle but not co-mingled),</li> <li>Fortnightly residual waste,</li> <li>Food collected on dry recycling vehicle in separate compartment</li> </ul>
<b>Fortnightly Two Stream G/O (Sep)</b>	<ul style="list-style-type: none"> <li>Fortnightly Two Stream (glass: other dry recycling) on split vehicle</li> <li>Fortnightly residual waste</li> <li>Food collected in a separate vehicle</li> </ul>
<b>Fortnightly Two Stream G/O (Pod)</b>	<ul style="list-style-type: none"> <li>Fortnightly Two Stream (glass: other dry recycling) on separate vehicle</li> <li>Fortnightly residual waste</li> <li>Food co-collected with both dry recycling and residual (on alternate weeks in a separate compartment on the same vehicle)</li> </ul>

### 3.3 Modelling Results

Based on assumptions set out in Appendix A.3.0, an analysis of the cost impacts of adding food waste collections to a range of current services are set out in Figure 6 to Figure 17. Each chart shows the change in collection costs per household (displayed as a teal line) overlaid upon stacked bars, showing the savings resulting from:

- moving food waste from the residual stream into AD or IVC (orange);
- a recognised food waste prevention effect (assumed to be 15% of the food waste recycling yield in predominantly urban areas, and 25% in other areas) associated with the introduction of separate food waste collections, which may result from increased home composting or householders becoming more aware of food waste (purple); and
- increases in dry recycling associated with moving to less frequent residual waste collections (yellow).

In Figure 6 to Figure 11, the point of comparison is a collection system with weekly residual waste collections. This is compared with a similar recycling system with fortnightly residual waste collections and separate food waste collections. In Figure 12 to Figure 17, the starting point is a system that already includes fortnightly residual waste collections.

#### 3.3.1 Comparison with Weekly Residual Collection Systems

The modelling results in Figure 6 to Figure 11 each show similar patterns. For almost all collection systems and area types, the transition to separate food waste collections and fortnightly residual waste collections results in a saving.

Urban areas tend to deliver lower yields of food waste per household, and so, the opportunity to make savings from diverting this waste to cheaper forms of treatment (shown in the orange section of each bar in the charts) is reduced. Nevertheless, for the great majority of collection systems, the net increase in collection costs is offset simply by the direct savings resulting from diversion of food waste away from residual treatment, and the expected waste prevention effect.

The only widespread exception is the Fortnightly Two Stream G/O (Pod) system; in these cases, the Fortnightly Two Stream G/O (Sep) system could be used instead. Equally, there are two instances (in Figure 6 and Figure 9) where the Fortnightly Co-mingled (Pod) system results requires the savings from additional dry recycling to ensure that its costs are covered. Again, the alternative Fortnightly Co-mingled (Sep) system could be used instead, in order to deliver additional savings.

In almost all cases, the greatest benefit comes from the introduction of separate food waste collections as part of weekly multi-stream collections, where the additional costs of adding weekly food waste collection are lowest.

It can therefore be concluded with some confidence that, for authorities where weekly residual waste collections are currently in place, a move to weekly separate food waste collections and fortnightly residual waste would lead to considerable savings.

**“For authorities where weekly residual waste collections are currently in place, a move to weekly separate food waste collections and fortnightly residual waste would lead to considerable savings.”**

3.3.2 Comparison with Fortnightly Residual Collection Systems

Where councils have already introduced fortnightly residual waste collections, they are likely to have already “banked” many of the benefits that lead to the results described in Section 3.3.1. It is therefore more challenging for food waste collections to be introduced in a cost neutral way in such authorities.

The most straightforward case is for separate food waste collections accompanying weekly multi-stream collections. The very low additional collection costs associated with adding food waste to this system means that in all cases, the savings from diverting food waste from the residual waste stream are sufficient to offset the additional collection costs. However, in almost all cases, authorities that operate multi-stream collections will already be separately collecting food waste (partly because of this suggested outcome).

For other collection systems, under the assumptions outlined above, there is likely to be an additional cost, typically between £6 and £10 per household, where food waste collections are added to a the previously used collection system.

