

Analysis of the Application of the Producer Pays Principle to Producers of Household Waste as a Driver Towards Sustainability

A Preliminary Discussion Document

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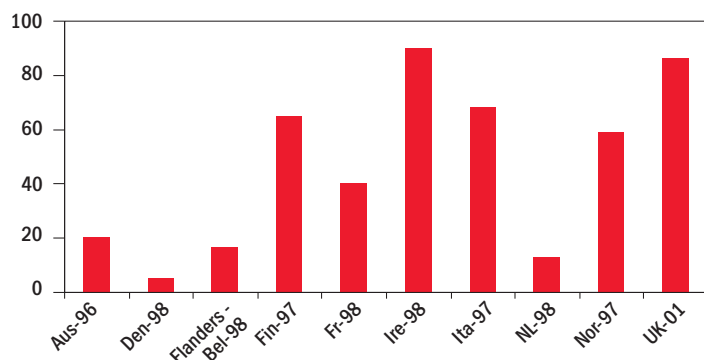
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Case studies across Europe suggest that charging householders based on the volume or weight of residual waste (variable charging) dramatically increases segregation at source, provided that the infrastructure for segregation and processing is in place and there are high levels of public awareness. In the UK, the systems and infrastructure are not in place and significant investment is required. This paper argues that a system of charging direct from waste management providers to householders would increase awareness levels and raise the funding required to deliver the EU Landfill Directive outside the public finances.

Introduction

The EU Landfill Directive 1999/31/EC places targets on EU member states to reduce the quantities of biodegradable municipal waste (BMW) sent to landfill. Under Article 5 of the Directive, by no later than 16 July 2016, BMW going to landfill must be reduced to 35 percent of the total amount by weight of BMW produced in 1995. Member states, such as the UK, which in 1995 put more than 80 percent of their collected municipal waste to landfill may postpone attainment of the targets by a period not exceeding four years.

Figure 1: Percentage BMW Landfilled across EU Member States



Source: Biodegradable Municipal Waste Management in Europe, January 2002, European Environment Agency. The figure for the Netherlands represents household waste only.
UK data source: DEFRA Municipal Waste Management Statistics 2000/01 for England and Wales

Definitions

Direct charge - Where the householder pays the service provider direct, or pays the municipality who passes the payment directly to the service provider.

Variable charge - A charge where the costs paid by the householder are related to the volume or weight of waste produced and/or the extent of segregated waste

This report was commissioned by ESTET as a positive contribution to the debate on the role direct charging could play in the future management of the UK's municipal waste.

Recent diversion levels in the UK have been much lower than in Continental Europe, largely due to the historic availability of landfill capacity and its low relative cost compared to recycling and recovery and specific regulations adopted in other EU member states. A rapid development in the management of municipal waste, the associated infrastructure and householder participation in the UK is required if the EU Landfill Directive is to be met. Figure 1 summarises the percentage of BMW landfilled across Europe using latest available data.

DEFRA municipal waste management statistics suggest that the proportion of municipal waste disposed of to landfill has reduced from 84 per cent in 1996/1997 to 78 per cent. However, growth in municipal waste over that time has increased by 14.6 percent from 24.6 million tonnes to 28.2 million tonnes (DEFRA: Digest of Environmental Statistics) such that waste disposed of to landfill has actually increased in absolute terms.

The delivery of the EU Landfill Directive will require significant investment in collection systems, recycling facilities and processing plant. The Ernst & Young survey of Local Authorities in 2001 suggested that to provide the necessary infrastructure would require £6-7 billion of investment or £600-700 million per annum over the next ten years. Allied to this, there will be the additional costs of operating new collection systems and processing facilities.

Against this investment requirement, Central Government has made available additional financial assistance to Local Authorities under the PFI credit regime, DEFRA's Recycling Fund and increases to the Standard Spending Assessment. These initiatives have started to lay the foundations for increasing recycling in some areas, and progress to date has been slow.

In addition, the level of financial assistance currently available is dwarfed by the future investment required and the key challenge facing the industry, Local Authorities and Central Government is financing the changes required in a way that is equitable and sustainable, and ideally without upward pressure on rates. In June 2002, ESTET asked Ernst & Young to undertake an analysis of the application of the producer pays principle to householders as a mechanism to raise the funding required to support sustainable delivery of the EU Landfill Directive. This paper:

- Outlines the drivers of sustainability, reviews the UK's approach to funding municipal waste management and highlights different approaches from other European countries;
- Summarises a number of case studies where variable charging has been applied to encourage sustainable management of municipal waste in specific municipalities;
- Examines the water sector in England and Wales to explore the impact of introducing direct charging into a utility requiring significant investment as a driver towards sustainability; and

- Based on the current position, case studies and the lessons from the water sector, puts forward the principles for a mechanism under the producer pays principle that could be adopted in the UK to raise the funding required to support the delivery of the EU Landfill Directive.

