

Topic report No 6/1999

# Waste

## Annual topic update 1998

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# 1. Introduction

This report outlines the objectives and results achieved during the first year of operation of the European Topic Centre on Waste. The Topic Centre has been appointed directly by the European Environment Agency.

## 1.1. European Environment Agency

The European Environment Agency (EEA) was established in 1990 by a Council Regulation of the European Union. The Regulation laid down a number of tasks for the Agency and prime among these is the establishment, development and co-ordination of a network for collecting, processing and analysis of environmental data – EIONET (European Environmental Information and Observation Network). Consequently, the Agency can be seen as a network covering all member countries but also linking countries outside EU and regularly delivering comprehensive environmental reports covering pressures, vulnerability and impacts on the environment. EEA aims to support sustainable development and to help achieve significant and measurable improvement in Europe's environment through the provision of timely, targeted, relevant and reliable information to policy-making agents and the public.

## 1.2. European Topic Centre on Waste (ETC/W)

The European Topic Centre on Waste (ETC/W) was appointed in June 1997 by the Agency to act as a centre of expertise for use by the Agency in support of its mission and, specifically, to undertake part of the Agency's Multiannual Work Programme.

A joint venture between the Danish Environmental Protection Agency and the Environmental Protection Agency of the City of Copenhagen has been appointed the lead organisation of the European Topic Centre on Waste under contract to the Agency. The Centre is led by the ETC Leader:

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ETC/W consists of a consortium of several European organisations, each with a representative on its Management Committee. The Management Committee is chaired by the ETC Leader. The following organisations are represented in the ETC/W and the Management Committee:

Joint Venture Danish Environmental Protection Agency/EPA of the City of Copenhagen  
ABAG/SAA Hazardous Waste Agency, Baden-Württemberg, Germany<sup>1</sup>

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<sup>1</sup> Since 01.01.1999: ABAG-itm GmbH, Stuttgart/Germany

Umweltbundesamt - Federal Environment Agency, Austria  
Irish Environmental Protection Agency  
Junta de Residus, Catalonia, Spain  
European Commission, DGXI (observer)  
European Commission, Eurostat (observer)

The Management Committee agrees the allocation of tasks and budget and partners are accountable to the ETC Leader for the satisfactory execution of the Work Programme.

### 1.3. National reference centres for waste

In order for the ETC/W to execute its tasks, a close co-operation with all member countries of the Agency is required. This co-operation is being established and developed through EIONET, and in particular the national reference centres for waste. The Reference Centres are appointed and funded by the member countries and are in charge of collaboration with their National Focal Points and the ETC/W to cover various topics. National reference centres are the regular collectors and suppliers of environmental data and information. A full list of primary contact points and national reference centres for waste is given in the Annex.

## 2. Work programme

Despite the long legislative tradition within the waste management area, it has often been recognised by policy makers at national as well as international level that only scarce information is available in order to focus legal and political initiatives optimally. However, with European Community waste legislation setting targets for various specific waste streams, and a Community Waste Strategy setting up a general hierarchy and principles on how to prioritise waste management objectives, comparable and reliable data related to the waste management areas are of key importance for policy makers at Community level as well as within member countries to help formulate, implement and enforce appropriate legal and political initiatives effectively.

Based on this recognition, the work of the European Topic Centre on Waste during 1998 has primarily been focused on a number of basic tasks related to for instance waste amounts, waste treatment capacities and waste management practices:

TASKS AND OBJECTIVES
<p><b>1998 STATE-OF-THE-ENVIRONMENT REPORT</b>  <b>Objective:</b> Contribution to the Agency's Second State-of-the-environment report, including collection of data and information, modelling trends, analysis and drafting of the waste chapter.</p>
<p><b>DATA AVAILABILITY AND COMPATIBILITY</b>  <b>Objective:</b> To establish a harmonised and comparable set of data on all major waste flows in the member countries, giving precise definitions on all issues addressed in order to secure reliable information on waste as a basic requirement for political decision-making.</p>
<p><b>PROJECTIONS, SCENARIOS AND ASSESSMENT</b>  <b>Objectives:</b></p> <ul style="list-style-type: none"> <li>a) As part of the preparation for the 1998 State-of-the-environment report, the development of a methodology in order to make projections for selected waste streams.</li> <li>b) The derivation of waste factors with the perspective to establish a basis for making projections of future waste arising and to demonstrate a methodology for generating alternative waste scenarios depending on the economic development and technological changes.</li> </ul>
<p><b>DANGEROUS SUBSTANCES IN WASTE</b>  <b>Objective:</b> To provide documentation on the dangerous substances and materials in waste which causes special problems in member countries and how the environmental impact from these substances and materials can be minimised by means of e.g. material substitution, good housekeeping, clean technologies etc.</p>
<p><b>WASTE MANAGEMENT FACILITIES</b>  <b>Objectives:</b> To provide a database of recovery and safe disposal facilities in member countries, containing data on nature, location and capacity of these facilities, giving additional information about permits, environmental management and pollution control systems and allowing an assessment of transfrontier shipment of wastes.</p>
<p><b>WASTE MANAGEMENT PRACTICES</b>  <b>Objective:</b> To support the development of waste prevention and waste management strategies, including documentation of waste management practices in all member countries, the administrative structure and the effectiveness and transferability of the various waste management plans and waste prevention schemes.</p>
<p><b>COMMON DATA MODEL ON WASTE</b>  <b>Objective:</b> To establish a common data structure for the various input data related to waste management, thus providing a tool for cross-sectoral and cross-country analysis.</p>

In order to follow closely waste policy development in the EEA countries and have an up-to-date close contact with the main issues related to waste

in the member countries the Topic Centre on Waste has been regularly attending the most relevant meetings held by the Commission including:

- Committee for the Adaptation to Scientific and Technical Progress of the EC Legislation on Waste (DGXI Unit E.3)
- Waste Management Committee (DGXI Unit E.3)

The results achieved during 1998 are described for each task in the following pages.

### 3. EEA state-of-the-environment report

As part of the preparation for the EEA report on the State of the Environment in Europe to be published in 1999, the ETC/W during 1998 drafted the chapter on waste generation and management, including the collection and presentation of data and the development of a methodology for making projections of selected waste streams.

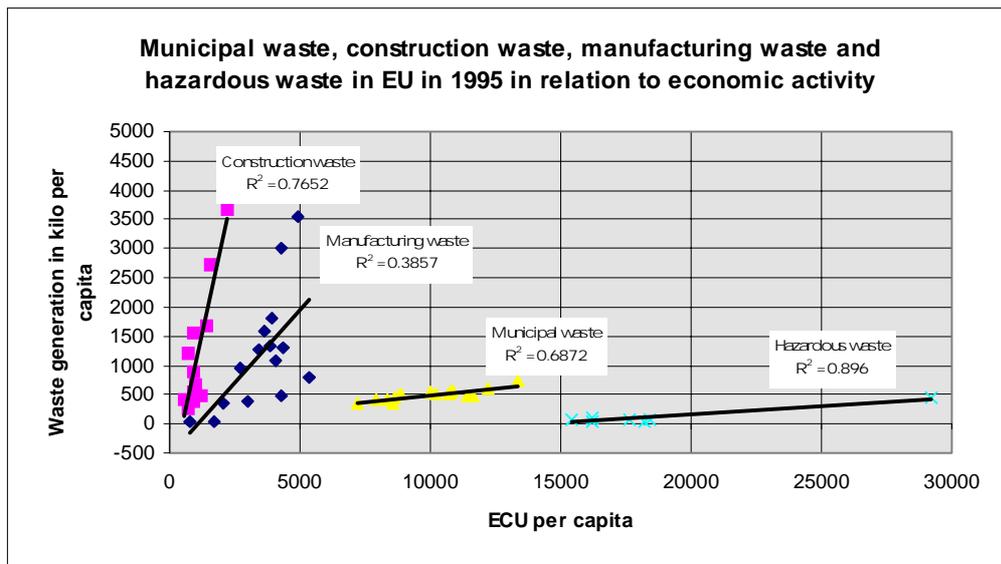
The chapter highlights a number of main problems related to waste generation and management, in particular the challenge of de-linking waste generation from economic growth, emerging problems, the importance of capacity and treatment prices and the need for an integrated approach:

#### **De-linking waste generation from economic growth**

The quantities of waste in EU are still increasing and amounted to about 3.5 tonnes per capita in 1995 (excluding agricultural waste). Waste production is influenced both by how efficiently we use resources in production and the quantity of goods we produce and consume. The importance of quantity means that in general it is possible to demonstrate a link between Gross Domestic Product (GDP) and waste generation. Reported total waste generation in OECD Europe increased by nearly 10 % between 1990 and 1995 (EEA, 1998a) while economic growth was about 6,5 % in constant prices.

