

# **Inventory of existing information on recycling of selected waste materials**

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# Summary

The European Topic Centre on Waste and Material Flows for DG Environment has carried out a survey on the available information on recycling of selected materials. The materials covered by the survey are plastic, paper, aluminium, steel, glass, rubber, inert waste and textiles.

The statistics for the eight materials is unbalanced. For materials such as plastic and paper detailed information is available on many aspects of consumption, waste generation and treatment, while only sporadic data is found for steel and inert waste. However, for six of the eight materials adequate data is available and it has been possible to present a status of the generation and handling of the particular waste material.

Table 1 summarises the main findings of the survey. Inert waste in the form of construction and demolition waste is probably the largest waste stream among the eight materials in kg per capita. However, due to lack of harmonised data it is not possible to prepare good indicators on the EU waste generation. Among the six materials for which data on consumption/waste generation is available, steel and paper make up the largest proportion of materials, and rubber and aluminium are the smallest proportion.

As regards waste management high recycling and recovery rates have been achieved for paper, metals, glass and rubber. Plastic has the lowest recycling rate due to the fact that the technical and economic barriers to recycling are very high for this material.

It is not possible on the basis of the information on current recycling rates to conclude anything about future recycling potentials for the listed materials.

**Table 1. Summary of main figures**

Material	Year	Consumption Per capita/year	Waste generation/ consumption	Recycling rate	Recovery rate	Main sectors
Plastic	2002	95 kg	56%	15%	38%	Households
Paper and cardboard	2002	205 kg	96%	56%	56%	-
Aluminium	2002	22 kg	-	84% <sup>1)</sup>	84%	Transport, building and packaging
Steel	2003	412 kg. <sup>2)</sup>	-	55% <sup>3)</sup>	55% <sup>3)</sup>	
Glass	2002	38 kg.	83% <sup>4)</sup>	59%	59%	Packaging
Rubber <sup>5)</sup>	2003	7 kg	-	47%	73%	Transport
Inert waste	-	-	-	-	-	Building
Textile waste	-	-	-	-	-	Households

"-" = Not available

1) Recycling of transport, building and packaging as ratio of consumption (and not waste generation)

2) Production

3) Metal packaging including aluminium

4) Packaging glass only

5) Tyres only

# 1. Introduction and methodology

## 1.1. Introduction

In the framework of the development of a potential material-based recycling policy as part of the EU Thematic Strategy on the Prevention and Recycling of Waste, DG Environment has requested the European Topic Centre on Waste and Material Flows (hereinafter: the Topic Centre) to draw up an inventory of the latest published information concerning the recycling of paper, plastics, rubber, metals, glass, textiles and inert materials. This includes publications by Eurostat, EU Member States, trade associations and other organisations such as NGOs.

The aim of this report is to provide background statistics that are a prerequisite for setting up targets in the strategy.

The report has the form of a status report giving information on accessible data. It furthermore creates an overview of areas where no statistics are available.

## 1.2. Data collected

For each material, the information collected will as far as possible include the following:

- yearly consumption of the material
- break-down of the quantity of the material consumed in main product groups
- estimated yearly arisings of waste
- break-down of the quantity of the waste material in main product groups/waste flows
- yearly recycling of the waste material and, where possible, estimation of the flows going to other waste treatment options
- break-down of the amounts recycled (product groups, waste flows)
- information on past and future trends, if available

## 1.3. Boundaries

The search for data has been limited to available statistics at European level.

The data covers in most cases EU Member States + Norway and Switzerland (which are often the countries represented in European industrial organisations). Acceding countries are only included in a few cases as data not is available for more than one or two years (or not comparable to previous time series).

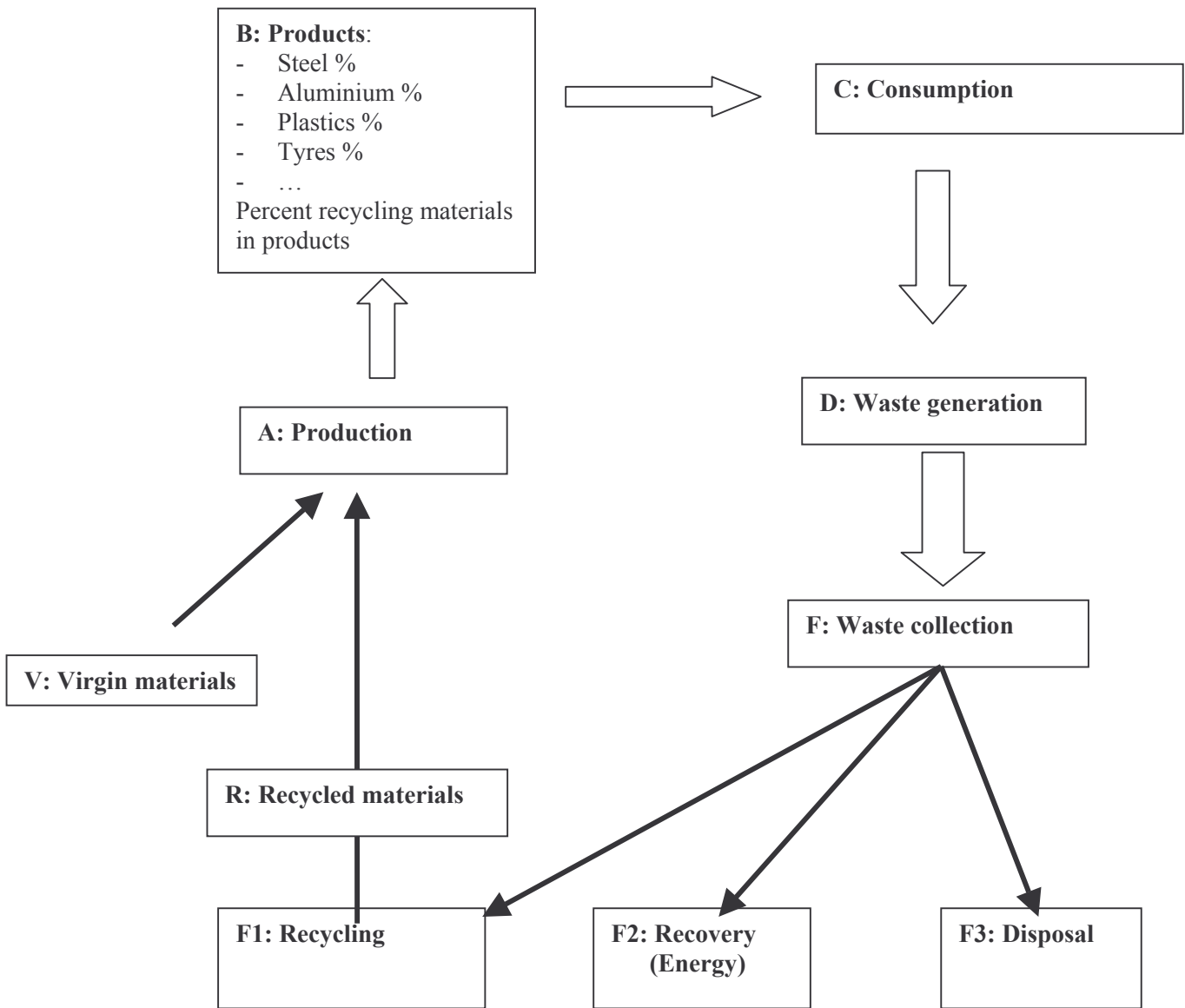
## 1.4. Methodology for data collection

- A search for data on the internet has been carried out, and a number of European industrial organisations have been invited to provide available statistics. Information was received from CEPI, BLIC, FEVE, PlasticsEurope, CPIV and ETRA. See annex A for a full list of organisation from which statistics have been requested.
- No search for data has been carried out from EPAs and statistical offices of the Member States. This is based on the assumption that available information will be reported through Eurostat, DG Environment or European industrial organisations. For the same reason we did not ask for information through Eionet.
- Baseline year is 1990 if available.
- Time series are for each year from 1990 onwards if available in electronic format.

For a number of products with short lifetime waste generation can be anticipated as equal to consumption. For other products this is not so easy (e.g. building up infrastructure and for some products emissions during use will jeopardise this anticipation).

Often waste generation and collection is expressed as equal. Waste statistics in the EU are mostly linked to the collection of waste, meaning that the exact generation is not known.

The material flow is illustrated in the flow chart on next page.



This flow chart is simplified and does not include all steps in the circuit of materials for recycling. Further specifications will be different from one material to another. The flow chart illustrates the possibilities for estimation of recycling activity and ideally to relate the recycling figures to one of the formulas below.

- $F_1 \cdot 100 / F$  = Recycling percentage of collection
- $F_1 \cdot 100 / D$  = Recycling in percent of generation
- $F_1 \cdot 100 / B$  = Recycling in percent of products placed on market
- $R \cdot 100 / (R + V)$  = Recycling as percentage in products, *Under the assumption of equal loss in production using either virgin materials or recycled products.*

## 2. Materials

The materials covered by this survey are plastic, paper, aluminium, steel, glass, rubber, inert waste and textiles. In this section the available information for each material will be presented. The background data for the figures can be found in Annex C.

The data availability for the eight materials is unbalanced. For materials like plastic and paper detailed information can be found on many aspects of consumption, waste generation and treatment while only few data is found for steel and inert waste. However, for six of the eight materials useful data was found and it is possible to present a status of the generation and handling of the particular waste material. An overview of data availability is given in Table 2.

Good data availability is not a guarantee for data comparability and like many other surveys on waste data this report has also encountered the problem that statistical data for some waste materials does not seem to be based on the same definitions and/or methodology of data collection in all countries.

Although not fully comparable between countries, one of the best data sets available is on packaging waste which reflects the fact that this data is collected in pursuance of the EU Directive on Packaging and Packaging waste (94/62/EC). The statistics on packaging materials (glass, paper/cardboard, plastics and metals) seem to be well in place for all EU Member States. Data is provided to the Commission for the years 1997 to 2001 on generation, collection, recovery, recycling and disposal of the respective materials.

**Table 2. Overview of data availability**

	Plastics	Paper	Aluminium	Steel	Glass (packaging)	Rubber (tyres)	Inert other materials	Textiles
<b>Yearly consumption of material</b>	✓	✓	✓	(✓)	✓	✓		
<b>Consumption by product groups/sector</b>	✓		✓	(✓)		✓		
<b>Yearly waste arisings</b>	✓	✓			✓	✓	(✓)	
<b>Waste arisings by countries</b>	✓	✓	✓	(✓)	(✓)	✓		
<b>Consumption/waste arisings by product groups</b>			✓					
<b>Treatment (total waste stream)</b>	✓	✓			✓	✓		
<b>Treatment (by products)</b>		✓	✓	(✓)				

✓= available

(✓)= partly available

### 2.1. Plastics

#### 2.1.1. Data availability

The Association of Plastics Manufacturers in Europe, PlasticsEurope, provides statistics on plastic consumption, waste generation and treatment in Western Europe (EU-15 + Norway and Switzerland). PlasticsEurope has statistics on a detailed level distributed on the different types of plastics and products. The statistics are published annually.

The data presented on plastic and plastic waste is based on the following sources:

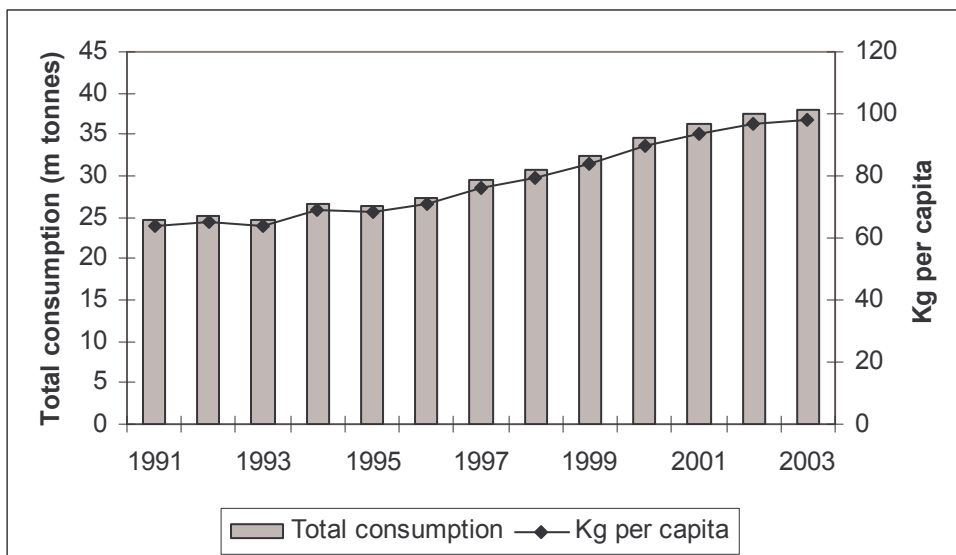


- PlasticsEurope website
- PlasticsEurope (2002): Plastics. An analysis of plastics consumption and recovery in Europe. European overview 2000 data
- PlasticsEurope (2003): Plastics. An analysis of plastics consumption and recovery in Europe
- DG Environment: Data reported by EU Member States on packaging waste generation and management in pursuance of the Directive on Packaging and Packaging waste (94/62/EC)

### 2.1.2. Plastic consumption, waste generation and treatment

The consumption of plastic in Western Europe from 1990 to 2003 is presented in Figure 1. In this period the consumption has increased by 55% from approx. 25 m tonnes to approx. 38 m tonnes. This is 3.46% per year on average. In the same period the consumption per capita has increased from 64 kg to 98 kg per year.

