

# **Financing and Incentive Schemes for Municipal Waste Management**

## **Case Studies**

**Final Report to**

**Directorate General Environment,**

**European Commission**



**on behalf of**



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## INTRODUCTION

This report supports the report concerning the financing of municipal waste which has been carried out by a similar group of consultants, led by Eunomia Research & Consulting on behalf of ECOTEC Research & Consulting. The team members are:

- 1 Eunomia Research and Consulting (UK);<sup>1</sup>
- 2 GUA (Austria);
- 3 Ecolas (Belgium);
- 4 COWI (Denmark);
- 5 Soil and Water (Finland);
- 6 TN SOFRES (France);
- 7 Öko-Institut (Germany);<sup>2</sup>
- 8 LDK ECO (Greece); and
- 9 Scuola Agraria del Parco di Monza (Italy); and
- 10 IVL (Sweden).

The study was conducted to fulfil part of a wider contract concerning municipal waste management (the companion study concerns the costs of different collection and treatment options for municipal waste). The specific objective of that contract to which this study relates is as follows:

1. *To carry out 20 case studies on innovative financing systems at local and national level, to be chosen in agreement with the European Commission. These case studies shall in particular focus on systems, which were able to give incentives to reduce waste quantities and increase recycling and composting. The experiences and results of such systems shall be described.*

The remit was expanded slightly to look at financing and incentive measures.

As the above suggests, the case studies were agreed with the European Commission. The case studies are quite varied, so it has been difficult to adhere to one 'template' for the studies. However, the team were asked to provide, as far as possible (and given the available resources):

- Rationale for the scheme;

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<sup>1</sup> Also responsible for Netherlands and Wallonia studies.

<sup>2</sup> Also responsible for Luxembourg studies.

- Basic description of the scheme (mechanism, administration, location, and how widely applied, e.g. local, regional or national)
- Evidence for effectiveness (as far as possible, bearing in mind that some schemes are very new);
- Evidence of undesirable side effects and means to overcome these;
- Lessons learned in implementation; and
- Potential for replication in other countries.

An attempt was made to cover a range of countries, but clearly, the prevalence of different initiatives in different Member States imparts a bias towards some countries more than others.

The Case Studies are grouped into the following categories:

1. Variable Charging (i.e. Pay-as-you-throw) Schemes;
2. Producer Responsibility Schemes
3. Schemes With Joint Waste Management / Social Objectives
4. Schemes Designed to Incentivise Municipalities
5. Schemes Designed to Incentivise Positive Behaviour by Households
6. Other Schemes

The case studies are as follows:

1. Variable Charging (i.e. Pay-as-you-throw) Schemes;
  - Belgian: pay-per-bag scheme
  - Denmark: weight-based schemes
  - Germany: weight- and volume-based schemes at apartment blocks
  - Italy: tagged bag schemes
  - Italy: pay-per-bag scheme
  - Luxembourg: combined weight and volume based scheme

- Sweden: weight-based scheme
2. Producer Responsibility Schemes
    - Belgium: BEBAT scheme for battery collection
    - Finland: paper collection by Paperinkays Ltd
    - France and Brussels: systems to deal with unsolicited mail
    - Netherlands: paper and fibre covenant
  3. Schemes With Joint Waste Management / Social Objectives
    - Belgium: white- and brown- goods collection
    - United Kingdom: community Re>paint schemes
  4. Schemes Designed to Incentivise Municipalities
    - Belgium: residual waste levy in Wallonia
    - UK: local public service agreements in England
  5. Schemes Designed to Incentivise Positive Behaviour by Households
    - Greece: schemes using aluminium can reverse vending machines
    - Sweden: schemes to promote home composting
    - UK: Real Nappy Initiative, West Sussex
  6. Other Schemes
    - Finland: benchmarking competition between companies, Helsinki
    - Luxembourg: household hazardous waste management

A brief summary of the key features of these schemes is given below.

It s quite clear that there are a number of innovative approaches being implemented across Europe, but the approach is uneven. The key will be for Member States (and

those acceding to the European Union) to look at what works, and in what context. It is important for instruments to be mutually supportive rather than contradictory. Hence, these case studies provide a platform for the development of ideas which must be considered in the context of the existing policy and regulatory framework. It is hoped that they lead to some fruitful developments and innovative instruments for dealing positively with municipal waste.

Table 1: Summary Characteristics of Schemes

Scheme	Key Features
Belgian: pay-per-bag scheme	Charges for householders intended to implement polluter pays principle Relatively low cost implementation of incentive to recycle / reduce residual waste through charges on bags
Denmark: weight-based schemes	Charges for householders intended to implement polluter pays principle Implementation of incentive to recycle / reduce residual waste through more sophisticated weight-based charging
Germany: weight- and volume-based schemes at apartment blocks	Charges for householders intended to implement polluter pays principle Implementation of incentive to recycle / reduce residual waste through innovative schemes for charging in apartment blocks
Italy: tagged bag schemes	Charges for householders intended to implement polluter pays principle Low-cost implementation of incentive to recycle / reduce residual waste through tagging bags and weighing vehicle loads
Italy: pay-per-bag scheme	Charges for householders intended to implement polluter pays principle Low-cost implementation of incentive to recycle / reduce residual waste through electronic payment card schemes for residual waste bags
Luxembourg: combined weight and volume based scheme	Charges for householders intended to implement polluter pays principle Implementation of incentive to recycle / reduce residual



Scheme	Key Features
	waste through combined weight- and volume-based charges
Sweden: weight-based scheme	Charges for householders intended to implement polluter pays principle Implementation of incentive to recycle / reduce residual waste through weight-based charges
Belgium: BEBAT scheme for battery collection	Industry funded take-back and recycling scheme for batteries
Finland: paper collection by Paperinkays Ltd	Industry funded collection and recycling scheme for paper and board
France and Brussels: systems to deal with unsolicited mail	Industry funded collection scheme for 'junk mail' Stickers for householders to express desire not to receive junk mail
Netherlands: paper and fibre covenant	Industry covenants with local authorities to ensure no negative price for paper collected separately for recycling
Belgium: white- and brown- goods collection	Scheme to encourage repair and re-use of white- and brown-goods. Joint objectives of materials re-use and provision of jobs and goods to those in greatest need
United Kingdom: community Re>paint schemes	Scheme to encourage collection of old paints for re-use in charitable
Belgium: residual waste levy in Wallonia	Scheme to encourage municipalities to constrain residual waste arisings – levies on surplus above 'quota'
UK: local public service agreements in England	Scheme to promote improved practice in waste management – funding and rewards from central government for attainment of various targets
Greece: schemes using aluminium can reverse vending machines	Scheme to promote recycling of drink cans through giving benefits to those inserting them into banks
Sweden: schemes to promote home composting	Scheme to encourage householders to reduce waste arisings through composting at home

<b>Scheme</b>	<b>Key Features</b>
UK: Real Nappy Initiative, West Sussex	Scheme designed to promote use of re-usable nappies as opposed to disposable ones. Incentives for new mothers to make use of re-useables. Also encourages local laundering service
Finland: benchmarking competition between companies, Helsinki	Competition to seek to encourage companies in the municipality to improve waste management
Luxembourg: household hazardous waste management	Central government funded collection of household hazardous waste

**SECTION 1:  
VARIABLE CHARGING  
(I.E. PAY-AS-YOU-THROW)  
SCHEMES**

## **CASE 1. BELGIUM: PAY PER BAG SCHEME**

### **1.1. Introduction**

Local authorities in Belgium have 2 ways of financing their municipal waste management: via the 'household waste tax' or 'environmental tax', and via payments for waste bags, or containers or the frequency of waste collection. The household waste tax and the environmental tax are fixed amounts which every household has to pay each year. The payments on the other hand, are made, for instance, each time a grey waste bag is bought. They therefore constitute a variable household levy.

In the Province of Flemish Brabant the payments for residual waste bags ('grey bags') are higher than in the rest of Flanders. This has a positive influence on the amount of municipal waste set out, and on the efforts made by householders in sorting their waste. The expensive grey bag system is an example of a pay-as-you-throw scheme.

### **1.2. Effects of Variable Household Levies, or Pay-as-you-throw Schemes, in Flanders**

A 1999 study carried out for OVAM found that a variable household tax has a significant impact on the amount of residual household waste offered. It was found that the introduction of a payment of € 0.50 (BEF 20) per grey waste bag purchased would lead, in an average commune, to a decrease in the amount of residual household waste offered of approximately 30 kg per inhabitant.

There are two avenues through which the residual waste collected is reduced:

1. Firstly, the charges for the bags lead householders to improve separation. This means that the amount of waste selectively collected increases significantly. This is called the separation effect. The separation effect is responsible for about 30% (or 9 kg) of the decrease in the amount of residual household waste offered; and
2. Secondly there is a reduction in waste set out for collection either through genuine preventative behaviour or through evasion. This is believed to account for, on average, 70% (or 21 kg) of the typical reduction in the quantity of residual waste.

The variable household tax (or retribution) does not simply reduce the amount of residual household waste offered, but there is some inverse correlation with the amount of bulky waste offered for collection. This conclusion arose from a model that looked for the correlation between the variable element of the waste fee and the amount of bulky waste offered for collection. Other parameters, such as whether or not municipalities had a strong policy on bulky waste, were not included in this model. It may be, therefore, that municipalities with high contribution schemes for grey bags might also be the ones that are more severe on the bulky waste fraction (for example, no door-to-door

collection of bulky waste). Alternatively, it may be that there is a greater awareness amongst householders of the issues involved, or more bulky waste may be sent to re-use centres.

The effect of the introduction of a contribution scheme of €0.50 (BEF 20) per grey waste on the total amount of municipal waste (= selective fractions + non-selective fractions) offered lies somewhere between 40 and 50 kg per inhabitant.<sup>3</sup> This is the net preventative and evasive-effect.

### 1.3. The Effect of Pay-as-you-throw in Flemish Brabant

Intermunicipalities of the Province of Flemish-Brabant have a system of payments whose level lies above the average for Flanders. Table 2 gives an overview of the mean prices of grey bags in the intermunicipalities of Flemish Brabant, as compared to the mean prices in Flanders.

Table 2: Mean Prices of Grey Bags in Flemish Brabant, as Compared to the Mean Price in Belgium. (in €, for the year 1998)

Region	< 60 litre	60 - 70 litre	> 70 litre
Flemish Brabant			
<i>intermunicipality of</i>			
Haviland	0.62	0.61	0.87
Interleuven	0.87	1.10	0.99
Interrand	0.58	1.12	
Interza		0.99	
Incovo	0.62	1.12	
<b>Flanders</b>	<b>0.63</b>	<b>0.60</b>	<b>0.59</b>

Source: OVAM, 1999

The higher cost for a residual household waste bag in the intermunicipalities in Flemish-Brabant results in an average decrease in the amount of residual household offered which is much greater than in the other provinces of Flanders. This effect is illustrated in Figure 1.

Over the period 1993-1996, the average amount of residual household waste offered in the intermunicipalities of Flemish-Brabant decreased by circa 140 kg per inhabitant. In the other Flemish provinces, the decrease varies somewhere between 20 and 55 kg per inhabitant (see Table 3). Source separation increased by more than in the other regions. Another effect in Flemish-Brabant is the decrease in the amount of bulky waste offered (almost 20 kg over the period 1993-1996). Lastly, the net change in total waste collection was much smaller than in the other regions. The 13kg per inhabitant increase compares with 59kg-108kg in other regions.

<sup>3</sup> Source: OVAM, February 1999.



Table 3: Change in Collected Waste in Flanders from 1993-96 (kg per inhabitant per year)

	<b>Increase in Separate Collection</b>	<b>Reduction in Residual Waste</b>	<b>Net Change in Waste Collection</b>
Antwerp	132.04	-49.25	82.79
Limburg	132.66	-24.47	108.19
East-Flanders	134.88	-54.89	79.99
Flemish Brabant	155.11	-141.79	13.32
West-Flanders	82.09	-22.64	59.45

#### **1.4. Potential for Replication in Other Countries**

The principle of variable charging is, of course, well-established across Europe, though some countries (e.g. the UK) prevent its application through legal obstacles, and in other countries, the mechanism is not widely used. Less is known about the elasticity of response of householders. The Flemish Brabant experience suggests that this might not be so small, although other factors are bound to confound any clear conclusions from this experience. In addition, there may some increase in the resort to illegal measures of evading payment for waste management services. Most local authorities appear to take the view that any incremental change in illegal evasion is outweighed by the benefits, in terms of encouraging positive behaviour, associated with variable charging. It is also a fundamental mechanism for implementing the Polluter Pays Principle at the household level.

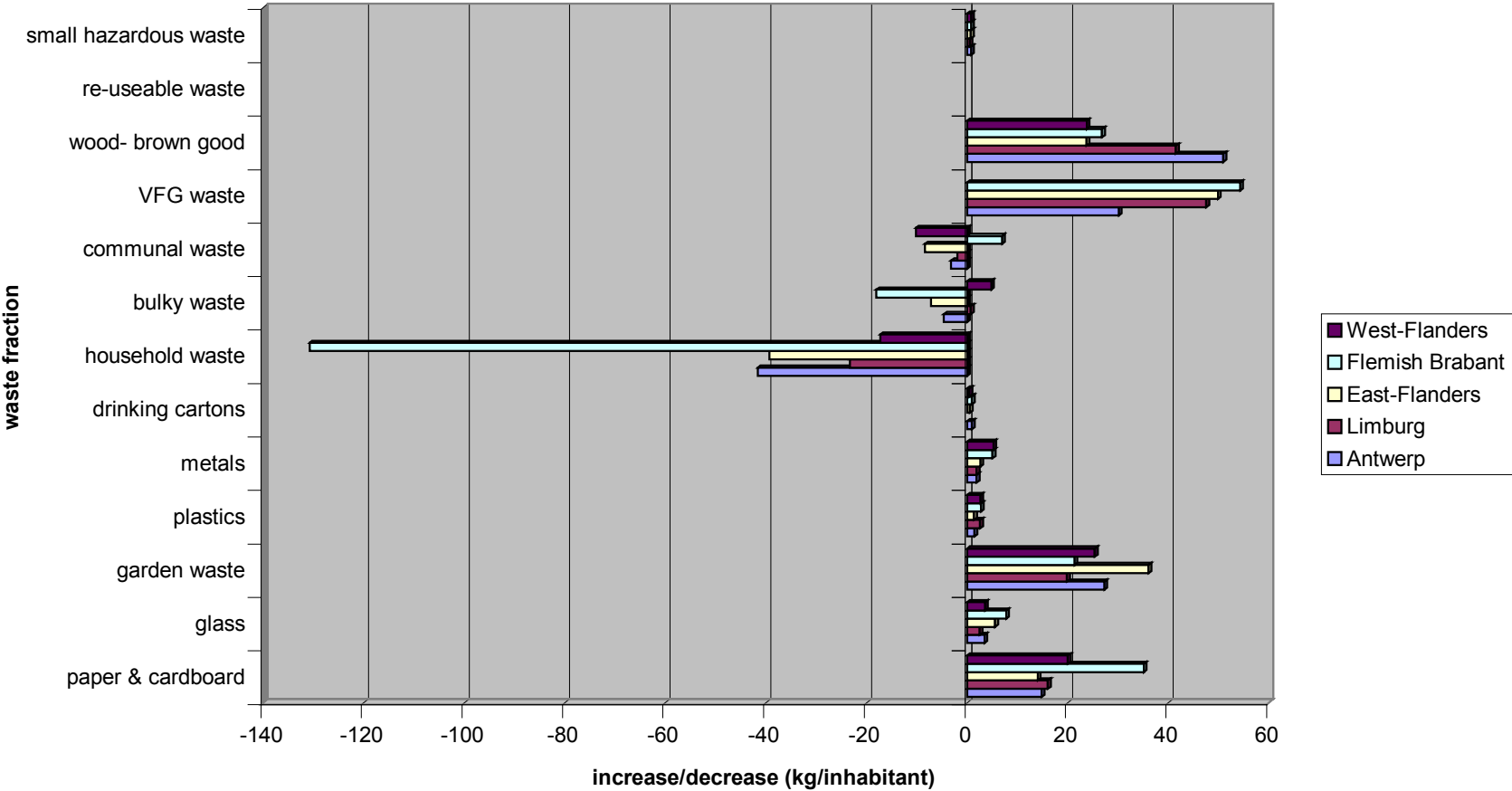
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Figure 1: Average Increase / Decrease in kg/inhabitant from 1993-1996 per Waste Fraction





## **CASE 2. DENMARK: WEIGHT-BASED CHARGING SCHEMES**

### **2.1. Introduction**

Currently a number of fee-differentiated collection schemes exist for household waste in Denmark, such as weight-based and volume-based charging for collection, and schemes based on home composting. This case study focuses on weight-based waste collection schemes. The study is based on a project conducted by the Danish Environmental Protection Agency in which 5 municipalities that have introduced weight-based collection schemes are compared to 5 municipalities without weight-based schemes. (DEPA 2000)<sup>4</sup>.

In this study, the general findings of the DEPA-project are presented and the weight based collection scheme of the Danish municipality of Bogense is provided as an example.

### **2.2. Weight-based Collection Schemes in Denmark**

Approximately 20 Danish municipalities have weight-based schemes for domestic waste from households, smaller companies and institutions. Tinglev municipality started the first such scheme in 1991 and during the 1990s, other municipalities followed.

The level of service differs amongst the municipalities that have introduced weight-based schemes. Whilst some of the municipalities only collect domestic household refuse, others have a dual collection system where organic waste and residual waste are each collected separately. The municipalities also collect the recyclable fractions (like paper, cardboard and glass). The waste collected includes only the smaller waste items (bulky waste is collected separately or delivered at municipal recycling stations).

All the municipalities that have introduced a weight-based collection scheme are small or medium-sized, rural municipalities with few multi-storey buildings. Bogense municipality is used as an example of a weight-based collection scheme in Denmark.

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<sup>4</sup> The project conducted by the Danish Environmental Protection Agency will in this presentation be referred to as the DEPA-project. Danish Environmental Protection Agency, 2000: "Fordele og ulemper ved gebyrdifferentierede indsamlingssystemer for husholdningsaffald". Miljøprojekt nr. 576, 2000. (Study on the advantages and disadvantages of fee-differentiated waste collection schemes for domestic waste from households).

## **2.3. Waste Collection in Bogense Municipality**

The municipality of Bogense is small, with approximately 6,400 citizens, located on the island of Funen. There are approximately 2,800 households in the municipality, divided into single-family houses, farmhouses, multi-storey houses (15%) and summerhouses (15%). 52% of the citizens live in towns and villages and 48% in the countryside. The average number of persons per household is 2.3.

The municipality of Bogense introduced the dual weight-based waste collection scheme in January 1993. The waste collection scheme includes domestic waste from households, small companies and institutions. The municipality of Bogense operates a recycling station for households and smaller companies where glass, paper, cardboard, metals, electronic waste, bulky waste, garden waste, demolition waste, hard white goods and hazardous waste can be delivered in separate containers.

The municipality provides a high level of service. Two waste fractions are collected by the scheme: residual waste, which is sent to an incineration plant, and organic waste, which is sent to the biogasification plant. Home composting of vegetable waste in private gardens is carried out, but households composting this organic waste are still included in the scheme, as little animal waste is composted at home and this still requires collection. The municipality does not deliver or sell composting containers to the citizens.

Waste is collected from the households every 14 days. Paper and cardboard is collected from households, companies and institutions once a month. Glass, however, has to be taken to central containers (bring banks) or to the municipal recycling station.

### **2.3.1. Equipment**

The households in Bogense municipality are equipped with a two-wheeled 260 l double container with a partition. The partition leaves 40% of the volume for organic waste and 60% for residual waste and cannot be moved. In the centre of Bogense a 140 l double container may be delivered at the owner's request if there is not enough space for a 260 l container.

Summerhouses are provided with 140 l containers (with no partition), as no organic waste is collected in those areas. Householders can request electronic locks for their waste containers at the municipality in case they suspect neighbours throw waste into their container. Very few citizens have requested electronic locks.

### 2.3.2. Fee Structure for Waste Collection Scheme at Bogense

The charging for waste collection in weight-based collection schemes in Denmark is based on similar principles across the country. However, the fee varies from 594 - 1,066 DKK per household per year between the municipalities, depending on the service level in general, the quantity of waste effectively covered by the fixed element of the overall fee, and the fee for the waste exceeding the fixed waste quantity. In the municipality of Bogense the fee for waste collection consists of a fixed yearly fee and a variable weight-based fee.

The fixed fee for households covers 5 kg waste per collection (i.e. residual waste and organic waste), collection and recycling of paper, glass and cardboard, recycling station including hazardous waste, biogasification, incineration, disposal and administration (see Table 4).

The variable, weight-dependent fee is paid per kg waste (i.e. residual and organic waste) above the 5 kg figure. The 5 kg 'charge-free' figure applies to each collection and cannot be transferred between collections.

The fixed fee for summerhouses covers 15 collections per year of 5 kg domestic waste per collection.

Table 4: Fees for Waste Management in Bogense, 2000.

Fee categories	Fee in DKK , incl. VAT, 25%, and waste tax <sup>d)</sup>
Fixed fee <sup>a)</sup> for households per year	1,063 DKK
Fixed fee for summerhouses per year	813 DKK
Variable fee per kg organic/residual waste <sup>b)</sup>	3.75 DKK
Additional waste container <sup>c)</sup>	375 DKK

- a) Covers collection and recycling/disposal of up to 5 kg of domestic waste per 14 days, recyclables, waste from recycling station and administration
- b) Fee on a weight-basis for residual waste and organic waste is paid for waste exceeding 5 kg per collection.
- c) Fixed fee for renting an additional waste container. The fee for the waste collected from an additional waste container is paid on a weight-basis.
- d) Waste tax: Incineration 330 DKK/tonne. Landfilling 375 DKK/tonne.

The municipality has no compensation for e.g. households with small children or other groups that may be affected negatively by this scheme.

### 2.3.3. Levying of Waste Collection Fees

The costs of operating the collection scheme are levied together with the property tax with adjustments, related to the variable fee, in the following year. The fee levied is therefore based on the amount of waste from the previous year.

On the bill, the fixed fee for 26 collections is shown as well as the amount of waste for the previous year with the 5 kg per collection deducted. Furthermore, the expected amount of waste and expenses for the coming year are shown.

For multi-storey buildings (rental departments), the owner obtains an overview of the expenses for each container. The owners can choose whether they divide the fee evenly between their tenants or whether the tenants pay individually for the use of the collection scheme.

Citizens can ask for a copy of the calculated waste amounts collected at their households.