The main challenge is to de-link waste generation from economic growth. A closer analysis of the relation between economic growth and waste generation reveals several different trends.

For waste from energy production no general correlation with economic output can be seen. This probably reflects differences in energy supply systems between countries. Coal fired power plants generate large amounts of fly ash, while hardly any waste is produced from hydroelectric power stations. Nuclear power plants generate a small but dangerous amount of waste.



### Total waste/GDP

For each member State the waste quantity/capita has been plotted against the economic activity related to the selected waste streams. The figure shows that the generation of municipal, construction and hazardous waste seems to relate to the economic activity behind waste generation whereas such a relation does not seem to exist for manufacturing waste. A good correlation is assumed if  $R^2$  values are above 0.7. In relation to municipal waste the economy is stated as final consumption from households in Purchasing Power Standard (PPS). Hazardous waste is related to GDP stated in PPS. Construction and manufacturing waste are related to the part of the GDP originating from construction and manufacturing activities.

Source: OECD, 1997a; OECD, 1997b; NRCs, 1998; Eurostat, 1999

For hazardous waste a correlation between GDP and waste quantities can be demonstrated for data from 1995 but not from 1990. In this period large changes have taken place in both awareness of hazardous waste and in definitions and classification procedures. Thus the apparent correlation in 1995 may be coincidental.

For municipal waste and construction & demolition waste a very close link between economic activity and waste generation can be demonstrated. For manufacturing waste there are significant variations between member countries and a general correlation does not exist. Some countries like Germany and Denmark have a low waste generation in relation to manufacturing GDP.

An important fact however is that decline in waste from production in some countries – supposedly due to better use of cleaner technology – has not been sufficient to neutralise the increase in total waste amounts due to the growth in the quantity of goods produced and consumed.

### Sewage sludge – a future waste problem?

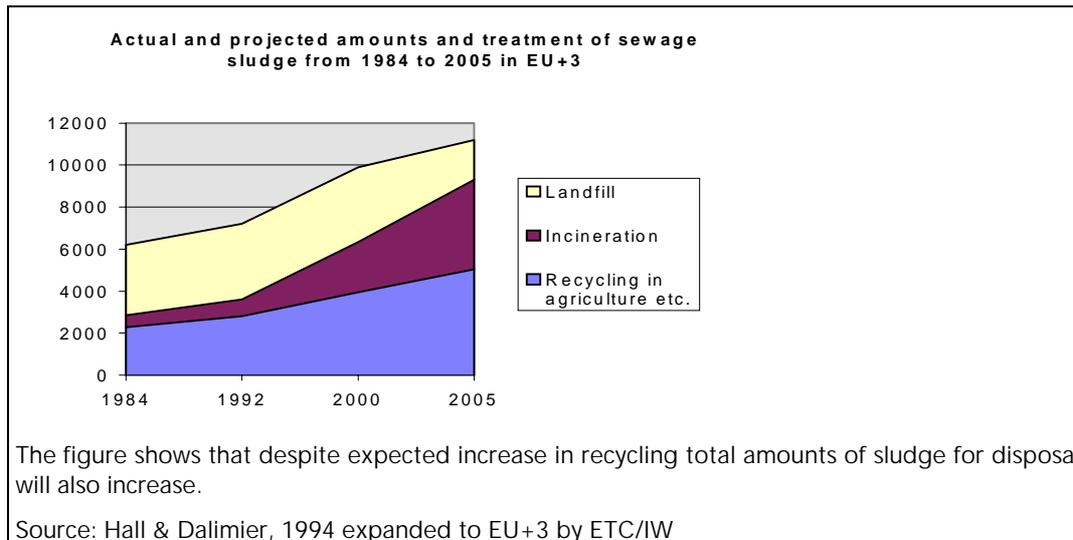
Due to more stringent demands of water treatment in the Council directive concerning urban waste water treatment (91/171/EEC) many new treatment plants are due for completion by 2005 and the amount of sewage sludge is expected to increase by 50 % to at least 11.2 million tons dry solids by 2005 (see figure Hall & Dalimier 1994a updated to EU+3 by

ETC/IW). For some countries the quantity will increase by as much as 500 %. This expected increase is in itself a challenge for waste management and the choices of treatment and disposal methods will have large economic and environmental implications.

Sludge can be a valuable fertiliser in agriculture. It is a good phosphorus source and has also a nitrogen content that can be valuable especially for crops with a long growing season (ISWA 1998) The organic content of the sludge can help improve the soil structure and in general sludge stimulates beneficial biological activity in the soil (DEPA, 1997). Phosphorus being a limited resource makes recycling of sludge for agricultural purposes an appealing solution for sustainable management of sludge.

However, sludge is also contaminated with heavy metals, bacteria and viruses and a number of organic substances, and both EU and national regulations set limits for contaminant concentrations in order to protect the soil and humans from pollution. Much of the sludge produced is already too contaminated and has to be incinerated or landfilled. Landfilling of sludge has hitherto been an inexpensive means of disposal, but both national restrictions and the proposed landfill directive will make landfilling more expensive. Several countries have introduced general restrictions on the landfilling of organic waste.

Incineration reduces the sludge to ash which can then be landfilled. In most cases supplementary fuel is needed in order to burn the sludge and there is usually no net gain of energy (Johnke, 1998). Depending on the concentration of heavy metals in the sludge and the incineration process the ash may be classified as hazardous waste.



The European Commission is considering tougher limit values for heavy metals and possibly limit values for some organic compounds which will further limit the potential for recycling. Several member countries have already established more stringent limit values for heavy metals and a number of member countries have also introduced limit values for a number of organic pollutants.

The economic consequences of a restricted agricultural application of sewage sludge are considerable. Depending on the alternative chosen the cost may rise from 75 EUR per tonne for agricultural use to 400 EUR for incineration in some countries (ISWA, 1998). One German source even gives prices up to 600 EUR per tonne for thermal treatment (Johnke, 1998). Thus a thrust for phasing out the use of the problematic compounds may be an economically sound solution

### **Do we treat the waste better and in accordance with the community strategy on waste ?**

For 10 years, the Community Strategy on Waste has recommended a hierarchy of principles. In general, prevention of waste shall have first priority, followed by material recovery, energy recovery and finally safe disposal of waste. An appropriate question is therefore: Has the Community made progress towards meeting the principles of this Strategy?

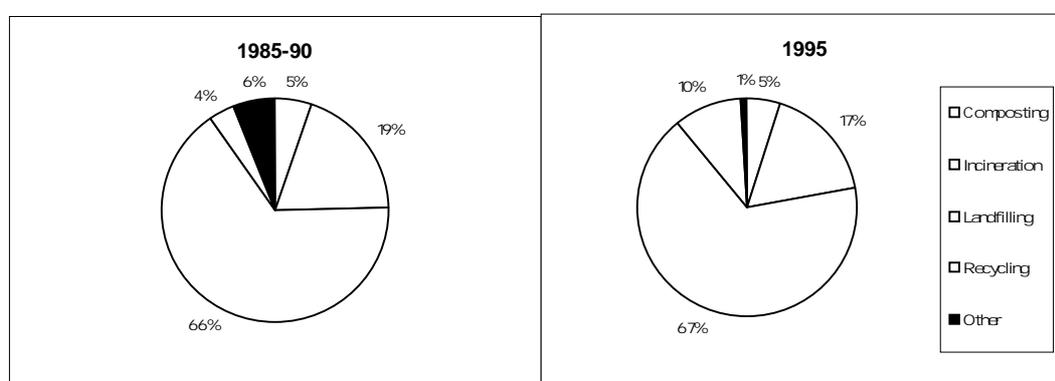
In relation to waste prevention the general trend has been an increasing amount of waste and the goal is far from being reached. This does not mean that it is not possible to demonstrate examples where waste prevention has taken place, but it has not been to an extent that has resulted in a stabilisation or reduction of waste quantities.

Due to lack of sufficient and reliable data it is difficult to evaluate the extent to which recovery has replaced disposal. For some countries it is possible for the total waste generation to identify an increase in recycling

and a reduction in landfilling for the period 1985-1995. But for many countries landfilling is still the most common treatment method.

For municipal waste it is possible to demonstrate trends in treatment in the 18 EEA member countries. Even though there has been an increase in the level of recycling, landfilling remains the most common treatment and is on the same level in 1995 as in 1985-90. In the same period there has been an increase in the amount of municipal waste landfilled from 81 million tonnes to 104 million tonnes. Even if a part of this increase may be due to better registration it is reasonable to conclude that in absolute figures, the EU+3 countries landfilled more municipal waste in 1995 than in the period 1985-90.

