



Federal Ministry for the  
Environment, Nature Conservation  
and Nuclear Safety

# WASTE MANAGEMENT IN GERMANY

A driving force for jobs  
and innovation



## Imprint

**Published by:** Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)  
Public Relations Division • 11055 Berlin • Germany  
Email: [service@bmu.bund.de](mailto:service@bmu.bund.de) • Website: [www.bmu.de](http://www.bmu.de)

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**Design:** design\_idee, büro\_für\_gestaltung, Erfurt  
**Graphics:** ID-Kommunikation, Mannheim, design\_idee  
**Printing:** Bonifatius GmbH, Paderborn

**Photos:** Front cover: Arnulf Hettrich/Fnoxx  
p. 5: Wolfgang Filser  
p. 7: BMU/Christoph Edelhoff  
p. 8/9: OKAPIA KG, Germany  
p. 10: [images.de/fotokurier.at](http://images.de/fotokurier.at)  
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p. 35: Hechtenberg/CARO  
p. 37: Friedrich Stark

**Date:** July 2006  
**First Print:** 5,000 copies

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## DEAR READERS,

All around the world, energy and raw materials are in ever shorter supply, whilst their consumption is on the increase – and greenhouse gases are speeding up climate change. And so we need to take a quantum leap in terms of efficiently using resources and energy.



The waste industry in Germany has a key role to play in that. Since the first law on waste management came into force in Germany in 1972, waste policy has achieved a great deal: Whilst in the past, waste was simply dumped in landfills, we today have very high-tech and specialised closed cycle management. Innovative processes and technologies allow us to fully and efficiently recycle our waste, turning today's trash into tomorrow's treasure-trove.

Closed cycle management reduces the adverse impacts on the environment and human health. The Ordinance on Environmentally Compatible Storage of Waste from Human Settlements and on Biological Waste Treatment Facilities represents a milestone in that respect. Since 1 June 2005 waste may no longer be dumped in landfills without any pre-treatment, putting an end to storage that is detrimental to the environment. Closed cycle management is a good example of how environmental policy contributes to more environmental protection, efficient use of resources, climate protection – and thus also to more economic efficiency.

That creates competitive advantages for the economy as a whole in other ways too. Our modern waste policy has triggered the rapid evolution of waste management and environmental technology. Some of the companies producing the technology used by the waste industry in particular are among the most successful internationally. Today, the waste industry employs over 250,000 people and generates an annual turnover of 50 billion Euros.



We must continue to follow the course which the waste management concept has set. That means using resources efficiently and processing them in an environmentally compatible manner. Materials management within closed materials cycles is our goal – and also one of the dictates of fairness towards future generations.

A handwritten signature in black ink that reads "Sigmar Gabriel". The signature is written in a cursive style with a large, stylized 'S' and 'G'.

Sigmar Gabriel  
Federal Minister for the Environment, Nature Conservation and Nuclear Safety

## FROM WASTE TO AN ECONOMIC FORCE

Waste management has evolved substantially since the early 1970s: Before the Waste Management Act of 1972 came into effect, each village and town had its own tip (around 50,000 in the whole of Germany). As a result of that legislation their number dropped to around 500 regulated landfill sites and the number of incineration plants and special treatment plants for industrial waste increased.

In the mid-1980s the political credo of the so-called waste hierarchy – “avoid – reuse – dispose of” – gained acceptance. In addition to the existing recovery of metal, textiles and paper, other recoverable materials were to be recycled by means of separate collection, sorting and reuse. This rationale formed the basis for the Closed Substance Cycle and Waste Management Act which came into force in the mid-1990s.

Today, the waste industry in Germany employs more than 250,000 people – from engineers to refuse collectors to administrative staff. Various universities have Waste Management faculties, and there is a separate vocational qualification in waste management. The industry has an annual turnover in excess of 50 billion Euros.

Today, more than half of municipal and production waste is recycled. In some areas, for example packaging, more than 80 per cent is recycled. 86 per cent of construction waste is now recovered. Figures for the total volumes of waste recovered make impressive reading: 28 million tonnes of municipal waste, 30 million tonnes of production and industrial waste and 163 million tonnes of construction and demolition waste. Nearly three tonnes of waste is recovered for each resident in Germany, that's equivalent to the weight of three small cars.

These figures provide impressive proof that environmental protection has developed into a key economic factor, making a significant contribution to an economy's value added chain.



Control room in a waste recovery plant

## THE STATUTORY FRAMEWORK

Waste management legislation is based on European law, German Federal law, the regional laws of the Federal *Länder* and the statutes of the local authority waste management services.

Environmental protection, and thus by definition also waste legislation, is one of the core concerns within the European Union (EU). Since 1974 the European Community (EC) has adopted a number of Directives and Regulations and thus decisively shaped the Member States' waste legislation in an attempt to harmonise requirements governing waste avoidance, waste recovery and environmentally compatible waste disposal within the EC. The European Commission's 1997 Waste Strategy and its Strategy on the Prevention and Recycling of Waste constitute the strategic backbone in this area.

The **Waste Framework Directive** is one of the pivotal European Directives. It regulates general aspects of European waste legislation and, as well as defining the term "waste" and outlining waste management measures and the obligations incumbent upon the originators and proprietors of waste, it also contains the general obligation for Member States to avoid waste and to recover and dispose of it in an environmentally compatible manner.



In addition, there are EU-wide regulations governing the treatment of hazardous waste, the binding classification of hazardous waste, requirements pertaining to landfill sites and waste incineration plants, and the trans-boundary shipment of waste within and outside the EU. Finally, the EU has also adopted various Directives aimed at the avoidance and recovery of specific types of product waste. For example, there are regulations governing selected types of product waste containing pollutants such as waste oil, polychlorinated biphenyl (PCB) and polychlorinated terphenyl (PCT), on packaging, batteries, end-of-life vehicles, and electrical and electronic appliances.

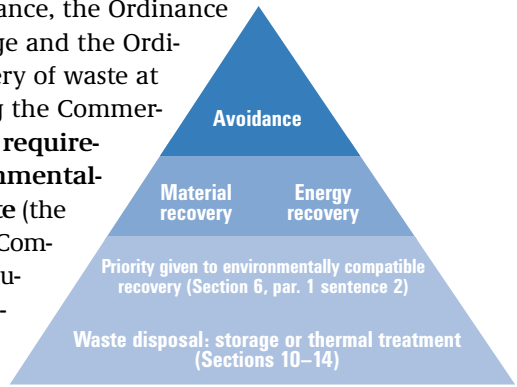
In Germany, waste legislation is governed by the Act for Promoting Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal, better known as the **Closed Substance Cycle and Waste Management Act**. The Act entered into force in 1996 and aims to ensure the complete avoidance and recovery of waste. Thus, avoidance takes precedence over recovery, which in turn comes before disposal. Avoidance means extended producer responsibility, which on the one hand involves developing products and materials with the longest possible service life and on the other introducing production techniques which generate the minimum possible volume of waste. Recovery, by contrast,

Sorting waste: Plastic is separated from biowaste



seeks to achieve the maximum possible and most environmentally compatible use of the waste’s material and energy potential.

