

## *Did you know that Europe produces 930 million tonnes of waste per year, including 132 million tonnes of household waste<sup>1</sup>?*

These 132 million tonnes of household waste, piled 30 metres high, would fill 1,000 football fields! In 1990, 68% of municipal waste was landfilled and 18% incinerated.

In 1975, the Community Institutions began to introduce policies and measures to improve waste management. For example, the Member States were required to draft waste management plans and to introduce policies for prevention, recovery and recycling, with incineration and landfilling considered less desirable solutions (for a description of the Community regulatory context, see page 22).

Cities, where population density and therefore production of waste are higher, play an essential role in the management of municipal waste. For this reason, two networks of European cities – the ACR-AVR (Association of Cities for Recycling) and Energie-Cités – along with Agrital Ricerche, an Italian research and study centre, jointly presented a proposal to the European Commission (DG Environment) for a project intended to increase awareness on the part of local authorities and the media in four EU Member States – Spain, Italy, Ireland and the UK – concerning the need to elaborate local waste management strategies. This project is based on the experience of the REMECOM network (European Network of Measures for Classification of Household Waste; see page 2) as an example of exchanges between cities regarding methods of analysis and measurement of the volume of household waste at local level.

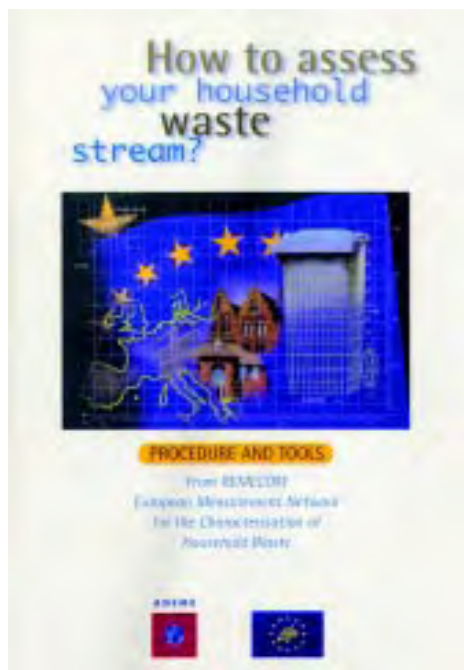
### **Media-Com : a means of increasing awareness and a collection of examples of «good practice»**

As a result of this proposal we have produced Media-com, a method for raising awareness of waste management based on descriptions of «good practice» in 18 cities in eleven countries of the EU. Some of these cities participated in the REMECOM network and adopted its methodology, while others chose to remain independent of REMECOM, in hopes that their own waste management practices could serve as an example to others. All these practices are described in an attractive, non-technical style and are supported by statistics and simple technical information, as well as illustrations. This document, which could also be termed a collection of «good practices», constitutes a source of information and ideas for local authorities and the media. We sincerely hope this document is a positive contribution to all initiatives taken in Europe to improve local management of household waste and thereby to promote integrated and sustainable urban development.

<sup>1</sup> Figures for 1990

Source : Commission Communication on a re-examination of the Community strategy for waste management – COM (96) 399 final.

## *The European Network for Measurement and Characterization of Household Waste<sup>1</sup> (Réseau Européen de Mesures pour la Caractérisation des Ordures Ménagères): defining an analysing and quantifying method for household waste*



### **Documents on REMECOM available from ADEME:**

#### *- Methodological reference:*

«How to assess your sources of household waste. Strategies and tools from the REMECOM» is available in English (reference number: 3158), Spanish (reference number: 3159) and Italian (reference number: 3160).

*- REMECOM network presentation document:* available in English (reference number: 2393)

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### **Remecom**

The REMECOM network was created in 1995 at the initiative of ADEME<sup>2</sup>, out of a desire on the part of the partners in the project – 18 local municipalities in six Member States – to exchange experiences concerning sampling and analysis of household waste.

The cities that participated in the activities of this network over three years aimed to:

- become more familiar with the composition of their household waste, improve recycling and assess the effectiveness of their sorting schemes,
- to exchange and compare the results while harmonising their data.

This project was subsidised by the European Commission via LIFE, the Community financial instrument for the environment.

Before a city can begin to recycle its waste and introduce a waste sorting scheme, it must first conduct a global assessment of flows of household waste, estimate their composition and identify their source. Once the type and quality of material to be processed is known, suitable procedures for collection and provision for treatment of waste can be established. Harmonised measuring methods facilitate assessment of whether the efficiency of sorting schemes meets the stated objectives, as well as comparison of results over time.

The REMECOM reference methodology produced by ADEME and its partners at the conclusion of the LIFE project presents the results of the exchanges of experience between the partners as concerns validation of methods of sampling and analysis of household waste. It provides detailed recommendations and methods for sampling, analysis, interpretation of results and data comparisons for cities interested in introducing waste sorting schemes. It constitutes a useful tool for cities that wish to implement a waste management plan or assess the effectiveness of their sorting schemes.

### **Media-Com**

In 1999, the ACR-AVR (Association of Cities for Recycling), Energie-Cités and Consorzio Agrital Ricerche implemented the MEDIA-COM project with the support of the European Commission (DG Environment) and in partnership with ADEME. Its objective is to promote this methodological reference for the characterisation of household waste and more generally sound management of household waste. Local authorities and the media should be most concerned by the described experiences.

<sup>1</sup> What is characterisation of household waste?

Characterisation of household waste means measuring the qualitative content, i.e., by type of waste, in addition to measuring the quantities generated by a particular waste source. An effective waste sorting scheme can be designed (on the basis of sampling, sorting and data processing), implemented and assessed.

The content of waste varies according to national, regional and even local specificities.

<sup>2</sup> The ADEME

The Agency for Environment and Energy Management (Agence de l'Environnement et de la Maîtrise de l'Energie) is an establishment of the French government under the authority of the Ministries of the Environment, Industry and Research. It is composed of 26 regional delegations and is active in the areas of energy monitoring, renewable energy sources, waste management, pollution (air, soil, noise) and technological research and development.

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	ACR - Association of Cities for Recycling		
	Consorzio Agrital Ricerche		

The project partners thank the organisations and municipalities for the illustrations that they have kindly provided. Authorization required for further reproduction. This publication is available in four languages (English, French, Italian and Spanish) and also on the website [www.energie-cites.org](http://www.energie-cites.org) in the section «What's new?».

**City** Barcelona  
**Country** Spain  
**Population** 1,550,000 <sup>†</sup>  
**Households** 510,000  
**Area** 99 km<sup>2</sup>  
**Type of development** Urban  
**Contact person** Ayuntamiento de Barcelona - Salvany Sabate  
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## Barcelona Spain

### Waste vacuumed up for recycling

In Barcelona, the sorting scheme is based on voluntary drop-off of three general types of waste: glass, paper and cardboard, and plastics, composite packaging and metals. These three types of waste are collected in containers located throughout the city and transported to a sorting or pre-processing centre, where they are sorted and prepared for recycling.

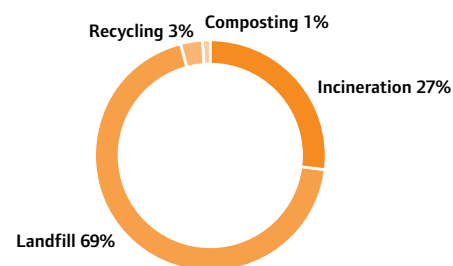
#### A novel system of collection

This sorting scheme is supplemented by an original method of collection notably of organic waste and other non-recyclable waste. It is currently in the experimental stages and operates in only two streets in Barcelona, as well as in the Olympic village. The residents of the two streets in question received, free of charge, rubbish bins with two compartments, one for organic and one for non-recyclable waste. They can empty these bins into boxes with circular openings located along the streets, from which the waste falls into underground containers and is later vacuumed up into a container truck. This completely automated system is controlled from a computer located in the truck. The system was introduced in the main street in May 1998 and was extended to an additional street in February 1999. This collection method is termed a «mobile» method to distinguish it from the «fixed» system established in the Olympic village in 1992, where residents of the apartment blocks concerned use specific rubbish chutes, saving them a trip to the street. Organic waste is also collected from the city's markets and then transported to the composting centre. Non-recyclable waste is taken to the incineration unit or the landfill.

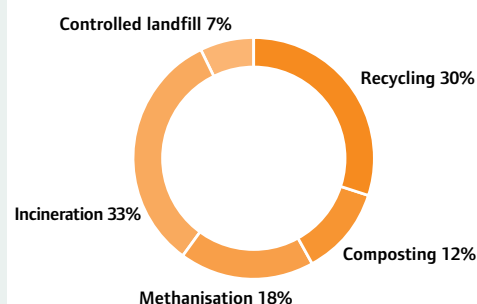
#### Information: the key to success

Naturally, during the first six months after the introduction of this collection system, Barcelona organised an intensive information campaign, with a team of people to distribute all the information necessary to residents, along with the dual-compartment rubbish bin. The campaign continued during the ensuing three months by means of information kiosks located next to the containers. Barcelona is planning gradually to extend this system to other districts of the city.

#### Processing methods in 1997



#### Processing objectives for 2006



#### Collection of recyclables

1997	T./year	Kg/resident	%
<b>Local drop-off</b>			
Glass	12,398	8	2,2
Paper and cardboard	16,113	10,4	3
Plastic, metal, composites	4,232	2,7	0,7
<b>Total</b>		<b>21,1</b>	<b>6</b>

**City** Brussels**Country** Belgium**Population** 950,597 <sup>▲</sup>**Households** 464,159**Area** 16,238 ha**Type of development** Urban, semi-rural**Contact person** IBGE-BIM - Jean-Pierre Hannequart

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## Brussels Belgium

### *New waste plan: focus on prevention*

#### € 5,250,000 for prevention

Brussels' waste management plan for the period 1998-2002 earmarks € 5,250,000 for a programme aimed at source prevention of generation of waste and home composting. The objective is to reduce the amount of waste generated by 10% by the year 2002. An observatory of sustainable consumption and of environmental labelling has also been set up in co-operation with consumer defence associations for informing the public about logos, labels, environmentally friendly products, etc. Local action involving the public is essential to the project, which is provided by the creation of a team of local advisors, initially composed of five members.

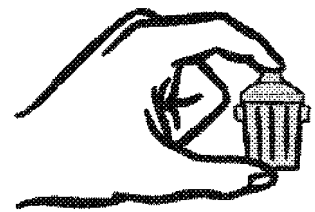
#### Initial activities

Communication campaigns aimed at getting messages about prevention across to the public are planned. The first general campaign used the slogan «Buy wisely and throw less away». It will be followed by targeted media campaigns on particular themes, such as «Say no to disposable bags». A free weekly newsletter entitled - «A minimum of waste – we can do it!» provides advice and information about the various programmes conducted by Brussels. Other documents are also available, including a practical brochure: «Ten tips for halting the proliferation of waste». Circular advertising is another major target. Residents are given stickers to affix on their mailboxes indicating that they do not want to receive this advertising. The objective is to reduce the distribution of free printed matter by 20% thanks to these stickers, which are recognised by distribution companies.