Development in disposal and treatment of municipal waste, EEA member countries from 1985-90 to 1995



The figure shows that despite increased recycling no progress has been made in reducing landfilling.

Source: Europe's Environment : The Second Assessment and NRCs

### **The importance of capacity, treatment prices and waste management**

Waste management throughout Europe and above all the management of disposal and recovery activities is partly governed by the rules of market economy but also strongly influenced by numerous EU and national regulations. Thus the success of the Community Strategy on Waste depends on a complex system governed by different national and regional regulations, the capacity of treatment facilities and the price structure between treatment forms and among nations.

Accordingly, knowledge of demand and supply of capacities for recovery, thermal treatment and landfilling and price relations is necessary to assess waste management comprehensively. Hardly any information is available on the capacity for re-use and recycling of different products and materials and an assessment is further complicated by the fact that many recyclable materials are traded on world-wide markets. The following discussion will thus focus on capacities and prices for incineration and landfilling.

#### *Incineration capacity in the EEA countries*

Incineration plants for municipal non-hazardous waste are in operation in most EEA member countries, except Ireland, Portugal and Liechtenstein.

In 14 countries a total of 533 incineration plants are reported in operation (nearly 280 of them in France). There is a very high degree of variation in the size of the plants. In addition to these, 239 incineration plants for hazardous waste are reported in operation.

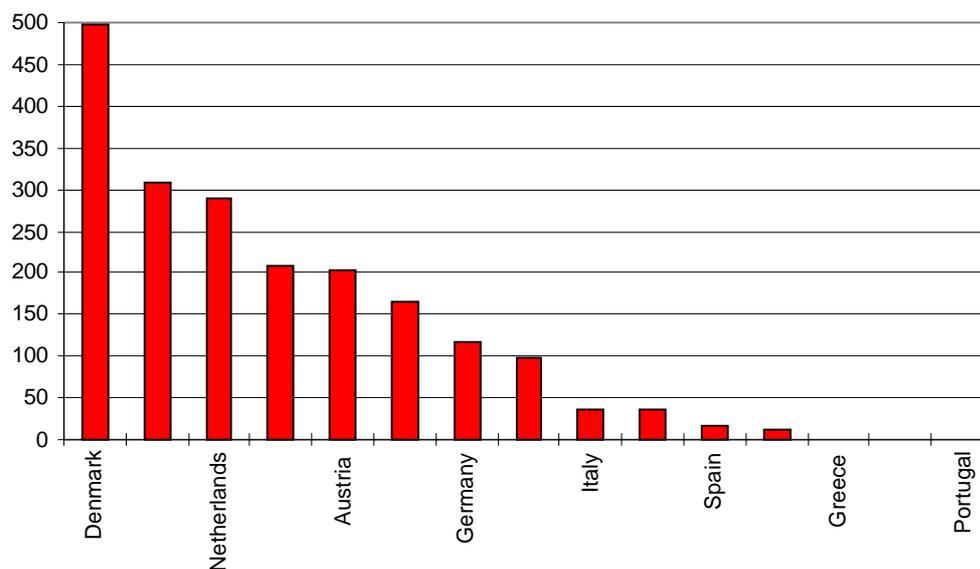
Information on the capacity of the incineration plants is incomplete and data are often several years old. Furthermore several countries have not been able to supply data at all. By combining information on capacity where accessible, with supplementary information on amounts of waste incinerated the total incineration capacity for non-hazardous waste within the EEA is estimated to be about 33 million tonnes (NRC's, 1998b; OECD, 1997a).

The total amount of municipal waste generated in EEA member countries in 1995 was about 191 million tonnes. In other words incineration capacity is only available for about 17 % of the total amount of municipal waste arising.

There is a very high degree of variation in available capacity for incineration (See figure on incineration capacity). These differences may reflect both the level of development of waste management but also differences in strategies, climate, structure of energy supply systems and public acceptance of or opposition to incineration.

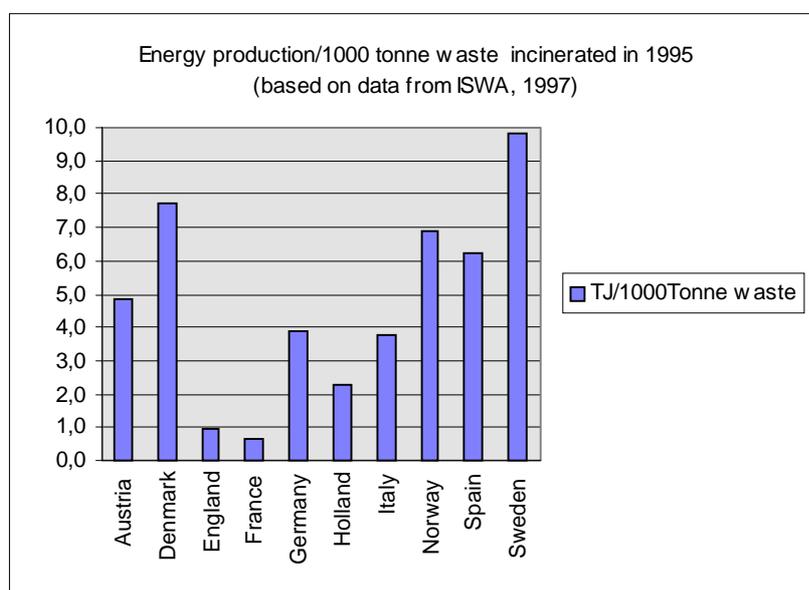
In some countries more than 90 % of the capacity is reported to come from plants with energy recovery (NRCs 1998b). While most countries have started to utilise the energy from waste there is a great deal of variation in the overall efficiency of energy utilisation (See figure on energy production). The variation may reflect differences in the composition of waste incinerated, but the main explanation is probably to which extent the incinerators operate only with electricity production, with heat production or a combination of the two. Optimal efficiency is obtained by combined systems where the heat is used in district heating systems.

### Capacity in kilo per capita



The figure illustrates a large variation in available incineration capacity per capita within EU. The figure covers municipal solid waste incineration plants with and without energy recovery and is based on information on capacity where available or actual incinerated quantity in 1996 or the latest reported year before.

Sources: NRCs 1998B; ISWA, 1997; OECD 1997a

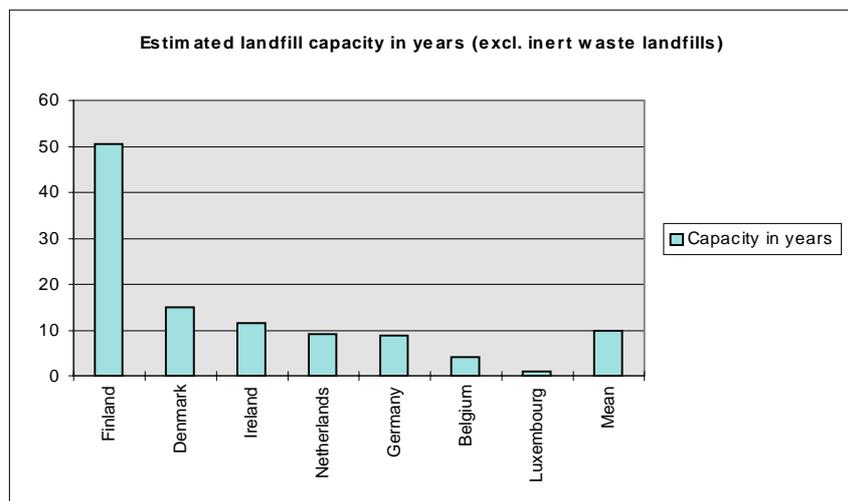


The figure shows a large variation among the EEA countries in total energy recovery (heat + electricity)/tonne waste and is based on data obtained directly from the plants. Source: ISWA, 1997

### *Landfill capacities*

An effort has been made by ETC/W in 1998 to collect data on the number and capacity of landfills. Available data are not complete, however, and some confusion on the terminology for different types of landfills makes interpretation difficult. The following conclusions should therefore be taken only as a rough estimate.

Figures for the total amount of waste landfilled are not available from official statistics. For the countries where data on both capacity and total amount landfilled in 1996 is available it is possible to calculate the remaining capacity expressed in years - i.e. how many years will it take to fill up the existing landfills at the present rate of disposal (see figure on Estimated Landfill Capacity).



The figure shows that there is a very high degree of variation in the available landfill capacity expressed in years.

