

# ENVIRONMENT

## Environmental-Economic Accounting in Germany 2001

Results of the Federal Statistical Office presented on the press conference in Frankfurt am Main in Oktober 2001

### Content

- 1 The productivity of using nature
- 2 Water and waste water
- 3 Emissions of carbon dioxide
- 4 Tables
- 5 Annex

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## 1 The productivity of using nature

Any economic activity, be it the production of goods and services, be it consumption, involves using our natural environment. There are many ways of using nature. Materials are withdrawn from nature as raw materials, areas are used as a location for economic activities, and for the discharge of residuals nature is used as a sink, i.e. substances are taken up by nature.<sup>1</sup>

Doing business in line with the principle of sustainability requires dealing with nature as carefully as possible, so that future generations, too, may enjoy an intact environment. The use of the environment as a source of resources may be measured through the quantities of natural **input factors** such as the consumption of raw materials and energy, as well as the kind and intensity of land use. The use of nature as a sink for residuals can be measured only indirectly, that is through the quantities of residuals discharged. If we establish a relation between the various quantities measured in physical units and the economic performance, we may calculate productivities – similar to studying the economic input factors of labour and capital – as an indicator of the efficiency of using natural input factors. The quantity and productivity trends for the individual environmental input factors however show only whether, and to what extent, the relevant factor is used more carefully than in the past.

### Input factors

For the use of the following input factors in the production process, quantitative trends and productivities can be shown (Table 2):

The use of economic factors

**Labour** - Volume of labour as the total of hours worked (bn hours)

**Capital** - Capital use as consumption of fixed capital  
(DM bn at prices of 1995)

Nature as a source of resources

**Area** - Area used as built-up and traffic area (km<sup>2</sup>)

**Energy** - Energy consumption as the consumption of primary energy (petajoules)

**Raw materials** - Raw material consumption, here measured as the quantities of used abiotic raw materials withdrawn from domestic nature and plus imported abiotic goods (mn t)

**Water withdrawal** - Water consumption as the withdrawal of water from nature (mn m<sup>3</sup>)

Nature as a sink for residuals

**Greenhouse gases** - Pressure on the environment through the emission of greenhouse gases, here: carbon dioxide, methane, dinitrogen monoxide (laughing gas)

**Acidification gases** - Pressure on the environment through the emission of acidification gases, here: sulphur dioxide, nitrogen oxides

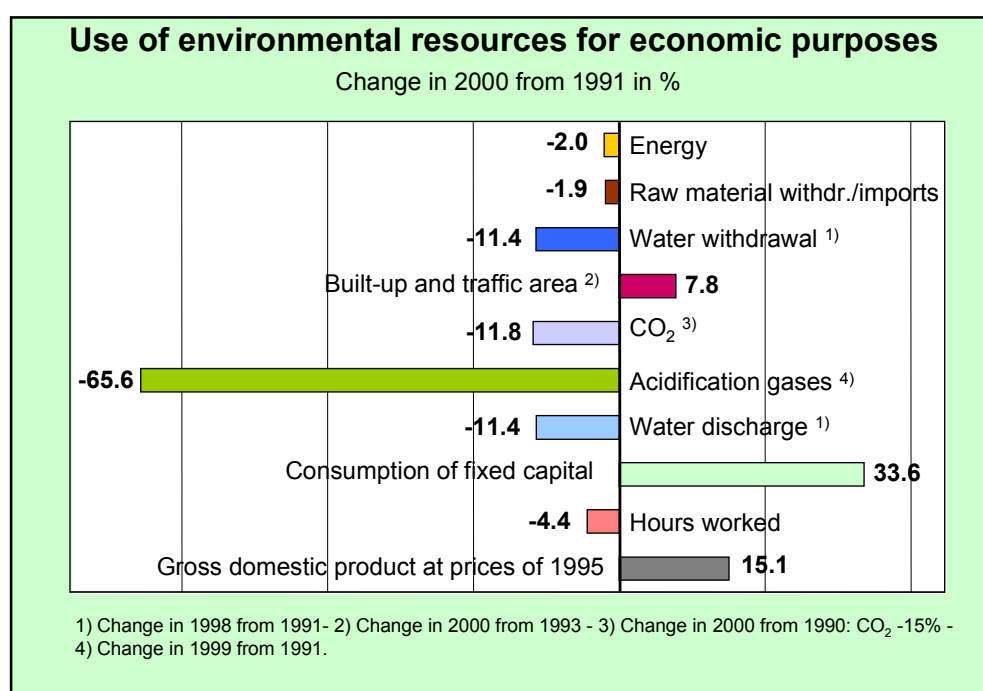
**Water discharge** - Pressure on the environment through the discharge of used water into nature

The goal of Environmental-Economic Accounting is to describe the interactions between the economy and the environment. The starting point is national accounts, which – through Environmental-Economic Accounting – are supplemented by the representation of items that are relevant for the environment. Therefore, in addition to the economic production factors of labour and capital, Environmental-Economic Accounting takes account of the production factor of nature and, consequently, the performance of nature used by the economic system. This includes not only the natural inputs with material character (e.g. raw materials), where nature is used as a source of resources, but also the "services" provided by nature, such as the absorption of residuals. Currently it is not possible to directly measure the input of natural services either in monetary or in physical units. This is why such input is measured indirectly through the quantity of residuals taken up by nature. The relation used here (i.e. that between gross domestic product and the quantity of residuals) thus is what nature contributes to production by absorbing those substances (function as a sink). This ensures that the productivity studies include important aspects of the use of nature which have an impact on changes in the quality of the ecosystems or on climatic changes.

Providing information on the extent to which sustainability has been achieved is possible through the indicators only when applying specific sustainability targets.

In Germany, the quantitative use of most natural factors decreased in the 1990s, although the extent differed considerably. **Nature as a source of resources**, in its function as a raw material and energy provider, was somewhat less heavily used in 2000 than in 1991 (figures 1 and 2). Raw material consumption was down 1.9%, energy consumption 2.0%. If we consider the impact of weather-related fluctuations, however, energy consumption was presumably rather stagnant over the period examined, because average temperatures in 2000 were higher than in the base year 1991. Thus at least part of the decrease in energy consumption shown for that period was due to the more favourable weather in the last year of the period. Another factor influencing the trend of energy consumption was the marked decrease of energy use in the new Länder in the early 1990s. The trend of raw material consumption was mainly influenced by fluctuations in demand for construction raw materials.

Figure 1

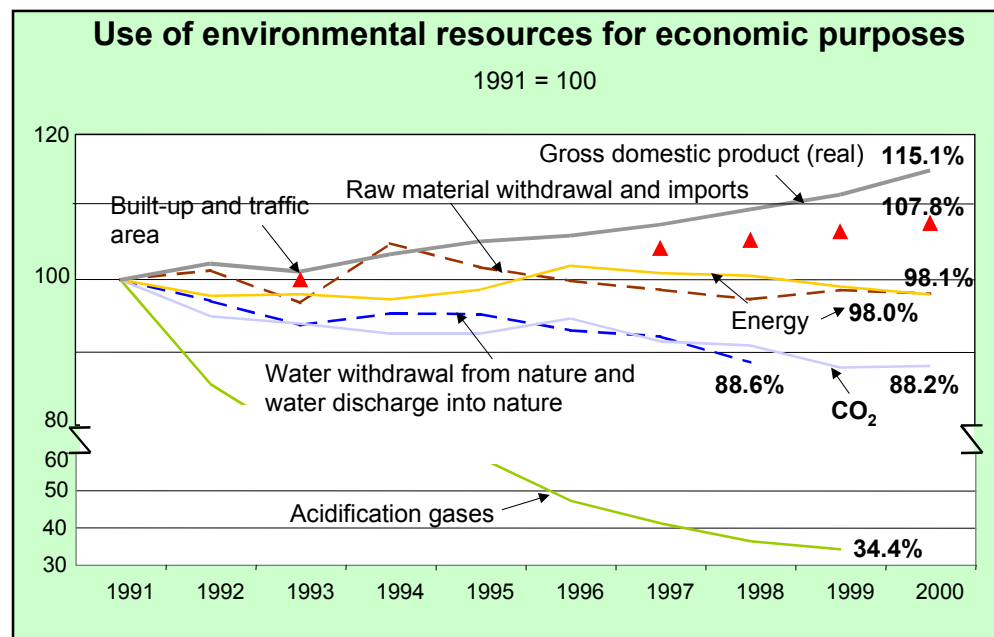


The decrease in the withdrawal of water from nature (-11.4%) between 1991 and 1998 was much larger than that of energy and raw material consumption. The trend of waste water discharge was the same as that of water withdrawal. The decline in water consumption was due in particular to changes of water-relevant legal provisions and a sharp rise in water and waste water charges.

According to provisional estimates of the Federal Office for Building and Regional Planning for 2000, built-up and traffic area increased from 40 305 km<sup>2</sup> in 1993 to 43 447 km<sup>2</sup> in 2000 (+ 7.8%). That was an increase by 123 ha per day over that period. In 2000, the increase was slightly larger (129 ha per day) than over the entire period.<sup>2</sup> Regarding the development of land use, the Federal Ministry for the Environment has set targets for the Environmental Barometer. According to those targets, land use should be reduced from 120 ha per day in the period from 1993 to 1997 to 30 ha per day by 2020. Considering the above increase in the late 1990s, to achieve that goal, a marked inversion of trend would be required which, however, is not in sight yet.

The use of **nature as a sink** for residuals in the context of air emissions has clearly decreased since the early 1990s. The discharge of acidification gases was down 65.6% between 1991 and 1999, reaching a third of the original level. The strong decrease in acidification gas emissions is mainly due to flue gas desulphurisation.

Figure 2

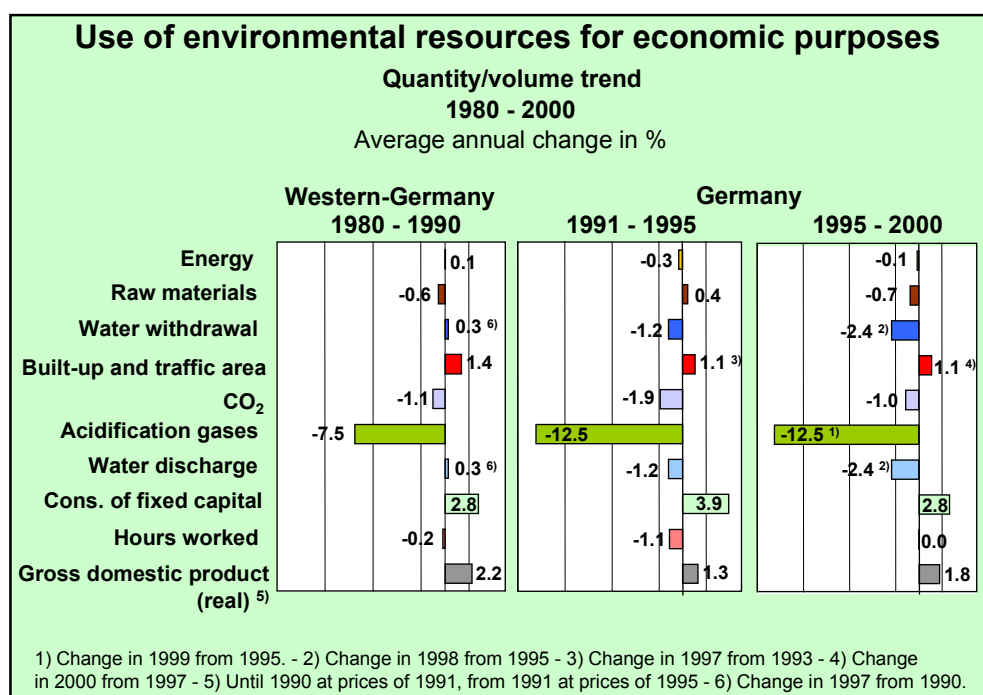


For CO<sub>2</sub> discharge, too, a positive trend was recorded. When put in relation to 1991 – which for reasons of data availability is generally used as a reference year in this report –, CO<sub>2</sub> emissions decreased by 11.8%. As is the case for energy consumption, the decrease in CO<sub>2</sub> emissions, too, is overdrawn by the temperature effect contained in the original figures. The development of carbon dioxide emissions, which is better than the trend of energy consumption, is mainly due to an increased use of energy sources containing less carbon. The use of energy sources containing much carbon, such as hard coal and brown coal, was down 30% and 41% from 1991 to 1999, respectively. Correspondingly, the quantity of natural gas used, which contains less carbon, was up 26% and nuclear energy, which does not produce CO<sub>2</sub> emissions, grew 34%.

Compared with 1990 (the reference year for the Federal Government's goal of reducing the emission of carbon dioxide), the discharge of carbon dioxide (CO<sub>2</sub>) was down 15%. The Federal Government aims at a 25% reduction for the period from 1990 to 2005. Actual CO<sub>2</sub> emissions fell by 153 mn t to 861 mn t between 1990 and 2000<sup>3</sup>. This is an average annual decrease by 15 mn t or 1.6%. More than half of the overall reduction of CO<sub>2</sub> emissions between 1990 and 2000, that is 86 mn t, was achieved between 1990 and 1992. So for the period starting in 1992, the average decrease (8.3 mn t or 0.9% per year) was markedly smaller than for the entire period. To meet the Federal Government's target (reduction to 760 mn t by 2005), CO<sub>2</sub> emissions into the environment in Germany would have to fall an annual 20.2 mn t or 2.4% on average in the years remaining until 2005. With the national climate protection programme adopted in autumn 2000, the Federal Government started additional measures to reduce CO<sub>2</sub> emissions.

When adjusted for price changes, the gross domestic product – measuring economic performance – rose 15.1% in the examined period from 1991 to 2000. The trend in the use of nature caused by such economic growth thus was comparatively moderate. The amount of capital employed – measured through the consumption of fixed capital – rose by just under 34%. That strong increase in capital utilisation and the related technological progress led not only to a reduction in the use of nature but also to a decrease in the input factor of labour, in spite of the growing domestic product. Between 1991 and 2000, the number of hours worked fell 4.4%. Although, compared with the smaller utilisation of the labour factor, the decrease in the use of the environment through the withdrawal of water and emissions of carbon dioxide and acidification gases was larger, the trends for the factors of energy, raw materials and built-up and traffic area were clearly less marked than the savings regarding hours worked.

Figure 3



A long-term examination of the development of the input of natural factors shows that, although the use of such factors increased between 1960 and 1980, it decreased again in the 1980s and 1990s – with the exception of built-up and traffic area (cf. Report on Environmental-Economic Accounting for the press conference in 2000). However, **examining the 1980s and 1990s more in detail** does not reveal really uniform trends (figure 3).

Uniform trends are observed for the growth of built-up and traffic area and for the reduction of CO<sub>2</sub> and acidification gas emissions for western Germany in the 1980s and for Germany in the first and the second half of the 1990s. The use of area for built-up and traffic area in western Germany rose an average 1.4% per year in the 1980s. Both in the period from 1993 to 1997 and from 1997 to 2000, the average annual increase for Germany (+1.1% each) was somewhat smaller. Both for the CO<sub>2</sub> emissions and the acidification gas emissions, the average annual reduction in the 1990s was larger than in the 1980s.

For the other natural factors, the trends of utilisation in the three periods examined (1980s, first half and second half of the 1990s) differed. For energy consumption, the differences between the 1980s and the 1990s were rather small. In the 1980s, a small rise by an average 0.1% per year was observed for western Germany. In Germany, the average decrease in the first half of the 1990s (-0.3%) was somewhat larger than in the second half (-0.1%). The use of raw materials grew an average 0.4% per year in the first half of the 1990s, one reason being the construction boom in the new Länder at the time. The decrease in the

#### Productivity – An indicator of the efficiency of factor use

The productivity of an input factor indicates how much economic output is produced by using one unit of the factor concerned.

$$\text{Productivity} = \frac{\text{Gross domestic product (real)}}{\text{Input factor}}$$

Productivity indicates how efficiently a national economy deals with the use of labour, capital and nature. Due to their different qualities and functions, those factors cannot directly be compared with each other. However, by observing their development over long periods one may obtain information on how the relations between the factors have changed.

It must also be noted that for the calculation of productivities the entire real yield of the economic activity is referred only to the production factor concerned, although the product is created through the joint action of all production factors. Therefore productivities as calculated can serve only for rough orientation.

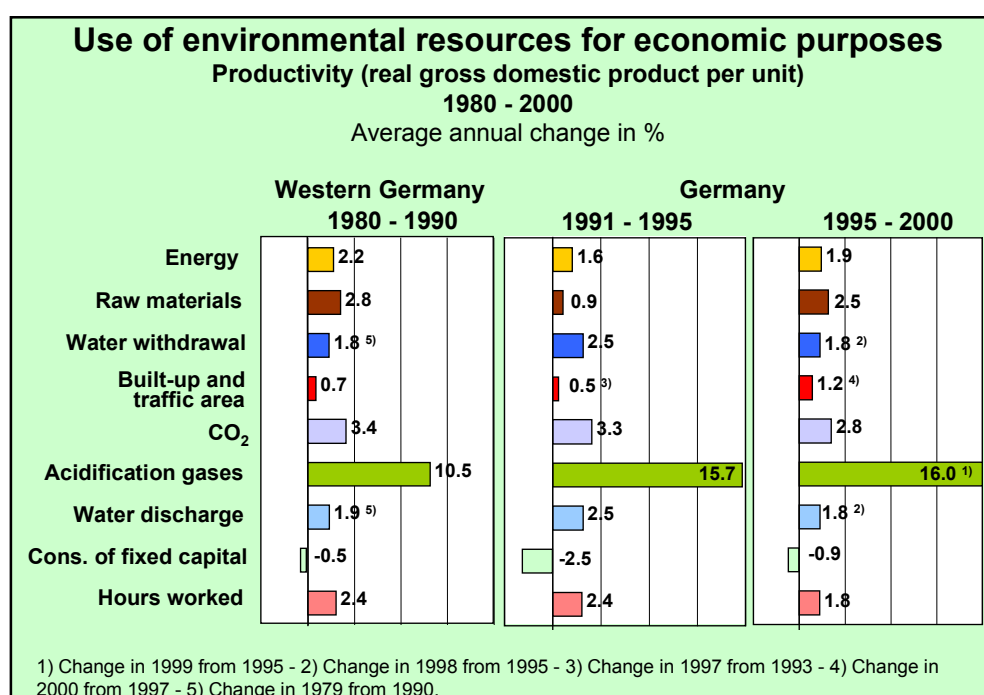
second half of the 1990s (-0.7% per year), however, was larger than in western Germany in the 1980s (-0.6%). Both for water withdrawal from nature and for the quantity of water discharge, the decrease in the second half of the 1990s (-2.4% per year) was markedly larger than in the first half of the 1990s (-1.2%). In the 1980s, a slight increase was recorded for both items (+0.3%). Altogether, for most of the production factors examined, the quantities used – showing the extent of environmental burdens – fell in the second half of the 1990s; in some cases, the decrease was much stronger than in western Germany in the 1980s. Only the use of areas still shows rather stable growth rates at a high level.

However, the utilisation of natural input factors caused by the economic development differed between the three comparative periods. In the period from 1980 to 1990, the annual average growth of the price-adjusted gross domestic product in western Germany (+2.2%) was considerably larger than in Germany in the 1990s (+1.3% from 1991 to 1995 and +1.8% from 1995 to 2000).

From the aspect of the efficiency of using natural input factors, the result thus differs from what was obtained when examining absolute quantities. The **efficiency** in using natural input factors - measured as the productivity, i.e. economic performance (real gross domestic product) per unit of an input factor - increased in the 1980s and 1990s for all factors examined, however to differing degrees (figure 4). Especially when comparing the second half of the 1990s with the 1980s, an examination of efficiency shows other results than an examination of absolute quantities used. Such absolute quantities in the second half of the 1990s showed larger decreases and smaller increases in Germany than in the 1980s (see figure 3), whereas a study of productivities provides a varied picture: For built-up and traffic area and for acidification gases, the average annual increases in productivity in the second half of the 1990s were larger than in the 1980s (built-up and traffic area 1.2% versus 0.7%, acidification gases 16% versus 10.5%). For the factors energy, raw materials and carbon dioxide, however, lower productivity growth rates were recorded than in the 1980s. For all natural input factors, with the exception of built-up and traffic area, the growth in productivity in the second half of the 1990s, however, was at least at the same level (water) as the increase in labour productivity (1.8%) or above that rate.

With regard to the development of energy and raw material productivity, the Federal Ministry for the Environment has set **targets** in the context of the Environmental Barometer. Energy productivity should double between 1990 and 2020. Between 1990 and 2000 it rose by

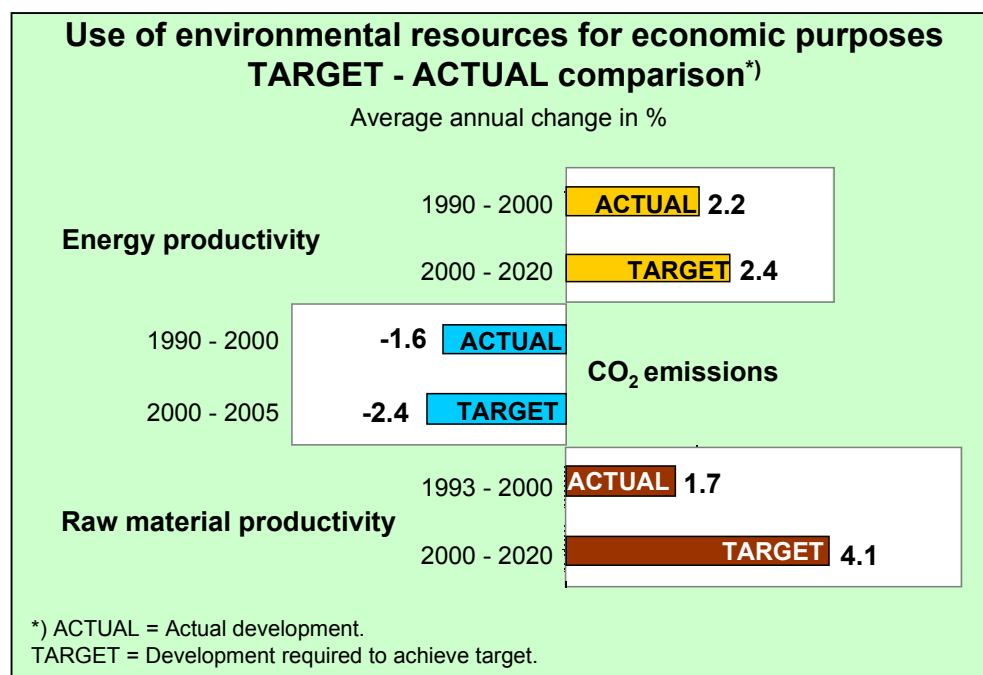
Figure 4



about 24%. This corresponds to an annual average growth of 2.2% (figure 5). To meet the

target set by the Federal Ministry for the Environment, an average annual increase by 2.4% would be required for the remaining years until 2020. For raw material productivity, a 2.5-fold increase on the level of 1993 is envisaged for 2020. It rose 12.3% between 1993 and 2000, which is an annual average increase of 1.7%. To meet the target set by the Federal Ministry for the Environment for the increase in raw material productivity until 2020, an average annual increase of raw material productivity by 4.1% would be required in the years after 2000. This means that for both productivity indicators a much faster development is required to meet the targets. Although the comparison between the first and the second half of the 1990s shows clear tendencies towards a faster development, the level of productivity development required to meet the political targets was not reached in that period.

Figure 5



<sup>1</sup> In addition to its function as a sink, other services provided by nature should be mentioned such as the buffer, recreation and production functions.

<sup>2</sup> The impairments of nature and landscape caused by the use of area for built-up land and land used for traffic purposes can in part be compensated for by compensation or replacement measures (Articles 8, 8a Federal Law on Nature Conservation); it is not possible yet to provide quantitative information on that issue.

<sup>3</sup> Data source: Federal Environmental Agency.



## 2 Water and waste water

The principle of **sustainable water management** is an element of Agenda 21, adopted at the Environment Conference in Rio de Janeiro in June 1992. There, it is considered necessary to protect water as a natural resource and to deal with it in a manner that is compatible with nature, efficient in economic terms and fair from social aspects. Also, the new EU framework Directive on water (Directive 2000/60/EC) creates a uniform frame for water protection and shows criteria for the assessment and preservation of water resources, thus contributing to sustainable use of water.

### Water flow accounts

Various data sources are used for the water flow accounts forming part of Environmental-Economic Accounting (UGR). Most of the basic data are taken from official statistics (statistics on water supply and waste water disposal in mining and manufacturing and in thermal-electric power plants for public supply as well as statistics of public water supply and waste water disposal). To bridge data gaps, other data (e.g. on agriculture) from publications of official statistics and of scientific institutes and organisations are used.

The goal of UGR is to show water flows in a breakdown by homogeneous branches and industries - from water withdrawal from nature to its passing into the economic system and the discharge of water into the natural system - and to draw up a complete balance of all water and waste water flows that are relevant for the economic process. This report shows the results by industries (national classification of economic activities, WZ 1993).

The water withdrawn from nature is used for various economic activities, including production processes of businesses and consumption of private households. In the economic process, water is distributed, incorporated in or removed from products, and it can be exported or imported. Water is discharged into nature in the form of waste water or evaporation.

From environmental aspects, the withdrawal of water from nature and the discharge of waste water into nature is relevant in more than one respect.

Withdrawing water from nature may pose a problem even if the amount withdrawn is far below the threshold of the regeneration rate of the natural water supply. This is because water withdrawal always interferes with natural processes and, consequently, has an impact on the natural systems such as ecosystems or groundwater systems. The environmental quality may be heavily impaired by waste water. Most of the water withdrawn is returned to nature in the form of waste water, i.e. in a different condition and generally at a different location. Relevant aspects of the discharged water are its quantity and, in particular, its quality.

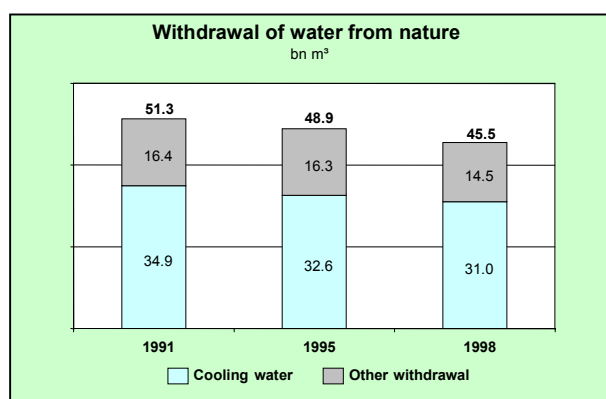
The results presented here have been taken from water flow accounts forming part of Environmental-Economic Accounting. Major data sources for calculation are environmental statistics. The goal of water flow accounts is to represent water and waste water flows caused by economic activities. For the time being, the report focuses on the quantitative representation of water flows at the national level, broken down by types of water and waste water. It is intended to supplement those data by additional information in the future. A working group of the statistical offices of the Länder has started setting up a regional presentation of such accounts. As part of Environmental-Economic Accounting, the Federal Statistical Office is developing a procedure to determine the pollutant loads in waste water.

### Withdrawal of water

In 1998, a total of 45.5 bn m<sup>3</sup> of water were withdrawn from nature for economic purposes in Germany (figure 6). Comparisons are made between **water withdrawal** and the total **water resources available** in Germany which, on a long-term average, are estimated at 182 bn m<sup>3</sup> per year. Two thirds of the total amount (45.5 bn m<sup>3</sup>) of water withdrawn from nature in 1998 were used as cooling water. In the 1990s, water withdrawal from nature decreased considerably. Between 1991 and 1998, it decreased 11.4% (5.8 bn m<sup>3</sup>). Withdrawal of cooling water was down 11.1% (3.9 bn m<sup>3</sup>).