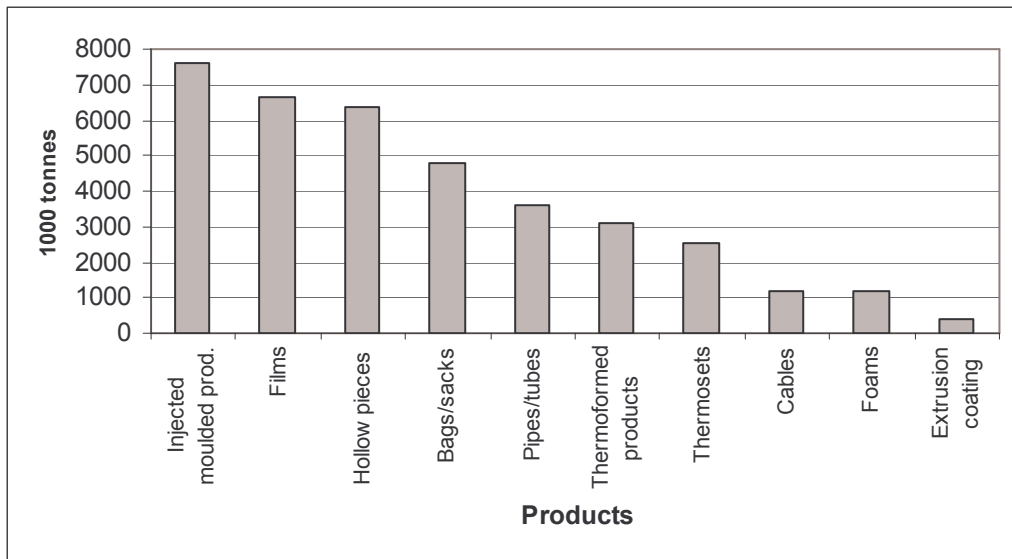
**Figure 1. Total plastic consumption and kg per capita, 1991-2003**



Source: PlasticsEurope (2004): Plastics. An analysis of plastics consumption and recovery in Europe 2002 & 2003

The plastic consumption distributed on products can be seen in Figure 2. Injected moulded products, thermosets and films account for nearly half of the plastic consumed.

**Figure 2. Plastic consumption in Western Europe by products, 2002**

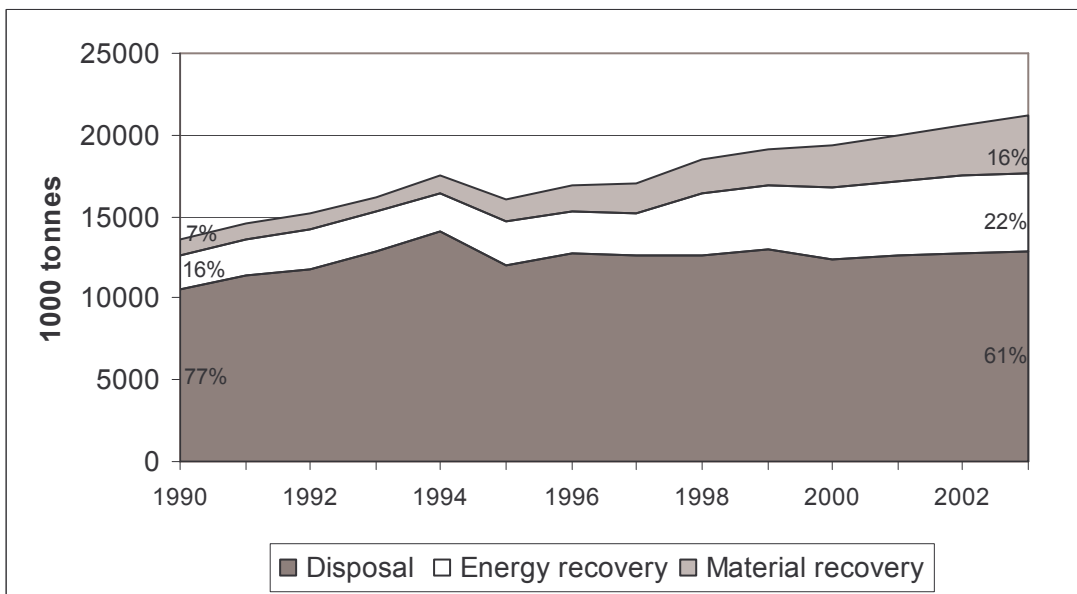


Source: PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

The management of plastic waste has improved much from 1990 to 2003 as appears from Figure 3. The recycling rate has more than doubled from 7 to 16%, and also the rate of energy recovery has increased from 16 to 23%.

Despite a drop from 77% to 61%, disposal remains the principal treatment method for plastic waste. Despite the decreasing disposal rate, the amounts of plastic waste going to landfills have actually increased from 10.5 to 12.9 m tonnes (+23%) in the period. This means that the improvements achieved in management of plastic waste have not been sufficient to outbalance the growth in total plastic waste generation.

**Figure 3. Plastic waste generation and treatment in Western Europe, 1990-2003**



Sources: PlasticsEurope, 1996:Plastics. A material choice for the 21st century. Plastic consumption and recovery in Western Europe 1996; and PlasticsEurope, 2003: An analysis of plastics consumption and recovery in Europe; and PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

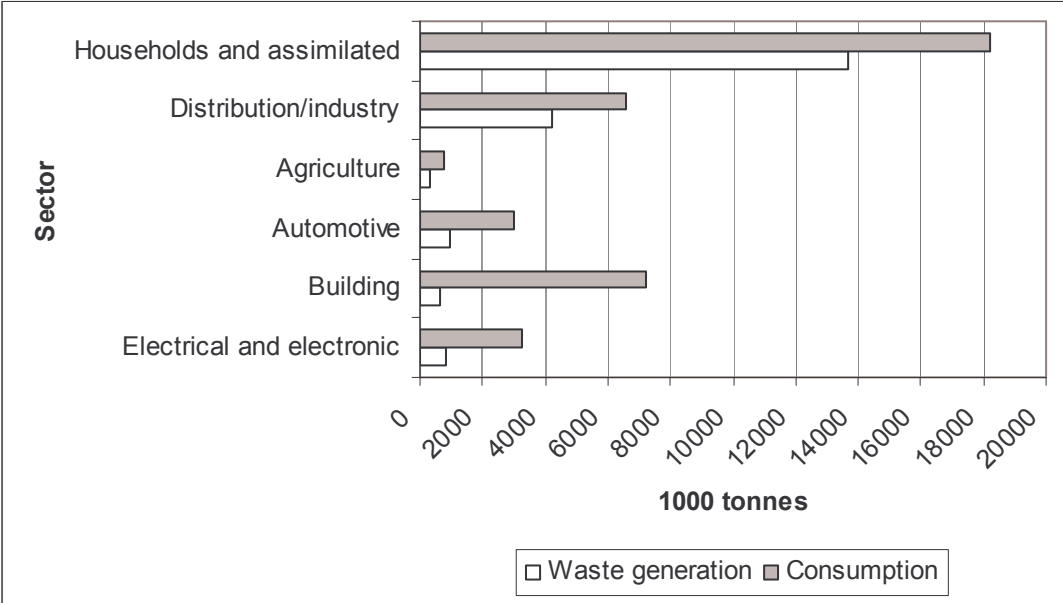
Plastic consumption and waste generation by economic sectors can be seen in Figure 4. Households is the sector with the highest final consumption of plastic, followed by Building and Distribution/Industry.

It appears that the final consumption of plastic in all sectors is considerably higher than the plastic waste generation. Whereas the final plastic consumption was approximately 39 m tonnes, the waste generation was about 21 m tonnes in 2002. Especially, the sectors Agriculture, Automotive, Building and Electrical/electronic have very low waste ratios, which reflects the fact that plastic products consumed in these sectors typically have a life span longer than one year. Contrary to this Households and Distribution/industry have high waste ratios due to the fact that packaging waste is a main product in these sectors.

According to PlasticsEurope packaging accounted for 38.1% of the total plastic consumption in 2002.<sup>1</sup> The share of packaging waste in the total plastic waste generation can be seen in Figure 5. In 2001 packaging waste made up 54% of the plastic waste generation.

Nearly all packaging waste origins from Households and assimilated (7.3 m tonnes) and Distribution and industry (3.4 m tonnes). The quantity of non-packaging waste from households and distribution/industry is about 6 m tonnes. This includes for example pails, trays, pots, furniture, shoes, toys, etc. However, there is no information on the exact quantities of the various products.

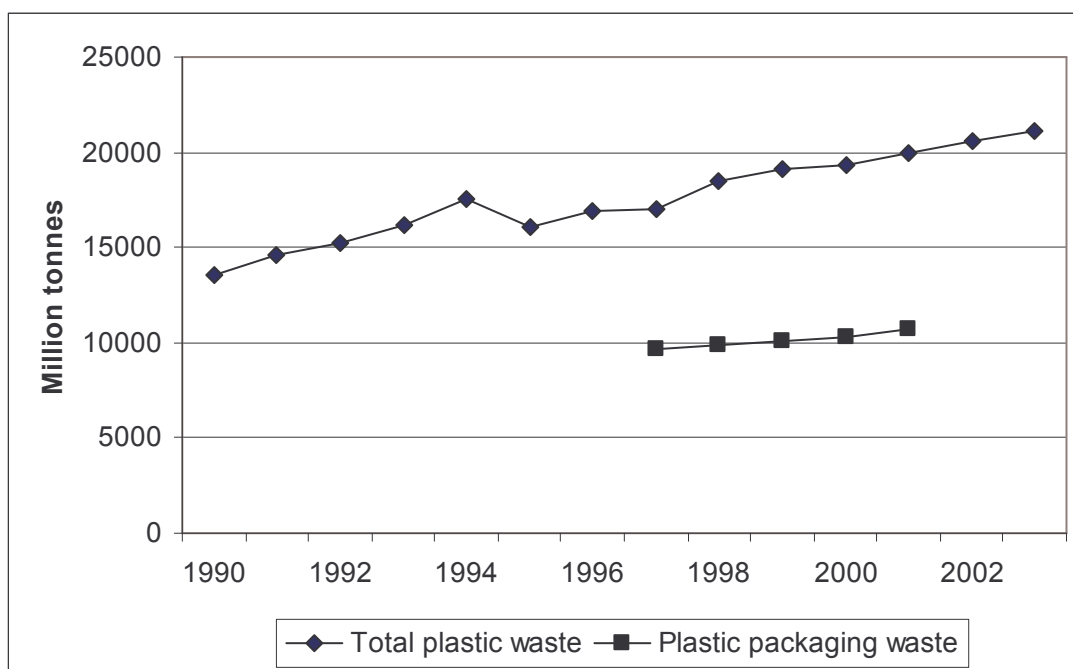
**Figure 4. Plastic consumption and waste generation by sector, 2002**



Source: PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

<sup>1</sup> APME: Plastics. An analysis of plastics consumption and recovery in Europe

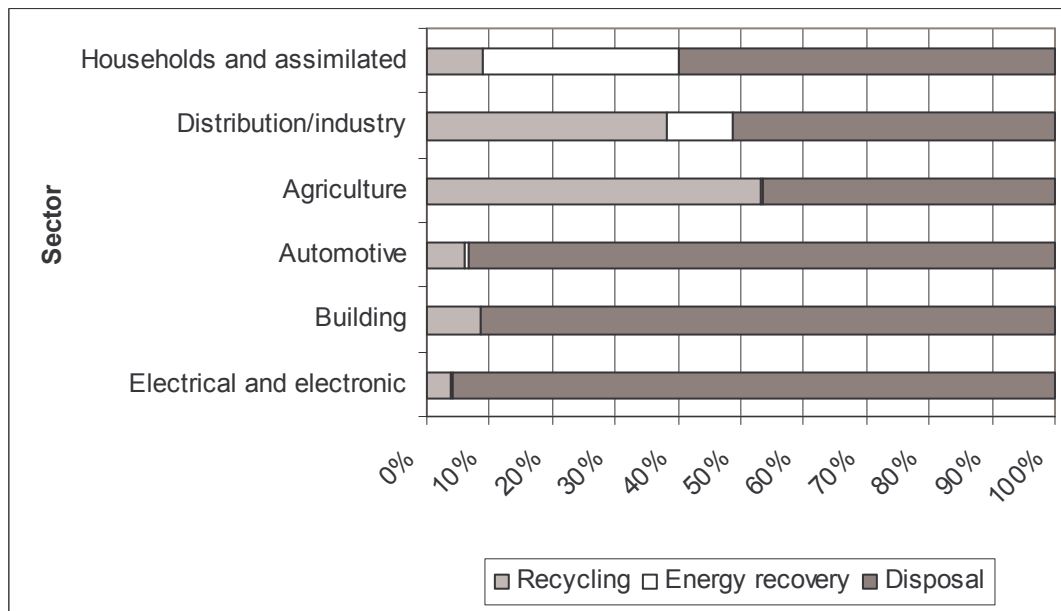
**Figure 5. Total plastic waste and plastic packaging waste in Western Europe, 1983-2002**



Sources :Total plastic waste: PlasticsEurope, 2003: An analysis of plastics consumption and recovery in Europe; Packaging waste: DG Environment; and PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

As can be seen in Figure 6 the highest recycling rates for plastic are found for waste from Agriculture and Distribution/industry. However, the sector's contribution to the total plastic waste generation is only 2%. The figure also shows that the recycling rates are lowest for plastic from households and WEEE. Approximately 30% of plastic from household is incinerated, which indicates the prevalence of this treatment method for mixed household waste.

