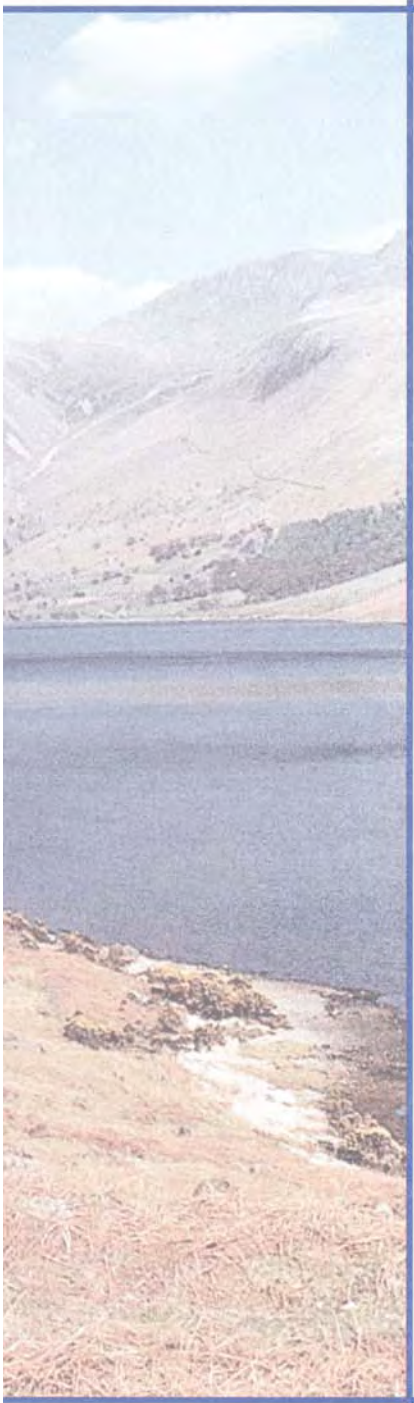
Green Cone Food Waste Digesters



Cost Benefit Appraisal

September 2006

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CONTENTS

FOREWORD

SLR Consulting Limited (SLR) is a wholly independent international environmental consultant, employing some 230 full-time specialist technical staff from a wide range of disciplines. Currently over 150 staff are fully employed on waste management related projects and SLR can therefore call upon the largest team of waste management experts in the UK. Undertaking projects throughout Europe and further afield, recent clients who have commissioned SLR's waste management services include national governments, government departments, international lending agencies, the European Union, local authorities throughout the UK, small to medium sized enterprises and major private sector waste management companies.

When seeking a review of its food waste digestor (FWD) product, Green Cone decided to commission SLR in recognition of the Company's independence and extensive waste management knowledge and expertise. The findings of our review have not been influenced or compromised in any way.

1.0 EXECUTIVE SUMMARY

The Landfill Directive introduced limits on the tonnage of biodegradable municipal waste (BMW) that can be disposed to landfill to reduce greenhouse gas emissions and climate change. Local Authorities in the UK have landfill allowance scheme targets to meet concerning the maximum amount of BMW that can be disposed to landfill. Local Authorities who exceed their target may be financially penalised. In England 17% of the average household's waste is biodegradable food. As a result many Authorities see the provision of separate collection and centralised treatment of organic kitchen waste, often in combination with garden waste, as the solution to avoiding these penalties.

For a significant proportion of households in many Local Authority areas an alternative method of disposing of kitchen waste is available in the form of home Food Waste Digesters (FWDs). FWDs utilise accelerated decomposition processes in an enclosed vessel very similar in appearance to modern plastic garden waste composters. The use of FWDs avoids the need to collect and process organic food waste and, by taking the wastes most likely to produce odour and attract vermin to household waste bins, can facilitate a reduction in the frequency of collection of residual wastes.

FWDs need to be designed to operate efficiently in the UK climate and eliminate the associated problems as far as practicable. One FWD already widely used in the UK is the 'Green Cone' which enhances biodegradation by using solar energy to create air circulation and warming. Air circulation minimises the production of methane by the processes.