Another important focus is home composting. Volunteer «composting masters» will be trained to help their friends and neighbours compost successfully and to promote composting in schools and associations.

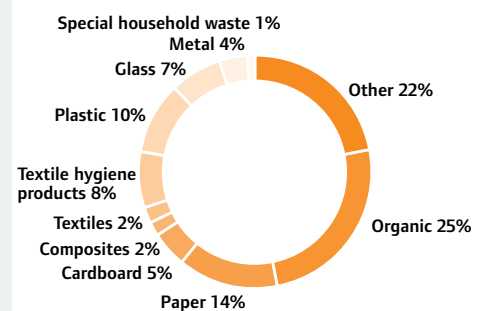
Pilot projects involving an apartment block, a few families or a neighbourhood are also under way to test advice on prevention of waste or home composting and should result in constant improvements to the programme.

Brussels is also concerned about verifying the results achieved. An observatory is being established and will use statistical methods and actual weighing of waste produced by groups of reference households to determine how much progress has been made.



## Moins de déchets! Minder afval!

#### Analysis of the composition of household waste, based on the REMECOM Charter



#### Collection of recyclables

	1997	T./year	Kg/resident	%
<b>Door-to-door</b>				
Paper and cardboard	15,572		16,3	4,6
Other multi-material	6,079		6,4	2
<b>Local drop-off</b>				
Glass		7,573	8	2,2
<b>Centralised drop-off</b>				
Paper		983	1	0,3
<b>Total</b>			<b>32</b>	<b>9</b>

**City** Carpi**Country** Italy**Population** 60,200 **Households** 25,000**Area** 13,156 km<sup>2</sup>**Type of development** Urban, semi-rural, rural**Contact person** CSR - Gian Franco Saetti

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## Carpi Italy

### Quality targeted collection of organic waste

The area of Carpi has entrusted its environmental management activities to the CSR, a waste management consortium active in 17 municipalities in the northern portion of the province of Modena, constituting a population of 170,000.

#### A key for composting

To reduce the quantity of waste landfilled, an experimental campaign for the collection of organic waste has been launched in the municipality of Mirandola. The city first organised biweekly door-to-door collection of organic waste from restaurants and small enterprises. It also launched a pilot experiment in which residents voluntarily dropped off their organic household waste. Families participating in the programme are given a small plastic rubbish bin, a quantity of biodegradable maize paper bags and a key. They carry their bags of organic waste to special brown containers placed strategically throughout the city. To ensure the quality of the organic matter thus collected, the containers are locked and are accessible only to people with a key given exclusively to those who follow the rules of the experiment.

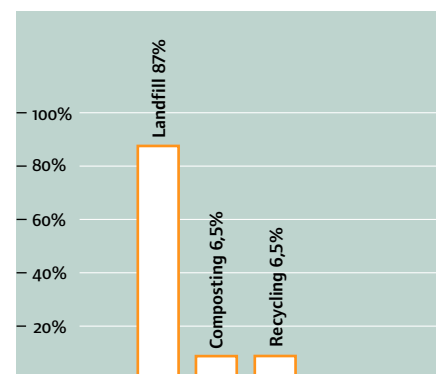
This method of collection is still in the experimental stages and involves only 3,500 residents. They have access to about 40 containers, or one container per 85 residents. These containers have a capacity of 1,700 litres and are emptied three times a week. All the organic waste collected in this manner, along with sludge from the water purification system, is transported to the regional composting centre. Carpi plans to extend the scheme to the entire city by 2001, with a network of 300 brown containers.

#### New life for old appliances

Other initiatives focus on collection of old appliances, either door-to-door or in container parks. The appliances are dismantled, with the metal being separated for recycling and all reusable parts from radiators, fans and other household appliances recovered and sold. This type of collection has provided jobs for about 20 unemployed people. It also provides a partial solution to the problem of hazardous waste such as freon from refrigerators, which are transported to a processing facility equipped to handle them. In 1997, 89 tonnes of household appliances, amounting to 1.5 kilos per resident, were collected. Only a fraction of this type of waste that cannot be recovered ends up in a landfill.



### Destination of municipal waste collected



#### Collection of recyclables

	1997	T./year	Kg/resident	%
<b>All types of collection combined</b>				
Paper		1,121	18,6	3,3
Cardboard		375	6,2	1,1
Glass		1,049	17,4	3,1
Plastic		195	3,2	0,6
Wood		167	2,7	0,5
Organic waste		1,582	26,2	4,7
<b>Local drop-off</b>				
Organic waste		206	3,4	0,6
<b>Centralised drop-off</b>				
Metal (except packaging)		213	3,5	0,6
<b>Total</b>			<b>81</b>	<b>14,5</b>

**City** Dublin  
**Country** Ireland  
**Population** 481,854 <sup>▲</sup>  
**Households** 173,085  
**Area** 144 km<sup>2</sup>  
**Contact person** Dublin Corporation Civic Offices - Lawrence Rochford  
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## Dublin Ireland

### *A new waste plan in sight*

The City of Dublin has developed a draft plan for waste management that will completely change its citizens' habits! The city has set itself ambitious goals, including putting a stop to growth in production of waste, significantly increasing the rate of recycling, the introduction of energy recovery and a reduction in the amount of waste landfilled from the current 90%.

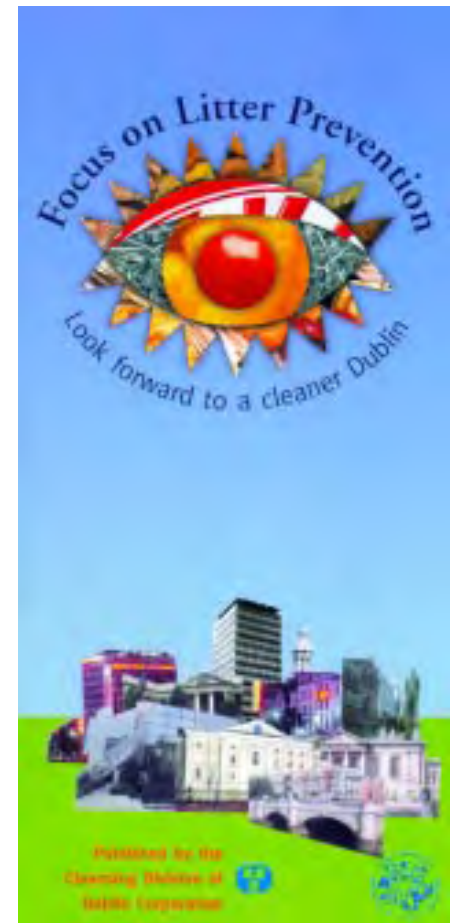
#### Measures focusing resolutely on prevention

This plan sets out objectives, year by year until 2010, for reduction in the production of household, commercial and industrial waste. For the past few months, the City of Dublin has been conducting an information campaign targeting consumers. A brochure distributed to households is intended to increase their awareness of how to reduce the production of waste at the source. It sets out «golden rules» for responsible consumption aimed at limiting waste, the purchase of more environmentally friendly products and includes a list of alternatives to disposable products as well as advice on repairing used products instead of throwing them away.

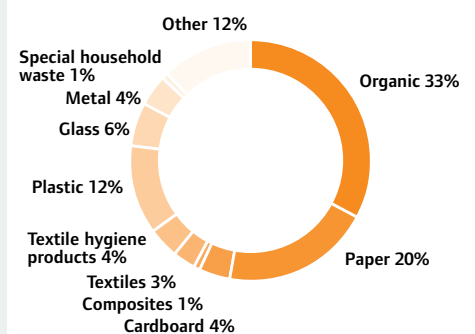
#### Objective: waste sorting, recycling and composting

Dublin also has ambitious goals for sorting of waste and intends to provide separate door-to-door collection of dry recyclable waste for 80% of the population. The draft plan provides for separation at the source of hazardous household and commercial waste and the introduction of collection of sorted organic waste for 80 to 90% of the population. The plan also lays down targets for recycling and recovery that vary according to the origin of the waste in question. By 2004, 60% of household waste should be recycled and 39% incinerated, leaving only 1% to be landfilled. The City subscribes to the REMECOM Charter and uses the MODECOM method to assess the results of sorting schemes.

These projects fall within the framework of Ireland's national strategy, which provides for a reduction in quantities of waste landfilled by means of the construction of facilities for collection, sorting and recycling of waste, the processing of organic waste in centralised composting or biological digestion facilities, and the construction of incineration facilities equipped with an energy recovery system. The scale of fees for waste disposal will be revised with a view to financing investment and to promoting minimisation of waste and a higher recycling rate.



#### Breakdown of composition of household waste using the MODECOM method



#### Collection of recyclables

	1996/97	T./year	Kg/resident	%
<b>Door-to-door</b>				
Recyclable waste		1,865	3,8	1
<b>Local drop-off</b>				
Recyclable waste		2,564	5,3	1,5
<b>Total</b>			<b>9</b>	<b>2,5</b>

**City** Fiumicino**Country** Italy**Population** 50.178 **Area** 213 Km<sup>2</sup>**Type of development** Urban, residential, rural**Contact person** Consorzio Agrital Ricerche - Stefano Carrano

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## Fiumicino Italy

### Keeping waste production under control

#### A new municipality active in environmental management

An essential factor in the resolution of urban environmental problems is the ongoing control of the production of waste with a view to averting resource management problems and errors as concerns the scale of sorting schemes. In 1995, the municipality of Fiumicino therefore decided to participate in the European REMECOM project for monitoring of production of locally produced waste. The municipality was created in 1993, by separation from the city of Rome, and up to that time no in-depth inquiry had been conducted into the quality and quantity of waste produced locally. Development in the area is very diverse and includes urban centres, residential developments, rural communities, villages and large agricultural spaces which together generate various economic activities (third sector, fishing, farming and industry) to form a heterogeneous and highly differentiated panorama of waste production. The need for an in-depth study was urgent, and the municipality decided to co-finance the REMECOM project with additional funding for a study of guidelines for sorting, to be commissioned from the Consorzio Agrital Ricerche.

#### The importance of the REMECOM method

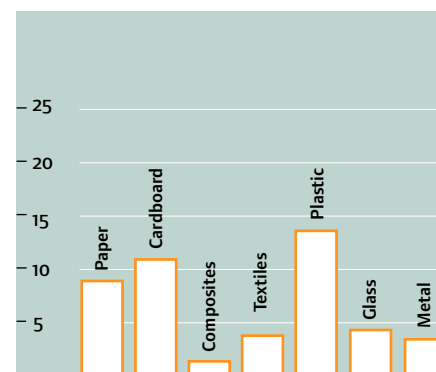
Participation in the REMECOM meant a great deal to the municipality and to Fiumicino's environmental service, both of which are deeply involved in the issues the project addresses. The goal was to increase public awareness by bringing together outside advisors, deputies to the Mayor and the Mayor himself at international meetings on the themes of the environment, and organising local press conferences.

The results of the study conducted using the REMECOM methodology gave the municipality a means of redefining its solid waste disposal and sorting services and led in 1989 to a revolution in systems of collection thanks to new side-loading containers for voluntary drop-off that greatly reduced the need for time and manpower. A sorting scheme, initially limited to glass, was introduced along with new containers: blue «multi-material» recipients (for glass, cans and plastic bottles) and white containers for paper.