### 2.3.4. Comparative Analysis

The fee for waste collection in Bogense municipality can be compared with a reference municipality having similar demography and level of service (Oelstykke Municipality on the island of Zealand).

Table 5 shows the waste collection fees (incl. VAT) for the municipalities of Bogense and Oelstykke for 1, 2-4 and > 4 persons in the household.

Table 5: Comparison of Waste Collection Fees in Bogense and Oelstykke with Different Number of Persons per Household, Including VAT

Municipality	1 person	2-4 persons	> 4 persons	Average
Bogense, per year	1,371 DKK	1,794 DKK	2,177 DKK	304 kg
Oelstykke, per year	2,800 DKK	2,800 DKK	2,800 DKK	707 kg

Table 2 shows that the waste collection scheme is cheaper in Bogense municipality, even when there are more than 4 persons in the household. It should be noted that the fee in Oelstykke is above average for Danish municipalities.

The municipality of Bogense uses e.g. approximately 960 hours per year for administration compared to approximately 860 hours per year in the municipality of Oelstykke.

## 2.4. Effect Of Weight-based Waste Collection Schemes In Denmark

### 2.4.1. Waste Amounts

There is a difference in the collected waste amounts in municipalities that have introduced weight-based waste collection schemes and those that have not.

On average, the amount of waste collected in municipalities with weight-based schemes is 359 kg less per household compared to municipalities without weight-based schemes. Taking composting in private gardens into account, the difference is estimated as 279 kg per household (see Table 6).

In those municipalities that have introduced the weight-based waste collection scheme, a significant increase in the amount of paper and cardboard collected has been registered compared to municipalities without this scheme. However, the amount of glass collected is almost similar.

Table 6: Average Amounts of Waste per Household in 1999, Including Composting In Private Gardens (DEPA, 2000)

Waste fraction	Average for municipalities <u>with</u> weight-based collection schemes	Average for municipalities <u>without</u> weight-based collection schemes
Residual waste (including organic waste)	325 kg	729 kg
Paper and cardboard	108 kg	67 kg
Glass	38 kg	34 kg
Composting in private gardens <sup>a)</sup>	124 kg	44 kg
<b>Total amount</b>	<b>595 kg</b>	<b>874 kg</b>

<sup>a)</sup> The amount of composted waste is estimated based on a questionnaire and is highly inaccurate.

#### 2.4.2. Difference in Waste Quantities Collected

As the DEPA-project did not reveal any differences in the consumption habits of the citizens of municipalities with and without weight-based schemes, it can be assumed that the same amount of waste is generated on average in the different municipalities. Thus, the difference in the waste amounts cannot be explained by different consumption habits within the municipalities.

The following reasons may explain the difference in the registered waste amount:

- Waste may be delivered at recycling stations;
- Composting in private gardens may be higher than estimated in the study;
- Waste may be burned in private fireplaces/stoves or oil containers; and/or
- Waste may be dumped at lay-bys or parking lots.

The DEPA-project did not reveal the amount of waste delivered at recycling stations and how well the waste received at the station was sorted. A higher amount of waste than assumed in the study may therefore have been recycled.

Waste composting in private gardens is not included in the municipal waste statistics. The amount of waste that is composted in private gardens is therefore subject to a high level of uncertainty and may therefore be higher than stated in the weight-based scheme.

The general advantages/disadvantages of weight-based waste collection schemes in Denmark are illustrated in Table 7.

Table 7: Advantages and Disadvantages of Weight-based Waste Collection

Advantages	Disadvantages
Higher degree of recycling of especially paper and cardboard	Garbage thrown in parking lots etc.
Higher degree of home composting	Garbage burned at the households
Economic benefits for sorting, recycling	No solidarity to e.g. families with babies that have relatively high amounts of waste
	Heavy administration

### 2.4.3. Advantages

According to the DEPA-project, the amounts of paper and cardboard brought for recycling are significantly higher in municipalities with weight-based waste collection schemes. The waste collection efficiency for paper and cardboard is 71% and 41% for municipalities with and without weight-based waste collection schemes, respectively.

The waste collection efficiency for glass is only slightly higher in municipalities with weight-based waste collection schemes, or 87% compared to 77% in municipalities without weight-based schemes.

The extent of composting in private gardens is also higher in municipalities with weight-based schemes. According to a questionnaire used in the DEPA-project, 59 % of the households with a weight-based scheme practise home composting compared to 21 % of the households with a traditional scheme.

The DEPA-project showed that the weight-based waste collection scheme is cheaper, even with more than 4 persons in the household, although most of the municipalities have higher administration expenses.

The scheme puts the "polluter-pays" principle into practice, since economic benefits are provided to those who sort and bring waste to recycling.

### 2.4.4. Disadvantages

The weight-based waste collection system has the disadvantage that more citizens try to avoid paying the variable fees by dumping waste at lay-bys, parking lots or in the neighbour's container. Many of the municipalities with

weight-based waste collection schemes have had problems with citizens burning the household waste in oil containers or fireplaces.

The Highway Authorities questioned in the study reported that there were greater waste amounts dumped illegally at lay-bys in those municipalities that had introduced weight-based waste collection schemes compared to those who had not. This was especially a problem in the beginning when the scheme was introduced, and in some of the municipalities, the dumping of waste at lay-bys has fallen back to the initial level.

The collection scheme has certain consequences which may be considered negative from a social perspective. Families with babies may have a relatively large amount of waste (such as diapers, organic waste etc.). However, it is possible to address this through promotion of re-usable alternatives.

The collection scheme is heavy in administration and may therefore have higher costs compared to a traditional collection scheme.

#### **2.4.5. User Behaviour**

The DEPA-project shows that living in a municipality with a weight-based collection system has positive effects on the users' behaviour regarding sorting and recycling. However, according to the study, this could explain only part of the user-behaviour.

The following factors have more significance:

2. The citizens' sense of duty of recycling waste;
3. The difficulties experienced with recycling; and
4. The owning of a composting container for private use.

If these three factors are influenced positively, they will exert a greater effect on the recycling rate than a weight-based waste collection scheme alone. No mention appears to have been made of influence on consumption patterns.

However, it cannot be denied that introducing weight-based waste collection scheme can motivate citizens towards the above mentioned factors. The weight-based scheme may, for example, motivate citizens to obtain a composting container, or use it more intensively than would otherwise be the case. Citizens may also regard the initiative as a strong signal from the authorities that they should focus their efforts on recycling waste.

## **2.5. Potential for Replication in Other Countries**



Weight-based waste collection schemes may be, and indeed, already are replicated in other countries. However, based on the experiences of the Danish municipalities, the success of such schemes requires that there are certain social and administrative conditions within the municipality.

**Comprehensive recycling schemes:** Replications of a weight-based collection scheme require that the recycling schemes within the municipality are operating successfully and have a high level of service. Otherwise, the users of the municipal scheme will be left with few other alternatives of disposing the waste except for illegal dumping or burning the waste.

**Consciousness:** Replication of the weight-based scheme is only recommended in communities where the general environmental consciousness is high. Otherwise, the costs of introducing the weight-based scheme would probably be used more cost-effectively in thorough information campaigns where the citizens are given instructions on sorting and recycling of waste (with weight-based schemes introduced subsequently).

**Information:** Frequent information campaigns aimed at households and schools are essential when introducing and operating waste schemes.

**Administrative systems:** Weight-based collection schemes require a higher level of administration due to individual accounting of waste amounts and fees. Replications of weight-based collection schemes require that the municipalities have good administrative systems. These additional costs should be considered alongside the potential benefits associated with improved monitoring and data concerning waste collection.

**Rural/Urban Issues:** The weight-based fee system is easier to implement in areas with single-family houses than in areas with multi-storey houses. In Denmark there are no examples of weight-based schemes implemented in predominantly urban municipalities. For this reason, alternative approaches (i.e. not weight-based) tend to be used in other countries where variable charging is used in urban areas.

The following German case study (in this report) provides examples of approaches used to implement charging schemes in apartment blocks.

## **CASE 3. GERMANY: WEIGHT- AND VOLUME-BASED SYSTEMS AT APARTMENT BLOCKS**

### **3.1. Introduction**

The solid waste situation at blocks of flats is, in many cases, different to the situation in other residential areas. A general problem is that the amount of residual household waste is much higher than the average amount. On the other hand, the amount of dry recyclables is very low, and separation is often poor.

Reasons for these problems are:

- high occupant density and tenants being anonymous;
- tenants often change; and
- the existence of waste fees which are calculated on the base of the living area. The polluter-pays-principle is not applied with fees related to the living area and the system therefore is not fair to the tenants.

In order to find solutions to improve the situation described above several pilot projects with innovative waste systems were established. These systems are based on lock gates for waste containers. The principal goals of the implementation of a lock gate system are:

1. Reduction of the costs of waste management;
2. Reduction of residual waste, and an increase in the quantity of dry recyclables, as well as better separation of different fractions (residual waste, dry recyclables, compostable waste);
3. The possibilities such systems introduce for setting waste fees according to the polluter-pays-principle (depending on the amount of waste) and transparency in the calculation of the waste fees; and
4. Rationalization of the waste collection.

There is a variety of lock gate systems in Germany, which have been tested or installed within the last years. Two of them, the IPW Centre and a simple mechanical lock gate system, shall be described in more detail.

### **3.2. IPW Centre**

The IPW centre (**I**dentifizieren, **P**ressen, **W**ägen = identify, press, weigh) is a more technically demanding system. The characteristics of a pilot project in Ohrekreis (Sachsen-Anhalt) are given in Table 8.

Table 8: Characteristics of the IPW centre

<b>IPW Centre</b>	
Duration of pilot project	5 months
Residential area	Blocks of flats (5 storeys), approx. 800 tenants
Waste system	IPW centre with 6 containers (1.1 m <sup>3</sup> each)
Description of the system	Weighing of waste, fee according to the mass (chip card); pressing of the waste, opening of the lock gate with a chip card, information and “what to do” on a display, automatic change of the containers and the actual filling capacity of the total system, connection to a PC for data transfer
Equipment	Concrete foundation necessary (max. 2,000 €), electricity
Costs	Total IPW centre approx. 19,400 € (incl. tax), laptop approx. 2,000 € (incl. tax)

The results of the project in relation to the goals given above are generally very good. A comparison of the waste management with and without IPW centre and further details are shown in Table 9.

Table 9: Results of the Pilot Project IPW Centre

	<b>Before installation of IPW centre</b>	<b>After installation of IPW centre</b>
Amount of waste		Approx. -45 %
“incorrect” waste in residual waste fraction	30 to 35 %	10 to 15 %
“incorrect” waste in dry recyclable fraction	Up to 30 %	5 to 10 %
Calculation of fees	Fixed fees; based on living area	Polluter-pays-principle; related to mass
Capacity of waste container needed		Less than before
Waste collection	Twice per week	One time per week
Time needed for waste collection	Container at different places	All containers at central position
Costs per month per household (example for 3 persons per household)	220 €	171 €

Distance to container for tenants	15 meters	79 meters
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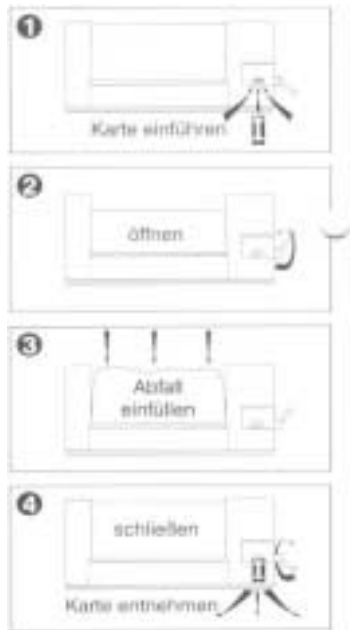
### 3.3. Mechanical Lock Gate

The waste fees within the mechanical lock gate system are calculated depending on the volume of the waste. The lock gate, which is totally mechanical, can be simply installed at (already existing) containers. The volume of the lock gate can be for example 5, 10 and 20 l on a 1.1 m<sup>3</sup> container (Figure 2). The lock gate is to be opened by a lever after inserting a chip card. After filling the waste into the lock gate it can be closed again by using the lever (see Figure 3 for instructions). The waste is emptied into the container at the same time. The chip card is given back when the process is finished.

Figure 2: Example of Mechanical Lock-gate



Figure 3: Display Showing Functioning of the Mechanical Lock gate: '(1) insert chip card (2) open gate (3) waste input (4) withdraw chip card'



A pilot project was run in Jena (Thüringen) (see Figure 4). 522 households with approximately 950 persons took part at the project. The results are given in Table 10.

Figure 4: Lock-gate Scheme in Jena



Table 10: Results of the Pilot Mechanical Lock Gate Project

	<b>Before installation of lock gate</b>	<b>After installation of lock gate</b>
Waste collection	35 containers (1.1 m <sup>3</sup> ) for residual waste, collection weekly, 17 containers (1.1m <sup>3</sup> ) for compostables, 22 containers	26 containers (1.1 m <sup>3</sup> ) for residual waste, collection every second week, 17 containers (1.1m <sup>3</sup> ) for compostables, 22 containers

	(1.1m <sup>3</sup> ) for waste paper	(1.1m <sup>3</sup> ) for waste paper
Dry recyclables	Two “amenity sites” with containers for glass, lightweight packaging, paper, metal scrap, textiles	Additional 12 containers (1.1m <sup>3</sup> ) for lightweight packaging
Separation of wastes		Has improved, no change in quality of the lightweight packaging and the compostable fraction
Cleanliness around the containers	Good	No change
Total amount of waste	31.4 l per week and person	11.7 l per week and person
		No direct vandalism, some minor damages while trying (without success) to manipulate the lock gates
		95.6 % of the persons answered the question “Should the lock gate be used permanently” with “Yes”

Another kind of “lock gate” system involved use of plastic bags for the residual waste with a volume of 5 to 25 l. The plastic bags are sold to the households together with a “ticket” and can be returned and emptied into the container only at a certain time. The waste container cannot be filled at any other time.

### 3.4. Effectiveness

Meanwhile, the effectiveness of the lock gate system has been proven in a number of cases and was also installed permanently in some cities. The acceptance of the lock gate system is generally good. Up to 80% reduction in residual waste is not considered unusual. No increase in illegal disposal of waste was recorded.

### 3.5. Potential for Replication in Other Countries

Principally, the positive results of the lock gate systems are likely to be applicable to comparable cases. However the local characteristics and the mentality of the people have to be taken into account. Such schemes will clearly not work well when applied in isolation (i.e. without charging schemes in operation in the vicinity). Such an approach could be expected to lead to dumping.





## CASE 4. ITALY: TAGGED BAG SCHEME

### 4.1. Introduction

The Comuni dei Navigli (the Italian “Comuni” stands for “Municipalities”, “Navigli” are some navigable channels flowing in the area) in Milan Province effectively covers ten municipalities including 24,200 inhabitants. As of 1999, the source separation rate for this area was 70.3%. The reasons for this can be traced to a specific series of measures undertaken in the area.

### 4.2. Description of the Scheme

Comuni dei Navigli have, since 1997, adopted a source separation scheme for biowaste, based on doorstep collection. Bags are used for the segregation of biowaste (on the one hand) and those for residual waste (on the other hand) were being distributed to householders free of charge. The PAYT system was first tested by Albairate Municipality (one of the municipalities belonging to the Navigli association) in June 1998, and PAYT was introduced more widely from 1 January 1999.

According to the principles of PAYT schemes, which have been mandated to be implemented within a few years throughout Italy, *the sum to be paid for the cleansing service is composed of 2 parts, a fixed one and a variable one*. In Comuni dei Navigli, the fee structure is as follows:

- The **fixed quota** for householders is assessed allowing on the basis of the width of the house, the number of people in the household and the type of dwelling (e.g. flat, detached house with garden, terraced house, etc.). This is in conformity with what is requested by the national technical provisions issued as a consequence of the National Waste Management Act (Decree 22/97) which defines different categories and specific waste production indices; and
- The **variable quota** is assessed allowing for the number of bags used to deliver the residual waste to the cleansing service. Each householder has a magnetic card (‘Navigli card’) whereby the household is identified through a numeric code. This is automatically linked to a personal set of bags and tags - with a bar code printed upon for the collection of residual waste.

The waste collector on each round collects the tags – which have to be tied by householders onto the bags – and then gives them to the Waste Taxation Office which is located at the Association of Municipalities. Together with the tags the waste collector also gives the Office the overall weight of the waste collected by the vehicle throughout the collection round. The overall weight is

then divided by the number of bags collected to assess an average weight of a single bag, and to develop a further level of control on the scheme.

In order to further verify the reliability of the estimates of the average weights of bags, some bags from different types of users (e.g. different dwelling conditions, commercial users) are randomly weighed. This ensures a more accurate estimation of the weight of waste delivered by different kinds of users.

### 4.3. Technical Details of the PAYT scheme

According to the principles set out by the National Waste Management Act and subsequent Technical Regulations on financing of MSW collection, overall running costs for the collection service should be partitioned between householders and other users (e.g. handicraft and commercial users) on the basis of *some parameters related to the specific potential waste production and to the quality of the service* (e.g. collection frequency, type of container, etc.).

In **Comuni dei Navigli** for householders the 2 part tariff is related to the total system costs in the following way:

1. **Fixed quota** – covers 50% of the overall forecast tariff income: in principle, it is deemed to include most of costs for collection and transportation (around 80%) as well as general financial and running costs (all those costs that cannot be linked to the waste arisings);
2. **Variable quota** - covers 20% of the costs for collection and transportation. In addition, it covers 100% of the costs for disposal.

It is important to recognise that because the variable cost element is only linked to the amount of residual waste delivered, and does not therefore take into account the possible lower delivery of biowaste where home composting is being practised, **householders doing composting in the backyard are allowed a 20% reduction of this quota**. This serves to incentivise participation in home composting, thereby encouraging waste minimisation. In addition, credits for a further reduction of the variable quota are given in proportion to the quantity of recyclables delivered in a separated manner at Civic Amenity sites.

### 4.4. Effectiveness

in case of **Navigli** after introduction of PAYT system:

- the specific amount of residual waste fell by about 18% (from 97 kg/inh/yr to 80 kg/inh/y);
- the rate of source separation rose by about 8%; and

- the total production of MSW actually increased from 322 to 340 kg/inh/yr, meaning that it is unlikely that fly tipping has been significant. Indeed, one explanation for this is that there is a better system for collecting waste in the source separation system.

It is important to keep in mind that in Navigli the PAYT has been introduced where a wet/dry collection system was already in place (so rates of source separation were already around 50 % by weight). Therefore the limited increase in rates of source separation, and the reduction in residual waste do not appear so impressive, yet they are significant. It is also of fundamental importance the fact that the total quantity of MSW did not fall (due to fly-tipping etc.).

#### **4.5. Advantages and Evolution Foreseen**

The scheme allows a good weighting of the tariff according to the actual delivery by households of residual waste to be disposed of. It is interesting that Albairate reported a reduction in the system cost of €2/inh/yr. This reflects the well-optimised system for collecting source-separated materials.

The computerised recording of data allows the managers to detect households and other users that don't use tags and bags. This therefore keeps the system under control and reduces the occurrence of lack of deliveries due to misbehaving (households with an overall delivery that seems to be particularly low can be checked).

The number of tags at each collection round, together with the overall weight of residual waste collected by the vehicle, enable the Association of Municipalities to tightly monitor and control the service supplied by contractors.

Source separation (and separation of foodwaste) is thus promoted indirectly, because households pay the variable quota in proportion to the amount of residual waste delivered, while the collection service for recyclables and biowaste is covered by the fixed part of the fee.

#### **4.6. Drawbacks and Management Problems**

Some tags occasionally become detached and lost, though this occurs relatively infrequently.

A survey led on families with a particularly low delivery of bags for residual waste (16% of total householders), reported some 43% of these 'zero-MSW-cases' were "true" or "justified", 29% were due to misbehaving (attempts for tax avoidance) and another 28% were *suspected* to be misbehaving, without this being proven. Therefore tax-evasion that is proven accounts for about

4.5% of total participants (as 29% \* 16%), though the true figure may be as much as double this.

In order to promote source separation of biowaste, the biowaste collection is not covered by the variable part of the charging structure (this is fairly common in Italy). Though extremely agreeable at one level, this does, however, make home composting less appealing, as reduced deliveries of food waste are not rewarded. The introduction of a 20% saving on the variable quota for home-composting households has thus been introduced in the scheme.

This requires some monitoring over whether or not declarations of those households claiming to be home-composting are true or not. The control is done by the Municipal Police, and though usually effective, it occasionally results in disputes.

#### **4.7. Potential for Replication in Other Countries**

Variable charging schemes are in place in many parts of the EU and other countries. The schemes described here are replicable in most parts of the EU. The tagging of bags provides a relatively low cost means of implementing pay-as-you-throw schemes.

A key difference in this scheme is that it is designed to ensure an incentive for home composting remains. The importance of ensuring that home composting is not discouraged through the collection process is increasingly recognised in collection schemes, both with and without variable charging. Mechanisms such as the one described here are one alternative, another is to charge a fee for collection of biowaste, but one which is lower than that for residual waste. The level at which this should be set probably depends upon the potential to undertake home composting – it would seem that it should be higher in areas with available garden space.

## **CASE 5. ITALY: PAY-PER-BAG SCHEME**

The population of Bergamo Province is around 1,000,000. The Province-wide rate of source separation of municipal waste was 42.5% in 1998. This was the average provincial rate, including those municipalities without any segregation of biowaste. Average rates among municipalities engaged in source separation of biowaste is generally above 50%, and as high as 75% in some municipalities.

The municipality of Torre Boldone has the highest rate of source separation of any municipality in Italy (77.4%) (this is probably one of the highest rates of source separation of any European municipality). This is a small municipality with a population of just under 8,000.

### **5.1. Description of the scheme:**

A programme commenced in 1998 aimed at:

- Volumetric quantification of MSW;
- Identifying the producer; and
- Introduction of PAYT (the polluter pays principle).

PAYT schemes have been implemented in many Municipalities in Bergamo Province (whose overall population is around 1,000,000 in some 250 Municipalities). Torre Boldone has been the pilot project. Here, we describe the technical details concerning some of the first schemes that have been established. These include, after Torre Boldone:

- Municipality Urgnano (pop. 8,000)
- Municipality Caravaggio (pop. 12,000)
- 7 Municipalities gathered in the Consortium “Linea Servizi” (overall pop. around 15,000)

By the end of this year such schemes will be implemented in another 20 Municipalities in the Province.

Pilot PAYT schemes in Italy are normally implemented in those situations where a collection at the doorstep is already in place for the main waste streams produced by the households. Such schemes usually adopt specific collection tools for different waste streams. In most cases, bags are used for

residual waste, and biodegradable bags, coupled with bins and buckets of appropriate size, are used for kitchen waste (food leftovers).