For a relatively small Authority with 50,000 properties, 60% with suitable gardens, with a conservative 17% uptake and use, after incurring an initial capital expenditure of £204,000 on Green Cones, the Authority could save £48,950 per annum on disposal costs. The pay back period is therefore approximately four years. This should be seen as a conservative estimate given that potential variable cost savings such as the collection costs have been ignored. The variable savings may be significant in rural areas especially if the use of Green Cones facilitates the introduction of alternate weekly collections for residual waste. It should be noted of course, that uptake and use of such systems will be very dependant upon marketing and education of householders.

There are factors that limit the potential uptake of FWDs but despite these there is potential for significant cost savings and environmental benefits through the introduction of such systems. Cost benefit analysis, based on conservative assumptions, demonstrates that over the lifetime of FWDs, significant savings can be achieved by Local Authorities, far outstripping the initial capital cost of the units.

2.0 INTRODUCTION

Current changes in the way household waste is being managed are being driven by a need to move away from the use of landfill for waste disposal. Biodegradation of waste in landfill produces landfill gas containing methane which is 21 times more damaging as a greenhouse gas than carbon dioxide. While much landfill gas is now collected and combusted, that which escapes is one of the four main greenhouse gases. The Earth's temperature is increasing due to the emission of greenhouse gases, causing climate change. Reducing biodegradable waste disposal to landfill will help reduce global warming and climate change.

The European Union has sought to limit the quantity of biodegradable municipal waste (BMW) disposal to landfill through the Landfill Directive. One of the key objectives of the Directive is to limit the effects of landfill on global warming and climate change. The Landfill Directive has requirements to reduce BMW disposed of to landfill, which for the UK (with a 4 year derogation) are to:

- 75% of 1995 tonnage by 2010
- 50% of 1995 tonnage by 2013
- 35 % of 1995 tonnage by 2020

UK governments have, over recent years, introduced a number of measures to help towards reducing the amount of biodegradable waste being disposed of to landfill, which include:

- The imposition of a landfill tax to address the problem that landfill has historically been the lowest priced waste disposal option in the UK.

- The introduction of statutory limits on the quantities of BMW that can be disposed of to landfill with penalties if these targets are not met (the Landfill Allowance Trading Scheme (LATS)).

- The introduction of a waste technology demonstrator programme to encourage new companies and technologies to treat waste as an alternative to landfilling.

In seeking to divert waste from landfill, the increase in landfill costs and the development of new alternative treatment technologies, with high capital or operating costs, have led to a significant increase in cost for waste treatment and disposal to Local Authorities.

Local Authority waste collection services from households are generally efficient and can handle almost any waste produced. The need to change the way we manage waste means there has been a focus on the composition of household waste.

On average biodegradable kitchen waste now makes up some 17% of the total household waste production in England, third only to garden waste at 20% and paper and card at 18%[1]. As much as 20% of the food we buy goes straight into the bin, without ever being cooked or put onto a plate[1],

Recycling of packaging waste is now a part of our way of life in the UK. Virtually all households now have access to recycling facilities either through kerbside collection services or 'bring' sites located at supermarkets, civic amenity sites or other accessible places. The development of these services has raised awareness by the public of the need to recycle but at the same time may also have created the impression that separation of

[1] Department for Environment , Food and Rural Affairs 14 September 2005, press release on the provisional figures based on Best Value Performance Indicators submitted by local Authorities for 2004/5

materials for collection is the only role they have in reducing the amount of waste that has to be disposed of.

Within Local Authority collection systems a momentum has built up behind the separate collection of glass, paper, card, cans for reprocessing. In now having to respond to government pressure to divert biodegradable waste from landfill most Local Authorities are looking at which of the remaining fractions in household waste could also be kept separate and sent for separate processing.

Garden and kitchen waste are the main biodegradable wastes left in the household waste stream and are potentially the 'big wins' if they can be diverted from landfill. Because of the way other recyclables have been handled it is perhaps natural that separate collection and processing are seen as the answer.