The general obligations contained in the Act are set out in more concrete terms in a number of statutory ordinances. In particular, these include the **provisions on product responsibility** (packaging, batteries, end-of-life vehicles, waste oil, electrical and electronic appliances), the **requirements governing the environmentally compatible recovery of waste** (e.g. the Commercial Waste Ordinance, the Waste Wood Ordinance, the Ordinance on Underground Waste Stowage and the Ordinance pertaining to the recovery of waste at surface landfills and amending the Commercial Waste Ordinance) and the **requirements governing the environmentally compatible disposal of waste** (the Ordinance on Environmentally Compatible Storage of Waste from Human Settlements and on Biological Waste Treatment Facilities, and the Landfill Ordinance).



The waste pyramid: Avoidance, reuse, environmentally friendly disposal

## GERMANY'S WASTE POLICY: SUCCESSES AND GOALS

We are not fully realising the potential in waste in terms of energy and raw materials. Consumption of primary raw materials is still too high.

That is why today's waste management aims to increase and optimise the efficient use of raw materials, to maximise recovery quotas and to permanently remove from our environment that residual waste which can no longer be used.

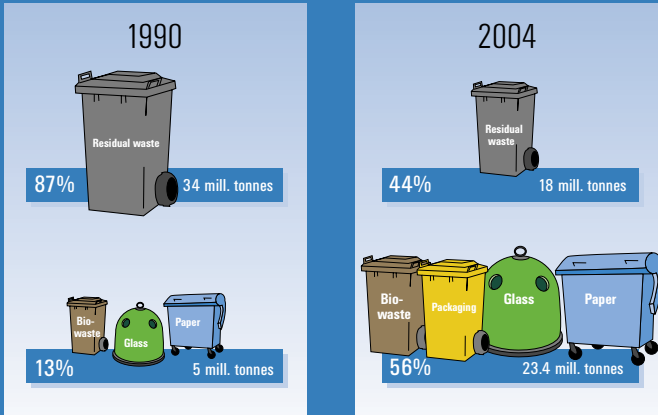
Germany is already on the right track. Regulations governing waste management and modern facilities and technology have led to the following environmental successes over the past 15 years or so:

- ▶ The total volume of domestic waste has remained constant over many years. The link between economic growth and the volume of waste has thus been severed, given the fact the economy grew by 15 per cent between 1992 and 2004.
- ▶ There has been a clear shift in terms of volumes of waste: in the past greater quantities were disposed of, now more is collected separately and recovered. The population's willingness to separate its waste has helped to improve possibilities for recycling. Recovery of municipal waste has now been increased to 58 per cent (2004). The figure for production waste is 57 per cent (2004).



Separating waste makes sense:

## More recoverable materials than residual waste in 2004

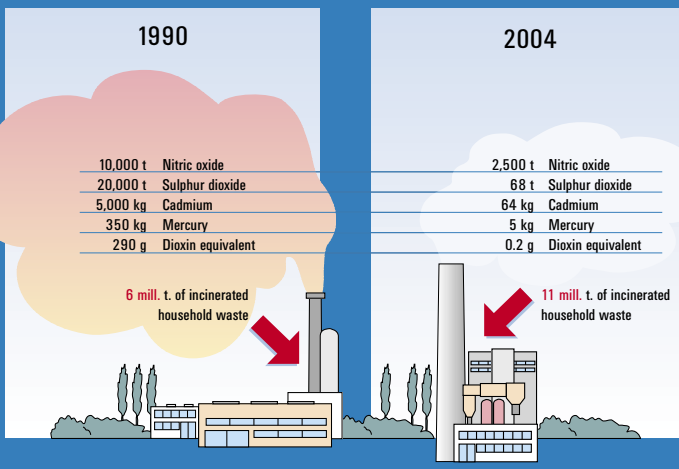


Source: IFEU (Institute for Energy and Environmental Research) 2006 study on household waste, Federal Environment Agency (Umweltbundesamt, UBA)

- Modern waste incineration plants have helped significantly reduce the burden on the biosphere.

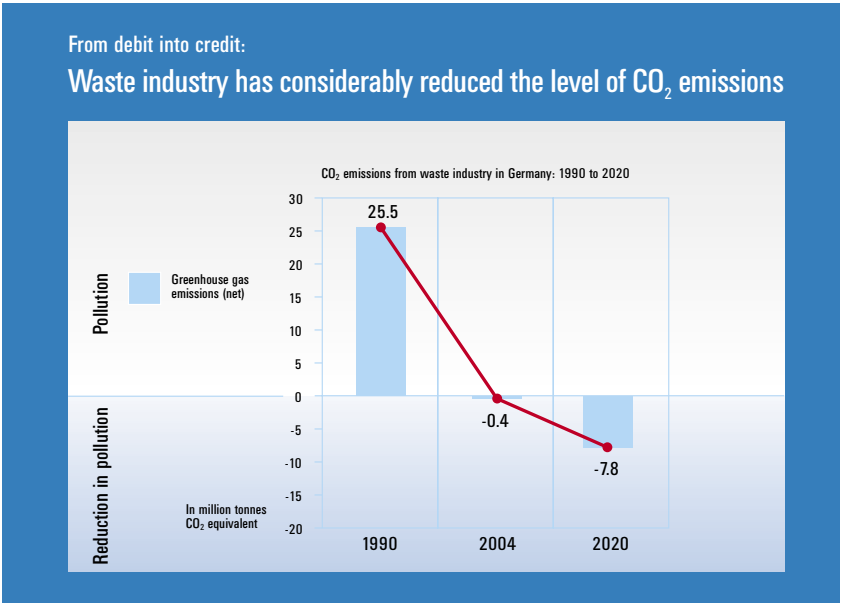
Ecological efficiency of waste incineration considerably increased:

## Emissions greatly reduced: 80 % more waste incinerated



Source: IFEU 2006 study on household waste, Federal Environment Agency (UBA)