Figure 6



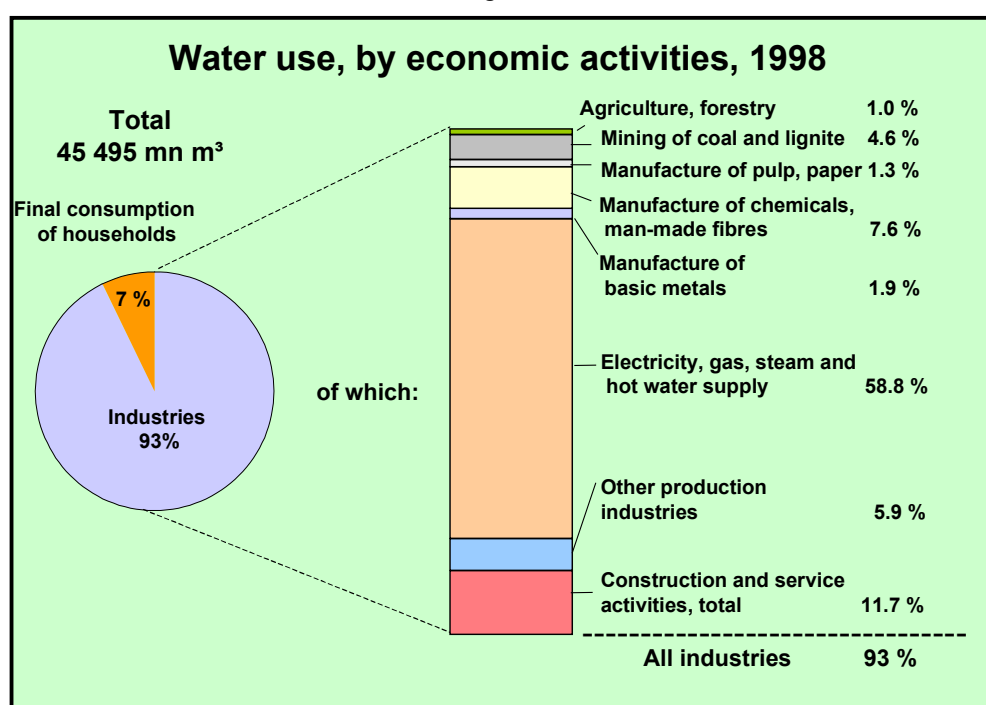
The decrease in water withdrawal from nature was accompanied by a growth in economic performance (+9.7%), measured as the trend of the real gross domestic product in 1998 compared with 1991. This means that water was used more and more efficiently. More efficient use of the resource of water was supported especially by the trend of water and waste water prices, and by relevant new technologies such as household appliances and production procedures requiring less water. Producer prices

of water to be distributed to households and the industry rose by just under 50% between 1991 and 1998. That increase was clearly larger than the increase in total producer prices (+3.2%) over the same period.

**Water use in the individual industries** (production) and for household consumption showed quite different trends. Water use in the industries and in households is composed of the water withdrawn by the relevant sector itself plus water received from other sectors, minus water transferred to other units. According to the concept of Environmental-Economic Accounting, the entire water use also includes foreign water and rainwater, water losses and water discharged without having been utilised. At the macroeconomic level, the volume of water used differs from the quantity of water withdrawn from nature only by the balance of water exports and imports (water flows across the borders of Germany).

Out of the total volume of water used (45.5 bn m<sup>3</sup>), production accounted for 93% and households for 7% in 1998 (figure 7). Far more than half of the water used within Germany was used in the economic sector of "electricity, gas, steam and hot water supply" (59%), where it was used almost only as cooling water. Other sectors that had large shares in the total volume of water used were "manufacture of chemicals, chemical products and man-made fibres" (8%), "mining of coal and lignite" (5%), "manufacture of basic metals" (2%),

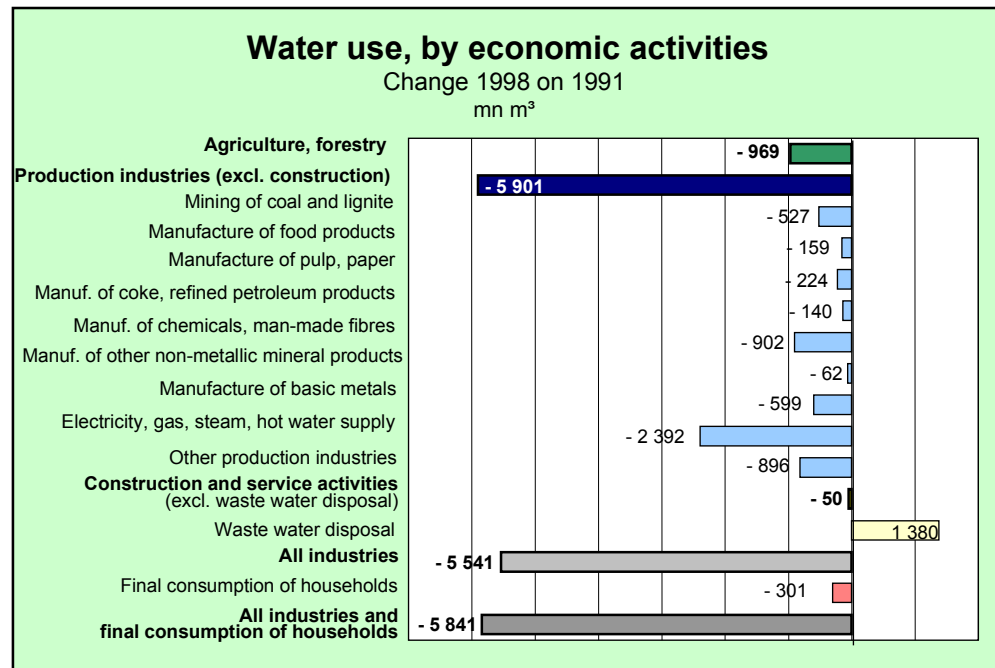
Figure 7



"manufacture of pulp, paper and paper products" (1%) and "agriculture, forestry" (1%). Nearly all the water used in "mining of coal and lignite" was mine water discharged without being used, while in "agriculture, forestry" the main part was irrigation water.

Except for "waste water disposal", all important industries showed a declining volume of water used (figure 8). The most marked decreases were recorded for the sectors "electricity, gas, steam and hot water supply" (2.4 bn m<sup>3</sup> or -8.2%), "agriculture, forestry" (969 mn m<sup>3</sup> or -67.5%), "manufacture of chemicals, chemical products and man-made fibres" (902 mn m<sup>3</sup> or -20.7%) and "manufacture of basic metals" (599 mn m<sup>3</sup> or -40.9%).

Figure 8

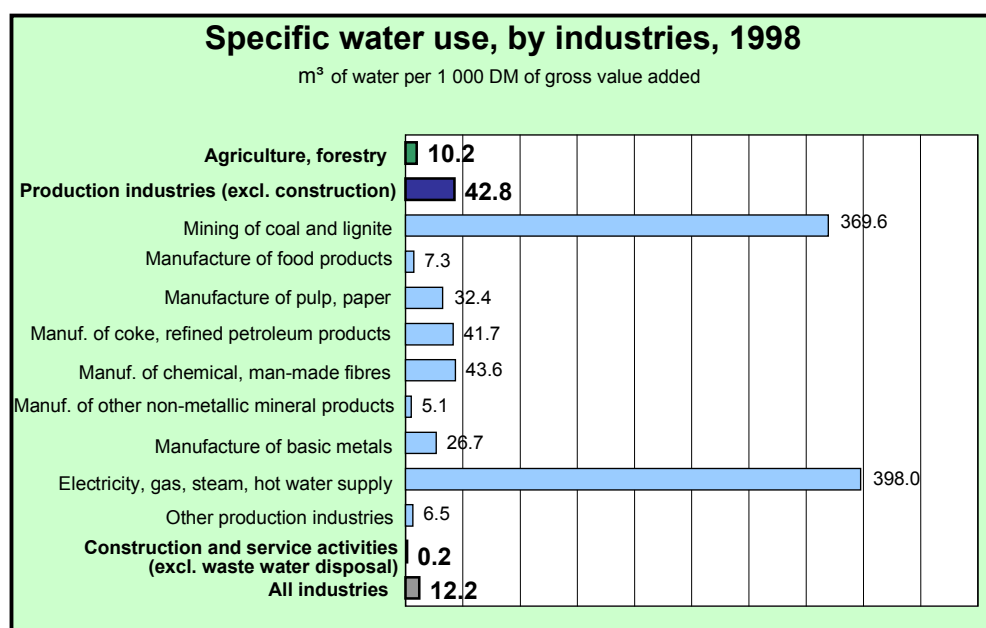


The increase in water consumption in the sector of "waste water disposal" (+1.4 bn m<sup>3</sup>) was due to the marked rise in the quantity of foreign water and rainwater, which is allocated to that sector. The reasons for an increase in the amount of foreign water and rainwater are the extension and restoration of the sewage network. The rather strong decline in the volume of water used in "agriculture, forestry" to about a third of the original level was due mainly to the fact that 1998 was a rainy year and that the use of irrigation water in the new Länder was reduced again.

The reasons for the reduction of water use in production industries included factors within businesses. In particular, the multiple and circulatory use of water increased. The ratio between the total quantity of water used and the quantity of water used in businesses rose from just over 4:1 in 1991 to nearly 5:1 in 1998. Especially in the industries of "manufacture of chemicals, chemical products and man-made fibres", "manufacture of basic metals" and "mining of coal and lignite", employing low water consumption technologies and substituting water by other substances such as emulsions play a major part.

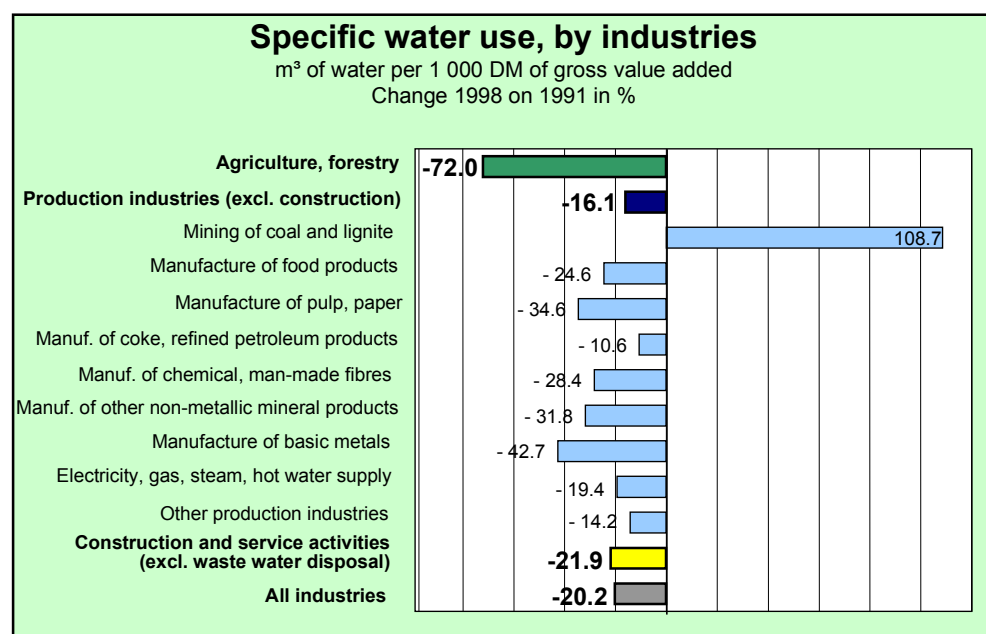
The level of **specific water use** - measured as water use per gross value added - differs between industries because of the technological situation and the resulting amount of water required (figure 9). On an average of all industries, 12.2 m<sup>3</sup> of water per DM 1 000 of gross value added were used in 1998. In total production industries (excl. construction), specific water use amounted to 42.8 m<sup>3</sup> per DM 1 000. Specific water use is especially high in the sectors of "mining of coal and lignite" (369.6 m<sup>3</sup> of water per DM 1 000 of gross value added) and of "electricity, gas, steam and hot water supply" (398 m<sup>3</sup> per DM 1 000 of gross value added). In "manufacture of chemicals, chemical products and man-made fibres", specific water use amounts to 43.6 m<sup>3</sup> per DM 1 000, in "manufacture of coke, refined petroleum products" to 41.7 m<sup>3</sup> per DM 1 000, and in "manufacture of pulp, paper and paper products" to 32.4 m<sup>3</sup> per DM 1 000 of gross value added.

Figure 9



In the past decade, water was used more and more efficiently. In the industries represented (with the exception of "mining of coal and lignite"), the specific water use decreased from 1991 to 1998. In production industries, specific water use was down 16.1%, while in construction and service activities together it was down 21.9%. Within production industries, the trend of specific water use was -42.7% in "manufacture of basic metals", -34.6% in "manufacture of pulp, paper and paper products", and -31.8% in "manufacture of other non-metallic mineral products" (figure 10).

Figure 10

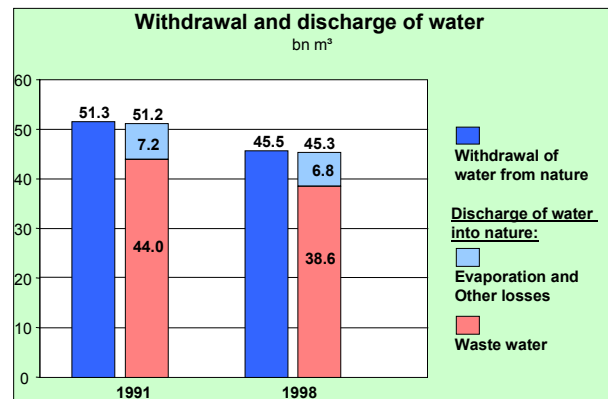


In "mining of coal and lignite", however, specific water use was up by 108.7%. The main reason here is a fall in value added due to smaller amounts of material extracted, without this trend having resulted in a similar decrease of water use. It should be noted here that the amount of mining water depends mainly on geological factors.

## Waste water

The level and trend of the amount of waste water depend on the amount of water withdrawn from nature. The difference between the two figures is basically the item "evaporation and other losses" (figure 11). In 1998, a total of 38.6 bn m<sup>3</sup> of **waste water** was discharged **into nature**. As is the case for water withdrawal, the main part of waste water is cooling water. The share of cooling water in 1998 was 79% (30.6 bn m<sup>3</sup>). This referred almost entirely to cooling water from power production processes. The temperature of cooling water discharged is higher than that of water withdrawn, so that it puts pressure on the environment. Also, due to the procedures applied, it may contain chemical substances that are used to protect the cooling systems from being covered by algae and that also put pressure on the environment. Most of the water discharged without prior treatment is mine water, which generally is not polluted.

Figure 11



## Waste water treatment

During mechanical treatment, coarse elements and depositable substances are separated through screens, sand traps as well as sedimentation and preclarifier basins. Generally, however, mechanical treatment is not sufficient to clarify heavily polluted waste water. Therefore, biological procedures have to be applied in addition. This involves the removal of biodegradable substances by microorganisms. During the more intensive chemical waste water treatment, other pollutants such as phosphorus compounds are removed through chemical and chemical-physical processes.

Parallel to the decrease in water withdrawal, waste water discharge too declined in the 1990s. Just under 6.0 bn m<sup>3</sup> were treated waste water and 2.0 bn m<sup>3</sup> were other untreated waste water (figure 12). The volume of waste water fell by 12.3% (-5.4 bn m<sup>3</sup>) between 1991 and 1998 (figure 13). Above-average decreases were recorded for the discharged quantities of treated (-16.8%) and untreated waste water (-15.7%). The volume of discharged cooling water was down 11.1%.

Figure 12

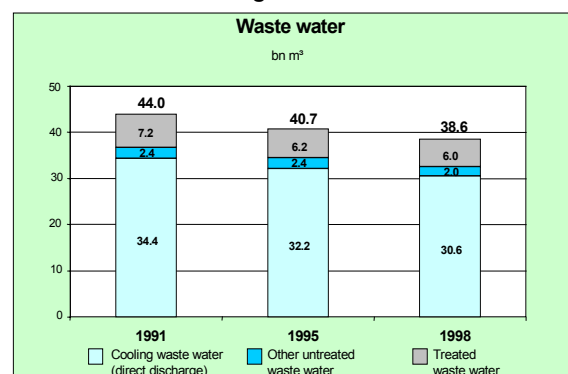
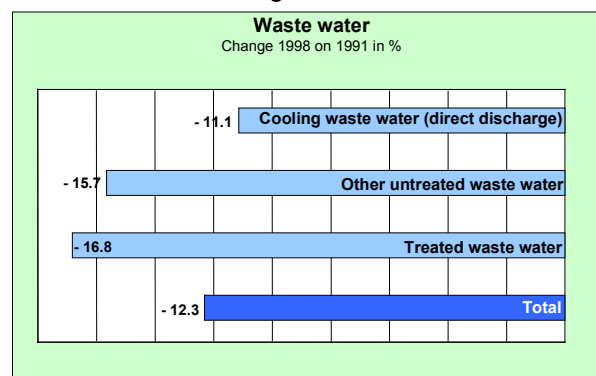


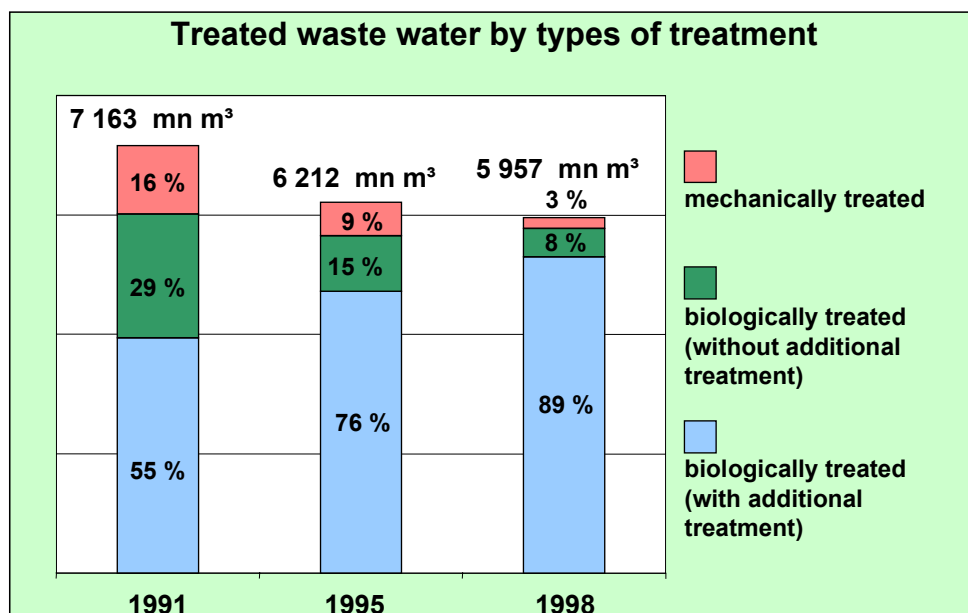
Figure 13



Waste water is discharged – indirectly – through the public sewage system (with or without prior treatment in the businesses' own purification plants) or directly back into nature. There are economic factors exerting influence on how waste water is discharged, e.g. the costs of a business's own purification plant as compared to the costs of an external plant, and legal provisions such as limiting values for pollutants.

The **quality of the treatment** of waste water improved considerably since the early 1990s. The share of biological procedures with additional treatment in the total volume of treated waste water rose from 55% in 1991 to 89% in 1998, while the share of waste water treated only mechanically was down from 16% to 3% (figure 14).

Figure 14



Treating waste water involves considerable **financial costs**, which generally are borne by those who caused the pollution; for instance, in public waste water disposal this is achieved through charges. According to the results of Environmental-Economic Accounting, expenditures to the amount of DM 32.5 bn were made on waste water treatment in 1997 by production industries, general government and the privatised public enterprises working on sewage and refuse disposal; about half of that amount was spent on investments, the other half on the current operation of the water protection plants. This means that the amount spent on waste water treatment was nearly the same as that spent on waste disposal, air quality control and noise abatement together. The value of fixed assets formed over the years for water protection is considerable, too: At the beginning of 1998 that value was DM 377 bn, which is 78% of the total fixed assets for environmental protection and about 2% of fixed assets of the overall economy. Compared with 1991, the value of fixed assets for water protection, measured in prices of 1995, rose by DM 55.5 bn or 17%.

### Water withdrawal in a European comparison

The availability and the utilisation of water in **European countries** are subject to different geological and climatic conditions. The countries in the southern part of the European Union withdraw large quantities of water for irrigation in agriculture, while Central European countries need water mainly for industrial purposes, e.g. cooling water in power production.

#### Withdrawal of water in European Union countries

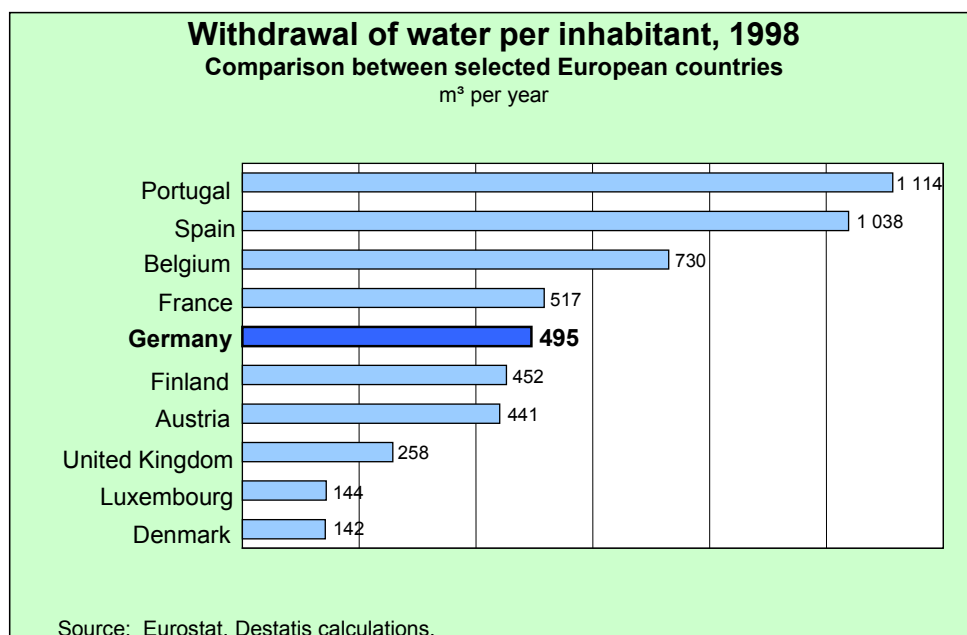
Regarding the statistical data from European Union countries, it should be noted that not all of them are based on the same methodological concepts. Although sea and brackish water have not been included in water withdrawal here, they may be quite important in some countries. In many cases, the data on the withdrawal of water in agriculture refer only to irrigation water, while not taking account of water required for animals. The coverage of cooling water does not always include cooling water used for power generation and for industrial processes.

A comparison of water withdrawal between selected European countries from macroeconomic aspects shows that in 1998 Germany ranked in the middle as regards **water withdrawal per inhabitant** and year (495 m³ per inhabitant and year) (figure 15). However, the

international data cannot fully be compared with the above results of Environmental-Economic Accounting, especially because the data available do not include the withdrawal of foreign water and rainwater.

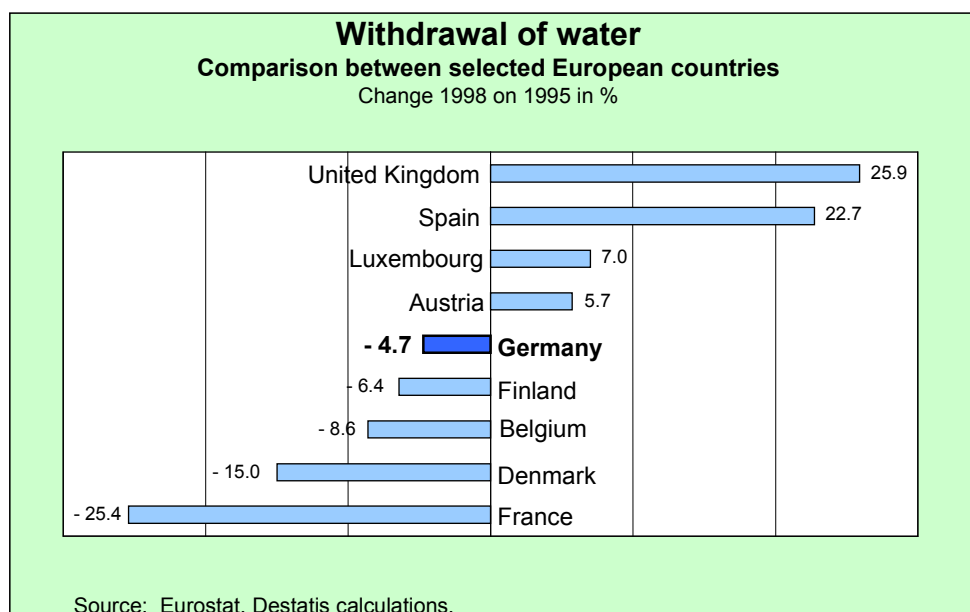
Portugal ranked first in water withdrawal (1 114 m³ of water withdrawn per inhabitant and year), followed by Spain (1 038 m³), Belgium (730 m³) and France (517 m³) (figure 10). In some countries, water withdrawal per inhabitant was lower than in Germany. They include Finland (452 m³), Austria (441 m³), the United Kingdom (258 m³), Luxembourg (144 m³) and Denmark (142 m³).

Figure 15



As regards the **trend of water withdrawal**, Germany also ranked in the middle of the European countries for the examined period from 1995 to 1998. In that period, water withdrawal in Germany fell 4.7% (figure 16). The reduction was much more pronounced in France (-25.4%), followed by Denmark (-15.0%), Belgium (-8.6%) and Finland (-6.4%). Water withdrawal rose, however, in the United Kingdom (+25.9%), Spain (+22.7%), Luxembourg (+7.0%) and Austria (+5.7%).

Figure 16



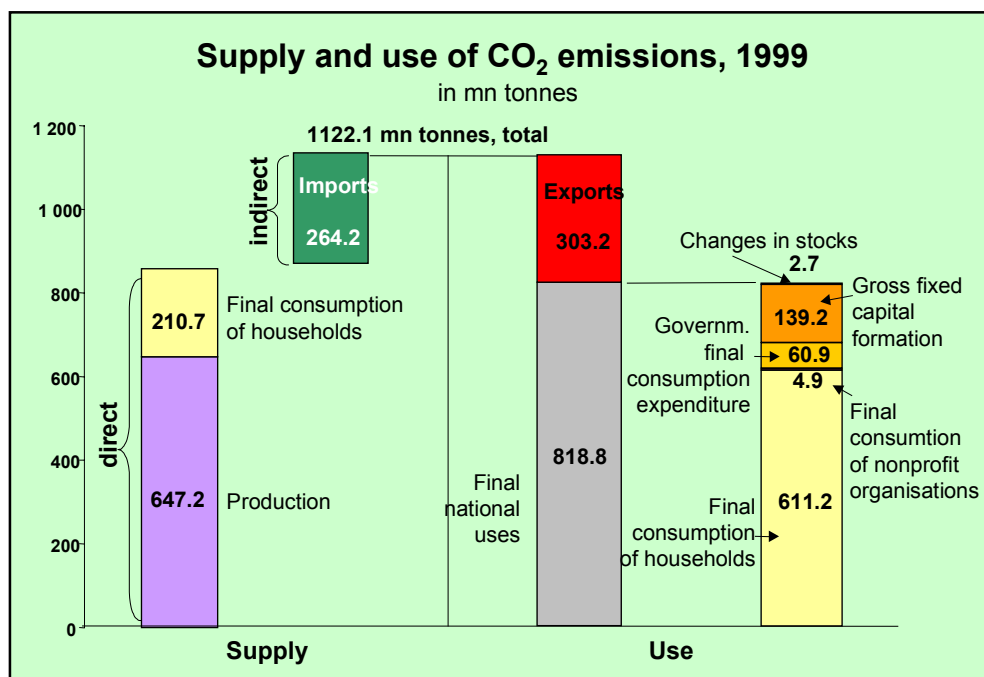
### 3 Emissions of carbon dioxide

#### Overall economy

Emissions of carbon dioxide (CO<sub>2</sub>) are mainly created by the burning of fossile energy sources such as coal, mineral oil and natural gas. Such emissions are a major cause of global warming, as has repeatedly been stated by the Intergovernmental Panel on Climate Change (IPCC)<sup>1</sup>.

