

Bag it or bin it?
Managing London's domestic food waste

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Foreword



Everybody creates it, and everybody expects it to be taken away, but very few of us think about how or where our food waste is managed once it enters the waste stream. Yet every year we throw away over 7 million tonnes of food and drink from our homes, with food waste accounting for around 20 per cent of all London's domestic waste.

Of course, preventing food waste from occurring in the first place is far better for the environment than any form of treatment, but no matter how careful our cooking or eating habits a certain amount of food waste is unavoidable – from banana skins and tea bags, to meat bones and egg shells.

In contrast to the now well established collection of 'dry' recyclables such as paper, metal, plastic and glass, the separate collection of food waste remains comparatively rare in London, with fewer than half of all households receiving a food waste collection service. At the same time London is struggling to meet its recycling targets while landfill capacity is fast running out. The case for improving the collection of food waste is therefore compelling.

This report looks at steps that the Mayor, local authorities and central government can take to improve the management and treatment of food waste within London in order to reduce the amount that goes to landfill.

During the course of our investigation we were pleased to receive evidence from a number of leading European cities as well as visiting a series of innovative community-led projects here in London. All these examples showed that the long-held view that food waste is too difficult and costly to collect in high-density urban London no longer holds true.

In fact, we found that properly funded and well promoted food waste collections can actually reduce the amount of waste generated by households in the first place, potentially making the service cost-neutral. What's more, as the costs of landfill continue to rise, the financial benefits of separate food waste collections will only increase further.

Like many world cities, London faces a series of challenges to its infrastructure over the coming years as its population continues to expand. It is clear, however, that the better management of food waste can play a major role in helping to meet this challenge, ensuring our city continues to operate efficiently and successfully, whilst also helping to deliver the commitment shared across all levels of government to support sustainable growth.



Stephen Knight AM
Chair of the London Assembly Environment Committee

Executive Summary

Food waste is a huge environmental problem. The UK alone creates seven million tonnes of household food and drink waste, and sending that waste to landfill is especially harmful to the environment. There is political consensus that reducing the amount of landfilled bio-waste is a key policy priority. In London, the Mayor recognises that processing food waste will play an important role in boosting the city's recycling and composting rates. Sending less of London's food waste to landfill is becoming an urgent priority for practical reasons too: the Greater London area contains very little landfill capacity, and sites outside its boundaries accepting its municipal waste are expected to be full by 2025.

Recent attention has rightly been focused on how much of the food we buy gets eaten. Supermarkets in particular have been criticised for the way that their buying and selling practices contribute to food waste. This report concentrates on what happens to the food we do throw away. The London Assembly's Environment Committee has looked at how well London is performing in collecting and processing food waste, and our report explores the potential strategies that will make recycling food waste more cost-effective, easier for residents and local authorities, and better managed.

London's performance

In recent years, London has greatly reduced the amount of domestic waste it sends to landfill, but food waste still accounts for around 20 per cent of its household waste. London also does not stand out nationally for its success in recycling — while recycling rates vary widely across the capital, there is particularly low participation in inner London. More London boroughs are collecting food and green waste than in the past. However, London urgently needs to introduce or extend food waste recycling in its high-density housing stock.

With tightening budgets, local authorities are often guided less by environmental concerns than they are by cost when choosing different recycling and processing methods. In general, separate food waste collections are likely to make waste management more effective overall, as food waste is one of the few waste streams that residents can directly control. Although more expensive, providing a separate collection for food waste can go some way towards improving an authority's overall recycling performance.

Therefore we recommend that boroughs should endeavour to include separate food waste collections in their waste management regimes across all property types. Additionally, reliable data on food waste is scarce and this limits local authorities' ability to plan for effective service provision. We argue that more should be done by those involved in planning and managing waste and recycling to improve data collection on food waste.

Funding and costs

For London boroughs, the biggest barriers to collecting food waste are financial as any financial benefits of separate food waste collections must outweigh the costs. We found that separate food waste collection schemes need not be more expensive than schemes that include bio-waste with other municipal waste. Programmes that offer authorities public funding and technical advice have been demonstrably successful. Such support for local authorities should continue, or even expand. Consequently, we recommend that the Mayor should support London Councils in its efforts to secure additional resources from the Government to develop separate food and organic waste collection services. He should also support waste reduction and recycling programmes such as the Waste and Resources Action programme (WRAP) or Recycle for London, and make a long-term commitment to protect the London Waste and Recycling Board's (LWARB) budget, should LWARB's self-financing capabilities not be sufficiently achieved.

The costs of landfilling continue to rise but the landfill tax raised is not returned to London boroughs, as happens in Scotland and Wales. At the same time, for boroughs that send residual waste for incineration with energy recovery, the cost issue is not landfill tax but gate fees. The devolution of landfill tax to London would allow many authorities to invest more in food waste recycling and other sustainable waste management practices, and we argue that the Mayor should lobby the Government for this.

Resident participation and communication

Even when separate food waste collections are available, participation rates can remain low because of people's misconceptions, especially about vermin and odour. Communication is essential to increasing participation, and communication strategies need to be clear and consistent. The Committee recommends a strategic, pan-London approach. Additionally, boroughs should look for ways to extend and diversify their approach to inform residents more successfully about food waste recycling.

Participation in separate food waste recycling generally declines with rising urban density. London urgently needs to improve its performance in recycling food waste from its high-density housing stock. Positive examples exist, such as Bexley in London or Milan in Italy, which provide best practices that may help others.

It is crucial that new developments are designed to accommodate recycling. Planning and design policies in London already take note of such issues but the Mayor must use his planning and investment powers to strengthen the concept of 'designing out waste'. Additional financial and technical support to waste collection authorities and community groups to retrofit alternative waste solutions, such as composting schemes or the removal of single stream waste chutes, would be welcomed.

Processing and recycling household food waste

London urgently needs new treatment facilities for organic waste. This investigation found that less than half of London's food waste is processed in London and that, at present, only one plant in London provides dedicated organic waste treatment. As a

growing city, London will require facilities to process about one million extra tonnes of food and green waste. While the Mayor is encouraging the development of further sustainable waste treatment facilities in London, it is hard to see where the funding will come from. Therefore, we recommend that the Mayor uses some of his landholdings to enable – or directly provide – waste infrastructure, such as food waste processing plants.

Finally, there is a perception within the waste industry that London is a complicated place to do business. Long-term direction and security are, therefore, key to decision-making and delivery, but the interests of local authorities and the waste industry are not always aligned. Stakeholders within the waste industry are calling for greater leadership and more coordinated policies. We found that there is a need for greater exchange of knowledge and understanding of need and demand, both between authorities and between the public and private sectors. More widely, we argue, that both sides would benefit from a stronger brokerage role taken up by LWARB.

1 Introduction

Food waste is a considerable environmental problem. In the UK alone, we create 7 million tonnes of household food and drink waste every year. While around two thirds of this waste was collected by local authorities in 2012, most was in with the ‘residual’ or general waste, which may end up on landfill. Only 11 per cent of the food was captured through separate collections of food waste.¹ Sending food waste to landfill is especially harmful to the environment. The methane and carbon dioxide released by organic waste in landfill sites globally adds an estimated 3.3 billion tonnes of greenhouse gases to the Earth’s atmosphere.²

There is political consensus in Europe that reducing the amount of landfilled bio-waste is a key policy priority. This is backed up by a raft of legislation, incentives and penalties. The European Union Waste Framework Directive (WFD) stipulates that the separate collection of paper, metal, plastic and glass will become mandatory from 2015; the separate collection of bio-waste, which includes food, is “encouraged”.³ At the same time, the Landfill Directive requires Member States to progressively reduce landfilling of municipal waste. In the case of the UK the adopted target is a reduction to 35 per cent of 1995 levels by 2020. A further legislative package recently presented by the European Commission proposes phasing out landfilling by 2025 for recyclable waste (including bio-waste) and enforcing separate collection streams; this has not been formally adopted but a further, purportedly more ambitious, programme of measures is expected later in 2015.⁴

In London, the Mayor recognises that processing food waste will play an important role in boosting London’s recycling and composting rates. The Mayor’s Municipal Waste Management Strategy 2011 sets out his ambitions to reduce the amount of municipal waste produced, increase the amount of waste reused, recycled or composted, and generate low carbon energy from the residual waste. The London Plan sets targets that would see London’s boroughs working towards zero biodegradable and recyclable waste to landfill by 2026, and recycling or composting 50 per cent of London’s municipal waste by 2020.

These targets are challenging but separating out household food waste at source would significantly contribute towards the national and Mayoral targets. Each tonne of food and drink waste diverted from landfill could reduce carbon emissions by 0.4-0.7 tonnes CO₂ equivalent.⁵ Food waste can also provide green energy, thereby mitigating climate change, particularly through anaerobic digestion (AD).

Sending less of London’s food waste to landfill is becoming an urgent priority. The Greater London area contains very little landfill capacity, and sites outside its boundaries accepting its municipal waste are expected to be full by 2025.

However, London faces particular challenges in disposing of food waste cost-effectively. Funding structures for waste disposal in the city are complex. Food waste recycling services are difficult to operate in areas of high-density housing. It can be hard to

promote recycling to London's large transient population. And, although technologies to treat food waste offer economic and environmental opportunities, creating the necessary infrastructure can be challenging when the needs of the waste industry conflict with those of local authorities.

This report recognises that the public debate on food waste needs to shift from consumption to disposal. Recent attention has rightly been focused on how much of the food we buy gets eaten. Supermarkets, in particular, have been criticised for the way that their buying and selling practices contribute to food waste. This report, in contrast, concentrates on what happens to the food we throw away. The Committee has looked at how well London is performing in collecting and processing food waste, and our report explores the potential strategies that will make recycling food waste more cost-effective, easier for residents and local authorities, and better managed.

2 London's performance: how well do we dispose of food waste?

In recent years, London has greatly reduced the amount of domestic waste it sends to landfill. In 2011/12, about 30 per cent of such waste went to landfill, a major improvement on previous years. Although this figure is better than the average for England (which stands at 38 per cent), London still lags behind other European cities in Germany, Austria and the Nordic countries, many of which have practically phased out landfilling of municipal waste.⁶ This should continue to be our aspiration.