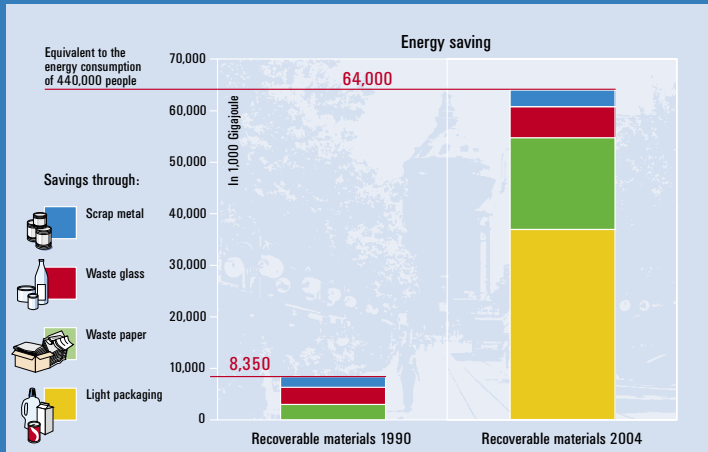
- ▶ Greenhouse gas emissions have been considerably reduced. The overall implementation of the Ordinance on Environmentally Compatible Storage of Waste from Human Settlements and on Biological Waste Treatment Facilities in 2005 has alone led to a reduction of more than 30 million tonnes of carbon dioxide (CO<sub>2</sub>) per year generated by household waste. The waste management industry is thus responsible for around 12 per cent of Germany’s planned reduction in greenhouse gases as required by the Kyoto Protocol. In signing the Kyoto Agreement, the German government obligated itself under international law to reduce greenhouse gas emissions by 21 per cent (compared to 1990 levels) in the period between 2008 and 2012.



Source: IFEU 2006 study on household waste, Federal Environment Agency (UBA)

- ▶ There has also been a notable saving of raw materials.
- ▶ The increased recovery of energy and materials from waste also means an eight-fold saving of fossil fuels such as oil, gas and coal in comparison to 1990. That is equivalent to the annual energy/raw material consumption of a city with more than 400,000 inhabitants.

Energy efficiency by recovering materials:  
**Amount saved = energy consumption of one big city**



Source: IFEU 2006 study on household waste, Federal Environment Agency (UBA)

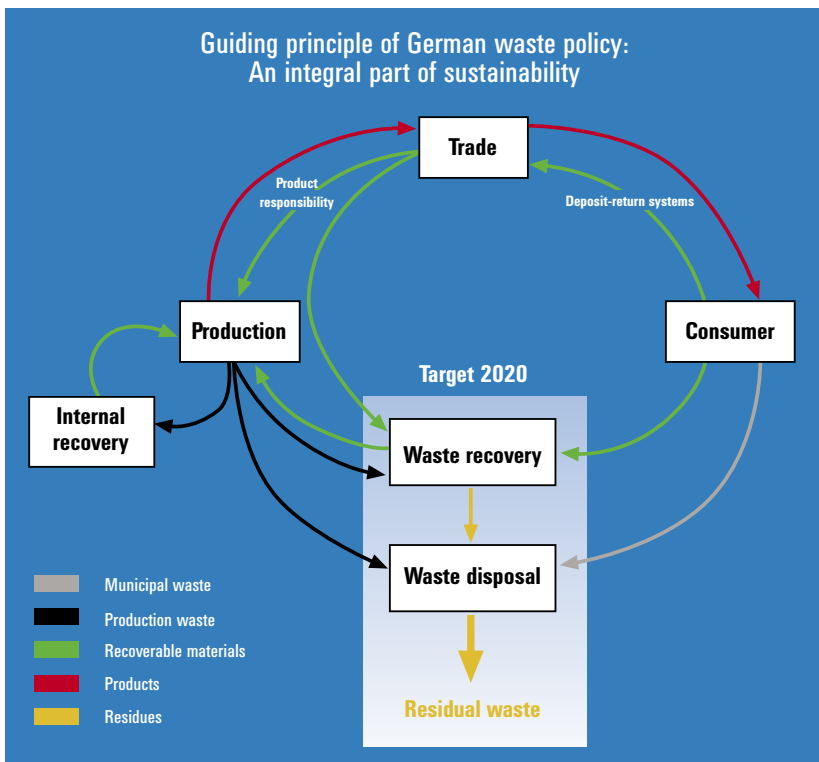
## TOMORROW'S TREASURE-TROVE: MATERIALS MANAGEMENT

In the medium to long term, primary raw materials such as oil and gas will become scarcer; pollutants in waste will have a negative impact on the environment and human health. That is why our waste policy should focus more on material flows and material characteristics. The goal is materials flow management and materials management within closed cycles. Resources must be used more effectively and more efficiently. Today's waste must, therefore, be seen as tomorrow's treasure-troves – and, by analogy, today's products are tomorrow's resources. The Federal Environment Ministry is thus working on a programme of action to increase the productivity of resources.

## What is 'materials flow management' and 'materials management'?

The materials flow approach allows the entire materials cycle to be monitored and analysed, from the extraction of raw materials from the environment to production, use and consumption, to collection and re-use or release into the environment. The volume and structure of these materials are thus to be influenced in such a way that the efficiency of resources is increased and the link between the volume of waste and economic growth is severed in the long term.

For materials management to be successful, production and consumption must also be incorporated. The cycle which raw materials undergo must be promoted. Pollutants in waste materials must not be allowed to re-appear in new products, rather they must be filtered out in a non-hazardous form.



Source: Federal Environment Ministry (BMU)



On the way to the incinerator:  
Waste is incinerated to produce energy

## WHAT TASKS FALL TO PRIVATE INDUSTRY?

Environmental policy is based on: the precautionary principle, the polluter pays principle and the principle of co-operation. These principles are reflected in **extended producer responsibility**, which the manufacturer of a specific commodity bears. The producer of a commodity (polluter) is required to consider the environmental impacts and possible risks of his product during its entire lifecycle and disposal phase (precaution). In collaboration with the other parties involved – producers, distributors, consumers, disposal and recycling companies, as well as government offices (co-operation) – the producer is required to create a system which minimises the adverse environmental impacts and maximises the recovery of resources (recycling, reuse).

For that reason, waste management policy in Germany centres around the concept of extended producer responsibility. In this way, even during the production phase, the foundations are laid for the effective and environmentally compatible avoidance and recovery of waste. Manufacturers and distributors must design their products in such a way as to minimise the amount of waste produced during manufacturing and subsequent use, so as to focus on high-quality and comprehensive recovery of waste, and, finally, to facilitate ecofriendly removal of those components of the waste which can no longer be reused.