Energy consumption and the consequent CO<sub>2</sub> emissions can be examined both from the production aspect and the use aspect, in analogy to the representation of income and value added aggregates in national accounting. This is because CO<sub>2</sub> emissions are produced on the one hand during the production of goods and in part directly through the consumption activities of households (e.g. room heating or individual transport) and, on the other hand, they are caused through the final demand for goods. The **uses side** (figure 17) of CO<sub>2</sub> emissions consists of exports (303.2 mn t) and national uses (818.8 mn t). Major items of the latter are emissions caused by the consumption of goods by households (611.2 mn t), the consumption of goods by general government (60.9 mn t) and fixed capital formation (139.2 mn t).

Figure 17



The **supply side** shows direct emissions, broken down by the activities of production and consumption by households, and emissions caused by the production of imported goods in the rest of the world (indirect emissions). Direct emission of carbon dioxide in Germany caused by economic activities amounted to 857.9 mn t in 1999. Of that amount, 647.2 mn t (75%) were emitted during the production of goods and services and 210.7 mn t (25%) were produced directly through household consumption activities.

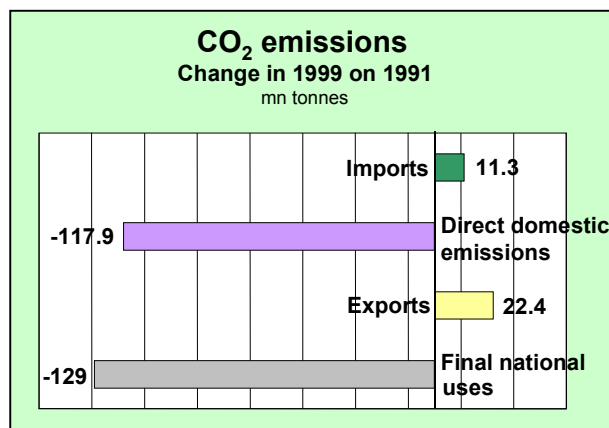
#### Calculating direct emissions into the air

**Direct emissions** of the various air pollutants are calculated for industries and private-households by means of specific emission coefficients (database of the Federal Environmental Agency), energy consumption (database of the German Institute for Economic Research / energy balance) and by taking account of the processes running in the branches.



Between 1990 and 2000, CO<sub>2</sub> emissions decreased by 153 mn t. In the following, the causes of that trend are analysed on the basis of Environmental-Economic Accounting in a detailed breakdown by economic activities. Data for such a detailed analysis are available for the period from 1991 to 1999. For overall analyses of the emission trend, the year 1990 is suited as a reference year, while for structural analyses, the year 1991 should be preferred.

Grafik 18



Between 1991 and 1999, direct CO<sub>2</sub> emissions (production and consumption) decreased by 117.9 mn t (-12.1%) to 857.9 mn t. Direct carbon dioxide emissions of households (consumption) were down by 8.5 mn t (-3.9%) over the period examined (figure 18). Direct emissions in domestic production declined by 109.4 mn t (-14.5%). The decrease thus was much more marked here than that observed for household consumption.

About two thirds of the emissions produced directly through consumption by **households** in 1999 regarded the purpose of "energy" (private heating of buildings, hot water preparation, cooking), while one third was due to the utilisation of motor fuels for private transport. The 3.9% decrease in direct CO<sub>2</sub> emissions by households was contrasted by a rise in price-adjusted final consumption expenditure by 11.2% (see table 4). Over the same period, direct energy consumption of households rose 12.2%, that is even slightly more than final consumption expenditure. This means that the decoupling of the trends of final consumption expenditure of households and of their direct CO<sub>2</sub> emissions is entirely due to the utilisation of energy sources containing less carbon. In particular, households replaced hard and brown coal by natural gas, which contains less carbon. Between 1991 and 1999, the use of natural gas by households rose 49.3%, while the use of hard coal and brown coal was down 56.5%.

The development of direct CO<sub>2</sub> emissions in **production** (industries) is determined mainly by the level of production. With other conditions remaining constant, CO<sub>2</sub> emissions would increase or decrease along with the development of production. Decreases in emissions along with rising production may be achieved if the energy, whose use causes the emission of CO<sub>2</sub>, is used more efficiently, i.e. if businesses succeed in producing the same product while using less energy. That process is supported both by general technological progress and by the relative rise of prices of the production factor of energy.

#### Hypothetical CO<sub>2</sub> emissions

The following factors influencing the trend of hypothetical CO<sub>2</sub> emissions during **production** (all industries) between 1991 and 1999 were taken into account:

- economic output (gross value added at prices of 1995)
- economic structure (shares of industries in the gross value added of production)
- energy intensity of the production (total energy consumption / gross value added) and
- CO<sub>2</sub> intensity of energy consumption (CO<sub>2</sub> emissions / total energy consumption).

The results regarding the hypothetical trend of CO<sub>2</sub> emissions are obtained with the assumption that for one factor the value of 1991 is imputed, whereas for the other factors the values of 1999 are assumed. The difference between hypothetical and actual CO<sub>2</sub> emissions may be interpreted as the impact which the factor kept constant has on the reduction of emissions.

Other potential factors that might contribute to reduction are, as for household consumption, the changeover to using energy sources containing less carbon per energy unit - e.g. replacing coal by natural gas or renewable energy sources - and the structural change towards a production structure with a larger share of types of goods whose production requires less energy. Such structural change is mainly the result of changed structures of demand. It consists of a variety of trends, some of which are countervailing with regard to energy consumption.

The impact of the above four components on the overall trend of CO<sub>2</sub> emissions may be estimated with certain assumptions. The influence of increased efficiency and structural change, however, can be shown separately only if data are available with a sufficiently detailed breakdown by industries, as is the case in Environmental-Economic Accounting.

When determining the impact of the individual components, the actual trend of emissions was compared with a hypothetical trend which would have occurred under the assumption that the factor under examination remained constant over time while for the other three factors the actual trend was assumed. The effects thus obtained can however be considered only as a rough orientation for the contribution of the individual factors to the overall development of CO<sub>2</sub> emission. This is because the level of any effect is also influenced by the level of the other three effects and, in strictly mathematical terms, cannot be added up.

Figure 19

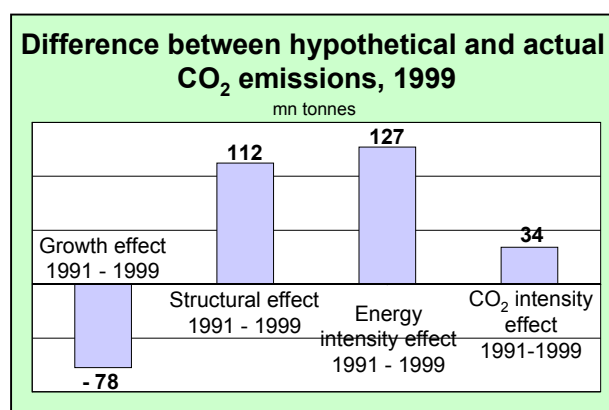


Figure 19 shows, for the period from 1991 to 1999, the difference between the hypothetical and the actual CO<sub>2</sub> emissions. With gross value added remaining the same as in 1991 and other conditions unchanged, CO<sub>2</sub> emission in 1999 would have been smaller by about 78 mn t (growth effect). The other three factors contributed to a decrease of actual CO<sub>2</sub> emissions. Improving the efficiency of energy use in the individual industries reduced CO<sub>2</sub> emissions by an estimated 127 mn t (energy

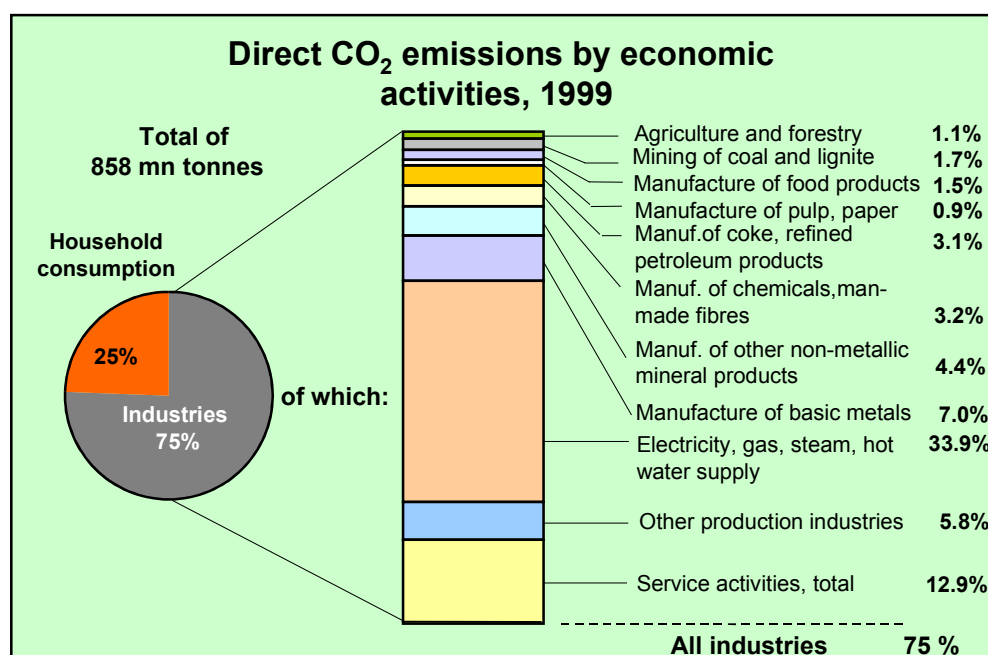
intensity effect). Structural change, i.e. the change in the demand structure of the overall economy towards types of goods that are less energy-intensive (structural effect), accounts for a decrease in emissions by 112 mn t. The increased use of energy sources involving less emission (CO<sub>2</sub> intensity effect) had a comparatively small effect (reduction by 34 mn t).

## Emissions by industries

The distribution of emissions by **industries** clearly shows some concentration. 75% of total direct emissions in 1999 were caused by the production of goods and services, 25% by household consumption (figure 20). Production industries accounted for about 61% of total emissions. About one third (34%) was caused by "electricity, gas, steam and hot water supply". Most of the CO<sub>2</sub> emissions of that branch are caused by electricity generation. "Manufacture of basic metals" ranked second with 7%, followed by "manufacture of other non-metallic mineral products" (a good 4% of all emissions), and "manufacture of chemicals, chemical products and man-made fibres" (3%). The share of "manufacture of coke, refined petroleum products" was 3%, too. It should be taken into account here that the CO<sub>2</sub> emissions of "electricity, gas, steam and hot water supply" (about 291 mn t) resulted from that industry's primary function, which is the transformation of fossile energy sources into electricity and electricity supply to other industries. The service sector together had a share of just under 13%.

For a realistic assessment of the chances to meet the national target for emissions (reducing the emissions by 25% in 2005 compared with 1990), the trends of CO<sub>2</sub> emissions in the

Figure 20



industries for 1999 compared with 1991 are of particular importance. The "big" producers of CO<sub>2</sub> emissions achieved considerable reductions over the last few years. As mentioned above, of the reduction achieved within Germany (117.9 mn t in 1999 compared with 1991), 109.4 mn t were contributed by the economy (figure 21). For example, "manufacture of other non-metallic mineral products" and "service activities, total", however, caused more emissions in 1999 than in 1991. What had a major impact on total services is the marked increase in CO<sub>2</sub> emissions in "trade", "land transport" and "air transport" (see table 33).

If the CO<sub>2</sub> emissions of industries are put in relation to their gross value added, i.e. if we examine the specific CO<sub>2</sub> emissions, the following picture is obtained: The big CO<sub>2</sub> emitters "electricity, gas, steam and hot water supply" and "mining of coal and lignite" show very high specific emissions also when put in relation to their gross value added (figure 22). The change of specific CO<sub>2</sub> emissions in 1999 compared with 1991 shows, however, that "elec-

Figure 21

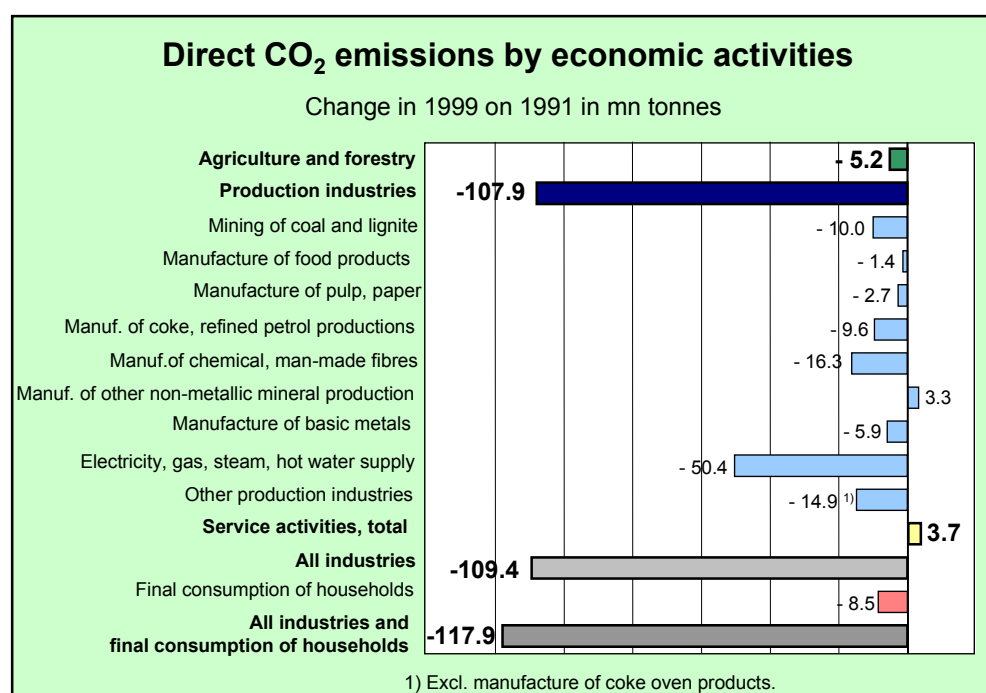
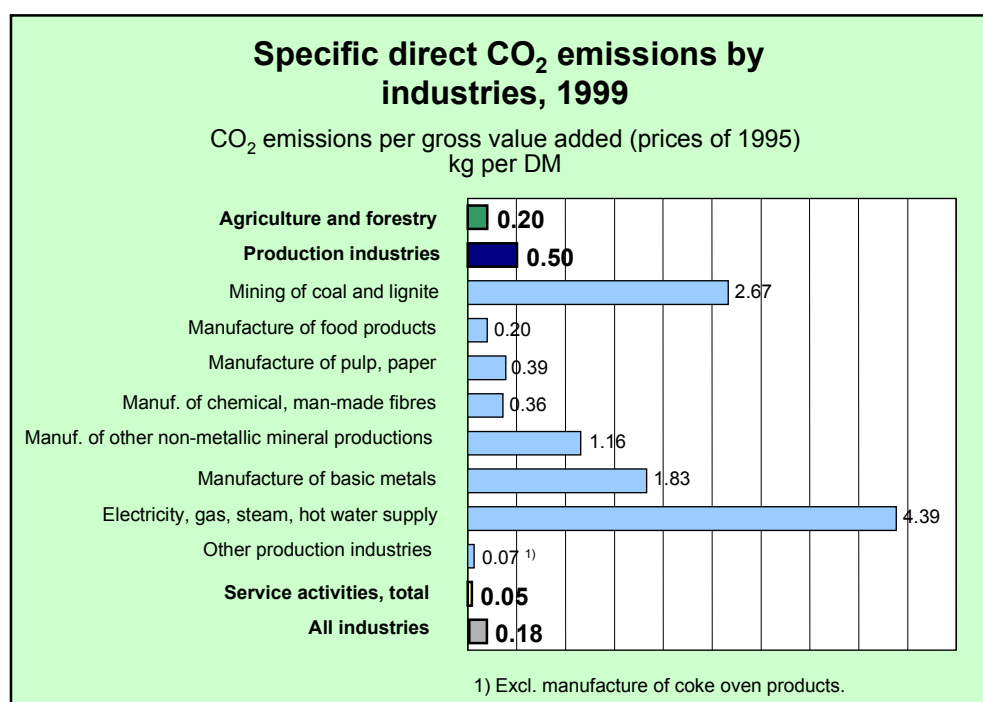
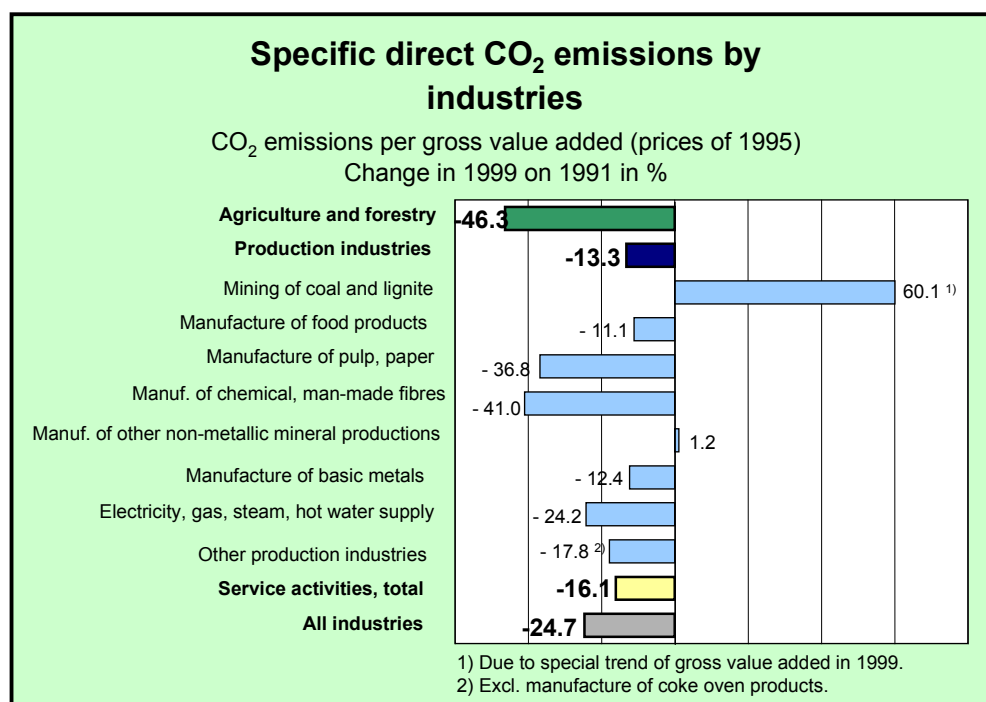


Figure 22



Electricity, gas, steam and hot water supply" reduced the specific CO<sub>2</sub> emissions over time, as did most of the other industries. Among the "big" emitters, only "mining of coal and lignite" showed an increase (figure 23). The marked rise in specific emissions along with falling absolute quantities of emissions in the industry sector is due to special factors connected with the drastic fall in value added there (to about one third).

Figure 23



### Specific CO<sub>2</sub> emission and CO<sub>2</sub> productivity

The **specific CO<sub>2</sub> emission** of an industry indicates how much CO<sub>2</sub> emission was produced to obtain one unit of the economic output (value added) produced there:

$$\text{specific CO}_2 \text{ emission} = \frac{\text{CO}_2 \text{ emission}}{\text{gross value added}}$$

The **CO<sub>2</sub> productivity** of an industry indicates how much economic output (value added) was produced with one unit of the CO<sub>2</sub> emission produced there:

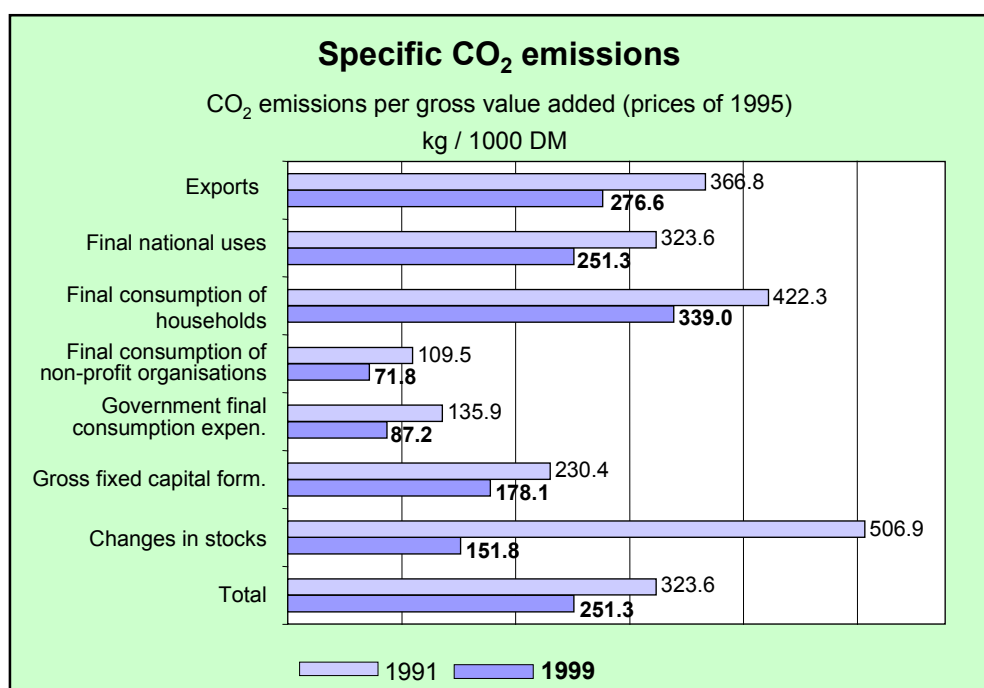
$$\text{CO}_2 \text{ productivity} = \frac{\text{gross value added}}{\text{CO}_2 \text{ emission}}$$

### Foreign trade

The following section examines the impact of foreign trade flows on CO<sub>2</sub> emissions. **Foreign trade** is of substantial importance for Germany. Exports and imports have a major share in the goods and services produced and used in Germany and the relative importance of foreign trade flows is increasing. The value of goods consumed or invested in Germany (final national uses) amounted to DM 3,369 bn in 1999, measured in prices of 1995 (see table 32). In the same year, goods to the value of DM 1,017 bn were imported and goods to the value of DM 1,096 bn were exported. Imports rose 45.0% between 1991 and 1999 and exports were up 43.2%, whereas the quantity of goods used for final national uses increased not more than 11.1%.

The production of imported and exported goods involves the creation of CO<sub>2</sub> emissions and other environmental pressures, which cannot be disregarded because of the great, and further growing importance of such flows. What is especially interesting is the question of whether the trend of decreasing environmental pressure in Germany through direct CO<sub>2</sub> emissions is accompanied by a trend towards relocating CO<sub>2</sub>-intensive production activities to other countries.

Figure 24



The production of imported goods involved 264.2 mn t of CO<sub>2</sub> emissions in the rest of the world (indirect emissions). The CO<sub>2</sub> emissions created in producing exported goods amounted to a cumulated 303.2 mn t, i.e. taking account of the direct emissions and of the emissions created at all pre-production stages (figure 17).

Between 1991 and 1999 the emissions connected with final national uses decreased by 129 mn t (-13.6%) (figure 18). The decrease was slightly larger than that of direct emissions (-117.9 mn t or -12.1%). As regards CO<sub>2</sub> emissions, the data thus do not support the hypothesis that the comparatively favourable trend of direct CO<sub>2</sub> pressure within Germany might be accompanied by a growing relocation of CO<sub>2</sub>-intensive production to other countries. The picture may be entirely different for other pressure factors, as has been shown in the UGR annual report of 2000 for the withdrawal of raw materials from nature.

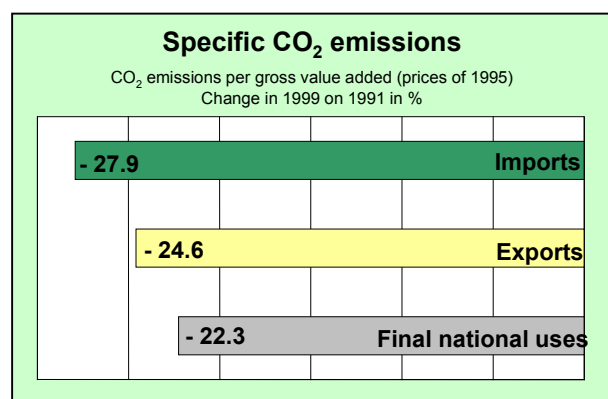
The CO<sub>2</sub> emissions involved in imports rose by 11.3 mn t between 1991 and 1999 (+4.5%) and the emissions caused by the production of exported goods increased by 22.4 mn t (+8.0%), whereas – as shown earlier – the emissions connected with final national uses were down by 129 mn t (figure 18). However, those different trends reflect in particular the growing foreign-trade related interconnections of the German national economy.

#### Cumulated CO<sub>2</sub> emissions

The consumption of energy required for the production of goods and the relevant production of emissions are the direct consequence of a specific activity of industries and private-households. Therefore, this is referred to as the production of **direct CO<sub>2</sub> emissions**. CO<sub>2</sub> emissions created during the pre-stages of the production of goods are referred to as **indirect CO<sub>2</sub> emissions**. The quantity of energy required indirectly abroad and the resulting CO<sub>2</sub> emissions can be taken into account by assuming production structures and technologies corresponding to those in Germany. The total of direct and indirect CO<sub>2</sub> emissions are the **cumulated CO<sub>2</sub> emissions**.

On average, the imported and the exported goods are more CO<sub>2</sub>-intensive than the goods of final national uses. The specific CO<sub>2</sub> emission of imports was 260 kg per DM 1,000 in 1999. The production of exported goods involved the creation of 277 kg of CO<sub>2</sub> per DM 1,000 (figure 24). The specific CO<sub>2</sub> emission of final national uses was 251 kg per DM 1,000.

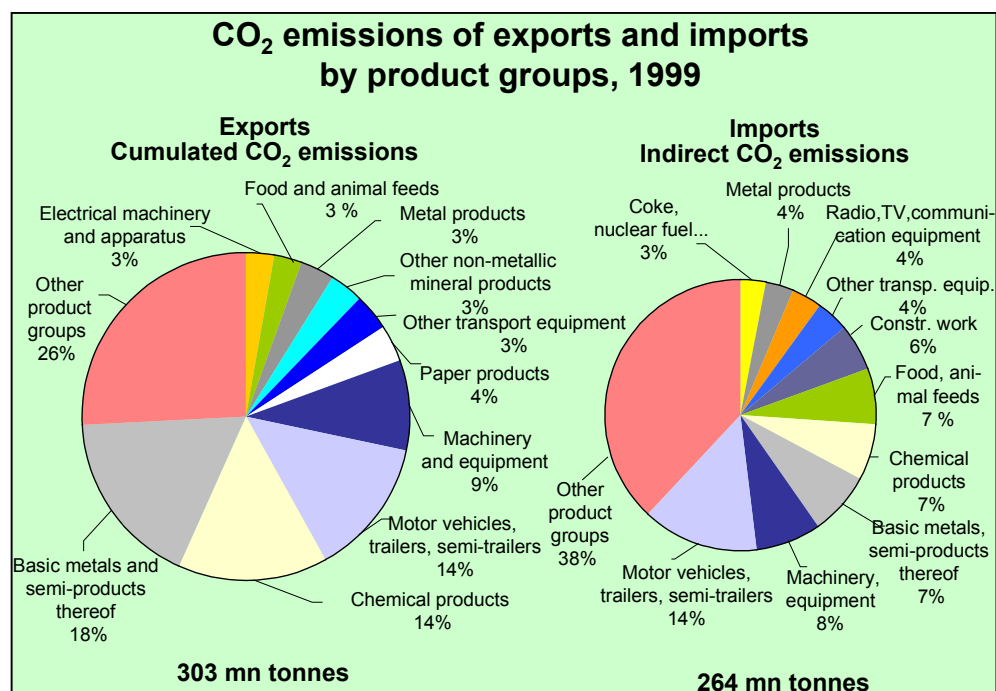
**Figure 25**



Between 1991 and 1999, the specific CO<sub>2</sub> emission of goods decreased markedly (figure 25); the decline for imported goods was clearly larger – assuming identical production conditions in Germany and abroad – than for final national uses. For imported goods, CO<sub>2</sub> intensity was down 27.9%. For exports, the decrease was 24.6%, while for final national uses it was 22.3%.