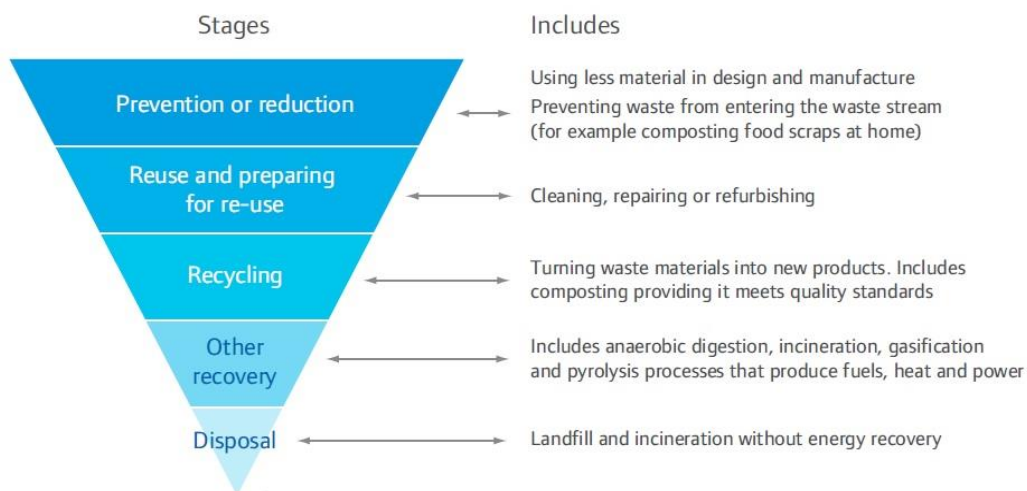
Food waste accounts for around 20 per cent of household waste in the capital. The Waste and Resources Action Programme (WRAP) estimates that 890,000 tonnes of food is thrown away in London each year, of which 540,000 tonnes is avoidable.

Producing a separate collection of food waste can go some way towards improving an authority's overall recycling performance. London already recycles dry waste successfully (paper, plastic and glass). Success in managing food waste, however, is harder to achieve: it is more difficult and costly to process. London boroughs already spend over £50m per year disposing of household food waste, around 20 per cent of London's total waste treatment and disposal cost.⁷ As a result, boroughs have been slower to extend their collection and processing of food waste.

Strategies and initiatives

To achieve the greatest cost savings and environmental benefits, local authorities adopt a 'waste hierarchy' strategy (see below). This strategy seeks to minimise disposal to landfill by concentrating on preventing, reusing and recycling waste. For food waste, this effectively means composting, anaerobic digestion, and incineration, particularly in waste-to-energy facilities.

The Waste Hierarchy prioritises prevention, reuse and recycling



Source: *The Mayor's municipal waste management strategy, 2011*

As different methods have similar environmental benefits, local authorities' choices are often determined by cost. For example, according to Sutton and Wandsworth, only very small reductions in carbon are achieved by diverting food waste from an energy-from-waste (EfW) facility to a composting or AD process. Data from the Department of Energy & Climate Change (DECC) and the Department for Environment, Food & Rural Affairs (Defra)⁸ indicates that there is often only a small difference in the environmental benefit between anaerobic digestion and other forms of energy recovery. Cost factors therefore become even more significant for strategic decision making.

In their quest to prevent and reduce waste, local authorities are supported by a number of initiatives to reduce food waste. In west London, for example, WRAP's *Love Food Hate Waste* campaign successfully encouraged people to change key targeted behaviours which then reduced the amount of avoidable food waste by an estimated 14 per cent in just six months. The campaign included radio, digital and print advertising along with supporting events, and community engagement such as cookery classes and direct customer engagement through a network of volunteers. Such a model would be relatively easy to replicate in other boroughs and linked with a London-wide strategy.

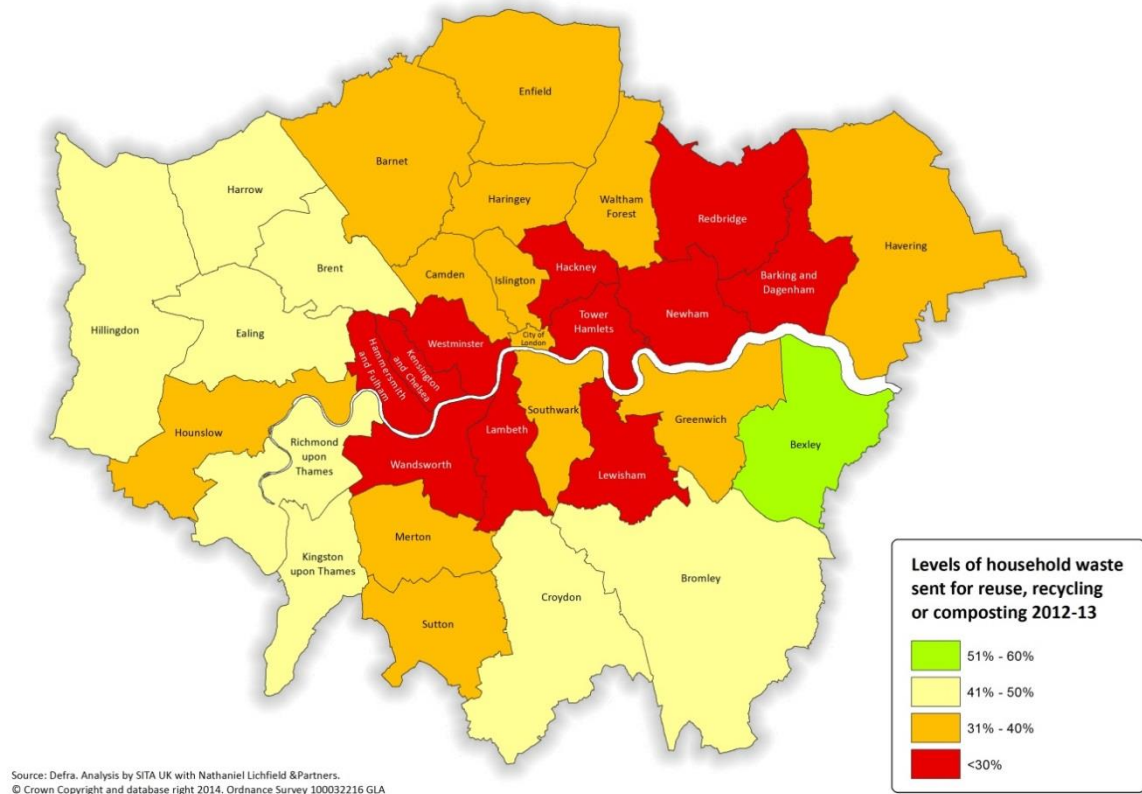
The Mayor's £1 million *FoodSave* scheme helps small and medium-sized businesses to reduce food waste; and there are a number of community or charity schemes in operation such as 'Food for good', a sustainable catering service that uses surplus produce, or 'PlanZHeroes', a matchmaking service to connect businesses with surplus food to charities.

Performance

London as a whole does not stand out nationally for its success in recycling. Since 2008, the amount of London's local authority-controlled waste sent to landfill has declined significantly, but the city, on average, still has one of the lowest household recycling rates among English regions, at 34 per cent. Moreover, London's overall recycling rates have virtually levelled over the last three years with almost half of London boroughs recycling less in 2013/14 than the previous year.⁹

Rates for inner London, at 16 per cent, are exceptionally low. The next poorest performer nationally – the West Midlands – has a total recycling rate of 31 per cent, nearly double that of inner London.¹⁰ However, recycling rates vary widely across London – there are also boroughs that have achieved or exceeded a 50 per cent recycling rate. A complex set of factors influences these rates, including demographics, the materials collected, the systems and containers used, communications, and the composition of housing stock.¹¹

Map 1: London's performance in reusing, recycling and composting its household waste is low, particularly in central and north-eastern boroughs



More London boroughs are collecting food and green waste than in the past. According to London Councils, the number of boroughs providing such collection services has steadily increased to 51 per cent of households over the last 10 years, but 10 boroughs still do not collect domestic food waste at all. In its own research, the Committee found that 23 out of the 33 boroughs currently collect food waste separately from other recycling, and from the residual waste, which is often destined for landfill. These collections serve 1.7 million of households, a 14 per cent increase since 2011/12.

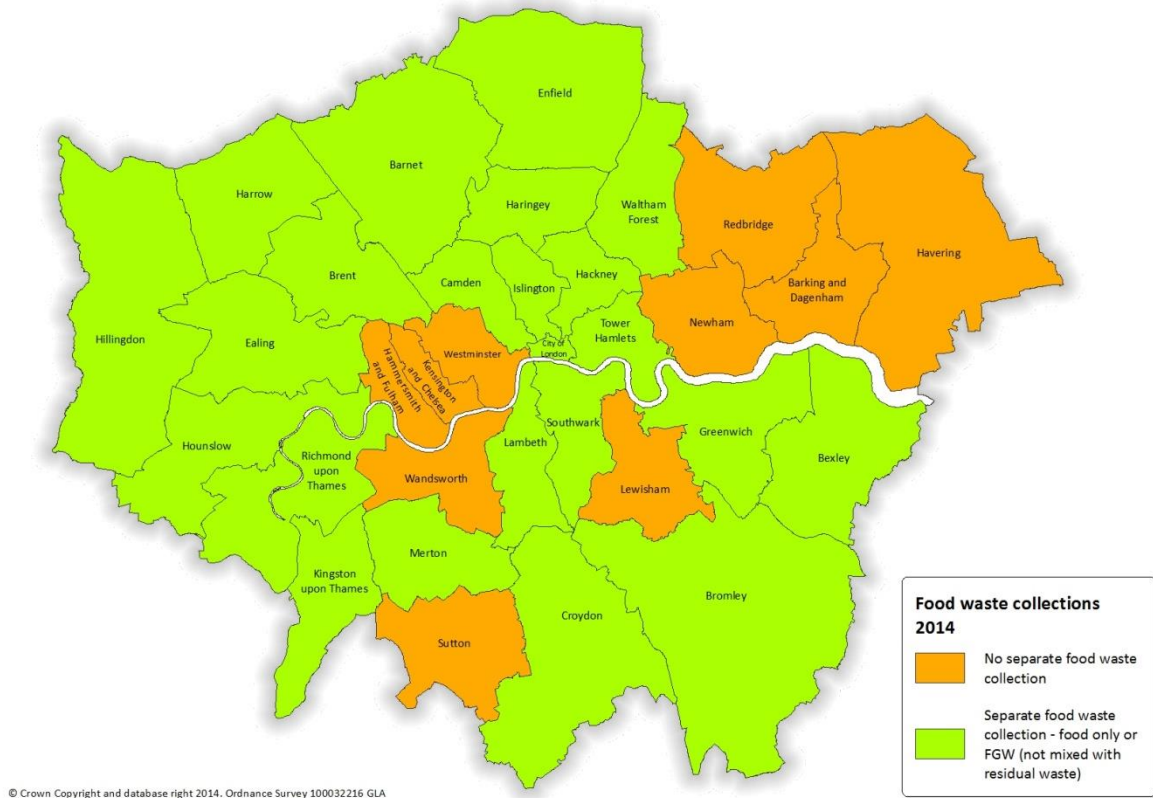
There are 12 unitary authorities responsible for both collection and disposal of its waste in London. For the remaining 21 London boroughs, disposal is arranged across four joint waste disposal authorities comprised of the East London Waste Authority (ELWA), North London Waste Authority (NLWA), Western Riverside Waste Authority (WRWA) and the West London Waste Authority (WRWA).¹²