Drivers Of Sustainability

The EU Commission's approach to waste management policy is based on the guiding principle of the waste hierarchy to prevent, re-use, recycle and recover, and a thematic strategy that seeks to deliver the effective use of resources and addresses the rate at which they are recycled back into the economy. Under the Sixth Environmental Action Programme presented in 2001, the key objectives in the sustainable management of waste are to decouple the generation of waste from economic growth and to achieve a significant reduction in the volumes of waste generated through improved waste prevention measures, better resource efficiency and a shift to more sustainable consumption patterns.

Funding Municipal Waste Management in the UK

The UK has introduced a range of instruments to encourage more sustainable management of municipal waste. These include:

- Economic instruments through the landfill tax and the tradeable permit scheme for biodegradable municipal waste, which has recently completed consultation;
- Statutory recycling targets for Local Authorities and PFI credits for projects that meet DEFRA's investment criteria;
- Public spending programmes, such as the Waste Action Resources Programme (WRAP) and the New Opportunities Fund;
- The landfill tax credit scheme used to fund research into the sustainable management of waste and education programmes; and
- Legislation will need to be introduced, for example, implementing the WEEE Directive, and the Landfill Regulations are already in force.

To date, there have been no transparent financial incentives on UK householders to support the waste hierarchy and the sustainable management of municipal waste. Such incentives would encourage households to play a key role in waste minimisation in the kerbside separation of biodegradable waste. In the UK, the costs of collection, treatment and disposal of waste are funded by Local Authorities, partly from the SSA allocated by Central Government to fund all local services, and partly through Council Tax paid by householders. There is no ringfencing of the SSA by Central Government for particular services under Local Authority control, such as waste management as this would conflict with the fundamental principle of local democracy.

Consequently, Local Authorities have discretion over the allocation from the SSA and Council Tax receipts to fund waste management services to reflect local priorities and the

costs of service provision. In areas where there is a two-tier system of local government, County Councils contract for and fund the costs of waste disposal and District Councils contract for and fund the costs of collection in line with the current requirement of the Environmental Protection Act 1990. Such a structure is not ideal for introducing rapid change. There is also no direct relationship between the costs borne by Local Authorities and the revenue generated locally from householders to fund waste management.

A potential side-effect of the current system is that other Local Authority services carry the exposure of spiralling waste management costs in areas where there are low levels of landfill diversion caused by low levels of householder participation in recycling and waste segregation. Historically, this has been of less concern to Local Government because of the low relative cost of landfill. However, the anticipated increases in the rate of landfill tax will increasingly expose Local Authority finances and other essential local services to the extent to which their communities participate in the sustainable management of waste.

The current funding system condones low levels of householder awareness to the costs of waste management and provides no direct financial incentive (or disincentive) to householders to either reduce the volume of waste produced or increase the level of recycling at source. With impending increases in landfill tax, this will expose Local Authorities to higher costs.

The introduction of an appropriate form of direct charging to householders could increase awareness and incentivise individual householders and local communities to play an appropriate role in the drive towards the more sustainable management of municipal waste. It could achieve this by creating a regime where householders take a more direct financial stake in the impact of their own activities to recycle more and segregate waste at source and enable individuals and communities to make informed decisions as to the role that they wish to play in the more sustainable management of waste. It would also provide a vehicle for raising the additional revenue to meet the costs of implementing the EU Landfill Directive outside the public finances.

Funding Municipal Waste in Europe

It is perhaps unsurprising that the instruments currently being deployed across Europe are similar to those in the UK given that the pressures stem from common EU legislation. In all member states, municipal waste management is funded by municipalities, which in turn are funded from Central Government and locally raised taxes. All member states have now introduced some form of landfill tax except Greece, Portugal and Germany. Some countries have, however introduced legal instruments and stronger economic measures than those prevalent in the UK, for example:

- The landfill tax rates in Austria, Belgium, Denmark and the Netherlands are much higher than the UK at 44, 50,

55, and 75 Euros compared to the current UK level of approximately 20 Euros¹. These countries have historically had a much lower reliance on landfill;

- The Netherlands has banned the landfilling of biodegradable wastes and in Denmark there is a legal requirement for the separate collection of magazines and newspapers. The priority in these countries is to recycle, then to recover energy and finally to landfill;
- There is a more widespread use of variable charging on householders by municipalities based on the amount of waste produced and the extent to which it is segregated for collection in countries such as Germany, Belgium, Finland, Ireland, Sweden and in Luxembourg where variable charging is now compulsory;
- In some countries, municipalities adopt more transparent regimes for charging householders for municipal waste management services where the local municipal tax covers the costs of service provision, for example in Spain and the Netherlands; and
- There is some evidence that in rare circumstances, for example in parts of Sweden, householders pay waste management contractors direct for services.