The structure of product groups is quite similar for imports and for exports. This reflects the fact that the German national economy is part of a complex international system of division of labour between a number of industrialised national economies. Such similarity between import and export structures becomes also obvious when examining the CO<sub>2</sub> emissions created through the production of foreign trade products (figure 26). Far more than half (55%) of all emissions caused by exports in 1999 regarded the product groups "basic metals and semi-products thereof" (18%), "chemicals, chemical products and man-made fibres" (14%), "motor vehicles, trailers and semi-trailers" (14%) und "machinery and equipment"

Figure 26



(9%). In imports, too, those groups have the largest share, although altogether it is clearly smaller there. Together, they account for a good third (36%) of all emissions caused by imports. Other product groups that are relatively important as regards import-related emissions are "food and animal feeds" (7%) and "construction work" (6%).

#### Estimating CO<sub>2</sub> emissions

The CO<sub>2</sub> emissions related to foreign trade flows can be estimated by means of input-output analysis. For this purpose, the results of Environmental-Economic Accounting on the energy quantities used for economic activities and relevant for emissions and those on the CO<sub>2</sub> emissions directly produced in that context are linked - using specific model assumptions - with information on interconnections between various economic activities which is contained in the monetary input-output tables of national accounts. One of the assumptions is that the domestic situation of production shall apply to the production of imported goods. So, to put it more precisely, what is measured is not the actual CO<sub>2</sub> emissions produced in the rest of the world but the CO<sub>2</sub> emissions avoided in Germany through imports.

#### International comparison

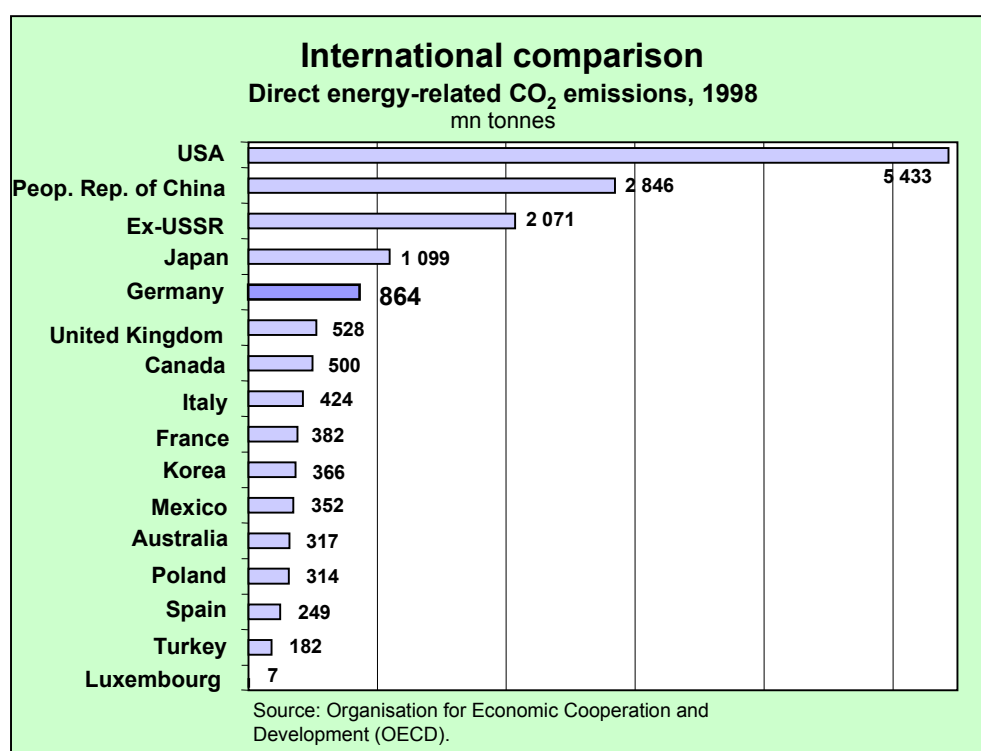
In the Kyoto Protocol of 1997, the industrialised nations have committed themselves to clearly reduce their CO<sub>2</sub> emissions. At the subsequent climate summits in The Hague (2000) and Bonn (2001), the procedure to be followed to achieve those targets was discussed.

In an **international comparison**, Germany ranks among the top group regarding the absolute quantity of CO<sub>2</sub> emissions (figure 27)<sup>2</sup>. Following the USA (5,433 mn t – by far the most important CO<sub>2</sub> emitter worldwide), China (2,846 mn t), the states of the former USSR (2,071 mn t) and Japan (1,099 mn t), Germany ranked fifth (864 mn t of CO<sub>2</sub> emissions) in 1998. Germany's share in worldwide CO<sub>2</sub> emissions was 4.0%. Regarding emissions per inhabitant, Germany (10.5 t) is clearly above the world average (3.9 t), though reflecting roughly the average of the OECD member countries (10.9 t).

Energy consumption and, indirectly, CO<sub>2</sub> emissions depend – among other things – on the economic structure, climatic conditions, consumption behaviour, and other factors such as the opportunities of making more use of water, wind or solar power.

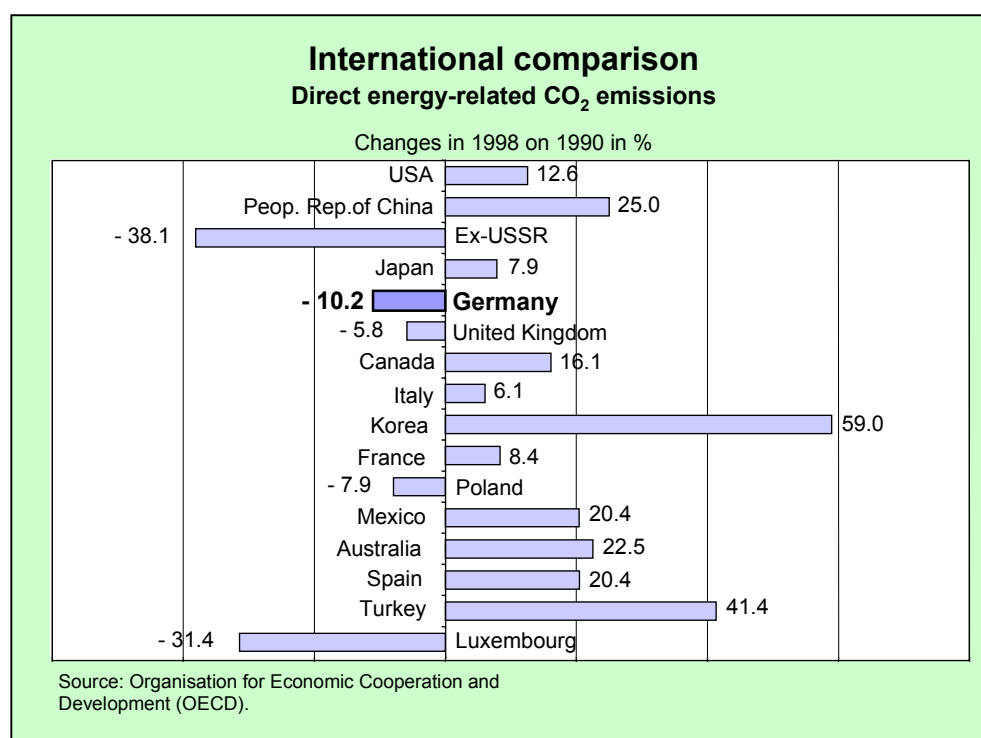


Figure 27



Germany is one of the few countries that succeeded in the past decade to reduce direct CO<sub>2</sub> emissions. According to OECD data, CO<sub>2</sub> emissions in Germany decreased 10.2% from 1990 to 1998 (figure 28). The only other countries that have reduced their CO<sub>2</sub> emissions were – apart from the former Eastern bloc countries (e.g. ex USSR –38.1%) – Luxembourg (-31.4%) and the United Kingdom (-5.8%). On a global scale, however, CO<sub>2</sub> emissions rose 7.8% in the period examined. For instance, CO<sub>2</sub> emissions increased 12.6% in the USA, 25.0% in China and even 59.0% in Korea.

Figure 28



In Germany, the reduction process was supported by special effects in eastern Germany in the first half of the 1990s caused by German unification (faster structural change, closing down or modernisation of less energy-efficient production plants). According to a study carried out by the *Fraunhofer Institut* in cooperation with the *Deutsches Institut für Wirtschaftsforschung* (DIW – German Institute for Economic Research), the unification-related special factors account for about half of the German volume of reduction.<sup>3</sup> In the former Eastern bloc countries, it is especially the collapse of the centrally planned economies that has a great effect. In Great Britain, the changeover from coal to low-carbon natural gas in electricity production implemented during the past decade was a major factor. The positive development in Luxembourg was clearly influenced by the strong decrease in steel production, which is highly energy-intensive.

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<sup>1</sup> Intergovernmental Panel on Climate Change: IPCC Third Assessment Report – Climate Change 2001. For additional information see <http://www.ipcc.ch>

<sup>2</sup> For an international comparison, only OECD data on energy-related emissions are available. Process-related emissions have not been taken into account. In Germany, process-related emissions accounted for about 3% of all emissions.

<sup>3</sup> Cf. *Fraunhofer Institut* and *Deutsches Institut für Wirtschaftsforschung*: "Greenhouse Gas Reductions in Germany and the UK - Coincidence or Policy induced?"; extracts published in: *Umwelt* 9/2001; p.596 ff.

## 4 Tables

**Table 1: Population and economy**

Specification	Unit	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Inhabitants	mn	80.0	80.6	81.2	81.4	81.7	81.9	82.1	82.0	82.1	82.2
Active population	mn	40.7	40.5	40.4	40.6	40.5	40.7	41.0	41.2	41.4	41.8
Persons engaged (national concept)	mn	38.5	37.9	37.4	37.3	37.3	37.2	37.1	37.5	38.0	38.6
Unemployed											
Total	mn	2.2	2.6	3.1	3.3	3.2	3.5	3.9	3.7	3.4	3.1
In % of active population	%	5.4	6.4	7.6	8.1	7.9	8.6	9.5	8.9	8.2	7.5
Domestic final consumption expenditure of private households	DM bn	1,622	1,660	1,653	1,661	1,692	1,707	1,722	1,757	1,803	...
Hours worked											
Total	bn hours	60.0	59.7	58.1	58.0	57.4	56.6	56.3	56.7	57.0	57.4
Per person engaged (domestic concept)	hours	1,560.4	1,576.4	1,555.8	1,555.0	1,535.3	1,519.1	1,513.2	1,507.0	1,496.2	1,481.7
Capital stock, at prices of 1995											
Total <sup>1)</sup>	DM bn	15,642	16,156	16,647	17,110	17,566	18,000	18,428	18,859	19,304	19,761
Per person engaged (domestic concept)	DM 1 000	406	426	446	459	471	484	496	502	508	511
Per hour worked	DM	261	269	277	285	293	300	307	314	322	329
Consumption of fixed capital, at prices of 1995	DM bn	447	472	492	507	521	535	548	562	579	597
Gross domestic product at prices of 1995											
Total	DM bn	3,346	3,421	3,384	3,463	3,523	3,550	3,600	3,670	3,738	3,850
Per person engaged (domestic concept)	DM	87,000	90,300	90,600	92,800	94,200	95,300	96,700	97,600	98,200	99,500
Per hour worked	DM	56	57	58	60	61	63	64	65	66	67
Per DM 1 000 of consumption of fixed capital	DM	7,486	7,253	6,882	6,828	6,760	6,637	6,574	6,532	6,460	6,449
Memorandum item:											
Persons engaged (domestic concept)	mn	38.5	37.9	37.4	37.3	37.4	37.3	37.2	37.6	38.1	38.7

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1) excl. cultivated assets.

**Table 2: Use of environmental resources for economic purposes**

Specification	Unit	1990	1991	1992	1993	1994	1995	1996	1997 <sup>1)</sup>	1998 <sup>1)</sup>	1999 <sup>1)</sup>	2000 <sup>1)</sup>
<b>Production factors</b>												
Primary energy consumption	petajoules	14,914	14,467	14,150	14,179	14,078	14,269	14,746	14,599	14,549	14,220	14,173
Raw mat. withdrawal/imports <sup>2)</sup>	mn t	.	1,460	1,479	1,413	1,533	1,485	1,458	1,440	1,421	1,439	1,432
Water withdrawal from nature <sup>3)</sup>	mn m <sup>3</sup>	.	51,344	49,852	48,150	48,972	48,909	47,786	47,334	45,502	...	...
Greenhouse gases <sup>4)</sup>	mn t	1,197	1,146	1,092	1,071	988	1,051	1,066	1,029	1,008	971	...
Incl.: carbon dioxide	mn t	1,014	976	928	918	904	904	925	894	888	859	861
Acidification gases <sup>5)</sup>	mn t	7.2	5.7	4.9	4.5	3.9	3.4	2.7	2.4	2.1	2.0	...
Water discharge into nature <sup>6)</sup>	mn m <sup>3</sup>	.	51,148	49,665	47,966	48,787	48,724	47,601	47,159	45,331	...	...
Incl.: waste water	mn m <sup>3</sup>	.	43,971	42,375	40,758	41,270	40,740	40,267	40,194	38,557	...	...
Built-up and traffic land <sup>7)</sup>	km <sup>2</sup>	.	.	.	40,305	.	.	.	42,052	42,503	42,976	43,447
Hours worked	bn hours	.	60.0	59.7	58.1	58.0	57.4	56.6	56.3	56.7	57.0	57.4
Cons. fixed cap. (prices of 1995)	DM bn	.	447	472	492	507	521	535	548	562	579	597
Memorandum item:												
Gross domestic product at prices of 1995	DM bn	.	3,346	3,421	3,384	3,463	3,523	3,550	3,600	3,670	3,738	3,850
<b>Production factors (Germany, 1991 or 1993 = 100)</b>												
Primary energy consumption	-	103.1	100	97.8	98.0	97.3	98.6	101.9	100.9	100.6	98.3	98.0
Raw mat. withdrawal/imports <sup>2)</sup>	-	.	100	101.3	96.8	105.0	101.7	99.8	98.6	97.3	98.6	98.1
Water withdrawal from nature <sup>3)</sup>	-	.	100	97.1	93.8	95.4	95.3	93.1	92.2	88.6	...	...
Greenhouse gases <sup>4)</sup>	-	104.4	100	95.2	93.4	86.2	91.7	93.0	89.7	87.9	84.7	...
Incl.: carbon dioxide	-	103.9	100	95.0	94.0	92.6	92.6	94.7	91.5	91.0	87.9	88.2
Acidification gases <sup>5)</sup>	-	125.7	100	85.7	78.0	67.9	58.7	47.3	41.3	36.4	34.4	...
Water discharge into nature <sup>6)</sup>	-	.	100	97.1	93.8	95.4	95.3	93.1	92.2	88.6	...	...
Incl.: waste water	-	.	100	96.4	92.7	93.9	92.7	91.6	91.4	87.7	...	...
Built-up and traffic land <sup>7)</sup>	-	.	.	.	100	.	.	.	104.3	105.5	106.6	107.8
Hours worked	-	.	100	99.5	96.9	96.7	95.6	94.4	93.8	94.5	95.0	95.6
Cons. fixed cap. (prices of 1995)	-	.	100	105.5	110.0	113.5	116.6	119.7	122.5	125.7	129.5	133.6
<b>Gross domestic product in relation to production factors (Germany, 1991 or 1993 = 100)</b>												
Primary energy consumption	-	.	100	104.5	103.2	106.4	106.7	104.1	106.6	109.1	113.6	117.5
Raw mat. withdrawal/imports <sup>2)</sup>	-	.	100	100.9	104.5	98.5	103.5	106.3	109.1	112.7	113.3	117.3
Water withdrawal from nature <sup>3)</sup>	-	.	100	105.3	107.8	108.5	110.5	114.0	116.7	123.8	...	...
Greenhouse gases <sup>4)</sup>	-	.	100	107.3	108.2	120.0	114.9	114.1	119.9	124.7	131.9	...
Incl.: carbon dioxide	-	.	100	107.6	107.6	111.8	113.7	112.0	117.5	120.6	127.0	130.5
Acidification gases <sup>5)</sup>	-	.	100	119.3	129.7	152.4	179.5	224.3	260.5	301.0	325.0	...
Water discharge into nature <sup>6)</sup>	-	.	100	105.3	107.8	108.5	110.5	114.0	116.7	123.8	...	...
Incl.: waste water	-	.	100	106.1	109.1	110.3	113.6	115.9	117.7	125.1	...	...
Built-up and traffic land <sup>7)</sup>	-	.	.	.	100	.	.	.	102.0	102.8	103.6	105.6
Hours worked	-	.	100	102.7	104.4	107.1	110.1	112.4	114.7	116.1	117.6	120.4
Cons. fixed cap. (prices of 1995)	-	.	100	96.9	91.9	91.2	90.3	88.7	87.8	87.2	86.3	86.1

1) In part estimated.

2) Withdrawal of abiotic raw materials subsequently used and imported abiotic goods.

3) Incl. foreign water and rainwater.

4) Greenhouse gases included are carbon dioxide, dinitrogen monoxide and methane. They have been grouped to CO<sub>2</sub> equivalents by means of conversion factors (CO<sub>2</sub> emission x 1; N<sub>2</sub>O emission x 310; CH<sub>4</sub> emission x 21).

5) Sulphur dioxide and nitrogen oxides have been grouped to acidification gases by means of conversion factors (SO<sub>2</sub> emission x 1; NO<sub>x</sub> emission x 0.7).

6) Incl. foreign water and rainwater, losses occurring in water distribution and evaporation.

7) According to area survey; (reference day: 31 December of preceding year, i.e. reference years 1992 and 1996)

and preliminary estimate by the Federal Office of Building and Regional Planning (reference day: 31 December of preceding year).

**Table 3: Direct use of environmental resources in private household consumption**

Specification	Unit	1991	1993	1995	1997	1998	1999	Change in 1999 from 1991 in %
Inhabitants	mn	80	81	82	82	82	82	2.6
Number of households	mn	35	36	37	38	38	38	7.1
Final consumption expenditure (prices of 1995)	DM bn	1,622	1,653	1,691	1,722	1,757	1,803	11.2
Direct energy consumption	petajoules	3,767	3,870	3,946	4,147	4,084	4,227	12.2
Material consumption	mn t	.	.	193	.	.	.	-
Emissions of carbon dioxide	mn t	219	224	216	228	223	211	- 3.9
Waste production	mn t	28	29	29	.	.	.	4.8 <sup>1)</sup>
Water use	mn m <sup>3</sup>	3,551	.	3,313	.	3,250	.	- 8.5 <sup>2)</sup>
Waste water	mn m <sup>3</sup>	3,409	.	3,180	.	3,254	.	- 4.5 <sup>2)</sup>
Built-up and traffic area	km <sup>2</sup>	.	23,120	.	24,080	.	.	4.2 <sup>3)</sup>

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1) In 1995 from 1991. - 2) In 1998 from 1991. - 3) In 1997 from 1993.

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Environmental-Economic Accounting 2001

**Table 4: Use of environmental resources for economic purposes \*)**  
**Western Germany**

Specification	Unit	1960	1970	1980	1990
<b>Production factors</b>					
Primary energy consumption	petajoules	6,198	9,870	11,436	11,495
Raw material withdrawal/imports <sup>1)</sup>	mn t	757	1,079	1,195	1,130
Water withdrawal from nature <sup>2)</sup>	mn m <sup>3</sup>	20,260	.	.	46,440
Greenhouse gases <sup>3)</sup>	mn t	555	907	950	857
Incl.: CO <sub>2</sub>	mn t	555	744	792	709
Acidification gases <sup>4)</sup>	mn t	4	5	5	2
Waste	mn t	218.9	.	.	320.4
Water discharge into nature <sup>5)</sup>	mn m <sup>3</sup>	20,053	.	.	46,207
Built-up and traffic area <sup>6)</sup>	km <sup>2</sup>	18,780	.	27,310	30,452
Hours worked	bn hours	56	52	47	46
Consumption of fixed capital (prices of 1995)	DM bn	78	158	242	318
Memorandum item: Gross domestic product, unrevised, at prices of 1991	DM bn	1,000	1,543	2,018	2,520
<b>Production factors (1960 = 100)</b>					
Primary energy consumption	-	100	159.2	184.5	185.5
Raw material withdrawal/imports <sup>1)</sup>	-	100	142.5	157.8	149.2
Water withdrawal from nature <sup>2)</sup>	-	100	.	.	229.2
Greenhouse gases <sup>3)</sup>	-	100	163.4	171.1	154.5
Incl.: CO <sub>2</sub>	-	100	134.1	142.7	127.7
Acidification gases <sup>4)</sup>	-	100	117.2	113.0	51.9
Waste	-	100	.	.	146.4
Water discharge into nature <sup>5)</sup>	-	100	.	.	230.4
Built-up and traffic area <sup>6)</sup>	-	100	.	145.4	162.2
Hours worked	-	100	92.3	84.0	82.4
Consumption of fixed capital (prices of 1995)	-	100	202.2	309.8	407.3
<b>Gross domestic product in relation to production factors (1960 = 100)</b>					
Primary energy consumption	-	100	96.9	109.4	135.9
Raw material withdrawal/imports <sup>1)</sup>	-	100	108.3	127.9	169.0
Water withdrawal from nature <sup>2)</sup>	-	100	.	.	110.0
Greenhouse gases <sup>3)</sup>	-	100	94.4	117.9	163.1
Incl.: CO <sub>2</sub>	-	100	115.1	141.4	197.3
Acidification gases <sup>4)</sup>	-	100	131.7	178.5	486.0
Water discharge into nature <sup>5)</sup>	-	100	.	.	109.4
Built-up and traffic area <sup>6)</sup>	-	100	.	138.8	155.4
Hours worked	-	100	167.1	240.4	306.0
Consumption of fixed capital (prices of 1995)	-	100	76.3	65.1	61.9

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\*) Data in part estimated.

1) Withdrawal of abiotic raw materials subsequently used and imported abiotic goods.

2) Incl. foreign water and rainwater.

3) Greenhouse gases included are carbon dioxide, dinitrogen monoxide and methane. They have been grouped to CO<sub>2</sub> equivalents by means of conversion factors (CO<sub>2</sub> emission x 1; N<sub>2</sub>O emission x 310; CH<sub>4</sub> emission x 21).

4) Sulphur dioxide and nitrogen oxides have been grouped to acidification gases by means of conversion factors (SO<sub>2</sub> emission x 1; NO<sub>x</sub> emission x 0.7).

5) Incl. foreign water and rainwater, losses occurring in water distribution and evaporation.

6) According to area survey; (reference day: 31 December of preceding year).



**Table 5: Material and energy flows**

mn t

Specification	1991	1992	1993	1994	1995	1996	1997	1998	1999
	<b>Solids and gases <sup>1)</sup></b>								
<b>Withdrawal</b>	5,121	4,697	4,779	4,717	4,508	4,438	4,276	4,151	4,098
Raw material withdrawal (domestic territory)	3,968	3,559	3,681	3,589	3,380	3,285	3,139	2,996	2,981
Withdrawal of material (unused) <sup>2)</sup>	2,686	2,336	2,422	2,259	2,089	2,021	1,897	1,791	1,741
Withdrawal of material (used)	1,282	1,223	1,260	1,330	1,291	1,263	1,242	1,205	1,240
Biotic substances	188	130	205	191	202	212	215	216	214
Abiotic substances	1,094	1,093	1,054	1,140	1,090	1,051	1,027	989	1,026
Energy sources	364	325	296	277	265	256	244	226	221
Ores	0	0	0	0	0	0	0	1	1
Non-metallic minerals	730	768	758	862	825	795	783	763	805
Imports	433	456	423	463	464	475	482	505	489
Biotic goods	68	70	64	69	69	69	70	73	76
Abiotic goods	365	386	359	394	395	406	413	431	413
Energy sources	203	210	208	217	214	238	238	246	237
Ores and products thereof	74	74	63	75	78	70	76	85	76
Non-metallic minerals and products thereof	51	64	56	64	64	59	57	54	54
Chemical products	23	23	21	24	24	25	27	29	28
Machinery and equipment	8	8	6	7	8	8	9	10	11
Other goods	6	6	5	6	7	6	7	8	8
Withdrawal of oxygen	719	683	675	664	664	678	655	651	629
<b>Discharge</b>	4,390	3,988	4,044	3,901	3,729	...	...	...	...
Application of material	295	284	283	284	283	283	278	277	274
Fertilizers	294	283	282	283	282	282	277	276	273
Pesticides	0	0	0	0	0	0	0	0	0
Sewage sludge	1	1	1	1	1	1	1	1	1
Discharge of unused material <sup>3)</sup>	2,527	2,167	2,258	2,091	1,934	1,875	1,751	1,638	1,588
Exports	211	216	202	223	225	238	249	260	265
Biotic goods	52	54	51	57	60	60	61	67	71
Abiotic goods	159	162	151	166	165	178	188	193	195
Energy sources	21	23	22	25	25	35	32	34	32
Ores and products thereof	37	37	36	38	38	37	43	41	41
Non-metallic minerals and products thereof	50	50	41	48	45	46	48	50	52
Chemical products	30	30	32	34	34	36	38	39	41
Machinery and equipment	12	12	10	11	12	13	15	16	17
Other goods	9	10	9	10	11	12	12	13	13
Waste, total <sup>4)</sup>	354	371	363	379	365	...	...	...	...
Air emissions	1,002	950	938	923	922	941	909	902	872
<b>Balance of solids and gases</b>	731	709	735	816	779	...	...	...	...
	<b>Water</b>								
Withdrawal of water from nature <sup>5)</sup>	51,344	49,852	48,150	48,972	48,909	47,786	47,334	45,502	...
Discharge of water into nature <sup>6)</sup>	51,148	49,665	47,966	48,787	48,724	47,601	47,159	45,331	...
Balance of water exports and imports	8	8	8	8	8	7	7	7	...
<b>Balance of water</b>	189	179	176	177	177	178	168	164	...
	<b>Total</b>								
<b>Material retained</b>	920	888	911	993	956	...	...	...	...

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1) Incl. non-solid energy sources, sludges, acids and alkalis.

2) Incl. excavated earth, hard coal slag, excavated material of brown coal.

3) Incl. excavated material of brown coal and hard coal slag not filled into underground space.

4) Incl. excavated earth, building and road demolition waste, hard coal slag filled into underground space.

5) Incl. foreign water and rainwater.

6) Incl. foreign water and rainwater, losses occurring in water distribution and evaporation.