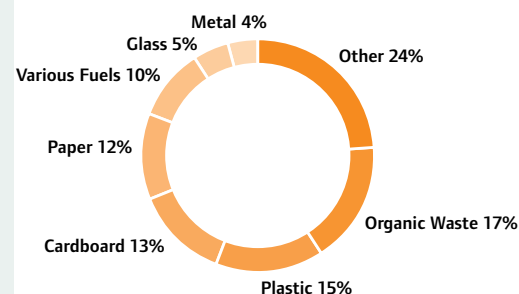
#### New processing facilities

Work recently began on a facility for composting of organic waste with a capacity of 88 tonnes a day and capable of producing high-quality compost. The facility should be completed in 2000 and is located at the heart of the bio-agri-food technology centre. Not only does the production of compost help to reduce the quantity of waste to be disposed of; it also helps to protect the environment as concerns biological cycles.

#### Percentage of recyclables in municipal waste




#### Composition of municipal waste



1997	T./year	Kg/resident	%
<b>Voluntary drop-off</b>			
Waste	32,231	492	99
Glass	264	4	1
<b>Total</b>		<b>496</b>	<b>100</b>



**City** Hanover**Country** Germany**Population** 522,124 **Area** 204 km<sup>2</sup>**Type of development** Urban**Contact person** ARGUS - Juergen Gonser

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-Abfallwirtschaftsbetrieb Hanover (Waste Management Services of Hanover) - Astrid Franssen

Karl-Wiechert-Allee 60c - 30625 Hanover

Tel.: 49 511 168 47986 - Fax: 49 511 198 47982

## Hanover Germany

*The new millennium opens with the start of operation of a large centre for mechanical and biological processing of solid municipal waste*

### Education for a responsible lifestyle

In Hanover, as everywhere in Germany, the need to reduce the amount of solid municipal waste requiring disposal is given top priority. Information and awareness campaigns target the citizens, starting at the end of compulsory schooling. Experiments aimed at reducing the amount of waste produced in schools have been introduced with the economic incentive of payment for reductions in the quantities of waste requiring either collection or disposal.

### Sorting begins at home

Hanover has also focused on waste recycling services for many years and began to collect sorted paper nearly 20 years ago. Today, sorted waste is collected up once a week from single-family dwellings and from 1 m<sup>3</sup> blue containers located in apartment blocks.

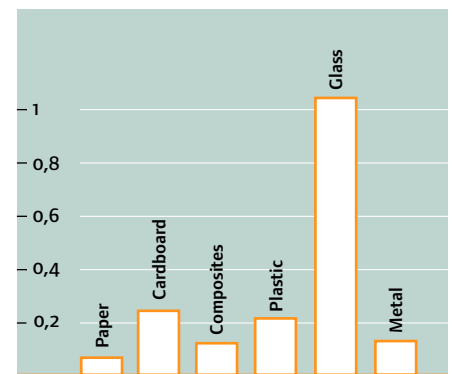
A yellow bag is distributed to each household for the collection of packaging waste and is exchanged for an empty bag once every two weeks. Glass recycling requires voluntary drop-off at containers for green, brown and clear glass strategically located throughout the city.

Organic waste has been collected since 1966, under a scheme that has gradually been extended to the entire city, by means of brown containers for «green» waste. A common container is emptied once every two weeks and the contents transported to the municipal composting centre.

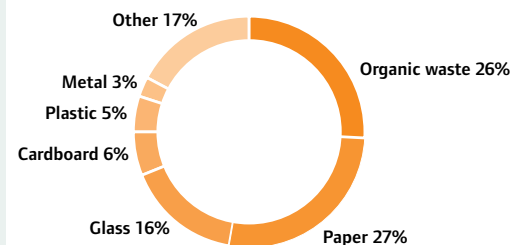
However, the most significant results have been achieved thanks to the processing and sorting centre. Hanover's pride will be a gigantic facility for mechanical/biological sorting and processing of residual waste. This facility, one of the largest and most modern in Germany, is under construction. An information and awareness event open to the public took place in July 1999 to mark the start of earthworks on a 9 hectare site. The sorting facility will be completed by 2000, and the associated biological processing facility will come on line in 2001.

Once fully operational, the centre will be able to process each year 90,000 tonnes of household residual waste, 15,000 tonnes of sludge and 16,000 tonnes of waste from street cleaning. The biological processing section will handle up to 160 tonnes of organic waste a day, producing high-quality compost. With this facility, Hanover will top the list of cities known for their focus on recycling.

### Packaging types as percentage of waste



### Composition of municipal waste



1997	T./year	Kg/resident	%
<b>Voluntary drop-off</b>			
Glass	19,450	37,3	9,1
<b>Door-to-door pickup</b>			
Municipal waste	136,296	261	66,1
Paper/Cardboard	37,671	68,3	17,4
Light packaging	8,512	16,3	4,2
Organic waste	6,500	12,4	3,2
<b>Total</b>		<b>395,3</b>	<b>100</b>

**City** Helsinki**Country** Finland**Population** 930,000 <sup>†</sup>**Households** 450,000**Area** 740 km<sup>2</sup>**Type of development** Urban, semi-rural**Contact person** Executive Waste Adviser YTV Helsinki Metropolitan Area Council - Juha Uuksulainen

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## Helsinki Finland

### Reducing the amount of waste landfilled

Incinerators are rather unwelcome in Finland, which has only one facility of this type. Since three of its landfills were closed in 1986 and 1987, Helsinki is left with only the Ämmässuo landfill for disposing of its waste. The city thus has an incentive to prevent waste generation and landfilling.

### Counting on prevention

YTV, a joint organisation of four municipalities, has for the past several years been engaged in measures to promote prevention of generation of waste, with the publication of addresses where appliances and other items can be repaired, organising events without the use of disposable dishes, encouraging the use of non-disposable nappies, provision of information over the Internet and in brochures distributed to households and SMEs. Nine prevention officers provide 1,200 hours of information a year in schools, childcare centres, companies and associations, and marionette shows are held in schools and childcare centres. In autumn 1999, YTV has launched a new prevention programme targeting households and SMEs in cooperation with the Finnish Environment Institute. This programme has received financial support from the European LIFE programme.

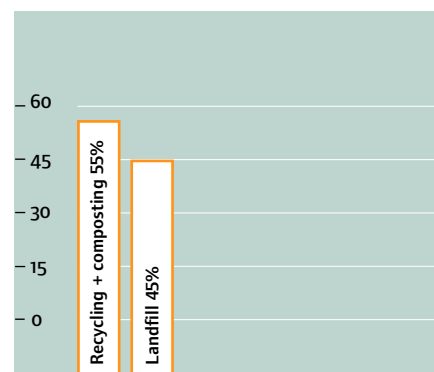
### Recycling: a way of life

Many types of waste are collected separately: hazardous waste, glass, cardboard and metals are picked up from containers distributed throughout the city. Used appliances and other objects are collected periodically and some are repaired and sold to bric-à-brac dealers and second-hand shops. Only about 10% of the glass bottles sold are collected in glass containers as in Finland, a deposit is charged on many containers for spirits, beers and soft drinks, and 83% of glass bottles are reused.


Paper, cardboard and organic waste is collected door-to-door. Offices are required to separate white paper from other paper waste, and in buildings with more than ten apartments, households are required to separate paper from organic waste, which is not collected separately from smaller buildings or in neighbourhoods with composting facilities. The objective of YTV is to recycle 60% of organic waste by the year 2000.

A pay as you throw policy encourages households to separate waste: costs vary depending on the size of rubbish bins, their location and the frequency of collection. The fee for collection of organic waste is two times lower than for unsorted waste.

### Destination of municipal waste collected



1998	Selective Collection (in tonnes)
Paper-Cardboard	159,000
Glass	8,484
Plastic	n.d.
Metal	59,800
Cans	646
Drink cartons	840
Wood	31,300
Hazardous waste	1,600
Organic waste	27,200
Tyres	3,352

**City** Hurepoix Association  
**Country** France  
**Population** 83,493   
**Area** 417.5 km<sup>2</sup>  
**Type of development** Urban, residential, rural  
**Contact person** SICTOM Hurepoix - Louis Dejean  
 Rue Reymond Laubier, 5 - 91410 Dourdan  
 Tel.: 33 1 6459 8989 - Fax: 33 1 6459 3396

## Hurepoix France

### One of the first packaging recycling pilot sites

Located to the southwest of Paris, the Hurepoix SICTOM (Inter-municipal Association for Collection and Processing of Household Waste - 36 municipalities, 83,493 inhabitants) was one of the first «packaging recycling» pilot sites of its size to implement separate collections of a certain number of materials with a view to materials recovery. The breakdown of its housing stock (25% collective, 75% individual houses) classifies this SICTOM as «urban» and thus requiring particular provisions as regards containers and frequency of collection.

#### «Education» concerning sorting

The sorting scheme focuses on three main materials: glass, newspapers/magazines and packaging, all of which are collected door-to-door. Waste lots for glass and newspapers/magazines also exist. The containers used for this collection system are small boxes the content of which is visible. When the project first began, non-standard boxes were not picked up, and a list of materials that could be deposited in the box would be left as part of the process of «educating» the public about sorting. Dual-compartment containers make it now possible to collect two types of material (newspapers/magazines and household waste or glass and packaging) simultaneously.

#### Future or objective: organic matter and individual composters

Of the individual houses, 2/3 are offered door-to-door collection of organic matter. This service will eventually be extended to all individual houses, with a view to reducing significantly of unsorted waste. The containers must be improved (the open plastic bags currently in use should be replaced by compostable paper bags). Moreover, one home out of ten has its own composter and the number is increasing each year.

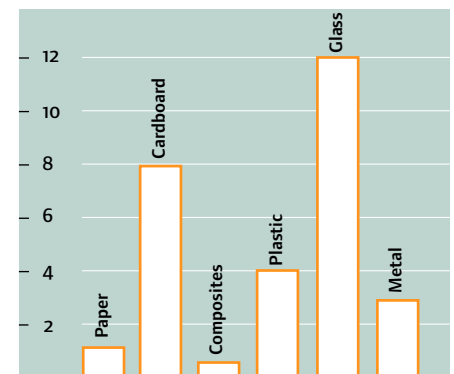
#### A 24% diversion rate

The SICTOM wants to take its strategy even further. Major future projects include the construction of a network of six waste lots throughout the district by 2001, individual monitoring of the quantities of waste produced by craft and commercial activities with a view to the introduction of a special fee and experiments in sorting of bulky objects.

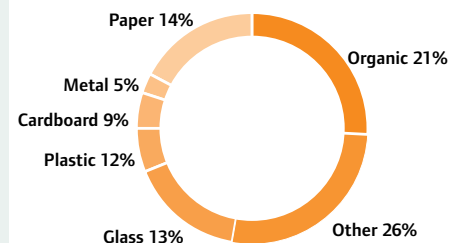
#### Communication

Since the project began, communication has been the tool used to increase residents' awareness of the various collection systems on offer (via public meetings, programmes in the schools, a quarterly information bulletin and an annual letter presenting the results of the project). After several years of operation, an ever greater complementarity is emerging between residents' efforts to pre-sort waste and increasingly specific collection requirements, with the goal of constantly improving the efficiency of the system and the quality of sorted materials.