Change from Weekly Residual Collections

Figure 6: Rurality 1

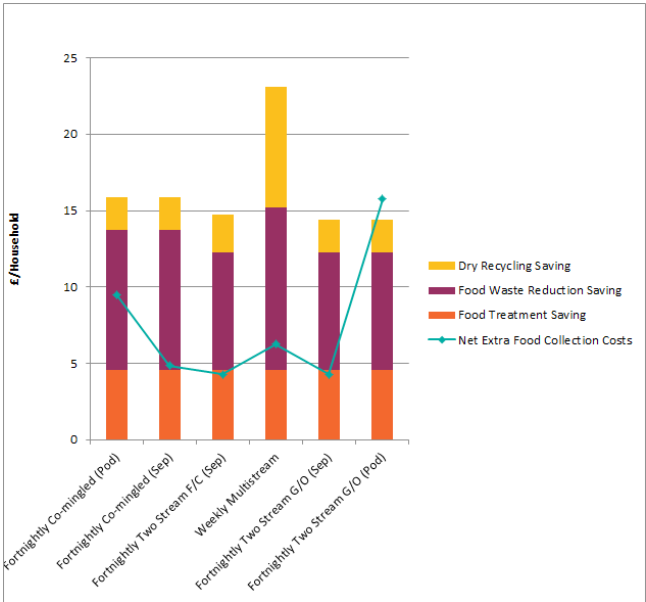


Figure 7: Rurality 2

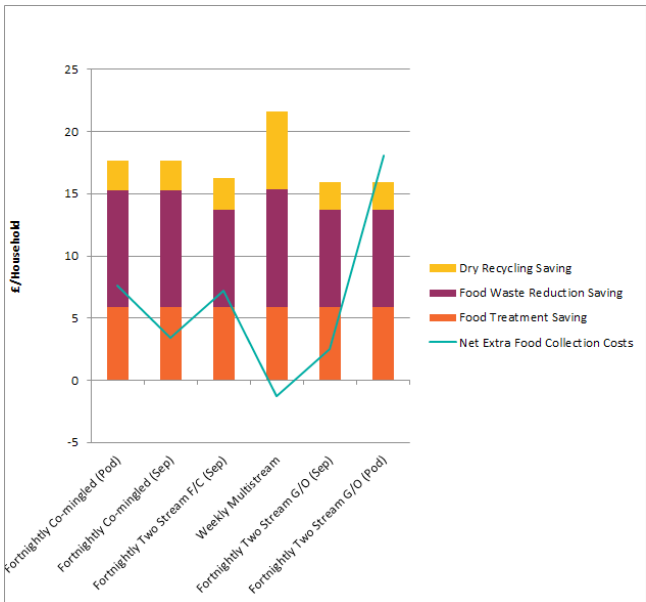


Figure 8: Rurality 3

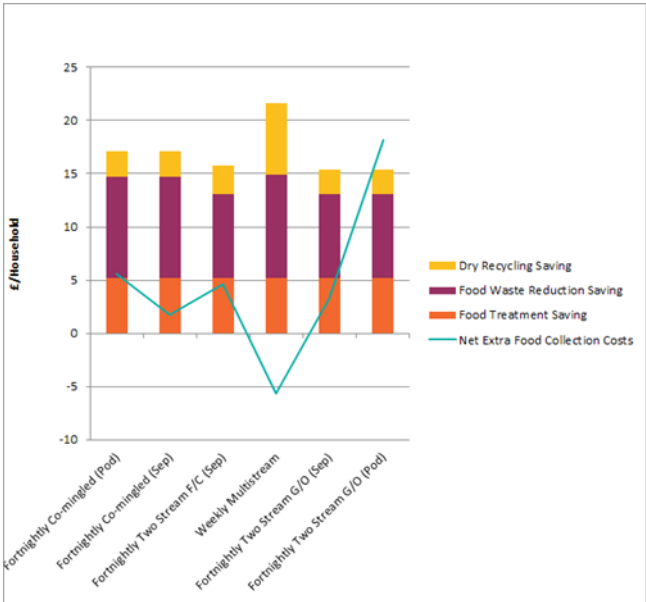


Figure 9: Rurality 4

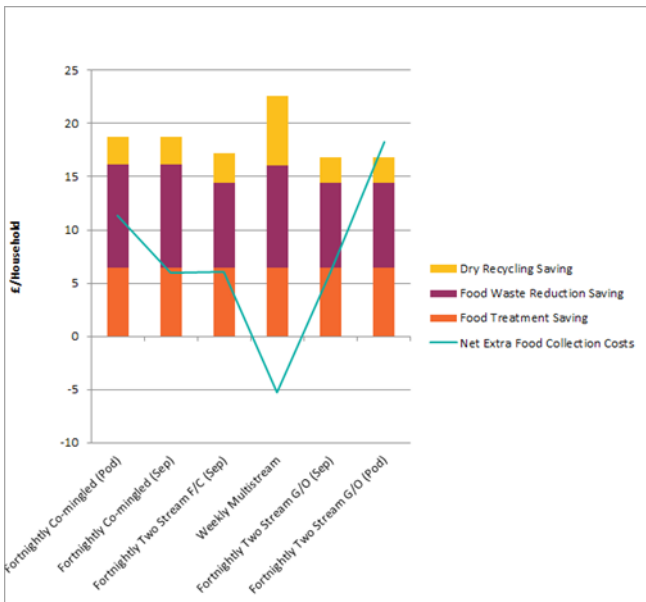


Figure 10: Rurality 5

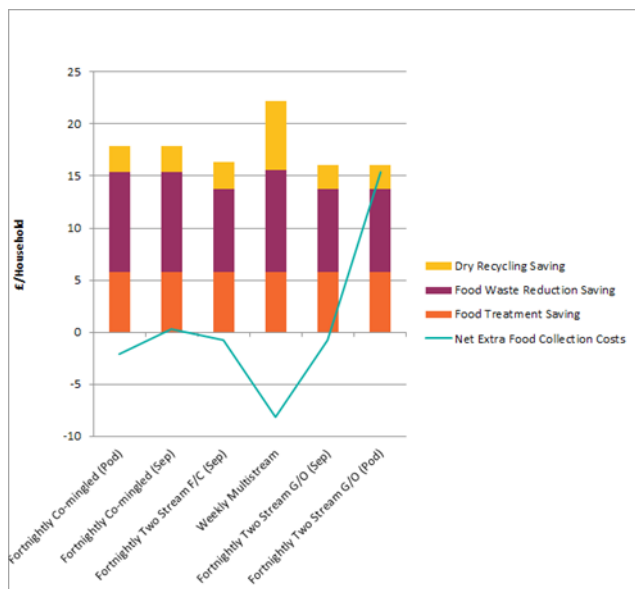
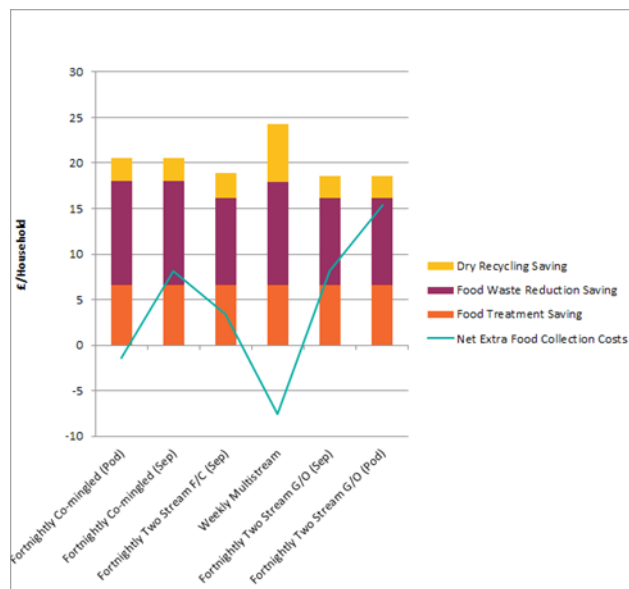


