11

Environment

Introduction

Eurostat, in close partnership with the European Environment Agency (EEA), provides statistics and further information on environmental pressures and the state of the environment. This data supports the development, implementation, monitoring and evaluation of the European Union's (EU's) environmental policies, strategies and initiatives, including its sixth environment action programme (EAP).

Sixth environment action programme

The action programme, laid down by European Parliament and Council Decision 1600/2002/EC of 22 July 2002 is a ten-year (2002-2012) policy programme for the environment. It identifies four key priorities:

- tackling climate change;
- nature and biodiversity;
- environment and health;
- sustainable use of natural resources and the management of waste.

In order to implement the sixth EAP, the European Commission adopted seven thematic strategies: air pollution (adopted in September 2005); marine environment (October 2005); the prevention and recycling of waste (December 2005); the sustainable use of natural resources (December 2005); urban environment (January 2006); soil (September 2006); and the sustainable use of pesticides (July 2006). The data required to monitor the sixth EAP are collected in ten environmental data centres. Eurostat manages the data centres on waste, natural resources and products, while the EEA is responsible for air, climate change, water, biodiversity and land use, and the Joint Research Centre (JRC) is responsible for soil and forestry. Each strategy follows an in-depth review of existing policy and wide-ranging stakeholder consultation. The aim is to create positive synergies between the seven strategies, as well as to integrate them with existing sectoral policies and the sustainable development strategy.

Sustainable development strategy

Several environmental indicators have been chosen as sustainable development indicators (see the presentation of statistics for European policies) for the assessment of the progress achieved towards the goals of the sustainable development strategy. Examples of environmental headline indicators are the common bird index as an indicator for natural resources and greenhouse gas emissions by sector as an indicator for climate change and energy. Several others are used as indicators for sustainable consumption and production, public health, climate change and energy, sustainable transport, natural resources, and global partnership.

Europe 2020 – Europe's growth strategy

At the European Council meeting of 26 March 2010, EU leaders set out their plans for a Europe 2020 strategy for smart, sustainable and inclusive growth. The strategy includes three targets specifically related to the environment and climate change: greenhouse gas emissions 20 % lower than 1990; 20 % of energy from renewables; 20% increase in energy efficiency. As part of the sustainable growth priority one of the flagship initiatives concerns a resource-efficient Europe. The aims are to help decouple economic growth from the use of resources, support the shift towards a low-carbon economy, protect biodiversity, increase the use of renewable energy sources, modernise the transport sector, and promote energy efficiency. In the context of this initiative, several key proposals have been adopted by the European Commission.

- In March 2011 a 'Roadmap for moving to a competitive low carbon economy by 2050' (COM(2011) 112 final) was adopted. This roadmap describes a cost-effective pathway to reach the EU's objective of cutting greenhouse gas emissions by 80-95 % of 1990 levels by 2050. Based on the cost-effectiveness analysis undertaken, the roadmap gives direction to sectoral policies, national and regional low-carbon strategies and long-term investments.

- In September 2011 a further building block in this initiative was adopted in the form of the 'Roadmap to a resource efficient Europe' (COM(2011) 571 final). This builds upon and complements the other initiatives under the resource efficiency flagship, in particular the policy achievements towards a low carbon economy. It sets out a vision for the structural and technological change needed up to 2050, with milestones to be reached by 2020, proposing ways to increase resource productivity and decouple economic growth from resource use and explaining how policies interrelate and build on each other.
- An ambitious new strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020 was adopted in June 2011. The 'EU 2020 Biodiversity Strategy' (COM(2011) 244 final) is built around six main targets and 20 actions to help Europe reach its goal. Biodiversity loss is an enormous challenge in the EU, with around one in four species currently threatened with extinction and 88 % of fish stocks over-exploited or significantly depleted.
- A new strategy to secure and improve access to raw materials was adopted in February 2011 titled 'Tackling the challenges in commodity markets and on raw materials' (COM(2011) 25 final). This is focused on the fair and sustainable supply of raw materials from international markets, fostering sustainable supply within the EU, and boosting resource efficiency and promoting recycling.
- A 'Roadmap to a single European transport area – towards a competitive and resource efficient transport system' (COM(2011) 144 final) was adopted in March 2011 – see the introduction for transport.
- In November 2010 the initiative 'Energy 2020 a strategy for competitive, sustainable and secure energy' (COM(2010) 639 final) was adopted, defining energy priorities for a period of ten years. In March 2011 the 'Energy efficiency plan 2011' (COM(2011) 109 final) was adopted: energy efficiency is considered to be one of the most cost effective ways to enhance security of energy supply and to reduce emissions of greenhouse gases and other pollutants. See the introduction for energy for more information.

The integrated economic and employment guidelines, first combined in 2008, were also revised as part of the Europe 2020 strategy. Guideline 5 concerns improving resource efficiency and reducing greenhouse gases.

Initiatives on water and waste

The development of a '2012 Blueprint to safeguard Europe's waters' was endorsed by the President of the European Commission on the occasion of World Water Day on 22 March 2010. The Blueprint is intended to combine a stocktaking of the achievements of the Water Framework Directive (policy assessment) with an analysis of the policy needs in the water domain for the years to come. Work on the proposed blueprint is still ongoing and may well create new data needs with respective implications for water statistics.

In January 2011 the European Commission published a review of the thematic strategy on the prevention and recycling of waste. While noting that overall recycling rates had increased, the amount of waste going to landfill decreased, and the use of hazardous substances had been reduced, the review indicated that the amount of waste produced had continued to rise in many Member States. Concerning waste statistics, the usability and policy relevance of the Waste Statistics Regulation of 2002 was improved by Regulation (EU) 849/2010. It has entered into force in 2010 and will be the basis for the collection of data in 2012. Eurostat's Environmental Data Centre on waste is a major source for data and background information on waste generation and management in the EU, presenting statistics for key waste streams by waste category and by economic activity and treatment method, such as recycling and disposal.

11.1 Land cover, land use and landscape

This subchapter presents statistical data on land cover, land use and landscapes for 23 Member States of the European Union (EU), totals exclude Bulgaria, Cyprus, Malta and Romania. The data were gathered as part of the Land use/cover area frame survey, or LUCAS, conducted during the summer of 2009. LUCAS is the largest harmonised land survey implemented in the EU.

Land is the basis for most biological and human activities on Earth. Agriculture, forestry, industries, transport, housing and other services use land as a natural and/or an economic resource. Land is also an integral part of ecosystems and indispensable for biodiversity and the carbon cycle.

Land can be divided into two interlinked concepts:

- land cover refers to the bio-physical coverage of land (for example, crops, grass, broad-leaved forest, or built-up area);
- land use indicates the socio-economic use of land (for example, agriculture, forestry, recreation or residential use).

Land cover and land use data forms the basis for spatial and territorial analyses which are increasingly important for:

- the planning and management of agricultural, forest, wetland, water and urban areas;
- nature, biodiversity and soil protection, and;
- the prevention and mitigation of natural hazards and climate change.

Main statistical findings

Land cover

Forests and other wooded areas occupied 39.1 % of the total area of the EU in 2009, cropland nearly a quarter (24.2 %) of the area and grassland almost one fifth (19.5 %), while built-up and other artificial areas, such as roads and railways, accounted for 4.3 % of the total area (see Figure 11.1.1).

Land cover varies in a significant way between countries located on the one hand in southern and northern Europe and on the other hand in western and eastern Europe. Woodland is the prevailing land cover in northern parts of Europe and for a number of countries whose typography is dominated by mountains and hilly areas (see Figure 11.1.2). The share of woodland in the total area exceeded 60 % in Finland and, Sweden and was over 50 % in Estonia and Latvia; it was also over 60 % in Slovenia and over 40 % in Austria (both Alpine), and over 40 % in Slovakia (the Tatra mountains) and Portugal (Sistema Central). Woodland and forests in these countries have traditionally been very important ecologically, economically and socio-culturally.

Cropland (including both arable land and permanent crops) covered, on average, some 24.2 % of the total area of the EU in 2009. Denmark and Hungary were the countries that reported the highest proportion of their total area covered by cropland, its share rising close to 50 %. In most of the remaining Member States, the share of cropland was between 17 % and 35 % of overall land cover. At the bottom end of the range, cropland accounted for between 11 % and 12 % of the total area in Latvia, Estonia and Slovenia, while the lowest shares were recorded in Finland (6.0 %), Ireland (5.0 %) and Sweden (4.5 %).

Natural and agricultural grasslands dominate the landscape in Ireland, the United Kingdom and the Netherlands. In Ireland almost two thirds (64.1 %) of the country was covered in grassland in 2009, while the corresponding shares in the United Kingdom and the Netherlands were 42.4 % and 37.4 % respectively. In most of the remaining Member States for which data are available, the share of grassland in the total area was between 18 % and 33 %. However, there were six countries below this threshold: four of them (Italy, Spain, Portugal and Greece) were from southern Europe where rainfall levels are relatively low; the other two countries were Sweden and Finland, where grass covered less than 5 % of the total area.

Shrubland is a typical land cover feature of hot and arid countries such as Greece, Portugal and Spain; on the other hand, shrubland is also prevalent on the moors and heath lands of northern areas of the United Kingdom and parts of Ireland, as well as in transitional areas between forests and tundra in Sweden; these were the only Member States to report that shrubland accounted for a higher share of their total area than the EU average (5.6 %).

Artificial land composed 4.3 % of the total area of the EU in 2009. The Benelux countries had the highest proportions of built-up areas: this was particularly true in the Netherlands (which is densely populated), where artificial land accounted for 13.2 % of the total area. The four largest EU Member States in terms of population (Germany, France, Italy and the United Kingdom) also reported a higher than average share of artificial land.

On average 1.8 % of the EU was covered by wetlands and 3.4 % by inland water areas in 2009. Wetland is typically found along lakesides and in coastal areas, as well as in the form of bogs. The relative scarcity of wetlands and their importance as a habitat for various animal species (in particular, birds) often results in wetlands becoming protected areas. Sweden, Finland, Ireland and Estonia reported the highest proportions (in excess of 5 %) of their total area accounted for by wetlands; the majority of the remaining Member States had less than 1 % of their total area classified as wetlands. Inland water areas, such as lakes or rivers, covered 3.4 % of the EU in 2009. This average was highly influenced by three Member States – the Netherlands (where 11.0 % of the total area was inland water areas), Finland (10.2 %) and Sweden (9.1 %). The former is characterised by artificial lakes, several large rivers that enter the North Sea and numerous canals, while the two Nordic countries have hundreds of thousands of inland lakes.

Bare land (areas with no dominant vegetation cover) is a relatively rare in the EU, accounting for an average of 1.9 % of the total area in 2009. Spain and Portugal (5.2 % and 4.0 %) recorded the highest shares of bare land.

Land use

Agricultural land use is the most common primary [6] land use category in the EU; it accounted for 43 % of the total area in 2009 (see Figure 11.1.3). Areas used for forestry covered 29.8 % of the EU's land area, while 5.0 % was used for services, residential and recreational purposes. Industrial, transport, energy production and mining purposes claimed a further 3.4 %, leaving a residual category accounting for the remaining 18.8 % of land; this was used, among others, for hunting and fishing, was under protection, or had no visible [7] use.

Land in agricultural use encompasses various land cover types: the most common are arable land, permanent crops and grassland. Small portions of other land cover types can also be in agricultural use, such as artificial land (farm buildings, roads, etc.) and water (for example, irrigation ponds). In 14 out of 23 EU Member States, more than half of the land area was used for agricultural purposes in 2009 (see Figure 11.1.4). The highest share of agricultural land was recorded in Ireland (73.2 %), while the United Kingdom, Denmark and Hungary each reported shares of more than 60 %. In Finland and Sweden agriculture played a minor role in terms of land use, accounting for less than 10 % of the land in both these Member States.

Unsurprisingly, forestry was often the dominant land use in those Member States which had a high degree of woodland land cover. However, not all of this land is used for forestry, with alternative land uses including recreation, hunting, protected areas, or no visible use. In Finland, Sweden and Slovenia more than 50 % of the total land area was used for forestry purposes, a share that fell to below 10 % in Ireland, the United Kingdom, and particularly the Netherlands (3.1 %).

Industry, mining and transport (which includes also energy production, waste treatment, storage and construction activities) occupied 3.4 % of the EU's territory in 2009. The most common use, among the various sub-categories, was for transport, which averaged some 70 % of the total land use within this category; some 11 % of the total for this category was accounted for by mining. The highest share of industry, mining and transport in total land use was

(6) The same area can be used in parallel for many purposes (for example, a forest can be used for forestry, hunting and recreation); the statistics presented are based on the primary use.
(7) The LUCAS survey is based on field visits; land use is determined on the basis of visible signs of land use.

found in the Netherlands, where 12.2 % of land was used for these purposes. The very high share in the Netherlands may be linked to a high density transport network and to large storage areas for ports and logistical services. The share of mining (which includes quarrying and the extraction of peat) in land use was relatively high in Austria, Estonia, Finland, Ireland and Latvia.

Commerce (distributive trades), community services, recreational and residential areas covered 5 % of the EU's land area in 2009. Approximately half of this total in the EU was devoted to residential areas, 30 % to recreational purposes, 10 % to community services, and less than 5 % to commerce. The share of commerce, community services, recreational and residential areas rose to above 10 % of the total area in Finland and Sweden, mainly due to larger than average areas for recreational purposes, with forest areas close to cities and towns often used for recreational purposes in these Member States.

Almost 20 % of the land in the EU in 2009 was used for other purposes or there was no visible use of the land. The most common economic uses were for fishing and hunting. However, large areas of land are excluded from any socio-economic use – for example, as a result of being in protected areas where socio-economic activities are either completely forbidden or heavily restricted; there are also remote or otherwise difficultly accessible areas which have not attracted socio-economic activities.

Landscape

The heterogeneity of land cover and the presence of linear features such as hedges, lines of trees, roads, railways, rivers and irrigation channels are two important elements characterising landscape structures. Some countries have large continuous areas of the same land cover, while others have a diversified mosaic of land cover elements. As Figure 11.1.5 shows, Slovenia, Portugal, Austria, Luxembourg, Denmark and Italy had a relatively high level of land cover diversity, characterised by a varied land cover mosaic composed of different small land cover patches. In Ireland, the United Kingdom and Estonia the landscape was dominated by larger areas composed of the same land cover type.

Structural linear green elements portray the joint role of nature and mankind in shaping the countryside. Irish landscapes, which rank lowest in terms of land cover diversity, had the second highest number of green linear features (see Figure 11.1.6). Other countries where the landscape was characterised by a high variety of green linear elements included the Netherlands and France. In Slovakia, Hungary and Sweden the landscape was characterised as having relatively few structural green elements.

The density of man-made linear elements, which have a dissecting nature (such as roads, railways, aerial cables), is closely linked to population and infrastructure developments. Countries with relatively high population densities and which act as transit countries, such as Belgium and Luxembourg, had a relatively high number of man-made infrastructure related dissection elements (see Figure 11.1.7); this was also the case in Slovenia, Portugal and France (where the population was concentrated in particular areas). At the opposite end of the scale, the Baltic States, Finland, Sweden and most eastern European Member States often reported a relatively low level of man-made linear elements, with natural land cover types prevailing.

Data sources and availability

LUCAS is a field survey based on an area-frame sampling scheme carried out by Eurostat. Data on land cover and land use are collected and landscape photographs are taken to detect any changes to land cover/use or to European landscapes. The transect, a 250-meter walk along which linear elements and land cover changes are recorded, is used for landscape analysis.

Eurostat carried out a large LUCAS campaign in 2009, covering 23 countries in the EU (Bulgaria, Cyprus, Malta and Romania were excluded). Data on land cover, land use and landscape diversity were collected for approximately 234 700 points. These points were selected from a standard 2 km grid from a total of one million points all over the EU. The land cover and the visible land use data were classified according to the harmonised LUCAS land cover and land use nomenclatures.

The LUCAS data set provides the basis for harmonised land cover/use statistics at European level. The data set is unique as it is comparable in terms of definitions and methodology. The data for the 2009 reference period were published, for the first time, by Eurostat and this information is freely available to users.

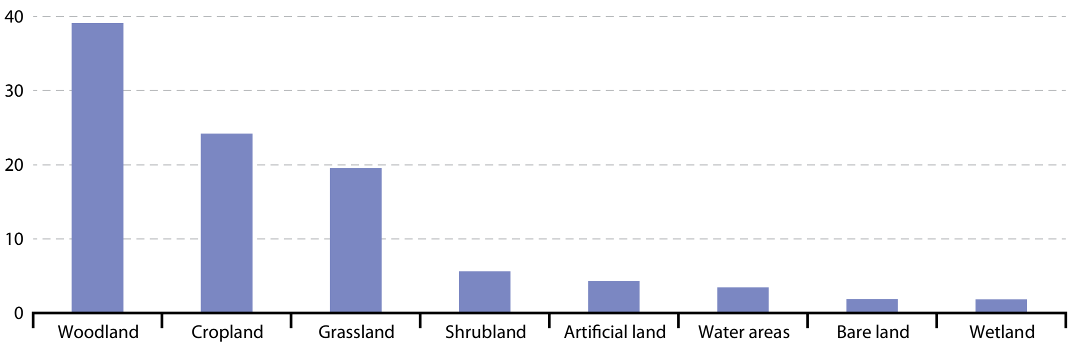
Context

Europe is composed of a myriad of different landscapes and land uses that reflect historical changes. While these are somewhat difficult to see on a day-to-day basis, on-going processes continually alter landscapes and the environment. Often the changes taking place may be linked to tensions arising from the conflict between the demand for more resources and infrastructure improvements on the one hand, and biodiversity and space on the other.

Land use and land cover data are important for an understanding of how environmental systems function, and their assessment over time provides a means for assessing the impact that any changes in land use may have on biodiversity and ecosystems.

Land use change is often considered to be a primary driver for changes in biodiversity and ecosystems. In recent years some of the most important land use changes have included: a decline in agricultural land use (as crop yields continue to rise); an increase in urban areas (arising from population and economic change); and a gradual increase in forest land areas (driven by the need to meet global environmental commitments in relation to climate change). The development of roads, motorways, railways, intensive agriculture and urban developments has led to Europe's landscape being increasingly broken up into small pieces. This pattern of fragmentation has the potential to affect levels of biodiversity and could result in negative impacts on flora and fauna.

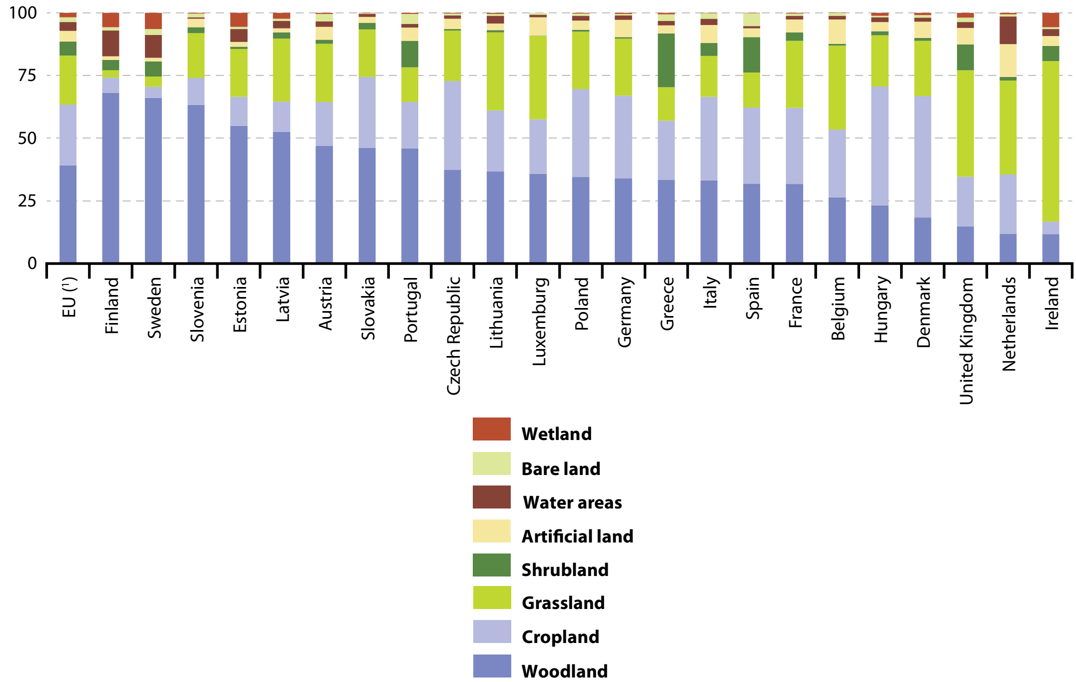
Figure 11.1.1: Main land cover by land cover type, EU, 2009 (1)
(% of total area)



(1) EU average excluding Bulgaria, Cyprus, Malta and Romania.

Source: Eurostat (online data code: lan_lcv)

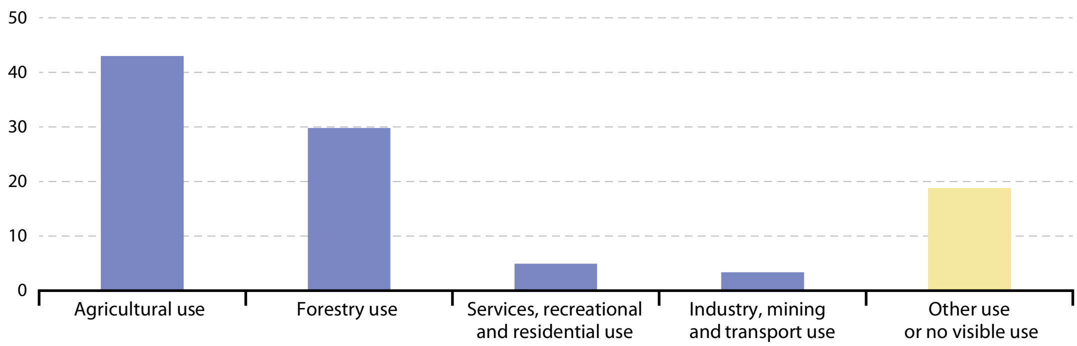
Figure 11.1.2: Main land cover by land cover type, 2009
(% of total area)



(1) EU average excluding Bulgaria, Cyprus, Malta and Romania.

Source: Eurostat (online data code: lan_lcv)

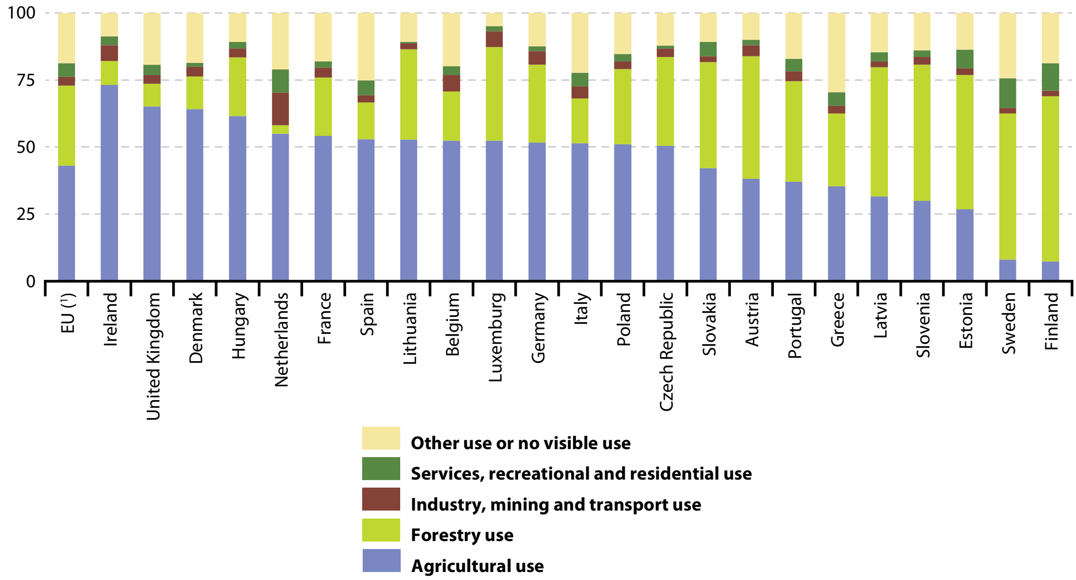
Figure 11.1.3: Main land use by land use type, EU, 2009 (1)
(% of total area)



(1) EU average excluding Bulgaria, Cyprus, Malta and Romania.