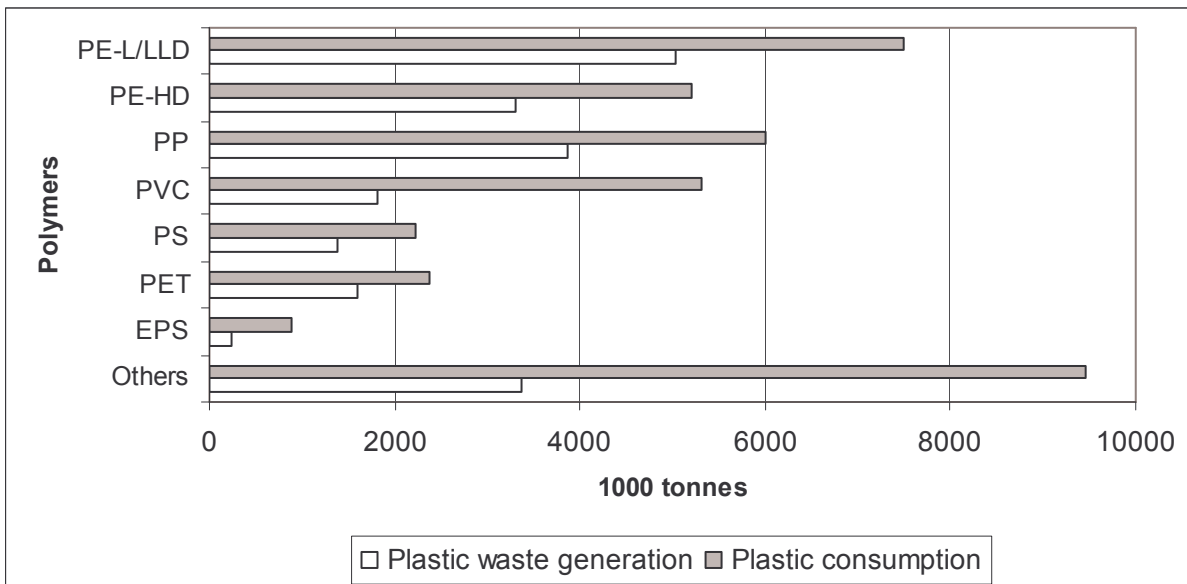
**Figure 6. Plastic waste management by sector, 2002**



Source: PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

In Figure 7, plastic consumption and waste generation are broken up on the various polymers. PE is the commonest plastic material followed by PP and PVC. The highest waste ratios are found for PET and PS which is due to the fact that these materials are mainly used for packaging.

**Figure 7. Plastic consumption and waste generation by polymers, 2002**

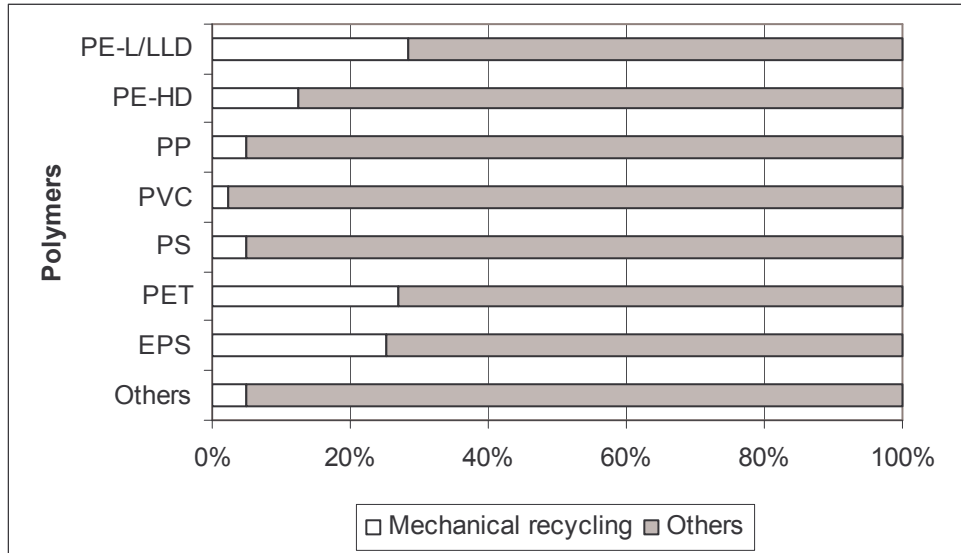


Source: PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

Note: PE= Polyethylene; PP=polypropylene; PVC= Polyvinyl chloride; PS=Polystyrene; PET= Polyethylene Terephthalate; EPS=Ekspandable polystyrene

According to Figure 8 the recycling rates are highest for PE-L/LLD, PET and EPS (all over 20%) and lowest for PVC. PVC waste often has a high concentration of heavy metals and specific formulas are used for the various PVC products. Together, this makes mechanical recycling of PVC more difficult than other polymers.

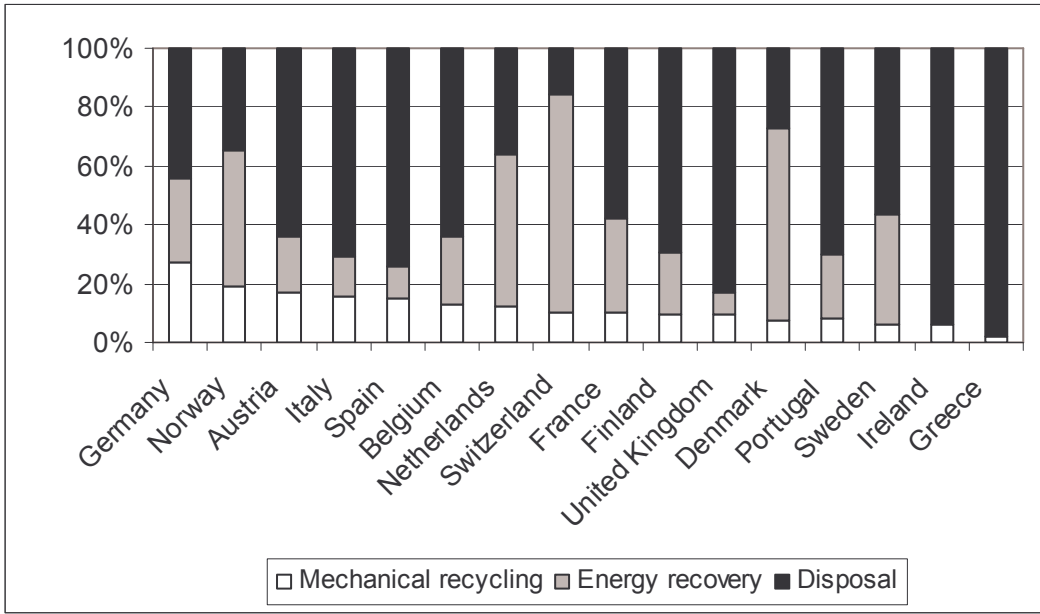
**Figure 8. Mechanical recycling of plastic waste by polymers, 2002**



Source: PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

In Figure 9 the management of plastic waste in the Western European countries can be seen. The highest recycling rates are found in Germany, Norway and Austria (17-27%) while only little plastic waste is recycled in Greece (2%). Switzerland and Denmark have the highest incineration rates (65-75%) and thus the lowest landfill rates (15-27%). Greece and Ireland have the highest landfill rates (94-98%).

**Figure 9. Management of plastic waste by country, 2002**



Source: PlasticsEurope (2004): Information system on plastic waste management. European overview. 2002+2003.

**2.2. Paper and cardboard**

**2.2.1. Data availability**

The Confederation of European Paper Industries, CEPI, provides statistics on paper consumption, waste generation and treatment in Western Europe (EU-15 + Norway and Switzerland). CEPI has statistics on a detailed level distributed on the different paper products. The statistics are published annually.

The data presented on paper and paper waste is based on the following sources:

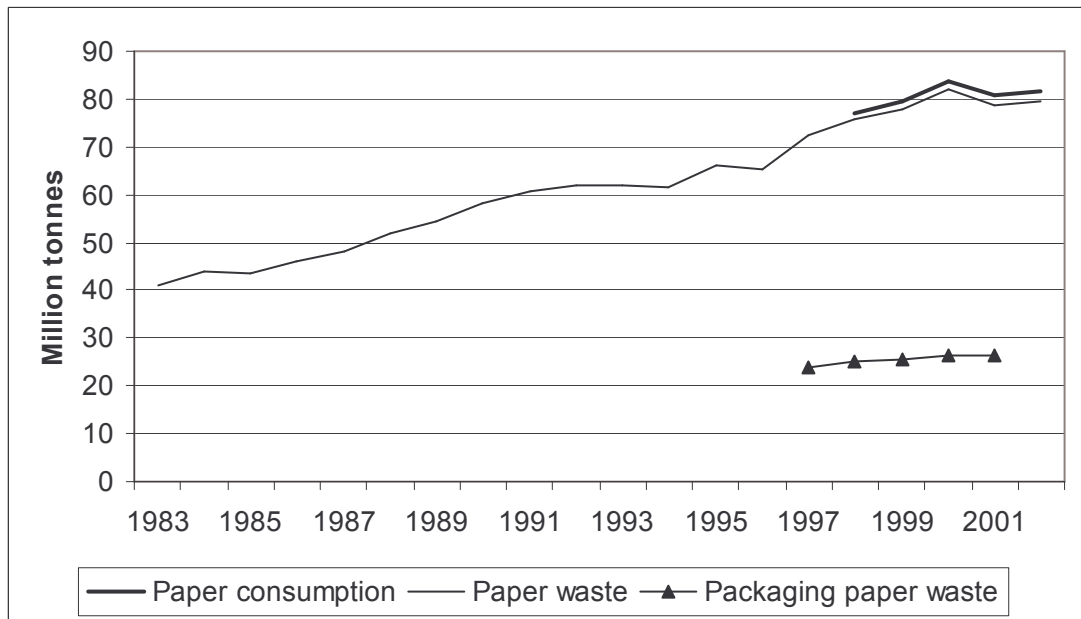
- CEPI's website (Confederation of European Paper Industries)
- CEPI (2003): Special Recycling 2002 Statistics, October 2003
- DG Environment: Data reported by EU Member States on packaging waste generation and management in pursuance of the Directive on Packaging and Packaging waste (94/62/EC)
- World Bank
- NewCronos – the Eurostat's reference database
- Wastebase – the Topic Centre's internet database on waste

**2.2.2. Paper consumption, waste generation and treatment**

Figure 10 shows the consumption of paper, paper waste generation and packaging paper waste. The paper waste generation constitutes 97-98% of the paper consumption in the years 1998-2002. This indicates that most paper products have a very short life span.

Packaging waste makes up approx. one third of the total paper waste generation. As can be seen the generation of waste paper has nearly doubled from 41 m tonnes in 1983 to 79 m tonnes in 2002.

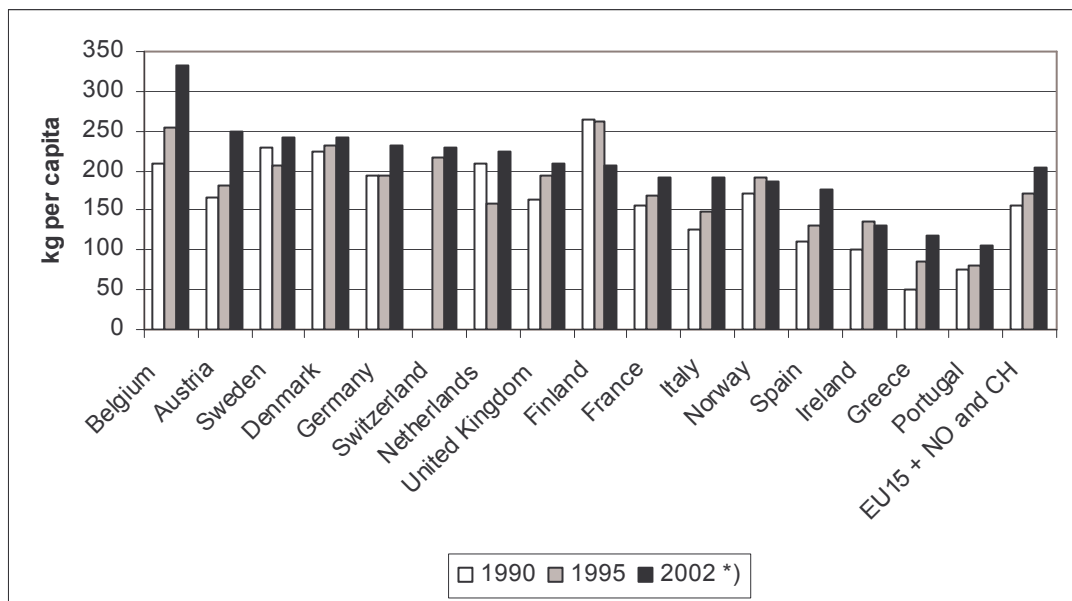
**Figure 10. Paper consumption, paper waste and packaging paper waste in Western Europe, 1983-2002**



Source: CEPI, New Cronos, DG Environment and Wastebase

The paper waste generation per capita and country can be seen in Figure 11. Except from Finland all countries have increasing waste generation from 1990 to 2002. Norway and Ireland have experienced a minor drop in waste generation per capita from 1995 to 2002. Belgium has the highest waste generation per capita while Ireland, Greece and Portugal have the lowest.

**Figure 11. Generation of paper waste per capita in the Western European countries, 1990-2002**



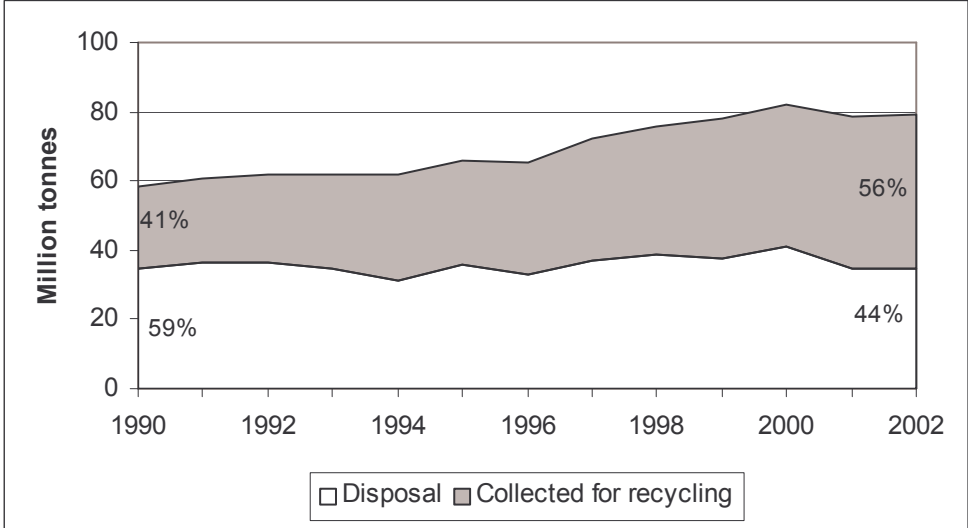
Source: CEPI, New Cronos, Wastebase, World Bank

\*) Based on population data for 2000



The treatment of paper waste in Western Europe has improved over the last decade. Figure 12 shows that the rate of paper waste collected for recycling has increased from 41% in 1990 to 56% in 2002. However, this has not led to a reduction of the quantities of paper waste for incineration and landfilling which has remained stable at approx. 35 m tonnes per year.