Figure 11: Rurality 6



## Already Implemented Fortnightly Residual Collections

Figure 12: Rurality 1

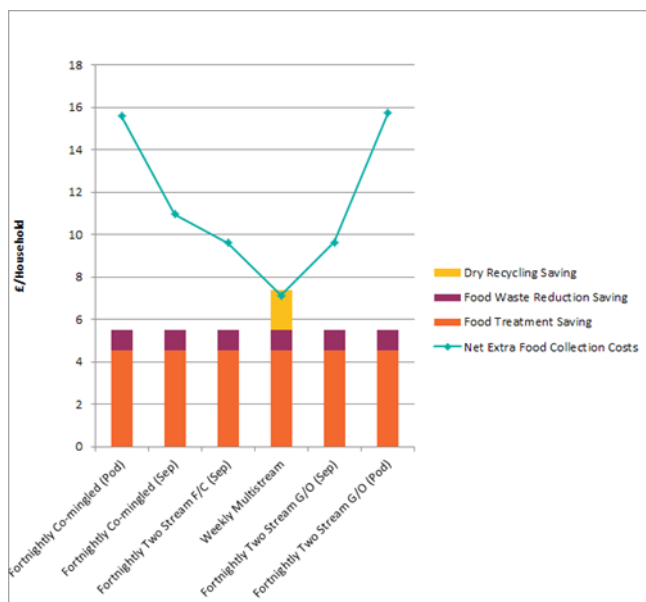


Figure 13: Rurality 2

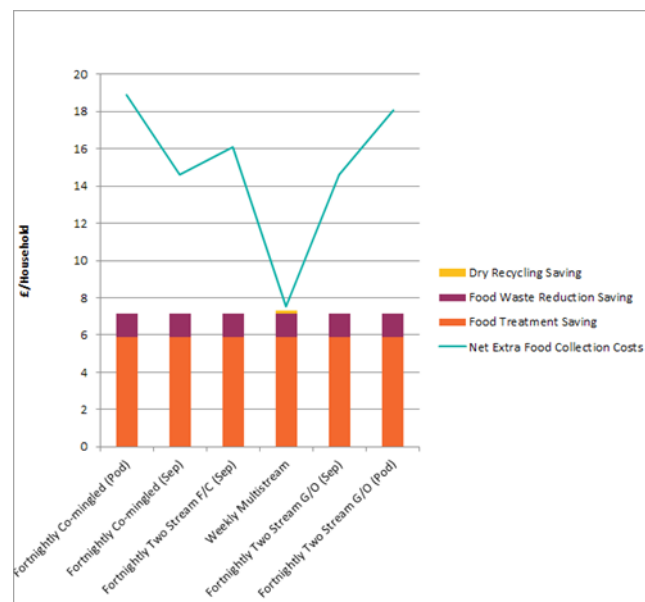


Figure 14: Rurality 3

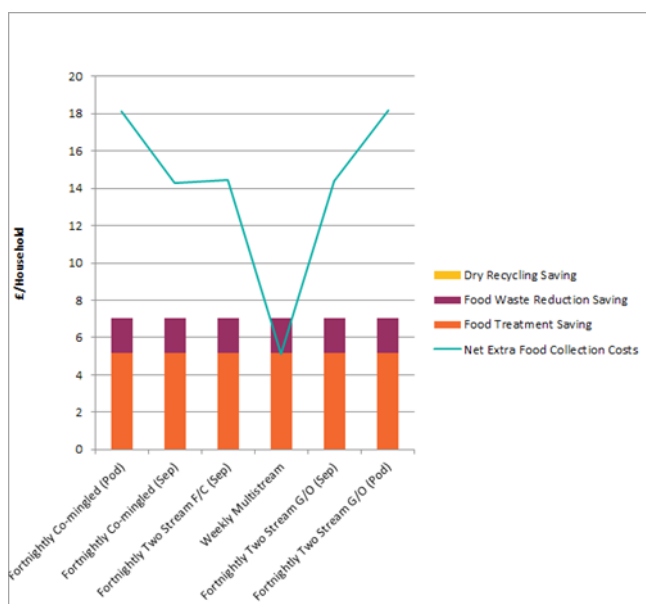


Figure 15: Rurality 4

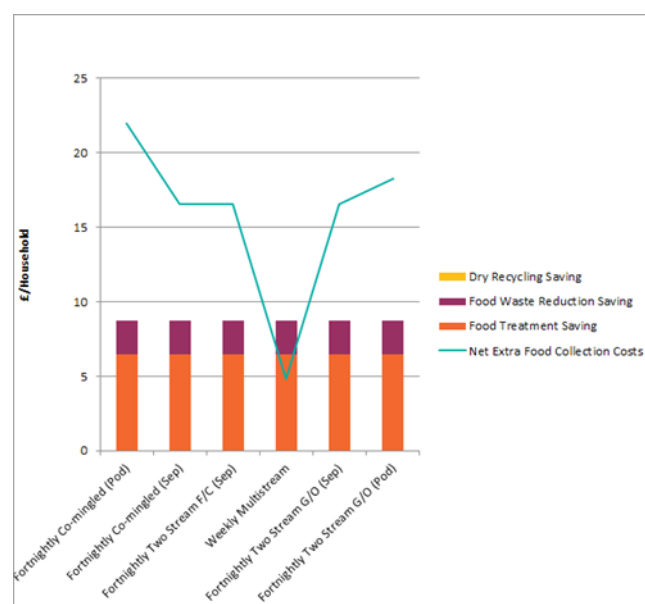


Figure 16: Rurality 5

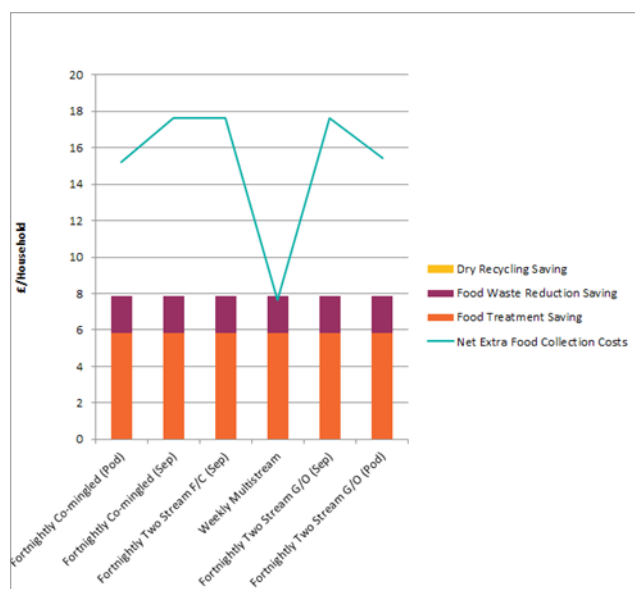
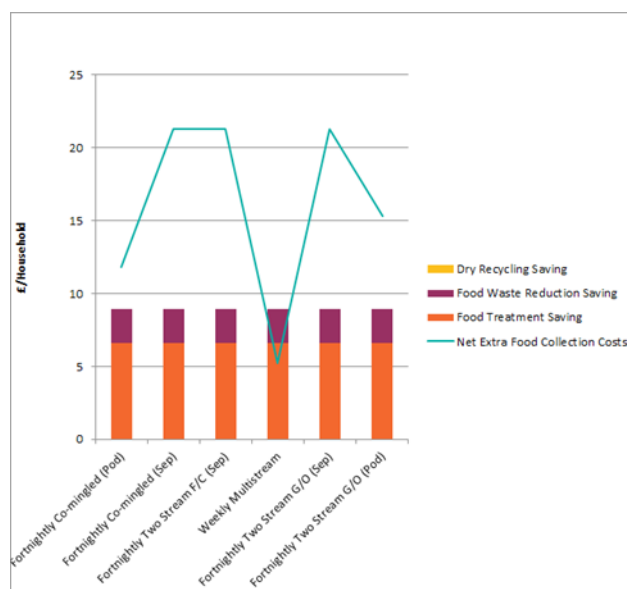


Figure 17: Rurality 6



### 3.4 Achieving Cost Neutrality

There are a number of ways in which the additional cost of food waste collections for councils that already collect residual waste fortnightly can be made to fall to zero.

#### 3.4.1 Residual Waste Gate Fees

Some authorities will have a greater differential between their residual waste and food treatment costs than modelled here. The residual waste treatment/disposal gate fees reported in WRAP's latest Gate Fee Survey<sup>23</sup> range from £36 to £135 per tonne, although there are certainly higher gate fees being paid by some. Where a local authority has access to very low cost residual waste treatment, it is very difficult for AD or IVC to compete. However, where the differential becomes very large, almost all collection systems and area types will show the savings from food waste collection offsetting collection costs.

#### 3.4.2 Additional Residual Waste Collection Savings

An increasing number of councils in England, Wales and Scotland are examining or implementing three or four weekly residual waste collections. While some authorities have found it possible to introduce fortnightly residual waste collections without putting separate food waste collections in place, it is unlikely to be acceptable to further decrease residual frequency without offering an alternative for organic waste.