### Voluntary commitment

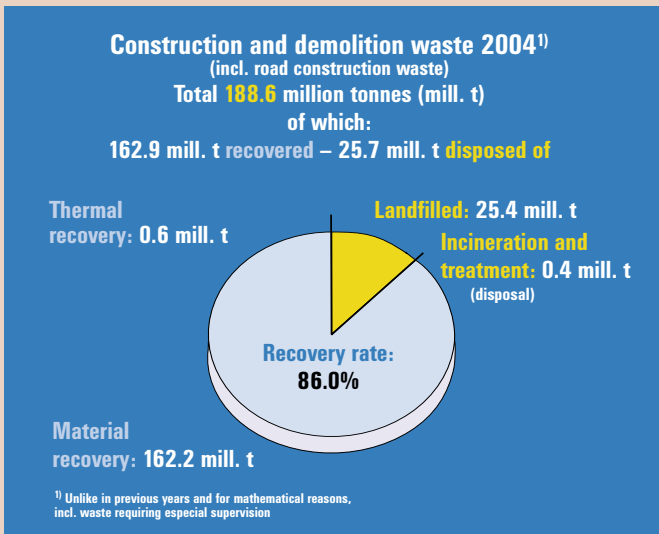
It is the responsibility of industry to make improvements to the development and manufacturing phase of products. First of all that can be done on a voluntary basis, for example in the form of voluntary commitments. This conserves resources and avoids waste.

In 1996 the German construction industry made a commitment to the German Environment Ministry to “halve by 2005 the volume of recyclable construction waste currently being landfilled”. According to the most recent survey, more than 86 per cent of construction and demolition waste and around 70 per cent (51 million tonnes) of building debris in Germany is recovered, thus fulfilling the recovery quota set out in the voluntary commitment.



### An example: Construction and demolition waste

Along with construction and demolition waste, mining waste represents the largest waste segment in terms of volume. Often it comprises a mix of mineral waste, wood, metal, paper and plastics of which are sometimes contaminated with hazardous substances.



Source: Federal Statistical Office 2006, Federal Environment Ministry (BMU)



## RETURN AND RECOVERY OBLIGATIONS

It is not necessary to introduce legislation until voluntary commitments are no longer sufficient to meet the demands of extended producer responsibility – or the EU introduces specific requirements.

### Packaging

To counter the steady increase in the volume of packaging, the German government in 1991 enacted the Packaging Ordinance. This was the first comprehensive regulation to be based on the concept of material cycles. The Packaging Ordinance aims to put extended producer responsibility into practice by extending the manufacturers' and distributors' responsibility for their products. That responsibility now begins when the product is manufactured and ends when it is disposed of in an environmentally compatible manner.

The Packaging Ordinance has proved to be an effective instrument. The annual increase in packaging consumption has been halted. Whilst in 1991 private households and small businesses produced 15.6 million tonnes of packaging waste, that figure dropped to 13.7 million tonnes in 1997, but then returned to a higher rate of 15.5 million tonnes in 2003.

Recovery of used packaging has been continuously increased: 6.1 million tonnes were recovered in 1991, 10.3 million tonnes in 2003.

### **Modern waste technology: Success sorting waste**

In Germany, glass, paper, old clothes, compost and biowaste, packaging, bulky waste and specialist waste are collected separately by private households before they are recycled by public-sector or private-sector waste management agencies.

Because of the high standards imposed on these recovery processes, even retail packaging, for example, that has been separately collected still needs to be further sorted. Originally, this sorting was done manually and with the aid of magnetic separators, air classifiers and vortex separators. Since 1997, however, more and more automatic sorting systems have been introduced.

It is now possible to separate different types of plastic using a refined detector system based on near infrared spectrography (NIR), which is capable of identifying the type, size, shape and colour of materials. The system is linked to a computer with such a high processor speed that separation of the individual pieces via precise compressed air jets occurs in real time. As a result, different types of plastic are separated with a high degree of accuracy.

**Waste sorting and treatment:  
The Cröbern Central Landfill Site near Leipzig**



**Recovery quotas for waste packaging: 1991-2003**  
 (in %, for those types of packaging for which quotas have been introduced)

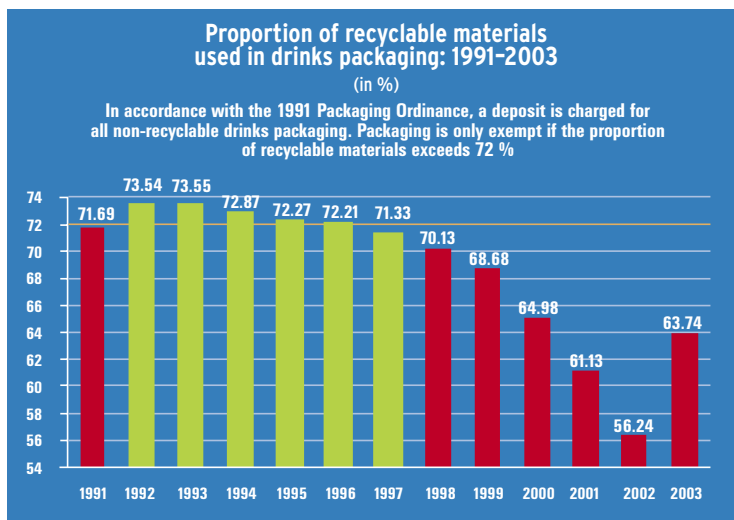
Material	1991	1997	2000	2001	2002	2003
Glass	53.7	83.5	84.5	85.1	86.2	85.9
Tinplate	37.1	79.5	74.8	75.7	77.2	81.0
Aluminium	16.6	79.7	74.5	75.3	73.7	71.2
Plastics	11.6	61.0	53.4	51.8	50.3	55.0
Paper	55.8	88.6	91.2	91.9	88.8	88.1
Liquid containers	0.0	61.6	61.6	62.8	63.4	62.2
<b>Total quotas</b>	<b>47.1</b>	<b>82.2</b>	<b>82.2</b>	<b>82.3</b>	<b>80.6</b>	<b>81.2</b>

**Deposit-return systems for drinks** make a significant contribution to reducing the volume of waste because the packaging can be recycled. But these systems were in an increasingly critical condition after 1995. At the end of 2002 only 50 per cent of packaging was being recycled. However, below a certain market share, deposit-return systems are no longer viable. Examples from neighbouring European countries (e.g. Belgium, Austria and Switzerland) show that without effective protective provisions, deposit-return systems will be forced out of the market within a very short time.



On 1 January 2003 Germany introduced a compulsory deposit on non-recyclable drinks packaging for mineral water, beer and carbonated soft drinks. The compulsory deposit has stabilised the proportion of recyclable drinks packaging and put an end to the throw-away mentality. The compulsory deposit was already set out in the Packaging Ordinance of 1991. After difficult negotiations between all the parties involved, the provisions were simplified in 2005 by amending the Ordinance. The compulsory deposit now applies to all non-ecologically favourable non-recyclable drinks packaging between 0.1 and 3 litres in volume. The compulsory charge is 25 cents for all containers.