#### Percentage of packaging present in municipal waste



#### Composition of municipal waste



1997/98	T./year	Kg/resident	%
<b>Drop-off</b>			
Newspaper	190	2,27	0,53
Glass	447	5,35	1,24
<b>Door-to-door collection</b>			
Municipal waste	26,412	316,54	73,84
Paper/Cardboard	1,381	16,55	3,87
Light packaging	2,346	28,11	6,55
Glass	2,188	26,22	6,12
Vegetable matter	2,805	33,61	7,85
<b>Total</b>		<b>428.68</b>	<b>100</b>

**City** Jerez de la Frontera  
**Country** Spain  
**Population** 182,000   
**Area** 1,389 km<sup>2</sup>  
**Type of development** Semi-rural, rural  
**Contact person** Aguas de Jerez - Ignacio Muñoz  
 Calle Cadiz, n° 1 - E - 11402 Jerez de la Frontera  
 Tel.: 34 956 35 95 00 - Fax: 34 956 35 95 01  
 E-mail: comunicacion.ajemsa@aytojerez.es

## Jerez de la Frontera Spain

### A new plan for integrated waste management

In 1995, the City of Jerez entrusted municipal enterprise Aguas de Jerez not only with rubbish collection, but also the development of a programme of collection of sorted waste, the key to a future plan for integrated waste management. This plan was intended to culminate in the construction of an integrated processing facility to handle the 260,000 tonnes of household waste produced each year by the 25 municipalities in the Jerez Region and to separate out recyclable and compostable waste.

Aguas de Jerez also began to invest in compactors for hospitals, shopping centres and other locations where large amounts of waste are produced with the aim of reducing the amount of waste to be transported, streamlining transport and decreasing the visual impact of waste.

### A network of special containers

Household waste is not collected door-to-door, but via a network of 2,800 brown or green containers in which residents can deposit their bags of rubbish. Paper/cardboard and glass are also collected separately in a network of special containers.

Used batteries and medicines may be deposited in containers located in shops and pharmacies. Batteries are then destroyed or stored safely. Four separate entities are responsible for the collection, transport, sorting and disposal of medicines and for public information campaigns. Unexpired medicines are sent to developing countries.

Residents may telephone to request collection of bulky waste, and agricultural plastics and old tyres are also picked up separately.

One of the main thrusts of the programme, the collection of organic waste, is being introduced gradually. The waste collected is added to sewage sludge to produce better-quality compost.

### Partnership agreements with packaging producers

The City has signed an agreement with «Ecoembalajes España» facilitating application of the national law on packaging. This agreement is intended to promote sorting programmes and introduce door-to-door collection in the centre of Jerez. The first phase of implementation of the agreement will involve the development of a pilot project for collection of packaging from about 10,000 residents. The results of this project will be used in developing future public information campaigns, assessing costs and defining the best system of collection for light materials, to be extended to the entire city, in a major step towards large-scale recycling.



Collection of recyclables			
1998	T./year	Kg/resident	%
<b>Door-to-door</b>			
Organic waste	96	0,5	0,1
Bulky waste	1,000	5,5	1,1
<b>Local drop-off</b>			
Paper-cardboard	1,399	7,7	1,5
Glass	851	4,7	0,9
Batteries (kg/year)	7,647	0,042	0,01
Medicines (kg/year)	8,190	0,045	0,01
<b>Total</b>		<b>18,5</b>	<b>3,6</b>

**City** Leeds  
**Country** UK  
**Population** 727,500 <sup>▲</sup>  
**Family units** 293,000  
**Area** 552 km<sup>2</sup>  
**Type of development** Residential  
**Contact person** Leeds University - John Barton  
 Woodhouse Lane - L 52 7ut Leeds  
 Tel.: 44 11 32 33 2278 - Fax: 44 11 32 33 2265  
 E-mail: cenjrb@CIVIL.leeds.ac.uk

## Leeds United Kingdom

### 86,000 family units given containers for sorting waste

#### The first experiments for better service

Leeds City Council has long been in the forefront in the provision of services to residents for kerbside and drop-off recycling. In the 1980's, the city was commended for its extensive network of drop-off sites, and in the early 1990's Leeds established one of the first multi-material kerbside schemes supported by a materials recovery facility in the UK. The last five years have seen steady expansion of both systems along with new initiatives to support home composting and routes for paper-only collection in areas not served by the multi-material kerbside scheme. Locally, rather high recycling rates are achieved. Taking into account the whole population, the average recycling rate is 8 % - the same as UK average. All household waste not recycled is currently sent via two road transfer stations to landfill sites located outside the city boundary in neighbouring areas.

#### A dual scheme: strategically planned kerbside and mini-sites

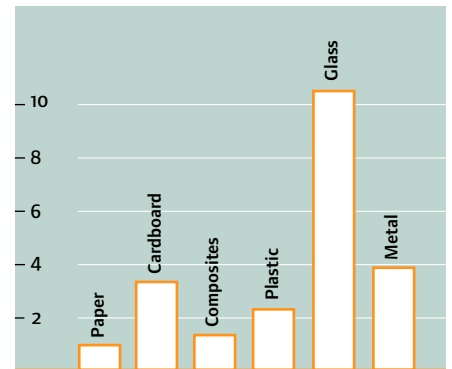
In considering recycling rates, it should be noted that roughly the third of the City population (86,000 households) is already served by the multi-material kerbside scheme (SORT). Paper is by far the largest component recovered (70 % of the recyclable material collected) and collection efficiencies of up to 70% are achieved. Plastic and metal packaging items make up the other targeted materials (glass is collected by drop-off facilities), but recovery efficiencies for these products tend to be much lower (35 to 50%). The paper-only collection route scheme, introduced for 20,000 householders in the spring of 1999, uses a sack-based collection method and represents an attempt to achieve similar diversion rates (10 to 15%) at much lower cost for the participating householders. Drop-off sites include 11 large managed multi-material Civil Amenity Sites (many offering separate containers for garden waste, inert rubble, glass, paper, card, metals, paint, textiles, books as well as for general bulky waste disposal) and 300 (1 per 1,000 households) unmanned mini-recycling sites located at supermarkets/ roadsides / car parks (mainly for glass and paper). A further 50 mini-sites are planned for over the next two years and the Civic Amenity sites are being progressively upgraded to increase the range of recycling possibilities available. Facilities for segregating and composting garden waste through these sites in particular will be expanded.

#### Education remains fundamental

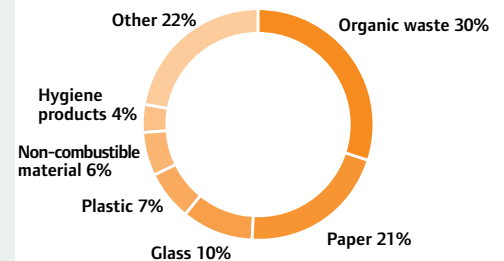
Promotion of home composting to minimise waste for disposal is being continued via subsidies for the purchase of composting bins. It is estimated that some 45,000 households in Leeds now compost their garden and kitchen waste.

The Council is very aware of the need to promote recycling schemes and contribute to improving awareness through educational initiatives.

#### Percentage of recyclables in municipal waste



#### Composition of municipal waste



1997/98	T./year	Kg/household	%
<b>Municipal waste</b>			
Municipal waste	43,622	206,54	79,44
<b>Sorted waste</b>			
Paper	7,583	10,41	13,8
Glass	2,108	2,89	3,87
Metal	580	0,79	1,05
Cardboard	526	0,71	0,95
Plastic	493	0,67	0,89
<b>Total</b>		<b>260</b>	<b>100</b>

**City** Lille**Country** France**Population** 1,067,345 <sup>▲</sup>**Households** 387,065**Area** 611 km<sup>2</sup>**Type of development** Urban, semi-rural and rural**Contact person** Lille Métropole Communauté Urbaine - Paul Deffontaine

1, rue du Ballon, BP 749 - 59034 Lille Cedex

Tel. 33 3 20 21 21 88 - Fax 33 3 20 21 24 05

## Lille France

### Combining the objectives of recycling and job placement

#### A step by step approach

In 1991, Lille introduced a pilot waste-sorting scheme involving 2,400 residents. Based on an analysis of the initial results, changes were made to the programme, in particular as concerns the frequency of collection and containers used, as well as the types of waste collected. In the early stages, the sorting scheme applied only to individual residences. In 1993, the Lille Urban Community introduced sorting into apartment blocks and opted for a definitive scenario in 1994. The scheme was gradually extended, 100,000 residents at a time, beginning in the city centre and moving towards peripheral areas, and applied to more than 450,000 residents in 1999. The development of sorting schemes was accompanied by a wide-ranging information campaign, using circulars in particular. «Awareness teams» criss-crossed the areas concerned and «Sorting Info Buses» provided information on public squares and in schools, for example. The natural history museum served as a forum for education and is home to a permanent exhibit on the problem of waste.

#### An experiment in composting

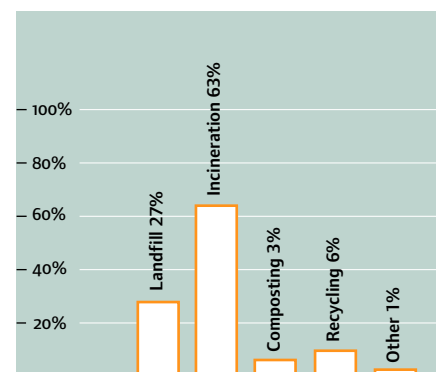
In May 1998, Lille launched an individual composting experiment involving 100 volunteer households. Families have been provided, free of charge, with a composter with a capacity of 300, 600 or 900 litres, along with directions for use. City officials are also available to furnish any other necessary information.

#### An initiative to promote employment

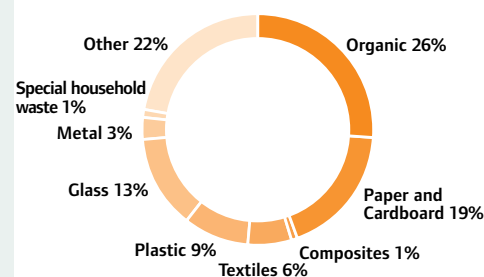
At the TRISELEC-Lille sorting centre, social economy is a key element in waste management: a placement programme helps the unemployed return to work by means of employment solidarity contracts, along with measures to improve both qualifications and morale. With the exception of a few permanent employees who keep the centre operating, all the workers are expected to look for a job in addition to their work at TRISELEC. The jobs on offer vary from sorting operator to quality assistant, who examines the composition of samples from the sorting line, to workshop coordinator. Since 1993, about 270 people have been hired on the basis of a part-time, fixed-term contract for six months with an option to renew. The experiment has proved a success, with a job placement rate of over 60%.