Map 2: Strategic London Waste Authorities



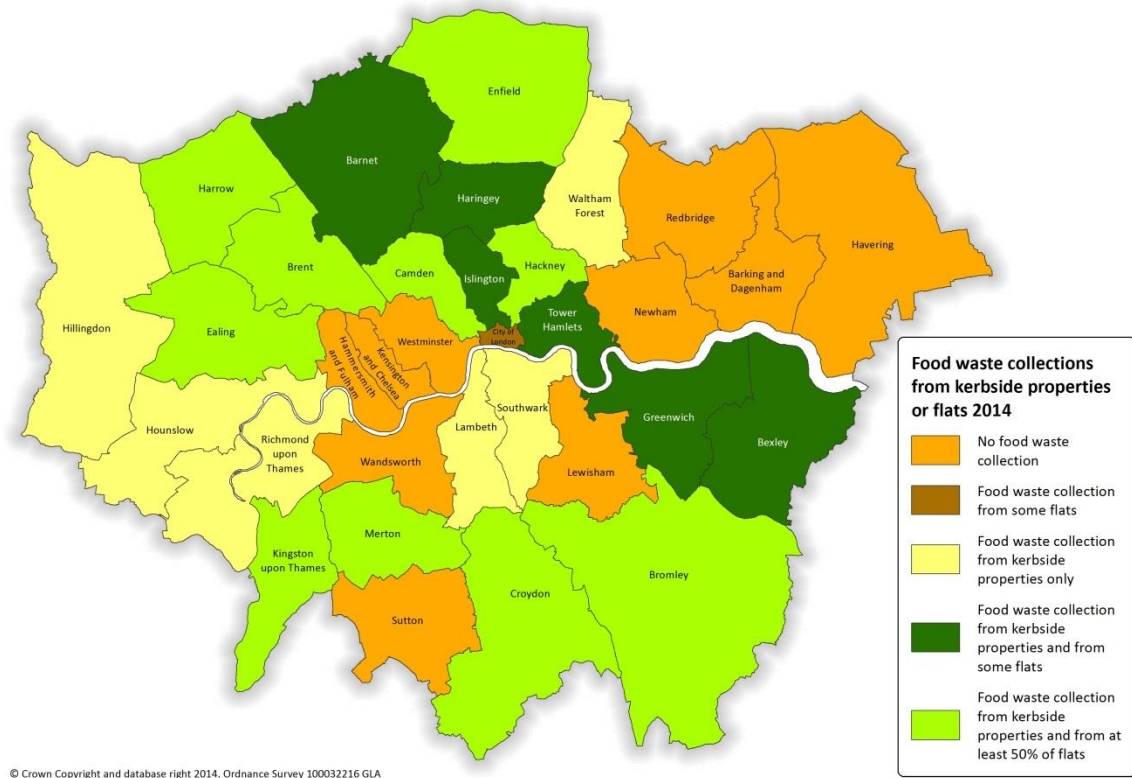
Source: www.londonwastemap.org

Map 3: The majority of London boroughs offer separate food waste collections



London urgently needs to introduce or extend food waste recycling in its high-density housing stock. Most boroughs offer kerbside collections. 17 of the 33 London boroughs also offer collections from multi-storey flats or estates, but coverage is much lower here: only ten have an extended service to more than half of all flats. 16 boroughs do not collect food waste from flats at all; two of these have confirmed that they are introducing a collection service to some flats or estates. The densely populated inner London boroughs, with high proportions of flats, tend not to have separate collections for food waste. Overall, half of London's households still lack access to separate food or organic waste collections.

Map 4: Food waste collection from different property types varies across London

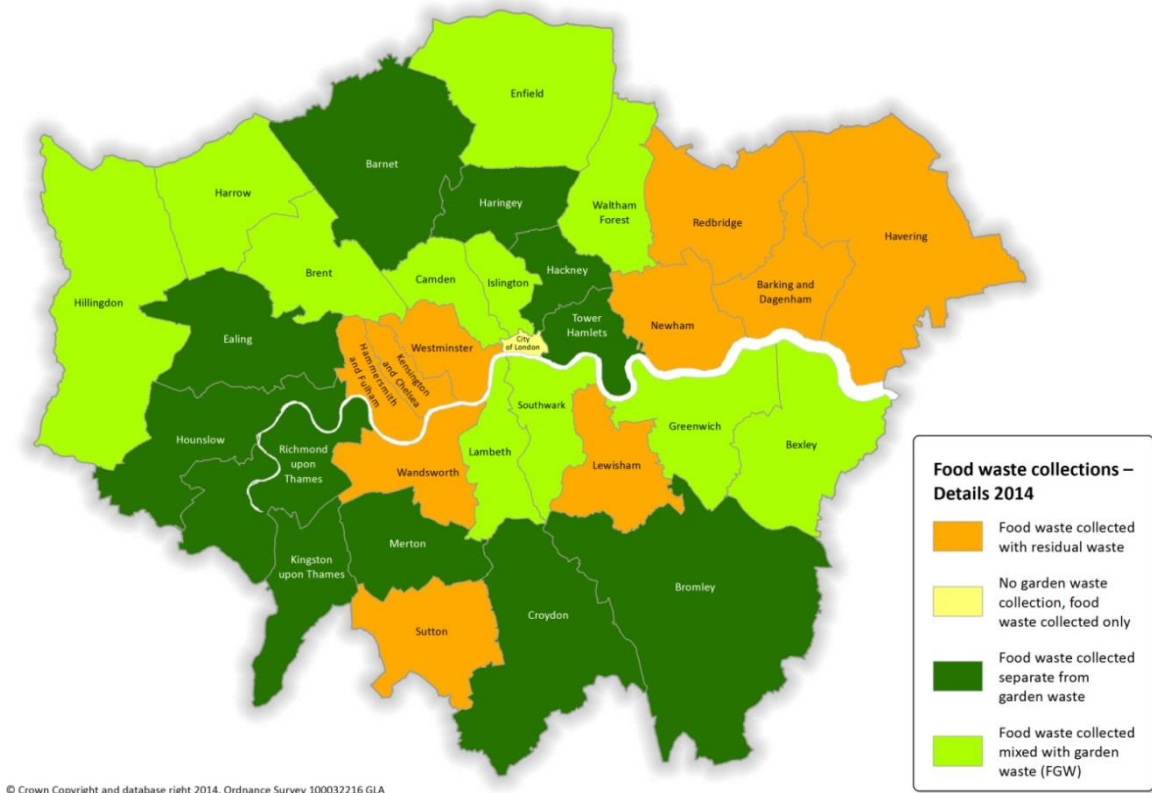


In general, separate food waste collections are likely to make waste management more effective overall. They can increase total recycling rates, which correlate strongly to the rates for organic recycling. Separate collections can also help reduce the amount of food wasted in the home. The London Borough of Hackney and others have reported, for example, that separate collections can prompt residents to notice how much food they are wasting.

Food waste is also one of the few waste streams that residents can directly control. In a recent workshop and survey on recycling, many participants considered collecting food waste the best thing their council could do to help them recycle more. A quarter of a typical household's waste is food waste: it is easy to identify and separate from other waste.¹³

Some London local authorities collect food waste separate from garden waste while others collect it mixed, which can affect the choice and cost of processing.

Map 5: Food and garden waste can be collected separately or mixed in London



Outlook: can the boroughs do better?

The Committee appreciates that it can be difficult for some London boroughs to extend or introduce separate collections for food waste. The Environmental Services Association (ESA) strongly supports separate collections, but is not in favour of making them mandatory (as suggested in the past by the EU Commission). The Association believes that there is no ‘one size fits all’ collection system which is best in all circumstances and notes: *“The design of waste collection schemes is complex and depends on factors such as the demographics, geography, housing stock and proximity to treatment facilities”*.¹⁴

Authorities may find it harder in the future to find the advice they need. Defra continues to help authorities sustainably manage their food waste, with technical support and information about appropriate treatment options.¹⁵ At the end of 2013, however, the Department announced that it would scale back support to local authorities in this area.¹⁶

London waste authorities have offered us other reasons for not implementing separate food waste collections. In their evidence to us, they have cited the need to meet costs, to address existing waste contracts, to achieve high participation rates, and to manage collections from high-rise properties as barriers to progress. Opportunities to instigate and extend food waste collections will arise, however, such as when existing waste contracts end. We believe that authorities should plan now to take advantage of these opportunities.

Recommendation 1

Following the final local government finance settlement for 2015/16, every London borough should allocate available resources to include separate food waste collections in their waste management regimes, across all property types.

Data collection and monitoring

Reliable data on food waste is hard to come by. At the national level, information about local authority collected waste is reasonably well gathered, through reporting and tracking systems such as Defra's WasteDataFlow. But the House of Lords' European Union Committee concluded in a recent report that "food waste is a data-poor area".¹⁷ Information on consumer participation or capture rates, which would give a picture of how much food waste remains in residual bins, is particularly scant. The data that does exist varies greatly in substance and format: many boroughs do not analyse waste composition or participation levels.

Recommendation 2

The London Waste and Recycling Board (LWARB), in partnership with the GLA, Boroughs and the Waste and Resources Action Programme (WRAP) should improve data collection on food waste so that better projections of need and demand can be made, and the impact of food waste on London's overall recycling and landfill targets can be assessed. Annual food waste recycling statistics for local authorities should be made available on the London Data Store.

3 Funding and costs

For London boroughs, the biggest barriers to collecting food waste are financial. To begin with, local authorities must be convinced that separate food waste collection can be cost-effective. They must receive adequate financial support to set up and operate the schemes. Contractual arrangements need to be flexible enough to allow boroughs to rationalise and share services if necessary. The costs of landfill continue to rise and London boroughs currently do not benefit from devolved landfill tax, in the way that authorities in Scotland and Wales do.