**Table 6: Detailed material and energy flows, 1998**

mn t

Withdrawal		Discharge	
Solids <sup>1)</sup>			
Raw material withdrawal (domestic territory)	2,996.0	Application of material	276.7
Withdrawal of material (unused)	1,791.2	Fertilizers	275.5
Brown coal	1,619.5	Manure	270.3
Hard coal	41.4	Commercial fertilizers (nutrients)	5.2
Other energy sources	1.1	Pesticides	0.0
Ores	0.0	Sewage sludge	1.2
Non-metallic minerals, stones and earth	34.0	Discharge of unused material <sup>2)</sup>	1,638.4
Excavated earth <sup>3)</sup>	95.1	Exports	259.9
Withdrawal of material (used)	1,204.8	Biotic goods	66.6
Biotic materials	215.6	Animals and animal products	0.0
Animals	0.2	Plants and vegetable products <sup>4)</sup>	7.9
Plants	186.5	Wood and wood products	37.3
Wood	28.9	Abiotic goods	193.3
Abiotic materials	989.3	Energy sources	33.8
Energy sources	226.0	Ores and products thereof	41.1
Hard coal	40.7	Non-metallic minerals <sup>5)</sup>	49.8
Brown coal	166.0	Chemical products	39.1
Mineral oil	2.9	Machinery and equipment	16.3
Natural gas	15.8	Other goods	13.2
Petroleum gas	0.1		
Energetic peat	0.2		
Other products of mineral oil and natural gas extraction	0.3	Waste	...
Ores	0.6	Excavated earth	...
Iron and manganese ores	0.6	Building and road demolition waste	...
Non-ferrous ores	0.0	Slag	...
Sulphur and magnetic pyrites	0.0	Waste excl. mass waste	...
Other ores	0.0		
Non-metallic minerals	762.6	Total	...
Stones and earths	738.8		
Raw and unbroken natural stones, crude earths	240.1		
Sand and gravel	370.6		
Limestone and dolomite	72.4		
Gypsum and chalk, anhydrite	4.7		
Raw materials containing alumina	44.7		
Quartzite, feldspar, pegmatite	2.4		
Other raw and broken natural stones	0.5		
Peat for gardening	3.3		
Minerals and products thereof	23.9		
Salts	22.6		
Natural raw potassic salts	7.8		
Rock salts, metallurgical salts, saline salts, de-icing salts, spring salts	14.8		
Fluor spar, barytes and graphite	0.2		
Sulphur from natural gas extraction	1.1		
Other mining products	0.0		
Imports	504.7		
Biotic goods	73.3		
Animals and animal products	6.4		
Plants and vegetable products <sup>4)</sup>	41.1		
Wood and wood products	25.8		
Abiotic goods	431.4		
Energy sources	246.3		
Ores and products thereof	84.9		
Non-metallic minerals <sup>5)</sup>	53.7		
Chemical products	28.7		
Machinery and equipment	9.9		
Other goods	8.0		
Total	3,500.7	Balance of solids	...

**Table 6: Detailed material and energy flows, 1998**

mn t

Withdrawal		Discharge	
Gases			
Withdrawal of oxygen		Air emissions of mass pollutants	
for the formation of carbon dioxide (CO <sub>2</sub> )	646.0	Carbon dioxide (CO <sub>2</sub> )	888.2
for the formation of carbon monoxide (CO)	3.1	Carbon monoxide (CO)	5.3
for the formation of nitrogen dioxide (NO <sub>2</sub> )	1.2	Nitrogen dioxide (NO <sub>2</sub> )	1.7
for the formation of sulphur dioxide (SO <sub>2</sub> )	0.4	Sulphur dioxide (SO <sub>2</sub> )	0.9
for the formation of dinitrogen oxide (N <sub>2</sub> O)	0.1	Dinitrogen oxide (N <sub>2</sub> O)	0.2
		Ammonia (NH <sub>3</sub> )	0.6
		Methane (CH <sub>4</sub> )	3.4
<b>Total</b>	650.7	Dust	0.3
		Volatile organic compounds, excl. methane (NMVOC)	1.7
		<b>Total</b>	902.3
		<b>Balance of gases</b>	- 251.6
		<b>Balance of solids and gases</b>	...
Water			
Water withdrawal from nature	45,501.9	Water discharge into nature	45,330.7
Foreign and rain water <sup>6)</sup>	4,734.2	Foreign and rain water <sup>6)</sup>	4,734.2
Groundwater, spring and surface water, bank filtrate	40,767.7	Waste water	38,556.6
		Evaporation	1,439.5
		Losses	600.4
		Balance of water exports and imports	6.7
<b>Total</b>	45,501.9	<b>Total</b>	45,337.4
		<b>Balance of water <sup>7)</sup></b>	164.5
		<b>Material retained</b>	...

1) Incl. non-solid energy sources, sludges, acids and alkalis.

2) Incl. excavated material of brown coal and hard coal slag not filled into underground space.

3) Estimated. - 4) Excl. wood. - 5) And products thereof.

6) Withdrawal through sewage system (e.g. drainage of sealed areas).

7) Transformation into other types of materials.

**Table 7: Environmental protection expenditure \*)**

at prices of 1995

Specification	Unit	1991	1992	1993	1994	1995	1996	1997	1998
Environmental protection expenditure, total <sup>1)</sup>	DM mn	.	.	.	67,510	69,320	70,320	66,300	...
Share in gross domestic product	%	X	X	X	1.9	2.0	2.0	1.8	...
Of which:									
Production industries <sup>2) 3)</sup>	DM mn	17,400	18,210	18,410	18,270	17,510	17,960	15,450	12,170
Government	DM mn	28,390	31,770	29,650	28,980	27,440	24,800	21,970	20,600
Privatised public enterprises <sup>4)</sup>	DM mn	.	.	.	20,260	24,370	27,560	28,880	...
Investments in environmental protection	DM mn	.	.	.	30,020	27,460	25,270	22,700	...
Share in total investments	%	X	X	X	3.8	3.5	3.2	2.9	...
Of which:									
Production industries <sup>2)</sup>	DM mn	6,300	6,680	6,470	6,020	5,050	4,910	3,460	3,090
Government	DM mn	14,840	16,890	14,640	13,500	11,980	9,860	8,560	7,570
Privatised public enterprises <sup>4)</sup>	DM mn	.	.	.	10,500	10,430	10,500	10,680	...
Current expenditure for environmental protection	DM mn	.	.	.	37,490	41,860	45,050	43,610	...
Of which:									
Production industries <sup>2) 3) 5)</sup>	DM mn	11,100	11,530	11,940	12,250	12,460	13,050	12,000	9,080
Government	DM mn	13,550	14,880	15,010	15,480	15,460	14,940	13,410	13,030
Privatised public enterprises <sup>4)</sup>	DM mn	.	.	.	9,760	13,940	17,060	18,200	...

\*) 1998: provisional results.

1) Environmental protection expenditure = Total of investments and current expenditure for environmental protection purposes.

2) Excl. construction industry and expenditure for integrated environmental protection measures.

3) 1998: excl. current expenditure of electricity, gas, steam and hot water supply and of collection, purification and distribution of water.

4) This item covers expenditure of enterprises outside public budgets, especially municipal public utility undertakings in waste disposal and water protection. Both in Environmental-Economic Accounting and in national accounts, they are considered as part of the enterprises, rather than of the government sector. Consistent data are available only from reference year 1994.

5) Excl. fees and remuneration for disposal services rendered by third parties.

**Table 8: Environmental protection expenditure by environmental protection areas, 1997**

current prices

DM mn

Specification	Total	Waste disposal	Water protection	Noise abatement	Air quality control
Environmental protection expenditure, total <sup>1)</sup>	66,530	26,720	32,510	690	6,630
Of which:					
Production industries <sup>2)</sup>	15,440	3,200	5,340	360	6,540
Government	22,040	9,230	12,400	330	90
Privatised public enterprises <sup>3)</sup>	29,050	14,290	14,770	-	-
Investments in environmental protection	22,370	4,340	15,850	520	1,670
Of which:					
Production industries <sup>2)</sup>	3,550	510	1,230	190	1,620
Government	8,350	840	7,140	330	50
Privatised public enterprises <sup>3)</sup>	10,470	2,990	7,480	-	-
Current expenditure for environmental protection	44,160	22,380	16,660	180	4,960
Of which:					
Production industries <sup>2) 4)</sup>	11,890	2,690	4,110	180	4,920
Government	13,690	8,390	5,260	-	40
Privatised public enterprises <sup>3)</sup>	18,580	11,300	7,290	-	-

-----  
 1) Environmental protection expenditure = Total of investments and current expenditure for environmental protection purposes.

2) Excl. construction industry and expenditure for integrated environmental protection measures.

3) This item covers expenditure of enterprises outside public budgets, especially municipal public utility undertakings in waste disposal and water protection. Both in Environmental-Economic Accounting and in national accounts, they are considered as part of the enterprises, rather than of the government sector. Consistent data are available only from reference year 1994.

4) Excl. fees and remuneration for disposal services rendered by third parties.

**Table 9: Gross fixed assets for environmental protection \*)**

at prices of 1995

DM mn

Specification	1991	1992	1993	1994	1995	1996	1997	1998	1999
Gross fixed assets for environmental protection	402,290	416,510	432,870	447,510	460,180	469,950	477,030	480,910	482,960
Of which:									
Waste disposal	24,500	26,980	30,230	32,360	33,780	35,030	36,010	36,470	36,650
Water protection	321,230	330,440	340,990	351,140	360,190	367,570	372,790	376,740	379,550
Noise abatement	7,550	8,010	8,430	8,840	9,220	9,540	9,830	10,170	10,610
Air quality control	49,010	51,080	53,220	55,170	57,000	57,820	58,400	57,530	56,150

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\*) Gross fixed assets of the government and of production industries (excl. construction industry and excl. fixed assets from integrated environmental protection investments). Stock at the beginning of any year. 1998 and 1999: preliminary results.

Federal Statistical Office of Germany  
Environmental-Economic Accounting 2001

**Table 10: Revenue from environment-related taxes and total tax revenue**

DM mn

Year	Cash tax revenue of public budgets				
	total <sup>1)</sup>	incl.: environment-related taxes			
		total	mineral oil tax	motor vehicle tax	electricity tax
	Western Germany				
1980	364,916	27,936	21,351	6,585	-
1985	437,199	31,871	24,521	7,350	-
1990	549,667	42,935	34,621	8,314	-
	Germany				
1991	661,919	58,277	47,266	11,011	-
1992	731,730	68,483	55,166	13,317	-
1993	749,119	70,358	56,300	14,058	-
1994	786,159	78,016	63,847	14,169	-
1995	814,284	78,693	64,888	13,805	-
1996	848,705	81,994	68,251	13,743	-
1997	853,055	80,426	66,008	14,418	-
1998	893,343	81,848	66,677	15,171	-
1999	952,178	88,596	71,278	13,767	3,551
2000	982,658	94,265	73,982	13,720	6,563

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<sup>1)</sup> Before deduction of children's allowance (children's allowance paid by the government to inactive persons and tax deductible children's allowance paid by employers to their employees).

Federal Statistical Office of Germany  
Environmental-Economic Accounting 2001

**Table 11: Taxed mineral oil**

Year	Petrol, leaded and unleaded	Diesel fuels	Domestic fuel	Natural gas
	1 000 m <sup>3</sup>			mn MWh
1991	40,643	25,890	41,752	692
1992	41,103	27,387	41,671	676
1993	41,606	28,782	41,758	720
1994	40,094	29,324	39,543	731
1995	40,067	30,425	39,208	807
1996	40,329	30,733	43,749	889
1997	40,645	31,423	41,702	845
1998	40,793	32,487	39,351	803
1999	40,898	34,018	33,412	762
2000	39,045	33,780	30,772	780

Federal Statistical Office of Germany  
Environmental-Economic Accounting 2001



**Table 12: Gross value added (prices of 1995)**

DM billion

WZ 93	Industries	1991	1995	1996	1997	1998	1999
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	39.3	42.2	45.1	44.9	45.9	47.5
<b>C-F</b>	<b>Production industries, total</b>	1,093.6	1,060.8	1,033.4	1,049.1	1,058.2	1,046.4
10	Mining of coal and lignite, extraction of peat	14.8	10.8	8.7	6.0	5.7	5.5
13, 14	Mining and quarrying, except of energy producing materials	5.4	6.5	5.8	5.1	5.4	5.4
15	Manufacture of food products	63.2	67.3	64.7	66.2	62.1	64.2
17	Manufacture of textiles	16.2	11.6	10.8	11.0	10.8	9.7
20	Manufacture of wood and wood products, except furniture	13.9	17.2	16.8	17.3	16.6	16.4
21	Manufacture of pulp, paper and paper products	16.6	15.1	16.5	18.4	18.5	19.3
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	8.1	4.5	3.8	4.8	5.7	2.7
24	Manufacture of chemicals, chemical products and man-made fibres	71.7	78.9	77.9	79.1	79.4	76.6
25	Manufacture of rubber and plastic products	34.6	36.1	34.9	37.8	39.3	38.3
26	Manufacture of other non-metallic mineral products	30.4	35.2	32.6	32.2	32.6	32.9
27	Manufacture of basic metals	31.4	31.2	30.7	32.0	32.3	32.6
28	Manufacture of fabricated metal products, except machinery and equipment	69.3	68.2	64.3	65.1	67.3	67.5
29	Manufacture of machinery and equipment	124.8	108.3	105.5	106.2	112.0	105.2
31	Manufacture of electrical machinery and apparatus n.e.c.	66.1	54.6	54.2	55.2	54.7	57.9
32	Manufacture of radio, television and communication equipment and apparatus	18.2	14.7	14.2	15.8	16.9	20.6
34	Manufacture of motor vehicles, trailers and semi-trailers	96.2	86.8	82.1	88.7	93.0	86.0
35	Manufacture of other transport equipment	16.1	10.2	11.8	13.6	14.2	17.2
40	Electricity, gas, steam and hot water supply	59.0	63.0	69.1	66.2	67.2	...
41	Collection, purification and distribution of water	9.4	7.7	7.7	8.7	8.7	...
45	Construction	201.8	223.0	214.1	210.8	206.7	206.2
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	126.4	109.9	107.2	108.8	109.1	107.4
<b>G-Q</b>	<b>Service activities, total</b>	1,984.0	2,192.4	2,253.6	2,300.6	2,368.6	2,448.4
51-52	Commission trade and wholesale trade, retail trade (except of motor vehicles and motorcycles); repair of personal and household goods	278.8	304.2	303.7	301.2	305.5	313.6
60	Land transport; transport via pipelines	63.0	57.8	58.8	57.6	57.5	61.7
62	Air transport	6.3	11.9	13.4	14.2	14.4	14.2
75	Public administration and defence; compulsory social security	212.1	218.4	219.9	218.3	217.6	216.1
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	1,423.8	1,600.2	1,657.8	1,709.3	1,773.6	1,842.8
<b>A-Q</b>	<b>All industries</b>	3,116.8	3,295.4	3,332.1	3,394.6	3,472.7	3,542.3
	Memorandum item: Domestic final consumption expenditure of private households	1,621.6	1,691.3	1,706.8	1,722.0	1,757.3	1,803.0

**Table 13: Gross value added (prices of 1995)**

1991 = 100

WZ 93	Industries	1991	1995	1996	1997	1998	1999
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	100	107.5	114.7	114.2	117.0	121.0
<b>C-F</b>	<b>Production industries, total</b>	100	97.0	94.5	95.9	96.8	95.7
10	Mining of coal and lignite, extraction of peat	100	73.1	58.7	40.1	38.3	37.2
13, 14	Mining and quarrying, except of energy producing materials	100	119.4	107.4	94.6	99.3	99.1
15	Manufacture of food products	100	106.5	102.5	104.8	98.3	101.6
17	Manufacture of textiles	100	71.6	66.8	67.7	67.0	60.1
20	Manufacture of wood and wood products, except furniture	100	123.6	120.8	124.3	119.3	117.7
21	Manufacture of pulp, paper and paper products	100	90.7	98.9	110.8	111.3	116.1
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	100	55.4	47.3	59.4	70.4	32.7
24	Manufacture of chemicals, chemical products and man-made fibres	100	109.9	108.6	110.3	110.7	106.8
25	Manufacture of rubber and plastic products	100	104.4	100.9	109.4	113.7	111.0
26	Manufacture of other non-metallic mineral products	100	115.8	107.2	105.9	107.1	108.2
27	Manufacture of basic metals	100	99.5	98.0	102.0	103.0	103.8
28	Manufacture of fabricated metal products, except machinery and equipment	100	98.4	92.8	94.0	97.0	97.3
29	Manufacture of machinery and equipment	100	86.8	84.5	85.1	89.8	84.3
31	Manufacture of electrical machinery and apparatus n.e.c.	100	82.5	81.9	83.5	82.6	87.6
32	Manufacture of radio, television and communication equipment and apparatus	100	80.7	77.9	86.7	92.7	113.4
34	Manufacture of motor vehicles, trailers and semi-trailers	100	90.3	85.3	92.2	96.7	89.3
35	Manufacture of other transport equipment	100	63.7	73.7	84.9	88.7	106.8
40	Electricity, gas, steam and hot water supply	100	106.8	117.1	112.3	113.9	...
41	Collection, purification and distribution of water	100	82.2	81.9	92.2	93.0	...
45	Construction	100	110.5	106.1	104.5	102.5	102.2
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	100	86.9	84.8	86.1	86.3	84.9
<b>G-Q</b>	<b>Service activities, total</b>	100	110.5	113.6	116.0	119.4	123.4
51-52	Commission trade and wholesale trade, retail trade (except of motor vehicles and motorcycles); repair of personal and household goods	100	109.1	109.0	108.0	109.6	112.5
60	Land transport; transport via pipelines	100	91.7	93.4	91.5	91.2	98.0
62	Air transport	100	187.4	211.4	224.5	227.8	224.6
75	Public administration and defence; compulsory social security	100	103.0	103.7	102.9	102.6	101.9
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	100	112.4	116.4	120.1	124.6	129.4
<b>A-Q</b>	<b>All industries</b>	100	105.7	106.9	108.9	111.4	113.7
	Memorandum item: Domestic final consumption expenditure of private households	100	104.3	105.3	106.2	108.4	111.2

**Table 14: Gross value added (prices of 1995)**

Percent

WZ 93	Industries	1991	1995	1996	1997	1998	1999
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	1.3	1.3	1.4	1.3	1.3	1.3
<b>C-F</b>	<b>Production industries, total</b>	35.1	32.2	31.0	30.9	30.5	29.5
10	Mining of coal and lignite, extraction of peat	0.5	0.3	0.3	0.2	0.2	0.2
13, 14	Mining and quarrying, except of energy producing materials	0.2	0.2	0.2	0.2	0.2	0.2
15	Manufacture of food products	2.0	2.0	1.9	2.0	1.8	1.8
17	Manufacture of textiles	0.5	0.4	0.3	0.3	0.3	0.3
20	Manufacture of wood and wood products, except furniture	0.4	0.5	0.5	0.5	0.5	0.5
21	Manufacture of pulp, paper and paper products	0.5	0.5	0.5	0.5	0.5	0.5
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	0.3	0.1	0.1	0.1	0.2	0.1
24	Manufacture of chemicals, chemical products and man-made fibres	2.3	2.4	2.3	2.3	2.3	2.2
25	Manufacture of rubber and plastic products	1.1	1.1	1.0	1.1	1.1	1.1
26	Manufacture of other non-metallic mineral products	1.0	1.1	1.0	0.9	0.9	0.9
27	Manufacture of basic metals	1.0	0.9	0.9	0.9	0.9	0.9
28	Manufacture of fabricated metal products, except machinery and equipment	2.2	2.1	1.9	1.9	1.9	1.9
29	Manufacture of machinery and equipment	4.0	3.3	3.2	3.1	3.2	3.0
31	Manufacture of electrical machinery and apparatus n.e.c.	2.1	1.7	1.6	1.6	1.6	1.6
32	Manufacture of radio, television and communication equipment and apparatus	0.6	0.4	0.4	0.5	0.5	0.6
34	Manufacture of motor vehicles, trailers and semi-trailers	3.1	2.6	2.5	2.6	2.7	2.4
35	Manufacture of other transport equipment	0.5	0.3	0.4	0.4	0.4	0.5
40	Electricity, gas, steam and hot water supply	1.9	1.9	2.1	2.0	1.9	...
41	Collection, purification and distribution of water	0.3	0.2	0.2	0.3	0.3	...
45	Construction	6.5	6.8	6.4	6.2	6.0	5.8
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	4.1	3.3	3.2	3.2	3.1	3.0
<b>G-Q</b>	<b>Service activities, total</b>	63.7	66.5	67.6	67.8	68.2	69.1
51-52	Commission trade and wholesale trade, retail trade (except of motor vehicles and motorcycles); repair of personal and household goods	8.9	9.2	9.1	8.9	8.8	8.9
60	Land transport; transport via pipelines	2.0	1.8	1.8	1.7	1.7	1.7
62	Air transport	0.2	0.4	0.4	0.4	0.4	0.4
75	Public administration and defence; compulsory social security	6.8	6.6	6.6	6.4	6.3	6.1
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	45.7	48.6	49.8	50.4	51.1	52.0
<b>A-Q</b>	<b>All industries</b>	100	100	100	100	100	100

**Table 15: Volume and use of primary energy in the economic territory, with intermediate goods from the economic territory and abroad**

Specification		Direct	Indirect	Cumulated	
		PJ		Final uses = 100	
		1991			
	Domestic production	5,641	-	5,641	27.5
+	Imports	10,015	4,825	14,840	72.5
=	Supply	15,656	4,825	20,481	100.0
-	Intermediate consumption	10,700	-10,700	0	0.0
=	Final uses	4,956	15,525	20,481	100.0
-	Exports and ocean bunkering	1,199	4,866	6,065	29.6
=	Final domestic uses	3,757	10,659	14,416	70.4
	Domestic final consumption of private households	3,767	6,626	10,393	50.7
	Consumption expenditure of non-profit institutions serving households	-	79	79	0.4
	Government final consumption expenditure	-	1,350	1,350	6.6
	Gross fixed capital formation	-	2,461	2,461	12.0
	Changes in stocks, acquisitions less disposals of valuables	- 10	143	133	0.6
		1999			
	Domestic production	3,795	-	3,795	17.8
+	Imports	11,336	6,203	17,539	82.2
=	Supply	15,131	6,203	21,334	100.0
-	Intermediate consumption	9,997	-9,997	0	0.0
=	Final uses	5,134	16,200	21,334	100.0
-	Exports and ocean bunkering	1,144	6,201	7,345	34.4
=	Final domestic uses	3,990	9,999	13,989	65.6
	Domestic final consumption of private households	4,227	6,493	10,720	50.3
	Consumption expenditure of non-profit institutions serving households	-	92	92	0.4
	Government final consumption expenditure	-	1,150	1,150	5.4
	Gross fixed capital formation	-	2,301	2,301	10.8
	Changes in stocks, acquisitions less disposals of valuables	- 237	- 38	- 275	- 1.3
		1999 on 1991, in percent			
	Domestic production	- 32.7	0.0	- 32.7	
+	Imports	13.2	28.6	18.2	
=	Supply	- 3.4	28.6	4.2	
-	Intermediate consumption	- 6.6	- 6.6	0.0	
=	Final uses	3.6	4.3	4.2	
-	Exports and ocean bunkering	- 4.6	27.4	21.1	
=	Final domestic uses	6.2	- 6.2	- 3.0	
	Domestic final consumption of private households	12.2	- 2.0	3.1	
	Consumption expenditure of non-profit institutions serving households	0.0	16.2	16.2	
	Government final consumption expenditure	0.0	- 14.8	- 14.8	
	Gross fixed capital formation	0.0	- 6.5	- 6.5	
	Changes in stocks, acquisitions less disposals of valuables	2,222.3	- 126.5	- 306.5	
		1999 on 1991, absolute			
	Domestic production	-1,846	0	-1,846	
+	Imports	1,321	1,378	2,699	
=	Supply	-525	1,378	853	
-	Intermediate consumption	-703	703	0	
=	Final uses	178	675	853	
-	Exports and ocean bunkering	-55	1,335	1,280	
=	Final domestic uses	233	-661	-427	
	Domestic final consumption of private households	460	-133	327	
	Consumption expenditure of non-profit institutions serving households	0	13	13	
	Government final consumption expenditure	0	-200	-200	
	Gross fixed capital formation	0	-159	-159	
	Changes in stocks, acquisitions less disposals of valuables	-227	-181	-408	

**Table 16: Domestic direct energy consumption**

Terajoules

WZ 93	Industries	1991	1995	1996	1997	1998	1999
A-B	<b>Agriculture, forestry and fishing</b>	207,056	159,815	158,981	154,184	147,696	159,126
C-F	<b>Production industries, total</b>	8,497,730	8,082,328	8,181,007	8,160,536	8,148,485	7,588,914
10	Mining of coal and lignite, extraction of peat	283,399	250,941	217,910	179,629	158,163	157,673
13,14	Mining and quarrying, except of energy producing materials	85,027	66,617	60,568	51,026	49,832	61,994
15	Manufacture of food products	264,915	270,576	274,535	267,447	267,203	261,767
17	Manufacture of textiles	47,467	39,726	39,474	37,613	37,677	39,641
20	Manufacture of wood and wood products, except furniture	48,989	45,718	45,679	43,704	45,826	46,794
21	Manufacture of pulp, paper and paper products	196,254	199,691	191,794	196,170	188,112	176,551
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	440,506	454,547	466,489	433,587	448,623	453,674
24	Manufacture of chemicals, chemical products and man-made fibres	1,539,995	1,443,308	1,429,418	1,472,240	1,460,405	1,488,197
25	Manufacture of rubber and plastic products	80,532	78,032	77,223	76,946	78,729	80,367
26	Manufacture of other non-metallic mineral products	316,030	379,050	374,186	376,497	367,342	366,137
27	Manufacture of basic metals	823,077	786,774	763,842	801,501	809,554	694,529
28	Manufacture of fabricated metal products, except machinery and equipment	136,555	120,069	119,852	116,792	118,117	120,551
29	Manufacture of machinery and equipment	140,245	118,196	120,565	111,843	109,194	122,418
31	Manufacture of electrical machinery and apparatus n.e.c.	70,457	59,772	60,281	56,905	57,073	58,977
32	Manufacture of radio, television and communication equipment and apparatus	33,426	29,272	30,309	28,514	28,640	29,367
34	Manufacture of motor vehicles, trailers and semi-trailers	141,602	156,281	167,919	162,855	163,713	169,010
35	Manufacture of other transport equipment	20,309	22,975	25,126	24,394	24,530	25,250
40	Electricity, gas, steam and hot water supply	3,218,793	2,965,983	3,085,786	3,119,159	3,139,908	2,621,136
41	Collection, purification and distribution of water	15,962	19,093	19,682	19,573	19,417	21,915
45	Construction	335,819	295,343	290,653	293,731	294,399	280,267
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	258,370	280,362	319,717	290,410	282,026	312,697
G-Q	<b>Service activities, total</b>	1,995,173	2,080,343	2,226,084	2,139,100	2,172,893	2,248,999
51-52	Commission trade and wholesale trade, retail trade (except of motor vehicles and motorcycles); repair of personal and household goods	381,044	433,317	462,145	442,481	450,622	464,134
60	Land transport; transport via pipelines	293,532	333,134	338,084	344,535	354,754	379,118
62	Air transport	207,273	248,744	256,685	265,815	273,847	292,398
75	Public administration and defence; compulsory social security	366,121	253,080	271,393	254,989	255,366	256,028
50, 59, 61, 63-64 70-74, 80-95	Other service activities	747,202	812,068	897,777	831,279	838,304	857,320
A-Q	<b>All industries</b>	10,699,959	10,322,486	10,566,073	10,453,820	10,469,074	9,997,038
	Domestic final consumption of private households	3,767,056	3,945,619	4,183,667	4,146,783	4,083,973	4,227,021
	<b>All industries and domestic final consumption of private households</b>	14,467,014	14,268,104	14,749,739	14,600,603	14,553,047	14,224,060

**Table 17: Domestic direct specific energy consumption**

Energy consumption per gross value added (prices of 1995)  
kJ / DM

WZ 93	Industries	1991	1995	1996	1997	1998	1999
A-B	<b>Agriculture, forestry and fishing</b>	5,274.0	3,785.3	3,529.0	3,437.8	3,215.0	3,349.3
C-F	<b>Production industries, total</b>	7,770.5	7,619.3	7,916.4	7,778.5	7,700.6	7,811.7
10	Mining of coal and lignite, extraction of peat	19,109.8	23,149.6	25,047.1	30,189.7	27,845.6	28,615.8
13, 14	Mining and quarrying, except of energy producing materials	15,716.6	10,312.2	10,424.8	9,966.0	9,279.7	11,566.1
15	Manufacture of food products	4,193.7	4,022.8	4,241.9	4,040.0	4,304.9	4,076.7
17	Manufacture of textiles	2,931.8	3,424.6	3,651.6	3,431.8	3,475.7	4,074.1
20	Manufacture of wood and wood products, except furniture	3,519.3	2,658.0	2,715.7	2,526.2	2,760.6	2,856.8
21	Manufacture of pulp, paper and paper products	11,794.1	13,224.6	11,652.1	10,638.3	10,157.3	9,138.2
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	54,383.5	101,235.4	121,798.7	90,142.8	78,705.9	171,197.9
24	Manufacture of chemicals, chemical products and man-made fibres	21,472.3	18,304.5	18,347.0	18,607.7	18,388.4	19,433.2
25	Manufacture of rubber and plastic products	2,330.9	2,163.4	2,215.9	2,035.6	2,003.3	2,096.2
26	Manufacture of other non-metallic mineral products	10,392.3	10,765.4	11,474.6	11,688.8	11,275.1	11,125.4
27	Manufacture of basic metals	26,229.4	25,192.9	24,848.5	25,039.1	25,048.1	21,324.2
28	Manufacture of fabricated metal products, except machinery and equipment	1,970.2	1,761.1	1,863.1	1,793.5	1,756.4	1,787.0
29	Manufacture of machinery and equipment	1,124.0	1,091.1	1,143.1	1,053.0	974.8	1,163.7
31	Manufacture of electrical machinery and apparatus n.e.c.	1,065.3	1,095.7	1,112.6	1,030.5	1,044.3	1,018.2
32	Manufacture of radio, television and communication equipment and apparatus	1,836.6	1,992.7	2,137.5	1,806.9	1,696.7	1,423.5
34	Manufacture of motor vehicles, trailers and semi-trailers	1,471.7	1,799.6	2,045.5	1,835.8	1,760.4	1,965.9
35	Manufacture of other transport equipment	1,264.6	2,245.8	2,122.1	1,788.4	1,722.6	1,472.3
40	Electricity, gas, steam and hot water supply	54,565.1	47,071.6	44,663.3	47,103.0	46,745.7	38,528.9
41	Collection, purification and distribution of water	1,699.9	2,473.2	2,559.4	2,260.2	2,224.2	2,478.6
45	Construction	1,664.3	1,324.3	1,357.6	1,393.1	1,424.1	1,359.1
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	2,043.9	2,551.3	2,982.4	2,669.2	2,585.3	2,912.3
G-Q	<b>Service activities, total</b>	1,005.6	948.9	987.8	929.8	917.4	918.6
51-52	Commission trade and wholesale trade, retail trade (except of motor vehicles and motorcycles); repair of personal and household goods	1,367.0	1,424.5	1,521.5	1,469.3	1,475.1	1,480.0
60	Land transport; transport via pipelines	4,660.0	5,768.6	5,748.7	5,978.4	6,172.8	6,142.5
62	Air transport	32,744.6	20,973.3	19,184.2	18,706.2	18,990.8	20,562.5
75	Public administration and defence; compulsory social security	1,726.3	1,158.7	1,234.3	1,168.0	1,173.5	1,185.0
50, 59, 61, 63-64 70-74, 80-95	Other service activities	524.8	507.5	541.6	486.3	472.7	465.2
A-Q	<b>All industries</b>	3,433.0	3,132.4	3,171.0	3,079.6	3,014.7	2,883.2
	Memorandum item: Domestic final consumption of private households <sup>1)</sup>	2,323.0	2,332.2	2,451.2	2,408.1	2,324.1	2,344.4

1) Energy consumption put in relation to the consumption expenditure of households at constant prices.