#### Destination of municipal waste collected




#### Breakdown of composition of household waste using the MODECOM method



#### Collection of recyclables

	1997	T./year	Kg/resident	%
<b>Door-to-door</b>				
Paper and cardboard		8,770	8	1,5
Multi-material		13,791	13	2,3
Organic		15,035	14	2,5
<b>Local drop-off</b>				
Paper		5,076	4,7	0,8
Glass		9,188	8,6	1,5
<b>Centralised drop-off</b>				
Organic		6,359	6	1
Dry recyclables		3,464	3,2	0,6
<b>Total</b>			<b>57,5</b>	<b>10,2</b>

**City** Milton Keynes**Country** UK**Population** 200,700 **Households** 83,000**Area** 31,000 Ha**Type of development** Urban, semi rural**Contact person** Civic Offices Saxon Gate - Andy Hudson

East Central Milton Keynes MK9 3 HN

Tel. 44 1908 25 25 77 - Fax 44 1908 25 24 72 - E-mail: andy.hudson@milton-keynes.gov.uk

## Milton Keynes United Kingdom

### *The keys to active citizen participation*

Located between London and Birmingham, Milton Keynes is the last and the largest of the cities created in the United Kingdom after the Second World War. As a fast-growing municipality, Milton Keynes quickly realised the potential environmental as well as economic benefits of effective waste management and in 1982 set up the Community Recycling Opportunities Programme (CROP), an NGO with the goal of creating jobs thanks to recycling. In 1990, the city introduced a pilot project for door-to-door collection of recyclable waste, and 5,600 households received plastic containers: a red one for newspapers and magazines and a blue one for cans and glass and plastic bottles. This initiative, based on voluntary citizen participation, proved so successful that in 1992 (one year earlier than planned), the collection system was extended to the entire population, including people living in rural areas. This success justified the opening in 1993 of the Milton Keynes Materials Recycling Facility (MRF). In 1994, the sorting scheme was enlarged to include boxes, telephone directories and textiles, which are collected in the red container.

#### **A transparent system, accessible to all**

Starting with the pilot project, Milton Keynes emphasised provision of information to the public. The system is transparent and the MRF employs a full-time education and training officer to work mainly with schools, but also with local groups and businesses. The centre has a permanent information centre and a gallery where visitors can observe the MRF's activities in complete safety. The effort put into communication has resulted in a high rate of voluntary participation (76% of citizens) and enables the sorting centre to work on loads of very high quality waste. Only 4% of waste collected under the sorting scheme is residue that has to be landfilled. The city is also developing sites where the public can dispose of old household appliances. These centres recover CFCs from refrigerators and separate metals for recycling.

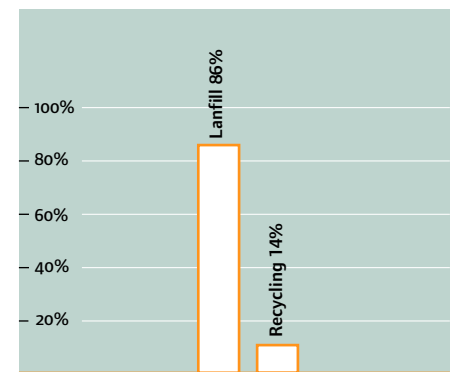
#### **New projects in the offing**

Thanks to this programme, Milton Keynes has been able to keep 24% of household waste out of landfills. The city intends to improve on these results by promoting individual composting and establishing a composting centre. Another target: nappies, which account for 6% of the total volume of waste. In October 1999, the city launched a campaign to promote a privately operated nappy-washing service.

The new waste management strategy for the period 2000-2010 has been developed in direct co-operation with the public, which was consulted by means of questionnaires (more than 3,000 responses have been received), meetings with neighbourhood committees and round tables bringing together local people and experts for debates.



#### **Destination of municipal waste collected**



#### **Collection of recyclables**

1997/98	T./year	Kg/resident	%
<b>Door-to-door</b>			
Multi-material	10,163	51	12
<b>Local drop-off</b>			
Multi-material	1,049	5	1
<b>Centralised drop-off</b>			
Various recyclables	1,970	10	2
<b>Total</b>		<b>66</b>	<b>15</b>

**City** Munich  
**Country** Germany  
**Population** 1,307,609 <sup>▲</sup>  
**Households** 722,954  
**Area** 310 km<sup>2</sup>  
**Type of development** Urban  
**Contact person** Amt für Abfallwirtschaft - Günther Langer  
 Sachsenstrasse, 25 - 81543 Munich  
 Tel.: 49 89 233 319 20 - Fax: 49 89 233 319 02

## Munich Germany

### *Prevention and composting: the two pillars of Munich's waste strategy*

In Munich, provision of information and promotion of awareness of the problem of waste are considered the best means of preventing production of waste at the source. Consequently, they constitute an essential aspect of Munich's strategy, and since 1991, the City has launched various campaigns using media such as brochures, advertising at the cinema, posters, audiocassettes and music videos.

#### **A team of prevention advisers**

In 1991, the city created a municipal waste advisory service. Encouraged by the success of this first initiative, the City set up a five-person «waste avoidance» team in 1993. This group is responsible for taking initiatives to prevent waste generation at the source and giving impetus to waste reduction efforts. The team developed a service for the hire of reusable dishes and cutlery as well as dishwashers for parties and small public events. A ban on disposable cutlery, dishes and glasses at large events was introduced. After some hesitation on the part of organisers, attitudes began to change and most now support this initiative. School food services have replaced single-use cans and bottles with reusable containers.

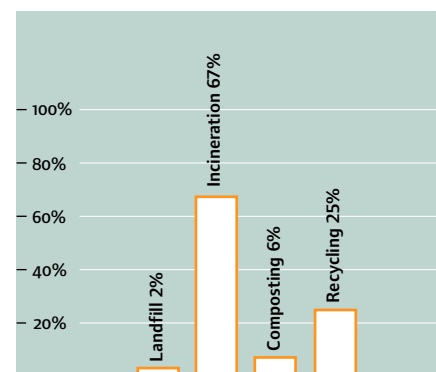
In 1997-98, Munich launched a campaign to change purchasing and consumption habits and holds information sessions on the repair and restoration of used goods. Offices and shops are also targeted. The goal is to create a genuine dialogue on the topic of prevention, between urban authorities and all the actors concerned producers, consumers, manufacturers' associations and other groupings. The City has also launched a programme to promote reusable washable nappies with the aim of reducing the quantity of nappies disposed of. Since the programme began in 1996, 650 families have joined each year.

#### **Composting pays**

Munich has also opted for individual composting: people interested in producing their own compost receive a subsidy of € 40 from the City for the purchase of individual composting equipment.



#### **Destination of municipal waste collected**



#### **Collection of recyclables**

1997	T./year	Kg/resident	%
<b>Door-to-door</b>			
Paper	69,302	53	14
Organic	17,254	13	3,5
<b>Local drop-off</b>			
Paper and cardboard	12,230	9,3	2,5
Multi-material (except paper)	36,080	27,5	7,2
<b>Centralised drop-off</b>			
Garden waste	13,402	10	2,6
Multi-material	15,021	11,5	3
<b>Total</b>		<b>124</b>	<b>33</b>



**City** Porto**Country** Portugal**Population** 400.000 †**Area** 144 km<sup>2</sup>**Type of development** Urban**Contact person** Lipor - Fernando Leite

P.O. Box, 1 - P-4446 Ermesinde codex

Tel. 351 2 975 74 53 - Fax 351 2 975 60 38 - E-mail: fleite@lipor.pt

## Porto Portugal

### *As recycling pioneers in Portugal, Porto and the surrounding area receive Cohesion Fund aid*

Porto and the surrounding area constitute a region undergoing rapid development and endowed with an undeniable cultural and historical heritage. It is along the banks of the River Douro that the delectable Porto wines are aged. But the region also has some 890,000 residents whose production of waste is increasing significantly as the region develops economically. Waste production is expected to grow from 397,000 tonnes in 1994 to 497,000 tonnes in 2000, i.e., by 25% in six years.

Environmentally safe processing of this waste and more particularly its recycling, composting and recovery constitute a major challenge to LIPOR, the inter-municipal organisation responsible for waste management. The strategy chosen by LIPOR firmly rejects putting all waste into landfills. Based on a detailed analysis of the current situation as concerns production of waste, its composition and probable trends as concerns quality and quantity, this strategy aims to develop methods of collection suitable to different local situations. LIPOR has thus designated areas where waste will be dropped off voluntarily at local containers and others where it will be collected door-to-door, and also plans to establish 21 container parks.

#### **Significant European support**

The dry recyclable waste-sorting centre opened in June 1999 is an essential component of this system. While it can handle more than 30,000 tonnes of recyclables each year, specifically paper and packaging of all types of materials, using the most advanced methods, it also takes into account workers' aspirations in the areas of education and welfare. The centre further operates a job placement programme. The comprehensive nature of this waste management strategy introduced in Porto and the surrounding area has probably contributed to European authorities' decision to provide financial support. The European Cohesion Fund will cover 85% of the necessary investment of around € 75 million.

#### **Citizen participation, the key to success**

However, a 20-fold increase in the amount of waste recycled in the space of a few years cannot simply be decreed. Public participation is crucial to the success of the project, as the local authorities who incorporate concerns about prevention of generation of waste into awareness campaigns targeting the public, school children and companies have recognised. An exhibition entitled «O Lixo Passou A Historia» organised by the Office of the Mayor of Porto in June 1999 reflects this determination by offering simple and realistic practical advice for avoiding the generation of waste. Art was also an important part of this exhibition; background music was played on instruments crafted out of waste. Craftsmanship was represented as well, in the form of lamps created out of discarded objects.



#### **Objectives for the year 2000: to increase the rate of recycling from 1% to 21%**

Recycling of materials:	8%
Composting:	13%
Incineration with energy recovery:	79%



**City** Rome  
**Country** Italy  
**District** 11th  
**Population** 140.749 <sup>▲</sup>  
**Area** 47.3 km<sup>2</sup>  
**Type of development** Urban  
**Contact person** AMA - Daniele Morettini - Leopoldo d'Amico  
 Via Calderon de la Barca, 87 - 00142 Roma  
 Tel.: 39 06 51 69 2334 - Fax: 39 06 51 69 2354 - E-mail: daniele.morettini@amaroma.it  
 Tel.: 39 06 51 69 2475 - Fax: 39 06 51 69 2829 - E-mail: leopoldo.damico@amaroma.it

## Rome-11th District Italy

### *The objective in Rome: to recycle up to 70% of solid waste*

A reduction in the volume of solid urban waste must be achieved by recycling and home sorting. Rome participated in the REMECOM network for monitoring of solid municipal waste via its city's association for the collection and disposal of waste, the AMA. Rome has thereby been able to make a detailed survey of the qualitative and quantitative production of waste in a test area of the city: the 11th district. This neighbourhood was selected for a «life-size» study of citizens' response to campaigns in favour of the more responsible behaviour necessary for the introduction of new sorting schemes. The REMECOM methodology, thanks to its simple system of calculation of the efficiency of sorting schemes, revealed citizens' positive response to the practice of sorting and showed that in three years of experimentation, citizens' average contribution to the quantity of waste sorted had increased by 59%. These results indicate that the goal of recycling 70% of urban waste by 2005 is indeed feasible.