The scheme in Bergamo Province implies the variation of the variable quota of the waste tariff by means of the sale of bags for the collection of residual waste. Each household is supplied with a card (“chip card”) whereby it can collect the bags at many locations (City Hall, Banks, CA sites, etc) or from vending machines.

The computerised system automatically detects the identity of the household and records it in order to determine the overall yearly amount of the tariff.

The tariff is split into

- A fixed quota, intended to cover fixed costs of collection and transportation, the road cleaning service, and the service for the collection of recyclables
- A variable quota, drawn by means of the sale of bags for residual waste to households; such income in principle should cover the costs for the collection, transportation and disposal of residual waste.

The bags for residual waste can be purchased at the City Hall and their number is recorded on a computerized system. The amounts of bulky waste and recyclables delivered at the CA site are also recorded through the use of an electronic card, supplied to each household.

Data on the number of bags picked by the household and of its deliveries at the CA sites are thus recorded on a software package that then uses the information for the assessment of the variable quota of the tariff. The software also makes it possible to detect those households and other users (e.g. shops) that do not buy the bags or that show an unexpected decrease in their use.

## **5.2. Technical Details on the PAYT Scheme**

The card given to each household makes it possible to quantify residual waste delivered for disposal through the number of the bags picked by the household. Furthermore, the card makes it possible to access CA sites and to monitor the amount of recyclables there delivered. Deliveries of non-recyclable bulky-waste are registered on the card and disposal costs are added to the variable quota of the waste tariff.

The waste tariff gets drawn by means of an invoice sent to the household; the invoice sums up the costs, split into fixed and variable, and costs related to

collection and disposal of residual waste and to treatment and recycling of recyclable waste streams.

The PAYT scheme aims at achieving the following:

- promoting a lower delivery of residual waste through the calculation of the variable quota of the tariff on the basis of the number of bags each household collects;
- crediting a further bonus to allow for the amount of recyclables delivered at CA sites

### **5.3. Advantages and Evolution Foreseen:**

The system makes it possible to determine the sharp sum due by each household.

The type of tool (E-card) is flexible under the viewpoint of investments and services covered; it allows a progressively growing number of distribution points, and/or a growing number of services covered by the card.

As a matter of fact, in some Municipalities the cards are also used in order to provide other services such as: sale of bus tickets, requests for certificates, etc. In particular, the card itself makes it possible to monitor the access at CA sites, preventing the use of them by non residents.

### **5.4. Drawbacks and Management Problems:**

Attempts for an avoidance of the variable quota of the tariff by households have occasionally led to deliveries outside the Municipal boundaries; such behaviour has been assessed at around 5/6% (weight basis); this value is usually considered as acceptable and is bound to decrease with the implementation of the scheme also in bordering Municipalities.

### **5.5. Potential for Replication in Other Countries**

Variable charging schemes are in place in many parts of the EU and other countries. The schemes described here are replicable in most parts of the EU.

Pay per bag schemes are increasingly common in the EU. They provide a relatively low cost means of implementing pay-as-you-throw schemes, though they are susceptible to fraudulent reproduction of bags.





## **CASE 6. LUXEMBOURG: COMBINED VOLUME AND WEIGHT-BASED SCHEME**

### **6.1. Introduction**

In order to implement the polluter-pays-principle and a cost-effective system of waste management, a new waste fee system was developed in Luxembourg. This new calculation system was tested in a pilot project in two communities, Koerich and Kopstal, of the waste syndicate SICA in cooperation with the Ministry of Environment. The general goal of the new waste fee was greater fairness in waste fees (polluter-pays) and incentivising improved environmental behaviour on the part of the households.

The following information refers to the pilot project which was prepared in 1994 and was run in 1995 and 1996. Approximately 4,800 citizens corresponding to 1,780 households took part in the project. In 1998, the new waste fee system was installed in all member communities of the syndicate SICA.

It was expected that at least 50 % reduction of residual waste being disposed via waste bins should be possible by:

1. Applying the polluter-pays-principle as far as it was ecologically beneficial to do so;
2. Ensuring that the option to avoid waste was reflected in the calculation of the fees;
3. Separating certain waste fractions for specific treatment;
4. Implementing a structure of fees which was transparent to households; and
5. An ongoing programme of awareness raising by public relations work and advice.

It follows from that that it is essential for the functioning of waste fees as an ecological tool that:

- The infrastructure for collection and treatment of specific waste fractions is in place; and
- An individual waste fee per “polluter” is calculated which takes the individual amount of waste into account and which is transparent and logical to the “polluter”.

## 6.2. Infrastructure

The waste treatment and recycling options of Koerich and Kopstal for the different waste fractions are listed in Table 11.

Table 11: Waste Infrastructure of the Pilot Project

Infrastructure	Waste fraction
Amenity site, waste paper bins, containers	Waste paper
Amenity site, containers	Glass
Amenity site, “by call” collection	Metal scrap
Amenity site	Plastics (other packaging materials)
Amenity site, containers	Textiles
Home composting, green bin	Compostables
Amenity site	Construction waste
Amenity site, Superdreckskescht	Hazardous waste
Grey bin	Residual waste
“by call” collection	Bulky waste

The installation of the weighing and identification system was another part of the necessary infrastructure. These systems for the determination of the weight of the waste include a micro chip at the bin to identify the owner of the bin, and an identification system and a weighing system at the vehicle. Micro chips were attached to the residual waste, waste paper and biowaste bins.

Apart from the improvement of the infrastructure the delivery of information to the citizens was the main task during the preparation period in 1994. The intensive and continual public relations work consisted of an information campaign via circulars to all households, brochures, information events and home visits and was accompanied by a questionnaire.

In 1995, data on the amount and the composition of the waste and other relevant information for the calculation of the waste fees were collected. The following year the new waste fee system (see Table 12) was applied to all households in the pilot project.

Costs for administration, public relations, amenity site, containers and compost plant are covered by the basic fee which has to be paid by every owner of a residual waste bin (grey bin). Generally, the use of containers (recyclables) or bins for waste paper and compostables are more economical to the households than the grey bin for residual waste. Home composting, because it is free of charge, is favoured relative to the green bin.

Table 12: Waste Fees for the Various Waste Fractions

Waste fraction	Waste Fee
Waste paper (bin)	Per emptying 120 l: 2.7 €; 240 l: 4.0 €; 1100 l: 9.9 € per emptying
Metal scrap (by call)	Per collection, 19.8 €/call
Compostables (bin)	Per weight; 0.09 €/kg
Residual waste (bin)	Basic fee 7.8 €/(month and bin) Additional per weight 0.11 €/kg and additional per emptying 120 l: 1.2 €; 240 l: 1.9 €; 1100 l: 4.7 € per emptying
Bulky waste (by call)	Per collection and treatment, 31.6 €/call
Refrigerators etc.	Per collection and treatment, 19.8 €/collection and 27.2 €/treatment
Container (recyclables)	Financed by basic fee from residual waste
Amenity site	Financed by basic fee from residual waste
Compost plant	Financed by basic fee from residual waste
Administration SICA	Financed by basic fee from residual waste
Information and public relations	Financed by basic fee from residual waste

The positive effect of the measures (improvement of the infrastructure, information and new waste fees) of the pilot project on the total amount of waste can be seen from Table 13 below.

Table 13: Total Waste of Different SICA Communities from 1994 to 1996

Community	Total waste [t]		
	1994	1995	1996
Koerich	612	390	294
Kopstal	1,020	731	541
Mamer	2,078	1,906	1,817
Steinfort	1,406	1,297	1,332

In Koerich and Kopstal a reduction of approximately 50 % of the total amount of waste took place in comparison to other SICA communities (Mamer and Steinfort) which were not part of the pilot project. More detailed information on the waste reduction is given in the Table 14.

Table 14: Developments of Different Waste Fractions in Koerich (differences 1994/1996)

Waste fraction	Difference 1994/1996	
	kg/citizen	%
Residual waste	-114,1	-55
Bulky waste	7,2	
Compostables	-9,5	-19
Waste paper	6,5	33
Glass	3,8	28
Metal scrap	-3,8	-60
Plastics	1,9	
Hazardous wastes	1,6	248
Others	4,0	
<b>Total</b>	<b>-102,6</b>	<b>-35</b>

Once more the figures show the overall waste reduction which, as no illegal waste disposal occurred, is expected to be caused by waste avoidance. A relevant aspect herein is the increase in home composting being promoted by a separate fee for compostables. Moreover, much better source separation of wastes and an increase in dry recyclables collected resulted from the pilot project.

Apart from the waste minimisation the project had also a positive effect on the overall costs for waste management in Koerich and Kopstal. One reason for the cost reduction was the reduction in waste needing to be incinerated in the MWI (residual waste 107 €/t; bulky waste 141 €/t). Another reason is the reduction within collection and transport of wastes due to the new waste system (for example emptying the grey bins (residual waste) only once every two weeks or increasing home composting).

### 6.3. Potential for Replication in Other Countries

As with other variable charging studies in this report, the means used here to implement the Polluter Pays Principle are inherently transferable across the EU. The interesting aspect of this system is that it seeks to encourage home composting through making charges for the collection of biowaste (and this happens also in parts of Flanders such as Gent). This appears to have been successful.

As with many other schemes, the flat rate fee covers several aspects of collection, ensuring a base revenue which facilitates budgetary planning.



## **CASE 7. SWEDEN, WEIGHT-BASED SCHEME**

### **7.1. Rationale for Scheme**

In Sweden, the municipalities are responsible for collecting household waste and taking charge of it in an environmentally sound way. Presently, a wide array of collection and handling methods are being used in order to cater for the increased demands on recycling and waste minimisation. Some 15 municipalities in Sweden are using a weight-based fee system for household waste collection, where a part of the collection fee is based on the amount of waste collected. This weight-based fee is intended to give direct economic incentives for households to recycle.

Starting in April 2000, the municipality of Bjuv implemented a weight-based system and at the same time provided kerbside collection of 11 waste fractions. The results of this initiative have far exceeded expectations when it comes to waste minimisation and recycling, even though there are some uncertainties and drawbacks that have to be dealt with.

### **7.2. Background Information**

Bjuv is a small municipality with some 13 700 inhabitants in the north-western part of Skåne, in the south of Sweden. It consists of several smaller rural settlements: the municipality has 4,100 household subscriptions for waste collection from detached housings, and 369 household subscriptions from apartment blocks. The average number of persons per household is 3.1.

Waste collection and transport in Bjuv is the responsibility of the municipality and carried out by a contract firm, Sita. An important actor in the area is the jointly owned regional waste company NSR, which apart from Bjuv also serves five other municipalities in the region with planning, design, building and operation of the regional plants for reception and treatment of household and industrial waste.

### **7.3. Waste Collection Schemes in Bjuv Municipality**

Up until 2000, Bjuv had a fixed collection fee and kerbside collection of residual waste, with collection every week. Recycling fractions were collected at 10 recycling stations around the municipality.

In April and May 2000, the system was more or less revolutionised: kerbside collection of residual waste, organic waste, newspapers, 6 fractions of packaging waste (cardboard, hard and soft plastics, coloured and uncoloured glass, metals), and an option for kerbside collection of garden waste were introduced. The collection fee was changed to a fee based on a flat fee as

well as variable elements based upon the weight of residual waste and compostable waste, with an option to have collection every two weeks (see Table 15). At the same time, 7 of the recycling stations were closed down.

An on-vehicle weighing system is used. Containers are tagged with an ‘intelligent chip’ (to avoid switching, voluntary or involuntary, between neighbours) and weighed both before and after emptying. The difference in weight is the basis for the charge to the household.

This change led to the cost for the waste collection system almost doubling. The fee paid by households was also expected to increase substantially (although this was, of course, dependent on how much sorting the household conducts).

Table 15: Subscription Fees for Household Waste Collection

<b>Compulsory fees</b>	<b>Collection every 7 days</b>	<b>Collection every 14 days</b>
Fixed fee for residual waste, 140-l container	560 SEK/year	280 SEK/year
Per kilo residual waste	3,65 SEK/kg	
Per kilo compostable waste	1,2 SEK/kg	
<b>Additional services</b>		
Collection of recycling fractions	158 SEK/year	(newspapers, cardboard, hard plastics 12 times/year, metals, coloured and uncoloured glass, soft plastics 6 times/year)
Collection of garden waste	500 SEK/year	(including container rent, collection 20 times/year)

All households have subscribed to the compostable waste (as this was compulsory), and some 3,000 households subscribed to the collection of recycling fractions, and some 2,100 for the collection of garden waste. Thus, 75% of the households presently have kerbside collection of the recyclable fractions.

### **7.3.1. Equipment**

The households in Bjuv are equipped with a 140-l container for residual waste (a 240-l container can be obtained at no extra fixed cost) and a 140-l container for compostable waste. For recyclables, 100-l fibre sacks are provided for each fraction. A container of 370 l is provided if the garden waste service is subscribed for. As discussed above, bins are tagged with an

intelligent chip to record data concerning collected weights from specific households.

### 7.3.2. Information

Prior to the change to a weight-based collection fee, there were significant information campaigns. Due to political disquiet concerning the existence of the system, no further information has been provided for households thereafter. The households seem to manage the new system perfectly well following the initial information campaign.

## 7.4. Effect of Weight-based Collection Fee in Bjuv

### 7.4.1. Waste Amounts

The introduction of the weight-based fee led to a dramatic change in waste streams (see Table 16).

Table 16: Waste Amounts per Household, kg/year, in Bjuv 1999-2001

	1999	2000
Total amount of waste*	302	245
Residual waste	246	136
Compostable waste and recycling fractions	56	109

\* including waste from kerbside collection and recyclables from recycling stations, not including garden waste

The amount of recycled waste (compostables and recyclable fractions) almost doubled in the first year with weight based fees. At the same time, the total amount of waste dropped by almost 20%, leading to a reduction in residual waste of some 45%. Presently, no official statistics for 2001 exist, but preliminary results indicate a further increase in recycled amounts of almost 30%, a drop in total waste amounts by a further 15%, and a reduction of residual waste by another 45%. The overall result over the last two years would thus be a total waste reduction of 30% and a reduction of residual waste of more than 70%.

The increased amounts of collection of recyclables and compostables can be explained by the introduction of the weight-based fee in combination with the increased sorting possibility for households with kerbside collection of recyclables and compostables.

There are a number of possible reasons for the reduction in total waste amounts:



- Waste may be dumped elsewhere. There has been an increase in the residual waste collected from recycling stations (households are not supposed to leave residual waste there). The waste collected from cleaning the municipality amounted to 62 tonnes in 2001 (compared to the total amount of waste in the municipality of some 3000 tonnes). No earlier statistics are available for comparison, but there has been no notable difference in the littering in Bjuv compared to neighbouring municipalities;
- Waste may be burned in private fireplaces/stoves etc.;
- Waste may be composted to a larger extent than before in private gardens; and
- The total amount of waste may actually have decreased.

According to analysis of the residual waste fraction, Bjuv municipality has a considerably smaller fraction compared to Swedish averages (see Table 17). The statistics also suggest (potentially) more accurate separation by householders (the potentially recyclable fraction is a lower proportion of the residual waste).

Concerning the recyclables and compostables, there has been no discernible change in the quality of these fractions after the change to weight-based collection fee.

Table 17: Comparative Analysis of Residual Waste in Bjuv and Swedish Averages

	<b>Bjuv 2000</b>	<b>Swedish average 2000</b>
	<i>Kg per household and week</i>	<i>Kg per household and week</i>
Average weight residual waste	2.1	11.3
Average amount of producer responsibility material in residual waste*	0.5	3.4
Average amount of compostable material in residual waste	0.7	4.6

\* cardboard, plastic, glass, and metal containers, newspapers

## 7.5. Lessons Learned in Implementation

In Bjuv, the weight-based fee scheme has been implemented for all households, including apartment blocks. The implementation in apartment blocks proved to be no more difficult than for detached housing areas. However, as Bjuv is a relatively small municipality, the implementation in a major urban settlement may lead to a different result.

During the start-up of the system, there were problems concerning the weighing equipment. These problems are considered to be transitory.

The most significant problem is that it has been difficult to balance the budget, since the reduction in residual waste (which provides most of the revenue) was far greater than expected.

### **7.5.1. Advantages**

The weight-based collection fee, in combination with kerbside collection of recycling fractions, has led to dramatically increased recycling rates and a dramatic reduction in overall waste amounts. This has presented some budgetary problems (see below).

### **7.5.2. Disadvantages**

The system has proved to be quite expensive – almost twice as expensive as the previous collection system. As the recycling rates increased far more than was expected, the collected fees do not now cover the costs for the municipality. To reflect this, Bjuv municipality intends to increase the fixed fee substantially (no amount fixed at date) while decreasing the variable fee from 3.65 SEK/kg to 2.40 SEK/kg. This change makes the system less vulnerable from the budgetary point of view. It will be interesting to see whether the rates of source separation fall, and residual waste collection increases.

Weight-based fee systems require a higher degree of administration, as waste amounts and fees have to be registered for every household.

The system may lead to increased incentives for disobedience from households, where waste is burned in private or dumped illegally. There is no indication whether this is an important problem or not in the Bjuv municipality.

## **7.6. Potential for Replication in Other Countries**

A weight-based collection fee can be replicated in other EU member states. Even though no explicit prerequisites for implementation of a weight-based collection fee can be obtained from the study of one single municipality, some potentially important conditions need to be mentioned:

- The weight-based collection fee was in this case implemented together with extensive kerbside collection of recyclables. The provision of alternatives to residual waste collection can be a crucial issue to the success of a weight-based system;
- When changing systems, information campaigns are important;
- A weight-based collection fee needs considerable administration;
- A weight-based collection system is more expensive than either flat-rate systems, or systems based on container size / tagging / bag purchases since it needs weighing equipment and more administration. Furthermore, since weight-based collection systems, in order to be successful, demand provision of alternatives to residual waste collection, then where such

alternative collection schemes are also expensive, the costs are likely to rise considerably.

Notwithstanding these limitations, the potential for replication is good.

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**SECTION 2:  
PRODUCER  
RESPONSIBILITY  
SCHEMES**

## **CASE 8. BELGIUM: BEBAT SCHEME FOR BATTERY COLLECTION**

### **8.1. Introduction**

The Battery Collection Fund or BEBAT is a non-profit organisation set up on August 28, 1995 by the battery industry under the framework of the Belgian Law on Ecotaxes. BEBAT collects all kinds of used dry batteries and accumulators for their subsequent recycling. BEBAT operates under the aegis of the Federal State and the three Regions (Flanders, Wallonia and Brussels Capital Region). A protocol agreement arranges the co-operation with the Regions.

The Belgian law on Ecotaxes, dated 16/7/1993, determined that a range of products sold in Belgium should be taxed. The aim of the ecotaxes was to give an incentive to consumers to change their consumer patterns in an environmentally friendly way. One of the product categories involved was batteries, on which a tax of € 0.50 (BEF 20) + VAT per battery sold was to be imposed.

Due to negotiations with the battery industry and subsequent voluntary agreements, this tax was never actually implemented. A voluntary agreement between the industry and the Federal government was signed on June 16, 1997. Batteries were now to be exempted from the ecotax when a voluntary collection and recycling scheme was set up. The following conditions applied:

- The system had to be financed by the battery industry
- By the year 2000, certain target percentages for recycling had to be met (see Table 18 below).

If these conditions were not met, an ecotax on batteries would be levied on all batteries for household use sold in Belgium. As a consequence of the voluntary agreement, the ecotax law was changed on March 7, 1996.

### **8.2. The BEBAT Scheme for Battery Collection**

BEAT collects the batteries in boxes which are placed at more than 20,000 collection points. These collection points are supermarkets, shops, schools, public and private institutions and the communal container parks.

The batteries are collected at fixed intervals from these collection points by specialised firms and sorted into four types of battery. For each of these types of battery, specific firms are entrusted to recycle and reload the batteries.

Any company which is liable for ecotax on batteries may become a member of the BEBAT system. Today, the BEBAT scheme has more than 500 members. Membership of the BEBAT scheme exempts these companies from ecotaxes. Three conditions have to be fulfilled for this exemption:

- The collection objectives must be achieved;
- The system must be financed by means of a collection and recycling contribution (CRC) payable by the consumer; and
- All batteries collected must be processed in a manner which conforms to regional legislation and the protocol agreement dated 17.6.97.

For monitoring purposes, BEBAT is required to provide information to the ecotax commission, the regional governments and the federal government at fixed intervals.

### **8.3. The Financing of the Scheme**

The BEBAT scheme is financed by means of a collection and recycling contribution (CRC) payable by the consumer. This contribution was originally set at € 0.10 (BEF 4) per battery, of which € 0.025 (BEF 1) went back to the individual firms to cover their compliance costs (labelling of batteries).

In 1997 the total income of BEBAT amounted to € 6.45 million (BEF 260 million), whilst total costs were € 5.82 million (BEF 235 million). This resulted in a net profit of € 0.69 million (BEF 28 million), whilst in 1996 there was a net profit of € 1.60 million (BEF 64.4 million). However, BEBAT incurred a net loss of € 1.22 million (49.4 million BEF) in 1998, and bigger losses were projected in 1999. The higher costs are due to:

- The improvement of recycling techniques, which lead to a higher recycling percentage but also an increase in costs; and
- The growing percentage of batteries that need to be collected by BEBAT, requiring ongoing and more intensive media campaigns.

To cover these costs, BEBAT asked the ecotax commission to allow an increase in the collection and recycling contribution from € 0.10 (4 BEF) to € 0.125 (5 BEF). This was agreed.

### **8.4. The Effectiveness of the BEBAT Scheme**

#### **8.4.1. Collection Percentage**

BEBAT is required to fulfil certain collection percentages (Weight of the collected amount of batteries during year x / Weight of the sold amount of batteries during year x), as mentioned in the ecotax law. These percentages are given in Table 18, and compared with the actual results for the years 1997-2000.

At first glance, it would appear that BEBAT has not achieved its objectives (comparison of columns w and x in Table 18). However, the (official) collection percentages are based on the total weight of batteries sold on the Belgian market. Not all of these batteries are available for collection. This is because the life-cycle of batteries can be longer than one year so not all of the batteries purchased on the Belgian market are available for collection in the same year. When the calculation is made with a correction for the batteries that were not available for collection (column y), the collection percentage for the year 2000 exceeds the objective set in the framework of the ecotax law.

Table 18: Collection of Batteries by BEBAT: Objectives and Results, 1997-2000.