Source: Eurostat (online data code: lan_lu)

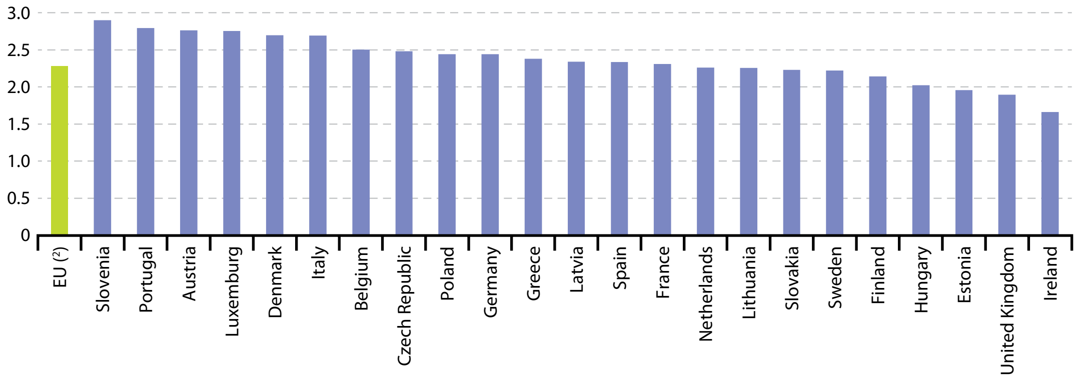
Figure 11.1.4: Primary land use by land use type, 2009
(% of total area)



(1) EU average excluding Bulgaria, Cyprus, Malta and Romania.

Source: Eurostat (online data code: lan_lu)

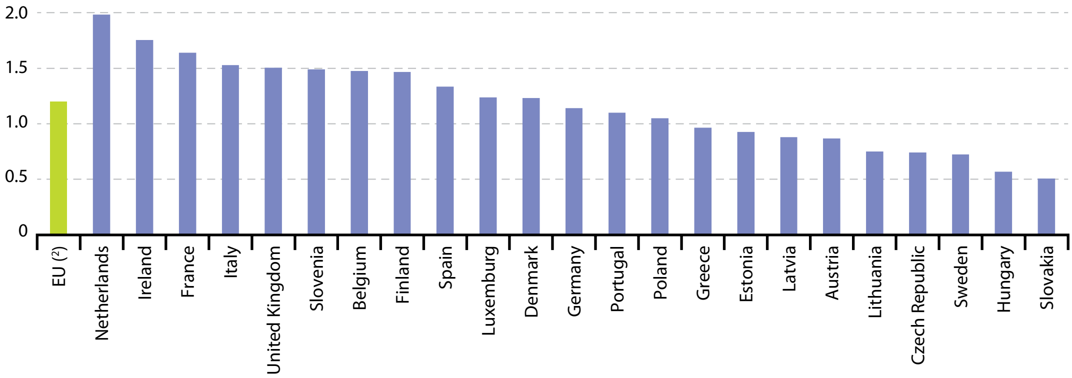
Figure 11.1.5: Land cover richness indicator – average number of different land cover types in a 250m transect, 2009 (1)
(number)



(1) Data derived from further analysis and computation of elementary data.
(2) EU average excluding Bulgaria, Cyprus, Malta and Romania.

Source: Eurostat (online data code: lan_lcs_ric)

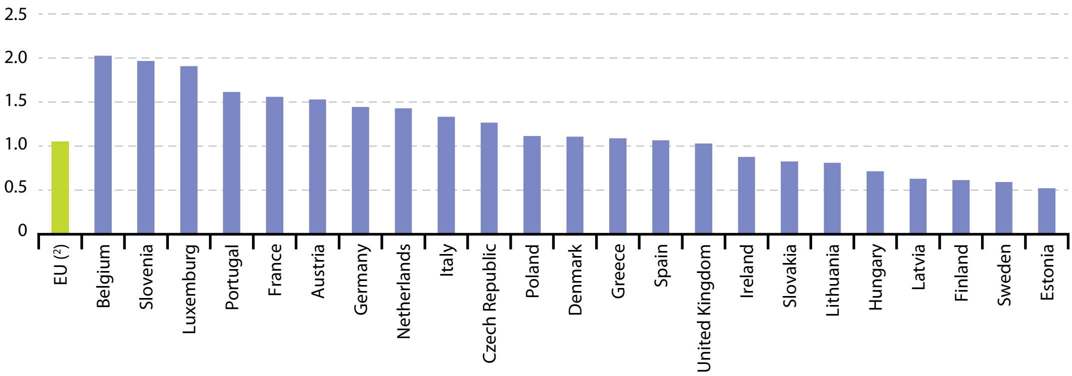
Figure 11.1.6: Average number of green linear structural elements in a 250m transect, 2009 (1)
(number)



(1) Data derived from further analysis and computation of elementary data.
(2) EU average excluding Bulgaria, Cyprus, Malta and Romania.

Source: Eurostat (online data code: lan_lcs_str)

Figure 11.1.7: Average number of different linear dissecting elements in a 250m transect, 2009 (1)
(number)



(1) Data derived from further analysis and computation of elementary data.
(2) EU average excluding Bulgaria, Cyprus, Malta and Romania.

Source: Eurostat (online data code: lan_lcs_diss)

11.2 Air emissions accounts

Air emissions accounts record emissions of greenhouse gases and air pollutants in the European Union (EU) showing the economic activities responsible for their production (in line with the 'polluter pays' principle), following the same classification that is used within national accounts, namely the statistical classification of economic activities in the European Community (NACE). Air emissions accounts are thus an extension of emissions inventories, such as those used for official reporting under international obligations (for example, the Kyoto Protocol).

Air emissions accounts are a statistical information system that combines air emissions data and economic data from national accounts. Their main purpose is to provide data for integrated environmental-economic analyses and modelling to supplement traditional economic data. This subchapter analyses the emissions and intensity of greenhouse gases (GHGs), acidifying substances and tropospheric ozone precursors (TOPs) in the EU-27 on the basis of an analysis of six economic activities that are responsible for their generation.

Main statistical findings

Greenhouse gas emissions

Greenhouse gas emissions for the purpose of this subchapter comprise carbon dioxide, nitrous oxide and methane; emissions of these three gases resulting from economic activities stood at 4 176 million tonnes of carbon dioxide equivalents in 2008; this was 2.4 % lower than in 1998. The development of greenhouse gas emissions over this period showed generally quite small shifts in the structure of emissions according to economic activity (see Figure 11.2.1). The biggest change was in relation to the transport, storage and communication sector (which excludes the use of private vehicles – reported under households); its share of greenhouse gas emissions rose by 3.2 percentage points.

The overall level of greenhouse gas emissions fell for four of the six activities covered in Figure 11.2.1 – by far the largest decline in emissions was recorded for mining and quarrying, where total greenhouse gas emissions fell by 29.5 % (reflecting, at least to some degree, a reduction in mining activity as natural resources were exhausted or were no longer economically viable for extraction). The manufacturing sector saw its level of greenhouse gas emissions fall by 9.6 % between 1998 and 2008; part of the reduction resulted from a slowdown in manufacturing activity as a result of the financial and economic crisis. On the other hand, the transport, storage and communication sector reported that its greenhouse gas emissions rose overall by 29.8 % over the most recent decade for which data are available, while a much smaller increase (1.1 %) was recorded for electricity, gas and water supply.

Emissions of acidifying substances

EU-27 emissions of acidifying substances totalled 21.3 million tonnes of acid equivalents in 2008; this was 28.6 % lower than in 1998. The largest emitters of acidifying substances (which for the purpose of this subchapter comprise sulphur oxides (SO_X), nitrogen oxides (NO_X) and ammonia (NH_3)) were agriculture, hunting, forestry and fishing with a 35.8 % share of the EU-27 total in 2008 (mainly from ammonia emissions), transport, storage and communication with 22.0 % (mainly through the combustion of fossil fuels leading to emissions of nitrogen oxides and sulphur dioxide), and electricity, gas and water supply with 20.8 % (especially from thermal power plants using coal). Together they accounted for almost four fifths (78.5 %) of the EU-27's total emissions of acidifying substances in 2008. Some acidifying substances react with the water in the atmosphere and subsequently result in acid rain, which in turn can damage forests, plants, fresh waters and soils as well as buildings and infrastructure.

There was a rapid increase in the share of emissions of acidifying substances coming from transport, storage and communication activities and from agriculture, hunting, forestry and fishing between 1998 and 2008. The relative share of the former rose by 7.9 percentage points within the EU-27, while the increase for the latter was 7.0 percentage points.

In contrast, the relative importance of the electricity, gas and water supply sector fell by 12.1 percentage points during the ten-year period under consideration, as this activity cut more than half (– 54.8 %) of its emissions of acidifying substances between 1998 and 2008 (these changes may be associated with a switch in the energy mix to cleaner fuels for power generation). Indeed, the overall level of emissions of acidifying substances fell for five of the six activities covered in Figure 11.2.2, with the only exception being the transport, storage and communication sector, where emissions rose by 11.4 % overall between 1998 and 2008.

Emissions of tropospheric ozone precursors

Emissions of tropospheric ozone precursors (TOPs), substances that lead to the formation of ozone in the part of the atmosphere closest to the earth's surface as a result of photochemical reactions, have negative impacts on human health including irritation of the respiratory system, exacerbation of asthma, lung diseases, and even premature death. For the purposes of this subchapter, tropospheric ozone precursors comprise nitrogen oxides (NO_X), non-methane volatile organic compounds (NMVOCs), carbon monoxide (CO) and methane (CH_4).

There were 22.0 million tonnes of emissions of tropospheric ozone precursors in the EU-27 in 2008; this figure was 16.0 % lower than in 1998. The transport, storage and communication sector was responsible for the highest share of EU-27 tropospheric ozone precursor emissions, accounting for nearly one third (30.1 %) of the total in 2008. It was closely followed by manufacturing (27.0 %), while the shares for agriculture, hunting, forestry and fishing (15.9 %) and other services and construction (14.0 %) were somewhat lower. Unlike the other types of air emissions, the electricity, gas and water supply sector had a relatively low share of total emissions of tropospheric ozone precursors (11.0 %).

When looking at the period from 1998 to 2008, there was an overall reduction in the level of tropospheric ozone precursors for five of the six economic activities shown in Figure 11.2.3. The only exception was the transport, storage and communication sector, where emissions of tropospheric ozone precursors rose by 9.8 % overall during the ten-year period under consideration, or by 7.1 percentage points in terms of their relative share of total emissions of tropospheric ozone precursors.

As such, the transport, storage and communication sector recorded an increase in its level of greenhouse gas, acidifying substances and tropospheric ozone precursor emissions during the period from 1998 to 2008.

Emissions intensity

Examining environmental variables together with economic ones can help identify which economic activity contributes to which environmental pressure and thus be helpful in devising specific policy measures where most needed. In order to make such comparisons it is first necessary to reflect upon the relative importance, in economic terms, of each economic activity. Across the EU-27 in 2008, by far the highest level of value added was generated by the other services and construction sector (which includes both private and public services, other than those concerning transport, storage and communication); it accounted for 71.5 % of the EU-27's gross value added. Manufacturing activities accounted for 16.5 % of the total, while transport, storage and communication had a 6.9 % share. The economic weight of electricity, gas and water supply (2.4 %) and of the primary activities of agriculture, hunting, forestry and fisheries (1.8 %) and mining and quarrying (0.9 %) was relatively small. More information on the breakdown of economic activity according to these six aggregates may be found in a subchapter on national accounts – GDP.

As shown in Figures 11.2.1 to 11.2.3, the picture was quite different when considering the relative contributions of each of these six activities to air emissions. The intensity of emissions can be used to measure the extent to which certain economic activities pollute the environment in relation to the economic value that they generate; the indicator is expressed as the ratio of emissions to gross value added and is presented in terms of the emissions produced for each monetary unit of economic output (for example, tonnes of emissions per EUR million of output).

Electricity, gas and water supply had by far the highest intensity of greenhouse gas emissions for the EU-27 among the six economic activities that are covered in Figure 11.2.4. This sector generated 7 866 tonnes of carbon dioxide equivalents for each EUR million of added value in 2008, which was almost three times as high as the next most intensive activity, namely agriculture, hunting, forestry and fishing (2 834 tonnes per EUR million). Furthermore, the electricity, gas and water supply sector was the only activity to record an increase in greenhouse gas intensity between 1998 and 2008 (up 1.9 %).

At the other end of the spectrum, the largest reductions in greenhouse gas intensity between 1998 and 2008 were recorded for manufacturing (– 26.6 %) and other services and construction (– 26.4 %).

While the electricity, gas and water supply sector also had a high level of intensity for EU-27 emissions of acidifying substances in 1998, there was a considerable reduction in its intensity rates during the following ten-year period, as the rate was more than halved from 55.0 tonnes of sulphur dioxide equivalents per EUR million of added value in 1998 to 25.1 tonnes per EUR million by 2008. This rapid change may be largely attributed to a switch from coal-fired to natural gas-fired thermal power plants and the use of industrial scrubbers that reduce emissions of sulphur oxides during energy combustion. As a result of this change, the agriculture, hunting, forestry and fishing sector became the activity with the highest level of intensity for emissions of acidifying substances by 2008 (38.1 tonnes per EUR million).

The intensity of emissions for acidifying substances in the EU-27 fell between 1998 and 2008 for all six of the economic activities covered in Figure 11.2.5; the most rapid reductions in intensity were recorded for electricity, gas and water supply (down 54.5 %), manufacturing (– 51.1 %), and other services and construction (– 42.4 %).

The intensity of tropospheric ozone precursors also fell between 1998 and 2008 for each of the six economic activities covered in Figure 11.2.6. Agriculture, hunting, forestry and fishing was the most intensive sector in both 1998 and 2008 for the EU-27, with intensity falling by 21.9 % to 17.5 tonnes of non-methane volatile organic compounds equivalents per EUR million of added value in 2008. This was the smallest reduction in percentage terms, with the intensity of tropospheric ozone precursors falling by more than a third (– 36.6 %) for manufacturing and by more than two fifths (– 43.8 %) for other services and construction.

It should also be borne in mind that these figures relating to the intensity of tropospheric ozone precursors are national averages and that regional variations could well exist. Indeed, tropospheric ozone precursors may have a pronounced local effect and it is possible for very high concentrations to be recorded at a regional level, especially in urban areas.

Data sources and availability

Air emissions accounts show data on emissions using a breakdown according to the economic activity responsible for producing them. The two main underlying data sources on emissions are two international conventions that govern efforts to reduce the release of polluting substances into the air, namely: the Kyoto Protocol for the United Nations Framework Convention on Climate Change (UNFCCC) concerning greenhouse gases; and the Gothenburg Protocol to the Convention on Long-Range Transboundary Air Pollution (CLRTAP) concerning acidifying substances. The core data from these emission inventories is published and distributed by the European Environment Agency (EEA).

Environmental accounts are subject to EU legislation, namely Regulation (EU) 691/2011 on European environmental economic accounts. The Regulation provides a framework for the development of various types of accounts, initially starting with three modules, with a view to adding other modules as they reach methodological maturity. Air emissions accounts are one of the three modules, alongside modules for material flow accounts and environmental taxes by economic activity. The aim of this legal base is to strengthen the coherence and availability of environmental accounts across the EU by providing a legal framework for their compilation, including methodology, common standards, definitions, classifications and accounting rules. The first regular annual data collection legally required under the Regulation will be in 2013.

In order to produce air emissions accounts, the emissions data are re-organised according to a breakdown by economic activity, as used within national accounts (based on the statistical classification of economic activities, NACE), which makes it possible to have an integrated environmental-economic analysis. The scope for air emissions accounts encompasses all nationally registered businesses (including those operating ships, aircrafts and other transportation equipment in other countries – the residence principle). Emissions are allocated to the economic activity responsible for producing them; unlike national emissions inventories, where the boundary for measuring the extent of emissions is the territorial border. As such, the accounting methodology used within air emissions accounts is not suited for monitoring progress towards internationally agreed emissions reduction targets, such as under the Kyoto Protocol.

The activity groups that are used in this subchapter are constructed as follows:

- Agriculture, hunting, forestry and fishing – NACE Rev. 1.1 Sections A and B;
- Mining and quarrying – NACE Rev. 1.1 Section C;
- Manufacturing – NACE Rev. 1.1 Section D;
- Electricity, gas and water supply – NACE Rev. 1.1 Section E;
- Transport, storage and communication – NACE Rev. 1.1 Section I;
- Other services and construction – NACE Rev. 1.1 Sections F, G, H, J, K, L, M, N, O and Q; as such, this grouping comprises construction, retail and wholesale trade, real estate, renting, financial services, hotels and restaurants, as well as public administration, education, health and social work.

Emissions of individual greenhouse gases and air pollutants may be converted and aggregated to provide information for three environmental pressures: greenhouse gas emissions are typically reported in terms of carbon dioxide equivalents, acidifying emissions in terms of sulphur dioxide equivalents, and ground level ozone precursors in terms of non-methane volatile organic compound equivalents. The use of a common unit allows the relative effect of different gases to be compared and combined – for example, a single kilogram of methane has 21 times the global warming effect of a kilogram of carbon dioxide (see Table 11.2.2 for more details on the conversion factors that are employed).

Air emissions accounts present information for three of the six Kyoto Protocol greenhouse gases – carbon dioxide, methane and nitrous oxide; at the time of writing no data are available for perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) or sulphur hexafluoride, as most EU Member States are unable to provide a breakdown of these gases by economic activity.

Context

The need to supplement existing information on the economy with environmental indicators has been recognised in a European Commission Communication titled 'GDP and beyond' (COM(2009) 433). Furthermore, similar recommendations have been made within the so-called Stiglitz report, released by the Commission on the Measurement of Economic Performance and Social Progress. The recommendations made support the expansion of the statistical understanding of human well-being by supplementing economic indicators such as GDP with additional information, including physical indicators on the environment.

Environmental accounts are one statistical means to try to measure the interplay between the economy and the environment in order to see whether current production and consumption activities are on a sustainable path of development. Measuring sustainable development is a complex undertaking as it has to incorporate economic, social and environmental indicators without contradiction. The data obtained from environmental accounts may subsequently feed into political decision-making, underpinning policies that target both continued economic growth and sustainable development, for example, initiatives such as the Europe 2020 strategy, which aims to achieve a resource-efficient, low-carbon economy for the EU by 2020.

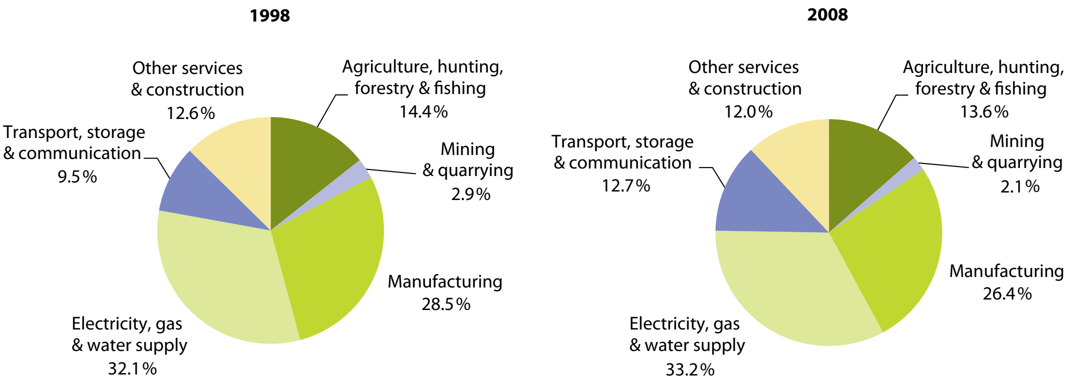
In order to have such a holistic view of the various aspects of sustainable development, the existing framework for measuring the economy (the system of national accounts) is supplemented by satellite accounts that cover, for example, environmental or social indicators. These satellite accounts are developed using the same concepts, definitions, classifications and accounting rules as the national accounts, bringing environmental or social data together with economic data in a coherent and comparable framework. Thus, environmental accounts serve to enhance the understanding of pressures exerted by the economy on the environment – for example, accounting for the subsequent release of substances (such as air emissions or waste) into the environment as a result of economic activities.

Note that a reduction in one type of environmental pressure can result in an increase in another type of pressure. For example, passenger cars with diesel engines are typically more fuel efficient and therefore tend to produce less carbon dioxide emissions per kilometre travelled. However, if consumers switch to driving diesel cars then (with current engine technology) it is likely that such a switch would be accompanied by an increase in acidifying emissions and ground level ozone precursors.

Table 11.2.1: Differences between inventories and accounts

	National emissions inventories (territory principle)	Air emissions accounts (residence principle)
Scope of national emissions reported	Direct emissions within the geographical national territory and: – emissions from international bunkers allocated to countries where the fuel is sold and not to the nationality of the purchasing unit; – emissions/removals induced by land use change and forestry are accounted for.	Emissions within the economic territory of the country covered, for example: – emissions of entities registered in the country (e. g. ships operating abroad, residents); – CO_2 from biomass is included since these emissions arise when using these energy carriers).

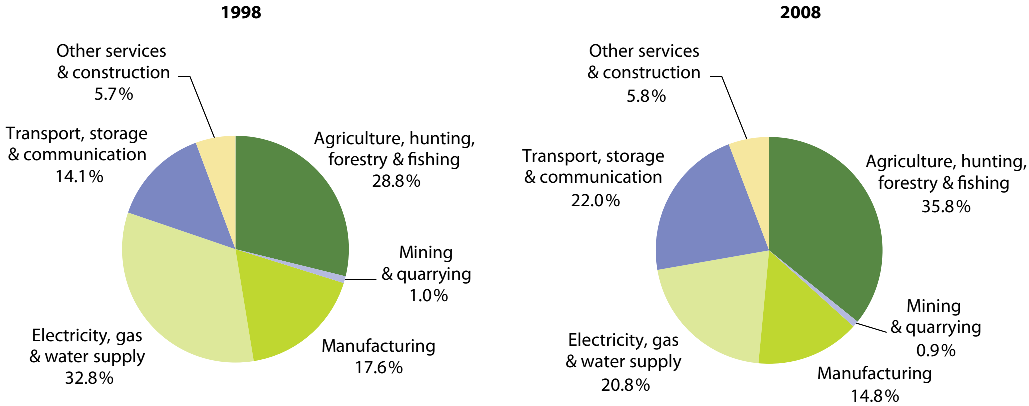
Figure 11.2.1: Greenhouse gas emissions, analysis by activity, EU-27, 1998 and 2008 ([1])
(% of total, based on tonnes of CO_2 equivalents of CO_2, CH_4 and N_2O)



([1]) Estimates.

Source: Eurostat (online data code: env_ac_ainacehh)

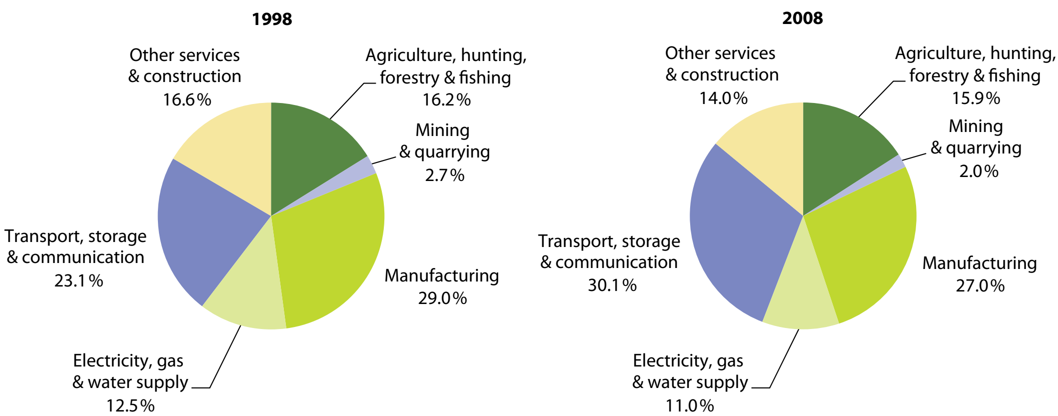
Figure 11.2.2: Emissions of acidifying substances, analysis by activity, EU-27, 1998 and 2008 (1)
(% of total, based on tonnes of SO_2 acid equivalents of SO_x, NH_3 and NO_x)



(1) Estimates.