Making food waste disposal cost-effective

The financial benefits of separate food waste collections must outweigh the costs. One critical factor is take-up rate among residents. Effective food waste collection can reduce the amount of waste generated in the first place, potentially making the organics service cost-neutral. Enough people must use the service to offset the costs of set-up and collection.¹⁸ The following chapter points to ways of ensuring good participation rates.

Evidence from elsewhere suggests that separate food waste collection schemes need not be more expensive than schemes that include bio-waste with other municipal waste. Many innovative and cost-effective separate collection schemes have been implemented in the south of Europe, in parts of the UK and in some new EU Member States.¹⁹ For example, in Milan, Italy, between 80 and 90 percent of households, mostly in blocks of flats, are regularly separating their food waste, while in Hackney good levels of participation are recorded for street-level properties. In Waltham Forest an improved waste collection service achieved significant financial savings (see box below).

A number of factors influence feasibility: the availability of funding, the costs of landfill disposal, participation rates, contractual arrangements and, not least, the costs of equipment. Providing free bags, for example, is an obvious cost, although they are popular among users.²⁰ Offering new users free bags for an initial period might help to limit costs overall.

Case study – costs and benefits

The London Borough of Waltham Forest negotiated a new waste collection contract in 2011 with specifications designed around the preferences of residents as expressed in a consultation the previous year. The new service maintains a weekly residual and dry recycling collection and has increased an existing food and garden waste service. By using split-body vehicles and double-shift working on recycling collections, the scheme has saved £2 million per year. By giving residents recycling bins instead of boxes and reducing the size of residual waste bins, the authority has increased the amount of recycling materials collected from the kerbside by 17.6 per cent in the last year. At the same time, resident satisfaction with the waste collection service has risen to 82 per cent - an increase of 32 per cent since 2011.²¹

Opportunities for rationalising and sharing waste services

There are opportunities for waste authorities to rationalise their operations and achieve significant savings. Data collected by the Committee shows that existing food waste collection arrangements vary greatly across London: In 20 boroughs, food and residual waste is being collected by five different operators; the other 13 boroughs manage the service themselves. Waste is sent, by 12 different operators, to 14 different locations within and outside London for processing (nine locations for food that was collected separately from the residual waste). In comparison, in Berlin, a city of 3.5 million people, only two operators manage the separate waste collection, recycling and processing, as well as street cleaning and other services.

Public funding schemes and other support

Programmes that offer authorities public funding and technical advice have been noticeably successful. LWARB, for example, has established a 'Flats Recycling Programme' and a 'Driving Up Performance Fund', which have helped to extend food waste collections to around 95,000 households across seven London boroughs. The Department of Communities and Local Government (DCLG) has offered funds to seven boroughs, through its Weekly Collection Support Scheme, to help extend food waste collections.

Such support for local authorities must continue and expand. London Councils has asked the Government to provide further support for separate food and organic waste collection services. The House of Commons Environment, Food and Rural Affairs Committee has made a similar call: in its recent inquiry on waste management in England, it heard that, despite the success of high-profile campaigns such as 'Recycle Now' or 'Love Food Hate Waste' over the past ten years, Defra has cut funding for WRAP and Keep Britain Tidy.²²

LWARB has in the past received capital and revenue grant funding from Defra. This funding, which has been gradually reduced of the past years, is due to run out this year. LWARB is expected to continue covering its operational costs and carry on investing in a pipeline of investment opportunities through its own revolving investment fund. It has also announced a partnership programme with WRAP.

Recommendation 3

The Mayor should join London Councils in its efforts to secure additional resources from the Government to develop separate food and organic waste collection services.

Recommendation 4

Alongside government funding the Mayor should make available from his own resources ongoing funding for waste reduction and recycling programmes such as the Waste and Resources Action Programme (WRAP) or Recycle for London.

Should the London Waste and Recycling Board's (LWARB) self-financing capabilities not be sufficiently achieved, the Mayor should make a long-term commitment to protect LWARB's budget, thereby enabling LWARB to continue its programmes to support boroughs and successfully embed food waste recycling in their waste management strategies. This could be achieved, for example, by including funding for LWARB in the GLA budget plans through to 2018/19, or by entering into contracts with LWARB for funding in return for delivery.

Landfill tax and gate fees

The costs of landfilling continue to rise. Although boroughs have significantly reduced their reliance on landfill in recent years, some (for example, Wandsworth) have not saved enough on landfill tax to cover the cost of providing a separate food waste collection.

At present, the landfill tax raised is not returned to London boroughs, as it is in Scotland and Wales. Devolving this tax would allow authorities to invest more in food waste recycling and other sustainable waste management practices. The London Finance Commission has already argued that London should enjoy greater financial and fiscal control.²³ London Councils has subsequently asked the Government to consider devolving the landfill tax to London.²⁴

For boroughs that send residual waste for incineration with energy recovery, the cost issue is not landfill tax but gate fees. Gate fees for organic waste treatment plants are generally lower than for residual waste plants. For some authorities (Bexley, for example), the residual waste gate fee is the financial motivator to set up a separate food waste collection; for others, this potential saving can be negated by the higher costs involved in collecting, providing equipment and promoting the scheme.

Recommendation 5

In line with the London Finance Commission's calls that London government should be allowed to make additional self-determined investments in its own infrastructure, the Mayor should lobby the Government for the devolution of landfill tax to London.

4 Resident participation and communication

Even when separate food waste collections are available, participation rates can remain low because of people's misconceptions, especially about vermin and odour.

Communication is essential to increasing participation, and communication strategies need to be clear and consistent. A strategic, pan-London approach would be beneficial. Thus, the Committee recommends that the Mayor should work with LWARB and London Councils to establish a more consistent, London-wide approach to communication about food waste. Additionally, boroughs should look for ways to extend and diversify their approach to inform residents more successfully about food waste recycling.

Communicating with residents

The most common reasons given by residents for not recycling food waste tend to be assumptions rather than real problems. Residents spoke to the Committee, for example, of their concerns about hygiene, odour or vermin – issues that were considered significantly less important by those residents who participated in the collections.²⁵ Many households believe that they are not producing enough food waste to make participating in recycling worthwhile. In fact, WRAP has shown in its 'The Food We Waste' study that even households claiming to generate no food waste at all produce on average 2.9 kg per week.²⁶

Most of these issues can be addressed by consistent, clear and regular communication.²⁷ Many people do not understand what happens to their waste after it leaves their home. Residents have called for more detailed information to build their trust in the system, as well as interest in the environmental benefits. Charlotte Morton, Chief Executive at the Anaerobic Digestion & Bioresources Association said: *"It is really important for people, the population as a whole, to understand why they are being asked to segregate their food waste and what the benefit is to them. That would probably improve the rates as well."*²⁸ Residents are also often confused by the range of services and collection systems provided in different areas.²⁹

Improving equipment and schedules

People are more likely to participate in food recycling if containers are the right size and easy to use. Containers outside a property are inconvenient; residents interviewed during both SITA's and Defra's studies also mention that stolen or damaged bins have stopped them from recycling.³⁰ Indoor caddies for interim storage can be more acceptable, especially for wet items. Free biodegradable bin liners also encourage participation and reduce the danger of contamination. Providing bags, however, represents a cost for local authorities; in some cases, using newspaper to wrap waste has been successfully promoted.

The most effective food waste schemes offer a weekly collection. Evidence collected by WRAP and other organisations suggests that collections can achieve high levels of public support where food waste is collected weekly, even if residual waste is collected fortnightly.

Collecting from estates and blocks of flats

Participation in separate food waste recycling generally declines with rising urban density.³¹ Around half of London's housing stock is multi-occupancy – the proportion is much higher in inner London – and it generates 40 per cent of municipal waste.³² Collecting this waste presents particular difficulties: storage space is extremely limited, and residents can find it hard to carry waste to a central collection point. Authorities struggle to promote recycling to the often diverse and hard-to-reach groups living in flats and estates. As a result, recycling performance from these properties is, on average, only 10 per cent.

Maximising participation in high-density housing areas

Experience suggests that boroughs should make targeted interventions to encourage residents in these areas to recycle their food waste. Such interventions can include:

- bin cleaning advice or services;
- a range of bin and container options, to cater for the needs of different households;
- free caddies or bin liners;
- suggestions for alternatives to using a kitchen container or biodegradable bags, for example to wrap food waste in newspaper;
- more information on the scheme itself, including the end uses for compost and digestate;
- regular reminders, particularly to capture new in-movers, for example with Council Tax bills; and
- incentives or rewards, for example Council Tax reduction for participants (see box below).

Case study - Incentives

The London Borough of Bexley specifically targets residents in blocks of flats to join its Green Points scheme, part funded by LWARB. Points are awarded for increased recycling which residents can use to claim discounts and offers provided by retailers on local high streets. Recycling rates have gone up since the scheme began and it is now being rolled out to more properties.³³

Recommendation 6

Boroughs should consider introducing specific measures and incentives to increase resident participation in separate food waste recycling collections, particularly in flats and estates, thereby reducing the amount of food waste in the residual waste stream.

Communication and marketing approaches

Communication is an essential element in increasing levels of participation in food recycling. Successful trials in various countries have highlighted the benefit of educating communities on the merits of recovering food waste.³⁴ London boroughs can learn from these initiatives, both in promoting the benefits of collecting food waste and offering practical advice.

Communication strategies need to be consistent. Promotional campaigns must present potentially competing messages as a package: on prevention, home composting and recycling food. The public often has little grasp of the waste hierarchy, and authorities need to explain how Londoners should prioritise their behaviour.

A strategic, pan-London approach is essential, but currently not sufficiently visible. Residents living and working in different boroughs, for example, need to be provided with consistent messages. London Councils identifies London's increasingly transient population, especially people that do not speak English as a first language, as particularly hard to engage. Collaboration between boroughs and other authorities is essential: standard messages, slogans and graphics, jointly adopted by all participating boroughs, could help raise awareness and change behaviours more widely.

The 2014 report 'The Ur[bin] Issue' stresses that: *"The Mayor and LWARB could provide the sort of leadership to help find a better balance between localisation and the devolvement of decisions and choices on recycling, combining local insight and knowledge with a national framework that the public and businesses can easily understand"*.³⁵

Support for boroughs in developing their communication strategies is available from LWARB. In June 2014, the Board re-launched its Borough Communication Support Programme, including a £100,000 fund which offers support and advice, mainly through WRAP. One of the priority areas for this new fund is low performing areas such as estates and large blocks of flats.