Year	Objectives Collection percentage (w)	Results		
		Collection percentage (x)	Collection percentage after correction (y)	Tonnes
1997	50%	45.2%	51.9%	1,389
1998	60%	51.5%	58%	1,562
1999	67.5%	50.4%	65.7%	1,834
2000	75%	54.4%	82.6%	2,105

Source: BEBAT, 2001

BEBAT provides some of the best results in the collection and recycling of batteries in Europe, with an (official) collection percentage of almost 55%. In 2000, BEBAT collected more than 2000 tonnes of batteries in Belgium.

BEBAT has to report the collection percentage on a yearly basis to the Ministry of Finance (Federal government).

#### 8.4.2. Recycling Percentage

Investments in the recycling techniques resulted in a recycling percentage (=The weight of the recycled material/ The weight of the batteries collected) of 70%. The balance of recycled materials for the years 1997-2000 is given in Table 19.

Table 19: The Balance of Recycled Materials, 1997-2000 (tonnes).

Year	Balance of recycled	Weight of batteries	Percentage by weight
------	---------------------	---------------------	----------------------

	materials	collected	recycled
1997	390	1,389	28%
1998	516	1,562	33%
1999	1,017	1,834	55%
2000	1,416	2,105	67%

Source: BEBAT, 2001

### 8.5. New Legislation: the Take-back Duty for batteries

VLAREA (the Flemish Regulations on Waste prevention and management) introduced the acceptance duty for certain product categories (paper and cardboard, batteries, white- and brown goods, tyres and used cars). For batteries, the new legislation came into effect from January 1998. The take-back duty implies that traders, producers and importers of batteries are obliged to take back the used batteries which the consumer wants to dispose of. This take-back duty is not dependent on whether the consumer buys new batteries or not.

For BEBAT, the new legislation implies that the protocol agreement with the three Regions has to be transformed into an Environmental Policy Agreement (EPA) between the Flanders Region and the industry. This EPA will be based on the results achieved in the framework of the ecotax law, with some new emphasis on prevention, consumer-sensitisation and monitoring. Similar agreements will be concluded between the industry and the Brussels Capital Region and Wallonia. The transformation into an Environmental Policy Agreement implies that Bebat will have to report to the Regions as well as to the Ministry of Finance. The collection percentage reported to the regions will be calculated on the total weight of batteries discarded by consumers and not on the weight of batteries sold on the market.

### 8.6. Potential for Replication in Other Countries

This type of scheme is not unique to Belgium. However, few countries have such an extensive collection system in place. The scheme implements the Polluter Pays Principle in a simple and effective manner. It enables potentially hazardous materials to be removed from the mixed waste stream and treated in an effective manner. So called advanced-disposal fees (which might be more correctly termed 'advanced recycling fees' in this case) are widely used, and not only in relation to batteries. As more is learned about the hazards of specific waste streams being treated as part of residual municipal waste, it seems likely that more countries will make use of such instruments under the banner of either, or both, of Producer Responsibility and the Polluter Pays Principle.



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## **CASE 9. FINLAND: PAPER COLLECTION BY PAPERINKERÄYS LTD**

### **9.1. Rationale for Scheme**

Waste paper has been collected in Finland since the 1920's. In the beginning the collection was carried out mainly by 'ideological' organisations committed to recycling. Especially after the war years in the 1940's the paper industry had a lack of raw material, and the value of waste paper increased strongly. Organised paper collection started in 1943, when the waste paper company Jätekeskus Ltd was established. The same company is still operating under the name of Paperinkeräys Ltd. The founder members and shareholders were the biggest paper industry companies in Finland. The company is still owned by the paper industry.

In the early days, paper was collected only from those entities which produced large quantities of waste paper (printing houses, paper manufacturing plants and public sector organisations). At the end of the 1940's, waste paper collection expanded to include households. Certain chain stores operated their stores as "drop off centres". Collection was incentivised by different compensation mechanisms (at the very beginning sweets, and later sugar, rice, clocks and toys) to the paper deliverers.

The use of these incentives ended at the beginning of 70's, and collection was centralised in the hands of private companies. In the metropolitan centres paper collection started to be provided as a service to properties, and in more dispersed settlements, special drop off centres were established.

Nowadays in Finland, there are three types of waste governed by producer responsibility: packaging waste, waste tyres and waste paper. The Council of State's decision concerning collection and recovery of waste paper came into effect at the beginning of 1999, and the paper recovery company Paperinkeräys Ltd made an agreement with the biggest paper industry companies. Paperinkeräys Ltd arranges the collection and recovering of waste paper on behalf of paper manufacturers.

The aim of the Council of State's decision is to collect and recover paper, the target recovery rates for household and office papers being 70 % in 2000 and 75 % in 2005.

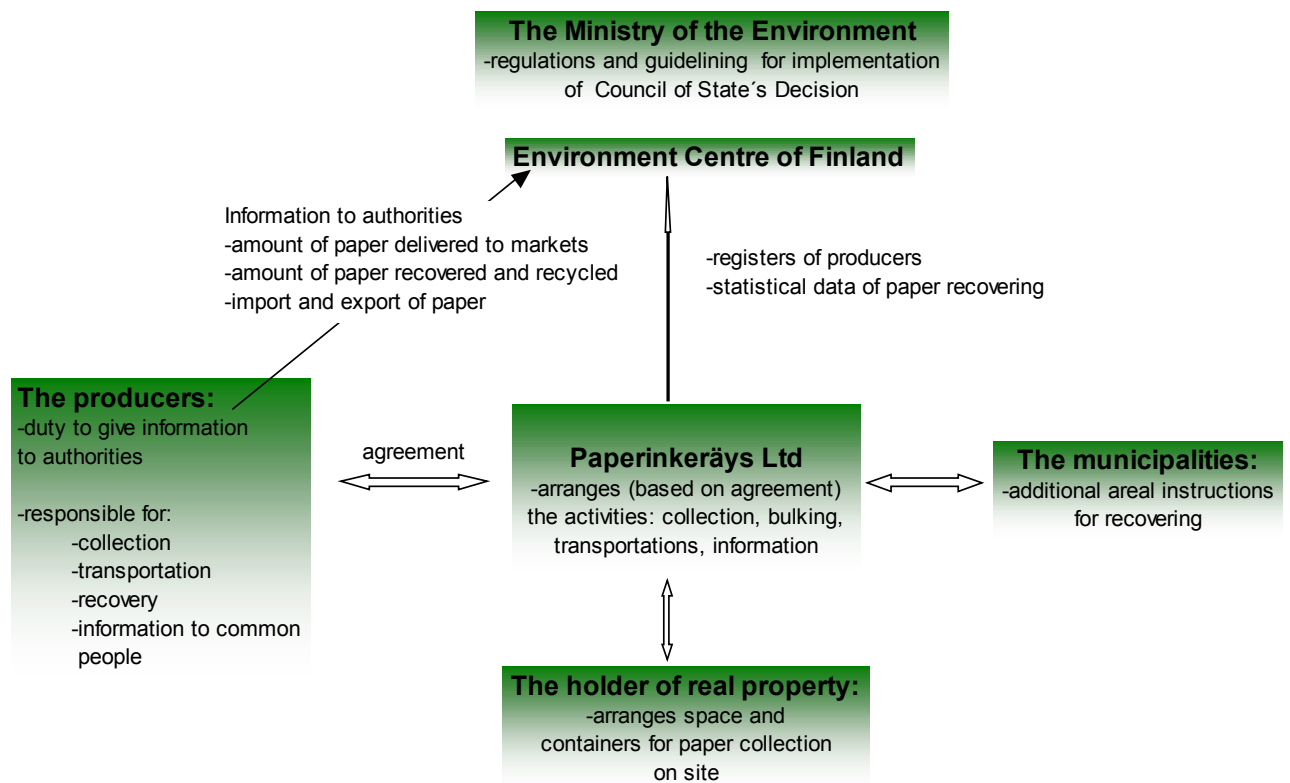
### **9.2. Basic Description of the Scheme**

The key operations of the Paperinkeräys Ltd are procurement, processing (sorting, bulking and baling) and supply of recovered paper. It arranges transportation and storage, as well as imports and exports of recovered paper.

The company also maintains and develops information systems pertaining to these operations.

The company purchases recovered paper from paper collection companies, waste management companies as well as commercial and industrial sources. The production units located all over the country take care of sorting, baling and storage of the recovered paper. The logistics system of the company guarantees the fluent deliveries to the paper and board mills, which use recovered paper as raw material. Figure 5 shows the organisation of paper recovery scheme in Finland.

Figure 5: The Organisation of the Paper Recovery Scheme in Finland

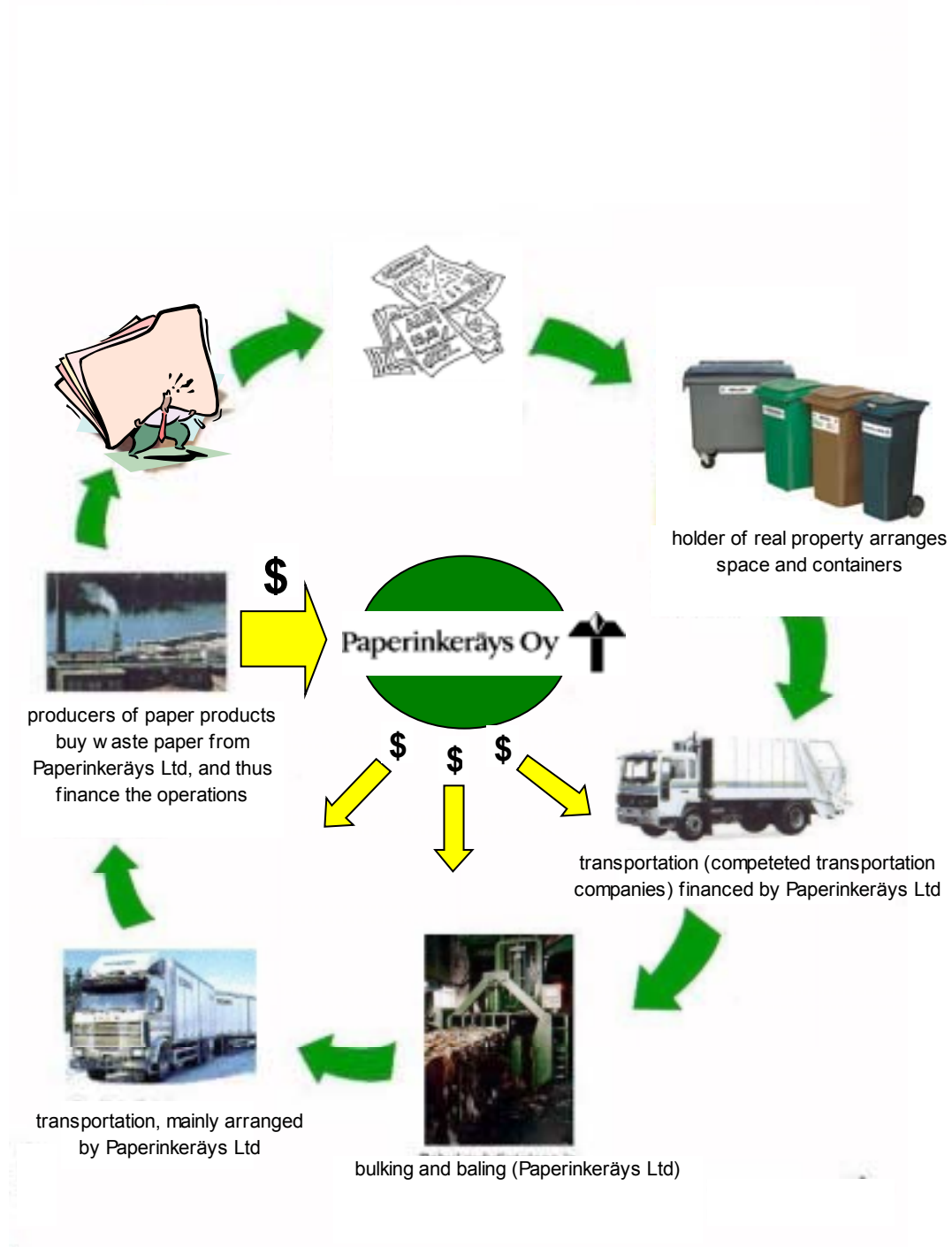


The operations required in the area of paper collection, sorting, baling, storage and transportation are mainly financed by income from waste paper sales to paper manufacturers. The price paid for waste paper varies with paper quality and also with general fluctuations in the situation in the paper markets. The typical, or trend-setting price paid for waste paper in recent times has been about 37 €/tonne.

The majority of Finnish waste paper goes through Paperinkeräys Ltd, but there are also other operators who supply waste paper to the paper industry, and thus Paperinkeräys Ltd does not have a monopoly.

In the places where waste is generated (households, commercial properties etc.), responsibility for collection and containers rests with the owners of these properties. Outside densely populated areas, collection is arranged in drop-off centres, and the paper producers are responsible for this (in practice Paperinkeräys Ltd manages the drop-off centres in co-operation with municipal operators). The operations of paper recovery scheme in Finland are described in Figure 6.

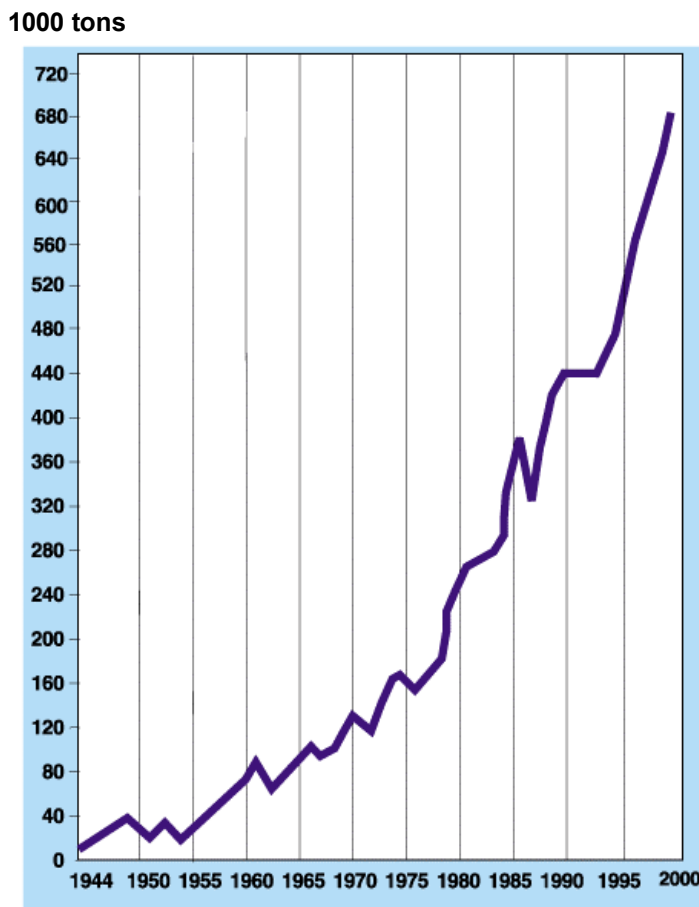
*Figure 6 The Operations of Paper Recovery in Finland*



### 9.3. Evidence for Effectiveness

As evidence of the effectiveness of the paper recovery scheme, Figure 7 shows the amount of paper recovered since 1944. In the year 2000 the total amount of collected waste paper and cardboard in Finland was 734,000 tons, which is about 142 kilograms per inhabitant.

Figure 7: Quantity of Paper Recovered in Finland Since 1944



The recovery rate in 2000 was 67 %. Most of the recycled waste paper (97 %) was used in paper and cardboard manufacturing, the rest was used in manufacturing of heat insulators.

### 9.4. Lessons Learned in Implementation

When the waste paper collection activities started, different incentives and payments were used to motivate collection from households. This is one way of changing behaviour in waste management, but in the 1970's, when collection was centralised to a more professional base, the amount of paper

collected increased remarkably and this illustrated the significance of well organised waste management.

## **9.5. Potential for Replication in Other Countries**

In Western Europe, the recovery rate of waste paper is, on average, 49 % (in 1998, source: Confederation of European Paper Industries). Naturally, the rate is higher in the countries where there are good markets for collected paper.

Producer responsibility (the Council of State's decision) lays down the basic rules for the paper recovery scheme, and this is one way to make the operation more effective.

The other recycling outlets for waste paper (like their use in thermal insulators) offer possibilities to other countries who do not have a paper industry of their own.



## **CASE 10. FRANCE AND BRUSSELS: SYSTEMS TO DEAL WITH UNSOLICITED MAIL**

### **10.1. Rationale for the Scheme**

A Decree on the collection, valorisation and elimination of unsolicited mail and free of charge newspapers (the field of application of the decree is called “couna” - “courrier non adressé”) is in preparation in France and should be issued in 2002. This Decree provides for the participation of producers (issuers of distribution advertising, free of charge press, directories, shops advertising) in the management of waste.

The responsible industries (the producers) have been offered the possibility to set up a voluntary scheme, which will receive the agreement of public authorities, as is the case for packaging waste. The scheme presented here is the partnership project presented by the industrial sectors involved in the “couna” loop to local and public authorities. The implementation of the scheme is pending on the publication of the Decree.

The scheme has two objectives:

1. Waste prevention and diminution of environmental impact; and
2. Valorisation through recycling or energy recovery of household graphic papers defined in the Decree.

In order to achieve specified recovery objectives, the industries responsible for issuing the graphic papers and the industries in the recycling chain (collectors, sorters, paper mills) will collaborate with the technical support of existing agreed organisations which are already in contact with local authorities (Eco-Emballages, Adelphe). A contract, subject to public agreement, will be proposed to the local authorities responsible for the elimination of household waste.

The scheme is meant to share the cost of achieving valorisation targets for “couna”.

### **10.2. Description of the Scheme**

#### **10.2.1. Partners**

The partners involved in the scheme are:

1. The “industrials”: all the companies responsible for issuing graphic paper products as defined in the decree. They are the large distributors, free of charge press editors, directories’ editors, and shops;
2. The “recycling chain”: companies utilising or recycling recovered paper;
3. The “agreed organisations”: organisations which received an agreement from the public authorities (for the valorisation of packaging waste) and which are already in contact with local authorities; and
4. The “local authorities” responsible for the collection / treatment of household waste.

### **10.2.2. Juridical Organisation**

A company will be set up with majority shareholders being the industrials and minority shareholders the recycling chain. The company will receive an agreement from the State in the framework of the decree and will be responsible for the achievement of the valorisation targets and putting together the necessary finance from its members.

A plan will define the schedule of achievement of the targets, both in terms of number of people and in terms of tonnage covered by the scheme. A financial contribution from the responsible industrials will be proposed to the public authorities. The money collected through these contributions will be distributed to local authorities.

The company will be responsible for meeting the targets but will not have an operational role. It will sign a contract with existing agreed organisations, which will act in its place and assist it in the negotiation of upstream and downstream tariffs.

A standard contract aiming at promoting the valorisation of couna will be proposed to every local authority which asks for it.

### **10.2.3. Field of Application**

The Decree defines the following field of application:

- free of charge newspapers;
- leaflets without an address; and

- non-addressed directories and catalogues.

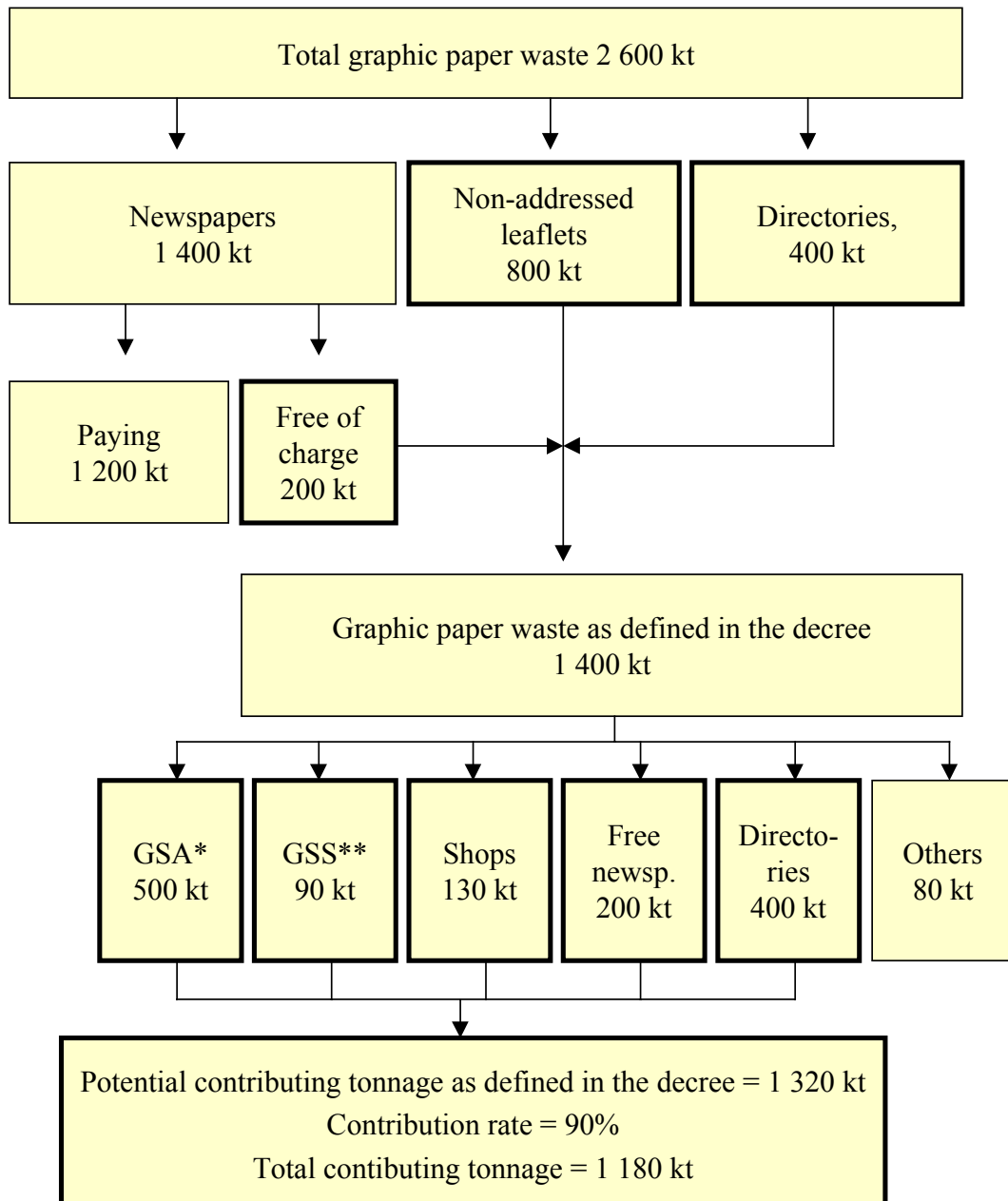
Figure 8 below gives a picture of the composition of the field. In 2000, the field of application is estimated at 1.3 million tonnes.