Source: Eurostat (online data code: env_ac_ainacehh)

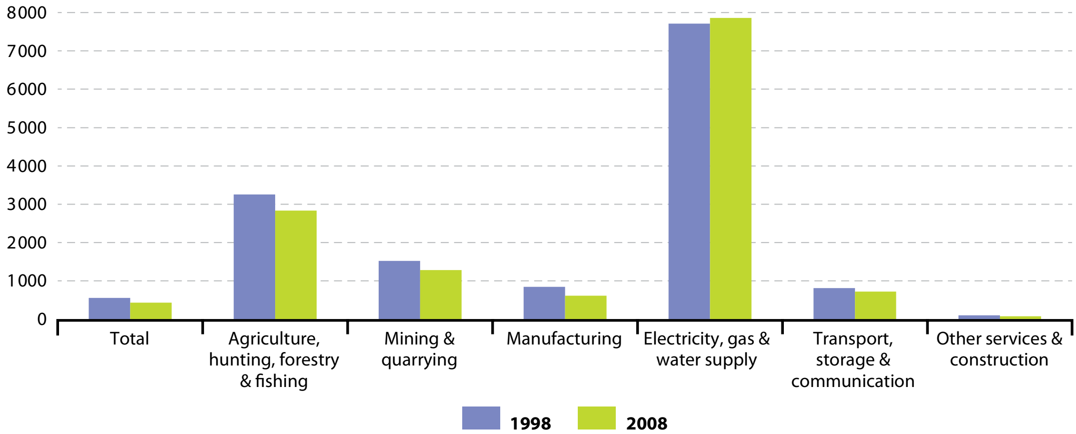
Figure 11.2.3: Emissions of tropospheric ozone precursors, analysis by activity, EU-27, 1998 and 2008 (1)
(% of total, based on tonnes of transopospheric ozone formation potential (TOFP) equivalents)



(1) Estimates.

Source: Eurostat (online data code: env_ac_ainacehh)

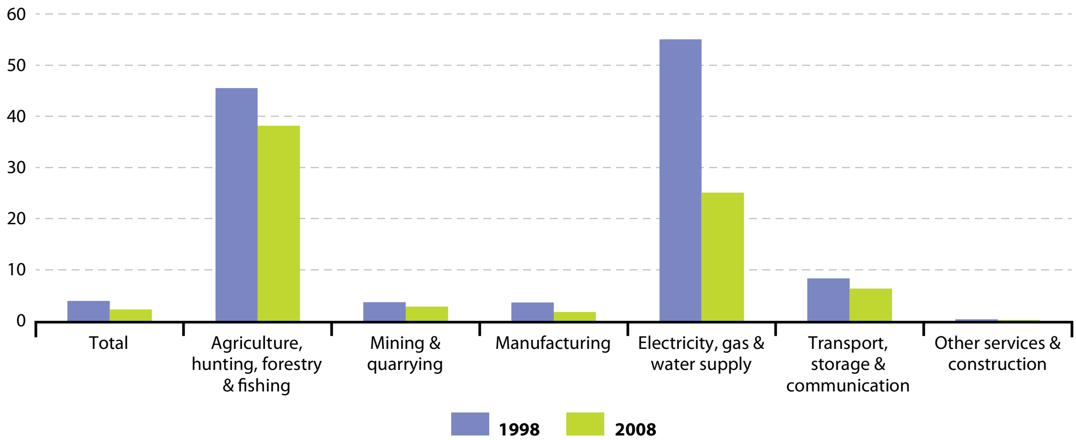
Figure 11.2.4: Greenhouse gas intensity, analysis by economic activity, EU-27, 1998 and 2008 (1)
(tonnes of CO_2-equivalents of CO_2, CH_4 and N_2O per EUR million of gross value added at basic prices)



(1) Estimates.

Source: Eurostat (online data codes: env_ac_ainacehh and nama_nace31_k)

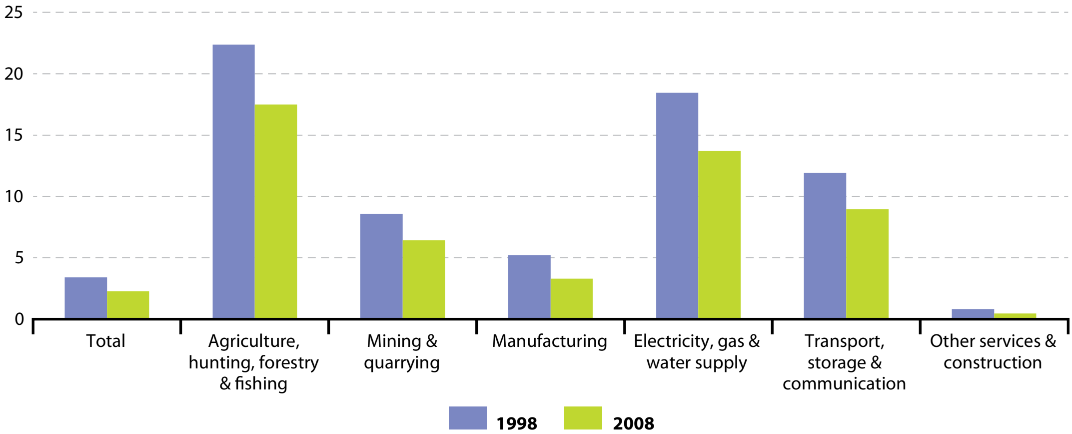
Figure 11.2.5: Acidifying substances intensity, analysis by economic activity, EU-27, 1998 and 2008 (1)
(tonnes of SO_2 acid equivalents of SO_x, NH_3 and NO_x per EUR million of gross value added at basic prices)



(1) Estimates.

Source: Eurostat (online data codes: env_ac_ainacehh and nama_nace31_k)

Figure 11.2.6: Tropospheric ozone precursors intensity, analysis by economic activity, EU-27, 1998 and 2008 ([1])
(tonnes of NMVOC-equivalents of NO_x, NMVOC, CO and CH_4 per EUR million of gross value added at basic prices)



([1]) Estimates.

Source: Eurostat (online data codes: env_ac_ainacehh and nama_nace31_k)

Table 11.2.2: Calculation of aggregated environmental pressures

Theme	Unit	Substance	Weighting factors	Pressure
Greenhouse gases	CO_2 – equivalents	Carbon dioxide (CO_2)	1	Aggregated greenhouse gas emissions – using Global Warming Potential weighting factors for 100 years
		Methane (CH_4)	21	
		Nitrous oxide (N_2O)	310	
Acidification	SO_2 – equivalents	Sulphur dioxide (SO_2)	1	Aggregated acidification emissions
		Nitrogen oxides (NO_x)	0.7	
		Ammonia (NH_3)	1.9	
Tropospheric ozone formation	NMVOC – equivalents	Non-methane volatile organic compounds (NMVOC)	1	Aggregated emissions of tropospheric ozone forming precursors
		Nitrogen oxides (NO_x)	1.22	
		Carbon monoxide (CO)	0.11	
		Methane (CH_4)	0.014	

11.3 Carbon dioxide emissions from final consumption

This subchapter provides an estimate based on various data sets of the European Union (EU) emissions of carbon dioxide (CO_2) induced by the final use of products. Eurostat estimates the EU's CO_2 emissions from final use to be 8.9 tonnes per capita in 2007.

The modelling-estimations that are presented are based on environmentally extended input-output tables. The data provides an opportunity for analyses by researchers and policy advisors – some illustrative examples of the use that may be made of this information are presented in this subchapter.

Main statistical findings

Carbon dioxide emissions associated with EU consumption

Extended supply, use and input-output tables have been used to estimate the carbon dioxide emissions induced by the final use of products within the EU-27 in 2007; these data are also available for seven other gases. Beside the carbon dioxide that is emitted by industries within the EU while processing products for final use, the estimates presented also take into account the carbon dioxide that is 'embedded' within the EU's imports; these arise from the worldwide production chains of goods imported into the EU-27. Carbon dioxide emissions that are embedded within products that are made in the EU but exported outside of the EU-27 are, in a similar vein, included in the account of consumers abroad.

The EU-27 total of 8.9 tonnes of carbon dioxide emissions per inhabitant in 2007 was composed of three main elements (see the right-hand bar of Figure 11.3.1):

- some 5.4 tonnes per inhabitant as a result of the consumption expenditure of households and governments on goods and services;
- a further 1.8 tonnes per inhabitant from direct carbon dioxide emissions from private households in the EU-27 (for example, through burning fossil fuels for private vehicles or for heating);
- another 1.7 tonnes per inhabitant as a result of investments (gross capital formation) in the EU-27 economy.

Table 11.3.1 provides a more detailed breakdown of the carbon dioxide emissions that are induced by final use, according to a range of different product groups and categories of final use. These are ranked according to their importance in the terms of their respective share of emissions. Electrical energy, gas, steam and hot water, construction, food products and beverages, chemicals and man-made fibres, and motor vehicles ranked as the five product groups with the highest levels of emissions per inhabitant in 2007 as a result of their final use.

Carbon dioxide emissions from a production perspective

Carbon dioxide emissions may also be analysed from a production perspective, in other words, according to where the emissions were actually generated; this may be seen in the left-hand bar of Figure 11.3.1.

Using this approach, it is once again necessary to take account of the carbon dioxide emissions from private households (as above for the consumption perspective); in this case households are considered as producing units, providing their own private services, such as heating for their dwelling or the combustion of fuel for driving their own vehicles.

However, by far the biggest contributor to carbon dioxide emissions was from the production activities of domestic industries; together these emitted 7.1 tonnes of carbon dioxide per inhabitant in 2007.

Finally, the production perspective also takes account of the embedded emissions that are contained within the goods and services that are imported into the EU-27 for intermediate and final use; these were estimated to be around 1.8 tonnes per inhabitant in 2007. The latter estimate is based on the 'domestic-technology-assumption' in other words, that the imported products are produced with EU production technologies. Moreover, through the import of goods and services from the rest of the world the EU has avoided 1.8 tonnes per inhabitant of carbon dioxide emissions in its own production system. Some evidence, for example international energy statistics, indicates that the rest of the world economy may have a more carbon-intensive production system compared with the EU. Hence, the 1.8 tonnes per inhabitant may be considered as a minimum estimate.

Data sources and availability

Under the European system of national and regional accounts (ESA 95), the EU Member States transmit to Eurostat supply and use tables on an annual basis and input-output tables on a five-yearly basis. These tables formed the point of departure for a sequence of calculations leading to a consolidated data set for the EU-27 and euro area aggregates

The combination of this data allows a set of environmentally extended input-output tables to be generated. Some basic modelling and analysis steps were performed, leading to the results that are presented in this subchapter. More detailed methodological explanations are documented in a technical report available on Eurostat's website.

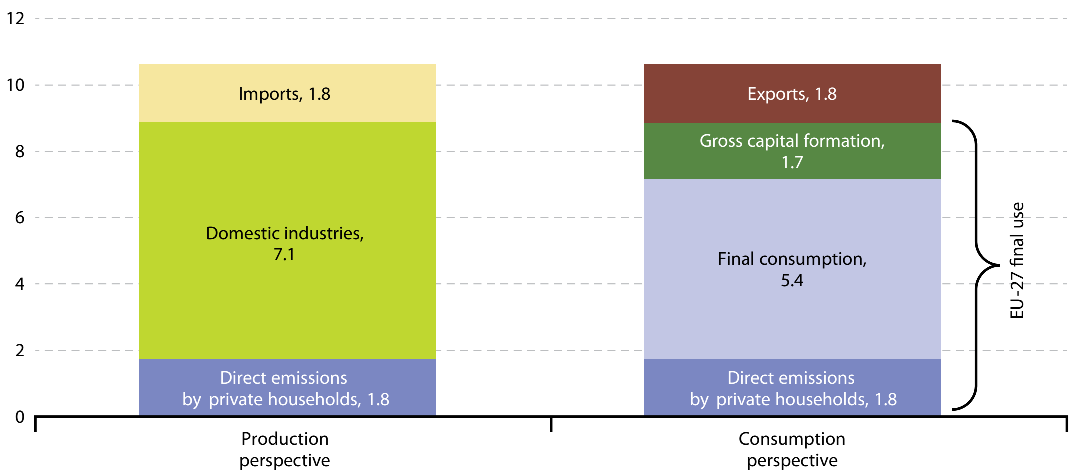
Eurostat's environmental accounts programme publishes information on air emissions accounts on a regular basis; these provide details of greenhouse gas emissions and air pollutants with a breakdown for various industries and households. The data are available for eight pollutants: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur oxides (SO_x), nitrogen oxides (NO_x), ammonia (NH_3), carbon monoxide (CO) and non-methane volatile organic compounds (NMVOCs). This information was added to the consolidated supply and use tables and input-output tables for the EU-27 and euro area aggregates.

Context

Supply and use tables portray production and consumption activities of national economies in a detailed manner. They form the basis for so-called input-output models and analyses. Both, the tables and the models, constitute powerful tools for addressing a range of policy areas. The focus of these models is generally made through an analysis of long-term structural changes within economies (for example, by studying value added shares, trade shares, or cumulated value added along certain production chains).

By adding environmental parameters (for example, on air emissions or the use of energy) to these input-output models, it is possible to extend their analytical scope. Environmentally extended input-output analyses are of particular relevance for policy areas such as sustainable production and consumption, sustainable use of natural resources, and resource productivity.

Figure 11.3.1: Domestic and global CO_2 emissions – production and consumption perspective, EU-27, 2007
(tonnes CO_2 per inhabitant)



Source: Eurostat (online data codes: env_ac_ainacehh and env_ac_io)

Table 11.3.1: CO_2 emissions induced by final use, by product groups and categories of final use, EU-27, 2007
(kg of CO_2 per inhabitant)

	Final consumption	Gross capital formation	Exports	Final use	
	(kg of CO_2 per inhabitant)				(%)
Electrical energy, gas, steam and hot water	1 103	1	38	1 141	11
Construction work	38	874	2	915	9
Food products and beverages	440	13	58	511	5
Chemicals, chemical products and man-made fibres	193	6	234	433	4
Motor vehicles, trailers and semi-trailers	154	118	118	390	4
Machinery and equipment	34	181	135	350	3
Health and social work services	311	0	0	311	3
Coke, refined petroleum products and nuclear fuel	203	–8	110	305	3
Public administration and defence services; compulsory social security services	295	2	0	297	3
Retail trade services, except of motor vehicles and motorcycles; repair services of personal and household goods	261	14	13	289	3
Hotel and restaurant services	268	0	3	271	3
Wholesale trade and commission trade services, except of motor vehicles and motorcycles	167	40	47	254	2
Land transport and transport via pipeline services	103	16	14	133	1
remaining 46 product groups	1 837	446	1 000	3 283	31
Total products	5 407	1 703	1 771	8 881	84
Direct emissions by private households	1 753			1 753	16
Total (products+direct emissions by households)	7 160	1 703	1 771	10 634	100

Source: Eurostat (online data code: env_ac_io)

11.4 Waste

This subchapter gives an overview on the development of waste generation and treatment in the European Union (EU) and several European non-member countries; it draws exclusively on data collected within the framework of Regulation 2150/2002 on waste statistics.

Waste, defined by Directive 2008/98/EC (Article 3(1) as 'any substance or object which the holder discards or intends or is required to discard', represents an enormous loss of resources in the form of both materials and energy. In addition, the management and disposal of waste can have serious environmental impacts. Landfills, for example, take up land space and may cause air, water and soil pollution, while incineration may result in emissions of dangerous air pollutants, unless properly regulated.

EU waste management policies aim to reduce the environmental and health impacts of waste and improve the EU's resource efficiency. The long-term aim of these policies is to reduce the amount of waste generated and when waste generation is unavoidable to promote it as a resource and achieve higher levels of recycling and the safe disposal of waste.

Main statistical findings

Total waste generation

In 2008, the total generation of waste from economic activities and households in the EU-27 amounted to 2 615 million tonnes; this was slightly lower than in either 2004 or 2006. Among the waste generated in the EU-27 in 2008, some 98 million tonnes (3.7 % of the total) were classified as hazardous waste. As such, inhabitants in the EU-27 generated on average about 5.2 tonnes of waste each, of which 196 kg were hazardous waste.

Table 11.4.1 shows an analysis of the total waste generated broken down by main economic activity (according to NACE Rev. 2). There were two activities that generated particularly high levels of waste across the EU-27 in 2008: they were construction (NACE Section F) accounting for 859 million tonnes (32.9 % of the total) and mining and quarrying (NACE Section B) contributing 727 million tonnes (27.8 % of the total). The vast majority of the waste that was generated within these activities was composed of mineral waste or soils (excavated earth, road construction waste, demolition waste, dredging spoil, waste rocks, tailings and so on); this explains the relatively high proportion of total waste that was accounted for by mineral waste and soils (63.0 % of the total waste generated) – see Figure 11.4.2. Manufacturing (NACE Section C) accounted for 342.7 million tonnes of waste generated in 2008 (13.1 % of the total), while households contributed a further 221 million tonnes (8.5 %). The relatively low share of total waste that was generated from agriculture, forestry and fishery activities (NACE Section A) is, at least in part, linked to manure and slurry being excluded from the data presented (as long as they are re-used within agriculture as fertiliser or a soil improver).

There was a considerable variation in the amount of waste generated in 2008 across those countries for which data are presented in Table 11.4.1 – the highest share of the EU-27 total being accounted for by Germany (14.3 %), just ahead of France and the United Kingdom. These figures may be expressed in relation to population (see Figure 11.4.1): using this measure, Latvia generated the lowest level of waste per inhabitant (660 kg) among the EU Member States, although relatively low levels of waste were also generated in Croatia, Turkey, the former Yugoslav Republic of Macedonia and Liechtenstein. Indeed, all four of these countries recorded a lower level of waste generated per inhabitant than the second lowest amount among the EU Member States, which was recorded in Hungary (an average of 2 tonnes per inhabitant). The amount of waste generated ranged between 2 and 7 tonnes per inhabitant for the majority of the EU Member States, rising to between 8 and 10 tonnes per inhabitant in Romania and Sweden, reaching 14.6 tonnes per inhabitant in Estonia, 15.4 tonnes per inhabitant in Finland, 19.6 tonnes per inhabitant in Luxembourg and peaking at 37.5 tonnes per inhabitant in Bulgaria.

Some of the large variations between countries may be linked to the differences in economic structures. For example, the extremely high level of waste that was generated in Bulgaria was strongly influenced by mineral wastes from mining and quarrying activities: Bulgaria extracts coal and lignite, metallic and non-metallic minerals, mostly by open-pit excavation. Relatively large quantities of mineral waste were generated by mining and quarrying activities in Romania, Sweden, Finland and Estonia, whereas in Luxembourg, mineral waste from construction was largely responsible for the high level of waste generated.

Non-mineral waste generation

The 919 million tonnes of non-mineral waste generated in the EU-27 in 2008 represented 35.1 % of the total waste generated; this figure was slightly less than the corresponding shares recorded in 2004 or 2006. When expressed in relation to the population, on average inhabitants of the EU-27 generated 1 843 kg of non-mineral waste each in 2008 (see Figure 11.4.3). Across the EU Member States, non-mineral waste generation ranged from an average of 606 kg per inhabitant in Latvia to 8 216 kg per inhabitant in Estonia (largely hazardous combustion waste and hazardous chemical deposits and residues from the refining and incineration of oil shale).

Figure 11.4.4 shows the origin and development of non-mineral waste broken down by economic activity. About a quarter of the total waste generated could be attributed to manufacturing, which was around 30 million tonnes lower than in 2004. Note that the reduction in waste generated within agricultural activities between 2006 and 2008 reflects a change in coverage for manure and slurry (excluded by several countries for 2008), rather than a decrease in the actual amount of waste being generated.

Hazardous waste generation

Hazardous waste may pose a risk to human health and the environment if not managed and disposed of safely. In 2008, some 98 million tonnes of hazardous waste was generated in the EU-27; this was higher than in 2004 (89 million tonnes), but lower than in 2006 (101 million tonnes).

Figure 11.4.5 shows the amount of hazardous waste that was generated per inhabitant during 2004, 2006 and 2008; note that the figures include all hazardous waste categories, including minerals. As noted above, the high figures for Estonia (5.6 tonnes per inhabitant) may be largely attributed to oil shale, and those for Bulgaria (1.7 tonnes per inhabitant) to the mining of copper ores. Aside from these specific cases, the generation of hazardous waste in the EU Member States ranged in 2008 from 23 kg per inhabitant in Greece to 553 kg per inhabitant in Belgium.

Waste treatment

In 2008, some 2 391 million tonnes of waste was treated in the EU-27; this includes the treatment of waste that was imported into the EU. Table 11.4.2 presents more information in relation to the types of waste treatment operation that were employed, while Table 11.4.3 provides the same information for the treatment of hazardous waste.

Almost half (48.9 %) of the waste treated within the EU-27 in 2008 was subject to disposal operations other than waste incineration (this was predominantly landfills, but also included a small amount of mining waste disposed in and around mining sites and waste discharges into water bodies). A further 45.7 % of the waste treated in the EU-27 was sent to recovery operations (other than energy recovery). The remaining 5.4 % of the waste treated in the EU-27 in 2008 was sent for incineration (with or without energy recovery).

Recovery

Figure 11.4.6 shows a breakdown of the 1 093 million tonnes of waste recovered in the EU-27 in 2008 by waste categories. The recovery of non-hazardous mineral waste originating mainly from construction and mining and quarrying activities amounted to 754 million tonnes and represented 69.0 % of the total waste recovered; there was strong growth in the amount of mineral waste recovery in the EU-27 during the period from 2004 to 2008. Among the other waste categories, there was also an increase in the quantity of animal and vegetal waste that was recovered between 2004 and 2008, such that this category accounted for 6.1 % of the total waste recovered in 2008. For metals, paper and cardboard, glass and plastic wastes, which are the most common recyclable materials, growth in the quantity of material that has been treated might be expected as a result of the implementation of European waste legislation on landfills (diversion of biodegradable waste) and producer responsibility (for example, separate collection and recovery of packaging waste). In practice, only modest growth was observed during the period from 2004 to 2008 and there was even a reduction in the amount of recovered plastic wastes; these developments are thought to be linked to increasing exports of recyclable goods to non-member countries.

Incineration (including energy recovery)

Figure 11.4.7 shows an analysis of the incinerated waste (including energy recovery) for 2008. Out of a total of 129.2 million tonnes of incinerated waste in the EU-27, 38.9 % was composed of household and similar waste. Sorting residues accounted for 9.6 %, chemical wastes for 2.9 % and common sludges for 2.5 %. Hazardous waste accounted for 8.1 % of the total (some 10.5 million tonnes). Note that the miscellaneous category (38.1 %) cannot be presented in any more detail given the limited breakdown required by the waste statistics Regulation; however, this category includes wood and other biomass waste.

The total amount of incinerated waste increased steadily between 2004 and 2008, rising by 21 million tonnes (or 19.6 % overall). Approximately half of the total increase could be attributed to Germany, where the implementation of a landfill ban for untreated municipal waste led to a considerable increase in energy recovery from waste.

Landfilling

Figure 11.4.8 shows the breakdown of landfilled waste in the EU-27 for 2008. The vast majority of the waste that was destined for landfills was non-hazardous mineral waste (80.3 % of the total). Household and similar wastes accounted for 8.1 %, while hazardous wastes accounted for 3.0 % of the total.

There was a steady decrease in the quantity of non-mineral wastes going to landfills between 2004 and 2008. The disposal of household and similar waste declined by 17.3 % overall during this period, presumably reflecting changes such as the separate collection and pre-treatment of household and similar waste.

Data sources and availability

In order to monitor the implementation of waste policy, in particular compliance with the principles of recovery and safe disposal, reliable statistics on the production and management of waste from businesses and private households are required. In 2002, Regulation 2150/2002 on waste statistics was adopted, creating a framework for harmonised Community statistics on waste.

Starting with reference year 2004, the Regulation requires the EU Member States to provide data on the generation, recovery and disposal of waste every two years. Data on waste generation and treatment are available for three reference years, namely, 2004, 2006 and 2008. There remain differences in data coverage across the Member States and methodological changes in individual countries may still have a significant impact on the comparability of waste statistics and on the time series presented, in particular at a national level.

Context

The EU's sustainable development strategy and its sixth Environment Action Programme, which identifies waste prevention and management as one of four top priorities, underline the relationship between the efficient use of resources and waste generation and management. The intention of Community policy in this area is to decouple the use of resources and the generation of waste from economic growth, while ensuring that sustainable consumption does not exceed environmental capacity.