Tools and messages

London boroughs can use a range of communication tools to raise awareness and engage communities. They should send out messages that address people's concerns about recycling, explain the environmental benefit of separating food waste, and offer simple solutions. Boroughs can choose the tools that are most suited to local circumstance, or follow a joint approach with other boroughs to generate more consistent messages beyond borough boundaries (see box overleaf).

Tools that work

- Mail drops with letters and leaflets, booklets or bin stickers
- Door knocking and canvassing exercises, particularly aimed at low participation areas
- A dedicated enquiry hotline during the early weeks of a new or changed scheme
- A dedicated webpage combined with the use of social media such as Twitter
- Press adverts and articles in the local press/borough magazines and local radio adverts
- Outdoor adverts on bus backs, refuse vehicles, bus stops, town centre banners, cyclists' jackets, local shops, or community notice boards
- Offering advice at roadshows, drop in sessions, information stalls in town centres and at local markets
- Establishing "Green Champions" to target specific groups or communities and to support council staff
- Use of colour coded bin stickers with pictorial images of items including a budget for replacement bin stickers at reasonable intervals

Messages that work

- Fostering a better understanding about end uses for recycled household food waste and promoting the value of these uses
- Communicating reasons why people should want to participate and explaining how home composting and food waste collection complement each other
- Setting out practical information on making food waste recycling as easy and convenient as possible such as clear 'dos and don'ts'
- Including feedback and updates on how residents and the waste authorities have been performing, providing positive feedback
- Including incentives like a voucher for free caddy liners, prize competitions, or a points scoring system to access incentives
- Combine cohesive and consistent messages and branding, for example by applying standard WRAP iconography across all types of communication

Sources³⁶

Boroughs in London and beyond use a range of messages and tools to communicate with residents. Greater Manchester, for example, has successfully run its 'Right stuff, right bin' campaign, which used tags to highlight the correct separation of materials, and included follow-up visits to households where continued contamination occurred. Other boroughs use imagery and messaging to promote forthcoming collection schemes, give instructions and offer practical suggestions.

Bournemouth Council promotes its new food waste scheme



Source: www.bournemouth.gov.uk

Hackney Council includes practical suggestions in its food recycling campaign



Source: www.hackney.gov.uk

Greater Manchester campaign seeks to reduce waste contamination using bin tags



Source: www.manchester.gov.uk

Greater Manchester bin tags



Bexley Council food caddy with pictorial images



Recycle for Scotland adds images to the instructions for using food waste caddies

An infographic from Recycle for Scotland titled "How to use your caddies". It features a "Top tip" box that says "Remember to only use the liners supplied" with an image of a liner roll. Below are five numbered steps with corresponding images: 1. Put one of the free liners into your indoor caddy. 2. Transfer any cooked or uncooked food waste to the caddy. 3. When the liner is full, tie and remove from caddy and replace with a new liner. 4. Place the full liner into your outdoor caddy. 5. Place your outdoor caddy at the kerbside on your collection day and we will collect it. The infographic also includes the "ZERO WASTE SCOTLAND" logo and the website www.recycleforscotland.com.

Source: www.recycleforscotland.org

Basildon Council integrates national recycle logos and food symbols

An infographic from Basildon Council titled "FOOD WASTE RECYCLING". It shows a bin overflowing with food waste. Below the bin are six icons representing acceptable items: bread & pastries, fruit & vegetables, fish, dairy, tea & coffee grounds, and cooked/uncooked meat & bones. At the bottom are the "recycle for Basildon" logo and the "Basildon Council" logo with the text "BASILDON • BILLERICAY • WICKFORD".

Source: www.basildon.gov.uk

Involving schools and the wider community

As well as targeting residents and households, boroughs can promote food waste recycling through the wider community (see box below). In particular, they can:

- provide collections or composting schemes for schools, community-based organisations and faith groups; and
- teach about recycling in schools and embed the topic within the curriculum.

Case study – School engagement

In the London Borough of Southwark, the Council's recycling and waste partner Veolia is running a scheme that seeks to get as many Southwark schools as possible to recycle their food waste and educates school children about the environmental value of reducing and collecting food waste. It is hoped that the children will integrate this in their home life as well and encourage family members to recycle.³⁷

Merton Council is similarly rolling out its food waste collection service to every school in the borough. Catering and school staff will be trained to educate the school children about recycling food waste and helping to protect the environment.³⁸

Merton pupils recycling food waste



Source: www.merton.gov.uk

Recommendation 7

The Mayor should work with LWARB and London Councils to introduce mechanisms for a consistent, London-wide approach to communication about food waste by April 2016. Collaboration with networks like the Association of London Cleansing Officers (ALCO) or the London Recycling Officers Group (LROG) as well as specialist organisations like the Waste and Resources Action Programme (WRAP) and Keep Britain Tidy would be beneficial.

Boroughs should consider extending and diversifying their communication and engagement approach to inform residents more successfully about food waste recycling, for example, by:

- ensuring a recurring scheme of promotion including circulating correspondence to new residents;
- more regularly engaging with residents through dedicated waste advisors or local 'green champions'; and
- setting up school and community engagement schemes and aiming to offer food waste collection services to all schools.

5 Estates and blocks of flats

London urgently needs to improve its performance in recycling food waste from its high-density housing stock. 17 London boroughs offer food waste collections from flats, but the number of households reached by the service is often low. As a result, London is underperforming in the European context: in Berlin, Germany, for example, organic waste is collected from 80 per cent of all multi-occupancy buildings.

Case study – door to door approach

In the city of Milan, despite high population density and high levels of multi-occupancy housing, over 90 kg per person of food waste is collected annually, compared with around 40 kg in London. An intensive door-to-door system was adopted in 2012 and accompanied by a high profile communication campaign. Through ongoing collection of waste data, the performance of the scheme is under constant surveillance.³⁹

In principle, the options used by boroughs to collect dry waste could also be applied to food waste, but there are challenges in doing so. Boroughs currently use a range of methods, including kerbside collection, door-to-door collection, and collection from a central point on each floor and communal bins.⁴⁰ Food waste presents particular challenges. For example, people in flats often have no outdoor space for storage, making it difficult to clean bins properly. They often also have very small kitchens with little space for a food caddy.⁴¹ To compound the problem, retrospective changes to the existing waste infrastructure on estates can be difficult, unpopular and costly.

Housing design and planning

Given these challenges in existing blocks of flats and estates, it is crucial that new developments are designed to accommodate recycling. Elsewhere in the world, planning requirements to support recycling in blocks of flats have been utilised successfully. For example, in the city of Markham, Canada, developers of high-rise blocks are now required to install tri-sorter chutes with a colour-coded button system to include organics, recycling and waste.

Planning and design policies in London could take note of such schemes (see box overleaf). Recycling should be integrated into the design of new housing developments through greater early stage planning, retrofit consideration and support. Housing associations or local authorities should be required to reach higher standards of hygiene, as well as factoring recycling infrastructure into new builds.⁴²

The GLA can set criteria for new housing developments, including the provision of waste storage facilities. Planning conditions can be used to ensure that these criteria are met. A number of other initiatives are available to promote more effective recycling in new developments.

- London Councils is currently investigating how to integrate the needs for waste storage and collection in planning enforcement practices in the boroughs.
- More specifically, the London Plan sets out that suitable waste and recycling storage facilities are required in all new developments.
- To support the London Plan, the Mayor's Housing Supplementary Planning Guidance 2012 provides standards to ensure that communal refuse and recycling containers, communal bin enclosures and refuse stores are accessible to all residents.
- Finally, the London Housing Design Guide provides strict criteria around housing design, including space standards for the provision of waste storage. Future versions of the guide could specify standards to enable better waste separation or composting of household waste.

Case study – design guidance

The 2010 ADEPT guide 'Making space for waste' provides comprehensive information for developers and local authorities to help ensure waste and recycling are considered in the planning process. The guide notes that:

"Inappropriate waste storage in new developments can impact on the appearance and environmental quality of the adjoining public realm. All design of waste storage facilities should be integrated into the initial design process for the whole public realm to give identity and enhance the sense of place. This coordination of design for all elements of the street scene will help to avoid clutter and confusion."

It also highlights the importance of factoring in collection frequencies, residential storage, manual transport to and from collection points, and home composting.⁴³

Alternatives to communal collection schemes and retrofitting options

Residents of large housing estates often need to find innovative ways of managing food waste locally. Food waste does not always have to be collected at the kerbside and then sent to a large waste plant for treatment. Individual or communal storage may not be available, and a dedicated food waste collection may not be possible. Alternatives include:

- community composting;
- composting waste at home, which usually requires a garden or larger balcony;
- disposing via in-sink drainage systems, which can be costly to maintain and requires drainpipes to be at a certain gradient to avoid blockages;
- the installation or upgrading of chute systems; and
- disposing via an on-site small scale anaerobic digestion facilities with methane recovery in larger developments.

Some boroughs have supported estates in local composting schemes. Wandsworth, where food is not currently collected, promotes home composting, including kitchen and garden solutions, and provides discounts to residents for purchasing equipment such as home food waste digesters or balcony wormeries. In Hackney and Camden, although food waste collections are offered, a number of estates offer community composting schemes that work well. These are largely resident-led but receive support from the borough's waste team where needed. Compost produced is mostly used on the estates' gardens and balconies, but is also sold on to garden centres and marketed online.

Committee Members visited different community composting schemes in Hackney



Also in Camden, a micro anaerobic digester at Camley Street Nature Park generates heat and electricity from locally collected food waste. Further sites have been secured to form a wider network, but construction has not yet begun. The pilot has demonstrated that such a scheme has technological benefits and can support educational initiatives about environmental issues. Finding suitable space for installing micro AD is the main challenge.

There are other emerging and new technologies - similar to micro AD - that could be of interest. For example bio-thermic digesters come in different capacity sizes and can process organic waste very rapidly.⁴⁴ Some technological solutions for processing food waste in large-scale developments are more controversial.

