



**Friends of  
the Earth**

# Briefing

## Food waste collections

There is an untapped energy source in your bin, which mostly ends up rotting in landfill and releasing climate change gases. We could be producing renewable electricity with our food waste, but instead we landfill 78 per cent of it - nearly ten million tonnes each year from households and trade. On top of that, we incinerate 13.5 per cent - 1.6 million tonnes each year.<sup>1</sup>

We should be separating this waste for composting or anaerobic digestion (AD), which produces renewable energy. If just 5.5 million tonnes of food waste was treated by AD we could generate between 477 and 761 GWh of electricity each year – enough to meet the needs of up to 164,000 households.<sup>2</sup> But at the moment we only compost 5 per cent of the UK's food waste and AD 0.4 per cent.

Separate food waste collections also offer the biggest potential for improving recycling rates, meeting targets for reducing how much we landfill and reducing the pressure for new incinerators.

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## **The problem with food waste**

In the UK we produce 31 million tonnes of household waste each year. Food waste makes up about 20 per cent of this,<sup>3</sup> or around 6.7 million tonnes;<sup>4</sup> accounting for around a third of all of the food we buy.<sup>5</sup> About half the food we throw away is edible and the rest is tea bags, peelings, meat bones etc.

The food supply chain accounts for around a fifth of the UK's greenhouse gas emissions. Throwing food away means that we waste all the climate change gases generated as it was produced, processed, transported and stored. If we stopped chucking away edible food we would save carbon dioxide (CO<sub>2</sub>) emissions equivalent to taking an estimated 1 in 5 cars off the road.

On top of the environmental costs, we pay a financial price for this waste. Households throw away between £250 and £400 of potentially edible food each year. This adds up to £15,000-£24,000 over a lifetime. We also pay to dispose of this food through our council tax.

Clearly, we need to do more to avoid this food waste. Easy steps we can take include avoiding buying too much food, using a shopping list, making sure our fridges are at a low enough temperature so food doesn't go off too quickly and making sure we eat food before it reaches its 'use by' date. More ideas can be found in the leaflet 'Simple Tips for Reducing Food Waste at Home' available at [http://www.wrap.org.uk/retail/food\\_waste/index.html](http://www.wrap.org.uk/retail/food_waste/index.html).

But even with prevention measures, we will continue to generate food waste. This briefing describes how we can stop our food waste damaging the climate and instead use it to create renewable energy.

## **Landfill targets and biodegradable waste**

As well as food, we also throw away a lot of garden waste, or 'green waste'. This makes up about another fifth of our rubbish,<sup>6</sup> or 5.9 million tonnes per year.<sup>7</sup>

Similar amounts of food and garden wastes are created by the municipal sectors and the commercial and industrial sectors – together these sectors produce an estimated 25 million tonnes of food and garden waste a year in the UK.

As well as food and garden waste, paper, cardboard and natural textiles also break down biologically. This biodegradable waste makes up 60 per cent of our bins.

Disposal of biodegradable waste to landfill contributes to climate change through the release of methane, a powerful climate change gas. The European Landfill Directive therefore requires member states to progressively reduce the amount of biodegradable waste collected by local councils (called biodegradable municipal waste or BMW) which is landfilled.

By 2020 the amount of BMW sent to landfill must be reduced to 35 per cent of the amount produced in 1995. In the UK, the Landfill Allowance Trading Scheme (LATS) will penalise local authorities that exceed their given allowances for landfilling BMW.

In the face of LATS, some authorities are turning to what they hope might be 'quick fixes' to meet their allowances, such as incineration and large-scale biological treatment of household waste.

## The solution

There are more sustainable ways local authorities can choose to meet their LATS targets. Food and garden waste can be collected separately from households and treated aerobically (in the presence of oxygen) by composting or anaerobically (in the absence of oxygen) by anaerobic digestion.

These are the best treatments for food waste and other biodegradable waste in terms of climate change. AD has the advantage of also generating truly renewable power exclusively from the biomass portion of waste,<sup>8</sup> and it has been found to offer higher net carbon savings than composting by offsetting fossil energy generation.

Routing 5.5 million tonnes of food waste through AD rather than composting would save at least 0.25 million tonnes CO<sub>2</sub> equivalent each year, assuming the displaced source is gas-fired electricity generation.