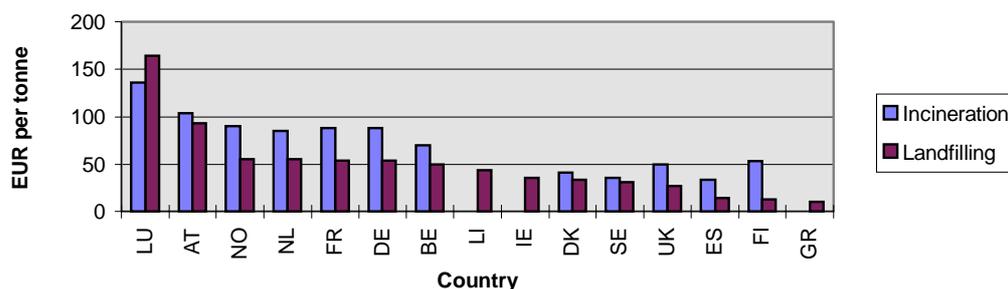
While the countries covered by data as a total have got sufficient capacity for 10 years some countries only have capacity for a few years. Source: NRCs 1998b

Not all licensed landfills are equipped with the membranes and leachate collection systems needed to protect the environment properly. Considering the time needed for finding suitable locations, getting public acceptance and constructing the landfill there is therefore an urgent need for either a dramatic reduction in the amounts of waste landfilled or a rapid construction of new controlled landfills or alternative treatment facilities.

#### *The effect of treatment prices on disposal patterns*

In nearly all EEA member countries the average treatment prices for landfilling non-hazardous waste are far below those for incineration. This means that unless other regulation is in place the market mechanism will direct waste to landfills instead of incineration with energy recovery. In other words the market mechanisms act in direct opposition to the official Community Strategy on Waste. Of even greater concern is that landfills which have inadequate pollution control and make up about 67 % of the landfills probably have disposal prices below the average. Price mechanisms may thus also counteract the aim of reducing the impact of disposal.

### Treatment prices for incineration and disposal



Average treatment prices for landfilling and incineration of non-hazardous waste in selected EEA member countries (excl. waste tax and VAT). It should be noted that all prices are averages of observed prices and cover large variations between plants. Italy and Iceland did not provide data on treatment prices

Source: NRCs, 1998b

The different treatment prices in EEA member countries are strongly influenced by national rules and regulations. A number of countries have issued detailed landfill regulations or guidelines which define the technical standard and the management of these waste management facilities. Particularly demands relating to the installation of liners, treatment of leachate and analysis of surrounding groundwater or surface water will increase the price of landfilling. Prices of incineration may vary according to the age of the installation, different interest rates, the income from sale of energy or cost for cooling towers etc.

The difference in treatment prices is in some cases due to very different environmental protection measures and reflects in this respect a conflict with the general community aim of an environmentally safe disposal. Therefore, it is important for the Community to determine an obligatory state of the art for all kinds of waste management activities including rules for the implementation of aftercare measures. This will lead to a gradual internalisation of external costs. This will, however, not change the fact that landfills are cheaper to construct and operate than incinerators.

Current differences in treatment prices between incineration and landfilling would have to be counteracted either by regulatory measures addresses to harmonise environmental standards or other waste management measures supporting the general waste strategy or using economic instruments like waste taxes to reduce the dependence on landfilling.

Large differences in treatment prices between countries in an open market counteract the aim of treatment of the waste close to the source (the proximity principle). Large profits or savings can be obtained by finding a low cost disposal solution. This may also very directly influence the competitiveness of recycling industries where the cost of disposing of the residual waste can be considerable.

### *Waste taxes can be used to correct the price relation*

As a consequence of the negative impact of the price relation a number of countries (Austria, Belgium, France; Denmark, Holland and United Kingdom) have introduced special landfill or general waste taxes which are levied in addition to the actual treatment price. Some German Länder have also had waste taxes but these taxes are according to the Federal Court in conflict with national legislation and have to be abolished.

The rate of taxation varies among countries depending on the kind of waste (Austria, France and United Kingdom), the kind of treatment and energy recovery (Denmark) and the technical standard of the landfill (Austria). The current rates per ton are in Denmark between 28 and 45 EUR, in Austria between 14 and 71 EUR and in United Kingdom between 2.5 and 8.5 EUR. Despite differences in structure the general purpose of the taxes is to reduce landfilling and support a state-of-the-art treatment recovery and recycling of waste.

The Danish waste tax has been in operation long enough to assess the actual effect. The table below illustrates the effect of this waste tax on the relation between landfilling and incineration. A study of treatment patterns from 1987 to 1996 concluded that a 32 % reduction of the waste landfilled or incinerated can to a large extent be explained by the effect of the waste tax. In the same period substantial increases in the recycling of building material, glass and paper have been obtained. The effect of the tax has been strongest in sectors with a high tonnage (i.e. building and construction) (Skou Andersen, 1998).

	Landfilling	Incineration
Disposal fee before tax	20-34	14-40
Waste tax	45	28/35
Total	65-79	42-75

The table shows treatment prices in EUR in Denmark in 1997 with and without waste tax. The tax is differentiated for incineration with only heat recovery and incineration with the more efficient combined heat/power production. Source: DEPA, 1997b

### **The need for an integrated approach**

The challenge of reducing the quantities of waste as such cannot be solved in a sustainable way by efficient waste management and recycling alone. There is an urgent need for integration of waste management into a strategy for sustainable development and into a number of related policy areas, where reduction of resource depletion, energy consumption and minimisation of emissions at the source is given high priority. Waste must be analysed and handled as an integrated part of total material flow through society.

Problems like heavy metals in incinerator ash and residues from flue gas cleaning should not be met with further input of resources for treatment and stabilisation but with a concentrated effort to phase out the use of heavy metals wherever feasible together with separate collection and treatment of products still containing heavy metals. Contamination of sewage sludge should not lead to an increased use of energy in incineration plants or advanced treatment but instead to a decrease in the use of chemicals and heavy metals in industry and products creating the problems or avoiding that these substances end up in the sewer.

Finally it is evident that much waste generation can be seen as a product of an unfavourable relation between the prices of raw materials, production and maintenance costs (capital investment and labour) and the cost of disposal. A gradual substitution of taxes on labour with taxation of energy and raw materials and waste is probably the most efficient way of obtaining sound resource management in a free market economy. However, this can only be done to a limited extent by the individual member countries because national industries will have higher costs than their competitors, unless it is compensated by a reduction in labour costs.

The assessment of specific waste streams, gathering information about quantities generated, current management status, fate and behaviour of dangerous substances in the streams that currently form part of the work undertaken by the ETC/Waste can help in the development of a more integrated approach.

## 4. Data availability and comparability

Detailed analysis of developments in waste generation, waste management and waste minimisation is hampered by the lack of comparable definitions and statistical information across Europe. National data on waste arisings and flows already exists and are reported through i.a. OECD/Eurostat and the EU Standardised Reporting Directive 91/692/EEC. However, for purposes of comparison among the member countries these data have limited value because of inconsistencies in terms of definitions, classifications, terminology and accuracy. The ETC is assisting OECD/EUROSTAT/EEA member countries to improve the quality and consistency of waste statistics.

### *Municipal and household waste*

Even for municipal waste and household waste, which are normally thought of as areas with good statistics, confusion prevails. Municipal waste is waste collected by the municipalities independently of the source of the waste. Municipal waste, however, is a management/collection term and the quantities and composition of municipal waste will therefore by nature be different from one country to another depending on the collection systems. On the other hand, household waste is, or rather should be, waste originating in the households sector, and should therefore be comparable.

### *Hazardous waste*

Statistical data on hazardous waste are particularly difficult to interpret. Analysis of the data show large changes in reported amounts over time especially a large increase in the first half of the 1990s. The increase should be seen in connection with the introduction in the Community in late 1994 of the hazardous waste list in the European Waste Catalogue.

The hazardous waste list (HWL) includes about 200 waste types and is first of all process oriented. It provides the first attempt to harmonise hazardous waste definitions within the Community but does not at this stage appear to be sufficient. Thus compared to the HWL some member countries have marked several other waste types as hazardous.

#### 4.1. Initiatives

In relation to future waste statistics, it is expected that a proposal for a Community regulation on waste statistics will secure the need for a reliable system of data collection for waste, based on common terminology, definitions and classifications. However, the proposal now adopted by the Commission, is not expected to be operational before the year 2001 at the earliest.

In order to assist the Commission and member countries with reliable data on waste generation and waste treatment until the regulation is in place,

the ETC/W has focused its attention on already existing waste data aiming at the provision of a harmonised set of data on all major waste flows in the member countries for the period 1993-96.