#### **Citizen education: a priority**

To achieve these results, the AMA has been working on various fronts for the past several years, in the belief that citizen awareness is of fundamental importance in resolving environmental problems. The «AMA Scuola» project, introduced in 1996, provided lessons on the themes of recycling and composting in 634 primary and secondary schools. Composting experiments were conducted in 50 schools. Other educational activities included decoration of waste containers in cooperation with artistic high schools, construction of scale models of monuments out of aluminium, public competitions on the theme of paper containers and the creation of a museum of waste.

#### **New processing and collection facilities**

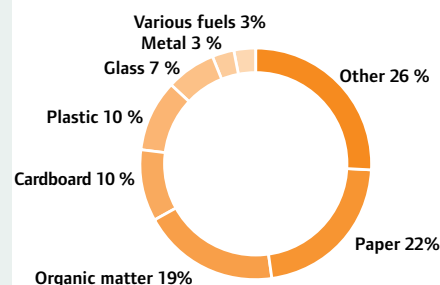
On the practical side, the City has focused on designing and building new waste processing, transport and disposal facilities. For example, a hospital waste incinerator is already operating at Ponte Malnome, a facility for composting of waste from businesses that will also conduct research into and testing of new technologies is planned; plans are under way for an exchange centre for intermodal train + road transport with a capacity of 1,000 tonnes of waste per day; and one new facility is to be built to recycle construction demolition materials.

#### **New associations for participation**

The involvement of all partners in the environmental sector has been reinforced by the creation of new associations for participation in the extermination of rats and clean-up of urban areas, the elimination of graffiti and reprocessing of asbestos from public and private buildings.



#### **Composition of municipal waste**



1997	T./year	Kg/resident	%
<b>Voluntary drop-off</b>			
Waste	61,250	435	92,4
Multi-material	1,922	13,6	2,89
Paper	2,651	18,8	3,99
Cardboard	66	0,5	0,09
Glass	398	2,8	0,6
<b>Total</b>		<b>470,7</b>	<b>100</b>

**City** Salzburg  
**Country** Austria  
**Population** 145,000 ↑  
**Households** 66,000  
**Area** 65.6 km<sup>2</sup>

**Type of development** Urban, semi-rural

**Contact person** Leiter des Abfallamtes Stadt Salzburg Rathaus - Winfried Herbst

Siezenheimerstrasse, 20 - A-5020 Salzburg - Tel.: 43 662 8072 4560 - Fax: 43 662 8072 4545

E-mail: winfried.herbst@stadt-salzburg.at - URL: <http://www.stadt-salzburg.at>

## Salzburg Austria

### An approach based on weight and volume

Austrian regulations on waste require municipalities to collect used oils, construction waste, organic waste, fluorescent light bulbs, batteries, refrigerators, small quantities of chemical waste, bulky waste and packaging separately. Paper and cardboard, textiles and electrical and electronic appliances are also collected separately on a large scale. Since 1993, the City of Salzburg has collected organic waste door-to-door and promoted individual composting. The City does not provide the composters, but everyone composting at home is eligible for a 15% reduction in the tax on household waste collection.

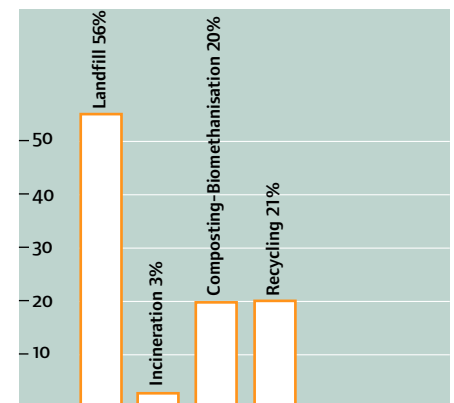
#### Reliable deterrents ...

Starting in 2004, a new law will prohibit landfilling of waste containing more than 5% organic matter or with a thermal value of more than 6,000 kJ/kg of dry matter. A progressive tax on landfilling will contribute still further to discouraging this practice. Since 1975, mixed waste collected door-to-door in the province of Salzburg as well as sludge from flushing of the sewers has been sent to a biomechanical treatment centre where, after processing, it is subjected to accelerated aerobic decomposition for three weeks. This pre-treatment reduces the load in organic matter and cuts volume by 20%. This system however needs to be optimised in order for the City to meet the objectives it set itself or the standards that will come into effect in 2004 for landfilling.

#### ... to encourage prevention and recycling


Additionally, over the past several years, the City has stepped up its efforts to prevent the production of and to recycle waste, in particular via awareness campaigns aimed at changing consumers' behaviour. Residents of Salzburg received a brochure listing craftspeople and workshops specialising in the repair and restoration of furniture, household appliances, computers, toys, clothing, shoes, sporting goods, bicycles and garden tools. It also lists shops selling second-hand goods and environmentally friendly products. Residents may bring anything they wish to dispose of to the recycling centre, which will separate the recyclable materials. The City plans to take measures to encourage producers of electrical and electronic appliances and cars to take more responsibility for collecting and recycling these products after use.

### Destination of municipal waste collected



#### Collection of recyclables

Year	T./year	Kg/resident	%
<b>1997</b>			
<b>Door-to-door</b>			
Organic	10,498	72	20
<b>Local drop-off</b>			
Glass	3,069	21	6
Metal	344	2	0,6
Plastic	892	6	1,7
<b>Centralised drop-off</b>			
Paper and cardboard	9,432	65	18
<b>Total</b>		<b>166</b>	<b>46</b>

**City** Stuttgart**Country** Germany**Population** 564,741 **Households** 272,439**Area** 210 km<sup>2</sup>**Type of development** Urban, residential**Contact person** SIA – Michaël Waldbauer

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## Stuttgart Germany

### At the forefront of recycling

#### 25 years of recycling awareness campaigns

The City of Stuttgart was one of the first municipalities to address environmental problems in a rational and clear-sighted manner. Recycling and citizen education in correct sorting of waste have been a priority since 1975. Action campaigns have been conducted in the schools in an effort to make children aware of the need to protect the environment. These included qualitative and quantitative analyses of waste produced within school activity and studies concerning new strategies to reduce the amount of waste generated. A theatre group has been promoting recycling awareness since 1988.

#### A sorting system with global coverage

Selective collection of glass began in 1975 and was based on a voluntary drop-off system. Since 1988, it has been expanded with the introduction of separate containers for green, brown and clear glass.

Paper collection began in 1981, and «green campaigns» for the collection and voluntary drop-off of paper and cardboard began in 1983.

In 1990, door-to-door collection of packaging was introduced. A yellow bag is distributed free of charge to each household and is collected once every three weeks. This system facilitates recycling of small household packaging waste: tins, plastic bottles, yoghurt containers, «tetrapak» cartons and plastic and aluminium trays, for example. This falls within the framework of the national recycling system using the «green dot» symbol.

New strategies for waste reduction, such as home composting of kitchen and garden waste, are now being tested, with the distribution of 874 specific containers since 1995.

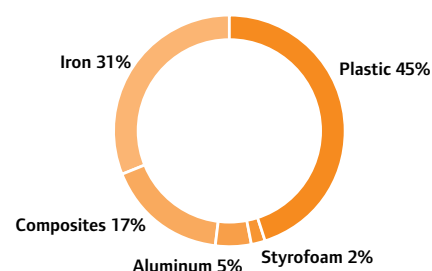
Garden waste is collected in spring and autumn, as well as green waste from public parks and cemeteries and are composted at a facility with a production capacity of about 10,000 m<sup>3</sup> a year. After the winter holidays, Christmas trees are also collected and composted. The City also collects metal waste and end of life household appliances.

#### An example to emulate

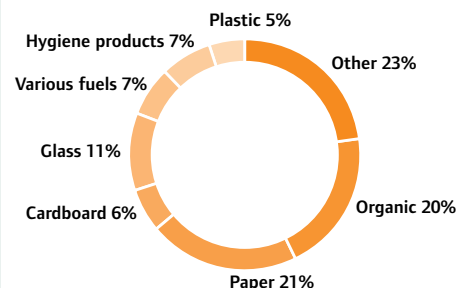
In conclusion, the high level of participation and excellent response by its citizens clearly demonstrate the feasibility of ambitious recycling policies.




#### Composition of light packaging



#### Composition of municipal waste



1996	T./year	Kg/resident	%
<b>Voluntary drop-off</b>			
Glass	15,032	26,2	7,1
<b>Door-to-door pickup</b>			
Municipal waste	137,597	244,7	65,4
Paper/Cardboard	46,399	82,5	22
Light packaging	11,487	20,4	5,5
<b>Total</b>		<b>374,3</b>	<b>100</b>

**City** The Hague**Country** Netherlands**Population** 442,183 **Households** 202,957**Area** 6,800 Ha**Type of development** Urban**Contact person** Municipality of The Hague - Johan Van der Poel

Department of Public Works and Services - Spui 70, P.O. Box 12651 - 2500 DP The Hague

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## The Hague Netherlands

### *Individual rubbish bins soon to be a thing of the past?*

The Netherlands is a highly urbanised country where space is at a premium. The country's low altitude further leaves the groundwater, which lies very close to the surface, particularly vulnerable to pollution. All these factors contributed to awareness, early on, of environmental problems and the need to recycle waste to avoid putting it into a landfill.

Local authorities are legally required to establish sorting schemes. The Hague began sorting its waste in the early 1990s. Non-returnable glass bottles are collected in aboveground containers located on the streets. New, more attractive and easier-to-use containers have replaced the older type. In the historic centre of the City, containers are located underground for aesthetic reasons. In the interests of greater efficiency and lower costs, the city plans to replace door-to-door collection of non-recyclable waste with a system of voluntary drop-off in containers placed strategically throughout the city.

### **Reuse, recycling, composting...**

The Hague has spared no effort to promote recycling: the City has developed sorting schemes for cardboard, textiles and household chemical waste. It has also reached agreements with associations that repair or restore some types of bulky waste, such as furniture or large appliances, for sales in second-hand shops.

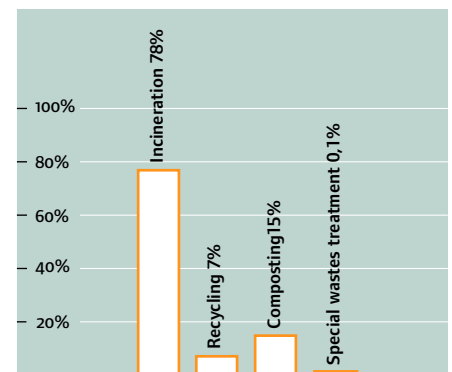
In the Netherlands, garden waste and organic household waste account for some 35% of household waste by volume. In addition to individual composting, which is encouraged by the distribution of individual composters, the City also organises collection of organic waste for composting, thereby preventing landfilling, providing a source of good quality compost for agriculture and horticulture and saving considerable amounts of money, as composting is less expensive than incineration in the new incinerator, equipped with a smoke scrubber, located in Rotterdam.

The City recently began to collect organic waste at the same time as unsorted waste in a dual-compartment truck. This combined collection of two different waste flows reduces the cost of collecting sorted waste.

### **... and jobs**

A total of 230 people have been hired for the City's collection system. Future projects will include a job placement programme and the creation of new jobs in the area of recycling and reuse.