In May 2006 the compulsory deposit was introduced for non-carbonated soft drinks and alcoholic mixed drinks (in particular so-called alcopops). Fruit and vegetable juices, milk and wine, as well as ecologically favourable non-recyclable drinks packaging – such as cartons, polyethylene bags and stand-up bags – are deposit-free.



Source: Gesellschaft für Verpackungsmarktforschung GmbH (GVM, Society for Packaging Market Research)

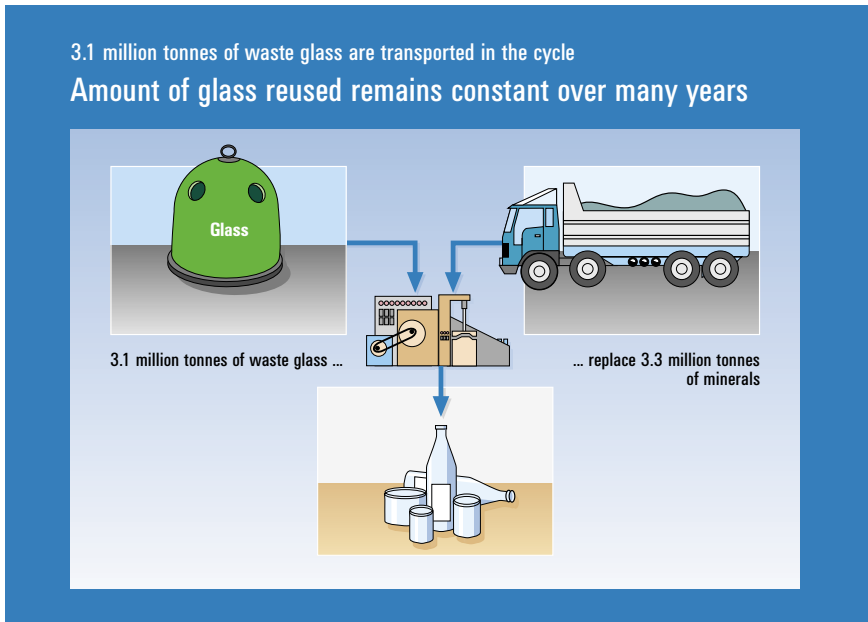
The concept and implementation of the 1991 Packaging Ordinance received a great deal of international attention. The German ordinance prompted neighbouring countries such as Austria, the Netherlands, Belgium and France to introduce their own national measures. It also formed the basis for the European Parliament and Council Directive of 20 December 1994 on packaging and packaging waste.

Recycling fluorescent tubes:  
The glass is reused once the  
poisonous mercury has been removed



## Glass

In Germany, container glass is used primarily by the food and drinks industry in the packaging of drinks, vegetables and yoghurt. Glass lends itself particularly well to recycling as it can be melted down and processed into new products any number of times. The recycling of waste glass helps to conserve raw materials and reduces energy requirements: 0.2 to 0.3 per cent less energy is required per percentage point of waste glass added.



Source: IFEU 2006 study on household waste, Federal Environment Agency (UBA)

In Germany a minimum recycling quota of 42 per cent was introduced with effect from 1993 by the Packaging Ordinance, which was increased to 72 per cent in 1995 and to 75 per cent in 1999. These quotas have regularly been exceeded. In 2004, 2.73 million tonnes of glass were collected across Germany, with a recycling quota of 91.21 per cent. However, non-recyclable glass bottles are not an ecologically advantageous form of drinks packaging. Reusable bottles, which can be refilled around 40 times, are significantly more favourable, as they save even more raw materials and energy than can be achieved by recycling glass.

## End-of-life vehicles

There are 46 million passenger cars on Germany's roads. Every year, 3.3 million new cars are registered. The waste industry dismantles and recycles around 800,000 passenger cars every year.

The End-of-Life Vehicle Ordinance of 2002 allows consumers to return end-of-life vehicles to their manufacturer or importer free of charge. The same has applied since 1 July 2002 to new vehicles, and with effect from January 2007 will apply to vehicles registered before 1 July 2002. Manufacturers and importers are obliged to take back the end-of-life vehicles and must set up a nationwide take-back system, either themselves or through a third party. Market players must ensure that from 2006 onwards at least 85 per cent of the average weight of an end-of-life vehicle is recovered, and that at least 80 per cent of that material is recycled or reused.



Container for waste batteries (labelled:  
Only waste batteries - no other waste)



## Batteries

Each year in Germany more than one billion batteries and accumulators enter the market. The Battery Ordinance regulates their recovery. The quota recovered has risen from initially 19 per cent to 82 per cent today, thus conserving resources. The increase was possible on account of the development and use of innovative sorting technology. According to the EU's new Battery Directive, which is expected to be adopted in 2006, all EU Member States will be obliged to separately collect and recover all waste batteries.



Recycling mobile phones

## Electrical and electronic scrap

Industrialised countries in particular are faced with a growing mountain of used appliances. The volume of electrical and electronic scrap is growing three times more rapidly than municipal waste. Experts estimate that around 1.8 million tonnes of used appliances accumulate in Germany every year. 27 million mobile phones were sold in Germany in 2004, but the average service life is only around three years. Worldwide, 400 million mobile phones are discarded every year. Similar figures apply to larger appliances such as personal computers (PCs). Unfortunately, many of these appliances are still being disposed of without any of their components being recycled, leading to major adverse environmental impacts on account of the hazardous materials they contain.

Since it came into force on 24 March 2006, the **new Electrical and Electronic Appliances Act** has allowed consumers in Germany to return old electrical and electronic appliances free of charge to local authority collection points. Since that date manufacturers have been obliged to accept the returned appliances and to recycle them. Since 24 March 2006 extended producer responsibility also applies to end-of-life appliances used for commercial purposes.