The EU's approach to waste management is based on three principles: waste prevention, recycling and reuse, and improving final disposal and monitoring. Waste prevention can be achieved through cleaner technologies, eco-design, or more eco-efficient production and consumption patterns. Waste prevention and recycling, focused on materials technology, can also reduce the environmental impact of resources that are used through limiting raw materials extraction and transformation during production processes. Where possible, waste that cannot be recycled or reused should be safely incinerated with landfills only used as a last resort. Both these methods need close monitoring because of their potential for causing severe environmental damage.

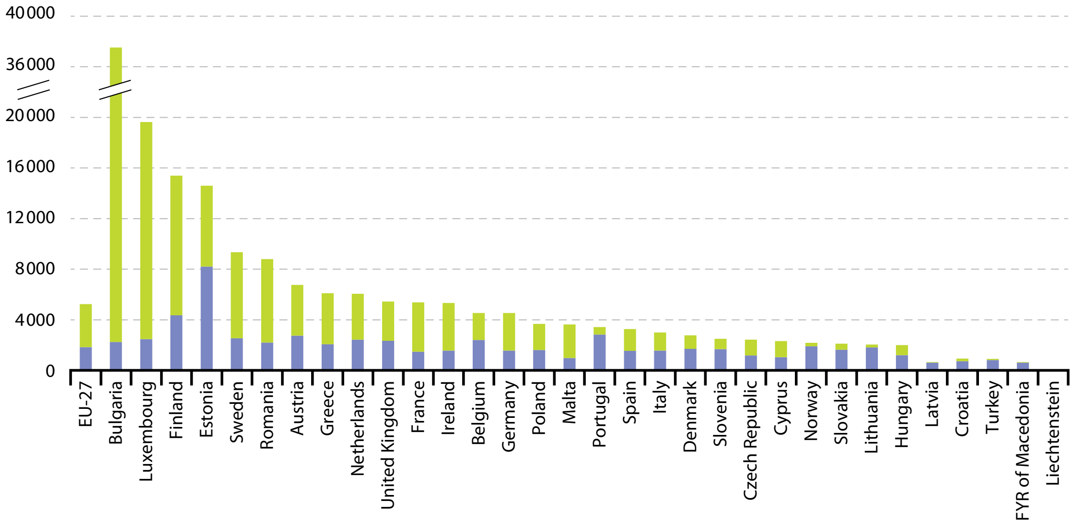
Table 11.4.1: Waste generation, 2008
(1 000 tonnes)

	Waste from economic activities and households		Agriculture, forestry & fishing (Section A)	Mining & quarrying activities (Section B)	Manufacturing (Section C)	Energy (Section D)	Construction & demolition activities (Section F)	Other economic activities (Sections E and G to U)	Households
	Total	of which, hazardous							
EU-27 (1)	2 615 220	97 680	45 050	726 740	342 710	90 880	859 490	328 930	220 950
Belgium	48 622	5 919	288	503	10 090	1 087	15 442	16 753	4 459
Bulgaria	286 093	13 043	754	267 559	3 447	7 655	1 829	1 943	2 907
Czech Republic	25 420	1 510	255	167	5 293	1 920	10 651	3 959	3 176
Denmark	15 155	420	41	2	1 454	1 358	5 674	4 111	2 514
Germany	372 796	22 323	1 351	28 288	52 322	11 708	197 207	46 515	35 405
Estonia	19 584	7 538	240	7 198	3 772	5 424	1 099	1 412	440
Ireland (2)	23 637	743	19	2 061	4 026	292	:	15 095	1 677
Greece (3)	68 644	253	:	38 152	5 703	11 181	6 828	2 826	3 954
Spain	149 254	3 649	11 356	25 716	19 369	4 872	44 926	18 584	24 431
France	345 002	10 893	1 313	1 195	21 640	1 004	252 980	37 559	29 311
Italy	179 034	6 655	349	1 263	43 086	3 090	69 732	29 043	32 472
Cyprus	1 843	24	127	505	138	2	431	207	433
Latvia	1 495	67	75	3	501	20	12	278	606
Lithuania	6 835	116	1 288	3	2 758	51	412	961	1 363
Luxembourg	9 592	199	2	10	673	1	8 282	347	276
Hungary	20 080	671	468	272	4 789	3 050	5 240	2 795	3 466
Malta	1 499	55	3	0	17	0	1 099	212	169
Netherlands	99 591	4 724	3 464	270	15 824	1 318	59 477	9 757	9 482
Austria	56 309	1 330	459	678	13 077	569	31 390	6 317	3 819
Poland	140 340	1 469	1 350	33 666	56 746	19 541	6 930	15 228	6 879
Portugal	36 480	3 368	160	1 891	9 001	255	8 085	11 932	5 157
Romania	189 311	524	17 035	140 677	11 064	7 058	318	4 695	8 464
Slovenia	5 038	153	132	55	1 735	354	1 376	673	714
Slovakia	11 472	527	789	151	4 469	1 151	1 302	1 838	1 772
Finland	81 793	2 163	2 739	31 796	16 948	1 531	24 455	2 648	1 674
Sweden	86 169	2 063	314	58 702	11 927	1 508	3 310	6 014	4 393
United Kingdom	334 127	7 285	681	85 963	22 837	4 885	100 999	87 223	31 539
Liechtenstein	0.35	0.01	0.00	0.01	0.03	0.00	0.00	0.30	0.00
Norway	10 427	1 336	184	113	3 689	46	1 498	2 531	2 365
Croatia	4 172	221	19	34	1 727	136	129	2 127	:
FYR of Macedonia	1 362	6	:	:	1 362	:	:	:	:
Turkey	64 770	1 024	:	:	10 741	25 525	:	50	28 454

(1) Excluding Greece for NACE Section A and Class 46.67; excluding Ireland for NACE Sections G to U (other than Class 46.67) for other economic activities.
(2) Other economic activities excludes NACE Sections G to U, other than Class 46.67.
(3) Total and other economic activities excludes NACE Section A and NACE Class 46.67.

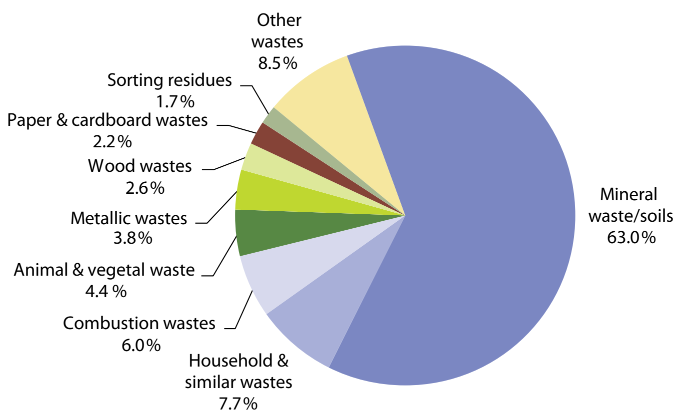
Source: Eurostat (online data code: env_wasgen)

Figure 11.4.1: Waste generation, 2008
(kg per inhabitant)



Source: Eurostat (online data codes: env_wasgen and tsdpc210)

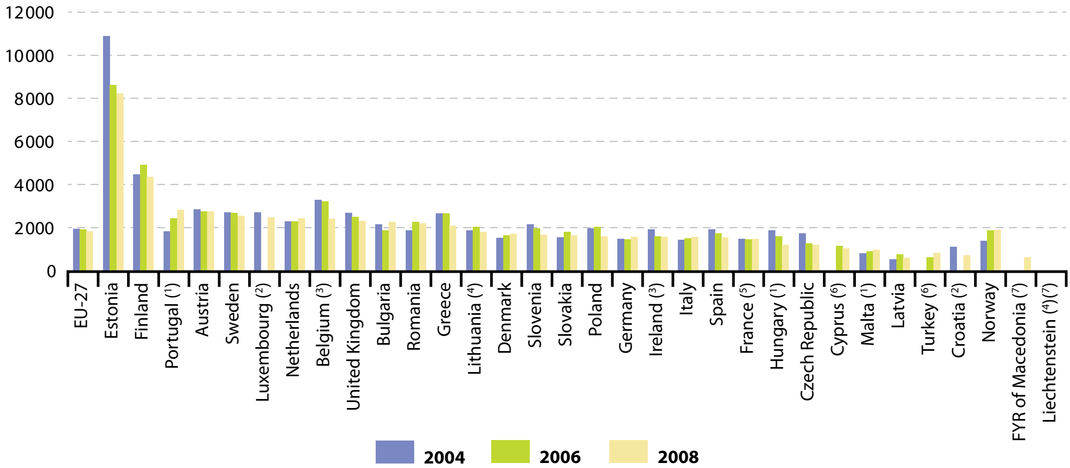
Figure 11.4.2: Waste generation, EU-27, 2008 (1)
(%)



(1) Figures do not sum to 100 % due to rounding.

Source: Eurostat (online data code: env_wasgen)

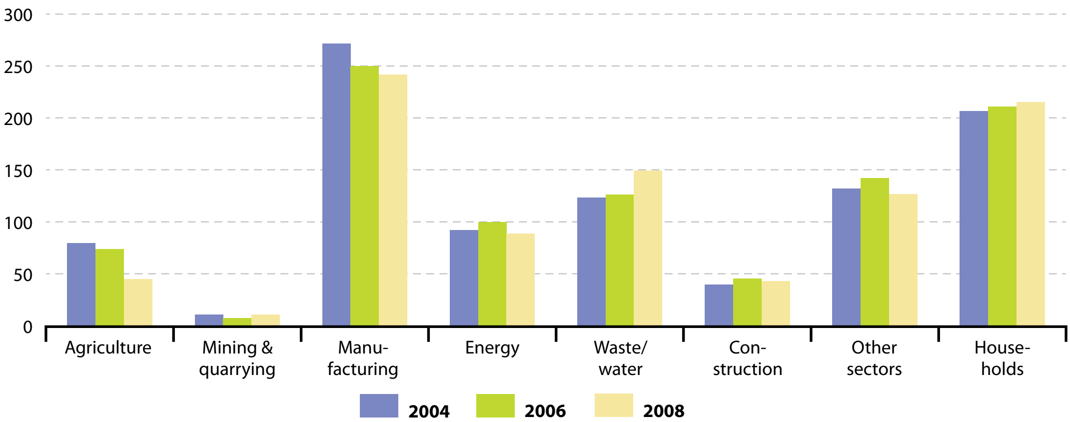
Figure 11.4.3: Non-mineral waste generation, 2004-2008
(kg per inhabitant)



(1) Estimates.
(2) 2006, not available.
(3) 2006, estimate.
(4) 2008, estimate.
(5) 2004 and 2006, estimates.
(6) 2004, not available.
(7) 2004 and 2006, not available.

Source: Eurostat (online data code: tsdpc210)

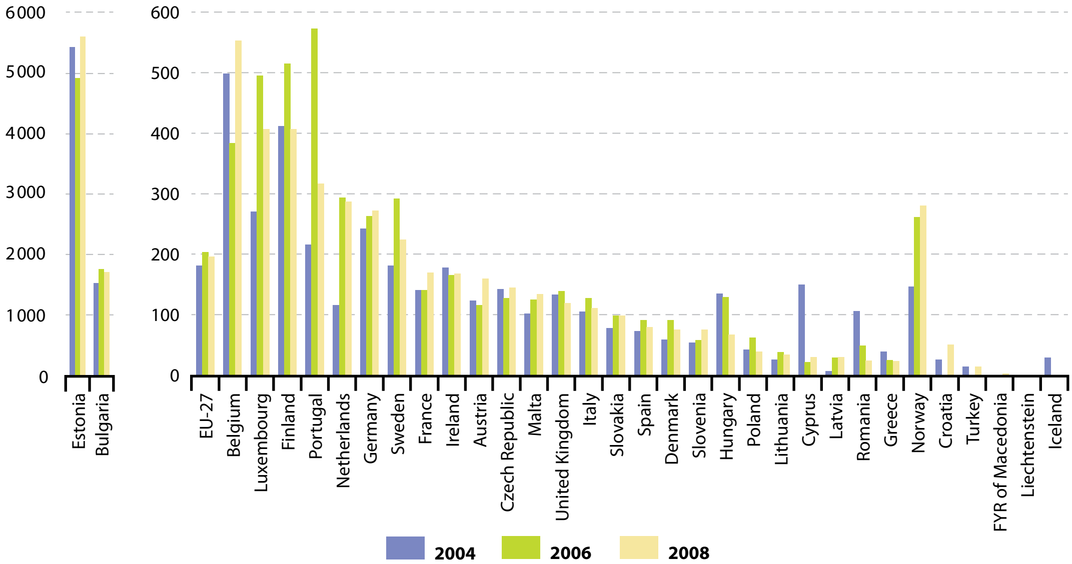
Figure 11.4.4: Non-mineral waste generation, EU-27, 2004-2008 (1)
(million tonnes)



(1) Based on NACE Rev. 2 classification.

Source: Eurostat (online data code: env_wasgen)

Figure 11.4.5: Hazardous waste generation, 2004-2008 ([1])
(kg per inhabitant)



([1]) Note that the two parts of the figure have different scales for the y-axis.

Source: Eurostat (online data code: env_wasgen)

Table 11.4.2: Waste treatment, 2008
(1 000 tonnes)

	Total	Energy recovery	Incineration without energy recovery	Recovery other than energy recovery	Disposal other than incineration
EU-27	2 391 070	81 690	47 550	1 092 900	1 168 950
Belgium	28 731	4 453	3 883	17 345	3 050
Bulgaria	279 608	94	61	2 700	276 752
Czech Republic	18 864	556	69	13 442	4 798
Denmark	14 636	3 320	0	10 283	1 034
Germany	367 256	23 316	13 895	255 337	74 708
Estonia	17 388	257	0	5 456	11 675
Ireland	16 247	104	21	10 415	5 707
Greece	67 523	135	29	5 251	62 108
Spain	137 687	2 552	490	70 355	64 291
France	322 641	12 056	8 612	194 549	107 424
Italy	127 894	2 459	5 157	87 826	32 452
Cyprus	1 843	8	14	745	1 076
Latvia	1 386	18	0	646	721
Lithuania	5 417	194	52	1 361	3 810
Luxembourg	11 632	38	135	5 311	6 147
Hungary	15 823	767	65	5 307	9 684
Malta	1 419	0	6	43	1 371
Netherlands	98 049	2 456	6 369	67 619	21 606
Austria	48 353	3 904	1 594	32 150	10 706
Poland	140 456	3 122	670	107 179	29 486
Portugal	22 044	1 432	400	8 812	11 400
Romania	158 507	1 333	55	8 172	148 947
Slovenia	5 242	314	16	3 040	1 873
Slovakia	9 243	586	66	3 875	4 715
Finland	74 851	9 631	170	22 855	42 195
Sweden	81 352	8 411	87	9 818	63 036
United Kingdom	316 991	171	5 635	143 008	168 178
Norway	9 537	2 091	514	4 542	2 390
Croatia	3 351	321	25	384	2 621
FYR of Macedonia	1 503	0	0	323	1 180
Turkey	60 236	143	81	14 632	45 380

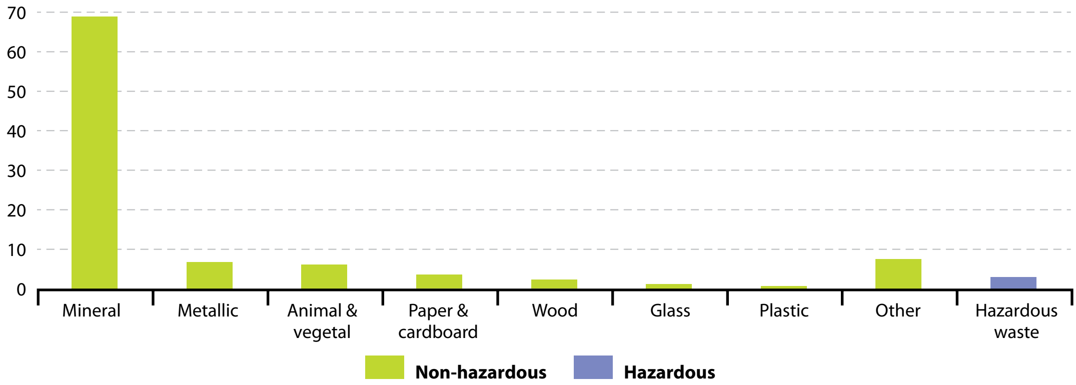
Source: Eurostat (online data code: env_wastrt)

Table 11.4.3: Hazardous waste treatment, 2008
(1 000 tonnes)

	Total	Energy recovery	Incineration without energy recovery	Recovery other than energy recovery	Disposal other than incineration
EU-27	77 860	5 760	4 730	32 260	35 120
Belgium	2 200	369	156	1 232	444
Bulgaria	13 037	0	50	141	12 846
Czech Republic	835	62	61	633	79
Denmark	416	92	0	154	170
Germany	23 824	2 390	1 544	14 674	5 215
Estonia	7 709	37	0	1 242	6 430
Ireland	193	36	21	123	13
Greece	157	8	4	129	16
Spain	3 362	342	10	1 823	1 187
France	6 841	1 031	1 229	2 462	2 120
Italy	3 277	144	449	1 994	691
Cyprus	23	1	0	9	13
Latvia	68	7	0	60	1
Lithuania	20	0	1	17	2
Luxembourg	47	:	:	:	0
Hungary	450	40	59	136	215
Malta	32	:	:	:	0
Netherlands	4 506	866	189	2 238	1 213
Austria	395	84	77	189	45
Poland	1 625	6	139	862	618
Portugal	1 623	15	18	1 464	125
Romania	260	35	32	172	21
Slovenia	116	10	11	46	49
Slovakia	356	13	47	67	228
Finland	2 178	58	113	286	1 722
Sweden	996	100	87	425	384
United Kingdom	3 314	11	433	1 600	1 271
Norway	1 338	113	45	158	1 022
Croatia	18	5	0	9	3
FYR of Macedonia	6	0	0	3	3
Turkey	1 169	122	57	252	738

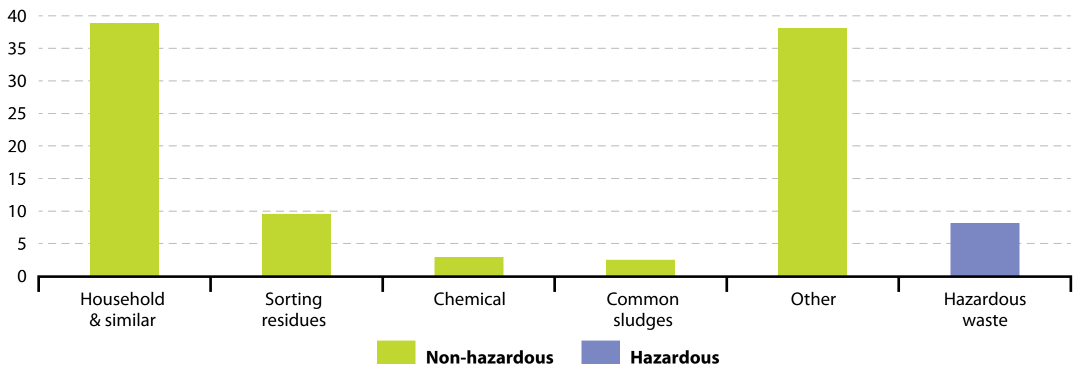
Source: Eurostat (online data code: env_wastrt)

Figure 11.4.6: Recovered waste (excluding energy recovery), EU-27, 2008
(%)



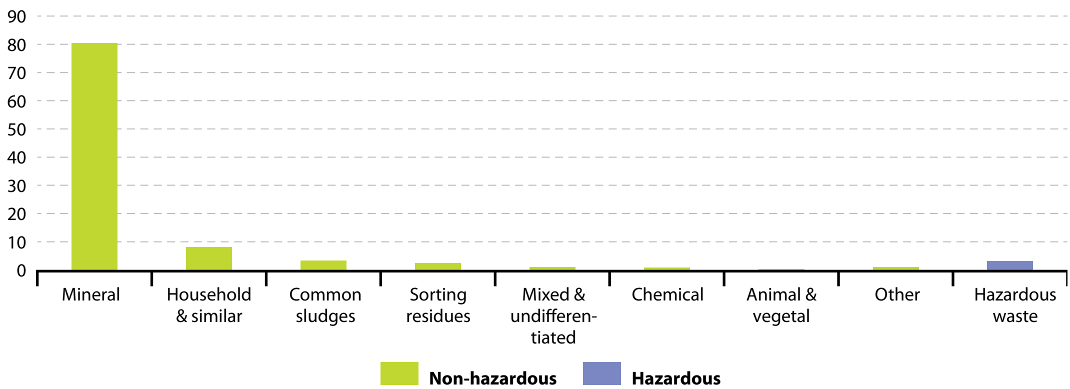
Source: Eurostat (online data code: env_wastrt)

Figure 11.4.7: Incinerated waste (including energy recovery), EU-27, 2008
(%)



Source: Eurostat (online data code: env_wastrt)

Figure 11.4.8: Landfilled waste, EU-27, 2008
(%)



Source: Eurostat (online data code: env_wastrt)

11.5 Water

Water is essential for life, it is an indispensable resource for the economy, and also plays a fundamental role in the climate regulation cycle. The management and protection of water resources, of fresh and salt water ecosystems, and of the water we drink and bathe in is therefore one of the cornerstones of environmental protection. This subchapter on water statistics presents data on freshwater resources and the human use of water in the European Union (EU), and includes information on water abstraction and wastewater treatment and disposal.

Main statistical findings

Freshwater resources

The three main users of water are agriculture, industry and the domestic sector (households and services). The overall abstraction and use of water resources can be considered to be sustainable in the long-term in most of Europe. However, specific regions may face problems associated with water scarcity; this is especially the case in southern Europe, where it is likely that efficiency gains in relation to agricultural water use will need to be achieved in order to prevent seasonal water shortages. Regions associated with low rainfall, high population density, or intensive industrial activity may also face sustainability issues in the coming years, which may be exacerbated by natural resource endowments, geographical characteristics and freshwater management systems. A number of Member States receive a significant proportion of their water resources as inflows from upstream rivers: this is particularly the case in the Danube basin and for the Netherlands, and is also the case, to a lesser extent, in Latvia, Germany and Portugal.

One measure of sustainability in water management is the water exploitation index (WEI), calculated as water abstraction divided by long-term annual resources (Cosgrove and Rijsberman, 2000). A WEI above 20 % typically indicates water scarcity problems in a country or region, and the European Environment Agency (EEA) uses this value as a warning threshold, while WEI values of more than 40 % indicate severe stress on resources and unsustainable water use. Using this measure and subject to data availability, a relatively high degree of pressure exists on water resources in Cyprus, Belgium, Spain, Italy and Malta, with Cyprus being the only Member State to record a ratio of more than 40 %.

In absolute terms (see Table 11.5.1), total freshwater resources were broadly similar in Germany, France, Sweden, the United Kingdom and Italy, as each of these Member States reported a long-term average of annual freshwater resources of between 188 000 million m³ and 175 300 million m³. When expressed in relation to population size (see Figure 11.5.1), Finland and Sweden recorded the highest freshwater annual resources per capita (around 20 000 m³ per inhabitant or more). In contrast, relatively low levels (below 3 000 m³ per capita) were recorded in the six largest Member States (France, Italy, the United Kingdom, Spain, Germany and Poland), as well as in Belgium and the Czech Republic, with the lowest level in Cyprus (410 m³ per inhabitant).

Water abstraction

There are considerable differences in the per capita amounts of freshwater abstracted within each of the Member States, in part reflecting the resources available, but also abstraction practices for public water supply, industrial and agricultural purposes, as well as land drainage and land sealing. These differences are also apparent when looking at the breakdown of water abstraction between groundwater and surface water resources (see Table 11.5.2). In Bulgaria and Romania surface water abstraction accounted for around ten times the volume of water abstracted from groundwater resources in the year 2009, with this ratio peaking at almost 14:1 for Lithuania. At the other end of the range, larger volumes of water were abstracted from groundwater resources in Latvia, Slovakia (2007), Cyprus and Malta.