The following initiatives have been taken during 1998 and will continue in 1999:

Clarification of comparability and non-comparability in relation to definition, classification and terminology for all main categories used in the description of waste generation of municipal waste and household waste in order to obtain a harmonised data set for all member countries covering the period 1993-96.

Developing a main structure for listing information from all member countries on hazardous waste. Clarification of data collection, definitions, comparability/non-comparability among the ETC/W-partners (in Austria, Catalonia, Denmark, Ireland and Germany) in relation to main categories used in the description of waste generation of hazardous waste.

It is expected that the two initiatives will result in two consolidated data sets during 1999. One on municipal waste and household waste covering all member countries, and one on hazardous waste covering, in this first phase, the countries/regions represented by the ETC/W-partners.

As part of the work, the ETC/W is involved in the work of the Eurostat Working Group "Statistics of the Environment, Sub-Group on Waste" and all other relevant projects on waste statistics in order not to duplicate work.

## 5. Projections, scenarios and assessment

Despite the fact that comprehensive and reliable data on waste are still absent, improved knowledge concerning potential trends in waste levels and their composition will provide important information for more thorough analysis of waste problems, thus facilitating the development of a comprehensive and overall strategy on waste.

During 1998 the ETC/W has been working with these issues from two perspectives:

As a part of the work related to the EEA State-of-the-environment report, the ETC/W has provided the EEA with information on the possible future development of a number of selected waste streams: household waste/municipal waste, paper and cardboard, glass and end-of-life vehicles.

The derivation of waste factors for different sources of waste, related to both economic aspects and waste generating process aspects. The perspective is provide a basis for making projections of future waste arising and to demonstrate a methodology for generating alternative waste scenarios depending on the economic development and technical changes.

From several studies, among them an ETC Technical report on Projections to be published in 1999 (see below), it is recognised that there is a relationship between the size of the economic activity and the amount of waste generated. However, it is not quite evident how the specific interaction should be described.

### 5.1. Projections

As part of the work related to the EEA State-of-the-environment report, a methodology for making projections was developed. The methodology was applied on a number of selected waste streams.

#### *Methodology*

The projections were based on the assumption that the generation of waste can be explained by the waste generating economic activity at a certain disaggregation level. In order to test and verify such a proportionality, historical data were compiled and a model for projecting the waste amounts was established.

An alternative model was developed by estimating a constant waste coefficient based on the relation between waste generation and economic activity in one base year. The second model is of particular relevance if historical observations over a long enough time period are missing.

In order to test the two models and to carry out the projections, historical data were compiled.

For paper and cardboard waste, data was found available for all member countries covering the period 1983-96, and for glass covering the period 1990-96. For household waste, data covering an adequate period of time was only available for some member countries.

Regarding the economic data, a linking of waste generation with the overall GDP or private spending was found to be too simple. An attempt was therefore made in order to identify those parts of the economic activity and private spending which characterise each of the waste streams household waste, glass, paper and cardboard waste. For this purpose OECD data on national accounts from 1983-96 was applied.

### *Household waste*

Because of a lack of historical data on household waste the projection was based on the model using the constant coefficients. The model results indicate a likely increase in the amounts of household waste within EU in the range of 22 % over the period 1995-2010, equivalent to an increase from 151 to 191 million tonnes.

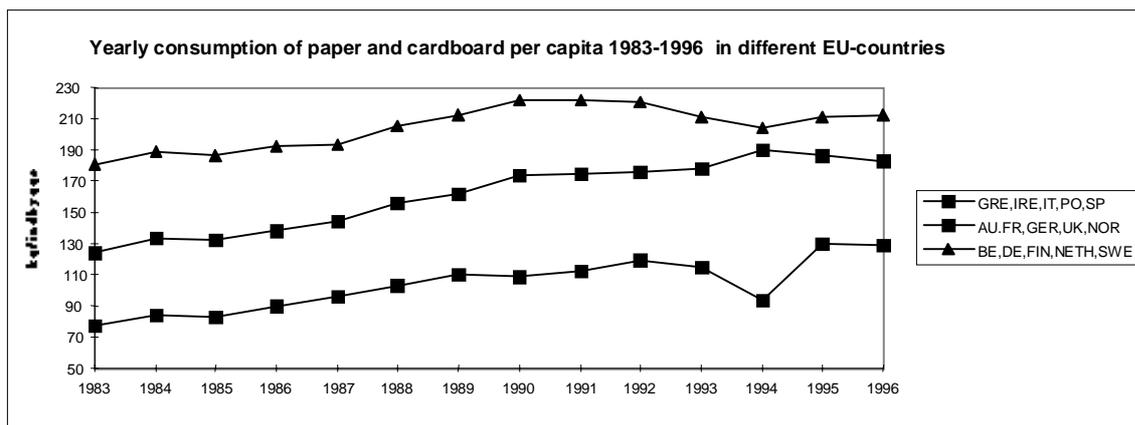
### *Paper and cardboard waste*

During the period 1983-1996 the consumption of paper and cardboard increased by 46 % (from 41 million to 64 million tonne) corresponding to an average increase of 3,5 % per year. It is reasonable to assume that waste production is related to consumption.

Amongst EU member countries a large diversity exists in the consumption of paper and cardboard per capita, see figure below.

Projection results indicate a likely increase in paper and cardboard consumption within EU in the range of 44 %-62 % from 1995-2010. The increase of 44 % is based on the model using constant coefficients, while the increase of 62 % is based on the model using long historical observations. This means in concrete terms that if no initiatives are taken to reduce consumption, the generation of paper and cardboard waste will have reached an actual level of between 92 and 105 million tonne by the year 2010.

The general opinion is that the recycling level on paper is high; for instance recycling in EU + Norway has increased proportionately from 36 % in 1985 to 49 % in 1996. However, because of the increase in consumption, more paper is presently incinerated and landfilled compared to the situation in 1985. Thus, in 1996 32.5 million tons of paper and cardboard were incinerated and landfilled compared to 28.3 million tonnes in 1985.



The countries are grouped in relation to the general consumption: Low: 40-140 kg/capita /year (Greece, Ireland, Italy and Spain); Medium: 110-200 kg/capita/year (Austria/France/Germany/UK/Norway); High: 150-260 kg/capita/year (Belgium; Denmark, Finland; the Netherlands, Sweden).

If the amount of paper and cardboard incinerated and landfilled is not to increase towards 2010 as a consequence of increased consumption, recycling of paper and cardboard must increase markedly. Thus, until 2010 a growth of 100 % needs to occur in recycling, corresponding to an increase of more than 2 million tonnes per year.

### *Glass*

During the period 1990-1996 the consumption of glass for packaging has increased in the total of EU countries and Norway from 11.7 million to 13.3 million tonne, that is, by almost 14 %. The glass used for beverages, excluding return bottles (as they are only regarded as waste at the time when the bottle is discarded), represent 75 % of the total glass packaging.

The results indicate a likely increase in the amount of glass waste within EU in the range of 24 %-53 % from 1995-2010. The increase of 24 % is based on the model using constant coefficients, while the increase of 53 % is based on the model using long historical observations.

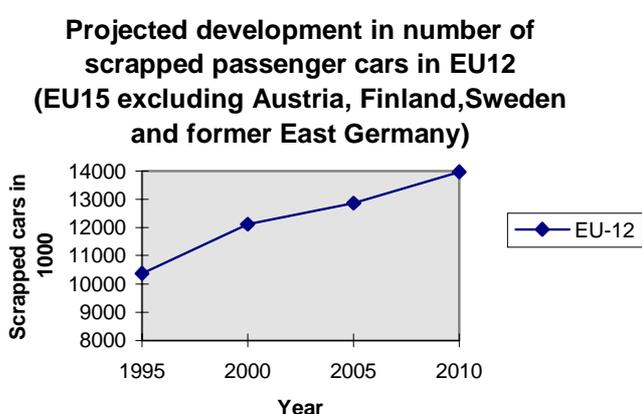
In 1996, 6.2 million tonne glass waste was landfilled in the total of EU countries and Norway. Should this amount of landfilled glass be maintained by the year 2010 (not reduced), the amount of recycled glass, as a consequence of the increased consumption, needs to be increased to between 10 and 14 million tonne/year, or between a 35 %-90 %, compared with current ratios.

### *End-of-life vehicles*

As the number of cars in EU is still increasing so is the number of scrapped cars (End of Life Vehicles) that need to be treated. No precise statistics on the number and weight of scrapped cars are available, but estimates of a present waste amount of 8 to 10 million tonne/year in 1996 in EU are probably realistic.

Scrapped cars are usually shredded in a machine and separated into three fractions. The metals, ferrous and non-ferrous, are recycled to a very high degree and smelted down to new raw materials.