### **Destination of municipal waste collected**



### **Collection of recyclables**

	1997	T./year	Kg/resident	%
<b>Door-to-door</b>				
Organic («green» and food)		14,400	33	8
Textiles		900	2	0,5
<b>Local drop-off</b>				
Glass		7,200	16	4
<b>Centralised drop-off</b>				
Paper and cardboard		12,600	28	7
<b>Total</b>			<b>79</b>	<b>20</b>

# The Community regulatory context concerning waste management

## The European Union as the driving force behind an environmental policy

*Protecting the environment is essential to economic growth and improved quality of life: this factor was recognised as essential by the Heads of Government of the European Community at the Paris Summit of July 1972. The stage was set for the first Community Action Programme (1973-1976). Since then, the Single Act of 1987 and the entry into force of the European Union Treaty in 1993 have given a definite impetus to European environment policy. How? First, by creating an explicit legal basis and making the environment a component of other Community policies. Next, by introducing the concept of sustainable development and the precautionary principle, a policy that resulted, in the area of waste, in the adoption of two strategies and several regulatory texts.*

## The Community waste management strategy

### 1. Principles

In 1996, the Commission adopted a new strategy for waste management aimed at extending and enhancing the main thrusts of the 1989 initiative. Its objective was to provide a high level of environmental protection with a view to sustainable development, without compromising the operation of the internal market.

#### *Waste management plans*

The Framework Directive requires the Member States to draft waste management plans and to update them regularly. These plans are taken into account for the provision of aid to the Member States via the Structural Funds.

#### *Encouraging producers to take responsibility*

Producer responsibility is at the core of the Commission's programme, as illustrated by the Directive on waste and various Directives now at the draft stage. The Commission emphasises the primary role the manufacturer plays in the decision-making process; producers are to a large extent responsible for the nature of products and processing options. The Commission also wants to increase producers' contribution to the costs of processing of their products after use, with the aim of integrating the environmental costs in terms of use of natural resources and damage to the environment throughout the product cycle. The goal is to use market mechanisms to achieve both environmental and economic benefits.

#### *The principles of self-sufficiency and proximity*

The European Union has reaffirmed the need for adequate monitoring of waste transfers. The Union does not want waste produced in one country of the Community to be disposed of in another, and also wants waste to be disposed of in appropriate facilities as close as possible to where it was produced. However, with rare exceptions, the principle of proximity applies only to movements of waste intended for disposal, and not to shipments of waste for recovery.

## Structural Fund waste management plans

Directive 91/156 on waste stipulates in Article 7 that the Member States are required to produce a waste management plan or plans defining a strategy for achieving the objectives of the Directive. These plans may be drawn up by the competent authorities designated by the Member States to implement the Directive.

They must include information about the types, quantities and origin of waste; on general technical requirements, on provisions applicable to household waste; and on sites and facilities for disposal. They may also include the names of natural or legal persons authorised to manage waste, the costs of recovery and disposal operations; measures to encourage streamlining of collection, sorting and processing. Regulation 1260/1999 (Article 12) on the principle of compatibility stipulates that activities receiving Structural Fund aid must comply with Community legislation.

The Commission Communication concerning the Structural Funds and their coordination with the Cohesion Fund – Guidelines for programmes in the period 2000 to 2006 (OJEC 1999/C267/02) cites this obligation incumbent on the Member States and provides that the adoption of these waste management plans should be a pre-condition for any Community financing of waste management infrastructure.

## 2. Instruments

To achieve its objectives, the Commission wants to increase the number of tools at its disposal, combining regulatory and economic instruments and voluntary agreements. It also aims to improve the quality of statistics, by harmonising currently discrepant definitions and classification systems. But harmonised standards and regulations are also vital to the operation of the internal market. Setting compulsory objectives for recycling or recovery sends a clear signal to authorities and economic actors to help them develop their strategies. By ensuring that market prices reflect the scarcity of natural resources and the costs involved in production and management of waste, economic instruments offer another fundamental tool. They encourage prevention of waste production and recycling of waste and can improve the competitiveness of recycling in relation to disposal. However, given the difficulty of defining a concerted course of action at European level as concerns economic instruments, the Commission also favours using voluntary agreements with the private sector, on the condition that they are applied correctly and that application is enforced independently.

### A hierarchy of management instruments

The European waste management strategy is based on a three-level hierarchical classification.

#### *Prevention*

Waste issues must be taken into account starting with the design of products, with a view to conserving raw materials and energy, reducing the production of waste and making it less hazardous. The promotion of clean technologies and production, reduction of the hazardousness of waste, promotion of reuse, eco-balance sheets, eco-audits, product life cycle analyses and consumer information and education are all necessary components of a waste prevention policy.

#### *Recovery*

Reuse should be given top billing, as it helps to avoid the use of new natural resources and the production of new waste. Recycling is the next best method. In addition to conserving materials and energy by eliminating the need to manufacture a new product, recycling also reduces the amount of waste incinerated in emissions-producing facilities. By encouraging sorting of waste at the source, recycling also increases consumers' awareness of the need to reduce the production of waste. In some cases, energy recovery is preferable for economic and environmental reasons, but must not be harmful to the objectives of waste prevention and recycling of materials.

#### *Final disposal*

This term essentially refers to incineration without energy recovery and landfilling. In principle, landfilling is considered a method of last resort and the least desirable solution. It should be avoided as much as possible.

### Consult the European Commission's website:

[http://europa.eu.int/comm/environment/waste/facts\\_en.htm](http://europa.eu.int/comm/environment/waste/facts_en.htm)

## Directives and general Regulations

- Directive 75/442 on waste (amended by 91/156/CE, known as the framework Directive)
- Directive 91/689/CE on hazardous waste
- Decision 94/3/CE establishing a list of types of waste
- Decision 94/904/CE establishing a list of types of hazardous waste
- Regulation n° 259/93/CE concerning monitoring and inspection of waste transfers (adapted by 94/271/CE and 96/660/CE )

## Directives on processing procedures

- Directive 89/369/EEC on new municipal waste incineration facilities
- Directive 89/429/CE on existing municipal waste incineration facilities
- Directive 94/67/CE on incineration of hazardous waste
- Directive 99/31/CE on landfilling of waste

## Directives on certain waste flows

- Directive 75/439/EEC on the disposal of used oils (modified by 87/101/EEC )
- Directive 91/157/CE on batteries and accumulators containing certain hazardous materials
- Directive 94/62/CE on packaging and packaging waste
- Directive 96/59/CE on the disposal of PCBs and PCTs

## Draft Directives

- Draft Directive on end-of-life vehicles (COM(99)176)
- Draft Directive on waste incineration (COM(98)558)
- Draft Council Regulation on statistics on waste management

## Other initiatives have been announced in the following areas

- Electrical and electronic equipment
- Batteries and accumulators
- Hazardous household waste
- Composting

## The regulatory context in Italy

Prior to 1997, Italy lacked an integrated waste management system and waste strategies focused almost exclusively on disposal rather than recovery of materials. It had become obvious by this time that a new regulatory framework in line with European standards, setting out specific objectives for each factor in the waste life cycle, was urgently needed. Legislative Decree no. 22 of 5 February 1997, nicknamed the «Ronchi Decree» for the Minister of the Environment responsible for it, aimed to implement European Directives (on hazardous waste, packaging and packaging waste), and to take an organic approach to all aspects of waste management and to simplify the regulatory framework.

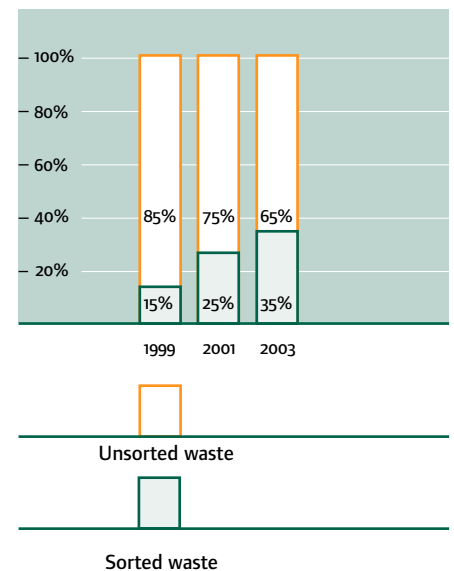
### The main innovations introduced by this legislation were as follows

- Waste management, as an activity of public interest, must comply with the principles of assumption of responsibility and cooperation by all the actors involved in production, distribution, use and consumption of goods from which waste is generated (Article 2, paragraph 3).
- Reuse, recycling and recovery of raw materials must be given preference in the interests of correct waste management and to promote the reduction of quantities of waste for final disposal (Article 4, paragraphs 1 and 2).
- The competent authorities must, as a priority, adopt initiatives aimed at promoting the prevention and reduction of amounts of waste generated and the hazards it presents; in particular, they must develop clean technologies that significantly reduce demand for natural resources (Article 3, paragraphs 1 and 2).
- Disposal must constitute only the residual phase of waste management (Article 5, paragraph 1).
- A new waste classification system was introduced based on the origin and hazardous nature of waste in particular (Article 5, paragraph 1):  
Solid municipal waste «became urban waste».  
«Special waste» kept its classification.  
«Toxic and noxious waste» became known simply as «hazardous waste».
- With a view to standardised management of municipal waste, the provinces are considered the optimal areas for new legislation (Article 23).
- The current tax on waste, based on type of activity and cadastral income, was replaced by a waste fee to apply as of 1/1/2000 and composed of a percentage based on the essential components of the cost of service and a percentage reflecting the quantity of waste produced (Article 49).

### Objectives and timetable:

- As of 1/1/1999, the construction of new incineration facilities will be authorised only if they incorporate energy recovery (Article 5, paragraph 4).
- As of 1/1/1999, non-hazardous waste must be disposed of in the region where it is produced (Article 5, paragraph 5).
- As of 1/1/2000, only inert waste, waste characterised on the basis of specific technical standards and waste resulting from recycling, recovery and disposal operations may be landfilled (Article 5, paragraph 6).
- All the optimal territorial areas must sort a minimum percentage of their municipal waste according to the timetable below (Article 24):  
15% within two years of the entry into force of the Decree (2/3/1999).  
25% within four years of the entry into force of the Decree (2/3/2001).  
35% within seven years of the entry into force of the Decree (2/3/2003).

Percentages of waste to be collected separately over the next three years as required by current Italian legislation





## The regulatory context in Ireland

In 1996, the Environmental Protection Agency (EPA) published a report on the state of the environment in Ireland. This report highlighted an increase in the production of all types of waste, a low rate of recycling (8%) and disposal of 92% of waste in landfills. At that time, Ireland had 118 active landfills, of which 88 were managed by local authorities. Most landfills were small and accept less than 15,000 tonnes of waste per year. They were usually operated under unsatisfactory conditions.

The Waste Management Act of 1996 provided a new legal foundation for waste management in Ireland. In particular, it redefined the distribution of responsibilities among the Ministry, the EPA and local authorities, and set out a new strategy for improving performance in the areas of prevention, minimisation and recovery of waste. All landfills had henceforth to be authorised and meet stricter environmental criteria, which led many operators to close their facilities. As of March 1999, the EPA had authorised 64 landfills, including 52 for household waste.