Germany, France and Spain recorded the highest amounts of groundwater extracted in 2008 (2007 in the case of France), each with 5 700 million m³ or more. Looking at the development of groundwater abstraction during the ten-year period to 2009, the volume of groundwater extracted generally fell, although Estonia, Spain and Slovenia recorded abstraction levels that were between 15 % and 30 % higher, rising to 63 % higher for Malta; a smaller increase of just over 1 % was registered in Belgium.

Spain, Germany and France headed the ranking of Member States in relation to surface water abstraction, with more than 25 000 million m³ in 2007 or 2008. Developments in surface water abstraction levels were somewhat more pronounced than for groundwater. The volume of surface water abstracted in Lithuania (2009) and Slovakia (2007) was around half the level recorded some ten years earlier. The Czech Republic and Sweden reported that their volume of surface water abstracted increased during the period from 1999 to 2009 by around 10 % (1999 to 2007 for Sweden).

Public water supply

While the share of the public water supply sector in total water abstraction depends on the economic structure of a given country and can be relatively small, it is nevertheless often the focus of public interest, as it comprises the water volumes that are directly used by the population. Most EU Member States had annual rates of freshwater abstraction of between 50 m³ and 100 m³ per capita (see Figure 11.5.2), although extremes reflect specific conditions: for example, in Ireland (141 m³ per capita) – where the use of water from the public supply is free; or Bulgaria (129 m³ per capita) – where there are particularly high losses from the public network. Abstraction rates were also rather high in some Nordic and Alpine non-member countries, notably Iceland, Norway and Switzerland, where water resources are abundant and supply is hardly restricted. At the other end of the scale, Estonia and Lithuania reported low abstraction rates, in part resulting from below-average connection rates to the public supply, while Malta and Cyprus have partially replaced groundwater by desalinated seawater.

An analysis of the development of abstraction rates over time is shown for selected Member States in Figure 11.5.3. There was a marked decrease in abstraction in a few Member States (the example of Bulgaria is shown in the figure), while there was an increase in abstraction for other Member States (for example, Portugal). Abstraction rates were relatively stable in the majority of the Member States (see the example of Belgium), with a pattern of gradually decreasing abstraction rates commonly observed (see the example of Sweden). It is likely that the reduction in abstraction is a result of various factors, including the introduction of water-saving household appliances, and an increasing level of consciousness concerning the cost or value of water and the environmental consequences of wasting it.

Wastewater treatment

The proportion of the population connected to urban wastewater treatment covers those households that are connected to any kind of sewage treatment (see Table 11.5.3). This share was above 80 % in approximately half of the Member States for which data are available (mixed reference years), rising to 99 % in the Netherlands, 97 % in England and Wales and 95 % in Germany and Luxembourg, while Switzerland (97 %) also recorded a high connection rate. At the other end of the range, less than one in two households were connected to urban wastewater treatment in Bulgaria, Malta, Cyprus and Romania; new treatment plants are under construction in Malta and it is expected that this will lead to a 100 % connection rate by 2011.

In terms of treatment levels (see Figure 11.5.4), tertiary wastewater treatment was most common (again mixed reference periods) in the Netherlands, Germany, Austria, Italy, Sweden and Greece, where at least four in every five persons were connected to this type of wastewater treatment. In contrast, no more than 1 % of the population was connected to tertiary wastewater treatment in Romania and Bulgaria.

The residual of wastewater treatment is sewage sludge. While the amount of sludge generated per capita depends on many factors and hence is quite variable across countries, the nature of this sludge – rich in nutrients, but also often loaded with high concentrations of pollutants such as heavy metals – has led countries to seek different pathways for its disposal, as illustrated in Figure 11.5.5. Typically, four different types of disposal make up a considerable share of the total volume of sewage sludge treated: more than two thirds of the total was used as fertiliser in agriculture in Cyprus, Spain, Ireland and the United Kingdom, while another five Member States (Lithuania, Bulgaria, Luxembourg, France and Latvia), as well as Norway, reported between one and two thirds of their total mass of sewage sludge being disposed of through agricultural uses. In contrast, more than two thirds of sewage sludge was composted in Estonia, Finland and Slovakia. Otherwise, alternative forms of disposal may be used to reduce or eliminate the spread of pollutants on agricultural or gardening land; these include incineration and landfill. While the Netherlands, Slovenia, Belgium, Germany and Austria (as well as Switzerland) reported incineration as their primary pathway for disposal, its discharge into controlled landfills was practised as the primary pathway in Italy, and was used almost exclusively in Greece and Malta, as well as in Iceland.

Data sources and availability

Many of the water statistics produced by Eurostat have been used in the context of the development of EU legislation relating to water, as well as for environmental assessments, which in turn can give rise to new data needs. Water statistics are collected through the inland waters section of a joint OECD/Eurostat questionnaire which is frequently adapted to meet the demands of relevant policy frameworks. It currently reports on the following:

- freshwater resources in groundwater and surface water – these can be replenished by precipitation and external inflow (water flowing into a country from other territories);
- water abstraction – a major pressure on resources, although a large part of the water abstracted for domestic, industrial (including energy production) or agricultural use is returned to the environment and its water bodies, but often as wastewater with impaired quality;
- water use – analysed by supply category and by industrial activities;
- treatment capacities of urban wastewater treatment plants and the share of the population connected to them – which gives an overview of the development status of the infrastructure, in terms of quantity and quality, that is available for the protection of the environment from pollution by wastewater;
- sewage sludge production and disposal – an inevitable product of wastewater treatment processes, its impact on the environment depends on the methods chosen for its processing and disposal;

- generation and discharge of wastewater – pollutants present in wastewater have different source profiles and, similarly, the efficiency of treatment of any pollutant varies according to the method applied.

A large amount of data and other information on water is accessible via WISE, the water information system for Europe, which is hosted by the European Environment Agency (EEA) in Copenhagen.

Context

The central element of European water policy is a Directive for 'Community action in the field of water policy' (2000/60/EC) – often referred to as the Water Framework Directive (WFD) – which aims to achieve a good ecological and chemical status of European waters by 2015. In this respect, the Directive focuses on water management at the level of (in most cases transboundary) hydrological catchments (river basins). An important step in the course of the implementation of this legislation involved establishing river basin management plans in 2010.

A study on water saving potential conducted for the European Commission estimated that water use efficiency could be increased by nearly 40 % through technological improvements alone and that changes in human behaviour or production patterns could lead to further savings. In a scenario without changes in practices, it was estimated that water use by the public, industry and agriculture would increase by 16 % by 2030. Conversely, the use of water saving technologies and irrigation management in the industrial and agricultural sectors could reduce excesses by as much as 43 %, while water efficiency measures could decrease water wastage by up to a third.

In a Communication addressing 'water scarcity and droughts' (COM(2007) 414), the European Commission identified an initial set of policy options to be taken at European, national and regional levels to address water scarcity within the EU. This set of proposed policies aims to move the EU towards a water-efficient and water-saving economy, as both the quality and availability of water are of major concern in many regions.

A major step forward in efforts to reduce pollutants discharged into the environment with wastewater was achieved by implementing legislation on 'urban wastewater treatment' (Directive 1991/271/EC). The pollution of rivers, lakes and groundwater and water quality is affected by human activities such as industrial production, household discharges, or arable farming; a report (COM(2007) 120) on 'the protection of waters against pollution by nitrates from agricultural sources' was issued in March 2007.

Another aspect of water quality relates to coastal bathing waters. The European Commission and the EEA present an annual bathing water report – the latest of these covers information for 2010 and shows that 92.1 % of Europe's coastal bathing waters and 90.2 % of its inland bathing waters met the minimum water quality standards. It is anticipated that legislation concerning the 'management of bathing water quality' (Directive 2006/7/EC) will provide for a more proactive approach to informing the public about water quality; it was transposed into national law in 2008 but Member States have until December 2014 to implement it.

An increase of variability in weather patterns and catastrophic floods (such as those along the Danube and Elbe in 2002) prompted a review of flood risk management. This process culminated in a Directive (2007/60/EC) of the European Parliament and Council on 'the assessment and management of flood risks', which aims to reduce and manage risks to human health, the environment, cultural heritage, and economic activity.

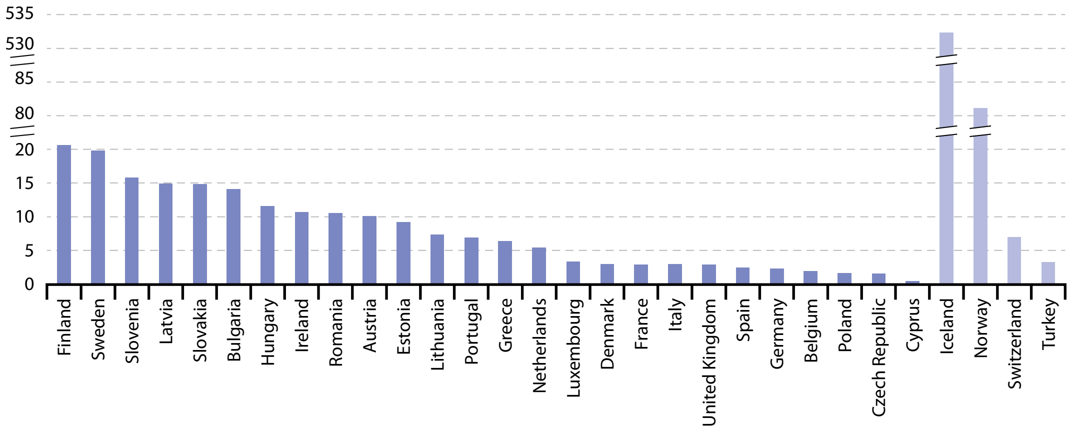
Table 11.5.1: Water resources – long-term annual average ([1])
(1 000 million m^3)

	Precipitation	Evapotrans-piration	Internal flow	External inflow	Outflow	Freshwater resources
Belgium	28.9	16.6	12.3	7.6	15.3	19.9
Bulgaria	68.6	50.5	18.1	89.1	108.5	107.2
Czech Republic	54.7	39.4	15.2	0.7	16.0	16.0
Denmark	38.5	22.1	16.3	*0.0*	1.9	16.3
Germany	307.0	190.0	117.0	75.0	182.0	188.0
Estonia	29.0	:	:	:	12.3	12.3
Ireland	80.0	32.5	47.5	:	:	47.5
Greece	115.0	55.0	60.0	12.0	:	72.0
Spain	346.5	235.4	111.1	0.0	111.1	111.1
France	485.7	310.4	175.3	11.0	168.0	186.3
Italy	296.0	129.0	167.0	8.0	155.0	175.0
Cyprus	3.1	2.7	0.3	0.0	0.1	0.3
Latvia	42.7	25.8	16.9	16.8	32.9	33.7
Lithuania	44.0	28.5	15.5	9.0	25.9	24.5
Luxembourg	2.0	1.1	0.9	0.7	1.6	1.6
Hungary	55.7	48.2	7.5	108.9	115.7	116.4
Malta	:	:	:	:	:	:
Netherlands	29.8	21.3	8.5	81.2	86.3	89.7
Austria	98.0	43.0	55.0	29.0	84.0	84.0
Poland	193.1	138.3	54.8	8.3	63.1	63.1
Portugal	82.2	43.6	38.6	35.0	34.0	73.6
Romania	154.0	114.6	39.4	*186.3*	*245.6*	*225.7*
Slovenia	31.7	13.2	18.6	13.5	32.3	32.1
Slovakia	37.4	24.3	13.1	67.3	81.7	80.3
Finland	222.0	115.0	107.0	3.2	110.0	110.0
Sweden	313.9	141.2	172.7	11.8	194.6	183.4
United Kingdom	283.7	111.2	172.5	2.8	175.3	175.3
Iceland	200.0	30.0	170.0	–	170.0	170.0
Norway	470.7	112.0	377.3	12.2	389.4	389.4
Switzerland	61.6	21.6	40.7	12.8	53.5	53.5
Croatia	63.1	40.1	23.0	:	:	:
FYR of Macedonia	19.5	:	:	1.0	6.3	:
Turkey	501.0	273.6	227.4	6.9	178.0	234.3

([1]) The minimum period taken into account for the calculation of long term annual averages is 20 years.

Source: Eurostat (online data code: env_watq1a)

Figure 11.5.1: Freshwater resources per capita – long-term average (1)
(1 000 m³ per inhabitant)



(1) The minimum period taken into account for the calculation of long term annual averages is 20 years; population data are as of 1 January 2009; Malta, not available.

Source: Eurostat (online data code: env_watq1a)

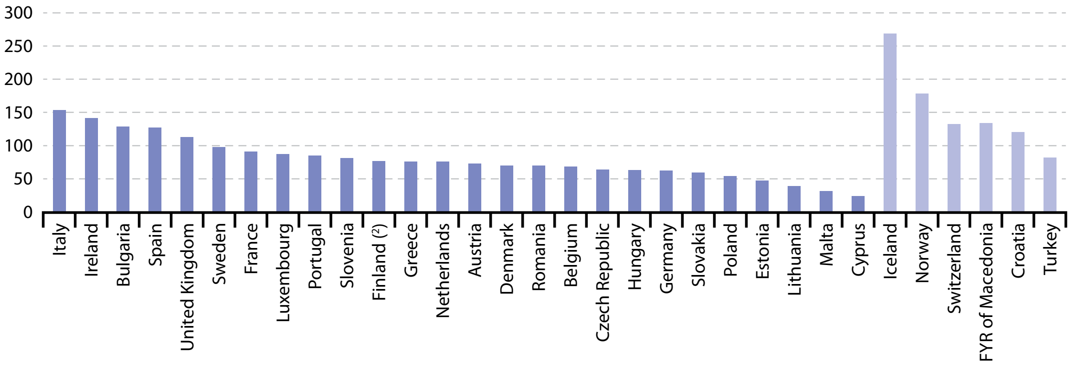
Table 11.5.2: Groundwater and surface water abstraction, 1999-2009
(million m^3)

	Groundwater abstraction			Surface water abstraction		
	1999	2004	2009	1999	2004	2009
Belgium (1)	641	658	648	6 506	5 789	5 570
Bulgaria	585	601	584	6 233	5 680	5 536
Czech Republic	557	402	376	1 419	1 626	1 572
Denmark	683	660	650	18	17	10
Germany (2)	6 710	6 033	5 825	33 880	29 524	26 476
Estonia	299	310	332	1 228	1 439	1 056
Ireland (1)	:	:	213	:	:	517
Greece (1)	:	3 734	3 651	:	5 843	5 820
Spain (3)	4 751	6 038	5 700	33 530	30 256	26 766
France (1)	:	6 425	5 710	:	27 289	25 905
Italy	:	:	:	:	:	:
Cyprus	155	172	145	45	95	39
Latvia (1)	133	104	108	174	126	104
Lithuania	183	157	161	4 461	3 121	2 241
Luxembourg	32	:	27	29	:	20
Hungary (4)	938	708	369	:	:	4 926
Malta	19	34	31	*0*	0	0
Netherlands (3)	:	1 023	967	:	10 577	9 640
Austria	1 115	:	:	2 553	:	:
Poland	2 906	2 504	2 586	9 339	8 973	8 931
Portugal (5)	6 290	:	:	4 800	:	:
Romania	1 134	760	628	7 436	5 090	6 248
Slovenia	148	184	190	:	802	753
Slovakia (6)	465	386	358	697	621	330
Finland	285	*285*	:	2 043	:	:
Sweden (1)	654	628	346	2 057	2 048	2 285
United Kingdom (7)	2 495	2 296	2 139	8 353	8 504	6 208
Iceland	157	160	:	5	5	:
Norway	:	:	:	:	:	:
Switzerland (3)	875	853	:	1 685	1 679	:
Croatia (1)	:	:	1 162	:	:	:
FYR of Macedonia	:	247	162	:	1 428	885
Turkey (8)	10 050	*11 443*	*12 096*	*27 840*	:	:

(1) 2007 instead of 2009.
(2) 1998 instead of 1999; 2007 instead of 2009.
(3) 2008 instead of 2009.
(4) 2008 instead of 2009 for surface water abstraction.
(5) 1998 instead of 1999.
(6) 2007 instead of 2009; 2003 instead of 2004 for surface water abstraction.
(7) England and Wales only; 2008 instead of 2009.
(8) 1998 instead of 1999 for surface water abstraction; 2007 instead of 2009.

Source: Eurostat (online data code: env_watq2)

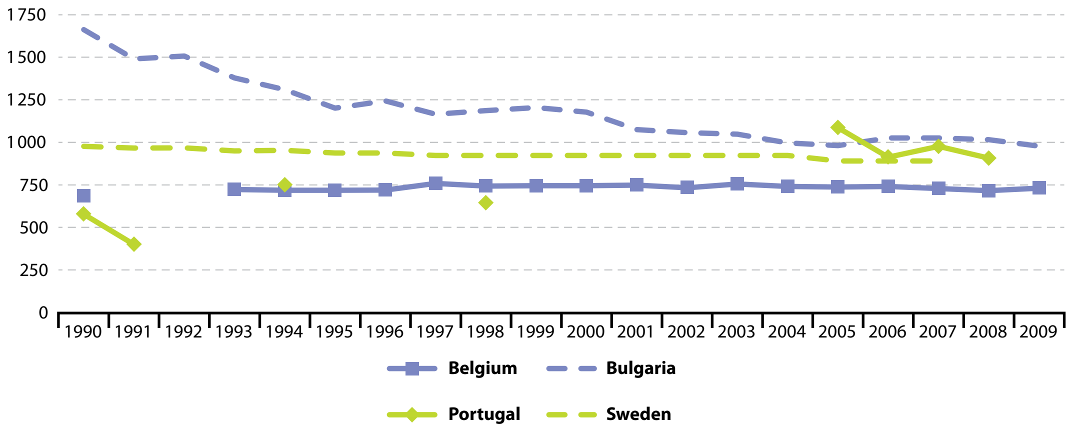
Figure 11.5.2: Total freshwater abstraction by public water supply, 2009 (¹)
(m³ per inhabitant)



(¹) Spain, Italy, the Netherlands, Austria, Portugal, United Kingdom and Turkey, 2008; Germany, Ireland, Greece, France, Slovakia, Sweden and Norway, 2007; Switzerland, 2006; Finland and Iceland, 2005; Latvia not available.
(²) Estimate.

Source: Eurostat (online data code: env_watq2)

Figure 11.5.3: Total freshwater abstraction for public water supply, selected countries, 1990-2009
(million m³)



Source: Eurostat (online data code: env_watq2)

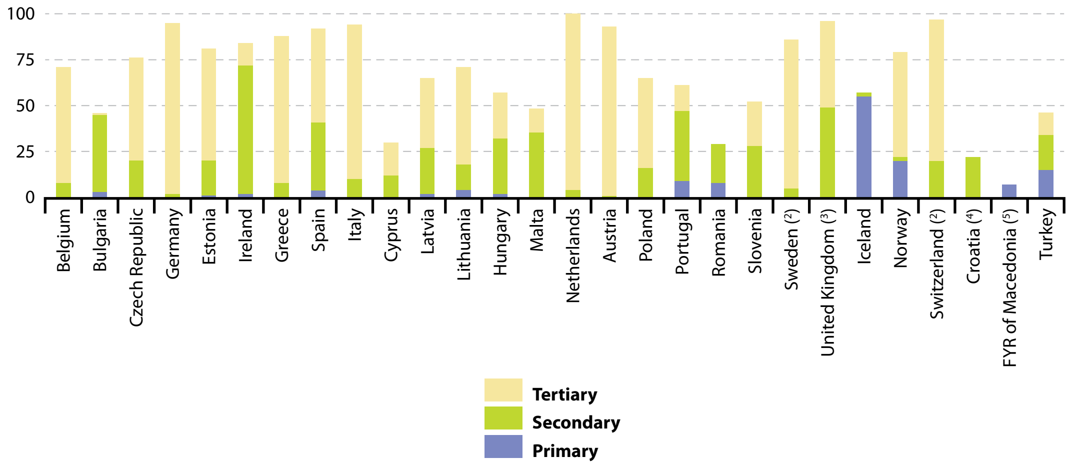
Table 11.5.3: Population connected to urban wastewater treatment, 1999-2009
(% of total)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Belgium	39	41	46	48	51	53	54	57	69	*71*	:
Bulgaria	36	37	38	39	40	40	41	41	42	44	45
Czech Republic	62	64	65	70	71	71	73	74	75	76	:
Denmark	:	:	:	:	:	:	:	:	:	:	:
Germany	:	:	93	:	:	94	:	:	95	:	:
Estonia	69	69	69	70	70	72	74	74	74	80	80
Ireland	66	:	70	:	:	:	84	:	:	:	:
Greece	:	:	:	:	:	:	:	:	85	:	87
Spain	:	:	:	:	:	:	:	91	:	92	:
France	:	:	79	:	:	80	:	:	:	:	:
Italy	69	:	:	:	:	:	:	:	:	:	:
Cyprus	13	14	16	18	23	28	30	:	:	:	:
Latvia	:	:	:	65	70	66	66	65	65	:	:
Lithuania	:	:	:	57	59	:	69	69	69	70	71
Luxembourg	93	:	:	:	95	:	:	:	:	:	:
Hungary	29	46	50	57	:	:	54	57	:	:	:
Malta	13	36	36	36	36	36	36	36	35	42	48
Netherlands	98	98	98	99	99	99	99	99	99	99	99
Austria	:	85	86	86	89	89	:	*92*	:	*93*	:
Poland	52	54	55	57	58	59	60	61	62	63	64
Portugal (1)	:	:	:	57	60	:	65	72	69	70	:
Romania	:	:	:	:	:	27	27	28	28	29	29
Slovenia	21	23	25	25	26	34	37	52	51	52	52
Slovakia	50	51	51	52	53	54	55	55	57	:	:
Finland	80	80	81	81	:	:	:	:	:	:	:
Sweden	:	86	:	85	:	86	:	86	:	:	:
United Kingdom (2)	92	95	99	98	96	97	97	99	99	97	97
Iceland	16	33	33	50	50	50	57	:	:	:	:
Norway	73	73	74	74	75	76	77	78	78	77	79
Switzerland	96	96	96	96	:	:	97	:	:	:	:
Croatia	:	9	:	:	:	15	28	28	29	:	:
FYR of Macedonia	:	5	6	6	6	6	7	7	7	7	7
Turkey	*23*	*26*	27	28	30	36	36	42	:	46	:

(1) The totals for urban wastewater treatment also contain values for preliminary treatment and for undefined treatment. These values refer to the public urban wastewater treatment, including collective septic tanks.
(2) England and Wales only.

Source: Eurostat (online data code: env_watq4)

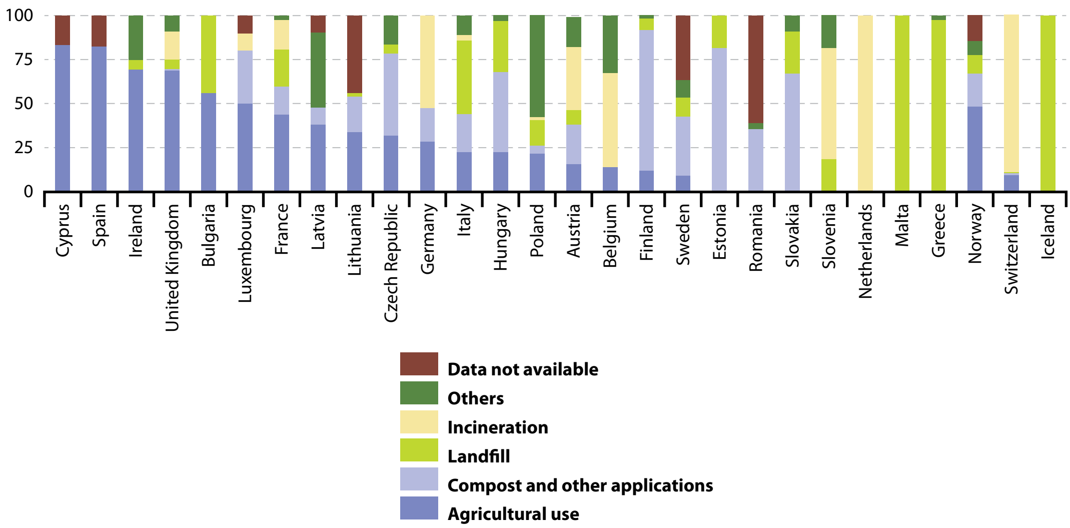
Figure 11.5.4: Population connected to wastewater treatment, 2009 ([1])
(% of total)



([1]) Belgium, the Czech Republic, Spain, the Netherlands, Austria, Portugal and Turkey, 2008; Germany, Latvia and Croatia, 2007; Hungary and Sweden, 2006; Ireland, Italy, Cyprus, Iceland and Switzerland, 2005; Denmark, France, Luxembourg, Slovakia and Finland, not available.
([2]) Primary, not available.
([3]) England and Wales only.
([4]) Primary and tertiary, not available.
([5]) Secondary and tertiary, not available.