The ICAP data does not include estimates of the costs and material yields associated with systems where residual waste collections are less than fortnightly. These systems are too recent and too few in number to provide a great deal of data, but early indications are that moving from fortnightly to three weekly collections can reduce residual collection costs by around 25%, whilst increasing recycling and producing increased food waste yields compared with fortnightly residual waste scenarios.

Whilst there is limited benchmarking data available at this stage, authorities that have already introduced fortnightly residual collections could help to offset additional food waste collection costs through a further reduction in residual waste collection frequency – a change that could not reasonably be implemented without a separate food service.

<sup>23</sup> WRAP (2015) Gate Fees Report 2014/15: Comparing the Costs of Alternative Waste Treatment Options, July 2015





### 3.4.3 Selecting the Lowest Cost Collection System

Rather than seeking to add food waste into their established recycling system, authorities could consider changing their approach to recycling to one that makes separate food waste collection more affordable. The WRAP collection cost benchmarks indicate that some authorities may not be operating the lowest cost collection system available, and councils in this position appear to have the opportunity to introduce food waste collections while making savings.

With the exception of co-mingled systems in the most urban areas, the WRAP figures indicate that councils that have already implemented fortnightly residual waste collections may still be able to save money while introducing separate food waste collections. However, this would entail a change of recycling system to one that is optimised for food waste collections.

### 3.4.4 The Timing of Change

In addition to concerns over operational costs, the prospect of introducing new services also gives rise to transitional costs. The WRAP benchmarking data used in the analysis above includes the annualised costs of capital expenditures such as vehicles and containers. However, the timing of changes is also important, principally due to the need to fit the expected lifetime of vehicles and issues around collection and treatment contracts.

Mandatory collections could be implemented so as to allow councils a sufficiently long lead time to introduce food waste collections as at the most economically advantageous point. However, the opportunity for councils to make service improvements and savings should not be delayed unnecessarily. With support, there can be scope to renegotiate contracts to allow service changes, without incurring substantial costs. Government could look to support councils in undertaking negotiations that could allow food waste collections to be introduced more quickly.

## 3.5 Conclusions

The key conclusions of this section are:

- Based on published WRAP data, for local authorities that currently collect residual waste weekly, the introduction of separate food waste collections alongside a reduction in residual waste collection frequency will in almost all cases result in a saving. In many cases this saving is significant – typically between £10-20 per household per year.
- Where local authorities have already moved to fortnightly residual waste collections, the WRAP benchmarking indicates those that use multi-stream dry recycling collection systems are likely to be able to introduce food waste collections without additional operational costs, as the disposal savings will offset collection and container costs – even if no other service changes are made.
- The choice of dry recycling system into which the food waste collection fits is a critical determinant of whether there are additional costs. With the exception of urban authorities with fully co-mingled services, it appears from the WRAP benchmarking data that many councils have collection system options available to them that would allow separate food waste services to be implemented at no extra cost, and without reducing residual waste collection frequency.
- In addition, introducing separate food waste collections may make it possible to secure further financial savings through reducing the frequency of residual waste collections to three or four weekly.

**“Many councils have collection system options available to them that would allow separate food waste services to be implemented at no extra cost, and without reducing residual waste collection frequency.”**

# 4

## • Are New Regulations Needed?

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In the previous sections, we have examined whether the introduction of a requirement to separate biowaste for collection would be costly for those affected by it. However, one further area of cost associated with any new requirement is the cost to government of devising, consulting upon, refining, implementing and enforcing new law.

In this section of the report, we review current waste legislation to examine whether there is already a regulatory basis for the mandatory separation of biowaste by local authorities or businesses. We also consider emerging European law proposals and the potential for new legislation to increase the amount of biowaste that is recycled.

### 4.1 Review of Current Legislation

The deregulatory instincts of the current Government mean that Defra will be reticent about introducing new waste legislation. However, legislation already in force appears to amount to a requirement to separate food waste. If this interpretation of the law is accepted, a great deal could be achieved through a change in enforcement policy.

#### 4.1.1 The Waste Hierarchy

##### 4.1.1.1 The Waste Hierarchy in English Law

The key piece of legislation to consider is the Waste (England and Wales) Regulations 2011, Regulation 12 of which gave the long-established waste hierarchy statutory force:

*1. An establishment or undertaking which imports, produces, collects, transports, recovers or disposes of waste, or which as a dealer or broker has control of waste must, on the transfer of waste, take all such measures available to it as are reasonable in the circumstances to apply the following waste hierarchy as a priority order—*

- (a) prevention;*
- (b) preparing for re-use;*
- (c) recycling;*
- (d) other recovery (for example energy recovery);*
- (e) disposal.*

No restriction is placed on the types of waste to which the hierarchy should be applied – so it clearly applies to food and garden waste.

Although compliance with the hierarchy is not optional (at least, where the measures required would be “reasonable in the circumstances”), departure from it is allowed where departure will “achieve the best overall environmental outcome where this is justified by life-cycle thinking on the overall impacts of the generation and management of the waste”.

When considering the ‘overall impacts’ the following must be taken into account:

- the general environmental protection principles of precaution and sustainability;
- technical feasibility and economic viability;
- protection of resources; and

- the overall environmental, human health, economic and social impacts.<sup>24</sup>

Ordinarily, biowaste composting (classed as recycling, so long as the compost output achieves End of Waste status) should be preferred to energy recovery. Anaerobic Digestion (AD) is deemed to fall into the latter category for waste hierarchy purposes, although waste that is sent for AD is allowed to be counted as recycled so long as the digestate meets the quality protocol for AD.<sup>25</sup> However, Defra's guidance on applying the waste hierarchy explains that:

*“for food, current research shows that anaerobic digestion is environmentally better than composting and other recovery options.”<sup>26</sup>*

This provides a clear example of what a justification for “departure” from the hierarchy should look like.



Photo: Media Room (CC BY-NC-ND 2.0), via Flickr.

#### 4.1.1.2 Does the Waste Hierarchy Create an Obligation to Separate?

Some have sought to argue that the waste hierarchy simply does not create an obligation to separate materials. It has been suggested that, because Regulation 12 says that the waste hierarchy is to be applied “on the transfer of waste”, that it concerns only the actual place and moment when waste is collected.

On such a reading, the hierarchy could not require separate collections of food waste, because it is applied too late in the day: once food is mixed with other material in a black sack, the option of separate collection simply does not arise. This view might underlie the inclusion in Defra's guidance on the hierarchy of advice on how “black bag” waste should be treated. The best environmental outcome available, Defra indicates, will be for this waste to be sent for mechanical and biological treatment (MBT) so that some material can be recycled and the remainder used as solid recovered fuel in place of coal; with various forms of energy recovery being somewhat less preferred options.