#### **10.2.4. Objectives**

Valorisation: priority is given to materials recovery. In second position come composting and energy recovery (provided that incineration plants are up to standards).

Prevention: prevention and material recovery objectives are linked and should be managed together. Prevention measures should facilitate recycling, by reducing the total quantities of waste to be recycled, by facilitating its collection and by upgrading its quality in view of their recycling.

*Figure 8: Field of Application of Couana Decree*



\*GSA: food super and hypermarkets

\*\*GSS: specialised super and hypermarkets

For example, the following measures are proposed:

1. Implementation of a system by which households can limit the quantity of couna appearing in their mail box (for example with a sticker “no advertising”),

2. Elimination of the plastic film packaging of certain couna (or higher contribution for this type of couna),
3. Elimination of products that hinder recycling, such as glue, staples, CDs, etc.

#### **10.2.5. Implementation**

The implementation of the scheme will be undertaken by the organisations commissioned by the newly created company. These companies, which already manage household waste valorisation schemes, will insure that the new scheme meshes well with existing systems for packaging waste and for used newspapers and magazines.

The missions assigned to the agreed organisations will be:

1. To assist industrials in the negotiation with the public and local authorities;
2. To manage upstream contributions (from the members);
3. To assist the company in defining the standard contract with local authorities;
4. To make the support payments to the local authorities; and
5. To ensure clear communication strategies.

#### **10.2.6. Financial Support to Local Authorities**

Financial support to local authorities will come from two sources:

1. Support from the industrials through the newly created company; and
2. The receipts from the sale of recovered products.

This financial support is independent of the support given on account of packaging waste valorisation. Its level and modalities are defined in the framework of the negotiation between the agreed companies and local authorities, and is therefore agreed by the public authorities.

In the case of support for material valorisation, the tonnage of couna as a share of total recovered papers will have to be estimated. As industrials consider that it is not economically viable to sort out couna from the mix couna + newspapers + magazines (and as counas are not always identifiable once

they are mixed), they have decided to propose a global take-up guarantee for the totality of graphic paper waste from households.

However, the financial support scheme concerns only graphic papers designated in the decree (couna). The tonnage supported by the scheme will have to be estimated and will be proportional to the proportion of couna in the waste. The proportion of couna will be defined on the basis of waste composition analyses.

In the case of composting, support will be given only for composting plants which produce compost of good agronomic quality.

In the case of energy recovery, support will be given only to plants which comply with emissions standards.

No support will be given to landfilling.

#### **10.2.7. Take-up Guarantee**

Every local authority which chooses it will be offered a take-up guarantee by the recycling chain. The conditions of these take up guarantees, the rules for calculating the price, and the minimum price will be fixed in collaboration with the different stakeholders.

An organisation called “Revigraph” will be created to organise this take-up guarantee. Revigraph will be composed of the different actors concerned with recycling.

### **10.3. Evidence for Effectiveness and Lessons Learned in Implementation**

As the scheme is not implemented this information is not available.

### **10.4. The Case of the Belgian Region of Brussels**

#### **10.4.1. Rationale for the Scheme**

An ordinance concerning the prevention and the management of waste from paper and board products was adopted on April 22<sup>nd</sup> 1999. The objectives of this ordinance are:

1. To gain a better knowledge of waste paper and board flows and their composition,

2. To promote prevention measures, both quantitative and qualitative,
3. To increase recycling and support recovered paper and board markets,
4. To increase the awareness and responsibilities of the initial producers of paper and board waste.

The recycling rates in Table 20 were established.

Table 20: Recycling Rates Established for Paper and Board in Brussels

	1998	1999	2000	2001
Recycling rate (%)	40	55	70	75

Specific measures are promoted for free of charge newspapers and advertising leaflets. In a first step, the industrials responsible for the production of free of charge newspapers and advertising leaflets have to reduce, by 8%, the weight of non addressed free-of-charge publications issued relative to 1995 figures. In a second phase, they should achieve a reduction of 18%. The government will decide on the deadlines for the first and second steps.

In application of the ordinance, two voluntary agreements were signed on February 4, 1999: one agreement with newspaper and magazine editors and one with those responsible for the printing of free advertising. The objective of these agreements is to introduce responsibilities on the part of the players that are the source of the waste paper flow. The editors of free advertising prints have committed themselves to the establishment of a fund which will be used to support selective collection and communication. Newspaper and magazine editors have committed themselves to either set up a fund or to offer advertising space in their publications.

The prevention objective is implemented through a system of mail box stickers described below. In addition, the regional government can pass agreements with responsible industries or the organisations that represent them.

#### **10.4.2. Description of the Scheme**

The regional government will organise a free distribution of mail box stickers. Two types of stickers are proposed which give the following options to households:

1. Refuse both free of charge newspapers and advertising leaflets; and
2. Accept free of charge newspapers but reject advertising leaflets.

Of course, the household can choose to accept both types of documents by not using any sticker.

On May 23<sup>rd</sup>, 2001, the specifications for the stickers were fixed through a government order. It is forbidden to deposit free of charge newspapers or advertising leaflets in violation of the indications mentioned on the mail box.



In conjunction with the ordinance, two voluntary agreements were signed on February 4, 1999: one agreement with newspaper and magazine editors and one with those responsible for the printing of free advertising. The objective of these agreements is to introduce responsibilities on the part of the players that are the source of the waste paper flow. The editors of free advertising prints have committed themselves to the establishment of a fund which will be used to support selective collection and communication. Newspaper and magazine editors have committed themselves to either set up a fund or to offer advertising space in their publications.

In addition to the sticker system, a financial fund is created in order to finance the selective collection, communication and market support operations necessary to achieve the recycling targets. This fund is not dedicated to free of charge newspapers and advertising leaflets but to the entire flow of paper and cardboard, which is the field of application of the ordinance.

The fund is fed by responsible industrials according to the following formula:

Contribution = 10 Belgian francs x N x T, where N = kilograms of paper or board put on the market for the period and T = fixed rate of recycling for the period (see Table above).

In addition, the regional government can pass conventions with responsible industrials or the organisations that represent them.

#### **10.4.3. Evidence for Effectiveness**

The Brussels region has set up a barometer for the monitoring of household waste. These indicators are measured every 6 or 12 months.

One indicator in particular is of interest to the current subject matter. This is the number of households which declare they have stuck an "anti-advertisement" sticker on their mailbox. The proportion of these households was estimated as:

- December 1998: 5.5%
- June 1999: 15%
- December 1999: 17%,
- June 2000: na,
- December 2000: 19%.

The measure is clearly having an impact. The objective for 2002 is to increase coverage to 40%, which it is estimated should decrease waste production by 5 kg/capita/year.

Another indicator of some interest is the quantity of waste paper which is recycled (in kg/capita/year). This was :

- December 1998: 21
- June 1999: n/a
- December 1999: 28.5
- June 2000: 30.9
- December 2000: 30.9.

The objective for 2002 is 32 kg/capita/year.

### **10.5. Potential for Replication in Other Countries**

The potential for similar schemes clearly exists. As well as the scheme in Brussels (see below), the United Kingdom is believed to be considering ways in which so-called 'junk-mail' can be reduced, or made subject to some form of producer responsibility. The potential links with the producer responsibility legislation for packaging materials are quite clear given the role of local authorities in both types of collection (hence the overlap with the Eco-Emballages in the above scheme).

## **CASE 11. NETHERLANDS: PAPER AND FIBRE COVENANT**

### **11.1. Introduction**

In Dutch waste policy, since the early 1990s, and in line with principles defined in Lansink's Ladder, it has been considered in the environmental interest to collect waste paper and cardboard separately and dispose of them further in the most advanced possible way. For this reason, in February 1995 the Consultative Body on Waste (AOO) agreed as part of the *Separate Collection of Household Waste Programme* (GIHA) that local authorities would collect all the waste paper and cardboard from households separately. Local authorities would endeavour to achieve a collection percentage of 85% for waste paper and cardboard from households before the year 2000, preferably by means of a system which involves the waste paper and cardboard being collected through door-to-door collections at least once every four weeks. It is also the intention that the percentage of contamination of the collected waste paper and cardboard from households should not be more than 10%.

### **11.2. The Paper and Fibre Sub-covenant (of the Packaging Covenant)**

Central government, local authorities (Association of Netherlands Municipalities, VNG) and the paper industry (Stichting Integraal Ketenbeheer Papier en Karton, IKP) [Integrated Lifecycle Management of Paper and Cardboard Organisation] consequently signed the *Declaration of intent on the collection and processing system for waste paper and cardboard for households* on 14 June 1995. The parties declared their intention of collecting and recycling as material 85% of the waste paper and cardboard that comes from households by the year 2000. They also expressed the intention of reaching mutual agreements to guarantee the continuity of collection and processing.

This Declaration of intent is the basis for the present sub-covenant on Paper fibre. In 1997, the paper and cardboard sector entered into a so-called Paper fibre covenant (a sub-covenant of the Packaging Covenant, as agreed and signed on 15 December 1997) with the Ministry of Environment. Although this mainly refers to Packaging, where paper is concerned, it relates not only to packaging but also to other products of paper and cardboard.

The Paper Fibre Sub-covenant is an agreement between The Minister Of Housing, Spatial Planning And The Environment, The Association Of Netherlands Municipalities, and Stichting Papier Recycling Nederland (Organisation for Paper Recycling in The Netherlands, or PRN). Member enterprises and organisations of PRN include those which either:

1. produce paper or cardboard, including paper or cardboard for packaging (paper and cardboard producers);
2. process paper or cardboard further into packaging (packaging products industry);
3. process paper or cardboard into graphic and related products, (printers, publishers);
4. process paper or cardboard further into other products (all other paper and cardboard processing industries);
5. collect, treat, store, transport and trade in waste paper or cardboard including waste paper or cardboard packaging (waste paper traders);

The covenant effectively established (amongst other things) that:

1. at least 65% of the total quantity of paper or cardboard which is to be newly placed on the market will be recycled as material;
2. local authorities, on the basis of the Packaging and packaging waste regulation and the provincial environmental ordinances, are responsible for the separate collection of paper and cardboard coming from private households;
3. the Association of Netherlands Municipalities, as part of the programme on the Separate Collection of Household Waste of the Waste Consultative Body [Afval Overleg Orgaan], committed itself to encouraging the local authorities to attain the targets of 85% collection and 90% purity for paper and cardboard, established therein;
4. pursuant to the Packaging and packaging waste regulation the obligation to take back packaging coming from private households applies from a location to be determined by the local authority;
5. the obligation to take back applies as from the waste paper trader in the municipality;
6. the costs of disposing of paper and cardboard, including paper and cardboard packaging coming from businesses (non-households), are to be paid for by those businesses.

### **11.3. Key Aspects of the Scheme**

The key aspects of interest in this case study are points 2-5. These points establish the role of local authorities in the collection of paper and cardboard from households, and the take-back obligations placed upon the paper industry. The effects of the Sub-covenant are such that local authorities arrange and pay for collection from households and pass on the paper and board to industry, while industry arranges and pays for the further processing. The local authorities are paid for the paper they supply. However, the interesting aspect of this system is that whilst in some countries, the fluctuation in the market for waste paper can lead to the price paid to local authority being negative (the local authority has to pay to have the material taken from it), in this system, if the market price at the time is negative, local authorities can still hand over the paper without any charge. In essence, the system established a floor price (of zero) for the material delivered by the local authority subject to certain constraints.

#### **11.4. Details of Operation**

Under Article 5 of the covenant, VNG undertakes to ensure that local authorities will transfer all the separately collected waste paper and cardboard to a waste paper trader who is affiliated to PRN. Local authorities or cooperating local authorities can join the system created by the present covenant by entering into an agreement with PRN.

The agreement with Stichting PRN covers a number of issues. Under Articles 6 and 7 of the Covenant, Stichting PRN undertakes to take up all the separately collected and offered waste paper and cardboard that meets specified quality requirements irrespective of market circumstances.

Article 1 defines what is known as a chain deficit:

##### **A. chain deficit:**

*the negative balance of the current international market price for waste paper and cardboard at any given moment less the standard cost price periodically established by or on behalf of the Stichting Papier Recycling Nederland for transport from the transfer point in the municipality, for sorting, treatment and transport to the buyers of waste paper and cardboard;*

Article 8 makes clear that for waste paper and cardboard from households, any chain deficit that occurs should not be borne by the local authority.

##### **Article 8 take-up of household paper and cardboard**

*1. Notwithstanding the provision of article 7, Stichting Papier Recycling Nederland will ensure that a chain deficit that occurs with regard to the*

*waste paper and cardboard from households, including paper and cardboard packaging, collected separately by a local authority and submitted to a waste paper trader affiliated to Stichting Papier Recycling Nederland that meets the quality requirements referred to in article 6, will not be for the account of the local authority.*

*2.If no waste paper trader who is affiliated to Stichting Papier Recycling Nederland is present in a municipality, the costs of the transport to the closest waste paper trader affiliated to Stichting Papier Recycling Nederland will not be for the account of that local authority in so far as these result in a negative revenue.*

Hence, any such chain deficit will be paid for by the paper and cardboard industry and will be financed from a disposal fund (Stichting Verwijderingsfonds – see below) organised by that industry. The way this operates is set out in more detail in what follows.

At times when the international market prices for waste paper and cardboard do not cover the transport and treatment costs to be incurred by the waste paper companies, the waste paper companies, by way of compensation for these costs, receive an amount from the disposal fund set up by the paper industry.

The disposal fund is made up of a levy on new paper and cardboard placed on the Dutch market which is levied only at times when a chain deficit occurs. This levy falls upon the first domestic buyer/user of paper and cardboard. The first users/buyers of paper and cardboard are for example, printers, publishers and producers of packaging equipment. The first buyers/users are free to choose whether, and if so how, they pass on the disposal levy.

The level of the compensation will be decided on by the fund management at the time at which a chain deficit occurs and is related to the international market prices and the average transport and treatment costs of an average waste paper company from the transfer point in the municipality (the "standard cost price") at that moment.

At present, the standard cost price of collecting paper, separating the material, cleaning it and delivering to the waste paper industry is of the order €45 per tonne. Since the chain deficit paid would never be above the standard cost, this is the maximum cost of the system at present.

The transport and treatment costs to be incurred by a waste paper trader from the transfer point in the municipality may be higher than the standard cost price periodically fixed by Stichting Verwijderingsfonds. The waste paper traders in Stichting PRN will endeavour to ensure as much as possible that the costs they incur for transport, treatment and sorting from the transfer point in the municipality are not higher than the standard cost price periodically

fixed by Stichting Verwijderingsfonds. Any deficit that arises at an individual waste paper trader who is a member of Stichting PRN as a result of the fact that his actual costs are higher than the standard cost price fixed by Stichting Verwijderingsfonds, will be paid by the waste paper trader. The local authority therefore does not need to make an additional payment.

If within the municipality there is no waste paper company that is a member of Stichting PRN and the transport costs from the municipality to the closest waste paper company that is a member of PRN is such that the revenue from the waste paper and cardboard for the local authority is less than zero, then the disposal fund refunds the cost of transport to the most proximate waste paper company that is a member of Stichting PRN in so far as these result in a negative yield for the local authority. The local authority, however, is free to supply the collected waste paper and cardboard to any other contracting party which is not the most proximate waste paper company, but in that case the additional transport costs to that company will be paid for by the local authority.

A choice has been made to have the compensation paid from the disposal fund to the waste paper company via the local authority. If the board of the disposal fund has established that there is a chain deficit, the same fund board will give written permission to a local authority to make an additional payment to the waste paper company, which has been fixed by the same fund board, when the waste paper and cardboard from households that has been separately collected is transferred. The local authority then submits a statement for this additional payment to the disposal fund. The local authorities are thus exempt from deficits.

Importantly, the system can only be joined at times when the disposal fund is not operational and/or when there is a surplus situation. A local authority that does not join the system cannot make any claim in respect of the take-up guarantee or disposal fund.

## **11.5. Quality Issues**

Stichting PRN gives a take-up guarantee for all the waste paper and cardboard collected and submitted separately that meets the stipulated quality requirements.

As part of the GIHA programme local authorities have indicated that they will endeavour to supply clean and dry paper with a total contamination of a maximum of 10%. A 1995 report showed that the average contamination was 4%, with a range of 2.5 to 10%. As part of the present agreement it has been agreed that consignments of waste paper and cardboard with a contamination percentage of more than 10% may be refused by the waste paper companies and do not fall under the take-up guarantee

## **11.6. The Issue of Surpluses**

In the sub-covenant on paper fibre companies which are members of Stichting PRN are responsible from the transfer point for all the waste paper and cardboard from households collected and submitted separately by the local authorities. This responsibility applies under all market conditions. In the case of surpluses or scarcities of waste paper and cardboard it is up to the paper and cardboard industry to take measures in line with market conditions to be able to safeguard the take-up guarantee vis à vis the local authorities.

If a surplus exists (there is no sales outlet whatsoever in the waste paper processing industry at home or abroad and the warehousing space of the waste paper companies and the waste paper processing industries are full), responsibility for the management of the surpluses rests entirely with the paper and cardboard industry. The industry has to do all in its power to prevent a surplus situation arising and - should this fail – is required to search for opportunities to keep the surplus waste paper in stock, pending a revival in demand. Only in the last resort, if there is no other option, will the incineration option be chosen. The disposal of surpluses will not be financed from the disposal fund.



## **11.7. Results**

This mechanism, though intuitively appealing, has limitations as long as the market for waste paper is buoyant. In such circumstances, there is little incentive for local authorities to enter into agreement with Stichting PRN. Because membership of Stichting PRN implies accepting the price offered by its members, and because this price may incorporate an adjustment (however made) to account for the obligation to pay money from the disposal fund if prices fall, local authorities may feel that the price they receive for waste paper is higher when they are outside the scheme. This may be especially true for larger municipalities with greater bargaining power.

Another possible reason for not entering the scheme is the administrative cost of entry. This raises questions as to whether these are one-off costs, or ongoing costs. If the market dips, then to the extent that the costs might be more of a 'one-off' nature, those entering the scheme under these conditions might then decide to remain.

VNG has no powers of compulsion to force local authorities to join Stichting PRN. It can only seek to persuade local authorities of the merits of joining. This is likely to be easier in times where the waste paper price is low. Even in this case, the contract durations may persuade some local authorities that it is better to remain outside the scheme than within it. Currently, membership runs at about 30% of all local authorities.

One possible approach would be to require local authorities to enter the scheme. However, this might raise concerns regarding competition issues (both inside and outside the Netherlands). This has been considered but the VNG seems unlikely to support such an approach.

Only once, in the second quarter of 1999, did the existence of a chain deficit require the levy to be triggered. However, no local authorities received any payment since there were no members contracted to the system. Hence, the fund generated has been used to support costs of the office, of monitoring the system, cash flow control and other administrative purposes. No chain deficits are expected for the foreseeable future.

Industry is generally happy with the way in which the scheme operates. It is low in cost, funding is only required when it is needed and there is no heavy market regulation. The targets in the covenant are unlikely to be met in 2001, but the final figure is expected to be close.

It is difficult to say what role the scheme has had in this. The real test of the system is likely to emerge if waste paper prices decline sharply.



## **11.8. Potential for Replication in Other Countries**

This mechanism, either in its current form or in other guises, is inherently reproducible across the EU. However, there are certain observations which deserve to be made.

One of the merits of this scheme is that its logic is based upon consideration of how materials are collected from the municipal waste stream. Whether paper is packaging paper or otherwise is not necessarily relevant for certain

**SECTION 3:**  
**SCHEMES WITH JOINT  
WASTE MANAGEMENT  
/ SOCIAL POLICY  
OBJECTIVES**

## **CASE 12. BELGIUM: 'WHITE- AND BROWN' GOODS COLLECTION**

### **12.1. Introduction**

VLAREA (the Flemish Regulations on Waste Prevention and -Management) defines the 'white and brown goods' as follows:

- a. White goods:
  - Cooling- and freezing machines: Refrigerators, freezers, air conditioners;
  - Bulky white goods: Washing machines, stoves, dishwashers, drying machines, water heaters; and
  - Small white goods: Grills, ovens, microwave- and other ovens
- b. Brown good with screens:
  - Televisions, computer screens
- c. Brown good without screens:
  - Radio's, tuners, amplifiers, cassette decks, record players, CD-players, video-recorders, video-cameras, computer hardware, telephones, fax machines, photocopier-machines, printers, mobile phones, loudspeakers;
- d. Small household machines:
  - Water boilers, mixers and blenders, toasters, deep fryers, garden equipment, vacuum cleaners, sewing machines, irons, hairdryers, razors.

People who want to discard their old brown- and white goods can either:

1. Take them to a re-use centre (free of charge), provided that the apparatus is still re-usable;
2. Take them to the nearest containerpark (sometimes paying, or sometimes free of charge);

3. Give them to a trader (free of charge) where a new product of the same kind is purchased, following the implementation of the tack-back duty for white- and brown good introduced in VLAREA<sup>5</sup>;
4. Use the municipal waste collection service for bulky waste, provided that that the municipality organises such a collection (paying a fee, or sometimes free of charge, depending on the community).

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<sup>5</sup> The Flemish Regulations for Waste-prevention and Management.

## **12.2. The Functioning and Financing of Re-use Centres**

Re-use centres collect re-usable goods and certain components of the municipal waste stream and prepare them for sale in second-hand shops. In 1999, there were 39 recognised re-use centres in Flanders. These have both an environmental objective (to seek maximal re-use of the goods collected) and a social objective (to employ people who were unemployed for a long time, and to provide consumer goods at low prices to low-income households). Most re-use centres have the status of a non-profit organisation.

In 1999, Flemish re-use centres collected 14,450 tonnes of re-usable goods and 1,215 tonnes of components. Furniture is the most important re-usable product group (7,938 tonnes in 1999), whilst collection of white- and brown goods amounted respectively 1,480 and 711 tonnes.

Re-use centres in Flanders took the initiative to set up repair-centres on a regional basis. These repair-centres select white- and brown goods for re-use and prepare them for sale in re-use shops. They operate on a scale of 300,000 to 500,000 inhabitants (implying 1 repair centre for every 3 or 4 re-use centres). The repaired goods are sold with a guarantee of 3 months and are labelled. The label indicates to the buyer that the goods have been checked before sale.