Garden and kitchen derived organic wastes can be converted into compost and soil improving materials, and some of the processes recover biogas which can be used for energy production. However, such schemes are based on an apparent assumption that collection and treatment are the only options for dealing with these wastes.

For some time, in a way similar to garden waste composting, an alternative has been available for food waste in the form of Food Waste Digesters (FWDs). One such FWD is the Green Cone which is similar to modern moulded plastic garden waste composters but has a double skin and lower 'basket' buried in the ground underneath. The purpose of FWDs is not to produce compost but to accelerate the natural decomposition of food waste to release the large proportion of water within the materials into the ground, giving off CO_2 and leaving behind a very much smaller quantity of residue which, because of its nature, would take many years to breakdown completely. The Green Cone FWD is designed to maintain air circulation keeping the biodegradation processes aerobic and thereby limit the amount of methane produced.

Storage and treatment of kitchen waste has the potential for the development of pathogens, odour and the encouragement of vermin etc. The presence of kitchen waste in the residual waste stream remains one of the main reasons why it is still collected once a week by many Authorities, but in the absence of these wastes there would be no reason why residual waste should not be collected less frequently. Clearly the collection of separated recyclables one week and residual wastes the next would have benefits both for collection services but also for households in terms of simplicity of what to leave at the kerbside and when. Concerns over alternate weekly collections of food waste can in part be overcome by the introduction of FWDs in areas with properties with gardens.

3.0 OPERATION OF FOOD WASTE DIGESTERS

FWDs offer an alternative means of disposing of kitchen derived organic wastes. Following the initial installation, operating them should be as easy for householders as putting waste for collection in a wheelie bin. With a FWD in the garden a small container kept in the kitchen can be emptied whenever necessary.

FWDs are not suitable for handling large amounts of garden waste and the addition of this type of material can have a detrimental effect on their operation.

Operated properly and with typical household derived input rates FWDs should only need residues to be emptied every 2-3 years.

Experience has shown that a key part of the success of FWDs is providing information to householders throughout the process of installation and subsequent operation. Very often problems can arise when householders encounter difficulties with operation due to their ignoring basic requirements. Simple instructions provided in a variety of formats helps to minimise the incidence of issues.

4.0 FWD DIVERSION RATES

While FWDs offer an alternative to the separate collection of kitchen derived organic wastes they are not suitable for every household and do not necessarily provide an ' Authority wide' alternative to kerbside collections of such materials. In order to quantify how much waste could be diverted by a household and from how many households, it is necessary to consider a number of key factors, including:

- How much of the average household waste production is suitable for disposal in a FWD
- How many households could practically accommodate a FWD; and
- How many households would be prepared to accommodate a FWD

Each of these issues is considered in more detail in the following sections.

5.0 HOUSEHOLD WASTE COMPOSITION

There have been a number of studies on the composition of the household waste stream. Questions have been raised over how accurate some calculations of the amount of kitchen waste in the household waste stream have been. These concerns are based on food waste having a high moisture content which may be readily transferred to other waste fractions such as paper and card when they mix in waste receptacles. If this has caused inaccuracy it would be to underestimate the amount of kitchen waste.

The Waste and Resources Action Programme (WRAP) has appointed consultants to carry out further surveys into the amount and composition of kitchen waste as part of work being undertaken to look at the reasons behind its production and therefore how it can be reduced. This work is set against the background of 5.2 million tonnes of household food waste being produced each year in the UK and as much as 20% of the food bought going straight into our bins[1]. By looking at the reasons behind the production of food waste, including the influence of supermarket policies such as 'buy one get one free' offers and short 'use by' dates, the work aims to come up with measures that halt the increase in the rate of production of these wastes.

One regular survey into the composition of household waste, that has been repeated over a number of years and that measures wastes before they mix in the bin, is that undertaken by the Open University (OU). Students of the OU carry out the survey measuring what makes up their own household waste[2]. Given the way the quantity of wastes are measured this survey serves as a good indication of the amount of biodegradable kitchen waste in the average household bin. In 2005 the figure was 17.6%, which equated to around 3.7kg/household/week.