**Figure 12. Management of paper and cardboard packaging waste in Western Europe, 1990-2002**



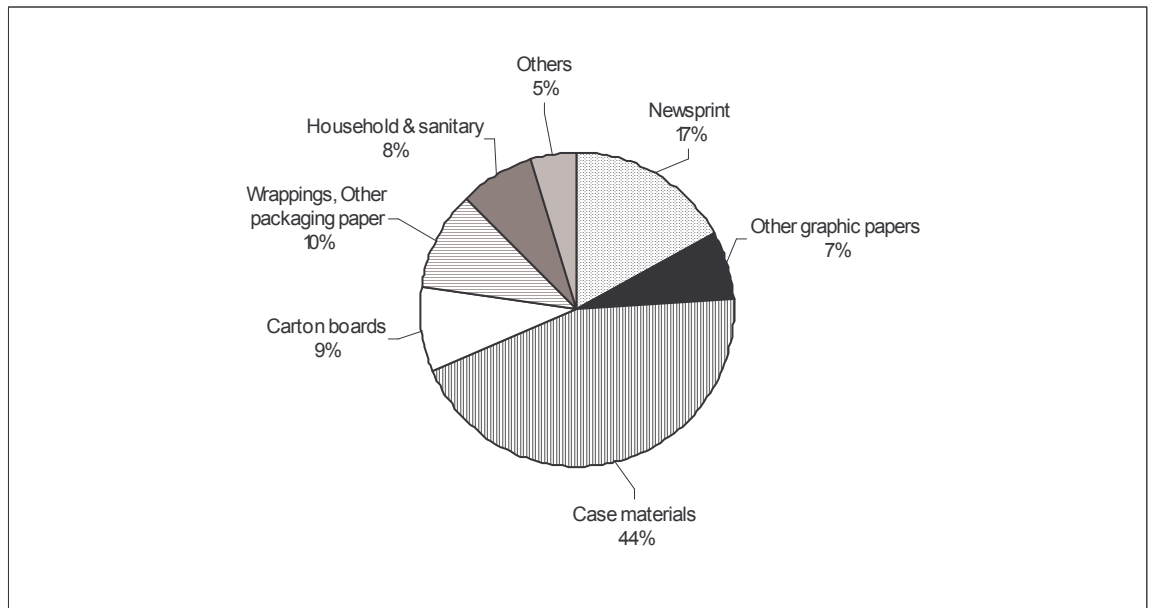
Source: CEPI, New Cronos, Wastebase

Figure 13 shows the utilisation of recycled paper in various products. Almost three-quarters of the collected paper and cardboard are used for case materials<sup>2</sup> or newsprint. CEPI states that all newsprint mills in Europe are based on recovered paper. However, the utilisation rate for recycled paper in tissue is decreasing. For graphic paper the availability of top quality paper is scarce and the benefits of using recovered paper are often low.<sup>3</sup>

<sup>2</sup> Case material = papers and boards mainly used in the manufacture of corrugated board.

<sup>3</sup> CEPI (2003): Special Recycling 2002 Statistics, October 2003

**Figure 13. Recycled paper utilisation by products in Western Europe, 2002**



Source: CEPI, 2003

## 2.3. Aluminium

### 2.3.1. Data availability

The European Aluminium Association (EAA) provides statistics on production based on virgin and recycled materials.

Further, the EAA has statistics on selected products, per capita use in Western Europe and statistics on aluminium beverage can recycling in Europe. The statistics are published annually.

The data presented on aluminium is based on the following sources:

- EAA's website
- EAA (2004): Results of the EAA Survey on Sustainable Development Indicators, preliminary report
- World Bank
- NewCronos – the Eurostat's reference database
- Wastebase – the Topic Centre's internet database on waste

### 2.3.2. Aluminium consumption and treatment

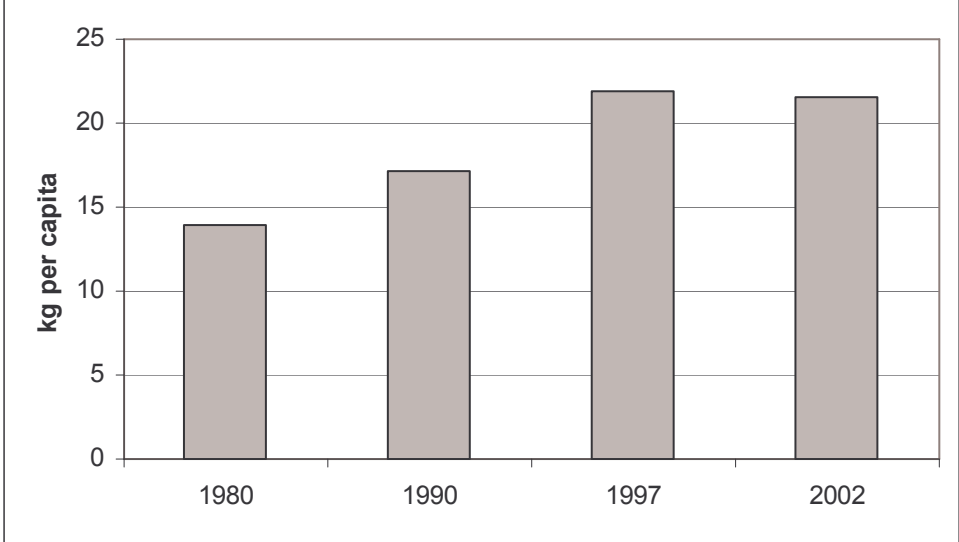
In 2002 the total aluminium consumption in Western Europe (EU-15 + Norway and Switzerland) was 8.86 m tonnes.<sup>4</sup> The quantity of recycled aluminium in Europe was 3.6 m tonnes<sup>5</sup>. It has not been possible to estimate or find information on total aluminium waste generation and overall recycling rates. EAA's statistics does not include this information and few countries have reported data on aluminium waste to Eurostat. However, recycling rates for specific products is presented below.

<sup>4</sup> Source: EAA (2003): Market report 2002

<sup>5</sup> Bob Lambrechts, EAA , email 7 April 2004.

As can be seen in Figure 14 the consumption of aluminium per capita in Western Europe has increased from about 14 kg to 22 kg between 1980 and 2002. This is 2% per year on average.

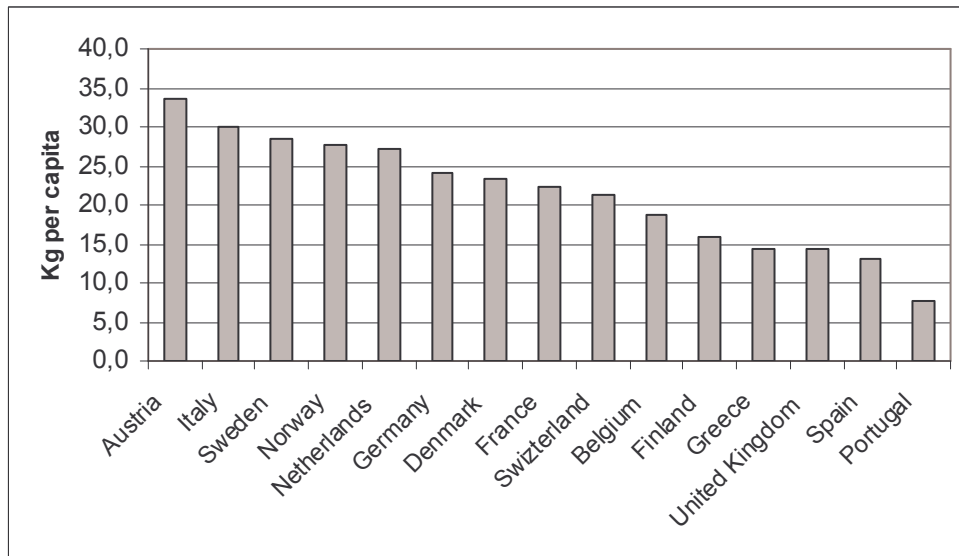
**Figure 14. Aluminium consumption per capita in Western Europe**



Source: EAA (2004): Results of the EAA Survey on Sustainable Development Indicators, preliminary report

In Figure 15 the generation per capita is distributed on countries. Austria has the highest consumption per capita (nearly 34 kg) while Portugal consumes less than 10 kg per capita per year.

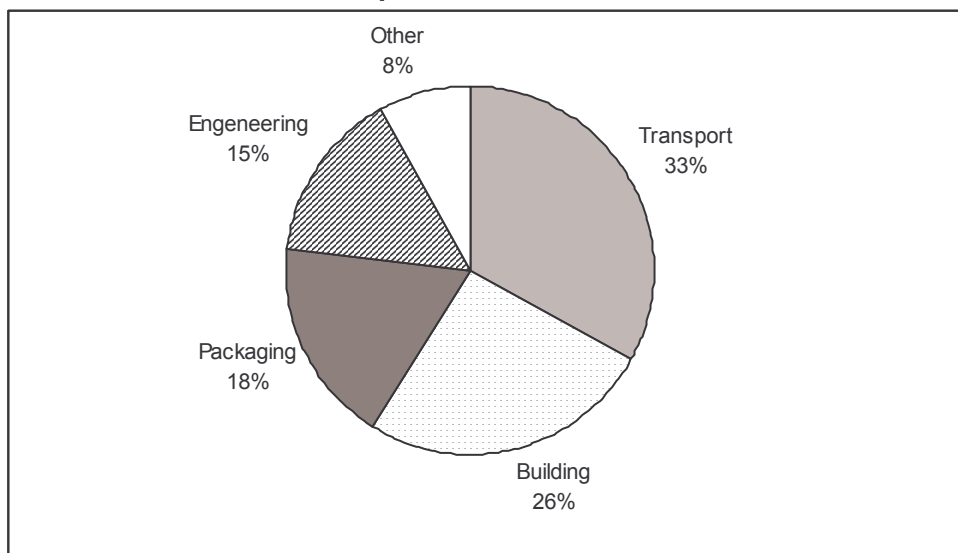
**Figure 15. Aluminium consumption per capita in selected Western European countries**



Source: EAA, NewCronos and World Bank

The utilisation of aluminium in products can be seen in Figure 16. The automotive and construction sectors consume about 60% of total aluminium in Europe, and packaging accounts for 18%. Packaging is likely to constitute a much larger share of the aluminium waste generation as most other aluminium products have a longer life span than packaging.

**Figure 16. End users for aluminium (rolled, extruded and cast) in Western Europe, 2002**



Source: EAA (2004): Results of the EAA Survey on Sustainable Development Indicators, preliminary report

The following three tables show the consumption and recycling rate (the percent of waste recovered for recycling compared with the total available quantity) for aluminium used in three products. Cars and buildings are products which typically have a long lifetime. As

can be seen the consumption of aluminium for these products is increasing, which indicates that consumption is much higher than the waste generation. Due to the high market value of aluminium and the relative easiness of collecting aluminium waste from cars and building, the recycling rate is very high – between 92 and 98%.

Also the market share for aluminium cans is increasing and the same is the recycling rate. However, the recycling rate is only half the size of cars and building due to the fact that collection is more challenging and less profitable.

**Table 3. Consumption and recycling of aluminium in cars**

<b>Automotive</b>	<b>1997</b>	<b>2002</b>
<b>Aluminium use in cars (kg/vehicle)</b>	85	117
<b>Aluminium recycling – automotive</b>	-	95%

Source: EAA (2004): Results of the EAA Survey on Sustainable Development Indicators, preliminary report

**Table 4. Consumption and recycling of aluminium from buildings**

	<b>1997</b>	<b>2002</b>
<b>Aluminium use buildings (m tonnes)</b>	1.63	2.11
<b>Aluminium recycling – building</b>	-	92-98%

Source: EAA (2004): Results of the EAA Survey on Sustainable Development Indicators, preliminary report

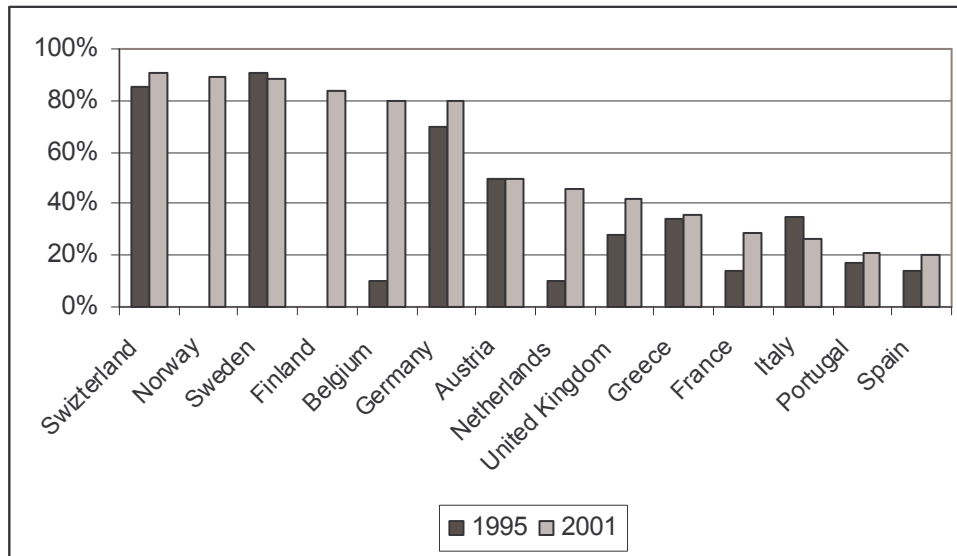
**Table 5. Consumption and recycling of aluminium cans**

	<b>1997</b>	<b>2002</b>
<b>Aluminium cans market share</b>	45%	50%
<b>Aluminium recycling – cans</b>	40%	46%

Source: EAA (2004): Results of the EAA Survey on Sustainable Development Indicators, preliminary report

The development in the recycling rates for cans by country is illustrated in Figure 17. Six countries recycle 80% or more of the aluminium cans while a few countries recycle only 20%. Apart from Italy and Sweden all countries have increased the recycling rate between 1995 and 2001.