The re-use centres gain their revenues from different sources:

1. First of all, revenues come from the sale of repaired goods in the re-use shops. The total turnover of these shops amounted to €7.35 million in 1999;
2. Secondly, revenues come from co-operation with local authorities (the municipalities or intermunicipalities served by the re-use centre). This co-operation has to be seen in the framework of the environmental covenants between the Flemish Region and the municipalities. The Flemish Region subsidises municipalities for a number of activities, one of which is co-operation with a re-use centre. This co-operation can consist of financial compensations, the use of the municipal or intermunicipal containerpark, or other means of support. The financial support consists in most cases of an allowance per tonne collected. The mean allowance is €0.09 per tonne. Some municipalities give an allowance per inhabitant of the area served (from €0.12 per inhabitant up to €0.37 per inhabitant); and
3. A third way in which re-use centres are financed is through the subsidies they receive for social employment. The social employment

of less well-educated people is a complex matter in Belgium with different objectives and financing mechanisms. The money comes from either the Flemish or the Federal government.

This mix of financing mechanisms makes re-use centres a good example of alternative financing of waste policy, partly owing to the fact that the centres serve a social as well as an environmental purpose.

### **12.3. The Acceptance Duty for White and Brown Goods**

VLAREA introduced an acceptance duty for certain product categories (paper and cardboard, batteries, white- and brown good, tyres and used cars). The acceptance duty for white- and brown goods started on July 1st, 2001, two years after the new legislation in VLAREA came into force.

The acceptance duty implies that, when consumers buy a new electronic (so-called white good) or electronical device (brown good), they can give their old (similar) device to the trader, who has to receive it free of charge. The treatment and recycling of the used devices is financed by a Collection- and Recycling Contribution (CRC), payable on every new electrical and electronical device. The size of the contribution depends on the type of device bought.

The execution of the acceptance duty is concluded in an Environmental Policy Agreement between the Flemish Region and the industry. The industry itself wanted to expand the agreement to the rest of Belgium as well, so a similar agreement has been developed between the industry and the Brussels Capital Region on the one hand and with the Walloon Region on the other.

To organise the collection and treatment of the white- and brown goods, the non-profit organisation Recupel has been established. Producers and importers can either become members of Recupel or they can organise the acceptance duty themselves. Recupel organises the collection of the devices delivered at container parks, retail traders and distribution centres.

The Collection- and Recycling Contribution which customers have to pay when buying a new device goes to Recupel to finance the treatment and recycling scheme. Recupel out-sources the recycling activities to specialised firms. Apparec, a co-operation between Indaver and Van Gansewinkel, is specialised in the recycling of electrical and electronical devices. Van Gansewinkel has the contract for the collection of white- and brown goods.

Considering its recent start, Recupel cannot yet provide reliable figures about the quantities of white- and brown good collected and recycled. The Collection and Recycling contributions are as follows (for a selection of items, in EURO):



- **Electrical devices**
  - Refrigerators and freezers: €20
  - Big devices: €10
  - Small devices: € 5-
  - vacuum cleaners: € 3-
  
- **Consumer electronics**
  - Audio- and visual devices: € 6
  - portable devices and car radios:€ 1.5
  
- **Small domestic devices**
  - Male shaving: € 1
  - Beauty: € 1
  - Health: € 1
  - Food & Beverage: € 1
  
- **IT-, telecommunications & office devices**
  - PC (all in): € 9
  - PC and writing machines: € 3
  - monitor: € 6
  - laptop: € 2
  - copy machines: € 3
  - printers: € 2

## 12.4. Potential for Replication in Other Countries

This type of scheme in which the repair and re-use of furniture, and white and brown goods is used to meet social and environmental objectives, is not unique to Flanders. Similar schemes exist in the UK, for example. In many cases, such schemes have been effective in helping to move people from long-term unemployment back into the labour market through re-training schemes designed to re-skill would-be employees. These projects compare favourably with other intermediate labour market projects in terms of their performance and the implied cost of re-training.

Clearly, the experience is transferable. An interesting issue, however, is the degree to which such schemes can be accommodated within more formal arrangements once, for example, new take-back legislation is implemented with statutory force. In these circumstances, the 'formalisation' of take-back requirements can become a threat to established schemes unless they are allowed to play a role within the statutory framework. There are areas where such schemes can be seen to conflict with the more formal take-back schemes. For example, the industry, upon whom the take-back obligation may fall, may see it as counter to their interests to ensure that schemes which produce low cost second-hand products for re-sale continue to flourish.

Recognition of the role of not-for-profit organisations in these and similar activities should be a part of European legislation and Member State-specific implementation.

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## **CASE 13. UNITED KINGDOM: COMMUNITY RE>PAINT SCHEMES**

### **13.1. Introduction**

The Community Re>Paint Initiative was started by the Leeds based environmental consultancy Save Waste And Prosper Ltd (SWAP Ltd) in 1992. It arose out of a trial household hazardous waste collection project. Paint was the largest component of the wastes collected by this project and quite a large proportion of it was of a useable quality. As a solution to this, the paint collected by the project was offered to local charities and voluntary groups and successfully used in the local community. Pilot studies followed and in 1994, a permanent paint re-use scheme was set up in Leeds. Funding support was received from the local council, ICI Dulux, and West Yorkshire Waste Management.

### **13.2. Rationale for the Scheme**

Over 300 million litres of paint are sold annually in the UK to the DIY market and to trade decorators. Approximately 37.5 million litres of DIY and 2.5 million litres of trade paint remain unused and there could be as much as 100 million litres of paint stored in homes across the UK. The paint tends to be stored and then disposed to landfill.

Community Re>Paint (CR>P) provides a practical solution to this waste stream that is environmentally and socially beneficial through diverting unwanted paint from the waste stream and redistributing it for re-use by community groups, charities and voluntary organisations. The focus of CR>P is on paint generated by the householder which is typically hoarded in garages for long periods of time.

CR>P has developed into a national network of schemes co-ordinated by SWAP Ltd. Each scheme has paint collection points situated at civic amenity sites and/or local DIY stores. These collection points (usually a walk-in skip) allow householders to donate surplus paint. The paint is then sorted before being redistributed to community groups and people on low incomes. CR>P schemes only take certain categories of decorative coating, which are summarised in Table 21.

In 1999/2000:

- 44,000 litres of paint were redistributed (with a market value of over £188,000);
- 2400 litres of paint were redistributed, on average, per scheme;
- Average amount of acceptable paint received by a scheme was 68%;

- CR>P Peterborough redistributed 6100 litres; and
- CR>P Ealing sent 15,000 litres of paint to Convoy Aid Romania.

Table 21: Acceptable and Unacceptable Materials

ACCEPTABLE MATERIALS	UNACCEPTABLE MATERIALS
Usable Paint for Domestic application	Paint Thinners
Emulsion Paint	Paint Brush Cleaners
Gloss Paint	Paint Stripper
Eggshell Paint	Varnishes and Wood Stains
Satin Paint	Wood Preservatives and Treatments
Undercoat	Car Paint
Primer	Specialist and Industrial Paints
Floor Paint	Aerosol and Spray Paints
Masonry Paint	Cellulose-based Paints
Exterior Paint	Paint NOT in its original container
	Paint over 10 years old
	Unusable paint

The scheme is undergoing considerable expansion across the UK due to funding from Biffaward (the environmental body established by the waste management company, Biffa, to distribute landfill tax credits), ICI Dulux and The National Lottery Charities Board. Hence, whilst by March 2001, there were expected to be 45 schemes in operation, SWAP plans to increase this number to 90 by 2004.

Essentially CR>P is series of local community initiatives. Local partners typically include community-based organisations, local authorities, local waste management companies and DIY retailers. The local schemes are linked together through a National Network Programme. This is co-ordinated by SWAP, which provides advice and support including a £3,000 capital grant, promotional material and advice and support on the set up and operation of the initiatives.

Running a Community Re>Paint scheme is generally thought to be straightforward. In practice however, local circumstances mean individual schemes can be very different. Paint for Community Re>Paint schemes comes from householders but can also come from traders, professional painters and decorators and retail outlets. Schemes use a variety of collection systems:

- dedicated drop-off points at DIY retail stores
- custom made, walk-in skips at civic amenity sites
- drop-off facilities at council or parish offices
- kerbside collection
- direct delivery to the scheme's base

Once collected, the paint is sorted, stored and redistributed. It is then given free of charge to eligible sectors of the community (local charity, community and voluntary groups) and public agencies that provide support services to people in genuine need e.g. Social Services, Housing Departments and Probation Services. The paint is then re-used locally for projects such as decorating youth clubs and village halls, painting murals, playgrounds and maintaining scout and guide huts.

Those seeking to qualify for assistance to set up a CR>P scheme should:

- be a community or voluntary group or a charity;
- be able to secure premises large enough and suitable for storing paint or be able to locate a shipping container or 'portakabin' on site for storage;
- have a identified a suitable site for collecting household paint;
- have sufficient staff and time to operate the scheme; and
- have existing activities/finances to sustain the scheme once operational.

Transport is also regarded as a useful asset in any application for assistance.

### **13.3. Funding a Community Re>Paint Scheme:**

SWAP acts as the national co-ordinator for the Community Re>Paint National Network and has done so since the pilot "paint exchange" in 1992, referred to above. Through the funds it secures, SWAP provides advice and other services to successful applicants once they have been selected. The following support elements may be provided:

- a capital grant of £3,000;
- technical advice and practical support;
- liaison with statutory bodies and local authorities;
- staff training;
- advice and publicity; and
- design and printing of customised leaflets.

SWAP encourages those organisations interested in setting up a Community Re>Paint scheme in their local area to obtain details of the relevant funding rounds.

### **13.4. Potential for Replication in Other Countries**

This type of scheme seems to have the potential for replication in several other countries, though a principal funding source – Landfill Tax Credits – is not available in other countries. However, the source of funding is not important in the running of the scheme. The approach seems particularly useful in generating social benefits, especially in cases where the collection of paint is not well-established.



**SECTION 4:**  
**SCHEMES TO**  
**INCENTIVISE**  
**MUNICIPALITIES**

## CASE 14. BELGIUM: RESIDUAL WASTE LEVY IN WALLONIA

### 14.1. Wallonia Residual Waste Tax

The Walloon Region of Belgium introduced a new and innovative instrument in January 1999. The instrument is a specific tax on municipalities if the total amount of household waste collected by the municipalities exceeds the legally allowed amount.

The tax covers household waste that is collected by the municipalities or associations of municipalities. Reusable materials and specific wastes that are collected either by the municipalities or by private companies that have been agreed on by the Walloon

Government is not subject to the tax.

The large amount of waste currently generated in the municipalities of the Walloon

Region was regarded as problematic and was predicted to increase if no changes were made (see Table 22). In the Walloon Region, the average production of household waste in 1995 was about 381 kg/inhabitant/year. In many municipalities it exceeded 400 kg/inhabitant/year. Organic waste is estimated to constitute 40 % of the total amount of household waste.

Table 22: Average Waste Development in the Walloon Region

	1995	2000 (projected)	2010 (projected)
Household wastes	1,104,110 tonnes	1,240,552 tonnes	1,469,112 tonnes
Household waste/inhabitant/year	381 kg	365 kg	423 kg
Reusable material (addit.)	419,390 tonnes	591,088 tonnes	700,243 tonnes
Reusable material/inhabitant/year (addit.)	145 kg	175 kg	203 kg
Total Household waste	1,523,500 tonnes	1,831,640 tonnes	2,169,355 tonnes
Total waste/inhabitant/year	526 kg	540 kg	626 kg

Source: Walloon Government 1998

Taking into account that reusable and recyclable materials, for example bulky waste, inert waste, metal, glass, paper and cardboard, car oils, plastics, textiles, composite-packaging etc. are not included within the calculation of



the household waste, the real amount of waste collected was estimated to be in excess of 520 kg/inhabitant/year.

Not only was the amount of waste produced in the Walloon Region considered to be very high, but also levels of source separation, though high compared with UK averages, was felt to be inadequate.

The Walloon Region therefore decided to enhance a prevention policy by introducing the new tax. This tax incentivises the municipalities to improve their waste management systems, to raise the general awareness of waste minimisation among their population and thus to limit as much as possible the quantity of waste produced. It is felt that the tax has been important in motivating many municipalities to introduce pay-as-you-throw (variable charging) systems so as to minimise exposure to the tax.

The measure taken by the Walloon Region for exerting political pressure on the municipalities is as impressive as it is simple. Every tonne of waste that exceeds a pre-set threshold level is subject to a special tax that has to be paid by the municipalities to the Walloon Region. The ultimate aim is to ensure that every inhabitant will be conscious of waste prevention in order to limit as far as possible the quantity of waste produced.

The basis of assessment for the application of the taxation is the total quantity of household waste collected within one year. The allowable tax-free quantity of household waste was 270 kg/inhabitant in 1999. After 1999 this amount will decrease each year by 10 kilos to 240 kg/inhabitant by 2002 (see Table 23).

*Table 23: Schedule for the Basis of Assessment*

<b>Year</b>	<b>Allowed tax-free household waste production</b>
1999	270 kg/inhabitant.
2000	260 kg/inhabitant.
2001	250 kg/inhabitant.
2002	240 kg/inhabitant.

Source: Enactment of the Ministry of the Walloon Region of 16 July 1998

Some kinds of wastes are not taken into account when calculating the yearly allowable amount of waste which is not subject to tax:

1. As already mentioned above, the reusable wastes, like paper or glass, etc. that are collected through specific collections are not at all subject to the tax, in order to support waste recycling.
2. Additionally, the collection of household waste by the municipalities covered by the tax has one essential exception: Any material that still could be eliminated, segregated, or recycled from the household waste after the collection is not taken into account. In

this context, recycling is also understood to include thermal recovery. In the Walloon Region recovery is defined as waste with a calorific value of more than 2 MJ/kg<sup>6</sup>.

This has the effect that a considerable quantity of waste can be understood to fall out of the scope of the tax through thermal recovery. Therefore one has to state that the calculation of the tax most probably only affects waste that has to be disposed to landfill.

The tax that has to be paid by the municipalities will vary over time. In 1999 each tonne of waste exceeding the allowed amount cost the municipality about £16. Each year the costs will increase by about £1.50 to around £22 in 2002.

## **14.2. Results**

It is still quite early to see the practical results of such a tax measure. However, the situation as of the year 2000 was such as to suggest that the instrument has had a significant effect. Selective collection of materials has led to a recycling and composting rate of 34% in 2000. Clearly, however, it is difficult to attribute changes in waste management practice solely to one instrument.

Because it is the municipality which is potentially subject to the tax, it is thought to have been a prime reason for increases in the level of municipal waste taxes and the introduction of pay as you throw schemes. These are designed to reduce production of residual waste. The municipalities are also encouraged to develop new activities for segregation and prevention of waste.

This period of quite rapid change, although it appears to have generated interesting results, has not been without its problems. Where one commune introduces variable charging and neighbouring communes do not, the incentive for waste tourism emerges. This has led, in turn, to some municipalities increasing charges even where infrastructure for source separation is poorly developed. This increases the likelihood of fly-tipping in such areas. It is thought that the Ministry may consider issuing guidance as to a 'standard' regime for variable charging systems to reduce incentives for 'waste tourism' between communes where different charging regimes apply.

## **14.3. Potential for Replication in Other Countries**

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<sup>6</sup> Very little municipal waste would fall below this value. Mixed waste typically has a calorific value of the order 10-10.5 MJ/kg. In Germany the calorific value of waste has to be 11 MJ in order to speak of thermal recovery.

This mechanism is an innovative one which has potential for replication at various different levels. Wherever municipalities group together, at whatever level, the scheme could be replicated. It seems a useful mechanism for focussing the efforts of municipalities in waste minimisation and clearly encourages them to implement polluter pays measures.

## **CASE 15. UNITED KINGDOM: LOCAL PUBLIC SERVICE AGREEMENTS IN ENGLAND**

### **15.1. Rationale for the Scheme**

The quest for efficient delivery of public services in the United Kingdom is an ongoing one. In an attempt to improve the quality and delivery of public services, Central Government has put in place a Local Government Public Service Agreements (PSAs) which pulls together key targets agreed with Central Government Departments that local authorities will help to deliver. These agreements have been made between Central Government and 'the totality' of Local Government.

A new scheme is being piloted to encourage delivery of quality services at the level of specific Local Authorities. Specific local authorities will sign up to challenging targets to deliver key local and national priorities in exchange for agreed flexibilities in operation, and incentive payments. The aim is to improve key outcomes at the local level more quickly and/or to a higher level than would otherwise be the case.

### **15.2. Description of the Scheme**

In the most recent Government Spending Review, the Local Government PSA included, as one aim, to '*Enable 17% of household waste to be recycled or composted by 2004*'. The 17% figure represents a national target (for England as opposed to the United Kingdom as a whole) which was established in the Waste Strategy for England and Wales, *Waste Strategy 2000*. Government committed additional resources to local Authorities in recognition of this and other objectives, including a specific sum of €225 million as a counterpart to the PSA.

At the local authority level, the 17% national target has been translated to the Local Authority level through specific targets for local authorities who are effectively statutory in nature. These are central to the 'Best Value' system which has developed as a means to monitor progress in Local Authority performance and service delivery (see Appendix One).

Local Public Service Agreements (LPSAs) are intended to represent commitments from Local Authorities to 'go beyond' the standard or statutory levels of service in return for financial payments to support these efforts. They are intended to cover a range of service provision. LPSAs do not only cover waste, and indeed, LPSAs may not cover issues concerning waste at all. However, the first tranche of LPSAs include some Local Authorities including waste within the LPSA agreement.

Where waste is included, the local authorities should either exceed their Best Value targets, or achieve targets more quickly than they are required to do under statutory obligations.

Each LPSA will set out the vision of the authority and its strategy to deliver enhanced outcomes. As far as waste is concerned, the link to Best Value targets needs to be made. More generally, each LPSA might contain around twelve key outcomes, of which waste may be (but will not necessarily be) one.

In exchange for these commitments, Central Government was prepared to relax a range of planning, operational and financial restrictions if authorities can demonstrate that these will promote improved performance. Each local authority in the pilot scheme also received a special grant of €80,000 in recognition of the additional administrative costs for the authority of drawing up and monitoring the LPSA. Each authority is also invited to apply for pump-priming funding of up to €1.6 million in support of early spending required to deliver the outcomes. The funding is for capital only, typically of an 'invest to save' or 'invest to improve' nature.

A special LPSA Performance Fund has also been established by Central Government. This is designed to reward authorities for achieving their outcomes. It is intended that these Performance Reward Grants (PRGs) will be staged, with the first payment (20% of total) made in 2003/4 for achieving interim targets for 2002/3, and two other equal payments made in 2004/5 and 2005/6.

The amount of PRG which an authority can receive is dependent upon how far beyond standard levels of performance it commits itself to go. The whole PRG will only be received by authorities who achieve targets. Those below 60% of their target outcome will receive no PRG.

### **15.3. Results**

It is too early to comment on the success of the scheme in delivering outcomes. The scheme is new and LPSAs have only recently been concluded. However, there has been some considerable enthusiasm for the mechanism.

LPSAs have now been signed by 20 different local authorities. The content of the LPSAs is wide ranging. As far as waste is concerned, there were a number of objectives put forward by Local Authorities. These were:

1. To increase rates of recycling and composting;
2. To reduce rates of fly-tipping;

3. To speed up clean-up after fly tipping;
4. To improve street cleanliness; and
5. To reduce the problem of abandoned vehicles.

Some Local Authorities had no waste-related target. These were Surrey, Derby, Tameside and Sunderland. The other 16 in the pilot scheme had one (usually) or more targets related to waste.

Those with targets to increase recycling and composting (above statutory requirements) are shown in Table 24 below. This is shown alongside the finance being made available for the purpose. Note that these figures are provisional ones. If they are correct, the sum per unit of waste recycled and per year of the programme varies enormously. On average, it is certainly a healthy sum.

This suggests that some of those with recycling targets in their PSAs are likely to see the budget for meeting their statutory targets considerably enhanced. It should be noted also that these authorities have a broad range of targets under Best Value (there is no obvious bias to high or low performers, though none of the very high performers are recipients – the scheme is not, after all, for waste only).

The sum of money - £18.1 million over three years – is quite considerable given the objective of achieving by the third year (not for each of three years) an additional 67,000 tonnes of recycling (or 75,000 at a 3% rate of growth). This is equivalent to £80-90 per tonne of material per year.

#### **15.4. Potential for Replication in Other Countries**

The mechanism used here is replicable in other countries. However, whether this is an appropriate mechanism for increasing recycling rates seems to hinge upon whether other instruments are available, and the degree to which local authorities experience major problems in respect of funding constraints.

Other cases in this report look at the potential for variable charging in achieving similar objectives. However, in the UK, primary legislation forbids the application of direct charging for waste management services. Hence, there is no direct mechanism for financing waste management, and frequently, local authority waste budgets are determined more by the political priorities of the local authority than any other factor. On the one hand, this places a premium on ensuring funds reach the waste management function directly, but on the other hand, principles of non-hypothecation prevent this.

Other countries could certainly use 'reward' systems to ensure improved performance. In Flanders, environmental covenants have been used to encourage waste minimisation, amongst other things. However, an important factor is to ensure the finance is attractive, but not overly so. In the context of an overall funding constraint, the money available through local PSAs seems to be very generous for what might be achieved through relatively incremental changes in the waste management service.

Table 24: Local Authorities in Receipt of PSAs

	Waste Arisings (tonnes)	Enhancement of Recycling Target (%)	Enhancement of Recycling Target (tonnes)	Performance (2003/4, %)	Funding / incentives <sup>1</sup>	Additional Recycling (tonnes)
Birmingham	454,167	5	22,708	17	UCA €4 million	22,708
Blackburn with Darwen	65,610	5	3,281	22	UCA €6 million (incl cap inv in bins etc)	3,281
Cambridge	43,046	5	2,152	33		2,152
Camden	89,623	2	4,981	24	€592k of €1.6 million pump-priming grant on recycling vehicles and split-bodied collection PRG €850,563 for meeting target	1,792
Coventry	130,920	1.2	1,569	13.2	PRG €1 mn	1,571
Kent	645,006	2	12,900	28		12,900
LB Richmond	98,738	3 8 (increase in Civic Amenity Site recycling) 5 (increase in participation in home composting)	2,961	29.8 16.8 48	€124,800 of pump-priming grant to construct recycling bays, buy compost bins and carry out green waste survey PRG up to €435,523 for each target	2,962
Newcastle	123,630	3	3,708	20	€1.6 million pump-priming grant plus PRG €916,064 for	3,709



	Waste Arisings (tonnes)	Enhancement of Recycling Target (%)	Enhancement of Recycling Target (tonnes)	Performance (2003/4, %)	Funding / incentives <sup>1</sup>	Additional Recycling (tonnes)
					hitting target	
Norfolk	360,467	3  (18) Household Waste Recycling Centres	10,812	31  (50) HHWRC	€6.152 mn UCA plus PRG of €1.712 million per target	10,814
Warwickshire	248,977	2	4,978	20	UCA of €4.384 million for recycling bins for 175,000 households, modification of vehicles, installation of charging and redesign at 10 CA sites PRG €1.17 mn for hitting target	4,980

*Note: UCA = Unsupported Credit Approval, a form of credit awarded by central government to local authorities to ease funding constraints. PRG = Performance Reward Grant, a grant awarded on attainment of the targets in the local PSA.*

*The financial figures are somewhat uncertain and should be used with caution.*

**SECTION 5:**  
**SCHEMES TO  
INCENTIVISE POSITIVE  
BEHAVIOUR BY  
HOUSEHOLDS**

## **CASE 16. GREECE: SCHEMES USING ALUMINIUM CAN RETURN-VENDING MACHINES**

### **16.1. Introduction**

This case study describes the use of reverse-vending machines in Greece for collecting empty aluminium cans. The two schemes described are private initiatives, but they clearly divert a portion of aluminium from the municipal waste stream, recover the value in aluminium cans, they promote recycling and environmental awareness, and they are largely self-financed.