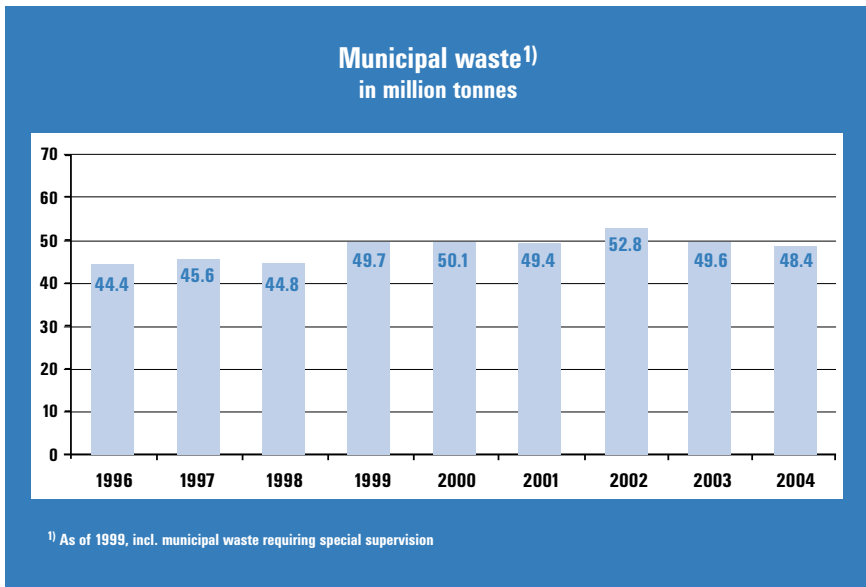
On account of this national legislation, Germany is one of the minority of EU Member States to have implemented the two EU Directives on the disposal of end-of-life electrical and electronic appliances and on the use of certain hazardous substances in new appliances. It is hoped that as a result of these Directives consumers will in future be able to purchase more environmentally friendly, readily recyclable new appliances with a particularly long service life and that it will be possible to remove pollutants in a targeted fashion.

In addition, since 1 July 2006 manufacturers have been prohibited from using particularly hazardous substances such as lead or cadmium in electrical and electronic appliances.

# HIGH STANDARDS IN WASTE MANAGEMENT

## Municipal waste

Municipal waste comprises waste from private households and similar institutions, as well as domestic-type waste produced by trade and industry. Municipal waste includes, for example, household waste, separately collected biowaste, bulky waste, road-sweeping and market waste, and separately collected recoverable materials such as glass and paper. In total, 48.5 tonnes of municipal waste was produced in 2004. Of this, around 58 per cent was recovered.

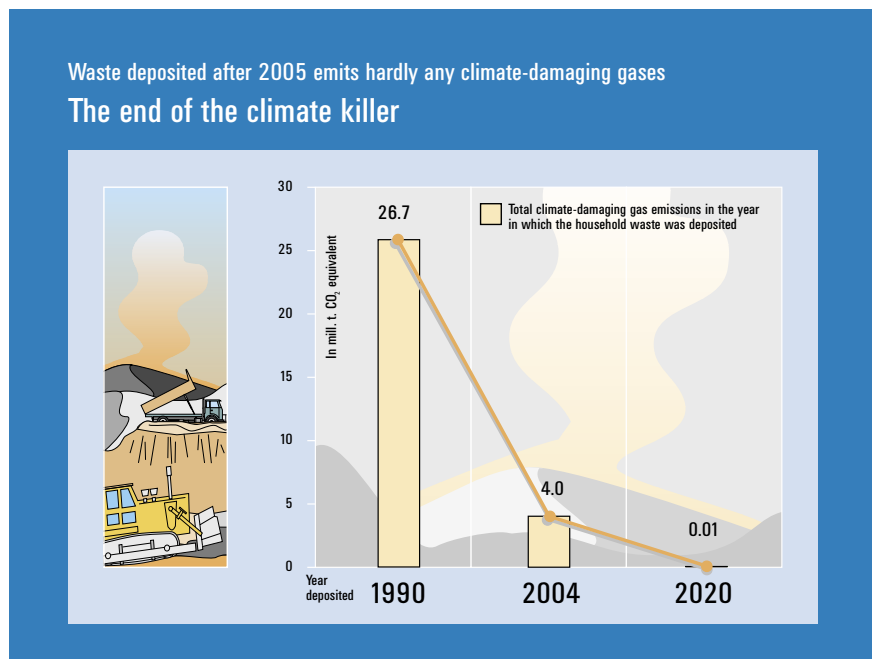


Source: Federal Statistical Office 2005, Federal Environment Agency (UBA) 2006

In accordance with the Ordinance on Environmentally Compatible Storage of Waste from Human Settlements and on Biological Waste Treatment Facilities of 2001, as of 1 June 2005 residual waste from households and industry is to be treated in such a way which prevents biological conversion processes from occurring in landfills. This presupposes that the residual waste is pre-treated by thermal or high-end mechanical-biological methods. This pre-treatment turns fermenting, rotting and foul-smelling residues into slag or a substance resembling soil which is no longer harmful

to the environment. The generation of landfill gas will be reduced to almost zero.

This is not only of exceptional importance as regards the protection of land and groundwater, but in particular as regards climate protection, as the methane gas produced is particularly harmful to the climate – 21 times more so than carbon dioxide (CO<sub>2</sub>).



Source: IFEU 2006 study on household waste, Federal Environment Agency (UBA)

Germany's new Ordinance on waste storage goes far beyond the goal set out in the EU's Landfill Directive, which envisages reducing to 35 per cent the volume of biodegradable municipal waste deposited – but not until 2016.

From 2020 all municipal waste in Germany is to be recovered as much as possible and above-ground landfills are to be practically abolished. In order to achieve this goal, residual waste processing procedures need to be developed in such a way as produces only substances which do not need to be stored but can be recycled, thus conserving raw materials.



The „Blue Tower“ in Herten, North Rhine-Westphalia where hydrogen is produced from biowaste

## Biowaste

The **Biowaste Ordinance** ensures that only biodegradable waste with a low pollutant content is utilised as a fertiliser or soil improver after composting or fermentation. The aim is to eliminate the accumulation of pollutants in the soil as far as possible. In addition, composted or fermented biowaste is an important source of humus.

Biodegradable substances must be collected separately if they are to be turned into biowaste composts and fermentation residues with low levels of pollutants. If farmers were to use composted waste as a fertiliser, up to 10 per cent of mineral fertilisers could be replaced. The Biowaste Ordinance is to be amended in the future so that insights gained from biowaste treatment in fermentation facilities can be incorporated.

Around eight million tonnes of biowaste is currently collected separately in Germany. Around 50 per cent of the population of Germany can currently collect biowaste separately. The separate collection of biowaste thus needs to be expanded.