<sup>24</sup> HM Government (2011) Waste (England and Wales) Regulations (as amended 2012), Regulation 12(3)

<sup>25</sup> Environment Agency and WRAP (2014) Quality Protocol: Anaerobic Digestate, January 2014, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/292473/426765\\_EA\\_QP\\_Anaerobic\\_Digestate\\_web.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/292473/426765_EA_QP_Anaerobic_Digestate_web.pdf)

<sup>26</sup> Defra, Guidance on Applying the Waste Hierarchy, June 2011, available from [www.gov.uk/government/publications/guidance-on-applying-the-waste-hierarchy](http://www.gov.uk/government/publications/guidance-on-applying-the-waste-hierarchy)



However, this reading of the hierarchy is plainly inconsistent with any attempt to reach its upper levels. If one is to prevent waste, clearly one must intervene earlier than at the point where an actual “transfer of waste” takes place. To make any sense of Regulation 12, it must be read as requiring reasonable measures to be taken so as to alter what is possible “on the transfer of waste”. One such measure is the implementation of separate food waste collections.

The key question is whether separating food waste for collection is likely to be a “reasonable” measure for a business to take, or for a council to facilitate. If it is, then the hierarchy places businesses under an implicit requirement to separately collect food waste, unless they can justify not doing so. There is good reason to regard separating food waste as (prima facie) a “reasonable” measure:

- **It is effective.** Separate collection has been shown to help prevent food waste and is a precondition of environmentally preferable treatment options, such as composting and AD.
- **It has already been shown to be feasible.** Separate collections are offered by around half of local authorities, and are taken up by a wide range of businesses across England and Wales.

“The waste hierarchy places businesses under an implicit requirement to separately collect food waste, unless they can justify not doing so.”

As we have seen, for many businesses and authorities there would also be financial benefits to separation of food waste. Against this background, it would be reasonable for Defra and the Environment Agency to take a view that, under Regulation 12, there is a general presumption that separation of food waste is required, except where a council or business can demonstrate that it would be unreasonable for them to implement it.

#### 4.1.1.3 Demonstrating Compliance with Regulation 12

In practice, in order to show they are compliant with the waste hierarchy, those subject to it might reasonably be expected to be able to evidence that they have applied it.

Most local authorities are aware of the waste hierarchy, and will have considered it at some stage in the development of their waste strategy. However, there is little consistency, whether in the approach taken to applying the hierarchy or the conclusions reached about what measures might be necessary. A clear indication from Government that separating food waste is a prima facie duty under the waste hierarchy would help to increase consistency.

Businesses are perhaps rather less likely to understand their waste hierarchy obligations, and how they connect to their duty of care in respect of waste. Under Regulation 35 every transferor of waste is required to confirm that they have applied the waste hierarchy. For most waste producers, this is done by ticking a box contained in Section B of the Waste Transfer Note (WTN), a document used to record almost all waste movements in the UK.





The Environment Agency estimates that annually 20 million WTNs and two million consignment notes are issued in England and Wales. The current *Right Waste, Right Place* initiative from CIWM and the Environmental Services Association Education Trust to raise businesses' awareness of their duty of care is encouraging, but the fact that such a significant effort is felt to be required highlights the likely scale of non-compliance.<sup>27</sup> It seems likely that many would struggle to evidence that they have taken "all such measures... as are reasonable in the circumstances" to apply the waste hierarchy. Again, a clear indication from government that separating food waste is a normal part of a food business's compliance with the waste hierarchy would be helpful.

#### 4.1.1.4 Enforcement of Regulation 12

Enforcement of Regulation 12 falls to the Environment Agency (EA) in England and Natural Resources Wales in Wales. Neither has taken any enforcement action in relation to the waste hierarchy, although the EA has engaged with businesses to educate and enable them on compliance. It is unclear how extensive or effective this has been.

**"There is a clear role for Government to support the EA in clarifying and meeting its regulatory obligations, which will deliver both environmental and economic benefits."**

The limited action on the part of the regulators is partly explained by the following:

- They received no new money to enforce the 2011 Regulations – indeed, the impact assessment said there would be no additional regulatory costs, although it anticipated that there would be 11 prosecutions a year for non-compliance with Regulation 12;<sup>28</sup>
- Their resources are increasingly constrained;
- They have no way to recover their monitoring and enforcement costs; and
- They have other enforcement priorities, such as waste crime.

All this is true, but it is inconsistent with upholding the law. It is also inconsistent with the EA's duty to have regard to economic growth: the Government's draft guidance for regulators explicitly states that 'support for the level playing field' is a key way for regulators to do this.

There is a clear role for Government to support the EA in clarifying and meeting its regulatory obligations, which will deliver both environmental and economic benefits.

## 4.2 Legislation in Prospect

### 4.2.1 Revised EU Directive on Waste

In addition to legislation that is already in force, the European Commission's recently published proposal for a revised directive on waste includes new requirements on bio-waste.<sup>29</sup> If adopted, any new directive would be likely to apply to the UK – certainly if the UK remains a member of the EU, and most probably as a condition of any future free trade agreement.

Article 22 of the current WFD requires only that Member States take measures to encourage the separate collection of bio-waste, and the provision of appropriate treatment. Since it contains no specific targets or time-bound obligations, the Government did not transpose Article 22 explicitly in UK law. Despite the numerous "encouragements" listed in the 2011 review of Waste Policy in England, the measures so far adopted clearly have not been sufficient to deliver ongoing change.<sup>30</sup>

<sup>27</sup> Right Waste, Right Place Right Waste Right Place, accessed 28 April 2016, <http://www.rightwasterightplace.com/#intro>

<sup>28</sup> Defra, Impact Assessment of the Transposition of the Revised Waste Framework Directive (Directive 2008/98/EC), November 2010. [http://www.legislation.gov.uk/ukia/2011/661/pdfs/ukia\\_20110661\\_en.pdf](http://www.legislation.gov.uk/ukia/2011/661/pdfs/ukia_20110661_en.pdf)

<sup>29</sup> European Commission (2015) Proposal for a Directive of the European Parliament and of the Council Amending Directive 2008/98/EC on Waste, 2015/0275

<sup>30</sup> Department for Environment, Food and Rural Affairs (2011) Government Review of Waste Policy in England 2011, June 2011, [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69401/pb13540-waste-policy-review110614.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69401/pb13540-waste-policy-review110614.pdf)

The prospect of a revised Article 22 might then be expected to require new UK legislation. The EC proposal is for the following text to be added:

*“Member States shall ensure the separate collection of bio-waste<sup>31</sup> where technically, environmentally and economically practicable and appropriate to ensure the relevant quality standards for compost and to attain the targets set out in Article 11(2)(a), (c) and (d) and 11(3).”*

If Defra were to drive forward the enforcement of the waste hierarchy as suggested, with the effect that separate collections become more widespread where they are practicable, there might be no need for new legislation to implement a revised Article 22.

#### 4.2.2 Revised EU Fertiliser Regulation

The European Commission is also preparing a revised EU Fertilisers Regulation, which is intended to ease the access of organic and waste-derived fertilisers to the EU single market, bringing them on a level playing field with traditional, non-organic fertilisers. According to the Commission, only 5% of biowastes are currently recycled but they could replace up to 30% of non-organic fertilisers, significantly reducing Europe’s reliance on imports of phosphate rock.

The proposal would allow compost derived from biowaste that is separately collected at source, and which meets safety, quality and labelling requirements, to achieve “End of Waste” status and be traded freely across the EU. This has the potential to significantly expand the market for composted and digested biowaste.