As a comparison the provisional 2005 figures published by Defra[1] based on audited Best Value Performance Indicators submitted by Local Authorities give a figure of 17% for the average amount of kitchen waste in the household waste stream. Again using Defra figures in 2003/4 the average household in England produced 23.1 kg of waste each week[3]. Household waste production rates rose by 1.2% between 2003/4 and 2004/5[4] so the average household production for 2004/5 would be around 23.4kg. Assuming 17%[1] of the total is kitchen waste this would give figures of just under 4 kg/hh/week or 206kg/hh/year. This is therefore a comparable figure to that obtained by the OU.

A summary of data from other kitchen waste arising surveys is given in Table 1. A summary of data from surveys of kitchen waste arisings undertaken as part of Green Cone FWD trials in a number of Local Authority areas has produced more variable figures which are shown in Table 2 overleaf.

Table 1: Summary of Data from Surveys of Kitchen Waste Arisings

Survey area	Kitchen waste generation per

[2] 2005, Open University, Open University Household Waste Arisings Study: Key findings from 2005
[3] 2005, Defra, Municipal Waste Management survey 2003/4
[4] 2006, National statistics Ref 125/06, Municipal Waste Management statistics 2004/5

	household per year (kg/hh/wk)
England[5]	194 (3.7)
Wales[5]	211 (4.1)
Burford[5]	177 (3.4)
University of Leeds[5]	182 (3.5)
Average	**191 (3.7)**

Table 2: Summary of Data from Green Cone FWD Trials

Trial Area	Kitchen waste generation per household per year (kg/hh/wk)
Dorset[6]	204 (3.9)
West Sussex[6]	185 (3.5)
Moray[7]	151 (2.9)
Average	**180 (3.4)**

The average figure based on the averages from Tables 1 and 2 above is 3.7 kg/hh/week or 192kg/hh/yr. The range is 2.9 kg/hh/week to 4.1 kg/hh/week (151 to 211 kg/hh/year).

The amounts of kitchen waste produced are likely to vary seasonally but not to the same extent as they do for garden waste. There are also some peak production times such as Christmas.

In a Local Authority with 50,000 households, based on the average rates above, the kitchen waste produced by all of the households would be 185 tonnes per week (3.7 kg/hh/week) or 9,600 tonnes per year. In an Authority serving 250,000 households the annual figure would be 48,000 tonnes.

Clearly the amount of this potential total that FWDs could keep out of the household waste stream is limited by the practical limitations on their siting and potential resistance to their use from householders. These practical requirements rule out households without gardens but there still remains a significant potential for their use. To a large extent their uptake is dependant on the will of local authorities to encourage their use and on the willingness of householders to accept and to use them.

[5] 2002 Gale Risk Assessment ; Use of Compostiing and Biogas Treatment to Dispose of Catering Waste Containing Meat
[6] 2005 Gysin, Household Treatment of Food Waste in Dorset, report for Dorset County Council
[7] Undated, Green Cone Limited, Summarised findings of Independent Consultants Reports