Variable Charging as a Driver Towards Sustainability

A desktop review of municipalities that have applied variable charging in other European countries suggests that a reduction in the volume of household waste disposed to landfill can be achieved by introducing variable charging to householders. To date, this has been primarily achieved by incentivising relatively small communities to work together to reduce the volume of waste produced and increase the level of source separation of recyclables from household waste. The case studies² that follow outline the potential implications of implementing variable charging schemes by providing details of experiences in Italy, Denmark, Germany and Sweden. Further details on these and a number of other schemes in Italy, Belgium and France are provided at Appendix A.

Biowaste Separation in Milan

In 1997, ten municipalities in Milan Province with a combined population of 24,200 implemented a regime that introduced variable charging to householders for the collection and disposal of household waste excluding biodegradable waste. The charging regime comprised a fixed charge based on the type and size of property and a variable charge based on the amount of residual waste collected from each household. The scheme resulted in an 18 percent reduction in the volume of residual waste and an 8 percent increase in waste segregation. There was some evidence of limited fly tipping and non-payment of the fixed charge.

¹ European Environment Agency: *Biodegradable Waste Management in Europe, Strategies and Instruments, January 2002.*

² Eunomia Research and Consultancy Ltd study of *Financing and Incentive Schemes for Municipal Waste Management 2001/02.*

Weight Based Charging Mechanism in Bogense, Denmark

The primarily rural community of Bogense implemented a weight based charging scheme covering residual and organic waste. The scheme comprised a fixed fee, covering the costs of recycling and a base amount of residual waste collection, and a variable, weight dependent element for residual waste over and above the base amount. The scheme resulted in significant reductions in waste collected, improved separation, increased quantities of recyclable elements and encouraged home composting. Initially there were instances of dumping of household waste in lay-bys, but in some areas this has fallen back to initial levels.

Combined Weight and Volume Scheme, Germany

The pilot scheme was tested in blocks of flats in Ohrekeis, Germany and involves containers for separate waste fractions, operated and charged based on weight or volume of waste through the use of 'chip' cards. Improvements in segregation and waste minimisation of 40 percent were reported in these schemes with little evidence of evasive behaviour.

Weight Based Scheme in Sweden

A weight-based scheme in the small municipality of Bjuv applied variable charging to the weight of residual waste and compostable waste collected and was supported by the kerbside collection of 11 waste fractions, financed through a fixed fee. Within the first year residual waste was estimated to have fallen by approximately 45 percent and the separation of recyclable fractions doubled. A recalibration of the fixed and variable charges was subsequently expected in order to maintain financial viability.

Together, these case studies, and those contained at Appendix A suggest that appropriate levels of fixed and variable charging to householders can increase the level of diversion. However, it should be noted that:

- The majority of the case studies reviewed have been based on relatively small communities, and caution should be exercised in extrapolating the conclusions of these studies to larger schemes.
- The success of the schemes does not rely on financial incentives alone, but are supported by appropriate infrastructure to enable kerbside separation and subsequent processing. It is notable that in the majority of case studies significant source separation systems were implemented as a prelude to introducing variable charging;
- The introduction of variable charging schemes is more likely to be successful and accepted in communities where there is a high level of environmental awareness and education is therefore important together with high levels of community ownership;

- Administration, management and operational costs will vary according to each scheme's sophistication. However, variable-charging schemes will tend to have a higher level of administrative cost associated with them than flat rate systems;
- Variable charging has encouraged evasion, and illegal dumping or burning of household waste, although the case studies suggest that the benefits outweigh the disbenefits where appropriate infrastructure is in place.
- Modifications to the level of variable charging have been required on certain schemes to maintain the cash flow available to contractors in the event of decreases in the volumes of residual waste collected.

Nevertheless, the case studies suggest that transparent charging systems that provide financial incentives on householders to separate waste can positively influence householder behaviour.

Direct Charging in the Water Industry

The most recent publicly funded service to introduce direct charging to householders has been the water industry in England and Wales. The developments in the water industry in recent years therefore provide a good framework against which to examine current Government policy on direct charging frameworks.

Background

In 1989, the ten Regional Water Authorities (RWAs) faced higher environmental and quality standards emanating from the EU Drinking Water Quality Directive 1980 and the pending EU Urban Wastewater Treatment Directive 1991, which together demanded investment of approximately £10 billion³ to maintain and upgrade water infrastructure. At that time, the UK Government's policy was to reduce the Public Sector Borrowing Requirement and the RWAs were unable to raise the finance necessary from Central Government. In addition, the UK Government was anxious to evolve its role to commissioner and enabler rather than provider of public services.