### 4.3 Potential for New Regulations

While there is a great deal that could be done simply by clarifying and enforcing legislation that is already on the books, the analysis in Section 2 suggests that there is potential for new regulations to assist in increasing the amount of food waste that is separately collected.

#### 4.3.1 Requirement to Separate Biowaste

The waste hierarchy implies a conditional requirement to separate biowaste for collection. Whether it is reasonable for one party to take the steps necessary to make separate food waste collections happen can depend on whether other parties also take action. There may also be a need to assess whether separation is required, which could delay action and result in administrative costs.

New legislation similar to that introduced in Scotland<sup>32</sup> and Northern Ireland<sup>33</sup> could greatly simplify matters by placing clear obligations on organisations, removing the need for them to assess whether and how they need to comply with the law. This requirement could be addressed both to food businesses and local authorities. Specific exemptions could be made where there are genuine concerns about the practicability of collections. This would be expected to lead to a high degree of compliance, with little need for costly assessments of whether separate collections were needed in any specific case.

For councils, the vast majority of which already collect garden waste, this would entail the introduction of food waste collections. It could allow food waste to be collected along with other biodegradable waste, so long as this allowed for the best overall environmental outcome.

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31 The proposed directive defines bio-waste as: ‘biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, comparable waste from food processing plants and other waste with similar biodegradability properties that is comparable in nature, composition and quantity’.

32 HM Government (2012) The Waste (Scotland) Regulations

33 HM Government (2015) The Food Waste Regulations (Northern Ireland) 2015, 2015 No. 14

For commercial producers of biowaste – principally food waste – a phased implementation would have the advantage of allowing larger commercial producers (those most likely to see financial benefits from the introduction of food waste collections at current prices) to transition first. This would give the market an opportunity to adapt and expand, and help to ensure the availability of cheaper, more efficient food waste services when smaller producers became subject to the requirements.

As explained in Section 2, almost all food businesses will produce in excess of 50kg of food waste per week. Further, businesses that produce 50kg of food waste per week are likely to make savings on waste collection if all such businesses adopt separate food waste collections.

However, the experience in Scotland indicates that the threshold for participation in mandatory food waste collections should be set well below this level to avoid non-compliance. Targeting food waste businesses, without a lower limit on the quantity of food waste each produces, will in itself minimise the risk that any incurs additional collection costs.

#### 4.3.2 Further Legislation: Commercial Waste Service

A further legislative approach focused on increasing the diversion of commercial biowaste would be to introduce a requirement that pricing mechanisms (especially for residual waste) should reflect weight.

As explained in Section 2, many waste collectors still charge for the collection of residual waste based on the bin's volume. This has become one of the principal obstacles to the diversion of food waste from the residual stream.



The key problem with this charging system is that it fails to reflect the costs of disposal, insulating commercial waste producers from the charges associated with the waste they produce. Those with light bins effectively subsidise those with heavy bins – such as customers that place large amounts of food waste in the bin. Because the food is heavy relative to its volume, a lot needs to be removed before a customer can make a saving by reducing collection frequency or bin size; and for smaller quantities of food waste, it is difficult for residual waste savings to offset the additional costs of food waste collection.

This system represents a market failure. It is bad for the environment, and for waste collectors – who can easily find themselves collecting bins where the volume-based price does not cover the cost of disposal, let alone collection. Some collectors are responding by implementing more sophisticated pricing systems – maximum bin weights at the standard price, for example – although few are going so far as to invest in the bin weighing equipment needed to allow a shift to pay by weight system. However, while some in the market remain willing to pick up any 1100 litre bin at a standard price, customers may well shop around for an option that allows them to carry on putting all of their waste in the residual bin.

There would be advantages to Government requiring that – for residual waste at least – bins must be charged for based on their actual weight. This would provide a very clear incentive to divert heavy materials such as food waste into a cheaper recycling bin.

However, there would be considerable capital costs, and similar results could be achieved in less costly ways, by simply requiring that charges for residual waste collections must include a variable element related to weight that must allow a range of no less than, say 25%, between the lowest and highest price.

This would allow the straightforward “maximum bin weight” approach to continue, but would allow room for further innovation. For example, customers that produce food waste could be offered different residual waste pricing options, depending on whether they opt for a separate food waste collection (taking account, perhaps, of how much food they propose to divert). Where the total cost of the service with separate food waste collections is lower, this is likely to be attractive to customers.

By addressing this market failure and requiring a fairer, more transparent approach to pricing – much as has recently been done in the utilities market – the Government could significantly facilitate the uptake of food waste collections. That said, the market is not ideally responsive to price, and so financial incentives should not be relied upon alone as a mechanism to drive behaviour. Waste collection is not a substantial annual cost for most businesses and the wide range of prices on the market suggests that price is not the only factor determining customer choice. Therefore improving price incentives will be most effective if it is accompanied by other policy measures.

### 4.3.3 Overcoming Challenges

#### 4.3.3.1 The Environmental Protection Act 1990

Many English authorities have a two tiered structure to their waste collection and treatment services, with waste collection authorities (WCAs) – the district or borough councils – collecting the waste and waste disposal authorities (WDAs) – typically the county councils – having responsibility for treatment or disposal.

This creates a challenge for the introduction of food waste collections. Changes to collection systems, and any increased collection costs, fall to the WCA; meanwhile, the responsibility for providing treatment and the benefit of the saving in disposal costs accrues to the WDA. To address this, the law provides for recycling credits to be paid by the WDA to the WCA.

However, under the recycling credit rules, it is up to the WDA to decide whether it will support separate food waste collections. If the WDA does not ask its WCAs to separate this material, then no recycling credits need be made available for food waste – even if the WCA believes that separate collections are a reasonable measure to implement under the waste hierarchy.

**“A significant degree of co-ordination and co-operation is needed for a WDA and its WCAs to move together towards implementation of food waste collections.”**

Clearly, a significant degree of co-ordination and co-operation is needed for a WDA and its WCAs to move together towards implementation of food waste collections. There are some excellent examples where such co-ordination works well. However, in the absence of willingness on both sides, it can be difficult to make progress.



A recent council report weighing up the costs and benefits of providing a food waste collection provides an example of how a WCA's options may be constrained.<sup>34</sup> It notes that:

*“the current position of the County Council is that separated food waste disposal is not within their plans for the short, medium or long term. The favoured disposal points for waste from Worcester are Norton (recyclates) and Hartlebury (residual waste, pending construction of energy from waste plant).”*

The City Council decided that it could not supply enough food waste to support an AD plant of its own, and would therefore need to ship waste to the nearest alternative facility, some distance away. Interestingly, the report does not mention the waste hierarchy.

The council estimated that if food waste was to be collected separately “the saving made by landfill diversion, net of the composting gate fee, will be of the order of £200k p.a.” However, there was a question mark regarding how this saving would be handled:

*“Assuming that the tonnage of food waste would not have a detrimental impact on the energy from waste plant (both in terms of the contractual obligations and operational requirements), it is reasonable to expect but highly unlikely that the County Council would be willing to pass on a proportion of this saving.”*

There are other instances where a WCA's interest in food waste collections has been similarly frustrated.