**Figure 17. Recycling rate for aluminium cans by countries, 1995 and 2001**



Source: EAA

## 2.4. Steel

### 2.4.1. Data availability

The European Confederation of Iron and Steel Industries (EUROFER) – produces statistics on crude steel production in the EU Member States.

In addition to this, the Association of European Producers of Steel for Packaging (APEAL) produces statistics on steel packaging recycling rates in the EU Member States. For some countries it is not possible to differentiate steel packaging from metal packaging.

The data presented on steel is based on the following sources:

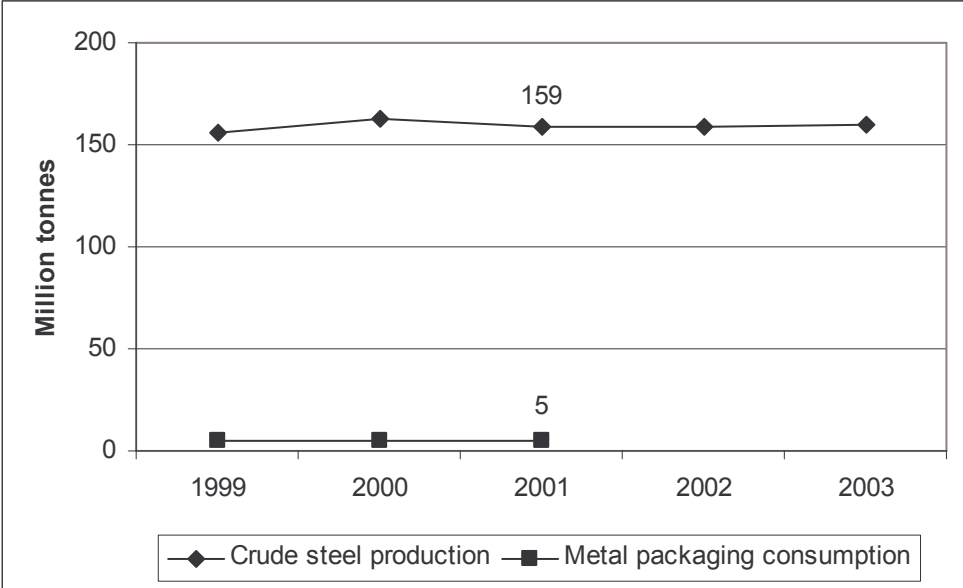
- EUROFER's website
- APEAL's website
- Correspondence with APEAL
- DG Environment: Data reported by EU Member States on packaging waste generation and management in pursuance of the Directive on Packaging and Packaging waste (94/62/EC)
- Wastebase – the Topic Centre's internet database on waste

### 2.4.2. Steel consumption, waste generation and treatment

In 2003, 160 000 tonnes of crude steel were produced in the EU (18% of the world-wide crude steel production). This equals to 412 kg per capita. As can be seen from Figure 18 the crude production has been quite stable in EU-15 from 1999 to 2003. However, it is important to emphasise that the production is not the same as consumption. This is due to the fact that a proportion of the production is exported as part of new products while the EU at the same time imports good containing steel.

For comparison the steel *packaging* consumption is also presented in Figure 18. The packaging steel consumption is about 3% of the European steel production.

**Figure 18. Crude steel production and metal packaging consumption in EU-15, 1999-2003**

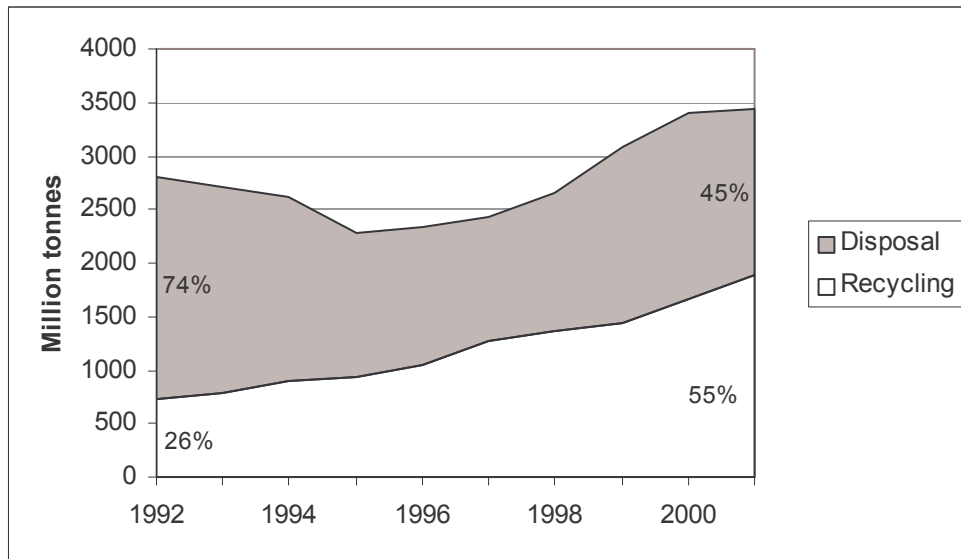


Source: EUROFER and DG Environment

The generation, recycling and disposal of steel packaging is presented in Figure 19. From 1992 to 2001 the generation has increased by 22% despite a minor decrease in the mid-1990s. An increasing part of the steel packaging is recycled. From 1992 to 2001 the rate has more than doubled from 26% to 55%. The disposal rate has decreased from 74 to 45% and also the quantities of steel packaging sent to disposal have decreased in the period.

The recycling data from APEAL does not vary much from the data on metal packaging waste reported to DG Environment in pursuance of the packaging directive. The difference is that the APEAL data includes Norway and Switzerland and to the extent possible only includes steel packaging.

**Figure 19. Generation, recycling and disposal of packaging metal in EU, 1992-2001**



Source: APEAL

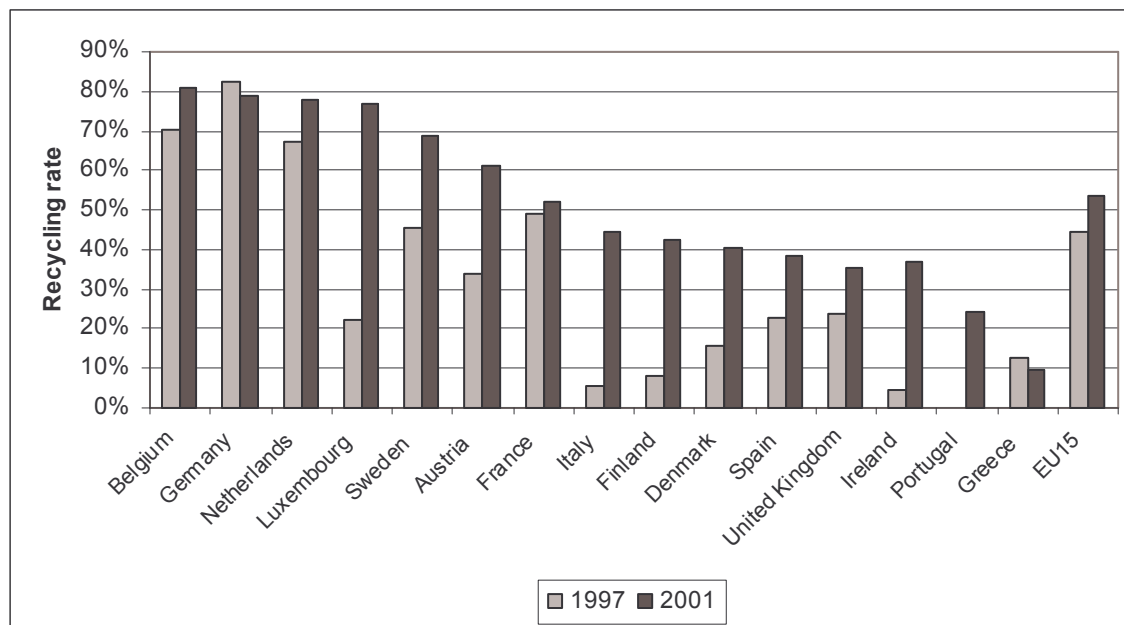
Note: Disposal is calculated based on information on recycling rate and recycled quantities

Based on data from DG Environment and APEAL Figure 20 shows the recycling rate for metal packaging in the various countries. Metal packaging includes aluminium, but for most countries the aluminium rate in metal packaging is limited.

Except from Germany and Greece all EU countries have increased the recycling rates from 1997 to 2001. The highest rates are found in Belgium and Germany with about 80%. Portugal and Greece have the lowest recycling rates. EU as a total reached in 2001 a recycling rate of 54%.



**Figure 20. Metal packaging recycling rate by country, 1997 and 2001**



Sources: EU-15: DG Environment

## 2.5. Glass

### 2.5.1. Data availability

The European Container Glass Federation, FEVE, provides statistics on glass packaging waste generation and treatment in EU-15. The statistics are published annually. Data on total glass production and consumption is provided by the Standing Committee of the European Glass Industries (CPIV), which is the European umbrella association that deals with common issues of the glass sector as a whole.

The data presented on glass and glass waste is based on the following sources:

- FEVE (European Container Glass Federation), Glass Gazette 29 October 2003.
- Correspondence with FEVE
- CPIV (Standing Committee of the European Glass Industries)
- DG Environment
- Wastebase – the Topic Centre's internet database on waste

### 2.5.2. Glass consumption, waste generation and treatment

Glass is used for a number of products of which packaging is the most important followed by flat glass. As can be seen in Table 6 the apparent consumption of glass in EU-15 was 28 500 tonnes in 2003.

The consumption of packaging glass (container glass) is by CPIV estimated to 17 746 tonnes or 62% in 2003. However, according to FEVE this figure represents the consumption of empty glass containers while the 'real' consumption is that of filled glass packaging. FEVE estimates the packaging glass consumption in 2002 to 14.7 m tonnes which is considerably less than the apparent consumption<sup>6</sup>. Furthermore, FEVE advises

<sup>6</sup> Email from Andrew Somogyi, Secretary General, FEVE, 15 June 2004.

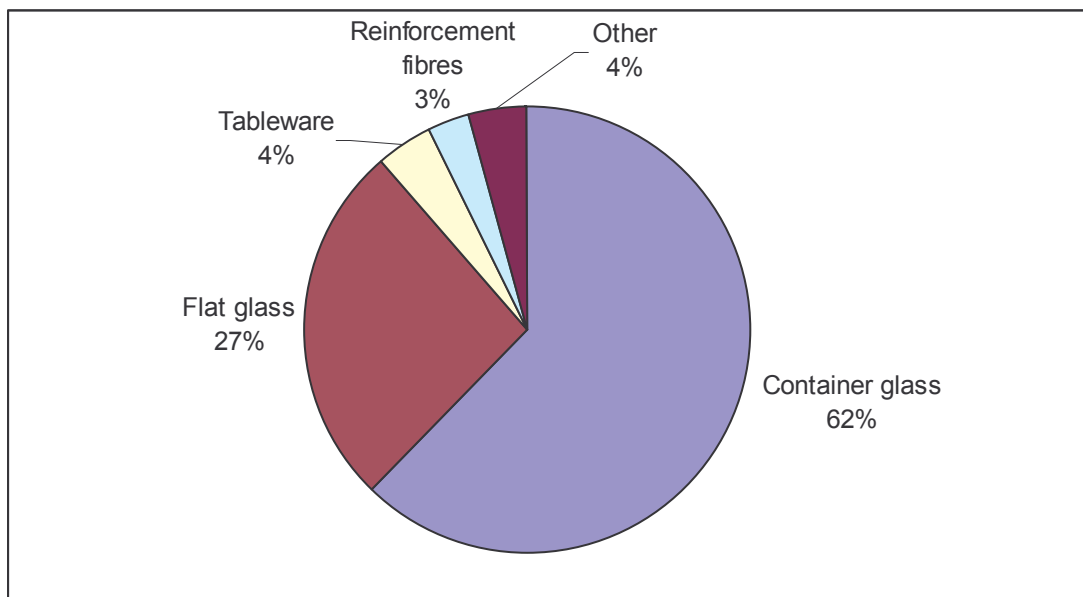
caution with regard to the comparison of apparent consumption figures for different glass products as the consumption time frames differs greatly.

**Table 6. Consumption of glass by glass types in EU-15, 2003**

	Container glass	Flat glass	Tableware	Reinforcement fibres	Other	Total
<b>Apparent consumption (1000 tonnes)</b>	17,746	7,565	1,212	851	1,171	28,545

Source: CPIV, 2004

**Figure 21. Consumption of glass by glass types in EU-15, 2003**

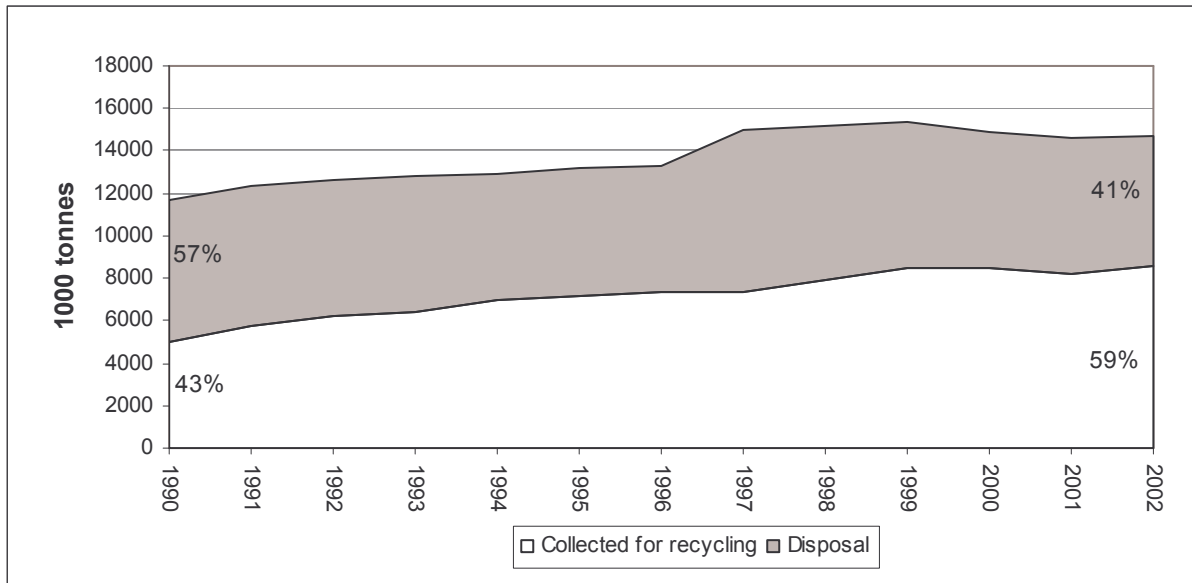


Source: CPIV, 2004

The generation and treatment of packaging glass waste in the EU is shown in Figure 22. The waste generation has increased by 26% from 1990 to 2002, or 2% per year. The recycling rate has increased from 43% in 1990 to 59% in 2002 while the disposal rate has decreased from 57% to 41%. In quantities the disposal has decreased by 600 000 tonnes or 9% in the period.