- In-sink food waste disposers (FWD) are installed under the kitchen sink and shred food waste into pieces small enough to pass through the plumbing. Approximately 50 per cent of households in the USA have an FWD; in some cities more than 90 per cent have them. The Chartered Institution of Water and Environmental Management (CIWEM) is in favour of FWDs after conducting a range of international studies.⁴⁵ Thames Water, in contrast, remains strongly opposed to these units because they could cause sewer blockages.
- Chute schemes for food waste can be built into new developments and retrofitted in existing buildings. However, they are expensive to install and maintain: WRAP has recorded good dry recycling rates in existing schemes, but many chutes would need frequent and intensive cleaning.⁴⁶

Targeted communication and support programmes

The LWARB Flats Recycling Programme has played a key role in helping London boroughs to address low recycling performance in flats. The scheme allowed LWARB to fund boroughs flexibly; as a result, boroughs could improve their recycling services for flats to suit their existing local services and demographic.⁴⁷

Recommendation 8

Design for housing development should enable waste minimisation and separation:

For new housing developments, the Mayor and Boroughs should use their planning and housing investment powers to 'design out waste', for example by prioritising funding for schemes that meet the highest levels of waste minimisation, and by promoting best practice for separating and recycling food waste. The proposed 2015 review of the Mayor's Housing Supplementary Planning Guidance should consider these ideas and also make particular reference to the requirements for food waste separation and storage.

For existing housing developments, the Mayor and LWARB should provide additional financial and technical support to waste collection authorities and community groups to retrofit alternative waste solutions, such as composting schemes or the removal of single stream waste chutes.

6 Processing and recycling household food waste

London urgently needs new treatment facilities for organic waste. Technology offers opportunities, both economic and environmental, to meet the Mayor's targets for sustainable waste management. But land values, limited public funding and EU regulation make investment difficult.

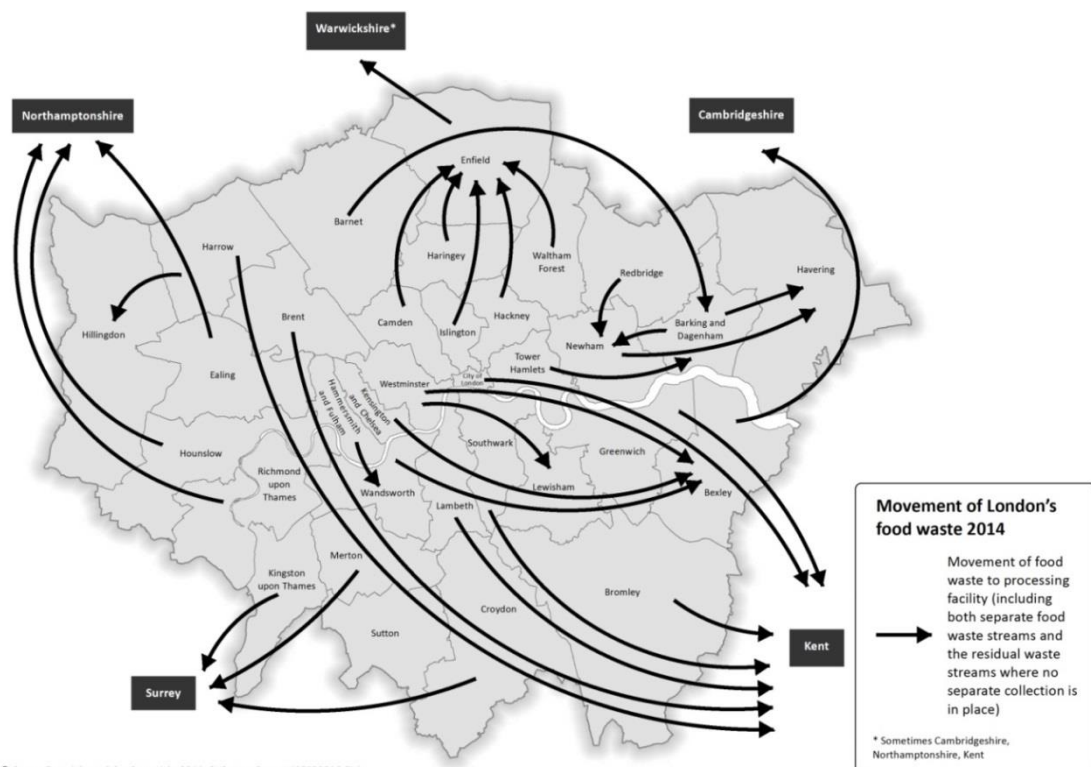
Processing options

Technologies for managing food waste have varying degrees of environmental impact. The main processing technologies applicable to food waste include in-vessel composting (IVC), anaerobic digestion (AD), mechanical biological treatment (MBT), and energy from waste (EfW). Compared with other processing options, AD and IVC minimise environmental harm and can also recover useful materials (the Glossary at Appendix 2 provides more detail on these).

Currently, most of London's food waste is treated through IVC or AD. The Mayor has strategies addressing waste and climate change in London, and supports the development of food waste infrastructure. He is technology-neutral and supports technologies with the greatest carbon benefits and cost-savings, which generally means supporting AD.

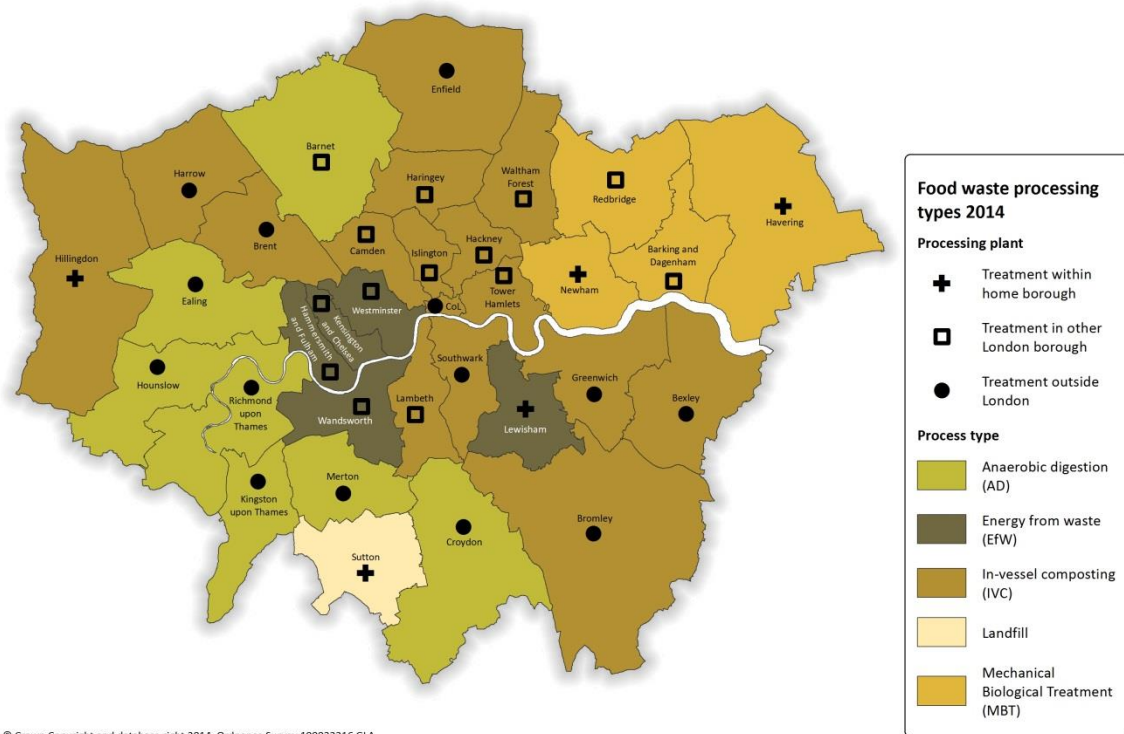
Where and how is London's food waste treated?

Map 6: Around half of London's food waste is transported outside London to be treated



Less than half of London’s food waste is processed in London. The city currently lacks sufficient treatment facilities; as a result, the majority of waste authorities send their separated green waste – garden and food – to composting and AD facilities outside London, including in Kent, Surrey, Cambridgeshire, Warwickshire, and Northamptonshire. Some food waste is treated in the London Boroughs of Enfield, Hillingdon and Barking & Dagenham. Food waste that is not collected separately, but together with residual waste, is treated mostly within London’s boundaries, at EfW and MBT facilities in Wandsworth, Lewisham and Bexley. Some waste is landfilled at Sutton.

Map 7: Most of London’s food waste is treated through IVC or AD but less than half of that takes place in facilities located in London



Developing food waste infrastructure in London

London currently requires facilities to process about one million extra tonnes of food and green waste.⁴⁸ Based on anticipated requirements and known projects in development, LWARB has identified regional “capacity gaps” for municipal waste. SITA UK estimates that, for every one million tonnes of waste diverted from landfill, 10 to 20 new treatment facilities will be needed.⁴⁹ Future requirements to collect more waste separately could increase this need still further, although campaigns to prevent and reduce food waste at source may mitigate this increase.

At present, only one plant in London provides dedicated organic waste treatment. TEG’s facility, situated on the GLA-owned London Sustainable Industries Park (LSIP), near Dagenham, provides both IVC and AD. There are currently two other IVC facilities in London. Planning permissions have been granted for a second AD facility for LSIP and a third in Sutton, but these have yet to be built.

The Mayor is encouraging the development of further sustainable waste treatment facilities in London. The London Plan sets a target date for boroughs to achieve “zero biodegradable or recyclable waste to landfill” and “managing the equivalent of 100 per cent of London’s waste within London”. Draft Further Alterations, published in January 2014, propose to bring forward the target date from 2031 to 2026.

It is hard to see where funding can be found to develop new treatment facilities in London. High land values are likely to dissuade commercial waste treatment operators from investing in projects within Greater London’s boundaries. There have been calls for public funding to build plants, for example from LWARB, possibly with support from the GLA in terms of land provision or planning consent. However, given the extent of the capacity gap and the capital cost associated with infrastructure development, LWARB will not have the funds to meet the entire capacity gap requirements of London’s waste infrastructure by 2031.

It is likely that other solutions will have to be found to meet the Mayor’s targets. The LSIP presents an opportunity for increasing London’s capacity to handle bio-waste but there is also potential for more decentralised, community-level facilities.

Recommendation 9

In developing future asset management strategies, the Mayor should consider how he can utilise GLA land holdings to enable waste infrastructure and sustainable development, providing small and commercial-scale anaerobic digestion plants on these sites.

Co-treating sewage sludge and food waste

The water industry is interested in co-digesting food waste with sewage sludge in their existing AD plants. These plants currently have a small amount of spare capacity (about 10 to 20 per cent). Thames Water has recognised the commercial benefits of co-digestion, particularly in generating energy (although they also point out that co-digestion makes treatment more complicated).⁵⁰ Involving the water industry could also create more competition in the market for organic waste management, encouraging other AD projects to come forward.⁵¹

However, using sewage treatment facilities would require EU regulations to change. Under these regulations, sewage sludge is currently excluded from the feedstocks allowed in order for a digestate to meet End of Waste criteria. Consequently, mixed digestion would cause all digestate to be treated as waste, rather than a useable recycled product. Work to reform these regulations appears to have stalled.