Separate treatment of biodegradable waste is increasing rapidly - the amount of organic waste (food and green waste) being collected and composted in the UK rose from 1.97 million tonnes in 2003/04 to 2.67 million tonnes in 2004/05 - a growth of 35 per cent.<sup>9</sup>

Although most of this food and garden waste is presently collected together in the same bin, it is better environmentally and financially to collect food and garden waste separately.

Food waste is the biggest fraction of the domestic waste stream but only around 2 per cent of this fraction is separately collected and around 4 million tonnes of food waste went to landfill instead of a composting facility in 2004/05.<sup>9</sup> Therefore separate food waste collections provide the biggest potential for improving overall domestic recycling rates.

The new Waste Strategy for England was published in May 2007. It strongly supports collecting food waste for treatment by AD,<sup>10</sup> stating "AD has significant environmental benefits over other options for food waste" and therefore "the government wishes to encourage more consideration of the use of AD both by local authorities and businesses."

## Benefits of separate food waste collections

- Contributing to targets for diverting organic waste from landfill
- Reduction of environmental impacts associated with landfill (toxicity in leachate and methane production)
- Improved recycling rates
- Reduced waste disposal costs
- Reduced nuisance from rats, vermin and flies attracted to food left in residual waste
- Greater acceptance of fortnightly refuse collection
- Reduced pressure for new incinerators
- People are more likely to separate out their food waste compared to households offered a mixed food and garden waste collection

## Composting

Composting is biological decomposition under aerobic (open air) and thermophilic (at or above 70°C) conditions, which breaks down organic material to leave a humus rich residue, the compost. Compost is a valuable soil conditioner for agriculture, gardening and forestry.<sup>11</sup>

The cheapest way to treat separately collected garden waste is open air windrow composting. However, this method is not suitable for treating food waste due to the Animal By-Products Regulations (see box below).

Enclosed (or covered) windrow composting and in-vessel composting (IVC) are suitable for treating food waste.

When treating food waste by IVC, garden waste is normally mixed equally with the food (by weight) in order to provide the necessary structural material. This method has the disadvantage of being a significantly more expensive way to treat garden waste than windrow composting. Therefore it is better to treat food waste by AD and avoid the need to divert garden waste from cheaper windrow treatment.

### Animal By-Products Regulations (ABPR)

The Animal By-Product Regulations state that in order for compost made from food waste to be spread on the land, it must have been treated in an enclosed or under-cover facility, with minimum treatment times and temperatures and maximum particle size requirements, designed to ensure that pathogens are killed. This is in case it contains or has been in contact with contaminated meat products.

### Home composting

Home composting is at the top of the waste hierarchy for composting because it avoids the transport emissions associated with collecting this waste from households and uses the waste where it is generated with very little environmental impact. It also replaces artificial fertilisers and peat in the garden.

Before local authorities introduce separate food waste collection schemes, they should encourage households to home compost garden and food waste through schemes such as subsidised compost bins and should provide support and advice on composting. However, lots of areas have large numbers of people without gardens so it is also necessary to offer separate collections of food waste.

Many people who home compost don't want to compost left-over meat, fish or cooked food due to potential vermin problems, so a food waste collection system would still be worthwhile for them.

## Anaerobic digestion (AD)

AD is another method of processing biological wastes, generating methane which can be used to generate power and heat, and a soil improver which can be used to fertilise land. Using the soil improver also brings climate benefits through storing up some carbon in the soil.

As well as food waste, garden wastes and cardboard (which is of too low a grade to recycle, e.g. because of food contamination) can be treated by AD. However, it is preferable not to include too much garden waste in the mix, as a substance called lignin which is found in woody materials does not break down anaerobically.

Around 0.36 per cent of UK electricity generation could be generated in the UK by anaerobic digestion (AD) of source-separated household waste.<sup>12</sup> Even more could be generated with non-household waste streams, such as food waste from restaurants, cafés and retailers.