### **16.2. Rationale for the scheme**

The idea is to have automatic machines where people can return their empty aluminium drink cans and get a refund. The cans are sent for recycling, thus contributing to the protection of the environment. The recycled cans are diverted from the municipal waste stream. The two schemes described were set up and operated by private firms, without any support, financial or other, from the authorities or aluminium recycling organisations.

### **16.3. Equipment - Description of the Aluminium Can Reverse-vending M Machines**

A Norwegian manufacturer supplied the reverse-vending machines. They were designed to accept aluminium cans inserted by customers into a special slot. The machines provide a ticket in exchange. Special sensors reject empty or damaged cans. Upon entry into the machine, the cans are compacted (75-80% volume reduction) and stored in plastic bags placed inside bins in the machine, which can hold up to 1,600 cans. The machines used were set up and serviced by the Greek importer (ESPAS HELLAS). The first scheme was operated by the supermarket chain Marinopoulos. The second scheme is operated by a businessman with the co-operation of the supermarket chain AB Vasilopoulos.

### **16.4. Description of Scheme No1**

Initially, around 50 aluminium can reverse-vending machines were bought by a supermarket chain and placed at its stores. But problems emerged with the running of the scheme.

One problem with that scheme was the lack of interest and motivation from the public for large-scale participation in the scheme. There are no compulsory incentive mechanisms from Greek solid waste management legislation for people to be motivated to take part in the scheme. The only

value attached to each returned can was the value of the aluminium itself, and only part of it was returned to the customers, by means of discount tickets for purchases at the supermarket (approximately 0.012 EUR for each can returned). As such, it became apparent that the scheme was not viable economically. This did not worry the supermarket chain initially, as it was not losing considerable amounts of money either, and was also looking to promote its “green” image.

However, after a while, one group of people started to show an increased interest in the scheme: homeless people began collecting cans from the streets and public waste bins, and delivering them *en masse* to the reverse-vending machines. By delivering, for example, 100 empty aluminium cans, they would get a discount coupon of considerable value that would enable them to purchase food at the supermarket. This led to a situation where the management of the supermarkets felt the machines did *not* contribute to enhancing the image of the stores. Instead, shoppers would see homeless people inside the stores, and it was felt that this created a negative image for the store.

The machines became dirty and neglected. The scheme became less attractive for the target customers (mothers with kids) and the participating stores. As a result, it was decided to start removing the reverse-vending machines, as the stores were being renovated. Currently (autumn 2001), about half of the machines have been removed and have been put into storage. It is estimated that all machines will have been retired 1-2 years from now.

## **16.5. Scheme No2: Adapting to the Local Situation**

As a result of the experience gained from the first scheme, a new scheme emerged, taking into account the lessons learned from the first one. The new scheme is operated by a scrap dealer in the Athens area, with the importer of the reverse-vending machines providing technical assistance. Thirteen aluminium can reverse-vending machines have been placed outside large supermarkets so far, over a period of 2 years (10 machines in Athens and 3 in Patras).

The main problems with the *first scheme* had been the following:

- Once the machines were installed there was little active promotion of their use by the store managers. The machines were neglected, and ended up being used only by homeless people, and became dirty and run-down. The scheme became unattractive for the stores involved; and
- They failed to spur the interest of the target group, mainly because the money returned per aluminium can was insignificant.

To overcome the first problem, the money given out for each returned can was halved, from approximately 0.012 EUR to 0.006 EUR per can. The price was now too low for homeless people to be interested, as they would get more money by selling the aluminium directly themselves. Additionally, special attention was paid to the presentation and location of the machines. They were positioned near exits to the supermarket, where they were readily visible by the targeted shoppers, and were organised as “recycling corners”, and embellished with small colourful tents, to increase their appeal. They were also cleaned regularly, as they tend to get dirty rather easily from liquid spilling out of near-empty cans as they are inserted into the slot.

To overcome the second problem, an innovative lottery system was used. The manufacturer of the machines was asked to prepare a special software modification for the machines, so that a prize ticket would be given out every 1000 cans. The prizes were usually offers from the supermarket or other local stores. Whoever offered the prizes for a certain week got to advertise his business on the sides of the machine, thus promoting their business and their contribution to recycling and the environment. For example, the local hairdresser offered free haircuts, and the local patisserie offered free sweets.

This scheme has been more successful than the first one, mainly because many of the problems discovered during the first scheme were tackled with appropriate solutions. Currently, approximately 10,000 cans/month are collected by each machine. The cans collected are sold as aluminium for around 0.015 EUR per can, subject to market prices. From a financial point of view, the scheme only just manages to cover its costs and make a small profit at the moment – ideally, double the current number of cans would be collected per machine. One particular burden for the businessman operating the scheme is the high price of each reverse-vending machine, which costs approximately 8,800 EUR.

## **16.6. Potential for Replication in Other Countries**

These types of scheme are readily replicable. It would be interesting to see whether they could be used in the context of litter prevention in urban areas since even a small financial reward might encourage use. However, such a strategy would require a dense network of facilities and they would need to be designed and sited to ensure that vandalism was not a major problem.

Otherwise, these machines have been used in other countries. It may be possible to design similar machines for other types of waste to encourage householders to behave in an appropriate manner.

## **CASE 17. SWEDEN: SCHEMES TO PROMOTE HOME COMPOSTING**

### **17.1. Rationale for Scheme**

In Sweden about 60 % of the municipalities have organised schemes for home composting of food wastes, with a reduction of the waste fee (RVF, 2001). The objectives of the schemes are to reduce the amount of waste at source, and encourage recycling of plant nutrients. The formal requirements, as well as the results are different in different municipalities.

It has been estimated that about 200,000 Swedish households have home composters for food wastes (RVF, 2001). However, there are large variations between different municipalities.

### **17.2. Basic Description of the Scheme**

#### **17.2.1. General Description of the Region**

The region Södertörn consists of five municipalities: Botkyrka, Huddinge, Haninge, Nynäshamn and Salem, with a total population of 260,000 inhabitants in 120,000 households. About 40 % of the households live in detached houses.

Municipal solid waste in the region is managed by SRV-Atervingning, which is owned by the five municipalities. During 2000, SRV-Atervingning handled about 179,800 tons of waste (SRV, 2001):

1. 102 100 ton waste from households
2. 27 200 tons of industrial and business wastes
3. 50 500 tons of sludges

The house owner is responsible for the waste fee. In apartment houses the house owner is invoiced, but the fee is distributed across all tenants, so the fee is included in the rent. For detached houses, the fee is invoiced directly to the house owner. Home owners can arrange for home composters and become eligible for a reduced waste fee. This option has been available since 1992.

Citizens are given information concerning this possibility through brochures distributed yearly to all households, and information is also given in the waste fee invoice.

### 17.2.2. Requirements on the Compost Bin

There are requirements that the compost bins shall be

1. closed;
2. heat insulated, so the compost process can proceed during winter time; and
3. constructed so that mice, rats and birds cannot come into the waste (e.g. all aeration holes or openings shall be covered by 6 – 9 mm mesh).

An approved compost bin costs around 1,000 SEK to buy.

A house with own composting has to send an application to SRV-Atervingning. The house owner has to declare that the compost bin is constructed according to the specified requirements. SRV-Atervingning or the municipality's environmental department may visit the house to inspect the bin (however, it is very seldom the compost bins are inspected).

### 17.2.3. Composting at Detached Houses and Summer Houses

The home owner can subscribe to different collection services. For detached houses the house owner can choose the volume of waste bin (130 – 240 litre), collection frequency (every week or every second week) and whether or not to compost.

The fee is according to Table 25 (detached houses, collection whole year) and Table 26 (summerhouses, collection 12 times during May-September). The fee for apartment houses is more complicated to show, and depends on volume and location of collection facilities, number of apartments, and area of apartments.

Table 25: Waste Fee for Detached Houses (1 SEK = 0.1077 Euro)

Collection frequency	Waste fee, SEK/year, inclusive 25 % VAT				
	Sack 210 litre	Sack (210 litre) in waste lockers	130 litre bin	190 litre bin	240 litre bin
14 days, without composting	1057	1038,50	878	951	1250
14 days, with composting	660,50	641	596,50	623	728
7 days, without composting	2254,50	2236	2075,50	2148,50	2447,50
7 days, with composting	1858	1838,50	1794	1820,50	1925,50
Reduction fee for composting	396,50	397,50	281,50	328	522

Table 26: Waste Fee for Summer Houses (1 SEK = 0.1077 Euro)

Collection frequency	Waste fee, SEK/year, inclusive 25 % VAT	
	Sack 210 litre	240 litre bin
Collection 12 times during May-October	646	1028
Collection 12 times during May-October	509	891,50
Reduction fee for composting	137	137



#### **17.2.4. Composting in Apartment Houses**

Owners of apartment houses can also apply for fee reduction due to composting. However, all tenants in the house have to participate in the composting program. There are only a few houses that have introduced local composting.

### **17.3. Evidence for Effectiveness**

About 20 % of all owners of detached houses (about 9,500 houses), and 14 % of owners of summerhouses or leisure homes have applied for fee reduction for composting. SRV-Atervingning has estimated that the total amount of composted waste is about 1,600 ton/year. The total fee reduction corresponds to 1.9 million SEK/year or 1,200 SEK/ton of composted waste (Kjellmeaus, 2001)

### **17.4. Evidence of Undesirable Side-effects**

Some undesirable effects are (Kjellmaeus, 2001):

- Some house owners have applied for fee reduction, without having an approved compost bin. However, most inspections have shown that there is an approved compost bin at the house. Only a small percentage of the inspected cases have revealed false declarations;
- The most undesirable effect is that a lot of the compostable waste is put in the residual waste bin, even where the house owner has an approved compost bin. Sorting analyses on ordinary waste from some randomly chosen houses, showed that 25 – 50 % of the potential compostable waste from approved houses was still put in the residual waste bin.

There have also been cases of mismanagement of home compost bins. Every year, there are about 10 cases where the neighbours have complained about odours, rats and birds from home compost bins in the neighbourhood.

### **17.5. Potential for Replication in Other Countries**

There should be a potential of home composting in other countries. Sorting analyses of waste shows that 40 – 50 % of the waste is possible to compost. However, the obtained results from Södertörn shows that only minor amounts of waste are composted at homes.

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## **CASE 18. UNITED KINGDOM: ‘REAL NAPPY’ INITIATIVE, WEST SUSSEX**

### **18.1. Rationale**

The rationale for this project is to minimise the arisings of municipal waste, specifically, disposable nappies (or diapers). These constitute an estimated 5% of the household waste stream in West Sussex (and estimates for the UK as a whole are that they are 4% or so of the stream, but these estimates are questionable).

Further motivation was given by the Draft England and Wales Waste Strategy, which suggested that the rate of growth in household waste should be cut by half by 2005. The final waste strategy, however, contains no such targets.

Around 9,000 births are recorded annually in West Sussex. The average number of ‘nappy changes’ per child is estimated at around 6,500 prior to their being able to use toilet facilities. This amounts to a total of 58.5 million ‘nappy changes’ per annum. The Women’s Environmental Network in the UK estimate that throughout the UK, 85% of nappy changes are made using disposable nappies, a figure which, if applied to West Sussex, equates to close to 50 million disposable nappies.

The average weight of a nappy which is full is between 200 and 300g. Currently, all disposable nappies in the West Sussex waste stream are landfilled. This amounts to around 10-15,000 tonnes per annum. The costs of disposal alone are of the order €480,000 – €720,000 per annum. These costs are likely to increase in future years as the costs of disposal increase through anticipated, and already announced, increases in landfill tax. It should be noted that in ‘per child’ terms, the weight of waste delivered for disposal is more or less equivalent to an average household’s total waste production in one year.

It has been estimated that disposable nappies create up to 60 times more solid waste than washable nappies and use considerably more renewables and non-renewable resources. Other potential benefits are avoidance of nappy rash (through use of breathable fabrics), better support for hips and more cushioning when learning to walk.

The typical alternative to the disposable nappy is not the old terylene nappy but a modern cotton nappy. This is placed within a pair of waterproof, or breathable fabric pants or outer wrap fastened with Velcro. Tissue liners are used to retain faeces which are usually flushed down the toilet. The outer wrap can be washed at home and the used cotton nappy can either be washed at home or at dedicated laundries ensuring a clean, thermo-clinical wash. Other alternatives used in Australia and New Zealand are designed such that they can be composted.



## **18.2. Description of the Scheme**

Before this scheme was initiated, research was undertaken to see what factors were hindering people's use of re-usable nappies for their babies. The research pointed to:

- Lack of awareness of alternatives to disposables;
- Perception that re-usable nappies were always 'the old-fashioned terry (i.e. terylene) squares';
- Lack of willingness to undertake laundering at home;
- Belief that disposables were convenient and therefore must be better
- Belief that alternatives would be more costly; and
- Related to the previous point, the fact that a greater initial outlay would be required rather than the periodic payments for disposables.

Further research showed that although some of these are amenable to change through education and publicity campaigns, where such campaigns had been undertaken, there was little real change in behaviour as a result. West Sussex Council therefore felt that the educational component of the campaign had to be supported with financial incentives.

### **18.2.1. Promotional Work**

West Sussex produced a leaflet promoting the use of alternatives to disposable nappies. This includes details of incentives designed to promote uptake of cotton nappies. The leaflet is distributed through libraries and through healthcare professionals via ante-natal packs for expectant mothers, doctors' surgeries, hospitals, clinics and other outlets.

A Real Nappy Week takes place during April each year. In some Districts within the County, exhibitions were set up at local maternity units. There was a children's party in a swimming pool at which 'swim nappies' were issued free, and this received coverage from the media.

Where households ask for larger bins for their waste, Council officers explain about the initiative where there are 'babies in nappies' in the household. Certain major stores have also supported the campaign, agreeing to put information in baby-changing rooms in their stores.

The offices registering births have also placed leaflets where parents registering new babies can see them. A stand at a Regional show was also used to promote the initiative.

West Sussex library has a 'campaign corner' which addresses a specific campaign periodically. The first to be chosen was the nappy initiative.

### **18.2.2. Incentive Payments**

The incentive scheme is run in conjunction with a company called 'Cotton Bottoms', the only company providing a nappy laundering service in West Sussex. Cotton Bottoms discussed incentive schemes with West Sussex, noting that the decision to use (or not) re-useables is usually made before the child is born. The decision is only revisited if they or the baby have problems with their choice. Those who elect to use cotton nappies may revisit the decision when their child outgrows a set of wraps of a given size. There are usually two such occasions, at three and six months.

The incentive payments are therefore designed to find support in line with the initial decision and these two periods:

5. An initial payment to offset part of the registration fee for joining the nappy laundering service (€17.60);
6. A second payment at three months when additional wraps need to be purchased (€15.20); and
7. A third payment at six months when the third set of wraps is needed (€15.20).

The payments are not made to the parents but to the laundering service, which deducts the payments from the charges incurred by parents. The periodic payments (as opposed to one-off payments) are designed to ensure parents 'stay with' the scheme. The magnitude of the payments has been related to the avoided disposal costs. The three payments amount to 80% of the lower end estimate of avoided disposal costs.

Not all parents choose to use the laundering service (preferring to do this themselves). For these parents, it is difficult to 'prove' use of the reusable nappies. However, the decision was taken to make an incentive payment equivalent to the first payment made to those in the laundering service on receipt of:

- a) a photocopy of the baby's Birth Certificate; and
- b) signed confirmation from a health professional that real nappies were being used;

Of these parents, those who use nappies for second and third children are given the first incentive payment a second or third time as appropriate.

### **18.3. Results**

A sum of €24,000 was suggested for the first year (1999-2000), with potential to make payments to 500 families saving up to 800 tonnes of used disposable nappies, generating a saving of the order €32,000. €8,000 was made available to allow production of a leaflet and other publicity material to promote the campaign to March 2001.

Since the implementation of the scheme on 24<sup>th</sup> June 1999, uptake appears to have been lower than was hoped. Indeed, registrations with Cotton Bottoms were very low in the early months. By November, however, numbers began to increase. By March 2000, 204 registrations had been received. By January 2000, 20 parents had applied for payments in respect of laundering their own nappies. At the time of writing (early 2002), the numbers had increased to 737 registrations with Cotton Bottoms and 350 registrations of parents doing their own laundering. The local authority report continuing demand for the service with new registrations occurring each week.

Cotton Bottoms reported that business had grown considerably. Cotton nappies and the laundry service now cover 5% of the birth rate in West Sussex, up from 0.88% prior to the scheme's launch. It seems likely that the employment effects of reducing disposable nappy use and disposal would also be positive in this scheme, which incurs no net cost to the Council.

It was recognised that the positive responses to the campaign were not being translated into behavioural changes as quickly as hoped. The attention of the Council turned to hospitals' on-ward policies. One of the hospitals in West Sussex, with the largest maternity unit in the County, was interested but could not fund the change through the existing Health Authority budget. The Council therefore agreed to fund the initial costs of the purchase of nappies, wraps and bins (a one-off cost of just over €9,000). Future costs will be taken on by the Health Authority, and Cotton Bottoms, who agreed to launder the nappies free of charge. The rationale for the latter was that the company would potentially see more 'converts'. The hospital provides packs and advice in ante-natal classes and other work with expectant mothers. Similar approaches are being considered for other hospitals.

A similar approach has been used with nurseries and childminders. One nursery operates outside the region as well, so it is hoped that this may lead to export of the initiative beyond West Sussex.

It should be noted that a number of municipalities now promote use of real Nappies. However, few of these provide incentive payments.

#### **18.4. Lessons Learned and Potential for Replication in Other Countries**

The Council has tried to promote minimisation through use of revenues which would otherwise be spent on waste disposal. The two-tier waste management system operating in England, in which counties have responsibility for



treatment, and Districts (a lower tier of local government) have responsibility for collection makes these sorts of arrangement less likely to occur in England than in other EU Member States. Indeed, in other countries, there may be marginal savings in collection costs as well as in the costs of disposal.

Clearly, the development of partnerships with hospitals, health professionals, stores and the Districts has been important in this County-led initiative. The dominance of re-usable nappies in the UK might not be replicated in other EU countries. Where it is, however, this type of scheme suggests that a quite high proportion of the waste stream could potentially be addressed by this type of approach. Arguably, in municipalities where direct charging schemes are already present, this type of scheme should prove especially successful (since the incentive payments support the general aims of the direct charging policy). In the UK, primary legislation prevents the application of direct charging which makes this scheme, and the design of the incentive payments, especially innovative.

# **SECTION 6: OTHER SCHEMES**

## **CASE 19. FINLAND: BENCHMARKING COMPETITION BETWEEN COMPANIES (AREA OF HELSINKI METROPOLITAN AREA COUNCIL)**

### **19.1. Rationale for Scheme**

The **Helsinki Metropolitan Area Council (YTV)** area covers the cities of Helsinki, Espoo, Vantaa and Kauniainen. The number of inhabitants in the YTV area is about one million. The YTV offers services for public transportation, air protection, waste management and spatial development planning. In the waste management sector, YTV is responsible for municipal waste management.

In addition to practical operations in waste management, YTV offers multi-faceted information and advisory services for households and companies. Based on the Waste Act, the aims of waste management are outlined by the hierarchy:

1) reduction of waste, 2) reusing, 3) recycling as raw material, 4) energy recovery and 5) safe disposal in landfill.

Since 1998 YTV has organised a Benchmarking Competition between companies to motivate the reduction of waste.

### **19.2. Basic Description of the Scheme**

YTV awards annually the company, or the organisation (schools, hospitals etc.), which has most successfully decreased the amount of generated waste in its activities. All the companies and organisations which have registered to the benchmarking system and have given the required information concerning waste quantities are participating in the competition. The benchmarking scheme is a computer based system, and the data is fed by the companies directly into the scheme.

When choosing the winner, the most important parameter is the quantity of waste generated compared to the company's turnover or number of employees. These parameters are compared with those of other companies in the same sector, or other organisations of the same type. In addition, the quantity of materials recycled, other activities for material effectiveness and material choices are noticed, as well as long term efforts in waste reduction and progress in waste management.

The annual winner is awarded a certificate and the winner is authorised to use the “*Natural resource saver*” –symbol in marketing and information material for one year.

Participating in practice requires the following phases:

- 1) Registration, getting a password and username;
- 2) Input concerning the company or organisation’s basic characteristics (branch, turnover, employees etc.)
- 3) Reporting of annual waste amounts; and
- 4) Acceptance of reports and results.

The participants are informed in detail concerning different measurement methods for the quantity of waste. Special calculation methods are given for both weight- and volume-based waste collection, such as density factors for different waste materials whose collection is capacity-based.

### **19.3. Evidence for Effectiveness**

There have been three winners of the Benchmarking competition so far (in 1998 there were two winners):

1998: Head office of Tapiola company (insurance branch) and Helsinki University Central Hospital (HYKS)

1999: the shopping centre Myyrmanni.

These companies / organisations successfully developed their waste management, for example by developing sorting, reducing total amount of waste produced and increasing the proportion of collected recyclable materials. For example in the shopping centre Myyrmanni the total amount of waste generated compared to turnover had fallen from 1700 kg to 1200 kg and the share of recyclable materials collected separately increased from 36 % to 60 % of the total waste generated. In practice, this implied a reduction in waste generated per unit of turnover of 56%.

Of course, not all of these improvements can be attributed solely to the Benchmarking Competition, but the scheme has certainly provided significant additional motivation.