**Table 18: Domestic direct specific energy consumption**

Energy consumption per gross value added (prices of 1995)

1991 = 100

WZ 93	Industries	1991	1995	1996	1997	1998	1999
A-B	<b>Agriculture, forestry and fishing</b>	100	71.8	66.9	65.2	61.0	63.5
C-F	<b>Production industries, total</b>	100	98.1	101.9	100.1	99.1	100.5
10	Mining of coal and lignite, extraction of peat	100	121.1	131.1	158.0	145.7	149.7
13-14	Mining and quarrying, except of energy producing materials	100	65.6	66.3	63.4	59.0	73.6
15	Manufacture of food products	100	95.9	101.1	96.3	102.7	97.2
17	Manufacture of textiles	100	116.8	124.6	117.1	118.6	139.0
20	Manufacture of wood and wood products, except furniture	100	75.5	77.2	71.8	78.4	81.2
21	Manufacture of pulp, paper and paper products	100	112.1	98.8	90.2	86.1	77.5
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	100	186.2	224.0	165.8	144.7	314.8
24	Manufacture of chemicals, chemical products and man-made fibres	100	85.2	85.4	86.7	85.6	90.5
25	Manufacture of rubber and plastic products	100	92.8	95.1	87.3	85.9	89.9
26	Manufacture of other non-metallic mineral products	100	103.6	110.4	112.5	108.5	107.1
27	Manufacture of basic metals	100	96.0	94.7	95.5	95.5	81.3
28	Manufacture of fabricated metal products, except machinery and equipment	100	89.4	94.6	91.0	89.1	90.7
29	Manufacture of machinery and equipment	100	97.1	101.7	93.7	86.7	103.5
31	Manufacture of electrical machinery and apparatus n.e.c.	100	102.9	104.4	96.7	98.0	95.6
32	Manufacture of radio, television and communication equipment and apparatus	100	108.5	116.4	98.4	92.4	77.5
34	Manufacture of motor vehicles, trailers and semi-trailers	100	122.3	139.0	124.7	119.6	133.6
35	Manufacture of other transport equipment	100	177.6	167.8	141.4	136.2	116.4
40	Electricity, gas, steam and hot water supply	100	86.3	81.9	86.3	85.7	70.6
41	Collection, purification and distribution of water	100	145.5	150.6	133.0	130.8	145.8
45	Construction	100	79.6	81.6	83.7	85.6	81.7
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	100	124.8	145.9	130.6	126.5	142.5
G-Q	<b>Service activities, total</b>	100	94.4	98.2	92.5	91.2	91.3
51-52	Commission trade and wholesale trade, retail trade (except of motor vehicles and motorcycles); repair of personal and household goods	100	104.2	111.3	107.5	107.9	108.3
60	Land transport; transport via pipelines	100	123.8	123.4	128.3	132.5	131.8
62	Air transport	100	64.1	58.6	57.1	58.0	62.8
75	Public administration and defence; compulsory social security	100	67.1	71.5	67.7	68.0	68.6
50, 59, 61, 63-64 70-74, 80-95	Other service activities	100	96.7	103.2	92.7	90.1	88.7
A-Q	<b>All industries</b>	100	91.2	92.4	89.7	87.8	84.0
	Memorandum item: Domestic final consumption of private households	100	100.4	105.5	103.7	100.0	100.9

**Table 19: Water flow between nature and economy as well as within the economy**

mn m³

Specification		Water distribution	Waste water disposal	Other industries	Private house holds	Total
<b>1991</b>						
	Water withdrawal from nature	6,869	3,354	41,037	83	51,344
	Foreign water and rainwater	-	3,354	-	-	3,354
	Ground water, surface water, etc.	6,869	-	41,037	83	47,990
+	Water received from other industries	- 5,969	-	2,494	3,467	- 8
=	Water use	901	3,354	43,531	3,551	51,336
-	Water incorporated into, minus water removed from other materials	-	-	343	- 154	189
=	Water discharged into nature	901	3,354	43,188	3,704	51,148
<b>1995</b>						
	Water withdrawal from nature	6,448	5,273	37,141	47	48,909
	Foreign water and rainwater	-	5,273	-	-	5,273
	Ground water, surface water, etc.	6,448	-	37,141	47	43,636
+	Water received from other industries	- 5,613	-	2,340	3,266	- 8
=	Water use	835	5,273	39,480	3,313	48,901
-	Water incorporated into, minus water removed from other materials	-	-	329	- 152	177
=	Water discharged into nature	835	5,273	39,151	3,465	48,724
<b>1998</b>						
	Water withdrawal from nature	6,135	4,734	34,587	46	45,502
	Foreign water and rainwater	-	4,734	-	-	4,734
	Ground water, surface water, etc.	6,135	-	34,587	46	40,768
+	Water received from other industries	- 5,403	-	2,192	3,204	- 7
=	Water use	732	4,734	36,779	3,250	45,495
-	Water incorporated into, minus water removed from other materials	-	-	320	- 155	164
=	Water discharged into nature	732	4,734	36,459	3,405	45,331

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Environmental-Economic Accounting 2001



Table 20: Withdrawal of water from, and discharge of water into nature, 1991

mn m³

WZ 93	Industries	Withdrawal of water from nature	Water received from industries <sup>1)</sup>	Water use	Water removed from	Water incorporated into	Water discharged into nature		
					other materials		total	through waste water disposal	direct (incl. evaporation and losses)
A-B	Agriculture, forestry and fishing	1,273	163	1,436	0	304	1,132	33	1,099
10	Mining of coal and lignite, extraction of peat	2,417	209	2,626	0	0	2,626	32	2,594
13, 14	Mining and quarrying, except of energy producing materials	609	7	616	0	0	616	4	612
15	Manufacture of food products	442	172	614	0	38	576	233	343
17	Manufacture of textiles	238	24	262	0	0	262	84	178
20	Manufacture of wood and wood products, except furniture	24	9	33	0	0	33	10	23
21	Manufacture of pulp, paper and paper products	798	27	824	0	0	824	72	753
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	344	34	378	0	0	378	18	360
24	Manufacture of chemicals, chemical products and man-made fibres	3,992	374	4,366	0	0	4,366	178	4,188
25	Manufacture of rubber and plastic products	106	22	128	0	0	128	28	100
26	Manufacture of other non-metallic mineral products	192	37	229	0	0	229	30	199
27	Manufacture of basic metals	1,284	180	1,464	0	0	1,464	102	1,362
28	Manufacture of fabricated metal products, except machinery and equipment	120	38	158	0	0	158	39	119
29	Manufacture of machinery and equipment	99	70	168	0	0	168	76	92
31	Manufacture of electrical machinery and apparatus n.e.c.	19	15	34	0	0	34	16	18
32	Manufacture of radio, television and communication equipment and apparatus	61	27	88	0	0	88	15	73
34	Manufacture of motor vehicles, trailers and semi-trailers	148	24	172	0	0	172	34	139
35	Manufacture of other transport equipment	13	12	25	0	0	25	10	14
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	84	47	130	0	0	130	46	84
40	Electricity, gas, steam and hot water supply	28,776	347	29,123	0	0	29,123	76	29,047
41	Collection, purification and distribution of water	6,869	-5,969	901	0	0	901	143	758
90 (part)	Waste water disposal	3,354	0	3,354	0	0	3,354	-4,983	8,337
F-O	Construction and service activities 2)	0	656	656	0	0	656	631	26
A-Q	All industries	51,261	-3,475	47,786	0	343	47,443	-3,075	50,518
	Domestic final consumption of private households	83	3,467	3,551	154	0	3,704	3,075	630
	All industries and domestic final consumption of private households	51,344	-8	51,336	154	343	51,148	0	51,148

1) Water distributed or supplied by water works or other facilities.

2) Excl. 90 (part) Waste water disposal.

**Table 21: Withdrawal of water from, and discharge of water into nature, 1995**  
mn m<sup>3</sup>

WZ 93	Industries	Withdrawal of water from nature	Water received from industries <sup>1)</sup>	Water use	Water removed from	Water incorporated into	Water discharged into nature		
					other materials		total	through waste water disposal	direct (incl. evaporation and losses)
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	764	152	917	0	290	627	31	596
10	Mining of coal and lignite, extraction of peat	2,175	114	2,289	0	0	2,289	29	2,260
13.14	Mining and quarrying, except of energy producing materials	660	4	664	0	0	664	7	657
15	Manufacture of food products	321	217	538	0	39	499	239	259
17	Manufacture of textiles	191	19	210	0	0	210	54	156
20	Manufacture of wood and wood products, except furniture	17	4	21	0	0	21	3	17
21	Manufacture of pulp, paper and paper products	683	66	749	0	0	749	99	650
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	253	43	296	0	0	296	36	259
24	Manufacture of chemicals, chemical products and man-made fibres	2,969	435	3,404	0	0	3,404	225	3,179
25	Manufacture of rubber and plastic products	79	21	100	0	0	100	24	77
26	Manufacture of other non-metallic mineral products	149	53	202	0	0	202	34	168
27	Manufacture of basic metals	866	125	992	0	0	992	67	925
28	Manufacture of fabricated metal products, except machinery and equipment	28	24	52	0	0	52	25	27
29	Manufacture of machinery and equipment	37	27	64	0	0	64	30	35
31	Manufacture of electrical machinery and apparatus n.e.c.	15	20	35	0	0	35	20	15
32	Manufacture of radio, television and communication equipment and apparatus	41	12	53	0	0	53	14	39
34	Manufacture of motor vehicles, trailers and semi-trailers	125	25	150	0	0	150	26	124
35	Manufacture of other transport equipment	11	7	18	0	0	18	6	11
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	53	23	76	0	0	76	23	53
40	Electricity, gas, steam and hot water supply	27,702	332	28,034	0	0	28,034	49	27,985
41	Collection, purification and distribution of water	6,448	-5,613	835	0	0	835	124	711
90 (part)	Waste water disposal	5,273	0	5,273	0	0	5,273	-4,689	9,962
<b>F-O</b>	<b>Construction and service activities<sup>2)</sup></b>	0	618	618	0	0	618	594	24
<b>A-Q</b>	<b>All industries</b>	48,862	-3,274	45,588	0	329	45,259	-2,930	48,189
	Domestic final consumption of private households	47	3,266	3,313	152	0	3,465	2,930	535
	<b>All industries and domestic final consumption of private households</b>	48,909	-8	48,901	152	329	48,724	0	48,724

1) Water distributed or supplied by water works or other facilities.

2) Excl. 90 (part) Waste water disposal.

Table 22: Withdrawal of water from, and discharge of water into nature, 1998

mn m<sup>3</sup>

WZ 93	Industries	Withdrawal of water from nature	Water received from industries <sup>1)</sup>	Water use	Water removed from	Water incorporated into	Water discharged into nature		
					other materials		total	through waste water disposal	direct (incl. evaporation and losses)
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	309	158	467	0	280	186	30	157
10	Mining of coal and lignite, extraction of peat	2,018	81	2,099	0	0	2,099	16	2,083
13.14	Mining and quarrying, except of energy producing materials	460	2	463	0	0	463	8	454
15	Manufacture of food products	301	154	455	0	39	415	185	230
17	Manufacture of textiles	173	13	185	0	0	185	49	137
20	Manufacture of wood and wood products, except furniture	16	3	19	0	0	19	7	12
21	Manufacture of pulp, paper and paper products	575	25	600	0	0	600	56	544
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	213	25	238	0	0	238	11	227
24	Manufacture of chemicals, chemical products and man-made fibres	2,961	502	3,464	0	0	3,464	307	3,157
25	Manufacture of rubber and plastic products	85	24	109	0	0	109	28	82
26	Manufacture of other non-metallic mineral products	142	25	167	0	0	167	43	124
27	Manufacture of basic metals	761	103	864	0	0	864	71	793
28	Manufacture of fabricated metal products, except machinery and equipment	27	21	48	0	0	48	22	26
29	Manufacture of machinery and equipment	32	15	47	0	0	47	21	26
31	Manufacture of electrical machinery and apparatus n.e.c.	14	16	30	0	0	30	12	19
32	Manufacture of radio, television and communication equipment and apparatus	38	10	48	0	0	48	12	36
34	Manufacture of motor vehicles, trailers and semi-trailers	61	26	87	0	0	87	26	60
35	Manufacture of other transport equipment	7	5	13	0	0	13	6	7
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	21	17	38	0	0	38	20	18
40	Electricity, gas, steam and hot water supply	26,372	359	26,731	0	0	26,731	35	26,696
41	Collection, purification and distribution of water	6,135	-5,403	732	0	0	732	132	600
90 (part)	Waste water disposal	4,734	0	4,734	0	0	4,734	-4,726	9,460
<b>F-O</b>	<b>Construction and service activities <sup>2)</sup></b>	0	606	606	0	0	606	583	24
<b>A-Q</b>	<b>All industries</b>	45,456	-3,210	42,245	0	320	41,926	-3,047	44,972
	Domestic final consumption of private households	46	3,204	3,250	155	0	3,405	3,047	358
	<b>All industries and domestic final consumption of private households</b>	45,502	-7	45,495	155	320	45,331	0	45,331

1) Water distributed or supplied by water works or other facilities.

2) Excl. 90 (part) Waste water disposal.

**Table 23: Discharge of water into nature, 1991**

mn m³

WZ 93	Industries	Total	Waste water			Water losses	Evaporation and other losses	Foreign water and rainwater
			total	directly discharged	indirectly discharged			
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	1,132	33	0	33	0	1,099	0
10	Mining of coal and lignite, extraction of peat	2,626	2,352	2,320	32	0	274	0
13, 14	Mining and quarrying, except of energy producing materials	616	457	454	4	0	159	0
15	Manufacture of food products	576	524	291	233	0	51	0
17	Manufacture of textiles	262	208	124	84	0	53	0
20	Manufacture of wood and wood products, except furniture	33	28	18	10	0	5	0
21	Manufacture of pulp, paper and paper products	824	791	719	72	0	34	0
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	378	313	295	18	0	65	0
24	Manufacture of chemicals, chemical products and man-made fibres	4,366	4,325	4,147	178	0	41	0
25	Manufacture of rubber and plastic products	128	119	90	28	0	10	0
26	Manufacture of other non-metallic mineral products	229	183	153	30	0	46	0
27	Manufacture of basic metals	1,464	1,371	1,270	102	0	93	0
28	Manufacture of fabricated metal products, except machinery and equipment	158	111	72	39	0	47	0
29	Manufacture of machinery and equipment	168	141	65	76	0	27	0
31	Manufacture of electrical machinery and apparatus n.e.c.	34	32	16	16	0	2	0
32	Manufacture of radio, television and communication equipment and apparatus	88	51	36	15	0	37	0
34	Manufacture of motor vehicles, trailers and semi-trailers	172	167	133	34	0	5	0
35	Manufacture of other transport equipment	25	22	11	10	0	3	0
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	130	100	54	46	0	31	0
40	Electricity, gas, steam and hot water supply	29,123	28,461	28,385	76	0	662	0
41	Collection, purification and distribution of water	901	143	0	143	758	0	0
90 (part)	Waste water disposal	3,354	0	0	0	0	0	3,354
<b>F-O</b>	<b>Construction and service activities <sup>1)</sup></b>	656	631	0	631	0	26	0
<b>A-Q</b>	<b>All industries</b>	47,443	40,562	38,654	1,908	758	2,769	3,354
	Domestic final consumption of private households	3,704	3,409	334	3,075	0	296	0
	<b>All industries and domestic final consumption of private households</b>	51,148	43,971	38,988	4,983	758	3,065	3,354

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1) Excl. 90 (part) Waste water disposal

**Table 24: Discharge of water into nature, 1995**  
mn m³

WZ 93	Industries	Total	Waste water			Water losses	Evaporation and other losses	Foreign water and rainwater
			total	directly discharged	indirectly discharged			
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	627	31	0	31	0	596	0
10	Mining of coal and lignite, extraction of peat	2,289	2,181	2,152	29	0	108	0
13.14	Mining and quarrying, except of energy producing materials	664	633	626	7	0	31	0
15	Manufacture of food products	499	469	230	239	0	29	0
17	Manufacture of textiles	210	199	145	54	0	11	0
20	Manufacture of wood and wood products, except furniture	21	18	14	3	0	3	0
21	Manufacture of pulp, paper and paper products	749	717	618	99	0	32	0
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	296	229	193	36	0	67	0
24	Manufacture of chemicals, chemical products and man-made fibres	3,404	3,356	3,131	225	0	48	0
25	Manufacture of rubber and plastic products	100	91	68	24	0	9	0
26	Manufacture of other non-metallic mineral products	202	147	113	34	0	55	0
27	Manufacture of basic metals	992	924	857	67	0	68	0
28	Manufacture of fabricated metal products, except machinery and equipment	52	48	22	25	0	5	0
29	Manufacture of machinery and equipment	64	59	30	30	0	5	0
31	Manufacture of electrical machinery and apparatus n.e.c.	35	32	12	20	0	3	0
32	Manufacture of radio, television and communication equipment and apparatus	53	52	38	14	0	1	0
34	Manufacture of motor vehicles, trailers and semi-trailers	150	138	112	26	0	12	0
35	Manufacture of other transport equipment	18	17	10	6	0	1	0
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	76	40	17	23	0	36	0
40	Electricity, gas, steam and hot water supply	28,034	27,462	27,413	49	0	572	0
41	Collection, purification and distribution of water	835	124	0	124	711	0	0
90 (part)	Waste water disposal	5,273	0	0	0	0	0	5,273
<b>F-O</b>	<b>Construction and service activities <sup>1)</sup></b>	618	594	0	594	0	24	0
<b>A-Q</b>	<b>All industries</b>	45,259	37,560	35,801	1,759	711	1,715	5,273
	Domestic final consumption of private households	3,465	3,180	250	2,930	0	285	0
	<b>All industries and domestic final consumption of private households</b>	48,724	40,740	36,051	4,689	711	2,000	5,273

1) Excl. 90 (part) Waste water disposal

**Table 25: Discharge of water into nature, 1998**  
mn m³

WZ 93	Industries	Total	Waste water			Water losses	Evaporation and other losses	Foreign water and rainwater
			total	directly discharged	indirectly discharged			
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	186	30	0	30	0	157	0
10	Mining of coal and lignite, extraction of peat	2,099	2,027	2,011	16	0	72	0
13, 14	Mining and quarrying, except of energy producing materials	463	384	375	8	0	79	0
15	Manufacture of food products	415	406	221	185	0	9	0
17	Manufacture of textiles	185	184	135	49	0	1	0
20	Manufacture of wood and wood products, except furniture	19	19	12	7	0	0	0
21	Manufacture of pulp, paper and paper products	600	540	484	56	0	60	0
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	238	204	193	11	0	34	0
24	Manufacture of chemicals, chemical products and man-made fibres	3,464	3,459	3,153	307	0	4	0
25	Manufacture of rubber and plastic products	109	103	75	28	0	6	0
26	Manufacture of other non-metallic mineral products	167	157	114	43	0	10	0
27	Manufacture of basic metals	864	799	728	71	0	65	0
28	Manufacture of fabricated metal products, except machinery and equipment	48	45	22	22	0	3	0
29	Manufacture of machinery and equipment	47	48	26	21	0	0	0
31	Manufacture of electrical machinery and apparatus n.e.c.	30	31	19	12	0	0	0
32	Manufacture of radio, television and communication equipment and apparatus	48	47	34	12	0	1	0
34	Manufacture of motor vehicles, trailers and semi-trailers	87	78	51	26	0	9	0
35	Manufacture of other transport equipment	13	13	7	6	0	0	0
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	38	34	14	20	0	4	0
40	Electricity, gas, steam and hot water supply	26,731	25,981	25,946	35	0	750	0
41	Collection, purification and distribution of water	732	132	0	132	600	0	0
90 (part)	Waste water disposal	4,734	0	0	0	0	0	4,734
<b>F-O</b>	<b>Construction and service activities<sup>1)</sup></b>	606	583	0	583	0	24	0
<b>A-Q</b>	<b>All industries</b>	41,926	35,303	33,623	1,680	600	1,288	4,734
	Domestic final consumption of private households	3,405	3,254	207	3,047	0	151	0
	<b>All industries and domestic final consumption of private households</b>	45,331	38,557	33,830	4,726	600	1,439	4,734

1) Excl. 90 (part) Waste water disposal.

**Table 26: Waste water directly discharged, 1991**  
mn m<sup>3</sup>

WZ 93	Industries	Total	with treatment	without treatment		
				total	cooling waste water	other waste water
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	0	0	0	0	0
10	Mining of coal and lignite, extraction of peat	2,320	175	2,144	912	1,232
13.14	Mining and quarrying, except of energy producing materials	454	30	423	120	304
15	Manufacture of food products	291	63	229	186	42
17	Manufacture of textiles	124	12	113	112	0
20	Manufacture of wood and wood products, except furniture	18	0	18	14	3
21	Manufacture of pulp, paper and paper products	719	253	466	386	80
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	295	66	229	194	36
24	Manufacture of chemicals, chemical products and man-made fibres	4,147	681	3,466	3,092	374
25	Manufacture of rubber and plastic products	90	10	80	77	3
26	Manufacture of other non-metallic mineral products	153	14	139	42	96
27	Manufacture of basic metals	1,270	454	816	743	73
28	Manufacture of fabricated metal products, except machinery and equipment	72	4	68	27	41
29	Manufacture of machinery and equipment	65	8	57	48	10
31	Manufacture of electrical machinery and apparatus n.e.c.	16	2	14	13	1
32	Manufacture of radio, television and communication equipment and apparatus	36	1	35	35	0
34	Manufacture of motor vehicles, trailers and semi-trailers	133	9	124	117	7
35	Manufacture of other transport equipment	11	2	10	7	3
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	54	5	49	26	23
40	Electricity, gas, steam and hot water supply	28,385	57	28,328	28,282	46
41	Collection, purification and distribution of water	0	0	0	0	0
90 (part)	Waste water disposal	0	0	0	0	0
<b>F-O</b>	<b>Construction and service activities<sup>1)</sup></b>	0	0	0	0	0
<b>A-Q</b>	<b>All industries</b>	38,654	1,846	36,808	34,433	2,375
	Domestic final consumption of private households	334	334	0	0	0
	<b>All industries and domestic final consumption of private households</b>	38,988	2,180	36,808	34,433	2,375

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1) Excl. 90 (part) Waste water disposal.

**Table 27: Waste water directly discharged, 1995**  
mn m<sup>3</sup>

WZ 93	Industries	Total	with treatment	without treatment		
				total	cooling waste water	other waste water
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	0	0	0	0	0
10	Mining of coal and lignite, extraction of peat	2,152	65	2,087	736	1,351
13, 14	Mining and quarrying, except of energy producing materials	626	21	605	76	529
15	Manufacture of food products	230	57	173	143	30
17	Manufacture of textiles	145	3	141	140	1
20	Manufacture of wood and wood products, except furniture	14	0	14	11	3
21	Manufacture of pulp, paper and paper products	618	227	391	385	6
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	193	81	112	100	12
24	Manufacture of chemicals, chemical products and man-made fibres	3,131	514	2,617	2,377	240
25	Manufacture of rubber and plastic products	68	7	61	60	1
26	Manufacture of other non-metallic mineral products	113	11	103	24	79
27	Manufacture of basic metals	857	231	626	578	49
28	Manufacture of fabricated metal products, except machinery and equipment	22	2	20	19	1
29	Manufacture of machinery and equipment	30	1	28	21	7
31	Manufacture of electrical machinery and apparatus n.e.c.	12	1	11	10	1
32	Manufacture of radio, television and communication equipment and apparatus	38	1	38	37	0
34	Manufacture of motor vehicles, trailers and semi-trailers	112	9	102	99	3
35	Manufacture of other transport equipment	10	1	10	6	4
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	17	2	14	10	4
40	Electricity, gas, steam and hot water supply	27,413	39	27,374	27,326	48
41	Collection, purification and distribution of water	0	0	0	0	0
90 (part)	Waste water disposal	0	0	0	0	0
<b>F-O</b>	<b>Construction and service activities <sup>1)</sup></b>	0	0	0	0	0
<b>A-Q</b>	<b>All industries</b>	35,801	1,273	34,528	32,159	2,369
	Domestic final consumption of private households	250	250	0	0	0
	<b>All industries and domestic final consumption of private households</b>	36,051	1,523	34,528	32,159	2,369

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1) Excl. 90 (part) Waste water disposal.