In October 1998, the Ministry of the Environment and Local Authorities published its waste management plan, entitled «Changing Our Ways». The plan provides local authorities with a national framework to help them redefine their strategy and draft new plans for waste management. In Ireland, these local authorities have general responsibility for waste management, including inspection of processing facilities. In its plan, the government defines its objectives as follows:

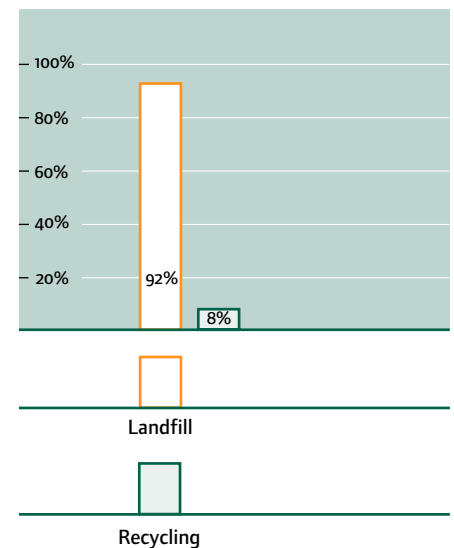
- a 50% reduction overall in the amount of household waste landfilled and a 65% reduction for organic waste;
- development of environmentally friendly industrial facilities, in particular composting facilities, with a view to processing 300,000 tonnes of biodegradable waste annually;
- recycling of 35% of household waste;
- recycling of at least 50% of construction waste within five years and 85% within 15 years.

This management plan is based on a regional approach to waste management emphasising the development of integrated solutions and creating a climate favourable to partnership between local authorities and the private sector. It encourages local authorities to find solutions to the shortage of processing infrastructure and to identify innovative technologies such as composting, anaerobic digestion, incineration with energy recovery or gasification.

Local authorities have responded very favourably to this programme, and as of early 1999, 32 of a total of 34 authorities had begun or completed the process of definition of a new waste management strategy.

In general, these strategies are based on door-to-door collection of recyclable waste in urban areas; the development of voluntary drop-off infrastructures; centres for transfer, sorting, recycling and energy recovery; and biological processing of organic waste. The consequences for the existing network have been overwhelming: five local authorities, for example, plan to reduce the number of landfills from 35 to 18 and eventually 10.

**Management of municipal waste in 1995**



### Objectives to be achieved within 15 years

- Reduction in quantity of household waste landfilled: 50 %
- Reduction in quantity of organic waste landfilled: 65%
- Composting capacity: 300,000 tonnes/year
- Recycling of municipal waste: 35%
- Recycling of construction waste: 85%
- Modernisation of the landfill network: 20 authorised landfills

## The regulatory context in the United Kingdom

Waste management in the United Kingdom was widely and for a long time based on landfilling: in 1994, the country still had 2,784 active landfills. The Department of the Environment estimates that during 1994 and 1995, production of household waste exceeded 25 million tonnes. The United Kingdom is also distinguished by a breakdown of authority between District Councils, which are responsible for collecting household waste, and County Councils, which have responsibility for processing it.

### A redistribution of powers

The Environmental Protection Act of 1990 marked an important change, by encouraging local authorities to introduce recycling and to subcontract waste treatment to the lowest bidder via calls for tenders. The Environment Act of 1995 brought additional measures:

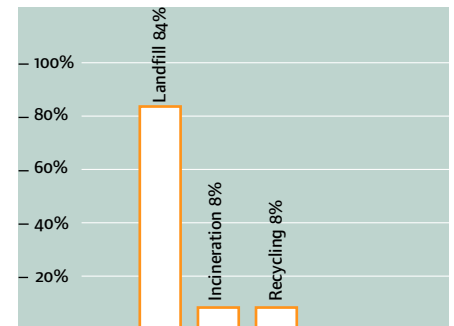
- setting the goal of recovery of 50% of packaging waste by the year 2001, with a minimum rate of 16% for each material;
- abrogation of all waste management plans defined by local authorities and encouragement of District Councils and County Councils to co-operate in developing new waste management strategies;
- creation of an Environmental Protection Agency (EPA) to become, along with the County Councils, the competent authority for waste treatment. The EPA is in particular responsible for establishing statistics on waste production, authorising and inspecting treatment facilities. The District Councils remain responsible for collecting waste.

The national waste management plan, known as «Making Waste Work» and published in 1996, emphasises recycling and recovery of household waste. Its objective is to reduce the quantities of waste landfilled by 60 to 70%. Composting is an important part of the plan: the goal is to compost one million tonnes of organic household waste and encourage 40% of households with a garden to compost at home by the year 2000. These are ambitious, but not binding, objectives.

### Landfill revenues to finance prevention

The leading instrument for achieving this objective is taxation: a tax of £ 2 is levied on each tonne of inert waste landfilled; the rate for «non-inert» waste was originally set at £ 7. It increased to £ 10 in 1999 and will reach £ 15 by 2004. Remarkably, 20% of revenue from the tax will be used to finance environmental projects and in particular awareness and information campaigns implemented by NGOs. In addition, the «Waste Minimisation Act» of 1998 authorises local authorities that wish to do so to promote the minimisation of waste by means of consumer awareness campaigns or partnership agreements with the private sector. In 1997, the UK adopted the «Producer Responsibility Obligations Regulation» in application of Directive 94/62 on packaging. On certain conditions, this Regulation requires companies that put more than 50 tonnes of packaging on the market each year to recover it, bringing the rates of recycling and recovery to 13 and 45% respectively by the year 2000. Companies must furnish certificates of recycling issued by authorised facilities and a system of trade and marketing of these certificates, modelled on the system of negotiable permits, has gradually been introduced. A new draft strategy concerning waste was submitted for public approval for the first time in 1998 before being adapted and presented again as second draft in June 1999.

### Management of municipal waste in 1995



### The objectives defined in «Making Waste Work»

- A 60 to 70% reduction in waste landfilled by 2005
- Recycling and recovery of 40% of municipal waste by 2005
- Recycling of 25% of municipal waste by 2000
- Recovery of 50% of packaging waste by 2001
- Composting of one million tonnes of organic waste years by 2001
- Promotion of composting by 75% of local authorities by 2000

## The regulatory context in Spain

Spain must reconcile three levels of power before it can take action concerning waste. The State defines the general legal framework and drafts a management plan. The 17 Autonomous Communities are responsible for putting this plan into practice and defining their own management plan; they may always take more binding measures. Municipalities take charge of management of household waste in co-operation with the autonomous authority to which they are responsible.

### The processing hierarchy

Law 11 of 24 April 1997 on packaging and packaging waste introduced a hierarchy of various options for managing waste. This hierarchy was confirmed in Law 10 of 21 April 1998 concerning all types of waste. This law applies to all economic operators, promotes strict application of the «polluter pays» and «shared responsibility» principles and defines the major environmental objective of minimising the growing volume of waste at the source, recycling all possible materials, reusing those that can be reused, composting in an organic manner and recovering energy from the remaining waste to reduce the amount that ends up in a landfill to a minimum.

### Developing prevention and recycling, and creating the necessary synergies among all the actors

These two texts marked a fundamental change of direction for Spain's waste policy and paved the way for prevention and recycling initiatives. Companies that put more than a certain quantity of packaging on the market every year must, every three years, draft a prevention plan, with the objective of a 10% reduction in the weight of packaging from 1994-95 levels by 2001.

The national waste management plan may be implemented via agreements between the state and the autonomous communities that define the objectives of reduction, reuse, recycling and recovery, as well as the means implemented to achieve them. The autonomous communities may take financial and tax measures to stimulate prevention and promote clean technologies, reuse, recycling and other forms of recovery of waste.

Law 10/98 makes sorting of household waste compulsory for municipalities with more than 5,000 residents.

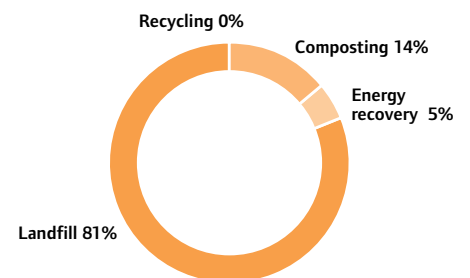
The law also requires producers to become involved in management of waste from products they have put on the market via voluntary agreements approved by public authorities. This obligation currently applies to packaging waste and end-of-life vehicles.

Objectives for 30 June 2001 as concerns packaging waste are:

- 50 to 65% recovery;
- between 25 and 45% recycling with a minimum of 15% for each material.

An intermediate objective - recycling of 15% of packaging waste by 1 April 2000 with a minimum of 10% per material - has also been set.

### Processing of household waste: situation in 1995





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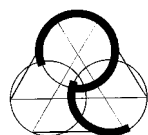
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## Energie-Cités

Energie-Cités is an association of municipalities whose first priority is to promote local energy policies which are both sustainable and integrated. The association has involved about 150 municipalities in its projects and has more than 90 members from all the countries of the European Union. Energie-Cités objectives include the strengthening of the role of municipalities in energy efficiency, the promotion of renewable energy and the protection of the environment, to promote debate on the policies and initiatives of the European Union in these fields and to develop municipal initiatives by exchange of experience, transfer of know-how and the setting up of joint projects.

Energie-Cités activities are primarily:

- The dissemination of information on Community policies and decisions, municipal best practice and transfer of know-how.
- Monitoring innovative municipal practice and in particular gathering information on best practice, preparation of joint analyses and opinions.
- Organisation of events and in particular an annual international seminar on a current theme (the next seminar will take place on 6-7th April 2000 in Verona, (Italy) on the theme of renewable energy in urban areas).

## ACR - AVR Association of Cities for Recycling

In order to achieve a significant improvement in the ecological and economic efficiency of the management of urban waste, the Association of Cities of Recycling aims at gathering all concerned parties and promoting the exchange of information among them, notably on :

- technical data on recycling operations, including markets for secondary materials
- methods of communication, education and public awareness
- legal, economic or voluntary instruments relating to recycling.

The ACR-AVR is an international association with a pedagogic and scientific aim.

Besides the annual General Meeting of the members, the Association is composed of the following bodies :

- the Board of Directors
- the Support Committee, composed of all the members who have an electoral mandate
- The Secretariat, the Association's permanent focal point, collects, centralizes and circulates the information.

The Association of Cities for Recycling provides its members with the following services :

- access to an international network of actors involved in urban waste management
- a regular Newsletter
- free technical reports
- participation in the works of the Association and in the annual General Meeting.

## Consorzio Agrital Ricerche

The Consortium set up in 1987 on initiative of Scientific Organizations, Public Bodies and Enterprises in order to promote a wider cooperation between University and Industry in the research sector. AGRITAL aims at supporting, planning and carrying out activities of research, experimentation, analysis, training and spreading of a permanent character and aimed at the scientific, technological and productive development of the extended primary sector: agriculture, zootechnics and forestry.

AGRITAL RICERCA is a non profit-making company. Its own activities have been supported by:

- FAO
- European Union
- Ministry of University and Scientific Research
- National Council for Scientific research
- Private Industries



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