In relation to waste treatment the non-metal part, shredder waste, is the most problematic one. The present amount of shredder waste from cars is in the range of 2 to 2.5 million tonne/year in EU. This waste is a mixture of foam, textiles, plastic, rubber, glass, oil and hazardous waste. It is generally highly contaminated with heavy metals, oil, brake fluids etc. and is at present landfilled in most member countries. It is not easily recycled and incineration is problematic due to the often high content of heavy metals and PVC. Danish studies indicate that better sorting of shredder waste can reduce the content of heavy metals considerably and make incineration with energy recovery less problematic.



The graph shows estimated numbers of scrapped cars in EU12 from 1995 to 2010. All figures are based on a model using historical data (until 1990) and projections of the car park combined with detailed information on age distribution of cars in the different member countries. The result should be seen as a trend more than a projection of exact numbers (Source: Kilde & Larsen, 1998).

Projections made for EEA covering EU12 (excluding former East Germany) imply that the number of scrapped cars will increase dramatically in the coming decades. The projections indicate an increase in the number of scrapped cars of 17 % by year 2000 and almost 35 % by year 2010 compared to 1995. The problems of disposal of shredder waste will increase at the same rate unless adequate measures are taken.

## 5.2. Waste factors

In general, environmental factors relate different kinds of emission to an activity or source. Waste factors are related to the source of waste generation or – using the DPSIR assessment framework – to the Driving Force. They can for example be quantity of waste generated per inhabitant or quantity of waste paint per car produced. Different levels of application have to be distinguished. For this purpose, the ETC/W has reviewed the following levels during 1998:

- macro economic/national or regional
- industrial sectors

- enterprises or production sites
- technology, e.g. production processes and sub processes
- consumer

The results of the review – as summarised in the technical report “Development and Application of Waste Factors – an Overview”, to be published in 1999 - give an overview on the present state of the derivation and application of waste factors in the EU. A first assessment regarding

- interested parties and corresponding levels of application,
- data source and reliability of data,
- definition and terminology,
- methodology, framework and system boundaries,
- linkage to other indicators and
- quantitative and qualitative aspects

has shown that all these aspects have to be taken into consideration in future work of the ETC/W on waste factors. Despite the fact that the experience on derivation and application of waste factors at both EU and national level is still limited, waste factors are already widely used in industry as benchmarks and instruments for eco-controlling.

Examples of waste factors and interested parties are shown in the following table:

Level	Interested party (customer)	Waste factor (example)
macro economic	political decision maker, statistic offices, economists, public administration	waste quantity per GDP, per inhabitant
industrial sectors	statistic offices, economists, industrial associations,	waste quantity per product or financial turnover
enterprises, production sites	management, waste management authorities,	waste quantity per product or financial turnover
technology: production process and sub-processes	management, engineer, waste management authorities	waste quantity per input of raw material or per product unit
consumer	private and industrial consumer, consumer associations	waste quantity per product bought

As a practical test of waste factors, the ETC/W carried out a pilot exercise in 1998 based on secondary aluminium smelting in Catalonia. The study concludes that in any manufacturing activity there are several aspects which influence both the quantity and quality of waste generation:

- a. the process technology itself, including additional environmental protection measures,
- b. the composition of raw materials, especially impurities,
- c. the pre-treatment of raw materials,
- d. operational/management practices, be they optimal or not.

The example has clearly shown that the derivation of waste factors at technology level is mainly hampered by lack of reliable data regarding material input, material output including waste, process technology and operational practices. It has also been shown that even plants with both similar technology and material input generate different quantities of waste, mainly due to specific operational practices. In a next step it should be considered, if the dependency on data could be minimised with help of simplifications by using rather straight-forward assumptions. It will also be investigated to what extent selected existing waste streams can be used for qualified waste projections.

## 6. Dangerous substances in waste

Hazardous as well as non-hazardous waste can contain various dangerous substances. The substances are either directly included in the waste when it is produced or the substances are created in the waste management process – when the waste is incinerated, treated in other ways or disposed of. Problems related to dangerous substances from waste are acknowledged to rise in relation to the treatment and disposal of waste. At present, however, the situation across member countries is not transparent, and options for legal initiatives at community level are therefore limited.

As a follow-up to the Community Waste Strategy, the Council requested the Commission to collect information on those environmentally dangerous substances and materials in waste which causes special problems in member countries, and to bring forward, as appropriate, recommendations for measures to deal with these problems.

Contributing to the request, the ETC/W took initial steps to provide documentation on the dangerous substances and materials in waste which cause special problems in member countries and how the environmental impact from some of these substances and materials can be minimised by means of e.g. material substitution, good housekeeping, clean technology, better source separation and handling.

### 6.1. Initiatives

In order to identify dangerous substances causing special problems in waste, a detailed study of two main methods for waste treatment – landfilling and incineration – were carried out, and a number of dangerous substances and relevant waste streams were selected for further studies based on their environmental impact.

For landfilling and incineration the following conclusions were drawn in this first study (see report on dangerous substances to be published in 1999):

#### *Landfilling*

There are two major pathways to release dangerous substances: Emissions of gases like methane and leachates containing organic compounds, heavy metals and salt.

Dangerous substances	Path	Category	
CH <sub>4</sub> , CO <sub>2</sub>	Gas	Global warming	Very important
Salt, e.g. chloride	Leachate	Eco-toxicology	Important, high contribution from landfill waste water treatment
Total N, NH <sub>4</sub>	Leachate	Eutrophication	Important because of the local contamination of surface and groundwater
Organic emission	Gas	Human toxicology, nuisance	Important for employees and local communities
Heavy metals (Cd, Ni, Cu, Zn, Pb, Hg)	Leachate	Eco-toxicology	Less important because little contribution to total emissions, assumed to be stable in the landfill body

Many of these releases could be reduced by an appropriate pre-treatment of waste and by applying adequate technologies.

The problems related to the emission of gases are mainly caused by biological degradation of organic substance in waste. New EU directives when adopted will reduce the organic inputs to landfills so that this problem is expected to decrease in the next years.

Although the leachate of landfills presents high concentrations of heavy metals, organic substances and salts, most of these problems can be solved by an appropriate waste water treatment. Only the salt e.g. chlorine passes the treatment facility without change. Compared to the loads released by municipal waste water treatment landfill leachate contributes less than 1 % to the total pollution of surface waters. Only chloride contributes significantly at a national levels with 2 % to the total amount.

#### *Incineration:*

Incineration of waste is a small overall contributor to air pollution. Other human activities such as power generation, industrial combustion or emissions from traffic are more important in overall terms. However, there are four important quality issues in relation to incineration of waste:

- Incineration is one of the important generating sources for the emission of organic micro pollutants like dioxins and furans.
- Incineration is an important source for the release of volatile metals like mercury, cadmium and lead which can be transported over long distances.
- Trace metals including heavy metals are not destroyed during incineration. The minor part remains in the slag that can be considered as inert materials. The major part is transferred to the fly ashes and the residues from gas cleaning and stays soluble. Thus, fly ashes and residues cannot be landfilled without pre-treatment.

- In common with landfill, high neutral salt loads are released from waste water treatment. In contrast to landfilling only surface water is affected by this release.

Important dangerous substances released by incineration of waste include:

Dangerous substances	Path	Category	Remark
Organic compounds especially dioxins and furans	Gas, fly ash, residues	Human toxicology eco-toxicology	Very important, incineration is major contributor
Volatile heavy metals Hg, Cd, Pb	Gas, fly ash, residues	Eco-toxicology	Important because of transboundary movement
HCl	Gas	Acidification	Important
Metals As, Cd	Gas, fly ash, residues	Human toxicology	Important, carcinogenicity
Salt, e.g. chloride	Waste water, fly ash, residues	Eco-toxicology	Important, high soluble transport to surface water

During 1999 the study will be followed up in the following steps:

- Analysis of a selected waste stream composition and tracking back of the flow of dangerous substances from final emissions to the source
- Compilation and analysis of measures for improving the environmental performance of the whole system (from source to final disposal)
- Valuation of the possible measures in order to identify the most efficient starting points for increasing the environmental performance.

## 7. Waste management facilities

Ensuring that the capacity of recovery and safe disposal facilities is adequate to handle the quantities of waste generated is an important objective of the Community waste policy. In addition, a thorough knowledge of available treatment facilities is a prerequisite for setting realistic and achievable targets for the various waste management options like material recycling and incineration with energy recovery, taking into account the required time for planning and investments in the member countries. However, at present there is little information available at the European level about waste management facilities in the Community.