Because the scheme is based on monitoring and registration of normal operations, and the aim is to motivate a decrease in waste generated, there has been no evidence of undesirable side effects noticed so far.

### **19.4. Lessons Learned in Implementation**

The Benchmarking Competition has had difficulties in generating participants, and the amount of participating companies is only 20-30. The principle reason for not joining (on the part of companies) has been that companies do not wish to join the scheme before their waste management has already been improved.

To make participation more attractive, the advertising of the scheme has more recently focused on measurement of performance against a company's own waste statistics instead of competition against other companies' performance. In other words, the benchmarking scheme has been offered as an instrument for self-monitoring.

As one of the methods to encourage positive behaviour in waste management, this kind of competition is more important to some companies than to others, depending on the prioritisation of waste and environmental issues overall.

## **19.5. Potential for Replication in Other Countries**

Replication of scheme of this type benchmarking competition is quite straightforward because it requires only registration of basic company information and input of material flow data. The scheme does not necessarily require any computer-based system, since it could work also as a hard-copy system based on the delivered waste amounts of different waste types.

Companies may feel this kind of competition as good possibility to get good environmental image, and this could motivate them to hard efforts.

It should be noted that in Italy, a highly successful scheme runs at the nationwide level in which municipalities' performance in respect of separate collection is compared. Awards are given to the best performers. The scheme has been successful in establishing a competitive element to the development of high capture rate schemes for municipal waste recycling and composting. Municipalities belong either to 'Club 50', 'Club 35' or 'Club 25' according to their achievements.

This suggests that both administrative entities and other institutions that are included in the municipal waste round, as well as the municipalities themselves, could be incentivised by competitions. The impact of such competitions may have effects beyond their immediate target audience. Schools, companies and public buildings are all constituted by people. The increase in consciousness developed in the workplace can spill over into the home, and visa versa.

## **CASE 20. LUXEMBOURG: HOUSEHOLD HAZARDOUS WASTE MANAGEMENT**

### **20.1. Introduction**

“SuperDrecksKescht fir Biirger” is the system for the collection of household hazardous wastes in Luxembourg. The collection is for free for citizens. Waste avoidance and recycling, as well as ecological disposal of problematic substances, are the aims of the system. Primary objectives are providing information and advisory services for citizens.

Another collection system is installed for refrigerators (“SuperFreonsKescht”) and for electrical and electronic wastes. The “SuperDrecksKescht fir Betriber” is supporting companies in developing an ecological waste policy.

### **20.2. Description**

The hazardous waste management system, SuperDrecksKescht fir Biirger, consists of three key parts: first of all, an information, awareness and advisory service, secondly, the collection of hazardous wastes, and lastly, the sorting, recycling and treatment of the collected wastes.

Numerous and multiple services and activities, as well as extensive programmes, are carried out in the context of public relations work for information, awareness raising and advisory services. Specific measures are:

- brochures, leaflets, circulars and an information telephone;
- internet homepage, <http://www.superdreckskescht.lu>;
- stands on environment days or fairs;
- special activities like “handicrafts by pupils – look how beautiful waste can be”, “O Direktor Speck-wat en Dreck – a captivating puppet theatre” or sport events for the 10<sup>th</sup> anniversary of SuperDrecksKescht; and
- SuperDrecksKescht as a trademark for environmental care in Luxembourg.

Wastes being collected are batteries, pharmaceuticals, spray cans, paints and any toxic waste from households. In order to make the separate collection at home easier a special container, the SuperDrecksKescht-box, is given to the households.

There are four different collection schemes for the hazardous wastes:

- mobile vehicles – 4 times a year in every commune. These not only provide occasions to collect problematic substances but also provide information about environmentally friendly alternatives;
- recycling centers with permanent collecting sites of the SuperDrecksKescht fir Biirger – a user-friendly combination for the collection of dry recyclables and hazardous wastes;
- collection at the door-step – for larger quantities a special van can be ordered by phone; and
- special collection campaigns – organized by communities or for example the fire brigade.

After the collection of the hazardous wastes all substances are transported to the logistical center at Colmar-Berg. This is the place where all steps relevant for further recycling and treatment are taken. The main tasks which are carried out at the logistic center are:

- Preparation of containers and vehicles for the hazardous waste collection and coordination of the collection;
- Quality assurance for incoming and outgoing materials; the amount and type of material are registered in a database;
- Identification of unknown substances, and quality check on substances before final treatment or recycling, in the in-house laboratory;
- Sorting and safe packaging of recyclables and hazardous substances; sorting and also further treatment of materials takes place in regard to the criteria of the final recycling or treatment company; solvents and volatile products are treated in special exhaust plants; and
- Storage of the various groups of substances until shipment for recycling or final treatment; unknown or highly dangerous materials are stored on special shelves with specific safety devices.

The amount of hazardous wastes collected by “SuperDrecksKescht fir Biirger” increased continually from approximately 200 t in 1990 to 1,400 t in 1999. Figures for 1998 of the different collection schemes are given in Table 27. 70 % of all materials being collected are (at least partially) recycled.

Table 27: Hazardous Waste Collection in 1999

Collection scheme	Hazardous waste in kg
Mobile vehicles	396,344
Recycling centre	882,145
Special collection campaigns	9,816
Door-step collection	110,177
Total	1,398,481
Specific amount kg/person	3.3

The “SuperDrecksKesch fir Biirger” is financed by the ministry of environment. The total cost for the years 1998 and 1999 are estimated to be approximately 2.84 € per kg of hazardous waste (including public relation, collection and the logistic center). This suggests a considerably higher cost for collection and treatment (€2,840 per tonne) for these wastes than for other materials.

### **20.3. Potential for Replication in Other Countries**

This type of scheme is transferable to other countries and already occurs in other countries. An interesting aspect of the Luxembourg scheme is that the mechanism appears to be financed entirely by the Ministry. In other countries, there might be more inclination to pass the costs on to the consumers of these products via the manufacturers (a form of producer responsibility). Advanced disposal fees are particularly appropriate for hazardous materials if the revenue so generated is used to support appropriate forms of waste management. Arguably, the key with hazardous wastes is to ensure that the materials do not find their way to the wrong destinations. Failure to do this is likely to lead to long-term problems with persistent and potentially damaging chemicals.



## ANNEX 1

### Recycling and Composting Targets for English Local authorities

Local Authority	1998/99 (baseline) Rate	2003/4 Target	2005/6 Target
Adur District Council	17	33	36
Allerdale Borough Council	4	10	18
Alnwick District Council	3	10	18
Amber Valley Borough Council	2	10	18
Arun District Council	14	28	36
Ashfield District Council	1	10	18
Ashford Borough Council	7	14	21
Aylesbury Vale District Council	13	26	36
Babergh District Council	7	14	21
Barnsley MBC	2	10	18
Barrow-in-Furness Borough Council	6	12	18
Basildon District Council	10	20	30
Basingstoke and Deane Borough Council	10	20	30
Bassetlaw District Council	7	14	21
Bath and North East Somerset Council	17	33	36
Bedford Borough Council	4	10	18
Bedfordshire County Council	6	12	18
Berwick-upon-Tweed Borough Council	4	10	18
Birmingham City Council	5	10	18
Blaby District Council	10	20	30
Blackburn with Darwen Borough Council	4	10	18
Blackpool Borough Council	5	10	18
Blyth Valley Borough Council	2	10	18
Bolsover District Council	2	10	18
Bolton MBC	5	10	18
Boston Borough Council	2	10	18
Bournemouth Borough Council	24	33	40
Bracknell Forest Borough Council	9	18	27
Braintree District Council	7	14	21
Breckland Borough Council	14	28	36
Brentwood Borough Council	14	28	36
Bridgnorth District Council	9	18	27
Brighton and Hove Council	10	20	30
Bristol City Council	9	18	27
Broadland District Council	9	18	27
Bromsgrove District Council	5	10	18
Broxbourne Borough Council	7	14	21
Broxtowe Borough Council	3	10	18
Buckinghamshire County Council	16	33	36
Burnley Borough Council	3	10	18
Bury Metropolitan Borough Council	3	10	18
Calderdale MBC	3	10	18
Cambridge City Council	14	28	36
Cambridgeshire County Council	16	33	36
Cannock Chase Council	2	10	18
Canterbury City Council	10	20	30
Caradon District Council	2	10	18
Carlisle City Council	11	22	33
Carrick District Council	7	14	21
Castle Morpeth Borough Council	**	33	40
Castle Point Borough Council	8	16	24
Charnwood Borough Council	17	33	36
Chelmsford Borough Council	3	10	18
Cheltenham Borough Council	8	16	24

Local Authority	1998/99 (baseline) Rate	2003/4 Target	2005/6 Target
Cherwell District Council	6	12	18
Cheshire County Council	11	22	33
Chester City Council	12	24	36
Chesterfield Borough Council	8	16	24
Chester-le-Street District Council	2	10	18
Chichester District Council	12	24	36
Chiltern District Council	24	33	40
Chorley Borough Council	4	10	18
Christchurch Borough Council	11	22	33
City of Bradford MDC (MBC)	8	16	24
City of Wakefield MDC (MBC)	3	10	18
City of York Council	6	12	18
Colchester Borough Council	14	28	36
Congleton Borough Council	7	14	21
Copeland Borough Council	5	10	18
Corby Borough Council	1	10	18
Cornwall County Council	6	12	18
Corporation of London	0	10	18
Cotswold District Council	19	33	40
Council of the Isles of Scilly	8	16	24
Coventry City Council	6	12	18
Craven District Council	9	18	27
Crawley Borough Council	10	20	30
Crewe and Nantwich Borough Council	5	10	18
Cumbria County Council	7	14	21
Dacorum Borough Council	6	12	18
Darlington Borough Council	5	10	18
Dartford Borough Council	7	14	21
Daventry District Council	15	30	36
Derby City Council	11	22	33
Derbyshire County Council	6	12	18
Derbyshire Dales District Council	9	18	27
Derwentside District Council	2	10	18
Devon County Council	17	33	36
Doncaster MBC	4	10	18
Dorset County Council	31	33	40
Dover District Council	4	10	18
Dudley MBC	5	10	18
Durham City Council	4	10	18
Durham County Council	3	10	18
Easington District Council	5	10	18
East Cambridgeshire District Council	11	22	33
East Devon District Council	9	18	27
East Dorset District Council	19	33	40
East Hampshire District Council	8	16	24
East Hertfordshire District Council	6	12	18
East Lindsey District Council	6	12	18
East London Waste Authority	4	10	18
East Northamptonshire Council	14	28	36
East Riding of Yorkshire Council	9	18	27
East Staffordshire Borough Council	5	10	18
East Sussex County Council	9	18	27
Eastbourne Borough Council	6	12	18
Eastleigh Borough Council	26	33	40
Eden District Council	8	16	24
Ellesmere Port and Neston Borough Council	8	16	24
Elmbridge Borough Council	8	16	24
Epping Forest Borough Council	14	28	36
Epsom and Ewell Borough Council	5	10	18
Erewash Borough Council	10	20	30
Essex County Council	11	22	33
Exeter City Council	10	20	30

Local Authority	1998/99 (baseline) Rate	2003/4 Target	2005/6 Target
Fareham Borough Council	20	33	40
Fenland District Council	4	10	18
Forest Heath District Council	23	33	40
Forest of Dean District Council	11	22	33
Fylde Borough Council	7	14	21
Gateshead MBC	2	10	18
Gedling Borough Council	7	14	21
Gloucester City Council	6	12	18
Gloucestershire County Council	12	24	36
Gosport Borough Council	9	18	27
Gravesham Borough Council	11	22	33
Great Yarmouth Borough Council	4	10	18
Greater Manchester WDA (MBC)	5	10	18
Guildford Borough Council	7	14	21
Halton Borough Council	4	10	18
Hambleton District Council	8	16	24
Hampshire County Council	23	33	40
Harborough District Council	5	10	18
Harlow District Council	4	10	18
Harrogate Borough Council	7	14	21
Hart District Council	11	22	33
Hartlepool Borough Council	4	10	18
Hastings Borough Council	6	12	18
Havant Borough Council	17	33	36
Herefordshire Council	7	14	21
Hertfordshire County Council	10	20	30
Hertsmere Borough Council	7	14	21
High Peak Borough Council	4	10	18
Hinckley and Bosworth Borough Council	9	18	27
Horsham District Council	13	26	36
Huntingdonshire District Council	7	14	21
Hyndburn Borough Council	6	12	18
Ipswich Borough Council	5	10	18
Isle of Wight Council	13	26	36
Kennet District Council	13	26	36
Kent County Council	10	20	30
Kerrier District Council	6	12	18
Kettering Borough Council	3	10	18
Kings Lynn and West Norfolk Borough Council	9	18	27
Kingston-upon-Hull City Council	7	14	21
Kirklees MBC	7	14	21
Knowsley Metropolitan Borough Council	2	10	18
Lancashire County Council	10	20	30
Lancaster City Council	6	12	18
Leeds City Council (MBC)	7	14	21
Leicester City Council	9	18	27
Leicestershire County Council	11	22	33
Lewes District Council	9	18	27
Lichfield District Council	13	26	36
Lincoln City Council	12	24	36
Lincolnshire County Council	10	20	30
Liverpool City Council	2	10	18
London Borough of Barking and Dagenham	3	10	18
London Borough of Barnet	9	18	27
London Borough of Bexley	18	33	36
London Borough of Brent	5	10	18
London Borough of Bromley	7	14	21
London Borough of Camden	11	22	33
London Borough of Croydon	14	28	36
London Borough of Ealing	10	20	30
London Borough of Enfield	9	18	27
London Borough of Greenwich	4	10	18

Local Authority	1998/99 (baseline) Rate	2003/4 Target	2005/6 Target
London Borough of Hackney	2	10	18
London Borough of Hammersmith and Fulham	8	16	24
London Borough of Haringey	5	10	18
London Borough of Harrow	8	16	24
London Borough of Havering	9	18	27
London Borough of Hillingdon	7	14	21
London Borough of Hounslow	14	28	36
London Borough of Islington	3	10	18
London Borough of Kensington and Chelsea	11	22	33
London Borough of Kingston-upon-Thames	15	30	36
London Borough of Lambeth	7	14	21
London Borough of Lewisham	4	10	18
London Borough of Merton	9	18	27
London Borough of Newham	2	10	18
London Borough of Redbridge	7	14	21
London Borough of Richmond upon Thames	14	28	36
London Borough of Southwark	3	10	18
London Borough of Sutton	16	33	36
London Borough of Tower Hamlets	3	10	18
London Borough of Waltham Forest	6	12	18
London Borough of Wandsworth	8	16	24
Luton Borough Council	8	16	24
Macclesfield Borough Council	8	16	24
Maidstone Borough Council	6	12	18
Maldon District Council	11	22	33
Malvern Hills District Council	5	10	18
Manchester City Council (MBC)	3	10	18
Mansfield District Council	1	10	18
Medway Borough Council	12	24	36
Melton Borough Council	19	33	40
Mendip District Council	8	16	24
Merseyside WDA (MBC)	4	10	18
Mid Bedfordshire District Council	5	10	18
Mid Devon District Council	11	22	33
Mid Suffolk District Council	8	16	24
Mid Sussex District Council	18	33	36
Middlesbrough Borough Council	3	10	18
Milton Keynes Council	16	33	36
Mole Valley District Council	12	24	36
New Forest District Council	22	33	40
Newark and Sherwood District Council	5	10	18
Newcastle-under-Lyme Borough Council	3	10	18
Newcastle-upon-Tyne City Council (MBC)	5	10	18
Norfolk County Council	14	28	36
North Cornwall District Council	7	14	21
North Devon District Council	10	20	30
North Dorset District Council	18	33	36
North East Derbyshire District Council	2	10	18
North East Lincolnshire Council	7	14	21
North Hertfordshire District Council	8	16	24
North Kesteven District Council	4	10	18
North Lincolnshire Council	8	16	24
North London Waste Authority	6	12	18
North Norfolk District Council	14	28	36
North Shropshire District Council	5	10	18
North Somerset Council	7	14	21
North Tyneside Council	4	10	18
North Warwickshire Borough Council	5	10	18
North West Leicestershire District Council	8	16	24
North Wiltshire District Council	5	10	18
North Yorkshire County Council	7	14	21
Northampton Borough Council	12	24	36

Local Authority	1998/99 (baseline) Rate	2003/4 Target	2005/6 Target
Northamptonshire County Council	9	18	27
Northumberland County Council& dagger;	4	10	18
Norwich City Council	6	12	18
Nottingham City Council	4	10	18
Nottinghamshire County Council	8	16	24
Nuneaton and Bedworth Borough Council	8	16	24
Oadby and Wigston Borough Council	16	33	36
Oldham MBC	3	10	18
Oswestry Borough Council	6	12	18
Oxford City Council	7	14	21
Oxfordshire County Council	10	20	30
Pendle Borough Council	4	10	18
Penwith District Council	3	10	18
Peterborough City Council	17	33	36
Plymouth City Council	8	16	24
Poole Borough Council	22	33	40
Portsmouth City Council	12	24	36
Preston Borough Council	3	10	18
Purbeck District Council	16	33	36
Reading Borough Council	8	16	24
Redcarand Cleveland Borough Council	2	10	18
Redditch Borough Council	4	10	18
Reigate and Banstead Borough Council	19	33	40
Restormel Borough Council	8	16	24
Ribble Valley Borough Council	6	12	18
Richmondshire District Council	4	10	18
Rochdale MBC	5	10	18
Rochford District Council	4	10	18
Rossendale Borough Council	5	10	18
Rother District Council	8	16	24
Rotherham MBC	5	10	18
Rugby Borough Council	4	10	18
Runnymede Borough Council	5	10	18
Rushcliffe Borough Council	6	12	18
Rushmoor Borough Council	8	16	24
Rutland County Council	11	22	33
Ryedale District Council	11	22	33
Salford City Council (MBC)	2	10	18
Salisbury District Council	16	33	36
Sandwell MBC	4	10	18
Scarborough Borough Council	6	12	18
Sedgefield Borough Council	1	10	18
Sedgemoor District Council	6	12	18
Sefton MBC	8	16	24
Selby District Council	3	10	18
Sevenoaks District Council	10	20	30
Sheffield City Council	5	10	18
Shepway District Council	12	24	36
Shrewsbury and Atcham Borough Council	9	18	27
Shropshire County Council	7	14	21
Slough Borough Council	8	16	24
Solihull MBC	5	10	18
Somerset County Council	14	28	36
South Bedfordshire District Council	7	14	21
South Bucks District Council	20	33	40
South Cambridgeshire District Council	8	16	24
South Derbyshire District Council	7	14	21
South Gloucestershire Council	7	14	21
South Hams District Council	14	28	36
South Holland District Council	8	16	24
South Kesteven District Council	6	12	18
South Lakeland District Council	7	14	21

Local Authority	1998/99 (baseline) Rate	2003/4 Target	2005/6 Target
South Norfolk Council	10	20	30
South Northamptonshire District Council	5	10	18
South Oxfordshire District Council	17	33	36
South Ribble Borough Council	7	14	21
South Shropshire District Council	10	20	30
South Somerset District Council	11	22	33
South Staffordshire Council	6	12	18
South Tyneside MBC	4	10	18
Southampton City Council	8	16	24
Southend-on-Sea Borough Council	9	18	27
Spelthorne Borough Council	11	22	33
St Albans City and District Council	14	28	36
St Edmundsbury Borough Council	21	33	40
St Helens MBC	1	10	18
Stafford Borough Council	3	10	18
Staffordshire County Council	9	18	27
Staffordshire Moorlands District Council	5	10	18
Stevenage Borough Council	8	16	24
Stockport MBC	11	22	33
Stockton-on-Tees Borough Council	4	10	18
Stoke-on-Trent City Council	9	18	27
Stratford-on-Avon District Council	12	24	36
Stroud District Council	13	26	36
Suffolk Coastal District Council	12	24	36
Suffolk County Council	14	28	36
Sunderland City Council	1	10	18
Surrey County Council	15	30	36
Surrey Heath Borough Council	19	33	40
Swale Borough Council	8	16	24
Swindon Borough Council	15	30	36
Tameside MBC	5	10	18
Tamworth Borough Council	5	10	18
Tandridge District Council	20	33	40
Taunton Deane Borough Council	12	24	36
Teesdale District Council	3	10	18
Teignbridge District Council	12	24	36
Telford and Wrekin Council	4	10	18
Tendring District Council	8	16	24
Test Valley Borough Council	16	33	36
Tewkesbury Borough Council	7	14	21
Thanet District Council	7	14	21
Three Rivers District Council	11	22	33
Thurrock Council	4	10	18
Tonbridge and Malling Borough Council	10	20	30
Torbay Council	10	20	30
Torrige District Council	11	22	33
Trafford MBC	2	10	18
Tunbridge Wells Borough Council	10	20	30
Tynedale District Council	6	12	18
Uttlesford District Council	12	24	36
Vale of White Horse District Council	11	22	33
Vale Royal Borough Council	4	10	18
Walsall MBC	8	16	24
Wansbeck Borough Council	1	10	18
Warrington Borough Council	10	20	30
Warwick District Council	9	18	27
Warwickshire County Council	8	16	24
Watford Borough Council	10	20	30
Waveney District Council	4	10	18
Waverley Borough Council	12	24	36
Wealden District Council	8	16	24
Wear Valley District Council	1	10	18

<b>Local Authority</b>	<b>1998/99 (baseline) Rate</b>	<b>2003/4 Target</b>	<b>2005/6 Target</b>
Wellingborough Borough Council	6	12	18
Welwyn Hatfield Council	12	24	36
West Berkshire District Council	10	20	30
West Devon Borough Council	15	30	36
West Dorset District Council	9	18	27
West Lancashire District Council	9	18	27
West Lindsey District Council	4	10	18
West London Waste Authority	9	18	27
West Oxfordshire District Council	5	10	18
West Somerset District Council	8	16	24
West Sussex County Council	12	24	36
West Wiltshire District Council	7	14	21
Western Riverside Waste Authority	8	16	24
Westminster City Council	6	12	18
Weymouth and Portland Borough Council	15	30	36
Wigan MBC	2	10	18
Wiltshire County Council	10	20	30
Winchester City Council	15	30	36
Windsor and Maidenhead Borough Council	15	30	36
Wirral MBC	7	14	21
Woking Borough Council	13	26	36
Wokingham Council	11	22	33
Wolverhampton MBC	4	10	18
Worcester City Council	8	16	24
Worcestershire County Council	10	20	30
Worthing Borough Council	12	24	36
Wychavon District Council	7	14	21
Wycombe District Council	10	20	30
Wyre Borough Council	7	14	21
Wyre Forest District Council	3	10	18