6.0 LOCATION LIMITATIONS

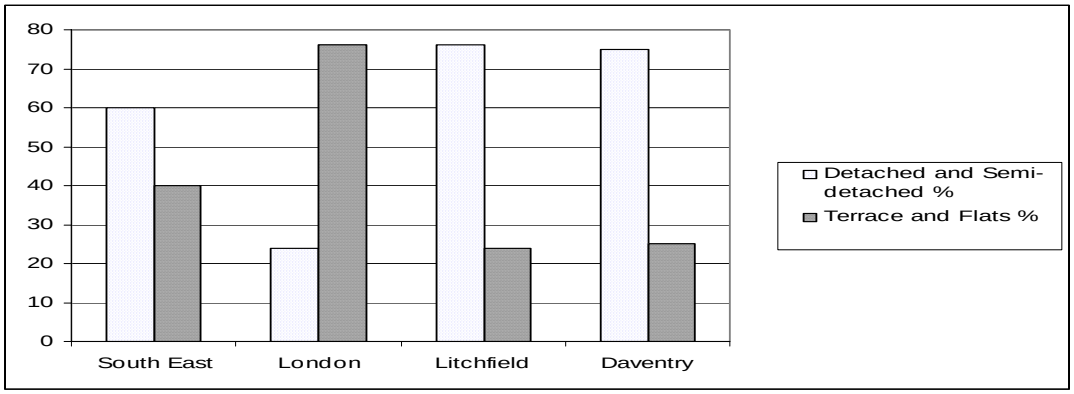
6.1 Maximum possible uptake

The key restriction on the use of FWDs is the need for a suitable location. They have to be located outside in a position where a small pit can be dug into the ground to accommodate the lower 'basket' section. The ground should be free draining, not prone to flooding, ideally in a sunny position although a semi-shaded area should still be adequate.

The actual number of households which could accommodate a FWD is dependant on the physical constraint of needing a garden. Data on the mix of housing types within areas usually breaks it down into detached, semi-detached, terrace and flats. It is reasonable to assume that generally detached and semi-detached houses will have gardens and flats will not. Terrace housing is slightly more problematical in that in some areas it can have gardens and in others not. For the purpose of this analysis it has been assumed that they do not.

Figure 1 below shows the average mix between detached and semi-detached housing against terrace housing and flats for four areas. For the south-east region of England where there is a mix of urban and rural areas the mix is 60% houses that would be likely to have suitable gardens against 40% that would not. For comparison the figures for London are 24% with gardens and 76% without, which would be expected to be typical for other major urban areas. Obviously there will be local variations within any area. The other extreme of the mix of housing would be the rural areas of parts of England and much of Scotland and Wales. In these areas the ratio is even higher than that shown by Litchfield and Daventry as indicated in Figure 1 below. In very rural areas home composting and feeding food scraps to animals potentially make extrapolation of uptake by housing types unreliable. Lichfield and Daventry have been used to represent the higher level of uptake as these are two of the most successful recycling Authorities making use of green waste collections and both show a ratio of approximately 75% to 25% gardens to no gardens.

Figure 1



With regard to the mix in individual areas, Kent as one County within the South-East region, has a mixture of towns and rural areas. For example it includes Canterbury, where the historical nature of the town might be expected to give rise to lower rates of houses with gardens, and Ashford where there has been significant new house building in recent years. Kent displays a range of ratios, ranging from almost 50:50 (with gardens:without gardens) to almost 70:30, approaching those of Litchfield and Daventry, as shown in Figure 2 overleaf.

Figure 2

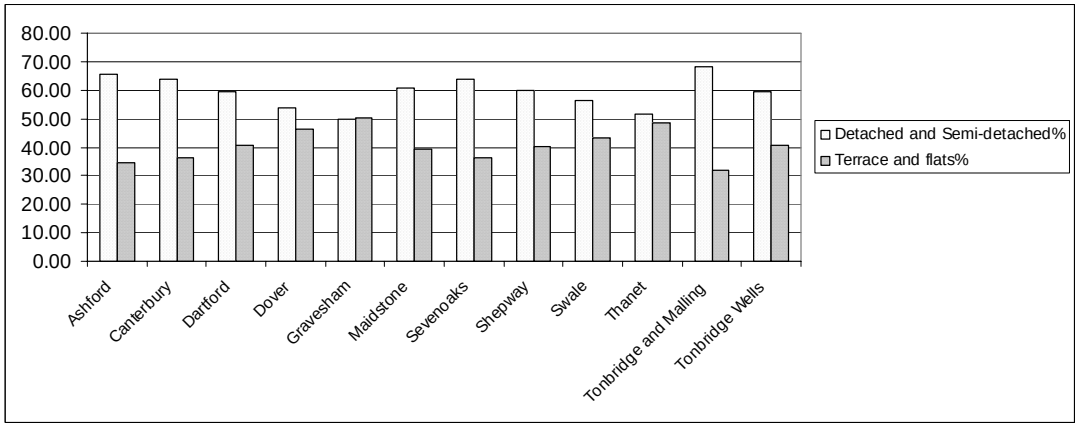
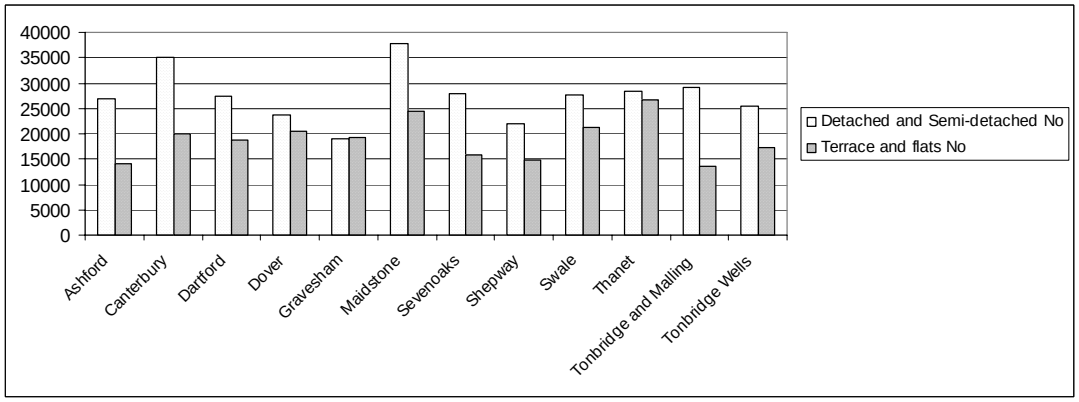