Source: Eurostat (online data code: env_watq4)

Figure 11.5.5: Sewage sludge disposal from urban wastewater treatment, by type of treatment, 2009 ([1])
(% of total mass)



([1]) Belgium, Germany, Luxembourg, the Netherlands and Austria, 2008; the Czech Republic, Ireland, Latvia and Slovakia, 2007; Greece and Switzerland, 2006; Italy, Cyprus and the United Kingdom, 2005; France and Hungary, 2004; Iceland, 2003; Sweden, 2002; Finland, 2000; Denmark and Portugal, not available.

Source: Eurostat (online data code: env_watq6)

11.6 Chemicals management

Work on European Union (EU) statistics concerning hazardous substances started in the mid-1990s when a set of environmental pressure indicators (EPIs) related to chemicals were developed. More recently, a set of indicators to monitor the effectiveness of the Regulation on the registration, evaluation, authorisation and restriction of chemicals (REACH) were developed. This subchapter presents two indicators developed and compiled by Eurostat that cover the production of important industrial chemicals.

Main statistical findings

Total production of chemicals

Figure 11.6.1 shows the development of EU-27 and EU-15 chemical production in terms of the level (or quantity) of output. The production of chemicals is largely concentrated in western Europe: Germany was the largest producer in the EU-27 in 2010, followed by France, Italy and the United Kingdom and these four Member States collectively generated two thirds of the EU-27's chemical production in 2010; adding Spain, the Netherlands, Belgium and Ireland, the overall share of these eight Member States was 88 %.

In the EU-15, between 1995 and 2007, the total production of chemicals increased by 64.9 million tonnes (+ 26.2 %) to reach a total of 313 million tonnes. In 2008, production decreased by 27.1 million tonnes (– 8.7 %) and in 2009 by a further 35.8 million tonnes (– 12.5 %) to reach its second lowest level of output (250 million tonnes) – just above that recorded in 1995. In 2010, total production of chemicals stood at 293 million tonnes, marking an expansion of 17.2 % compared with the year before.

A shorter time series is available for the EU-27 which shows that the total production of chemicals increased continuously between 2002 and 2007, rising overall by 9.6 % to reach a peak of 362 million tonnes. During the financial and economic crisis, production fell by 24 million tonnes (– 6.6 %) in 2008 and by another 46 million tonnes (– 13.6 %) in 2009. In 2010 the production of industrial chemicals in the EU-27 increased by 47 million tonnes (+ 16.1 %) to reach 339 million tonnes, still 23 million tonnes below the pre-crisis peak.

Production of environmentally harmful chemicals

Figure 11.6.2 presents the development of production of environmentally harmful chemicals, broken down into five environmental impact classes. Aggregated production of these chemicals in the EU-27 grew from 2002 to 2007 by 10.1 % overall to a peak of 194 million tonnes. Production fell by 32 million tonnes (– 16.5 %) over the next two years to a level of 162 million tonnes, which was 8.1 % lower than in 2002. In 2010, the production of environmentally harmful chemicals increased by 22 million tonnes (+ 13.6 %) to 184 million tonnes.

EU-15 production of environmentally harmful chemicals increased from 1996 to 2005 by 15.9 % overall to record a peak in production of 168 million tonnes. After a modest reduction in 2006, production recovered again in 2007 to stand at almost the same level as in 2005 (one million tonnes lower, at 167 million tonnes). However, the output of environmentally harmful chemicals then fell (reflecting the impact of the financial and economic crisis), reaching a low point in 2009, at 138 million tonnes. There was a strong recovery in 2010, as the EU-15's output rose to 160 million tonnes, which was 15.9 % higher than a year before.

The share of environmentally harmful chemicals in total EU-27 chemical output has not changed significantly, from 53.3 % in 2002 to 54.3 % in 2010. The 12 Member States that joined the EU in 2004 and 2007 produced 24 million tonnes of environmentally harmful chemicals in 2010, equivalent to 13.0 % of the quantity of production in the EU-27 as a whole.

Production of toxic chemicals

Figure 11.6.3 presents the development of production quantities of toxic chemicals, broken down into five toxicity classes. The EU-27's production of toxic chemicals (all five toxicity classes aggregated) increased by 6.8 % between 2002 and 2007 to reach a peak of 218 million tonnes. Production fell by 15 million tonnes in 2008 (– 7.0 %) and by 23 million tonnes (– 11.3 %) in 2009 to a level of 180 million tonnes. In 2010 the production of toxic industrial chemicals increased by 25 million tonnes (+ 13.9 %) to 205 million tonnes.

EU-15 production of toxic chemicals increased from 1995 to 2005 by 21.7 % to record a peak in production of 189 million tonnes. In 2010 the EU-15's output stood at 176 million tonnes, which was still 7 % lower than in 2005.

The overall share of chemicals classified as toxic (all five classes) in total EU-27 chemicals production was 60.5 % in 2010 – which was slightly less than the ratio that had been recorded in 2002 (61.8 %). EU-27 production of the most toxic chemicals – carcinogenic, mutagenic and reprotoxic (CMR) chemicals – reached 38 million tonnes in 2004. Output fell substantially in 2008 to 32 million tonnes and increased again in 2010 to 39 million tonnes (+ 21.8 %), a figure that was comparable to the quantity of production for toxic chemicals prior to the financial and economic crisis.

The relative share of CMRs in total EU-27 chemical production fell from 10.8 % in 2004 to 9.4 % in 2008 before increasing again to 11.5 % in 2010. A more detailed analysis shows that most CMRs were produced in lower quantities; however, the production of chlorine compounds, such as vinyl chloride, compensated for these reductions.

The 12 Member States that joined the EU in 2004 or 2007 produced 14.1 % (29 million tonnes) of the EU-27's toxic chemicals in 2010, in line with the 13.6 % share of total production of all industrial chemicals.

The development of toxic chemicals production followed a similar path to that recorded for the production of all chemicals. The time series from 2002 to 2010 provides little indication that EU-27 production of chemicals – that are toxic to human health and/or harmful to ecosystems – is being significantly decoupled from the overall production of industrial chemicals.

Data sources and availability

The indicators presented in this subchapter are derived from annual statistics on the production of manufactured goods (Prodcom). EU-15 statistics on toxic chemicals cover the years from 1995 to 2010, while statistics on environmentally harmful substances start in 1996. EU-27 data are available for the years 2002 to 2010 for both of these indicators.

The information presented on the production of environmentally harmful chemicals and the production of toxic chemicals has been aggregated, in both cases, to five impact classes: these classes of environmental impacts and toxicity to human health follow official classifications in EU legislation and scientific expert judgement. It should be noted that the indicators do not describe the actual risks associated with the use of chemicals, but instead their level of production in quantity terms. Indeed, production and consumption are not synonymous with exposure, as some chemicals are handled in closed systems, or as intermediate goods in controlled supply chains.

The production of environmentally harmful chemicals is divided into five classes based on their environmental impact. The impacts, beginning with the most harmful, are:

- severe chronic environmental impacts;
- significant chronic environmental impacts;
- moderate chronic environmental impacts;
- chronic environmental impacts;
- significant acute environmental impacts.

The production of environmentally harmful chemicals – which is a sustainable development indicator – monitors progress in shifting production from more environmentally harmful to less harmful chemicals; the indicator focuses on aquatic toxicity. It seeks to take into account the inherent ecotoxicity of chemical substances, their potential for bioaccumulation and their persistence in the environment. For this purpose, substance specific data on eco-toxicity, biodegradability and bioaccumulation potential have been used. The production of environmentally harmful chemicals is primarily based on the official environmental classification of substances; certain risk-phrases related to chronic human toxicity are also included.

The indicator on toxic chemicals is also published as a sustainable development indicator within the theme for public health. Aggregated production quantities of toxic chemicals may be broken down into five toxicity classes. The classes, beginning with the most dangerous, are:

- carcinogenic, mutagenic and reprotoxic (CMR) chemicals;
- chronic toxic chemicals;
- very toxic chemicals;
- toxic chemicals;
- chemicals classified as harmful.

The indicator on the production of toxic chemicals monitors progress in shifting production from more toxic to less toxic chemicals and addresses an important objective of REACH: to reduce risks by substitution of hazardous by less hazardous substances.

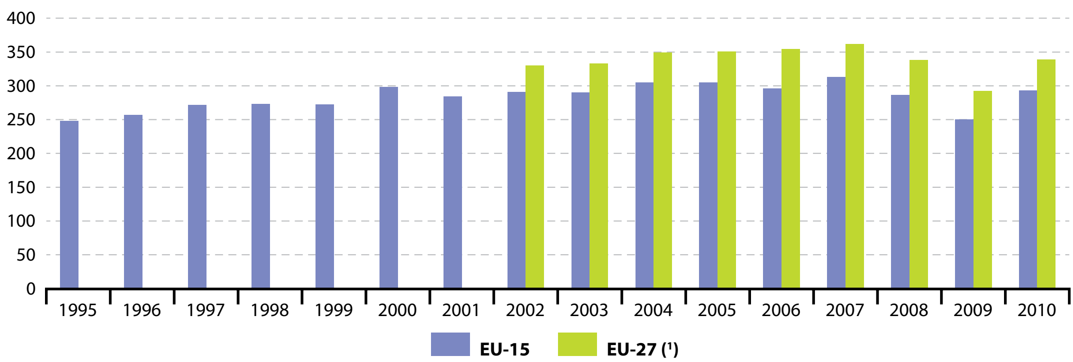
Eurostat has recently, in collaboration with the Directorate-Generals of the European Commission responsible for enterprise and industry and for the environment, published a baseline study providing a set of indicators to monitor the effectiveness of the REACH Regulation.

Context

The sixth environment action programme (6th EAP), which runs from 2002 to 2012, requires a complete overhaul of EU policies on chemicals management. It is intended that REACH shall ensure a high level of protection for human health and the environment, including the promotion of alternative methods to assess the hazards of substances, the free circulation of substances on the internal market, and the enhancement of competitiveness and innovation in the EU's chemical manufacturing sector. Through increasing knowledge about the hazardous properties of chemicals, REACH is expected to enhance conditions for their safe use in supply chains and contribute towards the substitution of dangerous substances by less dangerous ones, such that there are fewer risks to human health and the environment.

For this purpose, statistical indicators that provide information on the production of toxic chemicals and chemicals that are harmful to the environment may be used to measure progress towards a number of objectives. These include the headline objective for public health established under the EU's sustainable development strategy, alongside the aim of ensuring a high level of protection for human health and the environment – an objective of the 6th EAP.

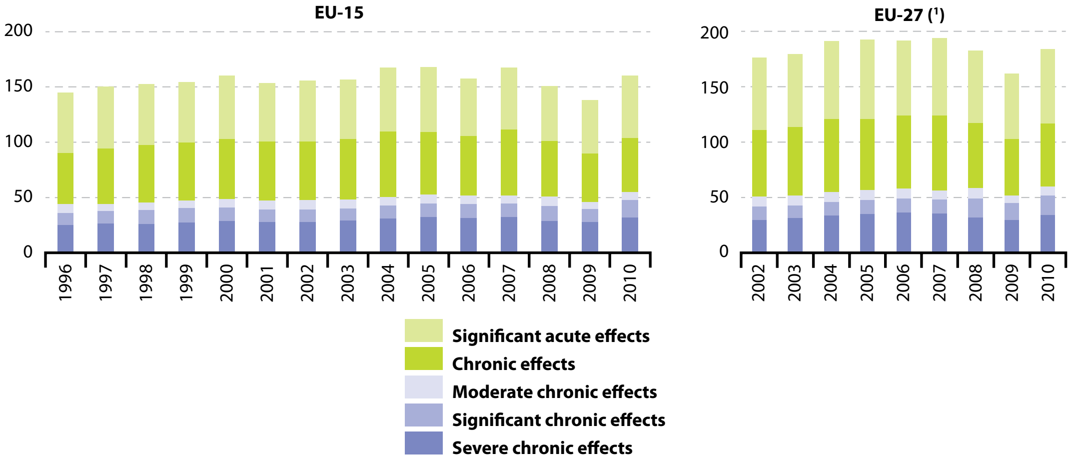
Figure 11.6.1: Total production of chemicals, 1995-2010
(million tonnes)



(1) Not available, 1995 to 2001.

Source: Eurostat (online data code: tsdph320)

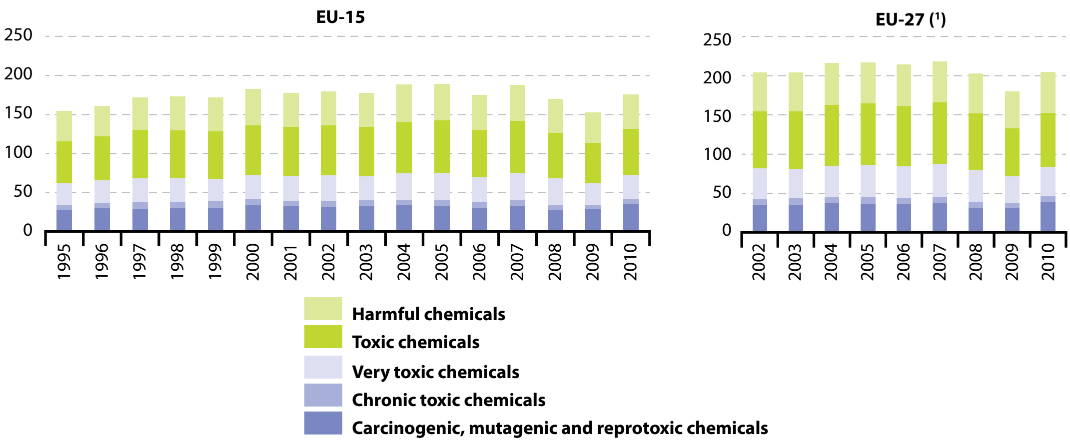
Figure 11.6.2: Production of environmentally harmful chemicals, 1996-2010
(million tonnes)



(1) Not available, 1996 to 2001.

Source: Eurostat (online data code: ten00011)

Figure 11.6.3: Production of toxic chemicals, 1995-2010
(million tonnes)



(1) Not available, 1995 to 2001.

Source: Eurostat (online data code: tsdph320)

11.7 Environmental protection expenditure

This subchapter provides details on the expenditure carried out in the European Union (EU) with the purpose of protecting the environment, in other words, environmental protection expenditure. This covers the money spent on activities directly aimed at the prevention, reduction, and elimination of pollution or any other degradation of the environment resulting from the production or consumption of goods and services.

Nowadays, the protection of the environment is integrated into many policy fields with the general aim of attaining sustainable development. Clean air, water and soils, healthy ecosystems and biodiversity are vital for human life, and thus it is not surprising that societies devote large amounts of money to curbing pollution and preserving a healthy environment. Both business and households pay to safely dispose of waste; production activities spend money to mitigate the polluting effects of production processes; governments subsidise environmentally beneficial activities and use public funds to invest in environmental projects.

Main statistical findings

The highest level of environmental protection expenditure in the EU-27 was accounted for by specialised producers of environmental protection services (EUR 127 300 million in 2009), while the public sector and industry (which excludes recycling) had expenditure of EUR 87 000 million and EUR 51 500 million respectively.

Between 2001 and 2009, the EU-27 expenditure of specialised producers grew in value terms by almost 50 % (see Figure 11.7.1). There was a 25 % increase in environmental protection expenditure made by the public sector between 2002 and 2009, while the expenditure for industry was largely unchanged (having dipped during the early part of the decade when industrial activity was relatively weak, before rebounding between 2004 and 2008).

Contrary to the general development of rising EU-27 environmental protection expenditure over most of the last decade, the latest growth rates between 2008 and 2009 reflect, at least to some degree, the impact of the financial and economic crisis. There was a reduction of 7.6 % in the expenditure made by industry, while expenditure declined by 2.7 % for specialised producers of environmental protection services and 0.9 % for the public sector.

An alternative means to analyse the importance of environmental protection expenditure is to express its level in relation to GDP. Figure 11.7.2 shows that the EU-27 environmental protection expenditure of specialised producers of environmental protection services increased by 0.2 percentage points between 2001 and 2009 to reach 1.1 % of GDP. The relative importance of EU-27 environmental protection expenditure made by the public sector was stable around 0.7 % of GDP between 2002 and 2008, increasing somewhat in 2009. In contrast, the relative importance of EU-27 environmental protection expenditure made by industry declined between 2001 and 2003 by about 1 percentage point and then remained relatively stable though until 2009.

Between 2008 and 2009 there was a 5.8 % reduction in EU-27 GDP in current price terms. This decline in economic activity was at a more rapid pace than the reduction in EU-27 environmental protection expenditure for specialised producers of environmental protection services or the public sector, resulting in their relative shares of GDP rising in 2009 while there was a very small reduction in the relative importance of industrial environmental protection expenditure.

A breakdown of environmental protection expenditure by domain is provided in Figure 11.7.3. This shows that in 2009 the largest expenditure concerned waste management, followed by wastewater treatment. More than half of the expenditure within these two domains was accounted for by specialised producers of environmental protection services. In contrast, environmental protection expenditure related to air pollution accounted for a quarter of the total expenditure made within industry.

Environmental protection expenditure by the public sector

In most European countries, environmental protection investments and current expenditure (thus excluding subsidies) made by the public sector accounted for between 0.25 % and 0.9 % of GDP in 2009 (see Figure 11.7.4). Croatia (0.02 %), Latvia (0.08 %) and Estonia (0.16 %) were below this range, while relatively high levels of public sector investments and current expenditure were recorded in Malta (1.59 %, 2008), the Netherlands (1.58 %, 2007) and Lithuania (1.19 %).

Figure 11.7.5 provides a breakdown of the investments and current expenditure incurred by the public sector: it shows that investment across the EU-27 accounted for one quarter of the total expenditure. Investment generally accounted for a much higher share of total expenditure in most of the Member States that joined the EU in 2004 or 2007; this may reflect expenditure on fixed assets required to meet EU environmental legislation.

As noted above, waste management and wastewater treatment are generally the two main domains for expenditure and this pattern held true for most of the EU Member States in relation to their public sector spending. Figure 11.7.6 shows that this was not always the case and that in some countries the public sector spent more in other domains. For example, in Spain, the public sector principally directed its expenditure towards biodiversity and landscape protection, whereas in Cyprus, Italy, Denmark, France and Finland more than two fifths of expenditure was given over to the miscellaneous category of 'other', which includes general environmental administration and management, education, training and information relating to the environment (as well as activities leading to indivisible expenditure and activities not elsewhere classified).

Environmental protection expenditure by specialised producers of environmental protection services

The expenditure of specialised producers of environmental protection services generally ranged between 0.4 % and 1.5 %, with an EU-27 average of 1.1 % of GDP in 2009 (see Figure 11.7.7). Below this range, Slovakia, Finland (2006), Latvia and Luxembourg had a lower level of relative expenditure among specialised producers. In contrast, the highest ratios of environmental protection expenditure for specialised producers to GDP were recorded in Estonia (2008) and Austria (2007). The differences between countries may, at least to some degree, reflect whether the public sector provides services itself, or whether these activities have been contracted out to specialised producers. The differences may also be related to the specialisation and concentration of particular industrial activities within each country. For example, wastewater treatment or waste management may be internalised within industrial plants in order to recycle or re-use some of the materials that are discarded as part of the production process.

The vast majority of the environmental protection expenditure made by specialised producers of environmental protection services was directly allocated to waste management and wastewater treatment (see Figure 11.7.8).

Environmental protection expenditure by industry

An average of 0.44 % of GDP was spent on environmental protection expenditure by industry across the EU-27 in 2009 (see Figure 11.7.9). This ratio was generally within the range of 0.2 % to 1.0 % of GDP, although Bulgaria reported a higher relative share and Cyprus (2008) and France (2007) lower shares; Turkey also had a relatively low share (2008).

Information is available for a more detailed industrial breakdown (using NACE sections) for most of the EU Member States and some non-member countries (see Figure 11.7.10). The majority of the environmental protection expenditure made within the industrial economy can be attributed to manufacturing (66.1 % of the total in the EU-27 in 2009). The manufacturing sector had the highest level of expenditure among the three industrial activities in each of the countries for which data are available, except in Latvia and Estonia (in 2008) where the electricity, gas, and water supply sector accounted for a higher share. The high manufacturing share is not surprising as this sector is far larger according to most economic measures than either mining and quarrying or the electricity, gas and water supply sector. Natural resource endowments, as well as industrial specialisation may, at least in part, explain some of the differences between countries. For example, a higher reliance on the burning of fossil fuels to generate electricity in many of the Member States that joined the EU in 2004 or 2007 may explain the relatively high degree of environmental protection expenditure within the electricity, gas and water supply sector in these countries, while natural resources of coal may explain the higher than average levels of expenditure for the mining and quarrying activity in Romania, the Czech Republic and Poland.

Figure 11.7.11 shows that 30.2 % of the environmental protection expenditure that was made within the EU-27's industrial economy in 2009 was attributed to investment; this was somewhat higher than the corresponding share recorded for public sector expenditure (25.0 %).

The environmental protection expenditure made by the industrial sector was largely concentrated among air protection measures, wastewater treatment and waste management activities (see Figure 11.7.12).

Data sources and availability

Eurostat regularly collects environmental protection expenditure data through a joint Eurostat/OECD questionnaire on environmental protection expenditure and revenues; this is based on EU methodology.

The questionnaire classifies units of the economy into four main sectors: specialised producers (in other words, public and private enterprises) of environmental protection services, the public sector (other than public specialised producers), business (other than private specialised producers) and households. In most European countries important environmental protection services (such as waste management and wastewater treatment) have evolved from being primarily provided free by the public sector (local government) to being more commonly provided by various forms of private and public specialised producers; the methodology used for the collection of data reflects these arrangements.

The grouping of economic units is based upon the type of environmental protection activity they carry out. Units classified under the pubic sector or as specialised producers of environmental protection services are units that carry out environmental protection activities for third parties.

The public sector comprises those units which carry out non-market activities for the community as a whole. Apart from legislative and regulatory tasks, public sector units may also provide environmental public goods. They also subsidise environmental protection activities directly and indirectly, for example, by providing investment grants.

Specialised producers of environmental protection services produce market services; this group also includes producers that carry out environmental protection activities as a secondary activity. Specialised producers can be divided between public specialised producers and private specialised producers.

Units that carry out environmental protection activities for their own internal use are part of the business sector and cover internal (ancillary) activities, in other words, activities carried out on their own behalf to reduce the environmental impact of their production processes. For example, businesses can invest in equipment for cleaning up pollutants (for example, filters), cleaner production technologies that reduce emissions, or they can organise (internally) their own waste management services. The business sector includes all activities in NACE Rev. 1.1 Divisions 01 to 99, excluding the public sector (falling mainly in NACE Rev. 1.1 Division 75, public administration) and excluding the activities of specialised producers (falling mainly in NACE Rev. 1.1 Division 90, sewage and refuse disposal).

The households sector groups together those units that belong to the institutional sector of households in the national accounts, considered in their capacity as final consumers. Households mainly buy environmental services (for example, they may pay for the collection and treatment of household waste, or the treatment of their wastewater).

Environmental protection expenditure is an indicator which comprises total investments and total current expenditure. Total current expenditure is the sum of internal current expenditure and fees and payments for environmental protection services. For the public sector, environmental protection expenditure also includes subsidies and investment grants that are paid to other sectors for related environmental protection activities. Environmental protection expenditure gives an idea of the money spent by each sector on environmental protection activities directly and indirectly, in other words, not only on environmental protection activities for their own use, but also by those buying environmental services from other economic units and financing environmental protection expenditure that is carried out by other units. Note that environmental protection expenditure is not adjusted to take account of receipts from any by-products, revenues from environmental protection services or from transfers/subsidies.

The indicators for environmental protection expenditure can be used to compare the performance of a particular sector across countries. However, these indicators should not be used to compare expenditure across sectors, as there may be cases of double-counting, for example, between specialised producers of environmental protection services and those business that purchase such services. As such, it is not possible (using the current methodology) to create a figure for the total spend on environmental protection; rather, a full satellite account to the national accounts would be necessary to perform such a calculation.