The total glass packaging waste generation in the EU in 2002 was about 15 m tonnes or 38 kg per capita.

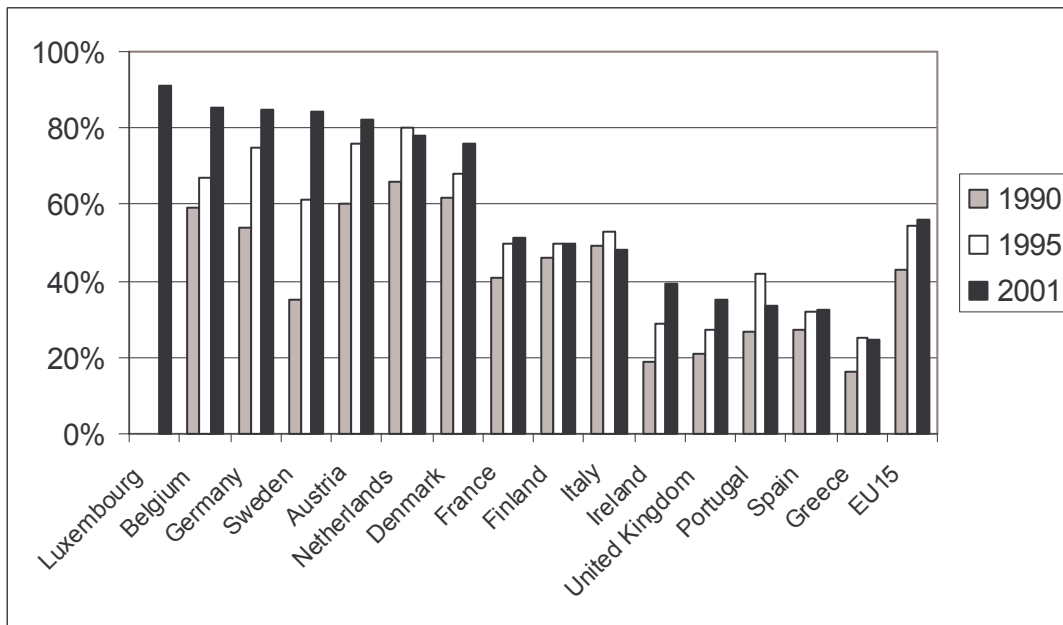
**Figure 22. Packaging glass waste generation and treatment in EU-15, 1990-2002**



Sources: FEVE, Wastebase, DG Environment

Packaging glass recycling distributed on countries is presented in Figure 23. Except from Italy all countries have increased the recycling rate from 1990 to 2001, but in countries like the Netherlands, Portugal and Greece a slight decrease in the recycling rate can be seen from 1995 to 2001. Five countries have recycling rates exceeding 80%.

**Figure 23. Packaging glass recycling by country, 1990-2001**



Sources: FEVE, Wastebase, DG Environment

## 2.6. Rubber

There is no data on total rubber consumption in EU-15<sup>7</sup>. The total primary rubber consumption in the EU-15 is estimated to about 4 m tonnes per year, but that does not take in import/export of rubber products. An increasing percentage of tyres used in the EU are imported from other regions.<sup>8</sup>

The most important industrial sector for natural and synthetic rubber is the automotive industry, which is estimated to use about 60% of world rubber output in tyres alone and another 15% in non-tyre automotive products. Other markets include latex materials, hosing, sealants, etc.<sup>7</sup>

Amongst all rubber products, end-of-life tyres will be the only product covered under this section. When used tyres are taken off vehicles, they become 'part-worn tyres'<sup>9</sup> or 'end-of-life tyres'<sup>10</sup>.

### 2.6.1. Data availability

Statistics on end-of-life tyres management in the enlarged Union are collected and published annually by the European Association representing the tyre industry i.e. BLIC (European Association of the Tyre/Rubber Industry), and ETRA (the European tyre recycling association)

The data presented on end-of-life tyres is based on the following sources:

- ETRA's website and correspondence
- BLIC's website and correspondence

### 2.6.2. End-of-life tyres arisings and management

The total end-of-life tyres arisings and management in EU-15 can be seen in Table 7. The generation of end-of-life tyres has increased by 9% from 1998 to 2002. In 2003, the end-of-life tyres arisings in the EU25 is estimated to 3 m tonnes or about 6.5 kg per capita.<sup>11</sup>

An increasing part of the end-of-life tyres is recovered. In total 35% was retreaded or recycled in 2002 while the figure in 1992 was only 26%. Landfilling has decreased from 50% to 26%. Energy recovery has increased from 14% to 27%.

In 2002, 74% of tyres were recovered and the rate of 80 % recovery is expected to be reached in 2004.<sup>12</sup>

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<sup>7</sup> Email from Fazilet Cinaralp, Secretary General, of the BLIC, 15 June 2004

<sup>8</sup> European Tyre Recycling Association (2004): Post-consumer tyres in the European Union

<sup>9</sup> The part-worn tyre is a tyre, which is reusable, as a second-hand purchase or re-usable after reprocessing (retreading). It can be reused as it is for its original purpose when a residual tread depth remains. Otherwise it can be reprocessed under a procedure whereby new tread is vulcanised on-to the casing and it becomes a retreaded tyre.

<sup>10</sup> As listed in the EU List of Waste under code 16 01 03, the end-of-life tyre is a non-reusable tyre in its original form. It enters a waste management system based on product /material recycling, energy recovery or goes to landfill (only allowed until 2006)

<sup>11</sup> BLIC, 2003.

<sup>12</sup> BLIC, 2003.

**Table 7. End-of-life tyres arisings and management in EU-15**

	1992	1998	2000	2002
<b>Arising (1000 tonnes)</b>		2,500	2,625	2,729
<b>Retreading %</b>	22	16	10	11
<b>Material recycling %</b>	4	14	21	24
<b>Energy recovery %</b>	14	26	24	27
<b>Export %</b>	10	12	15	12
<b>Final Disposal</b>	50	32	30	26

Source: BLIC, 2003.

As can be seen in Table 8 many countries are not landfilling tyres any longer and the recovery rate has reached 100%. Material recycling exceeds 75% in Finland and Denmark.

**Table 8. End-of-life tyres arisings and management by country, 2002**

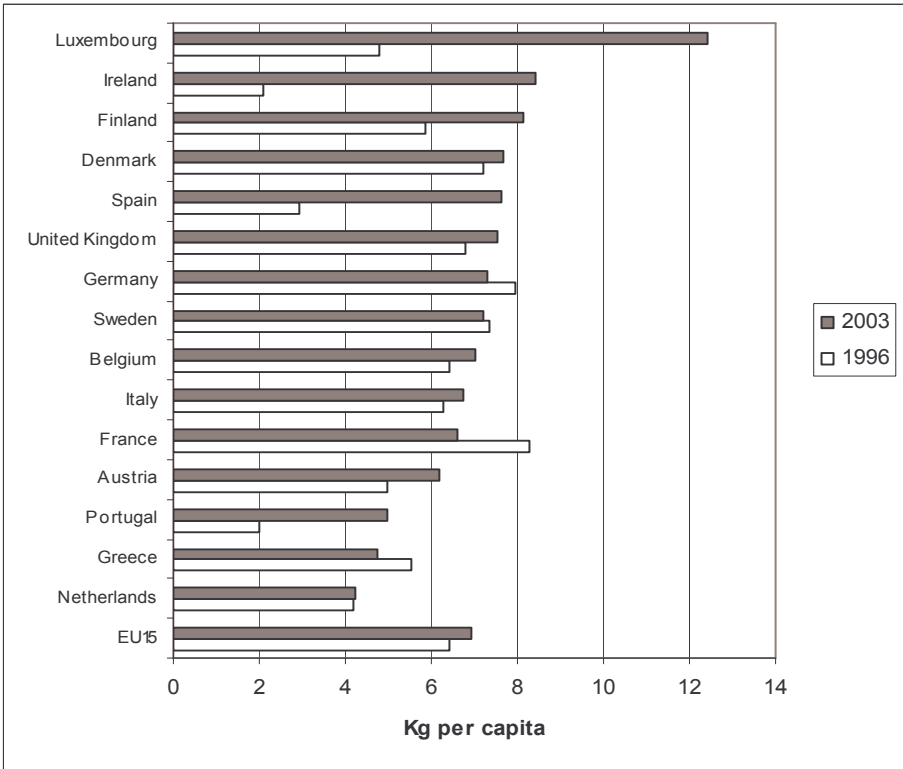
	Arisings (1000 t)	Reuse/ Export (%)	Retreading (%)	Material Recycling (%)	Energy recovery (%)	Landfill (%)	Recovery rate (%)
<b>Austria</b>	55	0	0	46	54	0	100
<b>Belgium</b>	75	5	4	23	31	37	63
<b>Denmark</b>	43,5	0	9	76	15	0	100
<b>Finland</b>	37	0	3	97	0	0	100
<b>France</b>	390	10	14	33	19	24	76
<b>Germany</b>	578	12	10	18	52	8	92
<b>Greece</b>	50	6	3	14	3	74	26
<b>Italy</b>	360	7	14	14	33	32	68
<b>Netherlands</b>	35	85	0	15	0	0	100
<b>Portugal</b>	50	0	30	40	16	14	86
<b>Spain</b>	263	4	14	8	10	64	36
<b>Sweden</b>	76	16	4	35	45	0	100
<b>United Kingdom (est.)</b>	485	18	10	32	10	30	70
<b>Hungary</b>	40	8	0	4	23	65	35
<b>Poland</b>	101	0	15	8	27	50	50
<b>Switzerland</b>	53	40	2	30	28	0	100

Source: BLIC, 2003.

The end-of-life tyres per capita in the EU-15 countries and the Central and Eastern European countries can be seen in Figure 24 and Figure 25. Among the EU Member States only Germany, Sweden, France and Greece have been able to reduce the waste generation per capita. The highest generation per capita is seen in Luxembourg; three times higher than the Netherlands that has the lowest waste generation per capita.

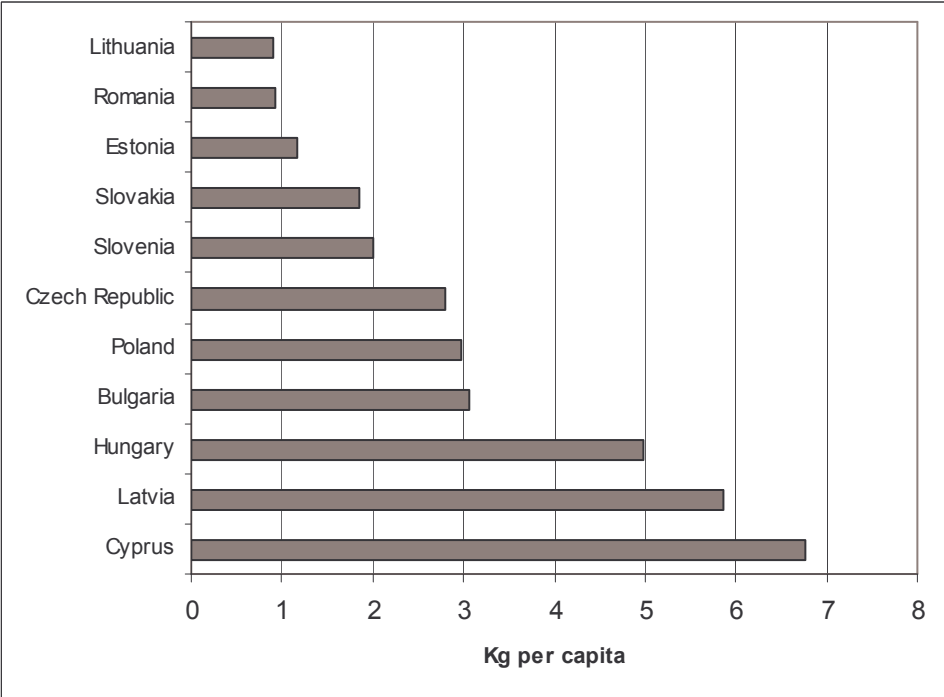
The end-of-life tyres arisings in the CEE countries is generally much lower than in the EU-15. Only Cyprus, Latvia and Hungary have a waste generation similar to the least waste producing EU Member States.

**Figure 24. End-of-life tyres arisings by country (EU-15)**



Source: European Tyre Recycling Association, 2004.