The methane from an AD plant can be burnt in a combined heat and power (CHP) plant, generating 100 per cent renewable heating and electricity. This reduces emissions of climate change gases by offsetting emissions from fossil fuelled power stations.<sup>13</sup> Furthermore, AD as a waste disposal technique powers itself, for example studies on the treatment of sewage waste have suggested a 16 per cent reduction in CO<sub>2</sub> emissions from using AD, in comparison to conventional sewage treatment techniques.<sup>14</sup>

Such AD/CHP plants would be well suited for use in distributed generation schemes, where power and heat are generated more locally than in our current electricity supply system. Plants can be small and low rise so may be situated in towns, reducing haulage distances and associated traffic pollutants. They are likely to be more acceptable to local communities than larger waste management facilities.

AD is widely used across Europe - Denmark has a number of farm co-operative AD plants which produce electricity and district heating for local villages, biogas plants have been built in Sweden to produce vehicle fuel for fleets of town buses and Germany and Austria have several thousand on-farm digesters treating mixtures of manure, energy crops and restaurant waste, with the biogas used to produce electricity.<sup>15</sup>

AD can also be used to stabilise mixed waste after the removal of recyclable materials, but the resulting solid and liquid digestates will be of lower quality and may not be suitable for use as soil enhancers.

## Case studies

### **Greenfinch's South Shropshire Biowaste Digester**

Greenfinch Ltd designed and installed an AD plant in South Shropshire in partnership with the South Shropshire District Council (SSDC), the first of its kind in the UK. It was constructed under Defra's New Technologies Demonstrator Programme, which aims to demonstrate the viability of new treatment processes, and its success will hopefully encourage the construction of further plants. It can be visited by anyone interested in finding out more.

It has a capacity of 5000 tonnes each year at a cost of between £40 and £50 per tonne.<sup>16</sup> The biogas - mostly made up of methane - is being converted into electricity and 800,000

kilowatts per hour is being used to heat the plant. The pasteurised bio-fertiliser is offered to local farmers. It is estimated that the plant could produce 4,320 tonnes of biofertiliser and 880 tonnes of biogas each year.

The plant began full operation in the first quarter of 2006 and initially processed source-separated kitchen waste and garden waste collected from households in South Shropshire. It was found that the alternate week co-collection of food waste and garden waste resulted in low capture of food waste, with a lot of food waste still ending up in rubbish bins. This meant that there was too much garden waste in the feedstock mix and the plant was not producing the optimum amount of biogas.

The plant now processes less green waste and mostly food waste. SSDC have been running a trial weekly food waste collection service for Ludlow residents and food waste is also being collected from local businesses and schools. The electricity generated from the Biodigester will be used to recharge the batteries on the specialised electric powered collection vehicle.

Garden waste is being collected separately in green wheelie bins and composted rather than processed by AD.

More information can be found at <http://www.greenfinch.co.uk/ludlow.html> and in the briefing on AD at [http://www.foe.co.uk/resource/briefings/anaerobic\\_digestion.pdf](http://www.foe.co.uk/resource/briefings/anaerobic_digestion.pdf)

### **Uttlesford District Council**

Uttlesford District Council is a mainly rural authority in north west Essex. Before the food waste scheme was introduced, rubbish was collected weekly in sacks and recycling was collected in black and green boxes.

45 per cent of household waste was found to be putrescible so the council decided to introduce a weekly food waste collection, collected in a 140 litre wheeled bin. Kitchen caddies were provided and a separate chargeable garden waste service was introduced. At the same time refuse and recycling collections became fortnightly. These were also collected in wheeled bins, on the same day as the food waste. A recycling hotline was launched before the scheme was rolled out to 26,000 households between June and October 2006.

The food waste collection was projected to cost £13 per household per annum, on top of £48 for the refuse and recycling service. Between January 2006 and January 2007, the recycling rate increased from 22.5 per cent to 56.8 per cent, waste to landfill reduced by 50 per cent and total waste arisings reduced by 10.3 per cent.

### **Bristol City Council**

Bristol was the UK's first city to offer food waste to all residents. The council rolled out food waste collections in two phases in 2006 to 150,000 households, providing a kitchen caddy and a 25 litre brown bin for food. At the same time, it introduced a weekly collection of card, a paid-for green waste service and fortnightly residual waste collections. A black box recycling service collects paper, glass, cans, foil, textiles, batteries and aerosols. In the first year after the scheme was introduced the recycling rate increased from 18 per cent to 37 per cent.

The green waste, card and food waste are currently processed at New Earth Solutions' in-

vessel composting facility at Wimbourne in Dorset. Bristol City Council is hoping to treat more food waste more locally by developing a plant in or near Bristol to process material in future.