Under the Government's privatisation programme of 1989, the 10 RWAs in England and Wales were floated as public limited Water & Sewerage Companies (WSC's) and most of the remaining statutory water companies took the opportunity to convert to plc's (WOC's). The Water Act 1989 gave the WOCs 25-year concessions for sanitation and water supply, effectively creating regional monopolies.

To protect the interests of consumers and the environment, three regulators were created at the time of privatisation. OFWAT was created as the industry economic regulator under the 1989 Water Act to simulate competition and balance the interest of consumers and the newly privatised companies. The National Rivers Authority, now the Environment Agency was charged with environmental standards and pollution and

³ Ernst & Young's Centre for Business Knowledge.

The Drinking Water Inspectorate (DWI) was responsible for monitoring water quality.

At the time of privatisation, the water companies replaced the water rates system with direct charging to householders based on the rateable value of properties and a right to generate a rate of return on capital employed agreed with OFWAT. OFWAT regulates these charges levied on consumers through a price cap, carried out according to RPI + k, where 'k' represents an adjustment to the price in relation to the prevailing rate of inflation, by reference to performance standards. The 'k' factors are set for individual water companies by the regulator and reviewed every five years to encourage the water companies to increase efficiencies.

In most cases, companies have used two primary charging methods for their water and sewerage services:

- Fixed (un-measured) charging, whereby charges are based on an arbitrary method, such as the rateable value (RV) of a property; and
- Variable (measured) charging via water meters, which measures the amount of water recorded by the customer's meter.

Where properties do not have an RV (for example in homes built since March 1990 when Council Tax was changed) or where the RV is significantly outdated (for example where premises have been extensively altered) companies may apply a notional RV charge based on criteria such as the size and location of the property, or an assessed charge.

Approximately 14 percent of the 20 million water customers in England and Wales are now metered.

The Water Industry Act 1999

In 1999, the Water Industry Act 1999 (WIA 99) introduced a new structure for the setting of water companies' charges that requires all companies to have a charges scheme approved by the Director of OFWAT and prohibits companies from charging household customers other than by an approved charges scheme. It is for companies to decide the method and level of charges to consumers, although OFWAT ensures that these are consistent with its various licensing measures over price and discrimination and its duty to protect customers.

The Act was adopted to support fair and affordable water charges, particularly for vulnerable customers and to encourage the sustainable use of water supplies and the protection of the aquatic environment. Under the Act, the Government has introduced measures the Director of OFWAT should consider when approving charging schemes. These are that:

- Protection is afforded to the most vulnerable groups in society in that charging schemes should recognise the customer's ability to pay and changes in the charging regimes should not cause unacceptable transitional effects or impact disproportionately on vulnerable groups;
- Charging schemes should take proper account of the impact of water services on the environment;

- There should be stability and predictability in household bills;
- Charges should be clear and transparent and relate closely to the services provided to customers. For most households, the overall bill comprises a charge for the water service and three elements of the sewerage service: foul water drainage, surface water drainage and highway drainage;
- Customers needs and local pressures should be taken into account in devising charges; and
- Metering policy should reflect that the balance and nature of supply and demand for services varies locally and this therefore guides the need to appropriately press for measured use in regions where water is scarce compared to areas where water is relatively abundant.

To meet these guiding principles, the Act:

- Removed water companies' powers to disconnect water supply for non payment by householders;
- Provided protection to vulnerable groups through social tariffs to customers on low incomes paying on a measured basis who might face unduly high bills if required to pay according to the water they use;
- Extended the powers for rateable values to be used as a basis for water charging beyond the original March 2000 deadline rather than enforcing metered use;
- Allowed customers currently paying on an unmeasured basis the right to continue to pay on this basis, or to opt for variable metered charging based on usage and for metering to be installed free of charge;
- Retained the principle of standing charges to recognise that some of the costs relating to water supply are fixed and that whilst abolishing standing charges would benefit low users, it would impose extra costs on high water users such as families who would not qualify for protection under the regulations; and
- Allowed customers who have opted for measured charging twelve months in which they can revert to unmeasured charging.

The Competition Act 1999

In the 9 years since privatisation, the real cost of an average annual water bill per company increased by 46 percent (OFWAT Memorandum 18 March 1998). Whilst this was due in part to the additional costs of financing investment and improving standards, the water industry came under criticism for making excessive profits. This was primarily as a result of the water companies overestimating the amount of capital investment required when setting tariffs and OFWAT underestimating the scope of efficiency gains available under the 1989 and 1994 price reviews.