#### 4.3.3.2 Waste Treatment Contracts

A further obstacle is that, where authorities enter into long-term waste treatment contracts, this can provide a disincentive to remove substantial amounts of food waste from the residual stream. In some cases, councils can find that a reduction in food waste could result in falling below the minimum tonnage they have contracted to provide. In other cases, issues can arise where the removal of food waste results in an increase in the overall calorific value of the residual waste, taking it outside parameters agreed in the contract. Either of these scenarios can mean that separate collection of food waste will lead to very limited residual waste savings.

The provision of residual waste treatment, especially energy from waste incineration, also appears to confuse some authorities regarding the application of the waste hierarchy. It is possible to find comments such as:

*“The opening of the incinerator means that the authority no longer has to rely on In Vessel Composting as being the only option for diverting food waste from landfill. Returning the food waste to the black bin means that it would be burnt and converted to energy along with all the other residual waste.”*

and:

*“the incinerator's outputs and efficiency are such that it constitutes a form of “recovery” pursuant to the criteria in Annex II to the WFD, which places it at the same level in the waste hierarchy as anaerobic digestion.”*

These indicate that there is still work to be done to ensure it is widely understood that the waste hierarchy:

- is a preference order, starting from the top, not from the bottom; and
- gives priority to AD over composting, which in turn is preferred to thermal treatment of food waste.

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<sup>34</sup> Worcester City Council (2013) Scrutiny Committee Agenda 30th October, 2013 – Item 7 <http://committee.cityofworchester.gov.uk/documents/g3312/Public%20reports%20pack%2030th-Oct-2013%2019.00%20Scrutiny%20Committee.pdf?T=10>



Increased clarity regarding the interpretation of the waste hierarchy in relation to food waste would help to avoid misunderstandings about whether composting and AD are preferable to MBT or incineration of biowaste.



#### 4.3.3.3 The Status of Anaerobic Digestion

It might aid also understanding if the anomalous classification of AD as a form of ‘other recovery’ rather than ‘recycling’ were to be addressed through revised guidance.

There is a clear case for doing so: not least because, after subtracting any contaminants removed at the treatment facility, separately collected biowaste that is sent for AD is already ‘counted as’ recycled, so long as the resulting digestate complies with end of waste criteria.

Further, there appears to be an inconsistency between the different ways that AD and EfW incineration are categorised:

- Under the R1 criterion, an EfW facility qualifies as a recovery facility if it can achieve an efficiency in the region of 25.5%. At this level, EfW can appear to be primarily a disposal operation, with only a quarter of the energy potential being recovered – which is deemed sufficient to boost it one rung up the hierarchy to the status of energy recovery;
- In AD, only 15-20% of the input material is converted to energy, while a much larger proportion is incompletely degraded material termed digestate. This has a renewable resource value. It appears that AD is primarily a biological treatment activity, with only a small portion of the feedstock being converted for use as energy. Nevertheless, this is sufficient to take AD down one rung, from recycling to other recovery.

It is unclear why this anomaly persists, and it makes the case for separate food waste collection more complex than is necessary. It should be agreed that, where the resulting digestate meets the AD Quality Protocol, AD is a form of recycling. This would mirror what is already included in Defra’s waste hierarchy guidance with regard to composting.

# 5. Recommendations

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The analysis provided in this report strongly indicates that requiring food businesses and local authorities in England to ensure that food waste is source separated need not mean imposing costs on those affected.

- A mandatory requirement on food businesses to separate food waste will significantly change the collection market for this material, and therefore appears likely to enable them to make savings that are less likely to be achieved without legislation.
- Many local authorities could introduce separate food waste collections without incurring additional operational costs if they were to make other changes to their collection system.
- Separate food waste collections would be a precondition of achieving indirect savings, through reduced residual waste costs and increased diversion of material into the recycling stream, that appear likely to result from introducing three-weekly or monthly residual waste collections.

A requirement to source separate food waste may not require new regulations to be introduced. The waste hierarchy is a potentially powerful piece of legislation, which creates an obligation on all those involved in the waste system to try to “deliver the best overall environmental outcome” – as an untransposed line of Article 4 of the WFD puts it. However:

- many of those with waste hierarchy responsibilities in England appear unaware of it;
- those who are aware of it do not necessarily understand it;
- those who understand it may face significant barriers in acting on it; and
- in the absence of any prospect of enforcement action, the incentive to apply it is limited.

In order to unlock the potential of Regulation 12, only a small investment of resource would be required.

- Local authorities generally wish to comply with their legal obligations at the lowest practicable cost. If it is made clear to authorities that the waste hierarchy requires them to separately collect food waste, and that unjustified failure to do so may result in regulatory action, it is likely that they will respond.
- For businesses, Defra and the Environment Agency should make it clear that there is a waste hierarchy presumption that food businesses should separate food waste, and could look to join forces with CIWM and the ESA Education Trust to promote waste hierarchy compliance alongside duty of care compliance.

Defra should improve its waste hierarchy guidance to make it clear that:

- the requirements of the waste hierarchy are not met by simply diverting waste from landfill; and
- separate collection of biowaste for anaerobic digestion is greatly preferable on environmental grounds to alternative treatment options for such waste when collected as part of a mixed waste stream.

Residual waste treatment commitments can pose challenges for authorities’ compliance with the waste hierarchy, but:

- Defra should make it clear that this will not always be the case, and that having commissioned a residual waste treatment facility need not prevent an authority from also seeking to secure separate biowaste treatment;

- a clear steer from Defra about waste hierarchy obligations would help to prevent the issue being exacerbated, e.g. through extensions to residual waste treatment contracts with terms that are not conducive to separating biowaste;
- the Environment Agency should take steps to review compliance by both businesses and local authorities – and perhaps by bringing a small number of enforcement actions. Local authorities could support this by ensuring that their waste teams and environmental health teams consider the waste hierarchy when carrying out inspections on food businesses. This would help to emphasise that compliance with the law is a requirement, and non-compliance carries consequences;
- Defra should provide support to authorities looking to renegotiate contracts, provided that moving more material up the waste hierarchy was a key aim of the negotiation; and
- the two tier local authority system appears, on occasion, to inhibit the implementation of the waste hierarchy. However, this could be unlocked by Government making clear to WDAs that they have a key role in implementing the waste hierarchy, and should support WCAs (through the provision of suitable treatment facilities and recycling credits) in implementing separate biowaste collections.

Looking at emerging European legislation, if there were to be truly effective enforcement of the waste hierarchy, it may be possible for the UK to demonstrate that this fully meets the requirements of the proposed new WFD Article 22.

In addition, there are measures that could further improve the extent of separate biowaste collection and avoid unnecessary compliance costs to businesses.

- Addressing the antiquated pricing system for commercial residual waste would allow market forces to be more effective in delivering change. However, a Scotland-style requirement to separate food waste (with exclusions and exceptions where these are justified) is likely to be highly effective, and would help reduce the risk of co-ordination problems between producers and collectors.
- Clear directions from Government would also help to avoid unproductive costs associated with producers and collectors undertaking assessments of whether separate biowaste collections would be “reasonable” or “TEEP”.