**Figure 25. End-of-life tyres arisings by country – Acceding and accession countries**



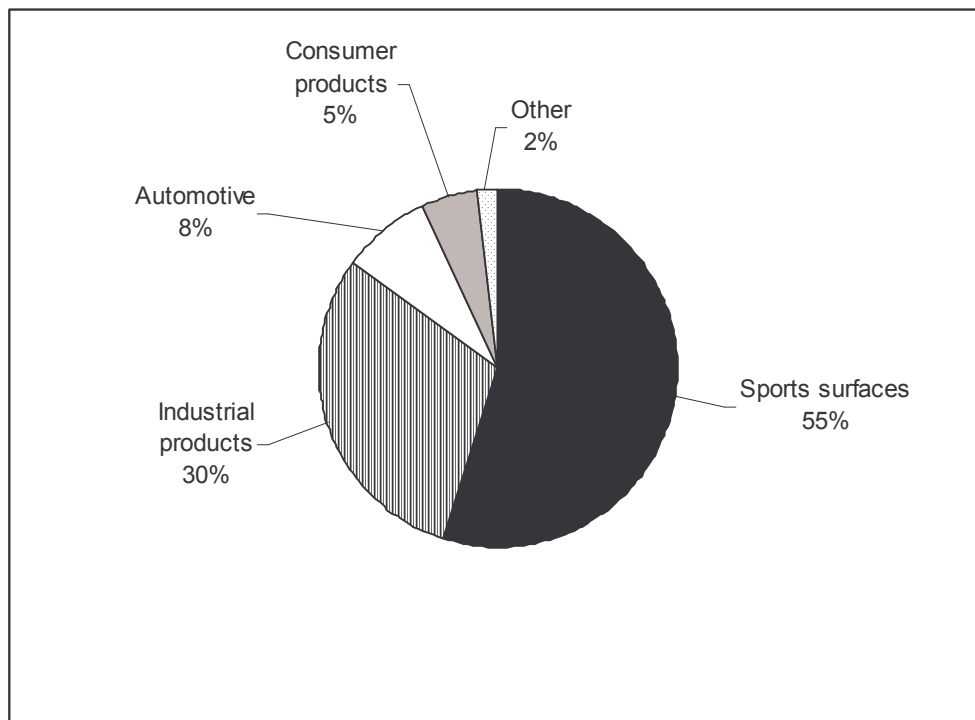
Source: European Tyre Recycling Association, 2004.

### 2.6.3. Application of end-of-life tyres

End-of-life tyres are used in many applications. Utilisation for energy is attractive due to the calorific value of the tyre, which is similar to that of coal. The most developed application is the use of end-of-life tyres, whole or crushed, as a substitute for traditional fuels in cement kilns.

Figure 26 shows the sectors in which rubber from end-of-life tyres is used. Sports surfaces – primarily hockey pitches and soccer fields – are the main uses for rubber (55%). This is followed by industrial products (30%) such as flooring tiles and roofing materials.

**Figure 26. Recycling of end-of-life tyres by products**



Source: European Tyre Recycling Association, 2004.

## 2.7. Inert waste

### 2.7.1. Data availability

Data on inert waste is rather scarce. Only data on construction and demolition waste is available for some countries, but data is not comparable due to the fact that definitions are not harmonised. In order to give an impression of the trends in construction and demolition waste generation data is presented with the above reservations in mind.

The data presented on construction and demolition waste is based on the following sources:

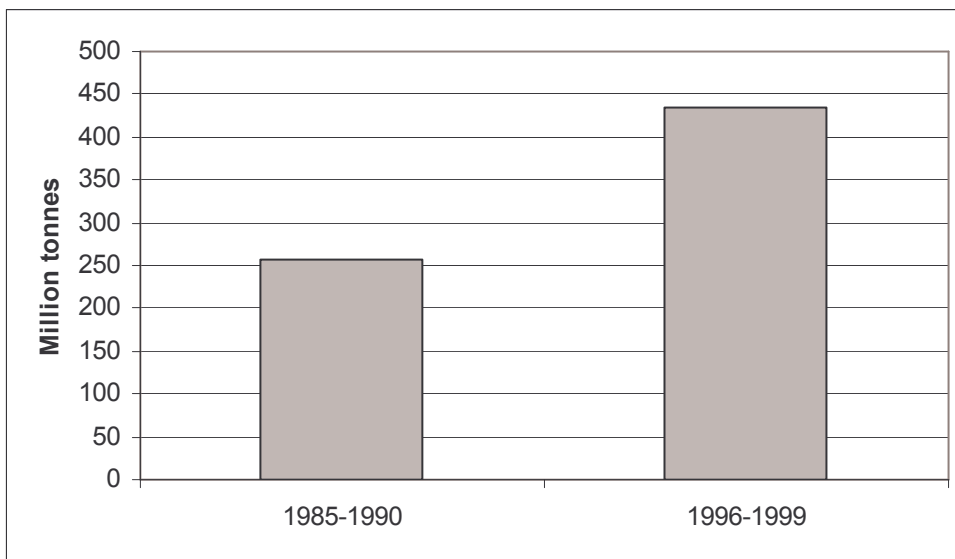
- NewCronos – the Eurostat's reference database
- Wastebase – the Topic Centre's internet database on waste
- Council of European Producer of Materials for Construction – Excel file

### 2.7.2. Generation of construction and demolition waste

Figure 27 and Figure 28 show the generation of construction and demolition waste in eight Western European countries and seven Central and Eastern European countries. In both regions waste generation is increasing, but it is remarkable that the waste generation in the Western European countries is much higher than the Central and Eastern European countries.

The data available does not allow to present meaningful information on the distribution of construction and demolition waste in relation to products or on treatment methods.

**Figure 27. Construction and demolition waste in eight Western European countries in 1985-90 and 1996-99**

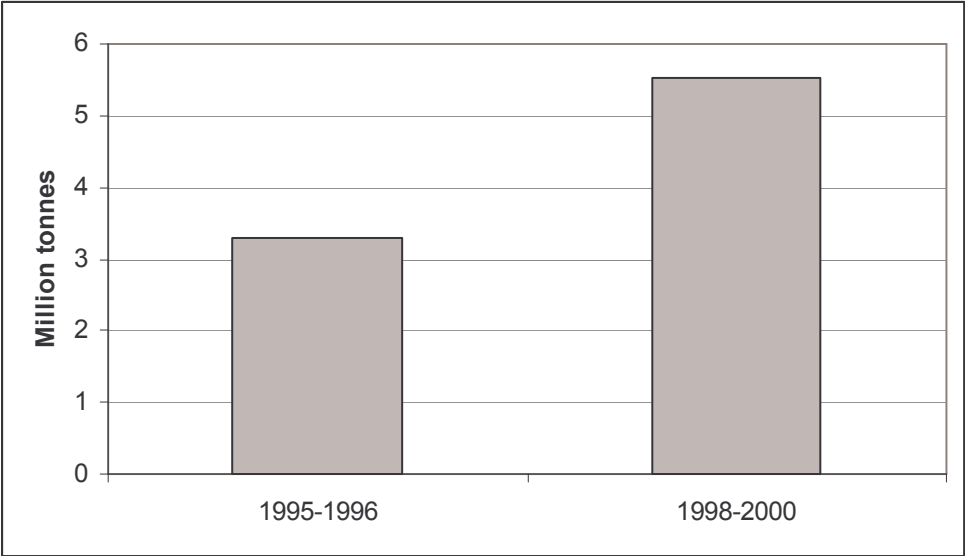


Source: NewCronos and Wastebase

Note: Countries: Austria, Denmark, Germany, Finland, the Netherlands, Spain, Switzerland and the United Kingdom



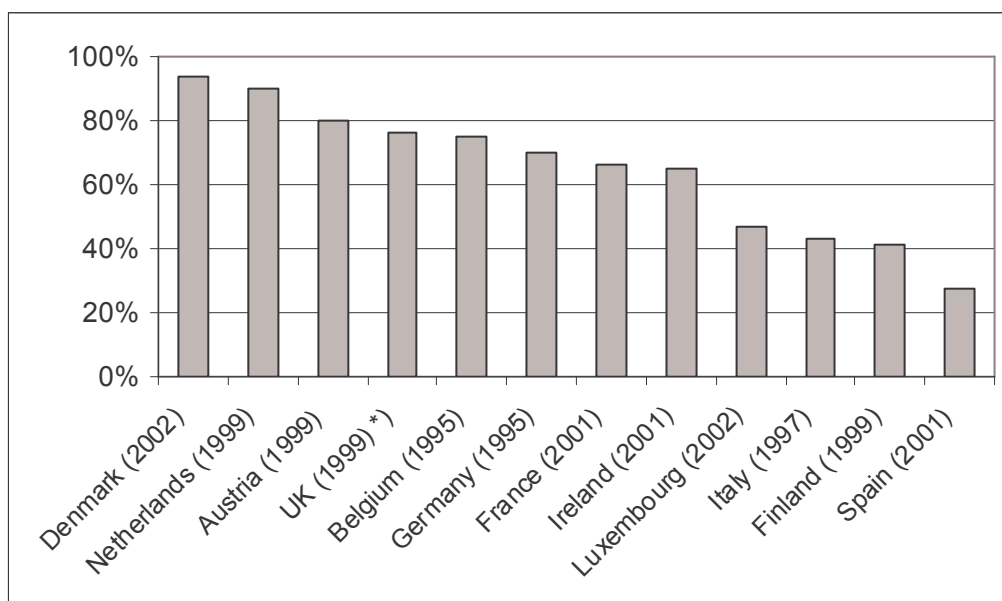
**Figure 28. Construction and demolition waste in seven Central and Eastern European countries in 1995-96 and 1998-2000**



Source: NewCronos and Wastebase  
Note: Countries: Croatia, Hungary, Malta, Poland, Romania, Slovakia and Slovenia.

Information on treatment of construction and demolition waste is even scarcer than on generation as very few countries report this to Eurostat. However, the Council of European Producer of Materials for Construction (CEPMC) has made a survey of recovery rates for construction and demolition waste in a number of countries. The result is presented in Figure 29 below. In Denmark, the Netherlands and Austria more than 80% of the construction and demolition waste is recovered while the recovery rate in Spain is below 30%.

**Figure 29. Recovery of construction and demolition waste in selected countries**



Source: CEPMC, 16th February 2004 and Wastebase

\*) CEPMC states that 25% of C&D waste recovered in the UK is recovered at registered exempt sites, e.g. landscaping.

## 2.8. Textiles

### 2.8.1. Data availability

A web search for data on textile waste generation and treatment has not resulted in applicable data. A few nationally based organisations involved in reuse of clothes have been identified, but no aggregated data has been found.

# Annex A: Search on the web

## ***EAA – European Aluminium Association***

([www.eaa.net](http://www.eaa.net))

Per capita use in WE 1999-2002

Aluminium beverage can recycling in Europe, recycling rates 1995 + 2001

Total production, total consumption and total production of recycled aluminium 1999-2000

## ***ASSURRE***

Fact sheets on:

- Glass manufacturing and recycling
- Plastics manufacturing and recycling
- Paper and board manufacturing and recycling
- Aluminium manufacturing and recycling
- Steel manufacturing and recycling

All fact sheets have a 'Facts and figures on recycling' part, but only specific data is mentioned.

## ***EUROFER – European Confederation of Iron and Steel Industries***

([www.eurofer.org](http://www.eurofer.org))

EU crude steel production 1999-2003 (all countries)

## ***APEAL – The Association of European Producers of Steel for Packaging***

([www.apeal.org](http://www.apeal.org))

Steel packaging recycling rates in Europe 1997-2002 (all countries)

Steel packaging recycling rate, Europe 1992-2002

## ***FEFCO – The European Federation of Corrugated Board Manufacturers***

([www.fefco.org](http://www.fefco.org))

Total shipments in tonnes (and per capita) 1994-2002 (all countries, including non-members)

Production of corrugated cardboard per capita 1994-2001 (all countries, including non-members)

Total consumption of paper in tonnes 1994-2002 (all countries, including non-members)

Total consumption distributed on Recycling, fluting, semi-chemical fluting, other recycled liner, brown kraft liner, white and coloured kraft and test liner in percentage, 1994-2002 (all countries, including non-members)

## ***BLIC - European Association of the Rubber Industry***

([www.blic.be](http://www.blic.be))

Data on collection and treatment from 1992 and onwards.

## ***BIR – Bureau of International Recycling***

([www.bir.org](http://www.bir.org))

No statistics available for textile recycling or reuse.

## ***CPIV- Standing Committee of the European Glass Industries***

Data on production and consumption from 1990 and onwards.

## ***CEPI - Confederation of European Paper Industries***

([www.cepi.org](http://www.cepi.org))

Paper recycling statistics update to 2002

***ETRA - European Tyre Recycling Association***

(<http://www.etra.eu.com>)

Data on collection and treatment from 1992 and onwards.

***FEVE - Federation Europeenne Verre Emballage***

([www.feve.org](http://www.feve.org))

Container glass consumption and recycling

## **Annex B: Definitions of waste**

**OECD/EUROSTAT Joint Questionnaire, WAQ2A**

*Waste*: Refers to municipal waste, waste handled by the scrapping material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product, and for different purposes should be included. Recycling within industrial plants i.e. at the place of generation should be excluded.

*Other waste streams*: Such as mineral and synthetic oils, used tires, rubber (excluding tires), textiles, organic materials (food, garden waste, bois, etc.), wood, ceramics, batteries and accumulators, etc.

*Waste generated*

*Waste collected for recycling*

*Imports of waste for recycling*

*Exports of waste for recycling*

*Waste recycled in country*: Refers to amounts actually recycled into finished products: can be based on amounts collected for recycling purposes, and adjusted according to amounts not actually recycled.

*Apparent consumption of related material*: refers to the economic notion of domestic production of the respective material + imports - exports (e.g. domestic production of paper + imports - exports). For certain materials, apparent consumption is considered to be equal or close to the total amount of waste generated.

**CEPI, 1997-2001**

*Generation of waste*: 'Consumption = Domestic deliveries + Imports from other CEPI countries + Imports from countries outside CEPI'

*Collected for recycling*: Apparent collection = utilisation + exports – imports of recovered paper (Utilisation = use of recovered paper as raw material to produce new products)

## Annex C: Background data

The following tables includes background data for the figures and tables used in the report. The titles of the tables are identical with corresponding figure/table.