Figure 2 above looks at the mix of housing as percentages of totals but it is also worth considering the mix in these areas as actual totals. Figure 3 shows figures for the same areas as in Figure 2 but expressed as actual numbers and therefore shows the variations between numbers. For example, note the contrast between the figures for Maidstone and Gravesham where the total number of houses in Maidstone with gardens is almost double the number in Gravesham, a factor not highlighted by figures based on percentages. This information is significant when considering the numbers of vehicles used in collection and therefore the potential for savings to be made in their service.

Figure 3



Based on the percentage figures above is would be reasonable to take a representative UK average mix to be 60% households with suitable gardens to 40% without.

Using this figure for houses with gardens that could site a FWD and the average quantity of kitchen waste as discussed above, a 50,000 household authority could divert 111 tonnes per week or 5,760 tonnes per year, and a 250,000 household authority 28,800 tonnes per year if all of the householders with gardens were to use FWDs rather than put the food waste they produce in their bins.

6.2 Achievable Uptake

Predicting the actual level of uptake of FWDs that might be achieved in an area is not easy. In one survey 86% of residents said they would be willing to separate waste for composting

at home, if by so doing, it reduced their Council Tax[8]. The current national uptake on home garden waste composters provided or partially subsidised by Local Authorities is around 10% and rising. As home composting is, in many ways, comparable with using a FWD this level of uptake may be considered the more realistic. To a large extent uptake will be influenced by the incentives to do so, be they positive or negative, and are therefore influenced by the degree to which Authorities wish to pursue the technology. Authorities have to decide if they would provide the FWDs free of charge to households or only at subsidised rates.

A potential disincentive is that householders in properties with gardens may already feel penalised by the level of Council Tax they are paying. With waste disposal being one of the services Council tax pays for, householders may be reluctant to do 'the Council's job' for which they are already paying without there being some link to a real (financial) benefit to themselves.

Other objections by householders to using FWDs may be perception of their being odorous and attractive to vermin. This is despite all the evidence that shows that when properly used these problems do not actually arise[4]. Current trends in 'designer' gardens may not fit with allowing space for a FWD. As with other aspects this could be helped by Planning Authorities who could require that new housing developments provide space for FWDs in the same way that space for wheelie bins is required now.

As stated above, the English uptake on home garden waste composters is currently around 10% but these, like FWDs, can only be installed in a limited number of households, i.e. the same 60% with gardens as discussed above. The 10% figure is therefore somewhat misleading since the uptake can only be among households with gardens i.e. 60% of the total. Among the households with gardens the uptake must be therefore be in the order of 17% to achieve the 10% overall national coverage for all households.