# Appendices

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## A.1.0 Commercial Waste Modelling Assumptions

This appendix sets out the key assumptions used in the modelling of the costs of separate commercial food waste collections.

**Table 10: Assumed Bulk Densities of Waste**

	Kg per Litre	% Food Waste (by Volume)	% Food Waste (by Weight)
Food Waste	0.29	100%	100%
Residual Waste (No food)	0.06	0%	0%
Residual Waste (Typical)	0.07	4%	20%
Residual Waste (50% food)	0.10	16%	50%
Residual Waste (70% food)	0.13	33%	70%

**Table 11: Treatment Costs**

Waste Stream	Treatment Cost (£/Tonne)
Food Waste	25
Residual Waste	110

**Table 12: Collection Costs**

Material	Container Size			
	1100	660	240	140
Residual Waste (Typical)	£15.97	£12.17	£8.55	£7.68
Residual Waste (Heavy – 50% Food)	£19.43	£14.25	£9.30	£8.12
Residual Waste (Extra Heavy – 70% Food)	£24.76	£17.45	£10.46	£8.80
Food Waste (Scenarios 1 & 2)	n/a	n/a	£8.78	£7.97
Food Waste (Scenario 3)	n/a	n/a	£7.51	£6.70
Food Waste (Scenario 4)	n/a	n/a	£6.76	£5.94

## A.2.0 Household Waste Modelling Assumptions

This section sets out the key assumptions used in the modelling, in which a relatively conservative approach has been adopted, drawing on estimates derived from widely accepted sources.

Collection costs are derived from the WRAP Indicative Cost and Performance (ICAP) Online tool,<sup>1</sup> which provides benchmark costs and performance (yields of food and dry recycling) of “a modelled good practice system operated across a range of geographical areas.” The six areas modelled in the ICAP tool are shown in Table 13.

**Table 13: Area Types**

Area Type	Descriptor
<b>Rurality 1</b>	Predominantly Urban, Higher Deprivation
<b>Rurality 2</b>	Predominantly Urban, Lower Deprivation
<b>Rurality 3</b>	Mixed Urban/Rural, Higher Deprivation
<b>Rurality 4</b>	Mixed Urban/Rural, Lower Deprivation
<b>Rurality 5</b>	Predominantly Rural, Higher Deprivation
<b>Rurality 6</b>	Predominantly Rural, Lower Deprivation

The ICAP tool employs four recycling collection systems. Where food waste is collected, this is, in some cases, on a separate collection round, and in others, co-collected with other materials. These choices reflect the most frequently used, and most cost effective collection systems used in the UK. The collection systems are shown in Table 14.

**Table 14: Collection Systems**

System	Descriptor
<b>Fortnightly Co-mingled (Pod)</b>	<ul style="list-style-type: none"> <li>Fortnightly co-mingled dry recycling</li> <li>Fortnightly residual waste</li> <li>Food co-collected weekly with both dry recycling and residual (on alternate weeks in a separate compartment of the same vehicle)</li> </ul>
<b>Fortnightly Co-mingled (Sep)</b>	<ul style="list-style-type: none"> <li>Fortnightly co-mingled dry recycling</li> <li>Fortnightly residual waste</li> <li>Food collected in a separate vehicle</li> </ul>
<b>Fortnightly Two Stream F/C (Sep)</b>	<ul style="list-style-type: none"> <li>Fortnightly Two Stream dry recycling (fibres: containers) on split vehicle</li> <li>Fortnightly residual waste</li> <li>Food collected in a separate vehicle</li> </ul>
<b>Weekly Multi-Stream</b>	<ul style="list-style-type: none"> <li>Weekly multi-stream dry recycling (co-collected on same vehicle but not co-mingled),</li> <li>Fortnightly residual waste,</li> <li>Food collected on dry recycling vehicle in separate compartment</li> </ul>
<b>Fortnightly Two Stream G/O (Sep)</b>	<ul style="list-style-type: none"> <li>Fortnightly Two Stream (glass: other dry recycling) on split vehicle</li> <li>Fortnightly residual waste</li> <li>Food collected in a separate vehicle</li> </ul>
<b>Fortnightly Two Stream G/O (Pod)</b>	<ul style="list-style-type: none"> <li>Fortnightly Two Stream (glass: other dry recycling) on separate vehicle</li> <li>Fortnightly residual waste</li> <li>Food co-collected with both dry recycling and residual (on alternate weeks in a separate compartment on the same vehicle)</li> </ul>

<sup>1</sup> The ICAP tool and its detailed assumptions can be accessed at: <http://laportal.wrap.org.uk/ICPToolHome.aspx>



Food waste collection costs are not shown separately within the ICAP outputs. For this work, they have been derived by comparing the costs of collections including food waste (which ICAP assumes will be implemented alongside fortnightly residual waste collections) from the most similar collection system excluding food waste.

The ICAP model also excludes garden waste collections, and the figures have therefore been supplemented with garden waste collection cost and yield data derived from Eunomia collection models and other WRAP studies. It is assumed that garden waste collection arrangements are largely independent of those for other waste streams.

The other key assumptions within the model are the treatment costs for the material streams that are collected. The figures used within the analysis are shown in Table 15.

**Table 15: Gate Fees**

<b>Waste Stream</b>	<b>£/t</b>
<b>Residual (MBT/EfW/Landfill)</b>	100
<b>Co-mingled</b>	30
<b>F/C Basket of Materials</b>	-10
<b>G/O Basket of Materials</b>	5
<b>Multi-Stream Basket of Materials</b>	-55
<b>Anaerobic Digestion (AD)</b>	30

*Source: Eunomia, based on recent procurement work and published prices, supplemented with information provided by REA and reflecting current organics and recycling prices*



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### **About the REA**

The REA was established in 2001, as a not-for-profit trade body, representing British renewable energy producers and promoting the use of renewable energy in the UK.

The REA endeavours to achieve the right regulatory framework for renewables to deliver an increasing contribution to the UK's power, heat, transport and renewable gas needs. It is influential in helping shape UK energy policy and has a track record in delivering high quality events on a wide range of energy related topics. REA aims to help its members build commercially and environmentally sustainable businesses.

### **REA Expertise**

The Organics Recycling Group (ORG) of the REA promotes the benefits of composting, digestion and other biological treatment techniques and the use of biologically treated materials for the enhancement of the environment, business and society.

The group has its own website ([www.organics-recycling.org.uk](http://www.organics-recycling.org.uk)) which provides news and information relevant to the biodegradable resource sector, including health and safety and technical information on treatment technologies, relevant consultations that ORG respond to on behalf of members as well as a downloadable list of certified composters. Relevant events are promoted here, as too are the products and services of advertisers and sponsors.

The ORG provides a technical enquiry service for members and supports enquiries relating to composting and anaerobic digestion, use of biowaste and organic materials on land as well as any subject relating to the treatment of biodegradable resources. The ORG works closely with the REA's Biogas Group and many of the companies are members of both.