Against this backdrop, the Competition Act 1999, which came into force on 1 March 2000 changed the way the EU Treaty

provisions on anti-competitive behaviour would be enforced. In respect of water companies, the Act:

- Strengthened OFWAT's powers to investigate associated complaints and;
- Gave OFWAT the power to take action including the imposition of financial penalties (up to 10 percent of turnover) where behaviour is found to be anti-competitive.

The Competition Act also makes the third party use of assets easier by forcing water companies to make their networks available to other water companies on fair and reasonable terms, and that refusal of access, or the imposition of unreasonable price could be regarded as abuse of a dominant position by the regulator.

The lessons from the water industry demonstrate that direct charging has successfully delivered the funding to underpin massive investment outside the public finances. To date there has been limited implementation of water meters as a variable charging mechanism. This has been largely due to Government's desire not to impose variable charging and if this approach is adopted for waste management, variable charging in the short term for household waste management appears unlikely.

A Producer Pays Mechanism for Municipal Waste Management in the UK

This paper has outlined the key issues facing municipal waste management in the UK, lessons from municipal waste management in Europe and ideas that might be transported from the introduction of direct charging in the water sector. Together these suggest that:

- Large scale investment in collection systems and processing infrastructure combined with higher levels of awareness and community ownership is required to deliver sustainable management of municipal waste;
- Variable charging mechanisms in Europe successfully incentivise householders to participate in sustainable waste management practices provided the infrastructure and awareness is already in place;
- Direct or variable charging to householders for municipal waste management would reduce the financial risk borne by Local Authorities in the event that householders do not segregate or recycle, particularly as landfill tax rates rise and;
- Government policy applied in the water industry suggests that any form of direct charging to householders for waste management service should reflect their ability to pay. This would tend to make variable charging without measures to ensure social equity less attractive to Government, and variable Charging is currently not permitted under UK law.

Key Objectives

The key challenge in developing a producer pays mechanism for the UK is to create a framework that legitimately recognises the priorities of Local Government, Central Government, the industry and consumers. Consequently, we believe that for a direct charging mechanism to be sustainable in the UK and capable of implementation in the short term, it should:

1. Support the obligations of Central Government to deliver the targets laid down in the EU Landfill Directive.
2. Enable solutions and charges for each area to reflect local circumstances.
3. Recognise that the current service models for municipal waste management differ widely across the UK in terms of asset ownership, private sector participation, and the contractual frameworks between Local Authorities and waste management service providers.
4. Complement the structures already in place for funding and regulating municipal waste management in the UK, for example the Council Tax collection regime, existing contractual frameworks between Local Authorities and the private sector and the pending introduction of tradeable permits.
5. Increase public awareness through higher levels of transparency in the way householders are charged for waste management.
6. Deliver the funding required to implement the collection systems and infrastructure to support sustainable waste management.
7. Provide flexibility to enable financial incentives on householders to minimise waste and segregate at source through variable charging in the longer term if desired.
8. Enable Local Government to meet its obligations under the Best Value Framework to challenge, compare, consult and compete.

The first priority is to raise the finance to fund investment and increase awareness levels. With these conditions in place, it will then be appropriate to consider variable charging.

The Mechanism

There are two potential models to introduce direct charging into waste management - a centrally regulated model akin to the water industry, and a model regulated under contract at a more local level. Both would follow the sustainability principles and combined with increased education would provide the foundations required to enable higher levels of public participation in kerbside separation and create an environment where variable charging could have a positive impact on householder participation in the longer term, if desired.

Centrally Regulated Model

Under a centrally regulated model, waste management services would be privatised into Regional Waste Management companies and the interest of householders met by a Central Government regulator. Revenue would be raised by the private sector directly from householders through a Waste Management Charge levied directly on householders to cover all the costs of municipal waste management resulting in a large-scale shift in funding from the SSA directly onto householders.

The implementation of this regime would be more complex than the privatisation of the Regional Water Authorities in 1989 because of the part privatised and fragmented nature of the industry. We believe that this would be impractical at this stage. The creation of regional companies would require fundamental changes in the structure of ownership in waste management and strict regulation similar to that used in the water industry (a re-nationalisation and then re-privatisation of the industry). Given the lessons that have been learned by consumers and Government and the initial unpopularity of the water privatisation, it is unlikely that the implementation of this model would be in the interest of industry and Local Government or attractive to Central Government.