Recommendation 10

The Government should press for EU regulations to be changed, namely the Sludge Directive, to allow anaerobic digestion of sewage sludge and organic waste such as food waste alongside each other (co-treatment) and the Mayor should support this call.

7 Investing in treatment plants: forging greater collaboration

The London Plan's 2026 targets create significant commercial opportunities for the waste management industry. To realise these opportunities, however, collection and treatment systems must develop in tandem: developers need consistent long-term plans, and boroughs need the assurance that facilities are available to process any food waste that they collect.

Long-term direction and security are, therefore, key to decision making and delivery. If boroughs are to meet their targets – zero biodegradable waste going to landfill; all London waste to be managed within London's boundaries – then policy makers need to make wise strategic decisions to create the right amount and mix of infrastructure.

The needs of local authorities and the waste industry are not always aligned. Boroughs may hesitate to instigate new food waste collections because of a lack of treatment facilities;⁵² investors may hesitate to commit to developing such plants because the economic case for them is shaky. There can also be uncertainty over how successful waste prevention measures will be – a greatly reduced waste stream could result in lower revenues for the industry,

The London Borough of Bexley believes that: *“there is often a ‘chicken and egg’ stalemate in regards to new processes. The waste industry will not build a plant unless a material stream is collected and waste authorities will not collect unless there is a plant to process it. They will also be nervous of newer less proven technology.”*

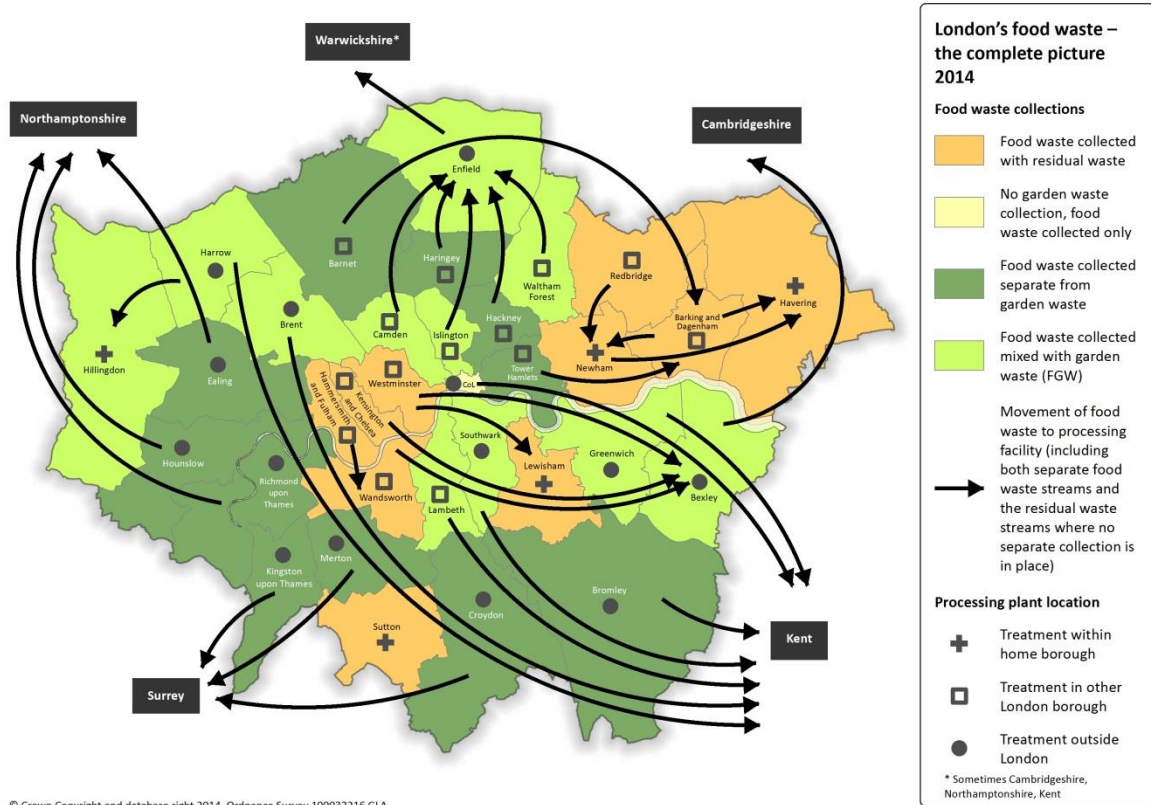
There is a perception within the waste industry that London is a complicated place to do business. Markets for compost and digestate (which is mostly animal feed) are more limited than in rural areas, and can be further from the treatment plant. Because local authorities typically focus on short procurement terms, developers are unlikely to be able to offer competitive prices, let alone unlock sources of funding. Potential funders will also want some guarantee that facilities will produce a decent amount of good-quality feedstock.

Stakeholders within the waste industry are calling for greater leadership and more coordinated policies.⁵³ Producers and consumers, investors and managers, have been reported to be *“crying out for some time now for greater ambition, consistency and coordination on waste [and] resource policy”*.

There is clearly a need for a greater exchange of knowledge and understanding of need and demand, both between authorities and between the public and private sectors. Bexley has suggested, as an initial practical step, that groups of authorities should consider committing to an organic collection scheme and tendering collectively for a new shared treatment facility.

More widely, both sides would benefit from a stronger brokerage role taken up by LWARB. LWARB could expand and supplement its current role in funding and supporting the development of waste infrastructure in and near London. All those involved in strategic planning for, and investment in, waste treatment facilities would have a single point of reference for information, advice and support.

Map 8: London's food waste – the complete picture



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Recommendation 11

LWARB should expand its brokerage role to promote mutual interests between London's waste authorities and the waste industry. This could include hosting or facilitating a regular "forum of exchange", providing technical expertise where needed, or assisting with developing suitable business models.

Appendix 1 Recommendations

Recommendation 1

Following the final local government finance settlement for 2015/16, every London borough should allocate available resources to include separate food waste collections in their waste management regimes, across all property types.

Recommendation 2

The London Waste and Recycling Board (LWARB), in partnership with the GLA, Boroughs and the Waste and Resources Action Programme (WRAP) should improve data collection on food waste so that better projections of need and demand can be made, and the impact of food waste on London's overall recycling and landfill targets can be assessed. Annual food waste recycling statistics for local authorities should be made available on the London Data Store.

Recommendation 3

The Mayor should join London Councils in its efforts to secure additional resources from the Government to develop separate food and organic waste collection services.

Recommendation 4

Alongside government funding the Mayor should make available from his own resources ongoing funding for waste reduction and recycling programmes such as the Waste and Resources Action Programme (WRAP) or Recycle for London.

Should the London Waste and Recycling Board's (LWARB) self-financing capabilities not be sufficiently achieved, the Mayor should make a long-term commitment to protect LWARB's budget, thereby enabling LWARB to continue its programmes to support boroughs and successfully embed food waste recycling in their waste management strategies. This could be achieved, for example, by including funding for LWARB in the GLA budget plans through to 2018/19, or by entering into contracts with LWARB for funding in return for delivery.

Recommendation 5

In line with the London Finance Commission's calls that London government should be allowed to make additional self-determined investments in its own infrastructure, the Mayor should lobby the Government for the devolution of landfill tax to London.

Recommendation 6

Boroughs should consider introducing specific measures and incentives to increase resident participation in separate food waste recycling collections, particularly in flats and estates, thereby reducing the amount of food waste in the residual waste stream.

Recommendation 7

The Mayor should work with LWARB and London Councils to introduce mechanisms for a consistent, London-wide approach to communication about food waste by April 2016. Collaboration with networks like the Association of London Cleansing Officers (ALCO) or

the London Recycling Officers Group (LROG) as well as specialist organisations like the Waste and Resources Action Programme (WRAP) and Keep Britain Tidy would be beneficial.

Boroughs should consider extending and diversifying their communication and engagement approach to inform residents more successfully about food waste recycling, for example, by:

- ensuring a recurring scheme of promotion including circulating correspondence to new residents;
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Design for housing development should enable waste minimisation and separation: For new housing developments, the Mayor and Boroughs should use their planning and housing investment powers to 'design out waste', for example by prioritising funding for schemes that meet the highest levels of waste minimisation, and by promoting best practice for separating and recycling food waste. The proposed 2015 review of the Mayor's Housing Supplementary Planning Guidance should consider these ideas and also make particular reference to the requirements for food waste separation and storage. For existing housing developments, the Mayor and LWARB should provide additional financial and technical support to waste collection authorities and community groups to retrofit alternative waste solutions, such as composting schemes or the removal of single stream waste chutes.

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In developing future asset management strategies, the Mayor should consider how he can utilise GLA land holdings to enable waste infrastructure and sustainable development, providing small and commercial-scale anaerobic digestion plants on these sites.

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Recommendation 11

LWARB should expand its brokerage role to promote mutual interests between London's waste authorities and the waste industry. This could include hosting or facilitating a regular "forum of exchange", providing technical expertise where needed, or assisting with developing suitable business models.

Appendix 2 Glossary

Anaerobic Digestion (AD) – a process by which microorganisms break down organic matter, in the absence of oxygen, into biogas (a mixture of carbon dioxide (CO₂) and methane) and digestate (a nitrogen-rich fertiliser). The biogas can be used directly for heat or Combined Heat and Power (CHP), or kept as fuel. This has long been used in the treatment of sewage and farm slurries and is now also being used for food waste.

Bio-waste includes garden and park waste, and food and kitchen waste from households and commercial premises. It should not be confused with the wider term biodegradable waste which also includes other organic materials such as wood, paper, cardboard or sewage sludge.

CO₂ equivalent (CO₂e) – a measure of the warming effect of mixtures of greenhouse gases, expressed as a standard concentration of CO₂.

Digestate – a nutrient-rich substance produced by anaerobic digestion that can be used as a fertiliser. It can be used straight from the digester, in which case it is called whole digestate. Alternatively it can be separated into liquor and fibre. Digestate is not compost, although it has some similar characteristics. Compost is produced by aerobic micro-organisms, meaning they require oxygen from the air.