An Onyx/NOP survey in 2002[9] found that 35% of all households were already participating in a home composting scheme. This figure must vary from the 10% figure on the uptake of household composters by including householders that compost but have not taken a composting vessel as part of a Local Authority scheme. This may be a more realistic number for households that might be likely to locate a FWD. Again as the figure is expressed as a percentage of total households it actually represents a participation rate closer to 50% of households with gardens.

As part of a trial of FWDs in selected areas the Moray Council area of Scotland carried out a survey (by Roslyn Associates and commissioned by Ecolinc[8]) in the mid 90s which saw uptake rates of FWDs by residents of 80%. As a target scheme before the introduction of other waste recycling initiatives such a response rate may be higher than would be achieved now.

It can be seen therefore, that there is a range of figures for potential indicators of possible uptake between varying between 17% and 80%. In calculating potential diversion it is proposed that a lower end figure of 17% be used, i.e. the current uptake of home composters, and a figure of 60% be used to reflect the possible upper rate of uptake.

Assuming the 17% lower end figure an Authority with 50,000 households would expect to see around 980 tonnes of kitchen derived organic waste diverted per annum through the use

[8] 2000, Roslyn Associates, the Waste away Scheme: is it a success.
[9] 2002 Parfitt J. From Participation to Diversion. WRAP, in Home Composting can it make a difference? Conference at Imperial College London, Tuesday 21 May 2002

of FWDs. For a 250,000 household authority the amount diverted would be in the order of 4,900 tonnes per annum. Assuming the 60% upper bound figure, the amount of kitchen derived organic waste diverted through the use of FWDs for 50,000 and 250,000 household authorities would be in the order of 3,500 and 17,300 tonnes per annum, respectively.

7.0 FINANCIAL CONSIDERATIONS

Given the kitchen derived organic waste diversion rates that have been identified in the previous section of this report this section considers the potential savings that could be realised by Local Authorities. The potential exists for savings to be made in both the collection and processing of household waste, which include:

- **Absolute savings** are those that can be directly calculated. For example, savings on the basis of tonnages of waste no longer being transferred to a processing plant.

- **Variable savings** are those that are more difficult to calculate as there is no means of direct measurement but which could include factors such as fuel savings or the time taken for collection services.

It is not possible to provide, or in practice achieve, accurate and detailed figures for the cost of collection services, although as a rough guide an average household produces around 1 tonne of waste each year and the average cost of waste collection services per household per year is £32. As already discussed the savings in the variable costs such as collection are not achieved as a simple cost saving for every tonne that does not have to be collected and the actual saving is variable depending upon the mix of service types being provided.

When one householder on a street starts using a FWD the effect would be in terms of a weight of waste that no longer has to be processed and a small saving in time and fuel. The cost of processing the waste can be calculated with some degree of accuracy. The effect of having to empty one less bin in a street and of transporting the reduced amount of waste to the processing plant is small and would be masked by the overall complexity of the way the rounds are organised. Where the marginal costs become significant is when whole streets and parts of whole rounds can be switched to alternate weekly collections. The time savings then start to increase eventually to a point where the rounds themselves can start to be modified. At this point Waste Collection Authorities can consider different mixes of vehicles or fewer vehicles. In addition the reduction in the amount of fuel starts to become quantifiable.

In Table 3 overleaf potential cost savings are presented for the two authority types already discussed above against the costs of landfill, energy from waste (EfW) and mechanical/biological treatment (MBT). This comparison assumes that the Authorities pay for disposal on a 'gate fee' basis and that there are no other contract penalties that would be incurred due to reduced quantities being disposed of.

Table 3: Potential Cost Savings Through the Use of FWDs

Disposal/treatment method	Cost per tonne	Saving for 50,000 hh authority per year, 17% uptake (979tpa)	Saving for 50,000 hh authority per year, 60% uptake (3,456tpa)	Saving for 250,000 hh Authority per year, 17% uptake (4,896tpa)	Saving for 250,000 hh Authority per year, 60% uptake (17,280tpa)
Landfill	£50*[1]	£48,950	£172,800	£244,800	£864,000
Energy from Waste (EfW)	£90	£88,110	£311,040	£440,640	£1,555,200
Mechanical Biological Treatment (MBT)	£100	£97,900	£345,600	£489,600	£1,728,000

*1 Includes landfill tax but excludes potential Landfill Allowance Trading Scheme (LATS) penalties.