Model Regulated Under Contract

Under a contractually regulated model, Local Authorities would retain their role as procurer of municipal waste management services in the UK. However, only the incremental costs of implementing the EU Landfill Directive would be raised through a Waste Management Charge levied directly by the waste management service provider on local householders, and collected on behalf of the service provider by the Local Authority. Under this proposal, funding for waste management would primarily be raised from three sources:

1. An element that reflects the current allocation system of waste management funding to Local Authorities from Central Government and takes into account the differences in the costs of current service provision between different areas. It is currently distributed to Local Authorities on an annual basis in accordance with the calculation of the Standard Spending Assessment for Environmental, Protective and Cultural Services that takes into account the population density, social and economic conditions, and the sparsity of the population in an area.
2. A fixed Waste Management Charge that is levied on each household by the waste management provider to fund the infrastructure and service enhancements required enabling separation at source and subsequent processing in each Local Authority area. The Local Authority could act as collection agent and collect householder payments through existing systems. The level of the charge would be regulated through contracts between Local Authorities and the waste management provider.

3. A variable element raised from householders that could be determined by the weight or volume of residual non-diverted waste produced by each household. This mechanism would encourage separation at source and waste minimisation, but its introduction would be subject to Central Government intervention. This element could not be introduced before the technology to measure householder usage and separation activity is installed.

This regime could be applied nationally, irrespective of whether services are provided by the public or private sector and would take the costs of the EU landfill directive outside the public finances in the same way that direct charging did for the water industry when faced with large investment to meet the Drinking water and Wastewater treatment Directives. It would also provide additional funding for Local Authorities for service changes and investments in waste management.

To deliver transparent charging for waste collection, processing, and disposal and the generation of economies of scale under this model would require consolidation of Local Authority responsibilities underpinned by changes in legislation. In addition, specific protections would need to be put in place to meet the needs of vulnerable groups. This role could be fulfilled by Local Government acting in its role as a contracting party with the waste management industry on behalf of the householder and could be administered using the Council Tax regime.

The introduction of these measures combined with tradeable permits, increases in the rate of landfill tax and the Governments PFI credit scheme would deliver a sustainable mechanism that:

- Enables more rapid delivery of the EU Landfill Directive;
- Supports the producer pays principle;
- Provides a mechanism to introduce financial incentives to individual householders to participate in the reduction and kerbside separation of household waste, if desired;
- Encourages community ownership by rewarding Local Authorities and householders financially for achieving higher levels of diversion;
- Allows equitable and cost effective implementation by building on existing fund raising and expenditure mechanisms in Local Government; and
- Provides Local Government and its electorate with discretion over the scale and nature of diversion initiatives for its local population through contracts with the industry.

Appendix A

Biowaste Separation in Milan

In 1997, ten municipalities in Milan Province with a combined population of 24,200 implemented a regime that charged householders in part according to the amount of residual waste produced. The charging regime comprised a fixed charge based on the type and size of property and a variable charge based on the amount of residual waste collected from each household. The scheme resulted in an 18 percent reduction in the volume of residual waste and an 8 percent increase in waste segregation. There was some evidence of tax evasion.

<p><i>Background</i></p>	<p>In 1997, the 10 municipalities adopted a source separation scheme for biowaste, with separate bags for biowaste and residual waste which were distributed free of charge. Prior to the introduction of the producer pays principle in 1999 the source separation rate was 70.3%.</p>
<p><i>Description of the scheme</i></p>	<p>Tariff structure:</p> <ul style="list-style-type: none"> • A fixed element based on the type and size of the property and the number of residents covers the majority of the costs of collection, transportation and system running costs. • A variable element, generated through the number of bags used to deliver residual waste. <p>The waste collector collects tags specific to each householder, which are tied to the bags. These tags combined with overall weight of residual waste in the vehicle are used to derive the variable element.</p>
<p><i>Results</i></p>	<ul style="list-style-type: none"> • The specific amount of residual waste fell by approximately 18%. • The rate of source separation rose by about 8%. • Total production of MSW increased marginally, suggesting fly tipping to be a minimal problem. <p>The computerised recording of data allows the detection of evasion and maintains a high degree of control over the collection system.</p> <p>Source separation is promoted indirectly, as the variable part of the fee in proportion to residual waste.</p> <p>A degree of tax evasion was proven for 4.5% of total participants in the scheme, though the true figure could be significantly higher.</p>

Source: *Financing and Incentive Schemes for Municipal Waste Management, Eunomia Research and Consulting.*

Appendix A

Weight Based Charging Mechanism in Denmark

The primarily rural community of Bogense implemented a weight based charging scheme covering residual and organic waste. The scheme comprises a fixed fee, covering the costs of recycling and a base amount of residual waste collection, and a variable weight dependant element for residual waste above the base amount. The scheme resulted in significant reductions in waste collected, improved separation and increased quantities of recyclable elements and encouraged home composting. Initially there was dumping of household waste in lay-bys, but in some areas this has fallen back to initial levels.