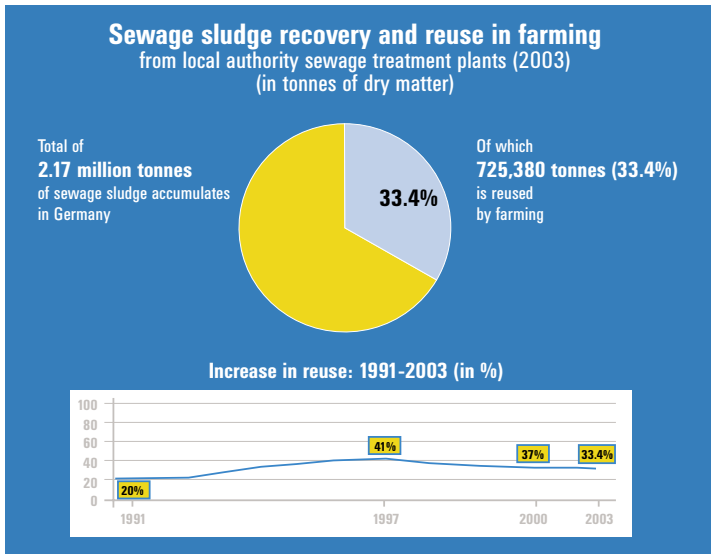
The German government – together with the governments of Austria, Spain and Portugal – is committed to the creation of a European regulation. According to a proposal put forward by the German Federal Environment Ministry, there is to be a transitional phase during which only biodegradable waste from separate collection may be used in the manufacture of compost fertilisers. In addition, minimum requirements are to be imposed on pollutants and foreign materials in compost.

### Waste treatment

Alongside the modern plants for waste incineration and landfilling, a high-tech structure for the treatment of waste has been developed in Germany, including in particular plants for the mechanical-biological treatment, fermentation and composting of biological wastes, for the chemical-physical treatment of hazardous wastes such as waste oil, acid, solvents, chemical residues, aerosol cans, as well as for the processing of slag and the production of secondary fuels. With effect from 1 June 2005 all biodegradable municipal waste must be pre-treated prior to landfilling.

## Sewage sludge

Sewage sludge from local authority sewage treatment plants contains high levels of phosphorous. That is why around 30 per cent of sewage sludge is currently used as a fertiliser. The German government promotes techniques for extracting low-pollutant phosphate from sewage sludge and domestic sewage. During this parliamentary term the Federal Environment Ministry aims to amend the Sewage Ordinance of 1992 in order to better safeguard the interests of precautionary soil protection.



Source: Federal Environment Ministry (BMU)

## Waste oil

End-of-life lubricants such as are used, for example, in machines, engines, transmissions, and turbines and which need to be disposed of in an environmentally friendly manner are classified as waste oil. Since they are extremely dangerous for groundwater and soil, Germany in 1979 introduced regulations governing the complete collection and correct storage of waste oil.

In Germany the waste oil market is purely market-economy-based. Since the provisions of the Waste Oil Ordinance came into effect in 1987 this



Fermenter in a sewage treatment plant

system has been running smoothly. Each year around 463,000 tonnes of waste oil is collected and completely recovered, 70 per cent of the waste oil materially and 30 per cent energetically.

Since the Waste Oil Ordinance was amended in 2002 reprocessing of waste oil has top priority. Thus, separating the hazardous substances from the waste oil produces base oil which can be returned to the lubricant cycle.

## Waste wood

The Waste Wood Ordinance of 2002 sets out concrete requirements governing the material and energy recovery and disposal of waste wood. The Ordinance thus ensures that the environmentally compatible recovery of waste wood is promoted in Germany and that pollutants are not recycled.

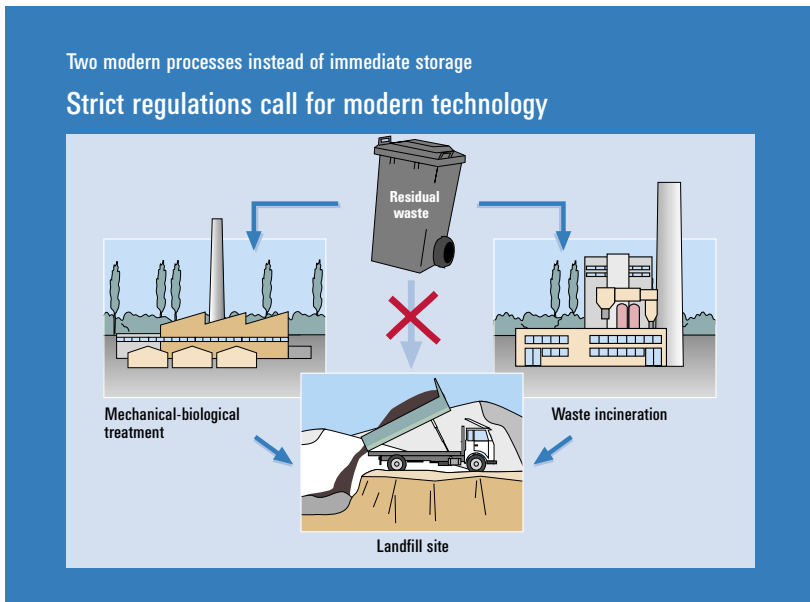
The Ordinance covers production residues from the dressing and treatment of wood and wood materials, as well as end-of-life products such as wooden packaging, pallets, furniture and demolition wood, provided that it constitutes waste.

Overall, the Ordinance guarantees a binding standard for the disposal of waste wood that applies across Germany. It thus creates identical competitive conditions in particular for small and medium-sized waste management companies, since they are the ones primarily active in this area.

## Commercial waste

Around 45 million tonnes of commercial waste accumulates in Germany every year, the majority of which is mixed waste. Mixed waste generally contains very many different recoverable materials and substances, as well as biodegradable materials which can cause problems when landfilled.

The **Commercial Waste Ordinance** came into effect in 2002. It ensures that commercial municipal waste and certain types of construction and demolition waste are separated as far as possible and the majority of commercial waste is recovered.



Source: IFEU 2006 study, Federal Environment Agency (UBA)

Landfill site in 2003:  
Such storage became a thing of the past in May 2005

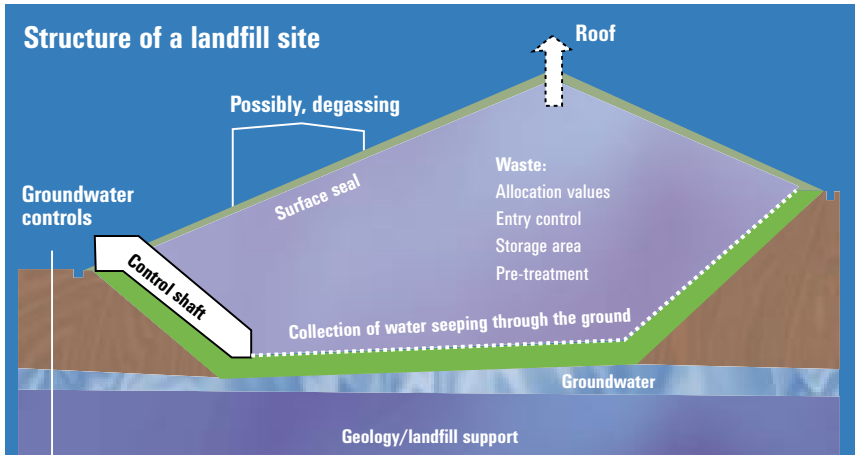


## Storing waste

The Landfill Ordinance of 2002 implemented the EU Landfill Directive and laid down legally binding, high standards for landfill sites depending on the type of waste deposited there and the concomitant risks for the environment. By 2009 at the latest all landfill sites must fulfil these requirements. Those landfills which are incapable of meeting the requirements are being gradually decommissioned since 2005.