During 1998 the ETC/W took the initial steps to provide an overview of waste management facilities in the Community. Thus, the objective is to provide a catalogue on safe recovery and disposal facilities in EEA member countries, containing data on type, location and capacity of waste management facilities and in the long term give additional information about permits, environmental management and pollution control systems as well as allow an assessment of transboundary movements of wastes. As a first step the database will concentrate on hazardous waste treatment facilities and landfills.

In addition to planning purposes in member countries, the information is intended to support the requirements of Directive 91/156/EC, according to which the member countries shall take appropriate measures to establish an integrated and adequate network of disposal installations thereby enabling the Community as a whole to become self-sufficient in waste disposal. At present, however, the necessary information is lacking with only limited data compiled through Directive 91/692/EC concerning questionnaires for member countries' reports on the implementation of certain Directives in the waste sector.

The database shall help develop a sustainable approach to waste management by ensuring that the capacity of recovery and safe disposal facilities is adequate to handle the quantities of different types of waste generated.

The catalogue is intended to meet the information needs of

- EEA and Community institutions,
- national, regional and local authorities,
- operators of waste management facilities,
- European industries,
- the public and NGOs

and will be a tool for:

- fulfilling obligations to report according to Community directives,
- planning waste management activities and policy making,
- controlling of transboundary movement of waste and
- reporting on specific database contents.

As the catalogue shall be a tool for competent authorities in particular, the needs and content have been discussed with member countries and the Commission during 1998 with the discussion continuing in 1999. It is a long term objective of the data base that data input should be managed directly in the member countries. During 1999 it will therefore have to be investigated, to what extent data recording and updates can be done directly by the NRCs.

## 7.1. Initiatives

As part of the work done in 1998, a review of existing data on waste management facilities and databases in EEA member countries was carried out. Based on the results of the review the database design and core data set have been developed and discussed with EEA, DG XI and Eurostat. A technical report on Information about Waste Management Facilities, summarising the results will be made available in early 1999.

From the review, a good overview on data availability was obtained. Thus, information on the location and the operator of landfills, material recovery facilities and incineration plants for non-hazardous waste and some kinds of disposal and recovery facilities for hazardous waste were available in almost all countries. In addition, 11 countries out of 18 reported to have databases on waste management facilities, which will facilitate data transfer to the planned database on waste management facilities.

Based on the review, a test collection of data on waste management facilities for hazardous waste and landfills was carried out in 1998 among the member countries and regions represented in the ETC/W (Austria, Denmark, Ireland, Baden Württemberg and Catalonia). Thus, core data like location, type of recovery or disposal operation (R/D-codes), type of waste (European Waste Catalogue, EWC) and capacity was collected.

As a result of the data collection it was concluded that there were some difficulties with reporting according to the R/D codes for classification of type of recovery/disposal operations and for using the EWC for classification of type of waste. The list for recovery/disposal codes are at present unclear with a common understanding among member countries. The same situation applies for the European Waste Catalogue, where not all member countries have fully implemented the EWC for national use.

Based on the test collection of core data in 1998 and the identified problems, core data is intended to be collected from all member countries during 1999. In addition an extended data set will be developed. The extension could include:

- Waste flow data (input and output of treatment plants),
- Pollution control systems for emissions,
- Data on transboundary movement of hazardous waste,
- Data on reporting obligation on waste management facilities for the EU member countries according to EU directives

## 8. Waste management practices

The problems related to waste generation and management have attracted increasing political attention in the last decade. The interest has focused both on the direct environmental problems related to treatment of waste and on the wider implications of establishing a sustainable society with an increased efficiency in the use of natural resources. Within the Community, a Strategy was initially set up 10 years ago, giving highest priority to waste prevention followed by material recovery, energy recovery and safe disposal. The Strategy has been supplemented by a number of legal provisions at Community level. At present, however, the general trend across Europe is towards an increasing amount of waste, putting pressure on additional or alternative measures to be taken.

During 1998 the ETC/W took the initial steps in order to support the development of waste prevention and waste management strategies. The overall aim is to provide documentation on how waste management are practised across member countries, thus securing an exchange of information between member countries. The intention is to provide a number of electronic catalogues as a tool for policy makers and others. Catalogues will be provided within the following areas:

### *Waste management institutions and clean technology centres*

The primary aim of this catalogue is to guide people in need of both general and specific technical information to the right institution. Thus, the idea is not only to give basic information about a certain institution but also to provide more detailed information on which activities are performed and which publications and databases are available. The aim is thus to list relevant institutions, describe their basic organisation and give information on which type of information can be accessed from the institution.

### *Waste management plans*

The catalogue will contain an electronic list dealing with all the Waste Management Plans delivered and notified to the Commission. In the catalogue the plans will be linked with core data such as the national code, the level for the competent authority, the type of waste (hazardous waste, non-hazardous waste and packaging waste) and the year of adoption, notification and validity of the plan. Furthermore, the catalogue will contain abstracts of selected plans. The abstracts will be based on key words related to the Framework Directive on Waste, national legislation and other kinds of instruments.

### *Competent authorities*

The objective of this catalogue is to give a comprehensive overview of the competent authorities relating to directive defined tasks in the member countries. This directly reflects parts of the Framework Directive on Waste.

The Directive states a number of different tasks to be fulfilled by the member countries (planning, permits, inspection, registration of waste collectors and brokers etc.) in reality a large number of different authorities can be involved in each member State. As these different tasks may be divided further according to the waste type the initial scope of the task includes a quite detailed survey of the administrative structures of the member countries.

### *Waste management and waste prevention strategies and instruments*

The objective of this catalogue is to give a full description of the actual situation concerning waste management and waste prevention practices and strategies in the member countries. The catalogue covering waste management strategies and instruments is designed to be a central tool for later analysis of waste management and waste prevention practices in the EU. The analysis will centre around a comparison of the goals set in both EU strategy and national strategies and try to identify successes and shortcomings of the present policies applied.

#### 8.1. Initiatives

During 1998 a survey on existing information was carried out, and a structure for the various catalogues was developed and finalised as can be seen in the Technical Report on "Catalogues on Waste Management Practice" to be published in 1999. The challenge for 1999 will be to collect all necessary information in order to fill in the catalogues. The information will be provided partly by the use of questionnaires, partly by personal interviews.

## 9. Common data model on waste

In order to optimise the use of the data component contained in the various products produced by the ETC/W the structure of an integrated set of data on waste flow and waste management in Europe including a common agreement on nomenclature, classifications and code lists was developed during 1998. The Technical Report on an overall data model for ETC/W, to be published in 1999, describes the common data model.

The main objectives for developing a common data model for ETC/Waste are:

- to put forward a proposal for a common “view of the real world” based on the DPSIR assessment framework adopted by EEA (**D**iving forces, **P**ressure, **S**tate, **I**mpact, **R**esponse);
- to describe an overall information model covering the various tasks of the topic centre;
- to analyse the possibilities to link data across the tasks by identifying a set of common dimensions and their classifications.

The point of making a “real world model” concerning waste and waste management is to ensure a common nomenclature and a common understanding of the entities, relations and interactions related to the subject field. Furthermore, such a model may contribute to an awareness of what is included and what is omitted in the scope of the topic centre.

Likewise, the purpose of making an overall information model for the tasks of ETC/W is to describe how the tasks are or should be logically linked to one another. The model is accompanied by an analysis of the common dimensions relevant for the subject field. The common dimensions are the “points of view” making it possible to link data across task subjects, e.g. the overall use of NUTS as a common code list for administrative regions within the EU, makes it possible to combine data from all catalogues at a spatial level.

Besides the temporal and spatial dimension (time and location), especially the category waste type is an important binding factor between most task catalogues. To work with a common waste category type seems to be one of the major challenges of the common data model, because there exist a number of different national waste classifications.

During 1999 the common data model, or WASTEBASE, will be implemented gradually. First of all the data base components of the model will be programmed, followed by an input of data step by step once these data have been compiled.

## 10. First annual workshop of the ETC/W

A first annual EIONET workshop on waste was held in Copenhagen in September 1998. The workshop was attended by representatives from 17 EEA member countries, DGXI, Eurostat, Secretariat of the Basel Convention, the EEA, and ETCs on Air Emissions and Inland Waters.

The workshop was organised in two sessions where the participants in smaller groups discussed the most important common waste management problems in the European Union and the kind of information and output from the ETC/W that could best serve as an inspiration and useful information for the national waste management policy.

### 10.1. Conclusions of the workshop

There was a common understanding that one of the main waste management problems in Europe is the lack of a uniform system for classifying waste followed by the lack of homogenous reliable data and information on waste. At present problems arise when political initiatives are supposed to be based on objective assessments of the actual waste generation and management in the member countries and in EU. Thus, due to defective reporting to authorities and to differences in definitions of waste, the comparison of data from one country to another is complicated.