<p>Background</p>	<p>Bogense municipality has approximately 6,400 citizens, 52% of the inhabitants live in towns and villages, and 48% in the countryside.</p>
<p>Description of the scheme</p>	<p>Each household has a partitioned container, 40% by volume for organic waste and 60% for residual waste. The fee for waste collection consists of an annual fixed fee and a variable weight based fee levied together with the property tax:</p> <ul style="list-style-type: none"> • The fixed fee for households covers 5kg of waste per collection, the collection and recycling of paper, glass and treatment and disposal costs. · • The variable, weight dependant fee is paid per kg of residual waste above the 5kg figure.
<p>Results</p>	<p>On average, the amount of waste collected in municipalities with weight-based schemes was reduced by 279kg.</p> <p>Significant increases in the amount of paper and cardboard collected have been recorded. The study estimated that the collection efficiency for these fractions was 71% and 41% for municipalities with and without weight-based schemes, respectively.</p> <p>The study found that 59% of households practiced home composting compared to 21% in traditional schemes.</p> <p>Instances of citizens burning the household waste in oil containers or fireplaces were noted. Illegal dumping in lay-bys was also reported as being a problem, particularly at the beginning of the scheme, but in some of the municipalities, the dumping of has fallen back to initial levels.</p> <p>The requirement for individual accounting of waste amounts and fees has led to high administration costs.</p>

Source: *Financing and Incentive Schemes for Municipal Waste Management, Eunomia Research and Consulting.*

Appendix A

Combined Weight and Volume Scheme, Germany

The scheme involves containers for separate waste fractions, operated and charged based on weight or volume of waste through the use of 'chip' cards. Improvements in segregation and waste minimisation of 40% were reported in these schemes with little evidence of evasive behaviour.

Background	A number of lock gate systems operate in Germany to overcome the problem of high levels of residual waste and low levels of source separation found in urban areas.
Description of the scheme	<p>A pilot project for the introduction of an "IPW" (Identify, Press, Weigh) centre was undertaken in Ohrekeis. The IPW centre encompassed 6 containers for source separation in a block of flats with approximately 800 tenants.</p> <p>The system incorporates a lock gate mechanism operated with a 'chip card' given to tenants. The system weighs and presses the waste, and a fee is charged according to mass, and administered through the card.</p>
Results	<p>Over the five-month duration of the project waste collected from the block reduced by 45%, with improved segregation. Waste collection frequency was correspondingly reduced. Overall, the costs per household per month reduced from EUR220 to EUR171.</p> <p>Such schemes do not work well in isolation. Where similar schemes are not in operation in surrounding neighbourhoods dumping of waste would be expected to increase. The cost of an IPW centre was estimated at approximately EUR 21,000 for the study in question.</p>

Source: *Financing and Incentive Schemes for Municipal Waste Management, Eunomia Research and Consulting.*

Appendix A

Weight Based Scheme in Sweden

The weight-based scheme in the small municipality of Bjuv applies variable charging to the weight of residual waste and compostable waste collected and is supported by kerbside collection of 11 waste fractions, financed through a fixed fee. Within the first year residual waste was estimated to have fallen by approximately 45% and the separation of recyclable fractions doubling. A recalibration of the fixed and variable charges is expected to maintain financial viability.

Description of the scheme	<p>Bjuv is a small municipality with approximately 13,700 inhabitants, and consists of several smaller rural settlements.</p> <p>Kerbside collection was provided for 11 waste fractions, and the previous fee structure revised to incorporate a variably charged element based on the weight of residual and compostable waste in addition to a flat fee.</p>
Results	<p>According to the results of the study the amount of recycled waste almost doubled in the first year with weight based fees. At the same time the total amount of waste fell by approximately 20% leading to a reduction in residual waste of around 45%.</p> <p>Part of this reduction may be attributable to evasion, and the study records an increase in the incidence of residual waste dumped at recycling stations.</p> <p>The revised collection system is almost twice as expensive to the previous system and fees paid by households were, at the time of the study, expected to increase. As recycling rates have increased more than expected it is likely that the fixed fee element of the system will need to be increased beyond the initial level to maintain financial viability.</p>

Source: *Financing and Incentive Schemes for Municipal Waste Management, Eunomia Research and Consulting.*

Appendix A

Pay per Bag Scheme in Belgium

A study conducted by OVAM, the public waste agency in Flanders, suggested that the introduction of a 0.5 EUR charge per bag of residual waste could reduce the amount offered for collection by 30kg per inhabitant, partly through waste improved separation, and partly through waste reduction. It also appeared from comparison with other similar schemes that household behaviour was responsive to the price level, and that while evasion may have accounted for part of the waste reduction the overall benefits of the scheme outweighed this.