**Figure 1. Total plastic consumption and kg per capita, 1991-2003**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total consumption (m tonnes)	24.6	25.1	24.6	26.5	26.3	27.3	29.4	30.8	32.5	34.7	36.2	37.5	38.1
Kg per capita	64.1	65.4	64	68.8	68.3	70.8	76.2	79.6	83.9	89.5	93.3	96.6	98.1

**Figure 2. Plastic consumption in Western Europe by products, 2002**

1000 tonnes	Consumption
Injected moulded prod.	7600
Films	6676
Hollow pieces	6370
Bags/sacks	4800
Pipes/tubes	3630
Thermoformed products	3120
Thermosets	2540
Cables	1170
Foams	1210
Extrusion coating	390
<b>Total</b>	<b>37506</b>

**Figure 3. Plastic waste generation and treatment in Western Europe, 1990 - 2003**

1000 tonnes	Total plastic waste	Material recovery	Energy recovery	Disposal
1990	13594	958	2108	10528
1991	14637	1080	2138	11419
1992	15230	1043	2422	11765
1993	16211	915	2425	12871
1994	17505	1108	2348	14049
1995	16056	1321	2698	12037
1996	16871	1571	2496	12805
1997	16975	1789	2575	12611
1998	18457	1975	3834	12648
1999	19166	2234	3949	12983
2000	19341	2542	4411	12388
2001	19980	2819	4583	12578
2002	20607	3138	4678	12791
2003	21150	3480	4750	12920

**Figure 4. Plastic consumption and waste generation by sector, 2002**

1000 tonnes	Consumption	Waste generation
Electrical and electronic	3250	848
Building	7200	628
Automotive	3000	959
Agriculture	744	311
Distribution and industry	6572	4190
Households and assimilated	18200	13671
Total	38966	20607

**Figure 5. Total plastic waste and plastic pack. waste in Western Europe, 1990-2003**

1000 tonnes	Total plastic waste	Material recovery	Energy recovery	Disposal	Plastic packaging waste
1990	13594	958	2108	10528	
1991	14637	1080	2138	11419	
1992	15230	1043	2422	11765	
1993	16211	915	2425	12871	
1994	17505	1108	2348	14049	
1995	16056	1321	2698	12037	
1996	16871	1571	2496	12805	
1997	16975	1789	2575	12611	9662
1998	18457	1975	3834	12648	9857
1999	19166	2234	3949	12983	10093
2000	19341	2542	4411	12388	10295
2001	19980	2819	4583	12578	10708
2002	20607	3138	4678	12791	
2003	21150	3480	4750	12920	

**Figure 6. Plastic waste management by sector, 2002**

1000 tonnes	Recycling	Energy recovery	Disposal
Electrical and electronic	32	3	811
Building	54	0	574
Automotive	57	7	895
Agriculture	165	1	145
Distribution and industry	1601	444	2143
Households and assimilated	1227	4222	8132

**Figure 7. Plastic consumption and waste generation by polymers, 2002**

1000 tonnes	Plastic consumption	Plastic waste generation
Others	9466	3365
EPS	885	238
PET	2368	1591
PS	2233	1387
PVC	5308	1820
PP	6007	3875
PE-HD	5198	3308
PE-L/LLD	7501	5023
Total	38966	20607

**Figure 8. Mechanical recycling of plastic waste by polymers, 2002**

1000 tonnes	Mechanical recycling	Others
Others	166	3199
EPS	60	178
PET	430	1161
PS	70	1317
PVC	40	1780
PP	195	3680
PE-HD	415	2893
PE-L/LLD	1430	3593

**Figure 9. Management of plastic waste by country, 2000**

	Mechanical recycling	Energy recovery	Disposal
Germany	27%	29%	44%
Norway	19%	47%	35%
Austria	17%	19%	64%
Italy	15%	14%	70%
Spain	15%	11%	74%
Belgium	13%	23%	64%
Netherlands	12%	52%	36%
Switzerland	10%	75%	15%
France	10%	32%	58%
Finland	10%	21%	69%
United Kingdom	9%	8%	83%
Denmark	8%	65%	27%
Portugal	8%	22%	70%
Sweden	6%	38%	56%
Ireland	6%	0%	94%
Greece	2%	0%	98%

**Figure 10. Paper consumption, paper waste and packaging paper waste in Western Europe, 1983-2002**

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<b>Million tonnes</b>																				
Paper consumption																77	79	84	81	82
Paper waste	41	44	44	46	48	52	54	58	61	62	62	62	66	65	72	76	78	82	79	79
Packaging paper waste															24	25	26	26	26	

**Figure 11. Generation of paper waste per capita in the Western European countries, 1990-2002**

<b>Kg per capita</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002 *)</b>
Belgium	210	218	223	202	245	255	263	276	292	285	310	299	333
Austria	166	175	173	166	186	182	186	203	222	243	248	241	248
Sweden	228	220	201	201	188	207	199	242	243	256	260	248	243
Denmark	225	237	231	216	236	231	225	233	232	229	272	261	242
Germany	195	199	195	193	200	194	187	195	208	216	235	228	231
Switzerland	0	185	190	192	207	217	209	225	232	241	246	235	230
Netherlands	210	219	224	205	163	159	159	261	279	282	303	240	223
United Kingdom	163	159	165	182	194	195	196	207	211	214	216	210	208
Finland	263	238	231	247	247	262	282	295	296	286	290	194	206
France	156	156	159	155	169	168	161	185	195	195	195	193	191
Italy	125	125	135	132	75	147	144	167	172	179	190	186	191
Norway	171	170	168	167	191	192	191	185	189	183	199	187	187
Spain	112	118	125	120	129	131	132	142	154	163	173	162	176
Ireland	102	101	99	108	108	137	136	118	119	123	120	129	132
Greece	50	62	62	76	84	86	84	88	90	86	116	118	118
Portugal	76	79	87	67	74	81	84	87	95	95	100	101	105
EU-15 + NO and CH	156	161	164	163	161	172	170	188	196	201	212	203	205

\*) Based on population data for 2000

**Figure 12. Management of paper and cardboard packaging waste in Western Europe, 1990-2002**

<b>Million tonnes</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Disposal	35	36	36	34	31	36	33	37	39	38	41	35	35
Collected for recycling	24	24	26	27	30	30	32	35	37	40	41	44	45

**Figure 13. Recycled paper utilisation by sector in Western Europe, 2002**

Newsprint	17.10%
Other graphic papers	6.80%
Case materials	44.70%
Carton boards	8.70%
Wrappings, Other packaging paper	10.20%
Household & sanitary	8%
Others	4.60%

**Figure 14. Aluminium consumption per capita in Western Europe**

<b>Kg per capita</b>	<b>1980</b>	<b>1990</b>	<b>1997</b>	<b>2002</b>
Aluminium use per capita	13.9	17.2	21.9	21.5



**Figure 15. Aluminium consumption per capita in Western European countries**

<b>Kg per capita</b>	<b>2002</b>
Austria	33.7
Italy	30.0
Sweden	28.5
Norway	27.7
Netherlands	27.2
Germany	24.1
Denmark	23.4
France	22.3
Switzerland	21.3
Belgium	18.8
Finland	15.9
Greece	14.4
United Kingdom	14.4
Spain	13.2
Portugal	7.8
Turkey	3.8

**Figure 16. End users for aluminium (rolled, extruded and cast) in Western Europe, 2002**

	<b>Share of total consumption (%)</b>
Transport	33
Building	26
Packaging	18
Engineering	15
Other	8

**Figure 17. Recycling rate for aluminium cans by countries, 1995 and 2001**

	<b>1995</b>	<b>2001</b>
Switzerland	85%	91%
Norway		89%
Sweden	91%	88%
Finland		84%
Belgium	10%	80%
Germany	70%	80%
Austria	50%	50%
Netherlands	10%	46%
United Kingdom	28%	42%
Greece	34%	36%
France	14%	29%
Italy	35%	26%
Portugal	17%	21%
Spain	14%	20%

**Figure 18. Crude steel production and metal packaging consumption in EU-15, 1999-2003**

<b>Million tonnes</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Crude steel production	156	163	159	158	160
Metal packaging consumption	4	5	5		

**Figure 19. Generation, recycling and disposal of packaging metal in EU-15, 1992-2001**

1000 tonnes	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Recycling	660.0	729.0	788.0	888.1	933.6	1051.4	1266.3	1358.1	1447.0	1666.7	1892.2
Disposal		2074.8	1929.2	1723.9	1343.4	1285.0	1168.9	1304.8	1631.7	1734.7	1548.1

**Figure 20. Metal packaging recycling rate by country, 1997 and 2001**

	1997	1998	1999	2000	2001
Belgium	70%	66%	72%	70%	81%
Germany	82%	83%	82%	78%	79%
Netherlands	67%	80%	78%	78%	78%
Luxembourg	22%	11%	42%	68%	77%
Sweden	45%	77%	50%	43%	69%
Austria	34%	38%	38%	49%	61%
France	49%	45%	45%	49%	52%
Italy	5%	5%	11%	45%	44%
Finland	8%	15%	19%	28%	42%
Denmark	16%	40%	35%	49%	40%
Spain	23%	22%	24%	34%	38%
United Kingdom	24%	23%	38%	42%	35%
Ireland	5%	4%	25%	24%	37%
Portugal			1%	15%	24%
Greece	13%	11%	11%	11%	10%
EU-15	44%	43%	47%	53%	54%
Switzerland					70%
Norway					56%
Australia					42%
Korea					53%
USA					59%
Japan					85%

**Table 6 and figure 21. Consumption of glass by glass types in EU-15, 2003**

	Container glass	Flat glass	Tableware	Reinforcement fibres	Other	Total
Apparent consumption (1000 tonnes)	17,746	7,565	1,212	851	1,171	28,545

**Figure 22. Packaging glass waste generation and treatment in EU-15, 1990-2002**

1000 tonnes	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Collected for recycling	4995	5736	6197	6386	6978	7158	7385	7394	7927	8454	8503	8216	8606
Disposal	6658	6603	6442	6411	5974	6032	5927	7593	7221	6924	6400	6396	6085

**Figure 23. Packaging glass recycling by country, 1990-2001**

	1990	1995	2001
Luxembourg			91%
Belgium	59%	67%	85%
Germany	54%	75%	85%
Sweden	35%	61%	84%
Austria	60%	76%	82%
Netherlands	66%	80%	78%
Denmark	62%	68%	76%
France	41%	50%	51%
Finland	46%	50%	50%
Italy	49%	53%	48%
Ireland	19%	29%	39%
United Kingdom	21%	27%	35%
Portugal	26%	42%	34%
Spain	27%	32%	33%
Greece	16%	25%	24%
EU-15	43%	54%	56%

**Table 7. End-of-life tyres arisings and management in EU-15**

	1992	1998	2000	2002
Arising (1000 tonnes)		2,500	2,625	2,729
Retreading %	22	16	10	11
Material recycling %	4	14	21	24
Energy recovery %	14	26	24	27
Export %	10	12	15	12
Final Disposal	50	32	30	26

**Table 8. End-of-life tyres arisings and management by country, 2002**

	Arisings (1000 t)	Reuse/ Export (%)	Retreading (%)	Material Recycling (%)	Energy recovery (%)	Landfill (%)	Recovery rate (%)
Austria	55	0	0	46	54	0	100
Belgium	75	5	4	23	31	37	63
Denmark	43,5	0	9	76	15	0	100
Finland	37	0	3	97	0	0	100
France	390	10	14	33	19	24	76
Germany	578	12	10	18	52	8	92
Greece	50	6	3	14	3	74	26
Italy	360	7	14	14	33	32	68
Netherlands	35	85	0	15	0	0	100
Portugal	50	0	30	40	16	14	86
Spain	263	4	14	8	10	64	36
Sweden	76	16	4	35	45	0	100
United Kingdom (est.)	485	18	10	32	10	30	70
Hungary	40	8	0	4	23	65	35
Poland	101	0	15	8	27	50	50
Switzerland	53	40	2	30	28	0	100

**Figure 24. End-of-life tyres arisings by country (EU-15)**

<b>Kg per capita</b>	<b>1996</b>	<b>2003</b>
EU-15	6.4	6.9
Netherlands	4.2	4.2
Greece	5.5	4.7
Portugal	2.0	5.0
Austria	5.0	6.2
France	8.3	6.6
Italy	6.3	6.7
Belgium	6.4	7.0
Sweden	7.4	7.2
Germany	7.9	7.3
United Kingdom	6.8	7.5
Spain	2.9	7.6
Denmark	7.2	7.7
Finland	5.9	8.2
Ireland	2.1	8.4
Luxembourg	4.8	12.4

**Figure 25. End-of-life tyres arisings by country – Acceding and accession countries**

<b>Kg per capita</b>	<b>2003</b>
Cyprus	6.8
Latvia	5.9
Hungary	5.0
Bulgaria	3.1
Poland	3.0
Czech Republic	2.8
Slovenia	2.0
Slovakia	1.9
Estonia	1.2
Romania	0.9
Lithuania	0.9

**Figure 26. Recycling of end-of-life tyres by products**

<b>Product</b>	<b>%</b>
Sports surfaces	55%
Industrial products	30%
Automotive	8%
Consumer products	5%
Other	2%

**Figure 27. Construction and demolition waste in seven Western European countries in 1985-90 and 1996-99**

<b>Million tonnes</b>	<b>1985-1990</b>	<b>1996-1999</b>
WE7	137	177

**Figure 28. Construction and demolition waste in seven Central and Eastern European countries in 1995-96 and 1998-2000**

Million tonnes	1995-1996	1998-2000
CEEC7	3.3	5.5

**Figure 29. Recovery of construction and demolition waste in selected countries**

Country	Recovery rate
Denmark (2002)	94%
Netherlands (1999)	90%
Austria (1999)	80%
UK (1999)	76%
Belgium (1995)	75%
Germany (1995)	70%
France (2001)	66%
Ireland (2001)	65%
Luxembourg (2002)	47%
Italy (1997)	43%
Finland (1999)	41%
Spain (2001)	28%