### **Preston City Council**

Preston City Council began a weekly food waste pilot scheme in May 2005 which targeted 7,500 households. Each house was given a seven litre kitchen caddy, two rolls of corn starch liner bags and a 25 litre outside container.

Many residents are from minority ethnic backgrounds and there is a mix of privately owned and rented property, all within inner city wards and without gardens.

The council worked closely with the public, who helped the authority make the decisions about aspects including container size and style.

Recycling officers carried out door-stepping to promote the new scheme and engaged with local religious leaders to include Muslim and Hindu communities in the service. All residents received simple and largely pictorial communication materials. Key points were presented in Gujarati and Urdu, two major community languages as well as in English.

As a result, rates of contamination in the food waste rapidly dropped from 40 per cent to 10 per cent within days of starting the scheme. Since the start of 2006 the rate of rejection due to contamination has been almost zero. Experience in other areas suggests initial contamination would have been lower had doorstepping taken place before the new system was introduced.

The food waste is taken to a new in-vessel composting plant situated locally at Preston. There it is mixed with wood chippings from furniture waste and turned into compost. The compost is used in many ways, including by the local authorities' parks department, by schools and it is also used for local planting activities.

Valuable information continues to be gained from householders through door-stepping and regular surveys. The collections have made residents realise how much food they waste, changing the way they consume and purchase food.

460 tonnes of food waste has been collected and composted each year. The council is now considering extending the food waste recycling scheme to all properties across the city without a garden - around 15,000 in total.

## **Conclusion**

The Government and local councils are starting to appreciate the huge benefits that food waste collections and anaerobic digestion can offer. As the case studies above show, recycling rates can increase dramatically when separate food waste collections accompany the introduction of fortnightly collections of residual waste. This means landfill targets are easier to meet and our waste has less impact on the climate.

If you would like to contact your council about this issue, please see the action guide at [http://www.foe.co.uk/resource/action\\_guides/food\\_waste.doc](http://www.foe.co.uk/resource/action_guides/food_waste.doc).

## Further information

### **Anaerobic Digestion**

[http://www.foe.co.uk/resource/briefings/anaerobic\\_digestion.pdf](http://www.foe.co.uk/resource/briefings/anaerobic_digestion.pdf)

### **Recycling – why its important and how to do it**

<http://www.foe.co.uk/resource/briefings/recycling.pdf>

### **Information from WRAP**

WRAP has commissioned a lot of research on food waste – some examples are listed below, and they are all available on the WRAP website at:

[http://www.wrap.org.uk/local\\_authorities/biowaste.html](http://www.wrap.org.uk/local_authorities/biowaste.html)

### **Understanding Food Waste - Research Summary**

Key findings of recent research on the nature, scale and causes of household food waste.

### **Sustainable ways of dealing with household food and garden waste in the UK**

A summary of the major findings from the studies on Dealing with Food Waste in the UK and Managing Biowastes from Households in the UK. It indicates the conclusions WRAP draws from the research.

### **Dealing with Food Waste in the UK**

This report shows that there can be real cost and environmental gains from collecting garden and food waste separately from each other. This enables processing costs to be minimized and can increase the amount of food collected. In terms of environmental impact, anaerobic digestion of food waste in particular performs best. There is clear evidence that to achieve the lowest financial and environmental costs, decision makers need to take a whole system approach, which considers options for treatment together with those for collection systems.

### **Managing Biowastes from Households in the UK: Applying Life-cycle Thinking in the Framework of Cost-benefit Analysis**

This report provides further details on the cost-benefit analysis for dealing with food and garden waste and shows how cost-benefit analysis can help inform decision making.

### **Carbon Balances and Energy Impacts of the Management of UK Waste Streams**

This report describes a macro-level investigation of the source and scale of energy and greenhouse gas benefits and impacts associated with the management of waste streams arising in the UK.

### **Useful websites:**

Composting Association <http://www.compost.org.uk/>

Somerset Waste Partnership <http://www.recyclesomerset.info>

Greenfinch <http://www.greenfinch.co.uk/>

Tips for reducing food waste at home and other information on food waste can be found at [http://www.wrap.org.uk/retail/food\\_waste/index.html](http://www.wrap.org.uk/retail/food_waste/index.html)

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