Description of the scheme	Local Authorities in Belgium finance municipal waste management through an 'environmental tax' and via payments for waste bags, containers or frequency of collection.
Results	<p>A 1999 OVAM study in Flanders found that the introduction of a payment of EUR 0.5 per waste bag would lead in an average commune to a decrease in the amount of residual waste of approximately 30kg per inhabitant. The study believed that approximately 30% of the reduction in residual waste was through improved separation, while 70% was through either genuine preventative behaviour, or through evasion.</p> <p>This study suggested that the higher cost per bag in Flemish Brabant resulted in a greater average decrease in the amount of residual waste and a higher level of source separation than in Flanders, where the price per bag was correspondingly lower.</p> <p>Most local authorities in Belgium appear to take the view that an incremental change in illegal evasion is outweighed by the benefits of the scheme.</p>

Source: Financing and Incentive Schemes for Municipal Waste Management, Eunomia Research and Consulting

Appendix A

Combined Weight and Volume Scheme in Luxembourg

A pilot project in Luxembourg utilises both weight and volume measures as a basis for implementing the producer pays principle to municipal waste. In addition to the basic fee, charges based on volume and weight were implemented across a range of waste fractions, the levels set according to each fractions position in the waste hierarchy. In the pilot studies a total waste reduction of 50% was recorded, improved source separation and increased home composting were also noted.

<p><i>Description of the scheme</i></p>	<p>A pilot project was tested in 1995 and 1996 and approximately 4,800 citizens in 1,780 households were involved in the project.</p> <p>The weight and volume schemes use a microchip in each bin identify the owner and identification and weighing systems are also required in the collection vehicle. In these pilot schemes home composting was promoted through the existence of a separately identifiable fee for compostable materials.</p> <p>Costs for administration, the amenity sites, and containers are covered by the basic fee, which has to be paid by every owner of a residual waste bin.</p> <p>In addition to the fixed fee, variable fees are charged according to weight, per emptying or combinations thereof for each waste fraction, the charges set consistently with each waste fractions position in the waste hierarchy.</p>
<p><i>Results</i></p>	<p>A reduction of approximately 50% of the total amount of waste collected took place in comparison with other comparable communities not part of the pilot project. No increase in illegal waste disposal was recorded. The pilot project also yielded improved source separation. The project reduced waste management costs in these pilot schemes, through:</p> <ul style="list-style-type: none"> • The reduction in waste going to incineration and the consequently avoided gate fees • The reduction in collection and transport costs following a re-optimisation of the waste collection system.

Source: *Financing and Incentive Schemes for Municipal Waste Management, Eunomia Research and Consulting.*

Appendix A

Waste minimisation scheme in Les Sorinières, France

The Council of Les Sorinières, in collaboration with a private sector organisation introduced a subscription contract with a fixed and variable fee structure generated individually for each household. The implemented system improved transparency and made individuals responsible for the waste produced. The results of the scheme were a significant reduction in waste offered for collection, with a consequent reduction in the overall costs of the waste management service to the community.

<p><i>Background to the Scheme</i></p>	<p>Prior to the introduction of the new system the costs of waste management had been covered by a tax for household waste collection (TEOM), based on the rental value of property. The efficiency of the tax was limited : -</p> <ul style="list-style-type: none"> • It did not correspond to the quantity of waste produced, or to the collection services. - • There was no transparency as to the cost of the service due to cross-subsidisation within the general budget.
<p><i>Description of the scheme</i></p>	<p>The tax was replaced with a subscription fee (REOM), which includes all costs of waste collection. The Council in collaboration with a private sector organisation implemented the services. An annual subscription contract is signed between the inhabitants and the community of Les Sorinières in which the subscription fee is fixed individually for each household:</p> <ul style="list-style-type: none"> • The fixed subscription fee element covers the volume of the containers delivered and the collection of recyclables and other services provided. • The variable element depends on the number of collections carried out for each household above the 26 carried out as part of the subscription fee. <p>Households are presented with a semi-annual personalised bill.</p>
<p><i>Results</i></p>	<ul style="list-style-type: none"> • The study suggests that the production of household waste per year reduced by 112kg/individual . - • The collection system was more effectively used as the frequency of collection was reduced in most cases. - • The study notes that the quantity of waste that would have been sent to incineration decreased by 30-40%. <p>The overall impact was to create a financial saving for the community, particularly as a result of the savings from increased diversion away from incineration plants.</p> <p>It was noted in the study that the private sector organisation planned to implement similar systems to its other waste management activities on a world-wide basis.</p>

Source: Waste Minimisation and prevention, Öko-Institut e.v

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