The Landfill Ordinance requires that especially **hazardous waste** be disposed of in underground landfills. According to the safety philosophy on which this requirement is based, such waste and the pollutants it contains will be permanently sealed from the biosphere in deep salt mines.

The **Ordinance pertaining to the recovery of waste at surface landfills**, which came into effect in 2005, contains provisions governing under which conditions and in what form waste may be used when setting up, operating and decommissioning above-ground landfills. It thus prevents so-called “phoney recovery”. The **Underground Waste Stowage Ordinance**, which came into effect in 2002, contains comparable provisions governing underground waste processing.



Source: Federal Environment Ministry (BMU)

## Controls

The **Ordinance on Waste Recovery and Disposal Records** came into force in 1996. It enables the responsible monitoring authorities to control whether waste is being properly disposed of. Every year the authorities charged with monitoring waste management examine approximately 125,000 disposal records and 2.5 million accompanying certificates.

New legislation and the **Ordinance to Simplify the Monitoring of Compliance with Legislation on Waste Management** will assist in this process. German waste management legislation must be harmonised with EU regulations and modern communication technology introduced in the monitoring of waste management legislation. This simplification will benefit environmental protection and the economy in equal measure.



## WASTE EXPORTS AND IMPORTS

Germany is one of the 170 signatories to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal created in 1989. The Basel Convention aims to control transboundary shipment of waste, as well as to prevent the undesirable export of waste. It is expected that the amendment to the EC Regulation on the supervision and control of shipments of waste will be adopted in mid-2007. It will apply directly to Germany.

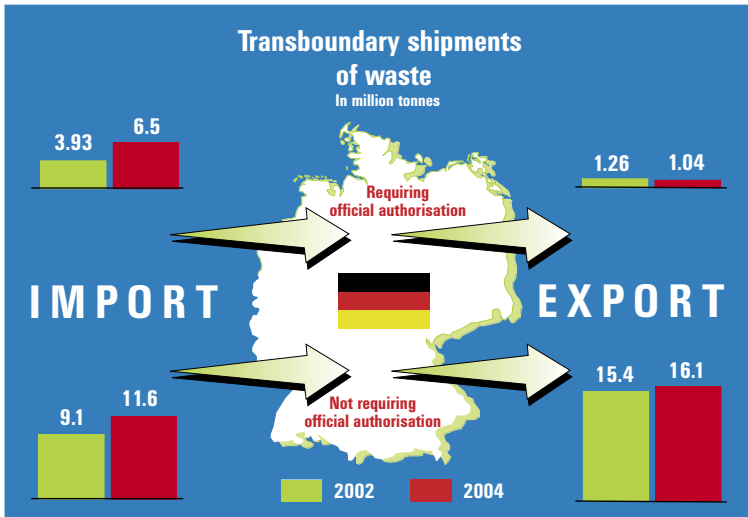
## Transboundary shipments of waste

Germany is economically integrated into the EU and, with nine immediate neighbours, lies in the heart of Europe. National borders no longer constitute obstacles to goods traffic within Europe. This promotes the exchange of goods.

### How much waste is imported and exported?

Around 4 per cent of the total of 386 million tonnes of waste produced in Germany every year is exported and imported. In 2004 6.5 million tonnes of notifiable waste was imported, 1.04 million tonnes exported. The responsible authority must first approve such imports and exports. In comparison, 11.6 million tonnes of non-notifiable waste (which does not require prior authorisation by an authority) is imported and 16.1 million tonnes of non-notifiable waste is exported.

Within the EU waste which is being transported to the place where it is to be recovered is classified as “goods”. Generally speaking transboundary movement of waste involves secondary raw materials. The shipment of waste which is to be disposed of or which is classed as risky must first be authorised by the competent authority.



Source: Federal Statistical Office, 2006, Federal Environment Ministry (BMU)

## INFORMATION AVAILABLE ON THE INTERNET

The Federal Environment Ministry's website includes pages with lots of additional information, links and references, in particular regarding the information offices of the various waste industry and environmental associations:

- ▶ [www.bmu.de/3865](http://www.bmu.de/3865): Up-to-date information and press releases on the German government's waste management policy
- ▶ [www.bmu.de/fb\\_abf/?fb=2970](http://www.bmu.de/fb_abf/?fb=2970): Waste management policy of the federal government, federal *Länder*, EU, and trade and industry
- ▶ [www.bmu.de/fb\\_abf/?fb=2950](http://www.bmu.de/fb_abf/?fb=2950): Exports of waste
- ▶ [www.bmu.de/fb\\_abf/?fb=3168](http://www.bmu.de/fb_abf/?fb=3168): Construction waste
- ▶ [www.bmu.de/fb\\_abf/?fb=3226](http://www.bmu.de/fb_abf/?fb=3226): Waste packaging
- ▶ [www.bmu.de/fb\\_abf/?fb=3015](http://www.bmu.de/fb_abf/?fb=3015): Electrical and electronic scrap
- ▶ [www.bmu.de/fb\\_abf/?fb=3009](http://www.bmu.de/fb_abf/?fb=3009): Waste batteries
- ▶ [www.bmu.de/fb\\_abf/?fb=6928](http://www.bmu.de/fb_abf/?fb=6928): End-of-life batteries
- ▶ [www.bmu.de/fb\\_abf/?fb=35459](http://www.bmu.de/fb_abf/?fb=35459): Waste oil
- ▶ [www.bmu.de/fb\\_abf/?fb=3151](http://www.bmu.de/fb_abf/?fb=3151): Waste paper
- ▶ [www.bmu.de/fb\\_abf/?fb=3157](http://www.bmu.de/fb_abf/?fb=3157): Waste glass
- ▶ [www.bmu.de/fb\\_abf/?fb=3162](http://www.bmu.de/fb_abf/?fb=3162): Biowaste
- ▶ [www.bmu.de/fb\\_abf/?fb=3198](http://www.bmu.de/fb_abf/?fb=3198): Sewage sludge

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