**Table 28: Waste water directly discharged, 1998**

mn m<sup>3</sup>

WZ 93	Industries	Total	with treatment	without treatment		
				total	cooling waste water	other waste water
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	0	0	0	0	0
10	Mining of coal and lignite, extraction of peat	2.011	38	1.973	729	1.244
13, 14	Mining and quarrying, except of energy producing materials	375	11	365	17	348
15	Manufacture of food products	221	52	169	153	16
17	Manufacture of textiles	135	4	131	130	1
20	Manufacture of wood and wood products, except furniture	12	0	12	10	2
21	Manufacture of pulp, paper and paper products	484	225	259	257	1
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	193	33	160	152	8
24	Manufacture of chemicals, chemical products and man-made fibres	3.153	488	2.664	2.454	211
25	Manufacture of rubber and plastic products	75	5	70	69	1
26	Manufacture of other non-metallic mineral products	114	6	108	17	91
27	Manufacture of basic metals	728	64	664	628	35
28	Manufacture of fabricated metal products, except machinery and equipment	22	2	21	18	3
29	Manufacture of machinery and equipment	26	1	25	17	8
31	Manufacture of electrical machinery and apparatus n.e.c.	19	1	19	17	2
32	Manufacture of radio, television and communication equipment and apparatus	34	0	34	34	0
34	Manufacture of motor vehicles, trailers and semi-trailers	51	9	43	37	5
35	Manufacture of other transport equipment	7	0	7	5	2
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	14	1	13	10	3
40	Electricity, gas, steam and hot water supply	25.946	83	25.863	25.842	20
41	Collection, purification and distribution of water	0	0	0	0	0
90 (part)	Waste water disposal	0	0	0	0	0
<b>F-O</b>	<b>Construction and service activities <sup>1)</sup></b>	0	0	0	0	0
<b>A-Q</b>	<b>All industries</b>	33.623	1.024	32.599	30.596	2.003
	Domestic final consumption of private households	207	207	0	0	0
	<b>All industries and domestic final consumption of private households</b>	33.830	1.231	32.599	30.596	2.003

1) Excl. 90 (part) Waste water disposal.

**Table 29: Specific water use, 1991, 1995 and 1998**

Water use per gross value added (prices of 1995)  
m³ per DM 1 000

WZ 93	Industries	1991	1995	1998
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	36.6	21.7	10.2
10	Mining of coal and lignite, extraction of peat	177.1	211.1	369.6
13, 14	Mining and quarrying, except of energy producing materials	113.9	102.8	86.2
15	Manufacture of food products	9.7	8.0	7.3
17	Manufacture of textiles	16.2	18.1	17.1
20	Manufacture of wood and wood products, except furniture	2.4	1.2	1.2
21	Manufacture of pulp, paper and paper products	49.5	49.6	32.4
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	46.7	65.9	41.7
24	Manufacture of chemicals, chemical products and man-made fibres	60.9	43.2	43.6
25	Manufacture of rubber and plastic products	3.7	2.8	2.8
26	Manufacture of other non-metallic mineral products	7.5	5.7	5.1
27	Manufacture of basic metals	46.7	31.8	26.7
28	Manufacture of fabricated metal products, except machinery and equipment	2.3	0.8	0.7
29	Manufacture of machinery and equipment	1.4	0.6	0.4
31	Manufacture of electrical machinery and apparatus n.e.c.	0.5	0.6	0.6
32	Manufacture of radio, television and communication equipment and apparatus	4.8	3.6	2.9
34	Manufacture of motor vehicles, trailers and semi-trailers	1.8	1.7	0.9
35	Manufacture of other transport equipment	1.5	1.7	0.9
11-12, 16, 18-19, 22, 30, 33, 36-37	Other branches of mining and manufacturing	1.1	0.7	0.3
40	Electricity, gas, steam and hot water supply	493.7	444.9	398.0
41	Collection, purification and distribution of water	95.9	108.2	83.9
90 (part)	Waste water disposal	968.1	4,272.5	4,045.2
<b>F-O</b>	<b>Construction and service activities 1)</b>	0.3	0.3	0.2
<b>A-Q</b>	<b>All industries</b>	15.3	13.8	12.2

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1) Excl. 90 (part) Waste water disposal.

**Table 30: Treated waste water by types of treatment**

Area	Year	Treated waste water	of which		
			mechanically	biologically <sup>1)</sup>	
				without additional treatment	with additional treatment
		mn m <sup>3</sup>	percent		
Direct discharge	1991	2,180	34	16	50
	1995	1,523	25	24	51
	1998	1,231	10	21	69
Indirect discharge	1991	4,983	8	35	57
	1995	4,689	4	12	84
	1998	4,726	1	5	94
Total	1991	7,163	16	29	55
	1995	6,212	9	15	76
	1998	5,957	3	8	89

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1) Including chemical-physical treatment.

Federal Statistical Office of Germany  
Environmental-Economic Accounting 2001

**Table 31: European comparison  
Water withdrawal and per capita consumption, 1995 and 1998**

Country	Water withdrawal <sup>1)</sup>		Inhabitants		Per capita consumption		Memo item:	
	1995	1998	1995	1998	1995	1998	Year	Withdrawal of seawater and brackish water
								mn m <sup>3</sup>
	mn m <sup>3</sup>		1 000		m <sup>3</sup>			mn m <sup>3</sup>
Belgium	8,145.0	7,443.0	10,130.6	10,191.3	804.0	730.3	1998	32
Denmark	887.0	754.0	5,215.7	5,294.9	170.1	142.4	.	.
Germany	42,601.1	40,591.0	81,583.6	82,057.4	522.2	494.7	.	.
Spain	33,288.0	40,855.0	39,177.4	39,347.9	849.7	1,038.3	1995	17,080
France	40 671.6 <sup>2)</sup>	30,341.0	58,020.4	58,722.6	701.0	516.7	.	.
Luxembourg	57.0	61.0	406.6	423.7	140.2	144.0	.	.
Austria	3,368.0	3,561.0	8,039.9	8,075.0	418.9	441.0	.	.
Portugal	.	11,090.0	9,912.1	9,957.3	.	1,113.8	.	.
Finland	2,488.0 <sup>2)</sup>	2,328.0	5,098.8	5,147.3	488.0	452.3	1999	5,414
United Kingdom	12,116.0	15,256.0	58,503.6	59,083.6	207.1	258.2	1998	7,699

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1) Excl. seawater and brackish water and excl. foreign water and rainwater.

2) 1994.

Sources: Eurostat, Maria Pau Vall, Ressourcen, Entnahme und Verwendung von Wasser in den europäischen Ländern,  
in Statistik kurzgefasst- 6/2001- Thema 8; Federal Statistical Office of Germany, Statistisches Jahrbuch für das Ausland 1997,1999

Federal Statistical Office of Germany  
Environmental-Economic Accounting 2001

**Table 32: Cumulated domestic CO<sub>2</sub> emissions with intermediate goods from the economic territory and from the rest of the world**

Specification		1991	1995	1996	1997	1998	1999	Change 1998 on 1991
		<b>CO<sub>2</sub> emissions</b>						
		<b>1 000 Tonnen</b>						<b>in percent</b>
	Origin of domestic product	975.799	903.165	923.891	892.743	887.464	857.890	- 12,1
	Production	756.626	687.021	691.412	665.273	664.088	647.206	- 14,5
	Households	219.173	216.144	232.479	227.470	223.375	210.684	- 3,9
+	Imports	252.859	244.260	241.643	252.971	263.475	264.193	4,5
=	Resources	1.228.658	1.147.425	1.165.534	1.145.714	1.150.939	1.122.084	- 8,7
=	Final uses	1.228.658	1.147.425	1.165.534	1.145.714	1.150.939	1.122.084	- 8,7
-	Exports	280.851	279.027	281.215	299.472	303.410	303.246	8,0
=	Final domestic uses	947.807	868.398	884.320	846.242	847.529	818.838	- 13,6
	Domestic final consumption of private households	684.873	636.387	660.850	638.853	632.296	611.164	- 10,8
	Domestic final consumption of non-profit institutions serving private households	5.105	4.942	5.315	4.852	4.820	4.875	- 4,5
	Domestic final consumption of general government	85.964	73.353	75.245	67.652	64.967	60.911	- 29,1
	Gross fixed capital formation	165.483	151.896	147.487	141.322	138.889	139.208	- 15,9
	Changes in stocks, acquisitions less disposals of valuables	6.381	1.820	- 4.577	- 6.437	6.556	2.681	- 58,0
		<b>Macroeconomic reference data</b>						
		<b>DM bn (price basis 1995)</b>						<b>in percent</b>
	Domestic production	5.713,4	6.072,6	6.150,5	6.280,4	6.488,8	6.686,6	17,0
+	Imports	701,4	753,2	783,0	855,3	939,8	1.016,7	45,0
=	Resources	6.414,8	6.825,9	6.933,5	7.135,7	7.428,6	7.703,3	20,1
-	Intermediate consumption	2.617,6	2.815,1	2.874,6	2.958,5	3.099,9	3.237,8	23,7
=	Final uses	3.797,2	4.010,8	4.058,9	4.177,1	4.328,7	4.465,5	17,6
-	Exports	765,7	825,1	870,7	969,9	1.040,0	1.096,4	43,2
=	Final domestic uses	3.031,4	3.185,7	3.188,2	3.207,2	3.288,7	3.369,1	11,1
	Domestic final consumption expenditure of private households	1.621,6	1.691,3	1.706,8	1.722,0	1.757,3	1.803,0	11,2
	Domestic final consumption of non-profit institutions serving private households	46,6	56,0	58,8	60,7	63,3	67,9	45,5
	Domestic final consumption expenditure of general government	632,4	697,8	702,5	696,5	699,6	698,7	10,5
	Gross fixed capital formation	718,2	733,1	728,0	729,9	751,5	781,8	8,9
	Changes in stocks, acquisitions less disposals of valuables	12,6	7,5	-7,9	-1,9	17,1	17,7	40,3
		<b>Specific CO<sub>2</sub> emissions</b>						
		<b>CO<sub>2</sub> emissions per gross value added (prices of 1995)</b>						
		<b>kg per DM 1 000</b>						<b>in percent</b>
=	Final uses	323,6	286,1	287,2	274,3	265,9	251,3	- 22,3
-	Exports	366,8	338,2	323,0	308,8	291,7	276,6	- 24,6
=	Final domestic uses	312,7	272,6	277,4	263,9	257,7	243,0	- 22,3
	Domestic final consumption of private households	422,3	376,3	387,2	371,0	359,8	339,0	- 19,7
	Domestic final consumption of non-profit institutions serving private households	109,5	88,3	90,4	79,9	76,2	71,8	- 34,4
	Domestic final consumption of general government	135,9	105,1	107,1	97,1	92,9	87,2	- 35,9
	Gross fixed capital formation	230,4	207,2	202,6	193,6	184,8	178,1	- 22,7
	Changes in stocks, acquisitions less disposals of valuables	506,9	242,9	578,5	3.387,6	384,3	151,8	- 70,0
	Memo item: Imports	360,5	324,3	308,6	295,8	280,4	259,9	- 27,9

**Table 33: Direct domestic CO<sub>2</sub> emissions**

1000 tonnes

WZ 93	Industries	1991	1992	1993	1994	1995	1996	1997	1998	1999
A-B	<b>Agriculture, forestry and fishing</b>	14,853	12,135	11,681	10,655	10,448	10,053	9,592	9,053	9,653
C-F	<b>Production industries, total</b>	635,028	596,533	573,924	572,544	566,375	564,988	547,061	543,874	527,094
10	Mining of coal and lignite, extraction of peat	24,697	22,849	22,555	22,472	27,786	22,203	17,738	15,593	14,690
13, 14	Mining and quarrying, except of energy producing materials	10,632	10,099	9,267	9,804	9,829	8,857	8,613	8,439	9,111
15	Manufacture of food products	14,373	14,283	13,841	13,667	14,134	14,275	13,740	13,618	12,989
17	Manufacture of textiles	2,106	1,611	1,408	1,311	1,383	1,347	1,196	1,196	1,185
20	Manufacture of wood and wood products, except furniture	2,254	1,851	1,697	1,596	1,673	1,654	1,489	1,471	1,456
21	Manufacture of pulp, paper and paper products	10,299	10,298	10,444	10,718	10,054	9,479	9,589	8,801	7,558
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	35,869	30,683	28,190	26,418	25,424	25,785	24,147	25,225	26,253
24	Manufacture of chemicals, chemical products and man-made fibres	43,876	42,228	39,522	39,309	33,400	32,354	31,862	27,237	27,618
25	Manufacture of rubber and plastic products	2,312	2,311	1,932	1,850	1,959	1,945	1,830	1,817	1,783
26	Manufacture of other non-metallic mineral products	34,778	34,710	35,789	37,162	39,569	37,911	38,458	38,202	38,074
27	Manufacture of basic metals	65,571	60,595	56,359	61,261	65,964	62,800	67,145	67,488	59,639
28	Manufacture of fabricated metal products, except machinery and equipment	5,456	4,946	4,451	4,162	4,543	4,434	4,105	4,097	4,014
29	Manufacture of machinery and equipment	5,976	5,421	4,469	4,004	4,395	4,512	4,063	3,886	4,397
31	Manufacture of electrical machinery and apparatus n.e.c.	3,366	2,715	2,472	2,325	2,405	2,397	2,116	2,120	2,050
32	Manufacture of radio, television and communication equipment and apparatus	1,690	1,409	1,306	1,240	1,324	1,355	1,203	1,205	1,166
34	Manufacture of motor vehicles, trailers and semi-trailers	5,733	5,424	5,466	5,056	5,723	6,340	5,756	5,558	5,742
35	Manufacture of other transport equipment	870	839	855	805	925	1,029	942	919	930
40	Electricity, gas, steam and hot water supply	341,268	323,491	313,760	310,807	297,216	307,254	295,380	299,646	290,893
41	Collection, purification and distribution of water	194	201	207	205	213	227	200	206	203
45	Construction	15,091	13,080	12,625	11,519	11,194	11,095	10,507	10,088	10,361
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	8,615	7,489	7,310	6,852	7,262	7,738	6,981	7,061	6,983
G-Q	<b>Service activities, total</b>	106,745	106,529	107,489	105,160	110,198	116,372	108,619	111,160	110,459
51-52	Wholesale trade and commission trade, retail trade (except of motor vehicles); repair of personal and household goods	21,701	22,640	23,496	23,457	24,795	26,026	24,264	24,898	24,814
60	Land transport, transport via pipelines	18,035	18,863	19,630	19,941	20,546	20,526	21,198	22,071	23,331
62	Air transport	11,923	12,747	13,512	13,619	14,190	14,596	15,106	15,606	16,874
75	Public administration and defence; compulsory social security	18,724	15,725	13,598	11,844	11,490	12,189	10,766	10,780	9,811
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	36,362	36,554	37,253	36,299	39,177	43,034	37,286	37,807	35,630
A-Q	<b>All industries</b>	756,626	715,197	693,094	688,358	687,021	691,412	665,273	664,088	647,206
	Domestic final consumption of private households	219,173	212,092	223,590	214,116	216,144	232,479	227,470	223,375	210,684
	<b>All industries and final consumption of private households (VGR-Konzept)</b>	975,799	927,289	916,685	902,474	903,165	923,891	892,743	887,464	857,890
	Balance <sup>1)</sup>	- 601	- 311	- 915	- 1 526	- 993	- 709	- 857	- 736	- 710
	<b>All industries and final consumption of private households (territorial concept)</b>	976,400	927,600	917,600	904,000	904,158	924,600	893,600	888,200	858,600

1) Emissions produced by resident production units in the rest of the world minus emissions of non-resident production units in the economic territory.

**Table 34: Direct domestic CO<sub>2</sub> emissions**

1991 = 100

WZ 93	Industries	1991	1995	1996	1997	1998	1999
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	100	70.3	67.7	64.6	61.0	65.0
<b>C-F</b>	<b>Production industries, total</b>	100	89.2	89.0	86.1	85.6	83.0
10	Mining of coal and lignite, extraction of peat	100	112.5	89.9	71.8	63.1	59.5
13, 14	Mining and quarrying, except of energy producing materials	100	92.4	83.3	81.0	79.4	85.7
15	Manufacture of food products	100	98.3	99.3	95.6	94.7	90.4
17	Manufacture of textiles	100	65.7	63.9	56.8	56.8	56.3
20	Manufacture of wood and wood products, except furniture	100	74.2	73.4	66.1	65.2	64.6
21	Manufacture of pulp, paper and paper products	100	97.6	92.0	93.1	85.5	73.4
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	100	70.9	71.9	67.3	70.3	73.2
24	Manufacture of chemicals, chemical products and man-made fibres	100	76.1	73.7	72.6	62.1	62.9
25	Manufacture of rubber and plastic products	100	84.7	84.1	79.1	78.6	77.1
26	Manufacture of other non-metallic mineral products	100	113.8	109.0	110.6	109.8	109.5
27	Manufacture of basic metals	100	100.6	95.8	102.4	102.9	91.0
28	Manufacture of fabricated metal products, except machinery and equipment	100	83.3	81.3	75.2	75.1	73.6
29	Manufacture of machinery and equipment	100	73.5	75.5	68.0	65.0	73.6
31	Manufacture of electrical machinery and apparatus n.e.c.	100	71.4	71.2	62.9	63.0	60.9
32	Manufacture of radio, television and communication equipment and apparatus	100	78.4	80.2	71.2	71.3	69.0
34	Manufacture of motor vehicles, trailers and semi-trailers	100	99.8	110.6	100.4	96.9	100.1
35	Manufacture of other transport equipment	100	106.3	118.3	108.3	105.6	106.9
40	Electricity, gas, steam and hot water supply	100	87.1	90.0	86.6	87.8	85.2
41	Collection, purification and distribution of water	100	110.0	116.9	102.9	106.4	104.4
45	Construction	100	74.2	73.5	69.6	66.8	68.7
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	100	84.3	89.8	81.0	82.0	81.1
<b>G-Q</b>	<b>Service activities, total</b>	100	103.2	109.0	101.8	104.1	103.5
51-52	Wholesale trade and commission trade, retail trade (except of motor vehicles); repair of personal and household goods	100	114.3	119.9	111.8	114.7	114.3
60	Land transport, transport via pipelines	100	113.9	113.8	117.5	122.4	129.4
62	Air transport	100	119.0	122.4	126.7	130.9	141.5
75	Public administration and defence; compulsory social security	100	61.4	65.1	57.5	57.6	52.4
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	100	107.7	118.3	102.5	104.0	98.0
<b>A-Q</b>	<b>All industries</b>	100	90.8	91.4	87.9	87.8	85.5
	Domestic final consumption of private households	100	98.6	106.1	103.8	101.9	96.1
	<b>All industries and domestic final consumption of private households</b>	100	92.6	94.7	91.5	90.9	87.9

**Table 35: Direct domestic CO<sub>2</sub> emissions**

Percent

WZ 93	Industries	1991	1995	1996	1997	1998	1999
A-B	<b>Agriculture, forestry and fishing</b>	1.5	1.2	1.1	1.1	1.0	1.1
C-F	<b>Production industries, total</b>	65.1	62.7	61.2	61.3	61.3	61.4
10	Mining of coal and lignite, extraction of peat	2.5	3.1	2.4	2.0	1.8	1.7
13, 14	Mining and quarrying, except of energy producing materials	1.1	1.1	1.0	1.0	1.0	1.1
15	Manufacture of food products	1.5	1.6	1.5	1.5	1.5	1.5
17	Manufacture of textiles	0.2	0.2	0.1	0.1	0.1	0.1
20	Manufacture of wood and wood products, except furniture	0.2	0.2	0.2	0.2	0.2	0.2
21	Manufacture of pulp, paper and paper products	1.1	1.1	1.0	1.1	1.0	0.9
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	3.7	2.8	2.8	2.7	2.8	3.1
24	Manufacture of chemicals, chemical products and man-made fibres	4.5	3.7	3.5	3.6	3.1	3.2
25	Manufacture of rubber and plastic products	0.2	0.2	0.2	0.2	0.2	0.2
26	Manufacture of other non-metallic mineral products	3.6	4.4	4.1	4.3	4.3	4.4
27	Manufacture of basic metals	6.7	7.3	6.8	7.5	7.6	7.0
28	Manufacture of fabricated metal products, except machinery and equipment	0.6	0.5	0.5	0.5	0.5	0.5
29	Manufacture of machinery and equipment	0.6	0.5	0.5	0.5	0.4	0.5
31	Manufacture of electrical machinery and apparatus n.e.c.	0.3	0.3	0.3	0.2	0.2	0.2
32	Manufacture of radio, television and communication equipment and apparatus	0.2	0.1	0.1	0.1	0.1	0.1
34	Manufacture of motor vehicles, trailers and semi-trailers	0.6	0.6	0.7	0.6	0.6	0.7
35	Manufacture of other transport equipment	0.1	0.1	0.1	0.1	0.1	0.1
40	Electricity, gas, steam and hot water supply	35.0	32.9	33.3	33.1	33.8	33.9
41	Collection, purification and distribution of water	0.0	0.0	0.0	0.0	0.0	0.0
45	Construction	1.5	1.2	1.2	1.2	1.1	1.2
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	0.9	0.8	0.8	0.8	0.8	0.8
G-Q	<b>Service activities, total</b>	10.9	12.2	12.6	12.2	12.5	12.9
51-52	Wholesale trade and commission trade, retail trade (except of motor vehicles); repair of personal and household goods	2.2	2.7	2.8	2.7	2.8	2.9
60	Land transport, transport via pipelines	1.8	2.3	2.2	2.4	2.5	2.7
62	Air transport	1.2	1.6	1.6	1.7	1.8	2.0
75	Public administration and defence; compulsory social security	1.9	1.3	1.3	1.2	1.2	1.1
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	3.7	4.3	4.7	4.2	4.3	4.2
A-Q	<b>All industries</b>	77.5	76.1	74.8	74.5	74.8	75.4
	Domestic final consumption of private households	22.5	23.9	25.2	25.5	25.2	24.6
	<b>All industries and domestic final consumption of private households</b>	100	100	100	100	100	100



**Table 36: Direct domestic specific CO<sub>2</sub> emissions**

CO<sub>2</sub> emissions per gross value added (prices of 1995)

Kilogram / EUR 1,000

WZ 93	Industries	1991	1995	1996	1997	1998	1999
A-B	<b>Agriculture, forestry and fishing</b>	378	247	223	214	197	203
C-F	<b>Production industries, total</b>	581	534	547	521	514	504
10	Mining of coal and lignite, extraction of peat	1,665	2,563	2,552	2,981	2,745	2,666
13, 14	Mining and quarrying, except of energy producing materials	1,965	1,522	1,524	1,682	1,571	1,700
15	Manufacture of food products	228	210	221	208	219	202
17	Manufacture of textiles	130	119	125	109	110	122
20	Manufacture of wood and wood products, except furniture	162	97	98	86	89	89
21	Manufacture of pulp, paper and paper products	619	666	576	520	475	391
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	4,428	5,662	6,732	5,020	4,425	9,907
24	Manufacture of chemicals, chemical products and man-made fibres	612	424	415	403	343	361
25	Manufacture of rubber and plastic products	67	54	56	48	46	46
26	Manufacture of other non-metallic mineral products	1,144	1,124	1,163	1,194	1,173	1,157
27	Manufacture of basic metals	2,090	2,112	2,043	2,098	2,088	1,831
28	Manufacture of fabricated metal products, except machinery and equipment	79	67	69	63	61	59
29	Manufacture of machinery and equipment	48	41	43	38	35	42
31	Manufacture of electrical machinery and apparatus n.e.c.	51	44	44	38	39	35
32	Manufacture of radio, television and communication equipment and apparatus	93	90	96	76	71	57
34	Manufacture of motor vehicles, trailers and semi-trailers	60	66	77	65	60	67
35	Manufacture of other transport equipment	54	90	87	69	65	54
40	Electricity, gas, steam and hot water supply	5,785	4,717	4,447	4,461	4,461	4,386
41	Collection, purification and distribution of water	21	28	29	23	24	23
45	Construction	75	50	52	50	49	50
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	68	66	72	64	65	65
G-Q	<b>Service activities, total</b>	54	50	52	47	47	45
51-52	Wholesale trade and commission trade, retail trade (except of motor vehicles); repair of personal and household goods	78	82	86	81	82	79
60	Land transport, transport via pipelines	286	356	349	368	384	378
62	Air transport	1,884	1,196	1,091	1,063	1,082	1,187
75	Public administration and defence; compulsory social security	88	53	55	49	50	45
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	26	24	26	22	21	19
A-Q	<b>All industries</b>	243	208	208	196	191	183
	Memo item: Domestic final consumption of private households	135	128	136	132	127	117

**Table 37: Direct domestic specific CO<sub>2</sub> emissions**

CO<sub>2</sub> emissions per gross value added (prices of 1995)

1991 = 100

WZ 93	Industries	1991	1995	1996	1997	1998	1999
<b>A-B</b>	<b>Agriculture, forestry and fishing</b>	100	65.4	59.0	56.5	52.1	53.7
<b>C-F</b>	<b>Production industries, total</b>	100	91.9	94.2	89.8	88.5	86.7
10	Mining of coal and lignite, extraction of peat	100	153.9	153.2	179.0	164.8	160.1
13, 14	Mining and quarrying, except of energy producing materials	100	77.4	77.6	85.6	80.0	86.5
15	Manufacture of food products	100	92.4	96.9	91.2	96.4	88.9
17	Manufacture of textiles	100	91.7	95.8	83.9	84.8	93.7
20	Manufacture of wood and wood products, except furniture	100	60.1	60.7	53.2	54.7	54.9
21	Manufacture of pulp, paper and paper products	100	107.6	93.0	84.0	76.8	63.2
23	Manufacture of coke, refined petroleum products, manufacture of fertile material	100	127.9	152.0	113.4	99.9	223.7
24	Manufacture of chemicals, chemical products and man-made fibres	100	69.2	67.9	65.8	56.1	59.0
25	Manufacture of rubber and plastic products	100	81.2	83.4	72.3	69.1	69.5
26	Manufacture of other non-metallic mineral products	100	98.3	101.7	104.4	102.5	101.2
27	Manufacture of basic metals	100	101.1	97.8	100.4	99.9	87.6
28	Manufacture of fabricated metal products, except machinery and equipment	100	84.6	87.6	80.1	77.4	75.6
29	Manufacture of machinery and equipment	100	84.7	89.3	79.9	72.4	87.3
31	Manufacture of electrical machinery and apparatus n.e.c.	100	86.6	86.9	75.3	76.2	69.5
32	Manufacture of radio, television and communication equipment and apparatus	100	97.1	102.9	82.1	76.9	60.9
34	Manufacture of motor vehicles, trailers and semi-trailers	100	110.6	129.6	108.9	100.3	112.1
35	Manufacture of other transport equipment	100	166.9	160.4	127.5	119.1	100.1
40	Electricity, gas, steam and hot water supply	100	81.5	76.9	77.1	77.1	75.8
41	Collection, purification and distribution of water	100	133.8	142.7	111.6	114.4	110.9
45	Construction	100	67.1	69.3	66.6	65.2	67.2
11-12, 16, 18-19, 22, 30, 33, 36-37	Other production industries	100	97.0	105.9	94.1	95.0	95.4
<b>G-Q</b>	<b>Service activities, total</b>	100	93.4	96.0	87.8	87.2	83.9
51-52	Wholesale trade and commission trade, retail trade (except of motor vehicles); repair of personal and household goods	100	104.7	110.1	103.5	104.7	101.6
60	Land transport, transport via pipelines	100	124.3	121.9	128.5	134.1	132.0
62	Air transport	100	63.5	57.9	56.4	57.5	63.0
75	Public administration and defence; compulsory social security	100	59.6	62.8	55.9	56.1	51.4
50, 59, 61, 63-67, 70-74, 80-95	Other service activities	100	95.9	101.6	85.4	83.5	75.7
<b>A-Q</b>	<b>All industries</b>	100	85.9	85.5	80.7	78.8	75.3
	Memo item: Domestic final consumption of private households	100	94.6	100.8	97.7	94.1	86.5

Table 38: Domestic cumulated CO<sub>2</sub> emissions of final uses by product groups