Energy from Waste (EfW) – the process of recovering the energy embedded in material through a variety of processes. Traditionally this has meant incineration incinerate unsorted household and similar waste that remains after waste prevention and recycling to generate energy in the form of steam, electricity or hot water, but has expanded to include anaerobic digestion (AD), mechanical and biological treatment (MBT) and a variety of other processes.

Greenhouse Gas (GHG) – in the atmosphere, GHGs such as CO₂ trap sunlight as heat, thus contributing to the greenhouse effect which keeps the Earth's surface warmer than it would otherwise be.

In-vessel composting (IVC) can compost organic waste such as meat and fish as well as other food and garden waste which is loaded into vessels (tunnels).

Mechanical and Biological Treatment (MBT) uses a combination of mechanical and biological processes to separate and transform the residual waste into several outputs. Some of these are then recovered or recycled, but a fraction will still go to landfill.

Municipal waste is everyday waste from households and can also include other waste which, because of its nature or composition, is similar to waste from households.

Recovery of waste means obtaining value through recycling, composting, anaerobic digestion (AD), mechanical-biological treatment (MBT) or energy-from-waste production (EfW).

Residual waste – the remainder of collection after recycling or food waste has been removed.

Waste and Resources Action Programme (WRAP) – the government’s main delivery body which works to reduce waste, increase recycling and develop markets for recycled and recovered products and materials.

Windrow composting is used for processing garden waste, such as grass cuttings, pruning and leaves (excluding catering and animal waste) in an open air environment or within where the material can break down in the presence of oxygen. This is similar to home composting but on a larger scale.

Appendix 3 Orders and translations

How to order

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Chinese

如您需要这份文件的简介的翻译本，
请电话联系我们或按上面所提供的邮寄地址或
Email 与我们联系。

Vietnamese

Nếu ông (bà) muốn nội dung văn bản này được dịch sang
tiếng Việt, xin vui lòng liên hệ với chúng tôi bằng điện
thoại, thư hoặc thư điện tử theo địa chỉ ở trên.

Greek

*Εάν επιθυμείτε περίληψη αυτού του κειμένου στην γλώσσα
σας, παρακαλώ καλέστε τον αριθμό ή επικοινωνήστε μαζί
μας στην ανωτέρω ταχυδρομική ή την ηλεκτρονική διεύθυνση.*

Turkish

Bu belgenin kendi dilinize çevrilmiş bir özetini
okumak isterseniz, lütfen yukarıdaki telefon
numarasını arayın, veya posta ya da e-posta
adresi aracılığıyla bizimle temasa geçin.

Punjabi

ਜੇ ਤੁਸੀਂ ਇਸ ਦਸਤਾਵੇਜ਼ ਦਾ ਸੰਖੇਪ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਲੈਣਾ
ਚਾਹੋ, ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਇਸ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ
ਉਪਰ ਦਿੱਤੇ ਡਾਕ ਜਾਂ ਈਮੇਲ ਪਤੇ 'ਤੇ ਸਾਨੂੰ ਸੰਪਰਕ ਕਰੋ।

Hindi

यदि आपको इस दस्तावेज का सारांश अपनी भाषा में
चाहिए तो उपर दिये हुए नंबर पर फोन करें या उपर दिये
गये डाक पते या ई मेल पते पर हम से संपर्क करें।

Bengali

আপনি যদি এই দলিলের একটা সারাংশ নিজের ভাষায় পেতে চান,
তাহলে দয়া করে ফো করবেন অথবা উল্লেখিত ডাক ঠিকানায় বা
ই-মেইল ঠিকানায় আমাদের সাথে যোগাযোগ করবেন।

Urdu

اگر آپ کو اس دستاویز کا خلاصہ اپنی زبان میں
درکار ہو تو، براہ کرم نمبر پر فون کریں
یا مذکورہ بالا ڈاک کے پتے یا ای میل
پتے پر ہم سے رابطہ کریں۔

Arabic

الوصول على ملخص لهذا المستند بلغتك،
فارجاء الاتصال برقم الهاتف أو الاتصال على
العنوان البريدي العادي أو عنوان البريدي
الالكتروني أعلاه.

Gujarati

જો તમારે આ દસ્તાવેજનો સાર તમારી ભાષામાં
જોઈતો હોય તો ઉપર આપેલ નંબર પર ફોન કરો
અથવા ઉપર આપેલ ટપાલ અથવા ઈ-મેઇલ સરનામા
પર અમારો સંપર્ક કરો.

Appendix 4 Endnotes

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- ¹ [WRAP \(2013\): Household Food and Drink Waste in the United Kingdom 2012. Final Report](#)
 - ² [United Nations Food and Agriculture Organization \(FAO\) \(2013\): Food wastage footprint. Impacts on natural resources. Summary Report](#)
 - ³ [European Commission – Moving towards a circular economy](#)
 - ⁴ [Edie.net website \(2014\): European Commission scraps Circular Economy Package, 'more ambitious' proposal awaits](#)
 - ⁵ [Defra \(2011\): Government Review of Waste Policy in England 2011. Action Plan](#)
 - ⁶ [London Councils \(2013\): Waste management in London - Key challenges](#)
 - ⁷ [WRAP \(2013\): West London food waste campaign](#)
 - ⁸ What are greenhouse gas conversion factors? In order to report the greenhouse gas emissions associated with an organisation's activities, users must convert 'activity data' such as distance travelled, litres of fuel used or tonnes of waste disposed into carbon emissions.
 - ⁹ [London Datastore - Household waste recycling rates 2004-2014](#)
 - ¹⁰ [EEA \(2013\): MSW Management in the UK](#)
 - ¹¹ *ibid*
 - ¹² [London Waste Map – London's municipal waste management arrangements](#)
 - ¹³ [Sita/Keep Britain Tidy \(2014\): The Ur\[bin\] Issue](#); with [Background report by BritainThinks](#)
 - ¹⁴ [ESA \(2014\): Biowaste in a Circular Economy](#)
 - ¹⁵ [Defra \(2012\): 'Progress Report' on the delivery of commitments from the Government's 'Review of Waste Policy in England'](#)
 - ¹⁶ [Letter to stakeholders from Dan Rogerson Parliamentary Under Secretary for Water, Forestry, Rural Affairs and Resource Management, Defra, 6 November 2013](#)
 - ¹⁷ [House of Lords European Union Committee \(2014\): Counting the Cost of Food Waste: EU Food Waste Prevention](#)
 - ¹⁸ [Defra \(2010\): Enhancing participation in kitchen waste collections: International review of overseas experience](#); Submission from London Borough of Wandsworth
 - ¹⁹ [Waste Management World website \(no date\): The biowaste directive](#)
 - ²⁰ [Enhancing participation in kitchen waste collection. Defra Waste & Resources Evidence programme WR 2009 – Final Project Report](#)
 - ²¹ [LGA \(2013\): Wealth from waste](#)
 - ²² [House of Commons Environment, Food and Rural Affairs Committee \(2014\): Waste management in England](#)
 - ²³ [London Councils \(2013\): Waste management in London - Key challenges](#)
 - ²⁴ Submission from London Councils; [Sita/Keep Britain Tidy \(2014\): The Ur\[bin\] Issue](#)
 - ²⁵ [WRAP \(2009\): Evaluation of separate food waste collections](#)
 - ²⁶ [WRAP \(2008\): The food we waste](#)
 - ²⁷ [Environment Committee meeting, July 2014](#)
 - ²⁸ *ibid*
 - ²⁹ [Sita/Keep Britain Tidy \(2014\): The Ur\[bin\] Issue](#); with [Background report by BritainThinks](#)

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- ³⁰ Research undertaken by Defra between 2006 and 2009; [Sita/Keep Britain Tidy \(2014\): The Ur\[bin\] Issue](#)
- ³¹ [Enhancing participation in kitchen waste collection. Defra Waste & Resources Evidence programme WR 2009 – Final Project Report](#)
- ³² [EEA \(2013\): MSW Management in the UK](#)
- ³³ [London Borough of Bexley website \(no date\): green points scheme](#)
- ³⁴ [Defra \(2010\): Enhancing participation in kitchen waste collections: International review of overseas experience](#)
- ³⁵ [Sita/Keep Britain Tidy \(2014\): The Ur\[bin\] Issue](#)
- ³⁶ A range of sources, for example [Wrap \(2013\): Impact of the West London LFHW campaign](#) or [Enhancing participation in kitchen waste collection. Defra Waste & Resources Evidence programme WR 2009 – Final Project Report](#)
- ³⁷ [London SE1 Community website \(2014\): Bermondsey primary school pupils learn to recycle food waste](#)
- ³⁸ [London Borough of Merton website \(2014\): Food waste collection for every school in the borough](#)
- ³⁹ [LinkedIn website \(no date\): Food waste collection in Milan; Presentation from Dr Marco Ricci, Environment Committee meeting, July 2014](#)
- ⁴⁰ [Brent Council \(2009\): Increasing participation in Recycling in Flats](#)
- ⁴¹ [Enhancing participation in kitchen waste collection. Defra Waste & Resources Evidence programme WR 2009 – Final Project Report](#)
- ⁴² [Sita/Keep Britain Tidy \(2014\): The Ur\[bin\] Issue](#)
- ⁴³ [Association of Directors of Environment, Economy, Planning and Transport \(ADEPT\) \(2010\): Making Space For Waste](#)
- ⁴⁴ [Resource efficient business website \(2014\): New bio-thermic digester technology could help eliminate organic waste to landfill](#)
- ⁴⁵ [CIWEM Policy Position Statement on Food Waste Disposers](#)
- ⁴⁶ [Brent Council \(2009\): Increasing participation in Recycling in Flats; Wrap – Flats chute recycling schemes](#)
- ⁴⁷ [LWARB \(2013\): Evaluation Report Flats recycling programme](#)
- ⁴⁸ [Imperial College London \(2014\): Waste Infrastructure Requirements for England](#)
- ⁴⁹ [Sita \(2014\): Mind the Gap. UK residual waste infrastructure capacity requirements, 2015 to 2025](#)
- ⁵⁰ [Thames Water Utilities Ltd \(2008\): Consultation on Thames Water’s Draft Strategic Proposals for Sludge Management](#)
- ⁵¹ [Office of Fair Trading \(2011\): Organic waste. An OFT market study](#)
- ⁵² [Defra \(2010\): Enhancing participation in kitchen waste collections – Technical report](#)
- ⁵³ [House of Commons Environment, Food and Rural Affairs Committee \(2014\): Waste management in England; BusinessGreen website \(2014\): MPs slam Defra’s decision to bin waste management policies](#)