The scope of environmental protection is defined according to the Classification of Environmental Protection Activities (CEPA 2000), which distinguishes nine different environmental domains: the protection of ambient air and the climate; wastewater treatment; waste management; protection and remediation of soil, groundwater and surface water; noise and vibration abatement; protection of biodiversity and landscape; protection against radiation; research and development, and; other environmental protection activities.

Context

The demand for goods and services to prevent or treat environmental damage encourages the supply of environmental activities and stimulates the development of a 'greener' economy. The analysis of expenditure patterns relating to environmental protection may help contribute towards an evaluation of environmental policies already in place and whether or not the 'polluter pays' principle is being implemented.

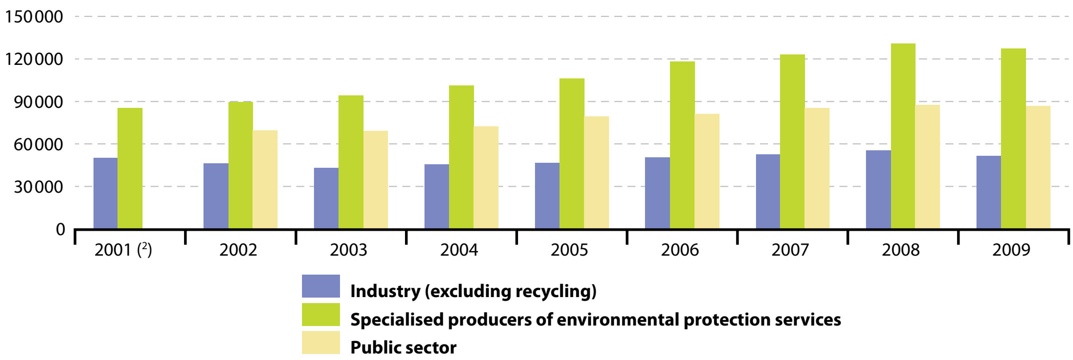
A low level of environmental protection expenditure does not necessarily mean that a country is not effectively protecting its environment. In fact, the indicator tends to emphasise clean-up costs at the expense of cost reductions which could be due to reduced emissions or more effective (less polluting) production techniques.

For many years, European statistical services have collected data on air pollution, energy and water consumption, wastewater, solid waste, and their management. The data sources can be used by policymakers to assess the environmental impact of economic activities (resource consumption, air or water pollution, waste production) and to assess the actions (investments, technologies, expenditure) that may be carried out to limit the causes and risks of pollution.

Eurostat has worked towards systematically gathering environmental statistics for all economic sectors within the EU. These statistics are used to: assess the effectiveness of new regulations and policies; analyse the links between environmental pressures and the structure of the economy.

A Regulation (691/2011) on European environmental economic accounts was adopted on 6 July 2011; it provides a framework for the development of various types of environmental accounts (also referred to as modules). Although not included in the first set of modules, the regulation does make reference to environmental protection expenditure as a future area for inclusion.

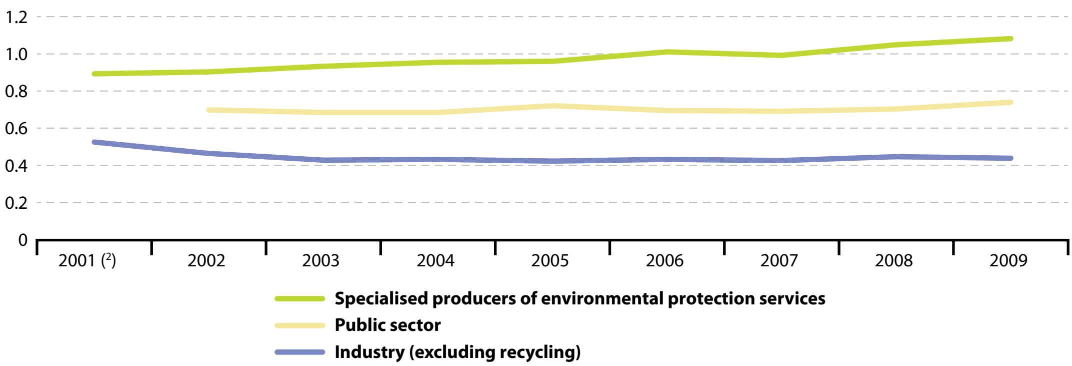
Figure 11.7.1: Total environmental protection expenditure, EU-27, 2001-2009 (1)
(EUR million)



(1) Estimates.
(2) Public sector, not available.

Source: Eurostat (online data code: env_ac_exp1)

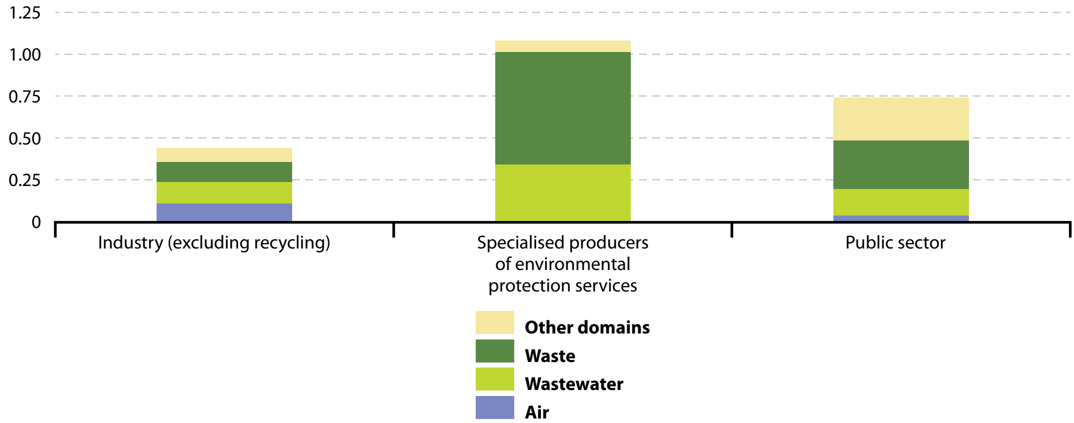
Figure 11.7.2: Total environmental protection expenditure, EU-27, 2001-2009 (1)
(% of GDP)



(1) Estimates.
(2) Public sector, not available.

Source: Eurostat (online data codes: env_ac_exp1 and nama_gdp_c)

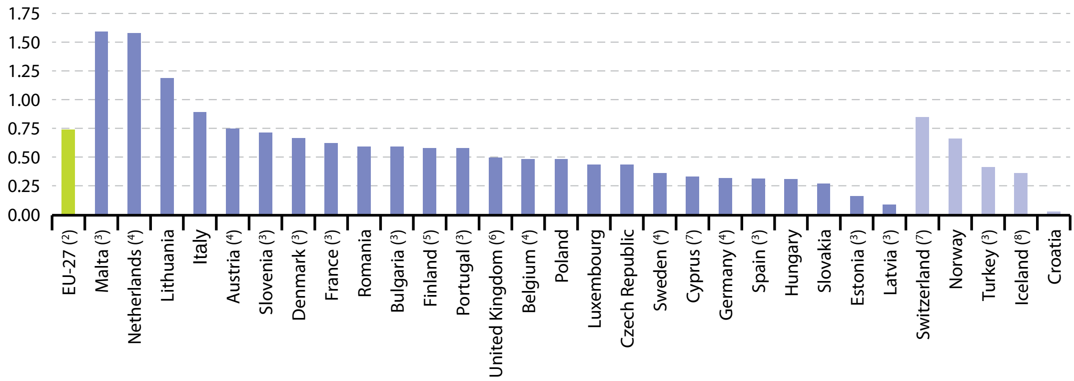
Figure 11.7.3: Total environmental protection expenditure by domain, EU-27, 2009 ([1])
(% of GDP)



([1]) Estimates.

Source: Eurostat (online data codes: env_ac_exp1 and nama_gdp_c)

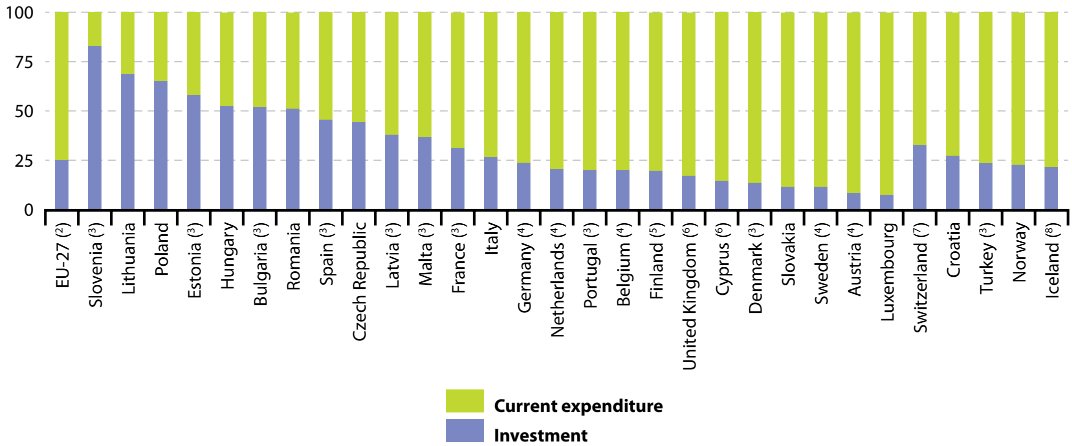
Figure 11.7.4: Public sector environmental protection investments and current expenditure, 2009 ([1])
(% of GDP)



([1]) Ireland and Greece, not available.
([2]) Estimate.
([3]) 2008.
([4]) 2007.
([5]) 2006.
([6]) 2004.
([7]) 2003.
([8]) 2002.

Source: Eurostat (online data codes: env_ac_exp1, env_ac_exp1r2 and nama_gdp_c)

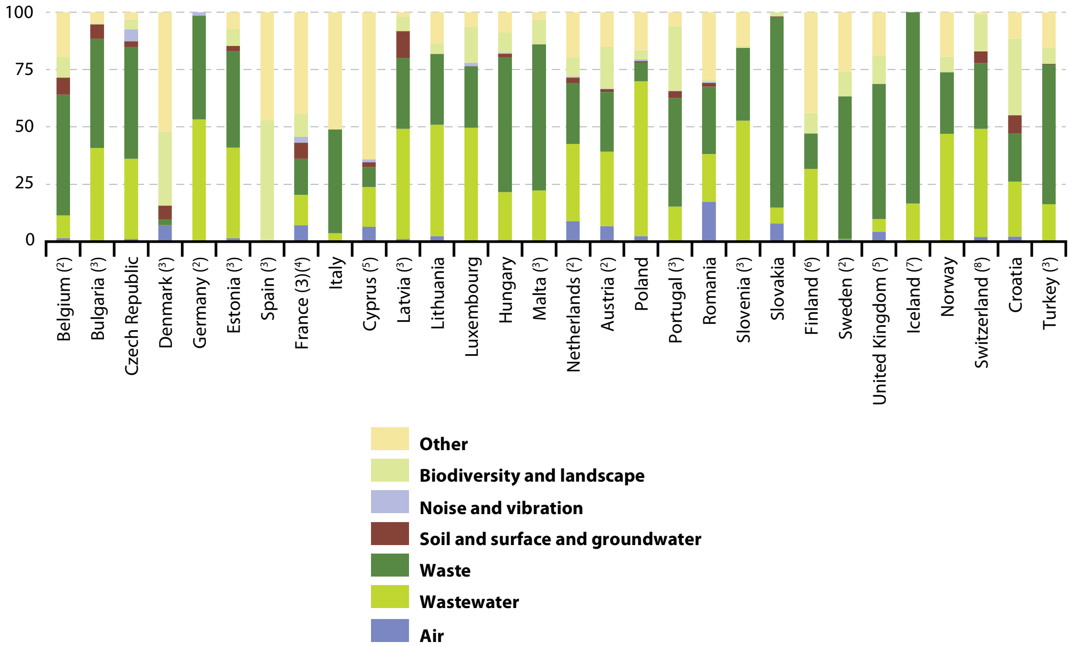
Figure 11.7.5: Breakdown of public sector environmental protection expenditure, 2009 (1)
(% of total)



(1) Ireland and Greece, not available.
(2) Estimates.
(3) 2008.
(4) 2007.
(5) 2006.
(6) 2004.
(7) 2003.
(8) 2002.

Source: Eurostat (online data codes: env_ac_exp1 and env_ac_exp1r2)

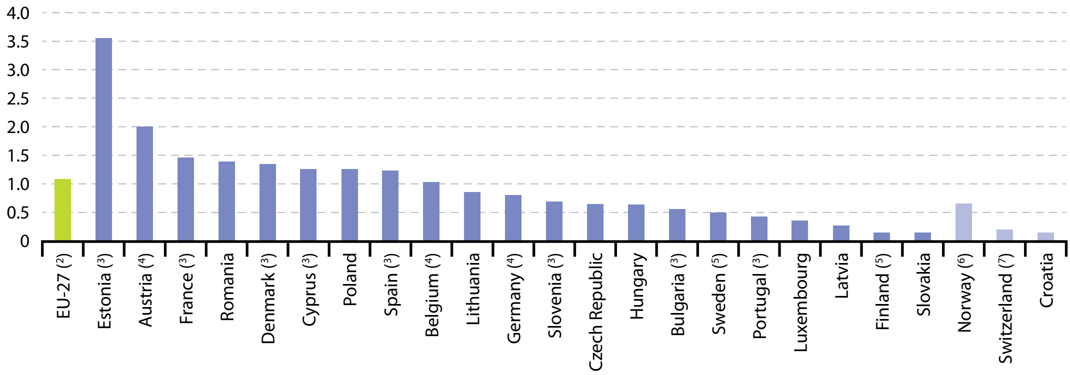
Figure 11.7.6: Breakdown of public sector environmental protection expenditure by environmental domain, 2009 ([1])
(% of total)



([1]) Ireland and Greece, not available.
([2]) 2007.
([3]) 2008.
([4]) Estimates.
([5]) 2004.
([6]) 2006.
([7]) 2002.
([8]) 2003.

Source: Eurostat (online data codes: env_ac_exp1 and env_ac_exp1r2)

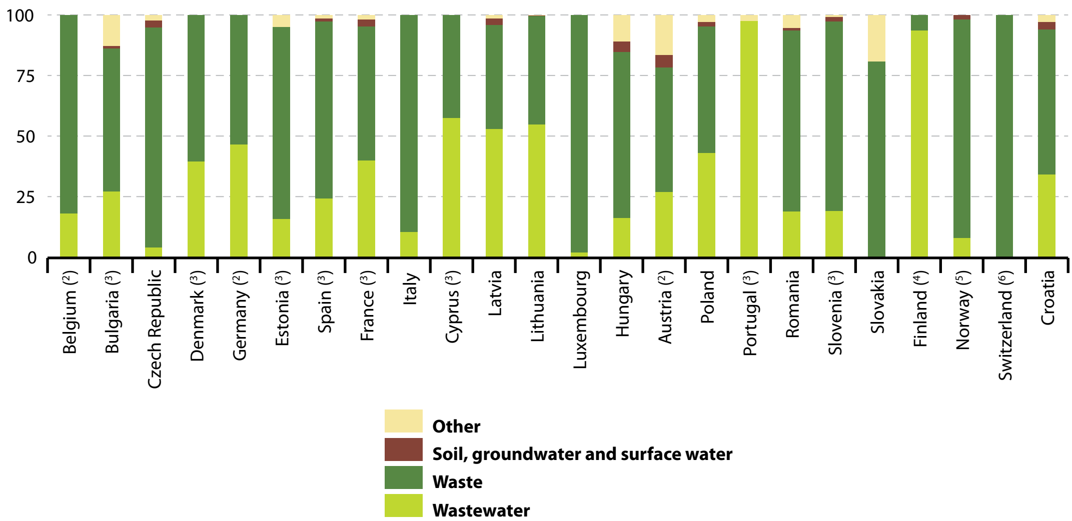
Figure 11.7.7: Specialised producers of environmental protection services' environmental protection expenditure, 2009 (1)
(% of GDP)



(1) Ireland, Greece, Italy, Malta, the Netherlands and the United Kingdom, not available.
(2) Estimate.
(3) 2008.
(4) 2007.
(5) 2006.
(6) 2005.
(7) 2003.

Source: Eurostat (online data codes: env_ac_exp1, env_ac_exp1r2 and nama_gdp_c)

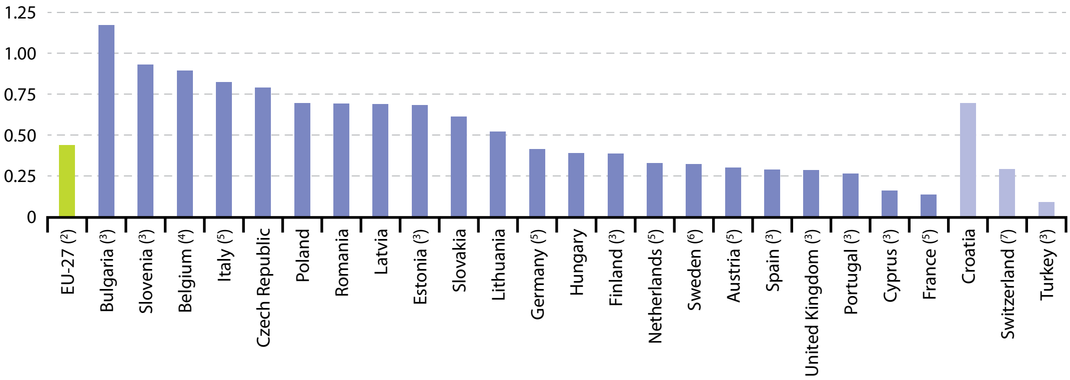
Figure 11.7.8: Breakdown of specialised producers of environmental protection services' environmental protection expenditure by environmental domain, 2009 (1)
(% of total)



(1) Greece, Ireland, Malta, the Netherlands, Sweden and the United Kingdom, not available.
(2) 2007.
(3) 2008.
(4) 2006.
(5) 2005.
(6) 2003.

Source: Eurostat (online data codes: env_ac_exp1 and env_ac_exp1r2)

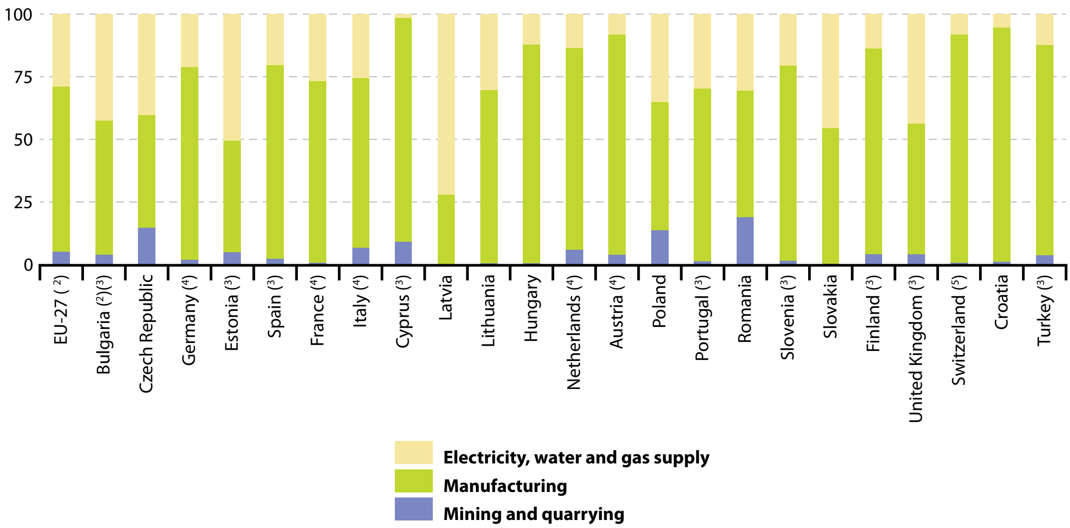
Figure 11.7.9: Industrial (excluding recycling) environmental protection expenditure, 2009 (¹)
(% of GDP)



(¹) Denmark, Ireland, Greece, Luxembourg and Malta, not available.
(²) Estimate.
(³) 2008.
(⁴) 2002.
(⁵) 2007.
(⁶) 2006.
(⁷) 2003.

Source: Eurostat (online data codes: env_ac_exp1, env_ac_exp1r2 and nama_gdp_c)

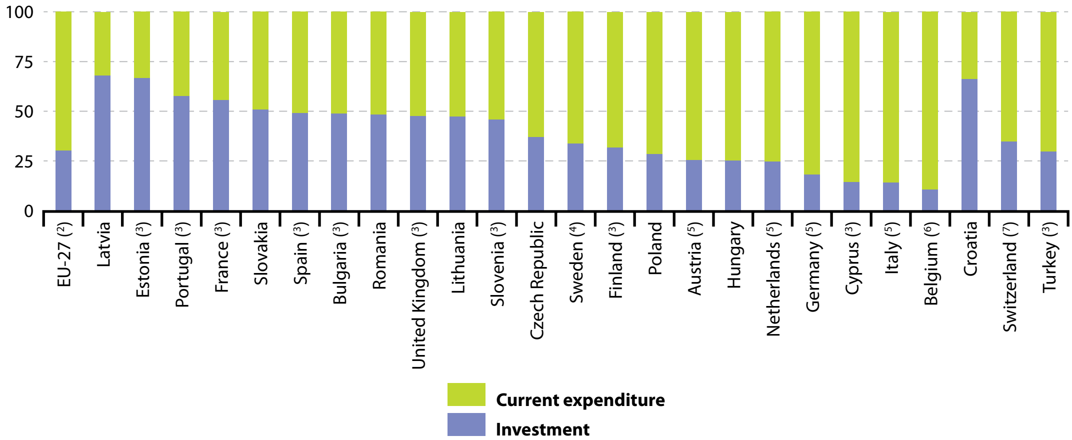
Figure 11.7.10: Breakdown of industrial (excluding recycling) environmental protection expenditure by subsector, 2009 (¹)
(% of total)



(¹) Belgium, Denmark, Ireland, Greece, Luxembourg, Malta and Sweden, incomplete or not available.
(²) Estimates.
(³) 2008.
(⁴) 2007.
(⁵) 2003.

Source: Eurostat (online data codes: env_ac_exp1 and env_ac_exp1r2)

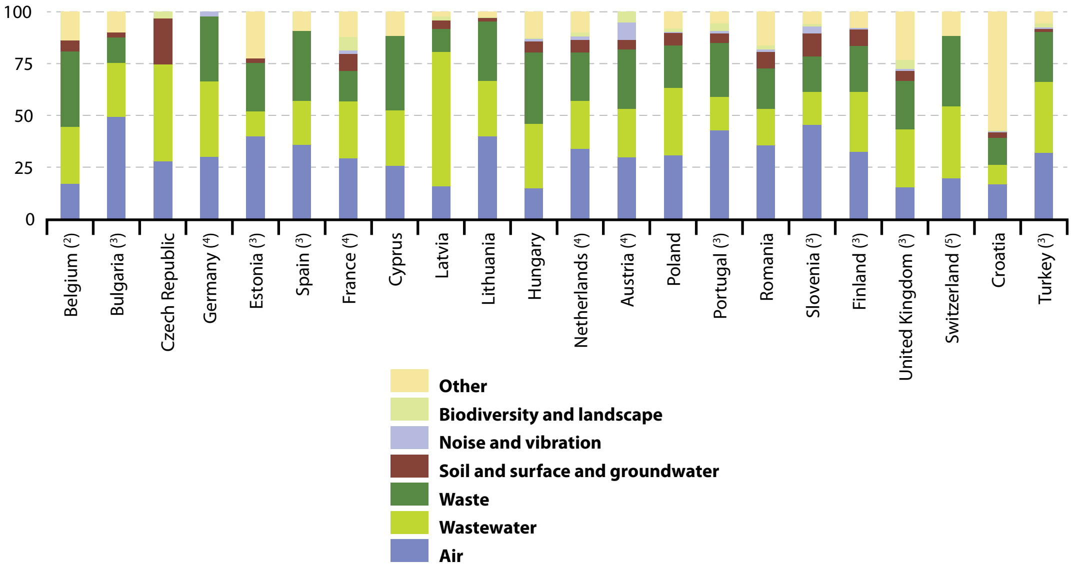
Figure 11.7.11: Breakdown of industrial (excluding recycling) environmental protection expenditure, 2009 ([1])
(% of total)



([1]) Denmark, Ireland, Greece and Malta, incomplete or not available.
([2]) Estimates.
([3]) 2008.
([4]) 2006.
([5]) 2007.
([6]) 2002.
([7]) 2003.