WZ 93	Product groups	Final uses			Including						Memo item: Imports		
		1991	1999	Change on 1991 in %	Consumption of households			Exports			1991	1999	Change on 1991 in %
					1991	1999	Change on 1991 in %	1991	1999	Change on 1991 in %			
		mn tonnes	Change on 1991 in %	mn tonnes	Change on 1991 in %	mn tonnes	Change on 1991 in %	mn tonnes	Change on 1991 in %				
A-B	Products of agriculture, forestry and fishing	18,462	9,528	-48.4	11,111	6,977	-37.2	5,958	2,175	-63.5	5,561	3,621	-34.9
C-F	Products of production industries, total	949,672	892,907	- 6.0	535,095	483,159	-9.7	251,639	274,359	9.0	211,222	226,745	7.3
10	Coal and lignite; peat	19,783	7,106	-64.1	18,795	6,688	-64.4	550	164	-70.2	305	293	- 4.0
13,14	Metal ores, other mining and quarrying products	2,450	1,790	-26.9	146	114	-21.6	2,466	1,479	-40.0	233	306	31.3
15	Food products and beverages	60,710	51,848	-14.6	51,302	40,176	-21.7	9,314	8,646	- 7.2	20,800	17,222	-17.2
17	Textiles	12,183	11,558	- 5.1	5,621	4,670	-16.9	5,987	6,193	3.4	7,695	6,942	- 9.8
20	Wood and products of wood and cork (except furniture); articles of straw and plaiting materials	3,020	2,617	-13.3	564	350	-38.0	1,050	1,103	5.0	944	795	-15.8
21	Pulp, paper and paper products	9,951	11,727	17.8	1,486	1,195	-19.6	9,045	10,916	20.7	4,175	5,164	23.7
23	Coke, refined petroleum products and nuclear fuel	196,534	176,187	-10.4	187,663	170,000	-9.4	4,939	5,006	1.4	12,655	8,224	-35.0
24	fibres	57,892	49,382	-14.7	8,992	7,296	-18.9	46,381	43,920	- 5.3	15,660	17,834	13.9
25	Rubber and plastic products	9,858	9,789	- 0.7	2,454	1,727	-29.6	6,727	7,812	16.1	4,012	4,586	14.3
26	Other non-metallic mineral products	16,613	15,208	- 8.5	6,531	5,533	-15.3	9,527	10,302	8.1	2,895	2,936	1.4
27	Basic metals	49,020	57,284	16.9	0	0		45,874	53,223	16.0	12,687	19,751	55.7
28	equipment	22,673	21,871	- 3.5	2,621	2,110	-19.5	9,994	9,979	- 0.1	8,171	8,705	6.5
29	Machinery and equipment n.e.c.	60,185	47,387	-21.3	3,044	2,622	-13.9	30,760	26,779	-12.9	22,078	20,575	- 6.8
31	Electrical machinery and apparatus n.e.c.	11,521	13,309	15.5	380	356	- 6.3	7,096	8,507	19.9	4,209	6,394	51.9
32	Radio, television and communication equipment and apparatus	8,621	14,343	66.4	1,652	2,209	33.7	3,500	7,921	126.3	4,491	9,638	114.6
34	Motor vehicles, trailers and semi-trailers	72,239	72,439	0.3	25,738	20,897	-18.8	29,607	42,099	42.2	32,562	36,511	12.1
35	Other transport equipment	12,130	14,939	23.2	1,122	1,039	- 7.4	7,898	10,385	31.5	8,931	10,318	15.5
40	Electrical energy, gas, steam and hot water	152,321	144,653	- 5.0	145,569	138,915	- 4.6	6,558	4,578	-30.2	4,602	4,391	- 4.6
41	Collected and purified water; distribution services of water	3,739	2,030	-45.7	3,716	2,020	-45.6	20	0		187	138	-26.3
45	Construction work	78,419	68,127	-13.1	1,283	1,026	-20.0	184	38	-79.3	15,798	14,568	- 7.8
11-12, 16, 18-19, 22, 30, 33, 36-37	Products of other production industries	89,810	99,312	10.6	66,414	74,215	11.7	14,163	15,311	8.1	28,133	31,453	11.8
G-Q	Service activities, total	260,524	219,648	-15.7	138,667	121,027	-12.7	23,254	26,712	14.9	36,076	33,828	- 6.2
51-52	Wholesale trade and commission trade services, except of motor vehicles and motorcycles, retail trade services, except of motor vehicles and motorcycles; repair services of personal and household goods	54,358	43,285	-20.4	41,544	32,149	-22.6	6,514	6,395	- 1.8	5,572	4,769	-14.4
60	Land transport and transport via pipeline services	20,531	26,572	29.4	15,248	16,987	11.4	3,622	7,068	95.1	2,092	3,013	44.0
62	Air transport services	15,526	15,733	1.3	8,758	10,645	21.5	6,764	5,061	-25.2	4,072	3,484	-14.4
75	Public administration and defence services; compulsory social security services+B16	40,113	24,878	-38.0	1,029	663	-35.6	168	66	-60.8	4,221	3,147	-25.4
59, 61, 63, 64-74, 80-95	Other service activities	129,996	109,180	-16.0	72,088	60,583	-16.0	6,186	8,122	31.3	20,118	19,415	-3.5
A-Q	All product groups	1,228,658	1,122,084	- 8.7	684,873	611,164	-10.8	280,851	303,246	8.0	252,859	264,193	4.5

**Table 39: International comparison  
Energy related CO<sub>2</sub> emissions 1990 and 1998**

Country	1990	1998	Change 1998 on 1990	Share of worldwide CO <sub>2</sub> emissions	Emission 1998 per inhabitant
	mn tonnes		%		in t/EW
OECD	10,955.7	11,992.6	9.5	55.4	10.9
Canada	430.2	499.6	16.1	2.3	15.8
Mexico	292.0	351.6	20.4	1.6	3.7
USA	4,827.4	5,433.3	12.6	25.1	20.1
Japan	1,018.7	1,099.3	7.9	5.1	8.9
Korea	229.9	365.5	59.0	1.7	8.0
Australia	258.9	317.2	22.5	1.5	16.6
New Zealand	21.9	27.8	26.9	0.1	8.0
Austria	57.4	61.2	6.6	0.3	7.6
Belgium	106.5	119.3	12.0	0.6	12.0
Czech Republic	154.1	113.6	- 26.3	0.5	11.7
Denmark	50.9	56.7	11.4	0.3	10.8
Finland	55.0	56.6	2.9	0.3	11.6
France	352.7	382.2	8.4	1.8	6.4
Germany <sup>1)</sup>	961.9	863.9	- 10.2	4.0	10.5
Greece	70.6	83.6	18.4	0.4	7.9
Hungary	70.5	57.5	- 18.4	0.3	5.7
Iceland	1.9	2.1	10.5	0.0	7.7
Ireland	30.3	37.9	25.1	0.2	10.4
Italy	399.4	423.8	6.1	2.0	7.5
Luxembourg	10.5	7.2	- 31.4	0.0	16.9
Netherlands	159.8	175.9	10.1	0.8	10.9
Norwegen	28.5	36.9	29.5	0.2	7.8
Poland	340.7	313.7	- 7.9	1.4	8.3
Portugal	39.6	53.5	35.1	0.2	5.5
Spain	206.4	248.6	20.4	1.1	6.5
Sweden	51.2	53.2	3.9	0.2	6.1
Switzerland	39.9	41.0	2.8	0.2	5.7
Turkey	128.8	182.1	41.4	0.8	2.9
United Kingdom	560.3	527.7	- 5.8	2.4	9.3
Europe (Nicht-OECD)	427.7	288.6	- 32.5	1.3	4.6
Africa	540.5	693.1	28.2	3.2	1.0
Asia	1,332.4	1,999.6	50.1	9.2	1.1
People's Rep. of China <sup>2)</sup>	2,276.5	2,846.2	25.0	13.1	2.3
Ex-USSR	3,344.8	2,070.9	- 38.1	9.6	7.6
Latin America	601.9	833.6	38.5	3.9	2.2
Middle East	596.0	924.2	55.1	4.3	5.8
World <sup>3)</sup>	20,075.5	21,648.9	7.8	100.0	3.9

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1) Differences from data of the German Government due to special OECD calculations.

2) Including Hongkong.

3) Without international transport (1990: 637,7 mn.t; 1998: 720,3 mn.t).

Source: Organisation for Economic Cooperation and Development (OECD)

Federal Statistical Office of Germany  
Environmental-Economic Accounting 2001

## 5 Annex

## Abbreviations - Units

J	=	joule	(1J = 1 Ws)	mn	=	million
kJ	=	kilojoule	(1 kJ = 10 <sup>3</sup> J)	bn	=	billion
MJ	=	megajoule	(1 MJ = 10 <sup>6</sup> J)	h	=	hour
GJ	=	gigajoule	(1 GJ = 10 <sup>9</sup> J)	m <sup>3</sup>	=	cubic metre
TJ	=	terajoule	(1 TJ = 10 <sup>12</sup> J)	%	=	percent
PJ	=	petajoule	(1 PJ = 10 <sup>15</sup> J)	m <sup>2</sup>	=	square metre
C.E.	=	coal equivalent	(1 t C.E. = 0.0294 TJ)	km <sup>2</sup>	=	square kilometre
W	=	watt		ha	=	hectare ( = 10,000 m <sup>2</sup> )
Ws	=	watt second		l	=	litre
MWh	=	megawatt hour	( = 3.6 GJ)	pkm	=	person kilometre
kg	=	kilogram				
t	=	tonne				

## Explanation of symbols

0	=	less than half of 1 in the last digit occupied, but more than zero	...	=	data will be available later
			X	=	cell blocked for logical reasons
			.	=	numerical value unknown or not to be disclosed
			-	=	no figures or magnitude zero

Differences in the sum totals may occur due to rounding of figures

### Input factors

For the use of the following input factors in the production process, quantitative trends and productivities can be shown (Table 2):

The use of economic factors

**Labour** - Volume of labour as the total of hours worked (bn hours)

**Capital** - Capital use as consumption of fixed capital  
(DM bn at prices of 1995)

Nature as a source of resources

**Area** - Area use as built-up and traffic area (km<sup>2</sup>)

**Energy** - Energy consumption as the consumption of primary energy (petajoules)

**Raw materials** - Raw material consumption, here measured as the quantities of used abiotic raw materials withdrawn from domestic nature and plus imported abiotic goods (mn t)

**Water withdrawal** - Water consumption as the withdrawal of water from nature (mn m<sup>3</sup>)

Nature as a sink for residuals

**Greenhouse gases** - Pressure on the environment through the emission of greenhouse gases, here: carbon dioxide, methane, dinitrogen monoxide (laughing gas)

**Acidification gases** - Pressure on the environment through the emission of acidification gases, here: sulphur dioxide,  
nitrogen oxides

**Water discharge** - Pressure on the environment through the discharge of used water into nature

The goal of Environmental-Economic Accounting is to describe the interactions between the economy and the environment. The starting point is national accounts, which – through Environmental-Economic Accounting – are supplemented by the representation of items that are relevant for the environment. Therefore, in addition to the economic production factors of labour and capital, Environmental-Economic Accounting takes account of the production factor of nature and, consequently, the performance of nature used by the economic system. This includes not only the natural inputs with material character (e.g. raw materials), where nature is used as a source of resources, but also the "services" provided by nature, such as the absorption of residuals. Currently it is not possible to directly measure the input of natural services either in monetary or in physical units. This is why such input is measured indirectly through the quantity of residuals taken up by nature. The relation used here (i.e. that between gross domestic product and the quantity of residuals) thus is what nature contributes to production by absorbing those substances (function as a sink). This ensures that the productivity studies include important aspects of the use of nature which have an impact on changes in the quality of the ecosystems or on climate changes.

### Productivity – An indicator of the efficiency of factor use

The productivity of an input factor indicates how much economic output is produced by using one unit of the factor concerned.

$$\text{Productivity} = \frac{\text{Gross domestic product (real)}}{\text{Input factor}}$$

Productivity indicates how efficiently a national economy deals with the use of labour, capital and nature. Due to their different qualities and functions, those factors cannot directly be compared with each other. However, by observing their development over long periods one may obtain information on how the relations between the factors have changed.

It must also be noted that for the calculation of productivities the entire real yield of the economic activity is referred only to the production factor concerned, although the product is created through the joint action of all production factors. Therefore productivities as calculated can serve only for rough orientation.

### **Water flow accounts**

Various data sources are used for the water flow accounts forming part of Environmental-Economic Accounting (*UGR*). Most of the basic data are taken from official statistics (statistics on water supply and waste water disposal in mining and manufacturing and in thermal-electric power plants for public supply as well as statistics of public water supply and waste water disposal). To bridge data gaps, other data (e.g. on agriculture) from publications of official statistics and of scientific institutes and organisations are used.

The goal of *UGR* is to show water flows in a breakdown by homogeneous branches and industries - from water withdrawal from nature to its passing into the economic system and the discharge of water into the natural system - and to draw up a complete balance of all water and waste water flows that are relevant for the economic process. This report shows the results by industries (national classification of economic activities, *WZ 1993*).

The water withdrawn from nature is used for various economic activities, including production processes of businesses and consumption of private households. In the economic process, water is distributed, incorporated in or removed from products, and it can be exported or imported. Water is discharged into nature in the form of waste water or evaporation.

### **Waste water treatment**

During mechanical treatment, coarse elements and depositable substances are separated through screens, sand traps as well as sedimentation and preclarifier basins. Generally, however, mechanical treatment is not sufficient to clarify heavily polluted waste water. Therefore, biological procedures have to be applied in addition. This involves the removal of biodegradable substances by microorganisms. During the more intensive chemical waste water treatment, other pollutants such as phosphorus compounds are removed through chemical and chemical-physical processes.

### **Withdrawal of water in European Union countries**

Regarding the statistical data from European Union countries, it should be noted that not all of them are based on the same methodological concepts. Although sea and brackish water have not been included in water withdrawal here, they may be quite important in some countries. In many cases, the data on the withdrawal of water in agriculture refer only to irrigation water, while not taking account of water required for animals. The coverage of cooling water does not always include cooling water used for power generation and for industrial processes.



### Hypothetical CO<sub>2</sub> emissions

The following factors influencing the trend of hypothetical CO<sub>2</sub> emissions during **production** (all industries) between 1991 and 1999 were taken into account:

- economic output (gross value added at prices of 1995)
- economic structure (shares of industries in the gross value added of production)
- energy intensity of the production (total energy consumption / gross value added) and
- CO<sub>2</sub> intensity of energy consumption (CO<sub>2</sub> emissions / total energy consumption).

The results regarding the hypothetical trend of CO<sub>2</sub> emissions are obtained with the assumption that for one factor the value of 1991 is imputed, whereas for the other factors the values of 1999 are assumed. The difference between hypothetical and actual CO<sub>2</sub> emissions may be interpreted as the impact which the factor kept constant has on the reduction of emissions.

### Estimating CO<sub>2</sub> emissions

The CO<sub>2</sub> emissions related to foreign trade flows can be estimated by means of input-output analysis. For this purpose, the results of Environmental-Economic Accounting on the energy quantities used for economic activities and relevant for emissions and those on the CO<sub>2</sub> emissions directly produced in that context are linked - using specific model assumptions - with information on interconnections between various economic activities which is contained in the monetary input-output tables of national accounts. One of the assumptions is that the domestic situation of production shall apply to the production of imported goods. So, to put it more precisely, what is measured is not the actual CO<sub>2</sub> emissions produced in the rest of the world but the CO<sub>2</sub> emissions avoided in Germany through imports.

### Calculating direct emissions into the air

**Direct emissions** of the various air pollutants are calculated for industries and private households by means of specific emission coefficients (database of the Federal Environmental Agency), energy consumption (database of the German Institute for Economic Research / energy balance) and by taking account of the processes running in the branches.

### Cumulated CO<sub>2</sub> emissions

The consumption of energy required for the production of goods and the relevant production of emissions are the direct consequence of a specific activity of industries and private households. Therefore, this is referred to as the production of **direct CO<sub>2</sub> emissions**.

CO<sub>2</sub> emissions created during the pre-stages of the production of goods are referred to as **indirect CO<sub>2</sub> emissions**. The quantity of energy required indirectly abroad and the resulting CO<sub>2</sub> emissions can be taken into account by assuming production structures and technologies corresponding to those in Germany.

The total of direct and indirect CO<sub>2</sub> emissions are the **cumulated CO<sub>2</sub> emissions**.

### Specific CO<sub>2</sub> emission and CO<sub>2</sub> productivity

The **specific CO<sub>2</sub> emission** of an industry indicates how much CO<sub>2</sub> emission was produced to obtain one unit of the economic output (value added) produced there:

$$\text{specific CO}_2 \text{ emission} = \frac{\text{CO}_2 \text{ emission}}{\text{gross value added}}$$

The **CO<sub>2</sub> productivity** of an industry indicates how much economic output (value added) was produced with one unit of the CO<sub>2</sub> emission produced there:

$$\text{CO}_2 \text{ productivity} = \frac{\text{gross value added}}{\text{CO}_2 \text{ emission}}$$

## German Environmental-Economic Accounting (GEEA)

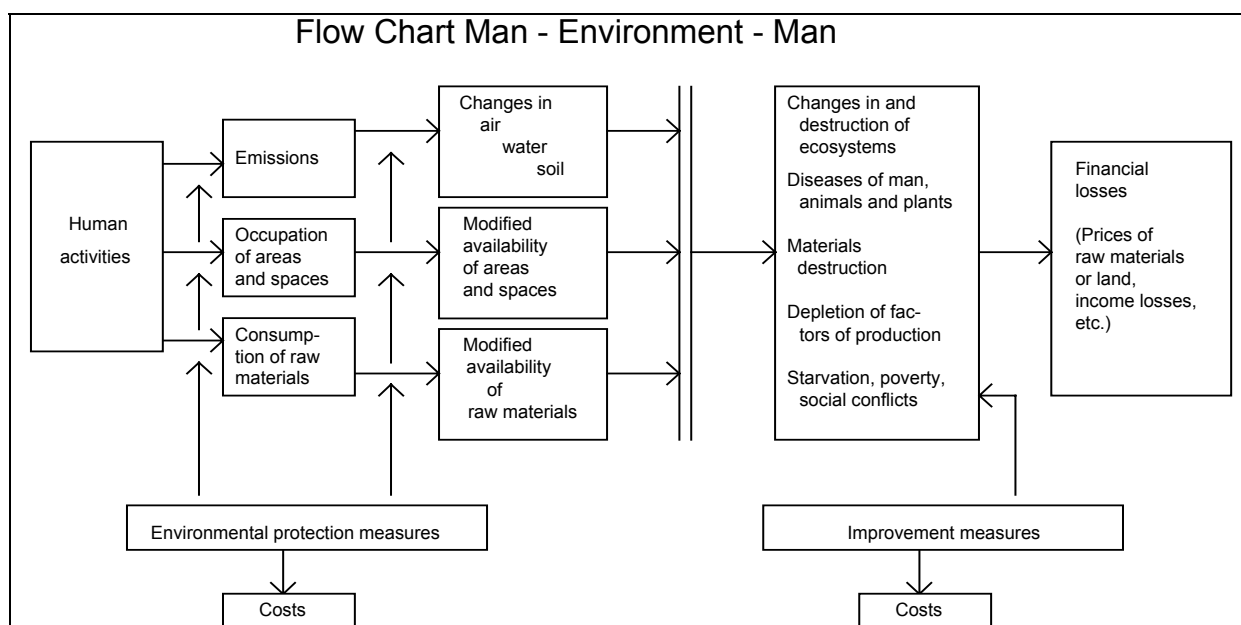
- Summary information -

### Objectives

Nature has much to offer for economic use. It supplies energy and raw materials, provides the location for businesses, and serves as a medium receiving pollutants, waste, etc. However, its potential is not unlimited. Being used it is reduced, at worst even destroyed. Nature is a factor of production whose scarcity must be considered in national economic accounting. This has been noted only in recent years as environmental problems are becoming more serious and pressing.

German Environmental-Economic Accounting (GEEA) approaches the statistical coverage of changes in "natural capital" due to economic activities. The idea is to calculate depreciation for nature as it is done for produced assets. In this context, sustainable development serves as a guiding principle. This means - as a first approximation - making the use of material, energy, and land for economic activities more efficient. In the final analysis, sustainability requires the long-term preservation of nature's functions (potentials). Environmental-Economic Accounting is to show in statistical terms which natural resources are used, consumed, depleted, or destroyed by the economic activities (production/consumption) of a period, and what expenditure is done or necessary for countermeasures. All this is based on the process of creating value added as reflected in economic statistics. Generally, only trends, mean values, distributions and similar macro-economic indicators are of interest. Individual cases such as materials, spaces, enterprises or incidents are aggregated.

### Subject Structure

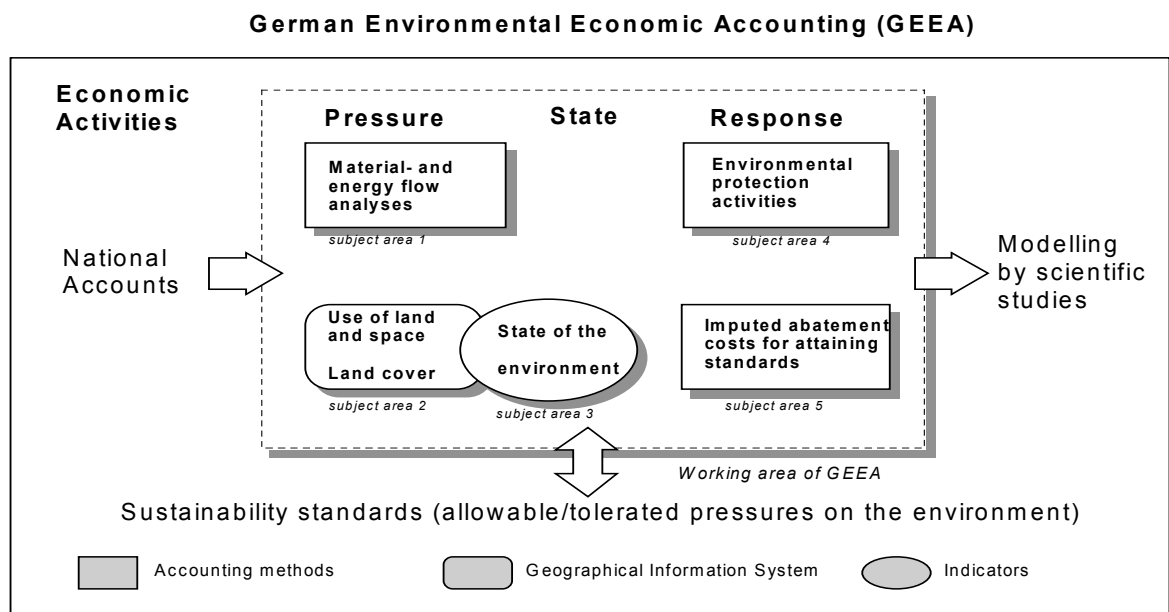


Statistical data have to be provided for the main categories sources of pressures on the environment, state of the environment and environmental protection measures. For the category pressures, a distinction can be made between material flows and area uses. In the field of environmental protection there are aftercare and preventive measures. This subject structure is outlined in the flow chart above entitled "Man - Environment - Man".

### Methodological concept

The calculation of depreciation for natural capital involves numerous methodological problems (problems of valuation/aggregation, limited knowledge of cause-effect relations, significant regional differences). For this reason, one must not expect too much of such a calculation. It would certainly be wishful thinking to believe that such a calculation could provide one single objective and indisputable depreciation value in monetary terms from which a sound, sustainable growth of the national income could in turn be derived. The „Eco-Domestic Product“ or „Green National Product“ as one single figure will not be calculated by the Federal Statistical Office. Moreover it seems to be more realistic to calculate pathways for a sustainable economy with the help of dynamic multi-sectoral models. By statistical law modelling in general is not a task of the Statistical Office. Such modelling calculations will be conducted in Germany by independent research institutes. For developing these multi-sectoral models GEEA will offer in close co-operation with the research institutes basic data.

The German Environmental-Economic Accounting has been set up to provide answers to questions in economic and environmental policy at every stage on the way to the final and filled GEEA-system. For evaluating the efficiency of natural resource handling within the framework of structural and environmental policy, it is of fundamental importance to know the use of raw materials, energy and land changes within the sectors of the economy over time, and what, in contrast, the emissions into the natural environment are. Highly aggregated indices of the state of the environment indicate qualitative changes in a standardized form and reflect the effects and benefits side of environmental protection measures. The cost side and the current burden on the economy are recorded for environmental protection activities which are actually being carried out. Imputed abatement costs of additional preventive measures complete the picture, helping to weigh different "standards" (target values) for important physical pressures. The following figure presents the complete concept of the German Environmental-Economic Accounting:



Five subjects are covered by the German Environmental-Economic Accounting:

1. Material and energy flow analyses, raw material consumption, emission structure
2. Use of land and space, land cover
3. State of the environment
4. Environmental protection activities, capital formation, expenditures
5. Imputed abatement costs for attaining standards

As indicated by the different symbols, the various subject areas are characterized by their own specific methods: In subject areas 1, 4, and 5, methods of economic statistics and accounting are used to balance the material flows caused by the economic sectors and the environmental protection activities taken. Subject area 2 deals with immaterial pressures arising from a modified distribution of land uses and physical interventions. In subject area 3, the objective basically is to condense measuring and monitoring data, which are available in an isolated form so as to provide suitable indicators. In this context an area sample was developed which aims at the production of ecoindicators/ecoindices. The sample should reflect the change of diversity of landscapes, fauna and flora.

The entire working area of Environmental-Economic Accounting does not include the setting of standards. For establishing such standards, however, information from Environmental-Economic Accounting explicitly aims at providing factual data on costs and benefits of alternative standard values for the process of political decision-making.

### **Relation to national accounting**

The result of the discussion on an environment-related extension of national accounting is that it would seem best to continue as before with the traditional national product computations, which are an important means of short and medium-term monitoring of business development. For presenting economic-ecological relations a satellite system should be created separately, which has to be closely linked with the traditional national accounts as its core system. This approach would be preferable in view of the methodological and statistical deficits still existing with regard to the valuation of economic pressures created by the business sector. Limiting the approach to supplementary satellite systems means that there will be the chance to test new concepts and to use also data whose accuracy in statistical terms is not yet absolutely certain. This would not affect the data quality required for national product computations in the narrower sense. International concepts for a satellite system for the environment were developed in particular by the United Nations. In a handbook on national accounting, the System for Integrated Environmental and Economic Accounting (SEEA) was presented in 1993 and revised in the last two years (SEEA 2000 will be published in the near future). In Germany, the satellite system for the environment is implemented on the basis of the conceptual proposals of the SEEA as part of the German Environmental-Economic Accounting.

### **Multi-sectoral modelling approaches**

As mentioned above the calculation of total cost figures for the entire economy reflecting the depreciation on the natural assets of a nation is not carried out within the framework of the GEEA (see figure on the previous page). Nevertheless the data of the GEEA-subject areas „Material- and energy flow analyses“, „Environmental protection activities“ and „Imputed abatement costs“ offer an important part of the basic information required for multi-sectoral modelling approaches. These models, in Germany conducted by scientific institutions, try to estimate the total abatement costs for the entire economy expressing the periodical valuation of the pressures on the environment. The results of such type of modelling calculation are depending to a great extent on the underlying model specific assumptions and restrictions.

### **Scientific advice**

In 1990 the Federal Minister for the Environment, Nature Conservation and Nuclear Safety established an Advisory Council for Environmental-Economic Accounting that has been entrusted with providing scientific advice in any matters related to Environmental-Economic Accounting. In its statements, the council expressed the opinion that Environmental-Economic Accounting are indispensable for an environmental policy aimed at achieving sustainability. Up to the beginning of 2002 the council discussed at regular intervals the methodological bases of the concept of Environmental-Economic Accounting and the details of its implementation. In 1994, an Advisory Circle representing various social groups (above all industrial and environmental associations and trade unions) was assigned to the Council with the aim to put Environmental-Economic Accounting on a broad social basis. All aspects of methodology and implementation are discussed in detail in the forth (and final) statement of the Advisory Council, given to the Ministry of Environment in May 2002.

### **Work progress and results**

The subject areas provide the framework for supporting further development and empirical work. Research projects and field studies partly assisted by external experts have been and will be carried out in those fields of work that are not yet completed. Empirical data have become available on economic activities creating pressures, material and energy flow analyses, emissions of individual sectors of economic activity and environmental protection expenditure. They are published periodically in the series 19 „Environment“ by the Federal Statistical Office. Core results about the main Environmental-Economic tendencies of Germany are presented to the public every year by a GEEA press conference. The documents of the press conference are available on the homepage of the Federal Statistical Office Germany (<http://www.destatis.de>).

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