Another major issue was the increasing waste quantities. The problem is at present at the top of the political agenda, and is supported by consumers. A general agreement was reached that clean technology and waste minimisation are the only ways to solve the problem. However, despite all good wills and adopted waste strategies, progress is difficult to track. Thus, the gap between the political agenda and the real world seems to be large. More often than not the cheapest waste treatment solution is preferred to a less environmentally damaging and more resource saving treatment.

There was a general agreement that the present work of the ETC/W is supporting the identified problems, in particular the work on comparability of waste data and information.

# 11. Support to EU policy framing and implementation

A Community Strategy for Waste Management was initially adopted by the Commission in 1989. The strategy sets out four strategic guidelines: Prevention, recycling and reuse, optimisation of final disposal and regulation of transport, together with a number of recommended actions. The main strategic guidelines were maintained in the 1996 review of the Community Strategy, adding, however, a particular focus on three main problem areas: i) scarcity of quantified information and the inefficient collection and transmission of comparable data by the member countries together with a lack of efficient Community procedures and systems based on the specific priorities and standardised definitions; ii) inadequate implementation of Community legislation at national level; and, iii) delays in adopting more sophisticated environmental measures, such as economic instruments and voluntary agreements, to encourage increased responsibility among producers and consumers.

The ETC/W work programme is directed towards the main problems of the Community Waste Strategy, aiming at providing the Commission and member countries with the necessary improvements of the knowledge base required in order to implement the Strategy efficiently. As part of this work, the ETC/W is seeking close co-operation with Commission staff in the Environment Directorate and in Eurostat as well as in the Secretariat of the Basel Convention. Thus, frequent meetings are arranged with these institutions, including regular participation in Commission Working Groups on behalf of EEA, participation in Commission steering committees on tender projects and ad-hoc support on various items as part of Commission policy framing and implementation.

## *Quantified information*

Preparation of efficient Community waste legislation and subsequent monitoring and enforcement of adopted legislation requires a thorough knowledge of the developments in waste generation and waste treatment in all member countries. Thus, with inconsistent data, legislative initiatives as well as monitoring and enforcement of existing legislation is deemed to be less efficient.

This conclusion is not only valid in relation to statistics on waste generation and waste treatment, but also in relation to waste treatment facilities. Indeed, a thorough knowledge about available treatment facilities is a prerequisite for setting realistic and achievable targets on the various waste management options like material recycling and incineration with energy recovery, taking into account the required time for planning and necessary investments in the member countries. In addition, the information would support the requirements of the Framework Directive, according to which the member countries shall take appropriate measures to establish an

integrated and adequate network of disposal installations thereby enabling the Community as a whole to become self-sufficient in waste disposal.

The ETC/W is tackling the majority of these problems as part of its work related to waste statistics and waste treatment facilities. Thus, during 1998 the ETC/W has contributed to the expected proposal for a Council Regulation on Waste Statistics, commented on the OECD/Eurostat 1998 questionnaire and the further development of this questionnaire. Ad-hoc support has been provided to DGXI on various items.

#### *Support to implementation of community legislation*

The ETC/W contributes to implementation of Community Regulations with transparent information on how waste management is practised across member countries, hopefully securing an exchange of information which could facilitate an appropriate implementation and enforcement of Community waste legislation, including the drawing up of one or more waste management plans.

At present the ETC/W is pursuing this aim within the work done on waste management practices, expecting to establish a number of databases containing pertinent information on among others waste management and cleaner technology strategies and policies in the various member countries. With this information exchanged between member countries, the basis of actual knowledge and information should be improved significantly, facilitating the drawing up of waste management plans in member countries. The work is closely co-ordinated with the Commission, and discussion between EEA/ETC and Commission are continuing on how ETC/W can contribute to assessing implementation of adopted Community waste legislation.

#### *More sophisticated measures*

Communications have been adopted by the Commission on voluntary agreements, economic instruments and, recently, a competitive recycling industry. Apart from the political pressure put on the Commission, the initiatives should be seen as an attempt to create a more effective combination of regulatory and market based measures in order to achieve the overall aim of the Waste Strategy.

The ETC/W is presently dealing with related items as part of the work on waste management practices. Thus, the work on waste management strategies and clean technology schemes is expected to some extent to provide an overview of measures not currently covered by regulatory instruments.

With the Commission Communication on a competitiveness of the recycling industry, a Recycling Forum will be established in 1999 in order to i.a. assess the key factors of competitiveness and identify the most appropriate mix of actions to be taken. Actions to be developed should

focus mainly on the proper functioning and the creation of new markets, the improvement of economic structures and innovation. The Forum will be made up of all interested parties, primarily companies involved in the various phases of recycling, the consumer products and equipment manufacturing industries, as well as representatives from environmental and consumer organisations. It will also include the public administrations, both national and at Community level. The Agency as well as the ETC/W will participate in the Forum.

## 12. Products

A number of products were delivered to the EEA during 1998, many of which will be finalised for publication in 1999:

- Chapter on waste generation and management, including all data sets, as a contribution to the EEA 1998 state-of-the-environment report;

### **Technical reports:**

- the development of a methodology for making projections of selected waste streams;
- a main structure for listing information from member countries about municipal waste and household waste;
- a main structure for listing information from Austria, Catalonia, the Basque Region, Denmark, Germany and Ireland on hazardous waste;
- comparability and non-comparability in relation to definitions, classifications and terminology for all main categories used in the description of waste generation of municipal waste and household waste;
- hazardous waste factors, their derivation and application and on the experiences made;
- dangerous substances in waste (interim and final draft);
- dangerous substances in waste, including the study of major methods for treatment of waste and the selection of a number of dangerous substances and relevant waste streams for further analysis;
- existing data and databases on waste management facilities, including a consolidated concept for the construction of a database;
- collected and recorded data on waste management facilities, including a proposal for further activities;
- the design of databases on waste management and waste minimisation;
- an overall data model for ETC/W;

In addition, the following products are expected to be published during 1999:

- public web site giving general information about the ETC/W and the main results of work;
- report on a consolidated data set on municipal waste/household waste covering all EEA member countries;
- launching of a WASTEBASE database containing detailed data and information on all relevant waste management issues covered by the ETC/W. The WASTEBASE will be established and reviewed continuously, reflecting the progress of work.

## 13. ETC workplan 1999

EVENT/ACTIVITY	EVENT DATE	RESPONSE DEADLINE	EXPECTED OUTPUT	OUTPUT DATE
<b>Workshop</b>				
Annual workshop	Sep/Oct 1999		Proceedings	Oct/Nov
<b>Country visit to:</b>				
Selected NRCs - general issue	3-8/1999		Missions reports	One month after visit
All NRCs - information on waste management strategies and plans	3-12/1999			
<b>Questionnaires/request</b>				
Questionnaires on core data on waste management facilities	3/1999	7/1999	Status report	12/1999
Request for information and data on hazardous waste from 1993-1996 according to the Hazardous Waste List (All countries except AU, IE, ES, DK & DE)	8/1999	9/1999		
Information on waste minimisation and clean technology centres	6-8/1999	8-10/1999	Part of WASTEBASE	2000
Information on waste minimisation strategies	6/1999	9/1999	Part of WASTEBASE	2000
<b>Draft report for review</b>	<b>Final drafts to EEA:</b>		<b>Expected output for NRC's comments</b>	
Harmonised data set, municipal and household waste	5/1999		Topic report	6/1999
Existing information on substitution, good housekeeping etc., on dangerous substances in waste	10/1999		Technical report	11/1999
Harmonised data set, hazardous waste (AU, IE, ES, DK & DE)	10/1999		Topic report	11/1999
Model for calculating waste arising from end-consumer goods	12/1999		Technical report	1/2000
Definition on extended data set on waste management facilities	12/1999		Technical report	1/2000
Strategies and instruments for organic waste in relation to the forthcoming Landfill Directive	12/1999		Topic report	1/2000
<b>Other main output</b>				
Waste management plans	7/1999		Catalogue*	2000
Data on waste minimisation and clean technology centres in AU, IE, ES, DK & DE	7/1999		Catalogue*	2000
Overview of waste prevention and clean technology strategies and instruments in AU, IE, ES, DK & DE	10/1999		Catalogue*	2000
Overview on competent authorities	10/1999		Catalogue*	2000
Data on waste management strategies and instruments for organic waste	10/1999		Catalogue*	2000

- Catalogue = Part of WASTEBASE

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## 15. List of primary contact points and national reference centres for waste

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Note: National Reference Centres are the Primary Contact Points except where the National Focal Point (NFP) is included in the list.