Over a ten year period the savings would be as set out in Table 4 below.

Table 4: Potential Cost Savings Over a 10 Year Period

	Saving for 50,000 hh authority per 10 years 17% uptake	Saving for 50,000 hh authority per 10 years 60% uptake	Saving for 250,000 hh Authority per 10 years 17% uptake	Saving for 250,000 hh Authority per 10 years, 60% uptake
Landfill	£489,500	£1,728,000	£2,448,000	£8,640,000
Energy from Waste	£881,100	£3,110,400	£4,406,400	£15,552,000
Mechanical Biological Treatment (MBT)	£979,000	£3,456,000	£4,896,000	£17,280,000

The provision of FWDs at a cost of approximately £40 per unit to Local Authorities at a 17% uptake rate by the 60% of suitable households in a 50,000 household authority (5,100 x 40) would give rise to an overall capital cost of £204,000 where provided free of charge to residents to encourage their uptake. This cost is reduced where some of the cost of FWDs is met by households. Using the same assumptions, providing FWDs in the 250,000 household area would give rise to a capital cost of £1,020,000.

Against the cheapest disposal option of landfill and without further increases in Landfill Tax the investment in FWDs is paid back in four years. FWDs should have a lifespan of over twenty years. The pay back period where EfW and MBT are used is 2 years, and if the Local Authority were to miss their allowance and incur LATS costs (£150/tonne) on top of the landfill cost (£50/tonne) the pay back on FWDs is 1 year.

These cost saving calculations are based on the **absolute** savings made on the cost per tonne of disposal/treatment saved; they do not include the **variable** costs. Where Local Authorities already have contracts for waste treatment by EfW or MBT plants, there can be concerns that the reduction in kitchen waste (biodegradable waste) will take the waste outside contract acceptability envelopes (e.g. calorific value). However, given the uptake (17%) and the other biodegradable elements of the waste, the reduction in kitchen waste through the introduction of FWDs, should not take residual waste arising outside acceptability envelopes, whilst they will provide a cost benefit to the Authority.

8.0 ENVIRONMENTAL BENEFITS

The environmental benefits of the diversion of kitchen derived organic waste from the household waste stream to FWDs stem from:

- the reduced use of energy in transport, handling and processing;
- reduced use of landfills and the associated leachate and gas emissions or emissions from processing plants;
- reduced land take and raw material use in constructing new processing facilities;
- reduced scavenging of residual waste containers by wild and domestic animals;
- enhanced environmental awareness and ownership of waste by the public; and
- 'cleaner' residual wastes further enhancing the potential to recover other fractions

While not quantifiable these are also considered to be worthwhile potential benefits.

9.0 CONCLUSIONS

The benefits of FWD system include the following:

1. reduced quantity of biodegradable waste disposal, reducing the impact on global warming and climate change;

2. reduced waste disposal costs, which will be significant where LATS apply;

3. reduced weight of waste collected, with the potential for collection cost savings; and

4. less frequent collection of residual waste required. Alternate weekly collection can be introduced without increasing concerns over health and environmental impacts.

Against the cheapest disposal option of landfill and without further increases in Landfill Tax or taking into consideration any variable cost the investment in FWDs is paid back in four years. FWDs should have a lifespan of over twenty years. The pay back period where EfW and MBT are used is 2 years, and if the Local Authority exceed their allowance and incur LATS costs (£150/tonne) on top of the landfill cost (£50/tonne) the pay back on FWDs is 1 year.

England has adopted a biodegradable element of municipal solid waste of 68% of the total; Wales has adopted a lower figure of 61%. WRAP are currently considering how this should be measured. If an Authority introduces FWDs then the biodegradable element of the MSW from households that use FWDs is reduced to 51% or less making Landfill Directive targets easier to meet, particularly the 2012/13 target of 50%.

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