Source: Eurostat (online data codes: env_ac_exp1 and env_ac_exp1r2)

Figure 11.7.12: Breakdown of industrial (excluding recycling) environmental protection expenditure by environmental domain, 2009 (1)
(% of total)



(1) Denmark, Ireland, Greece, Italy, Luxembourg, Malta, Slovakia and Sweden, incomplete or not available.
(2) 2002.
(3) 2008.
(4) 2007.
(5) 2003.

Source: Eurostat (online data codes: env_ac_exp1 and env_ac_exp1r2)

11.8 Environmental taxes

This subchapter concerns environmentally related taxes (hereafter referred to as environmental taxes); these are taxes levied on products and activities with a proven negative impact on the environment. Environmental taxes are distinguished by four different types of tax relating to: energy, transport, pollution and resources; note that value added tax (VAT) is excluded from the definition of environmental taxes.

The subchapter examines trends in environmental taxes over the period 1999-2009 for these four categories of taxes. Its focus is on economic activities (industries and households) that pay these taxes, in order to determine who bears the biggest share of the environmental tax burden. These taxes may be viewed as a tool for implementing the 'polluter pays' principle, since they allow environmental externalities to be taken into account. Through environmental taxes, consumers and producers may be motivated to use natural resources more responsibly and to limit or avoid environmental pollution.

Main statistical findings

Environmental taxes in the EU

Table 11.8.1 shows that the total revenue from environmental taxes in the EU-27 in 2009 was equal to EUR 286 600 million; this figure equated to 2.4 % of GDP and to 6.3 % of the total revenues derived from taxes and social contributions.

As can be seen in Figure 11.8.1, environmental tax revenue in the EU-27 increased during the period between 1999 and 2007, before the effects of the financial and economic crisis were felt, with a reduction in economic activity leading to falling revenues in 2008 and 2009. The decrease in environmental tax revenues during the last two years reversed some of the increase in revenues recorded between 1999 and 2007, although it did not fully offset it; as a result, environmental tax revenue in the EU-27 stood some EUR 42 200 million higher in 2009 than it had done in 1999 (equivalent to an overall increase of 17.3 %).

While environmental tax revenues increased in value terms between 1997 and 2007 within the EU-27, the size of these taxes relative to GDP and the share of total revenue from all taxes and social contributions fell from 2003 to 2008; this development stopped in 2009, when the relative importance of environmental taxes increased. The decline in the relative importance of environmental tax revenue during the period from 2003 to 2008 resulted from environmental tax revenues rising at a slower pace than overall economic growth; the significant increase in oil prices may have contributed to this development. While the total revenue from environmental taxes fell in 2008 and again in 2009, the losses were at a slower pace in 2009 than the reduction in general economic activity, resulting in an increase in the relative importance of environmental taxes (see Figure 11.8.2).

The level of environmental taxation varies across European countries. Comparisons should be made with caution: for instance, low revenues from environmental taxes could either be due to relatively low environmental tax rates, or could result from higher tax rates that have had the effect of changing behavioural patterns among producers and consumers. Higher levels of environmental tax revenue could be linked to individuals or businesses purchasing taxed products in countries where they are not resident if the tax rates are lower there than in the domestic market (for example, crossing a border to purchase petrol or diesel in a neighbouring country).

Map 11.8.1 shows an overall picture of relative tax revenues (both in relation to GDP and in relation to total taxes and social contributions). Whether in relation to GDP or in relation to total taxes and social contributions, the relative importance of environmental tax revenues was high in Denmark, the Netherlands, Slovenia, Malta and Bulgaria, as these five Member States headed the rankings for both measures. At the other end of the scale, Spain and Belgium both recorded relatively low levels of environmental tax revenue (in relation to both GDP and total taxes and social contributions).

Environmental taxes by type

Energy taxes (which include taxes on transport fuels) represented, by far, the highest share of overall environmental tax revenue – accounting for 74.0 % of the EU-27 total in 2009 (see Figure 11.8.3). These taxes were particularly important in Lithuania, the Czech Republic and Luxembourg, where they accounted for upwards of 90 % of the total revenues from environmental taxes (see Figure 11.8.4). In contrast, energy taxes represented less than 60 % of total revenues from environmental taxes in Cyprus and the Netherlands, and less than 50 % in Denmark and Malta (as well as Norway).

Transport taxes made the second most important contribution to total revenues from environmental taxes, some 21.8 % of the EU-27 total in 2009. However, their relative significance was considerably higher in Malta, Cyprus, Greece and Ireland (as well as Norway), ranging between 48.4 % and 38.0 % of the environmental tax total.

Pollution/resource taxes represented a relatively small share (4.2 %) of total environmental tax revenues in the EU-27 in 2009; this pattern was repeated across most of the EU Member States, as only Estonia, the Netherlands and Denmark (as well as Iceland) reported that in excess of 10 % of their total environmental tax revenue was raised from taxes on pollution and resources; some countries did not raise any revenue from this type of tax (Greece, Luxembourg and Cyprus).

Environmental taxes by economic activity

In 2008, across those EU Member States for which data are available (see Figure 11.8.5), households paid an average of just over half (50.9 %) of the energy tax revenues collected by governments, while 46.9 % of the total was paid by enterprises and 1.4 % by non-residents; Luxembourg stood out, insofar as 44.6 % of its energy tax revenues were paid by non-residents.

Among those economic activities and Member States covered in Figure 11.8.5, the average contribution to total energy revenues from mining, manufacturing, electricity supply and construction was somewhat higher (16.1 % of the total) than that from the transport, storage and communication sector (15.5 %) or the other services sector (13.0 %). Half of the Member States for which data are available reported that the biggest contribution to energy tax revenues among enterprises came from the transport, storage and communication sector. In Denmark, Sweden and the Netherlands, it was the other services sector which paid the highest share of energy taxes among the different economic activities considered in Figure 11.8.5, while mining, manufacturing, electricity supply and construction enterprises paid the highest share of energy taxes in the Czech Republic, Italy, Germany and Lithuania.

In 2008, on average 69.4 % of the transport tax revenues collected by governments in those EU Member States for which data are available (see Figure 11.8.6) were paid by households, 20.3 % by businesses (agriculture, fishing, mining, manufacturing, electricity supply and construction, and all services), 10.2 % were non-allocated, and 0.1 % were paid by non-residents. Households accounted for more than half of total transport tax revenues in most of the Member States for which data are available, although their share of the total fell to 48.8 % in Italy and only 0.2 % in the Czech Republic. Services (other than transport, storage and communication) were often the leading contributor to transport taxes among businesses.

An analysis of pollution taxes shows that in 2008 most of the pollution tax revenues collected by governments were paid by businesses. On average for those Member States for which data are available (see Figure 11.8.7), businesses contributed 73.0 % of the total revenue stream. Households contributed almost one quarter (23.1 %) of the total revenues from pollution taxes, while the remaining 3.9 % was not allocated. Among businesses, the highest share of pollution taxes was paid by services (other than transport, storage and communication) and by mining, manufacturing, electricity supply and construction; these two activity groupings contributed 32.0 % and 31.5 % of the total revenue.

Among the eight Member States for which data are available for resource taxes by economic activity, by far the highest receipts were collected in Denmark – some 69.3 % of the total for the eight Member States (see Figure 11.8.8). Mining, manufacturing, electricity supply and construction enterprises paid the highest share of resource taxes in five of the eight Member States for which data are available, accounting for all of the resource taxes collected in Belgium (2007), Sweden and the United Kingdom, and for upwards of 90 % of the resource taxes collected in Denmark and Lithuania in 2008. In the Netherlands and Austria the majority of resource taxes were paid by households (59.6 % and 56.1 % respectively), while in the Czech Republic resource taxes were collected in almost equal amounts from the transport, storage and communication sector, other services and households.

Data sources and availability

The European Commission's Directorate-General for Taxation and Customs Union, using Table 9 from the ESA 95 transmission programme, gathers data on environmental taxes for four categories of environmental taxes (energy, transport, pollution and resources). Eurostat validates and publishes these data.

Eurostat collects data on environmental taxes at a more detailed level, by economic activity; this data is also published. The annual collection of data concerning environmental taxes is currently based on a gentlemen's agreement. A Eurostat publication titled, 'Environmental taxes – a statistical guide' constitutes the methodological reference base for completing the questionnaire on environmental taxes.

Among the four main categories of environmental taxes, energy taxes include taxes on energy products used for both transport (for example, petrol and diesel) and stationary purposes (for example, fuel oil, natural gas, coal and electricity); in addition, carbon dioxide taxes are included under energy taxes rather than under pollution taxes. Transport taxes include taxes relating to the ownership and use of motor vehicles; these taxes may be one-off purchase taxes (for example, related to the engine size or the emissions of a particular vehicle) or recurrent taxes (such as an annual road tax). Pollution taxes include taxes for: emissions into the air (except for carbon dioxide taxes) and water; the management of waste; and noise. Taxes on resources cover taxes on the extraction of raw materials (with the exception of oil and gas). Pollution and resource taxes are generally quite small and so they are often grouped together for the purpose of analysis.

Data relating to environmental taxes provide information on the revenue stream from such taxes, as well as providing a relative measure of the importance of these taxes through the calculation of ratios relative to gross domestic product (GDP) or the total revenue from all taxes and social contributions. In the first case, the comparison helps to provide an understanding of the tax burden and identifies those activities which 'use up' the environment. In the second case, the comparison helps assess whether there is a potential shift towards 'green' taxes, in other words, shifting the tax burden from other tax bases (for example on labour income) to the most polluting behaviours.

Environmental tax revenue can also be allocated according to the different economic activities paying the tax(es). Eurostat collects data on environmental taxes using a breakdown by economic activity (using the NACE Rev. 1.1 classification supplemented by information for households, non-residents and a category not allocated).

Increasing revenues from environmental taxes should be interpreted with caution. The increases may be caused by the introduction of new taxes or an increase in tax rates, or alternatively may be linked to an increase in the tax base.

Satellite accounts are a set of accounts that can be used to supplement national accounts; they exist/are in the process of being developed in a range of areas (for example, health accounts, tourism accounts or environmental accounts). An important feature of satellite accounts is that the basic concepts and classifications of the national accounts framework are retained (ESA 95, paragraph 1.20). Regulation (691/2011) on European environmental economic accounts was adopted on 6 July 2011; this will make the collection and delivery of data obligatory from 2013. Regulation 691/2011 provides a framework for the development of various types of environmental accounts (also referred to as modules). Environmentally related taxes by economic activity are one of the three modules included in the Regulation (Annex II). The statistics on environmentally related taxes by economic activity, as stipulated in the Regulation, will record and present data from the perspective of the entities paying the taxes in a way that is fully compatible with the data reported under ESA 95.

Context

The environment is affected by existing production and consumption patterns. To counter potential environmental problems in the coming years, some commentators argue that behavioural changes will be needed – some of which may involve substantial economic costs. Environmental policy in the EU is designed to assist the Member States to attain environmental and sustainable development goals. Policymakers use incentive-based tools for targeted outcomes with the intention that these will encourage low-cost environmental solutions, which correct for externalities and/or raise revenues for specific purposes.

Economic instruments for pollution control and natural resource management are thus an increasingly important part of environmental policy in the EU Member States. The range of instruments that are available includes, among others, environmental taxes, fees and charges, tradable permits, deposit-refund systems and subsidies. Environmental taxes have been increasingly used to influence behaviour, since these taxes generate revenue that can potentially be used to promote further environmental protection. Indeed, the EU has increasingly favoured these instruments because they provide a flexible and cost-effective means for reinforcing the polluter-pays principle and for reaching environmental policy objectives. The use of economic tools for the benefit of the environment has been promoted in the 6th Environment Action Programme (EAP), the renewed EU sustainable development strategy, and the Europe 2020 strategy.

Table 11.8.1: Total environmental tax revenue by type of tax, EU-27, 2009

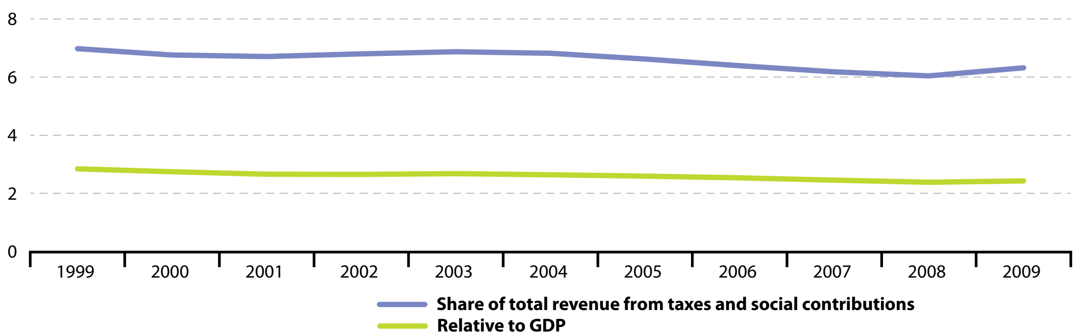
	(EUR million)	(% of total environmental taxes)	(% of GDP)	(% of total revenues from taxes and social contributions)
Total environmental taxes	286 603	100.0	2.43	6.32
Energy taxes	212 189	74.0	1.80	4.68
Pollution/resources taxes	11 915	4.2	0.10	0.26
Transport taxes	62 499	21.8	0.53	1.38

Source: Eurostat (online data code: env_ac_tax)

Figure 11.8.1: Total environmental tax revenue, EU-27, 1999-2009
(EUR 1 000 million)

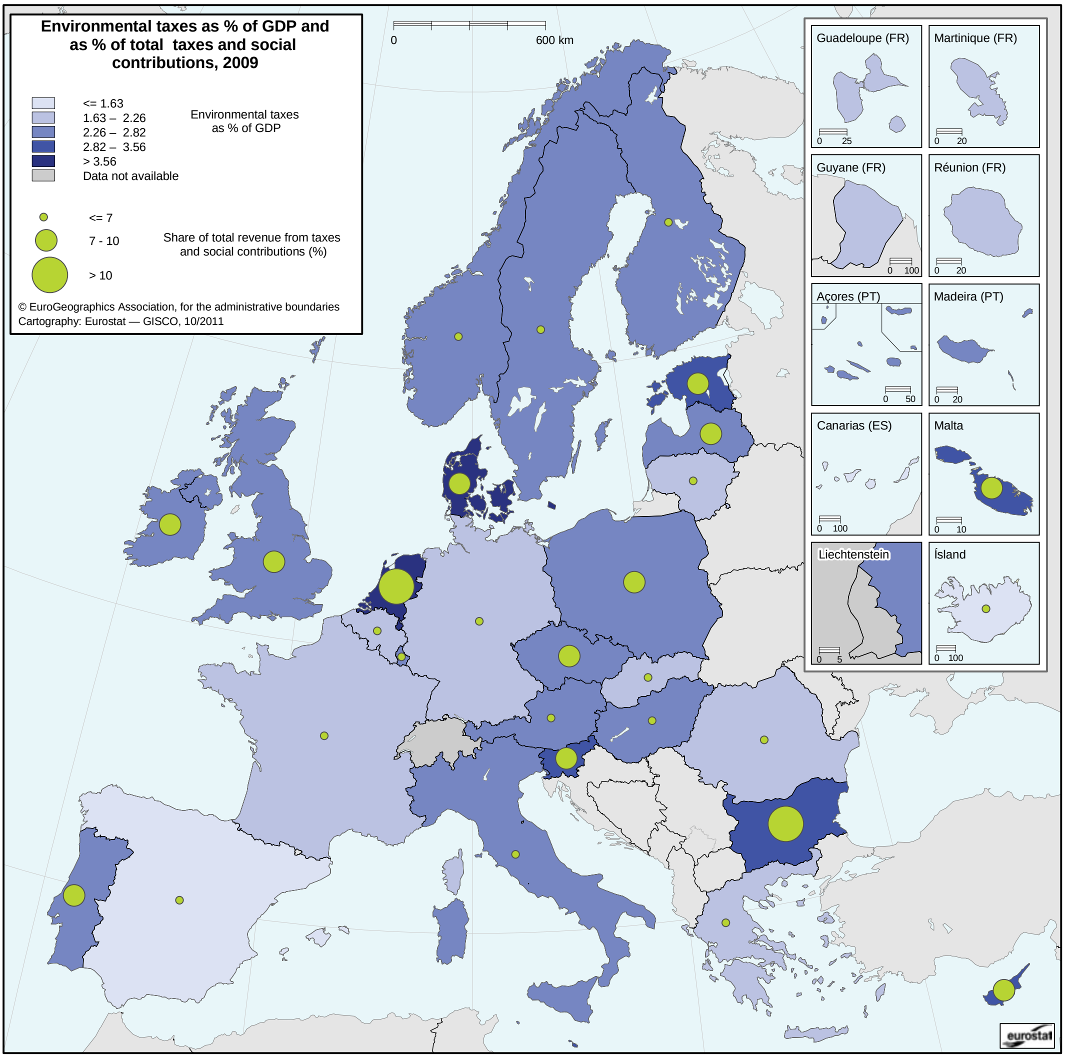
Source: Eurostat (online data code: env_ac_tax)

Figure 11.8.2: Total environmental tax revenue, EU-27, 1999-2009
(%)



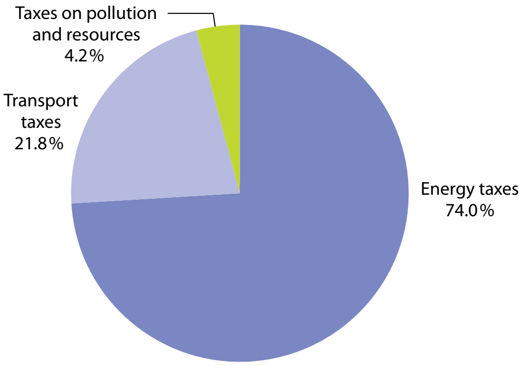
Source: Eurostat (online data code: env_ac_tax)

Map 11.8.1: Environmental taxes as % of GDP and as % of total taxes and social contributions, 2009



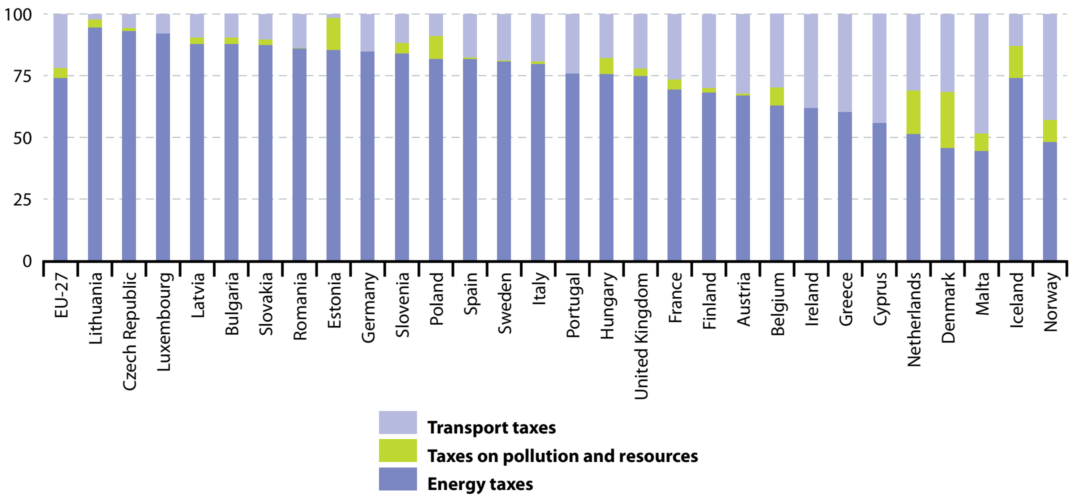
Source: Eurostat (online data code: env_ac_tax)

Figure 11.8.3: Environmental taxes by tax category, EU-27, 2009
(% of total)



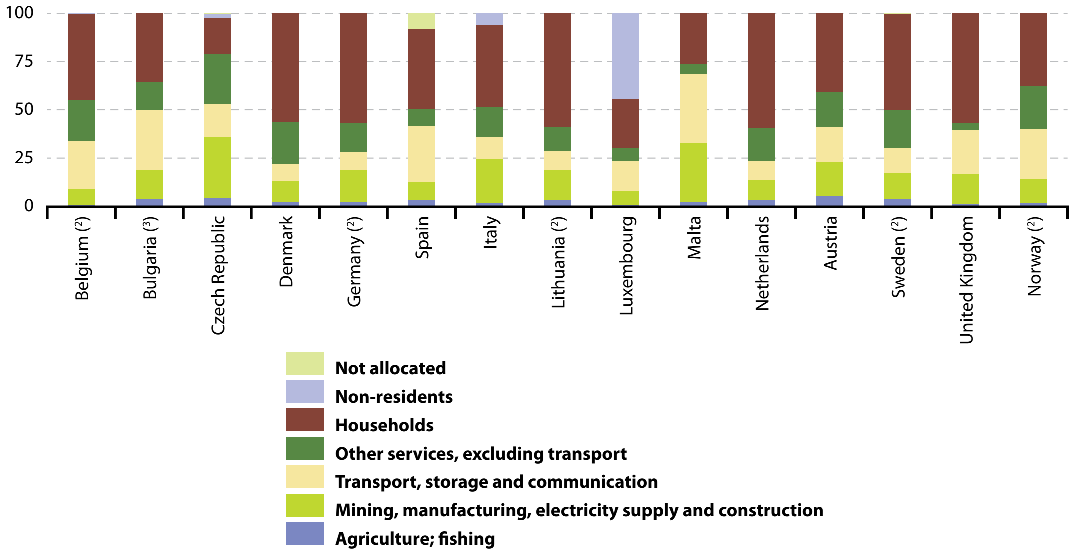
Source: Eurostat (online data code: env_ac_tax)

Figure 11.8.4: Environmental taxes by tax category, 2009
(% of total environmental taxes)



Source: Eurostat (online data code: env_ac_tax)

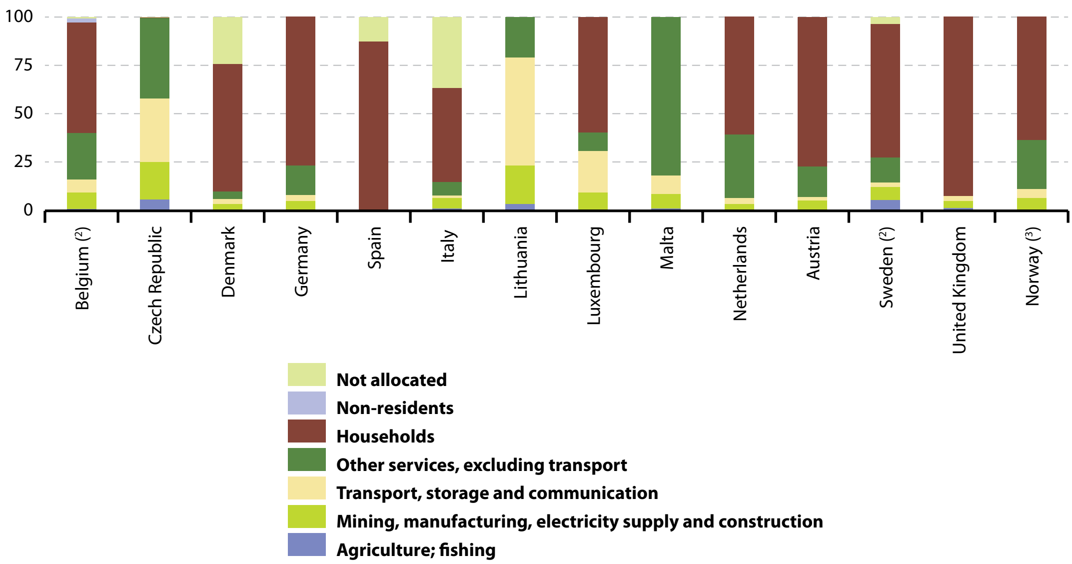
Figure 11.8.5: Energy taxes by economic activity, 2008 ([1])
(% of energy tax revenue) based on data in EUR million



([1]) No information available for those Member States that are not shown. ([2]) 2007. ([3]) 2005.

Source: Eurostat (online data code: env_ac_taxind)

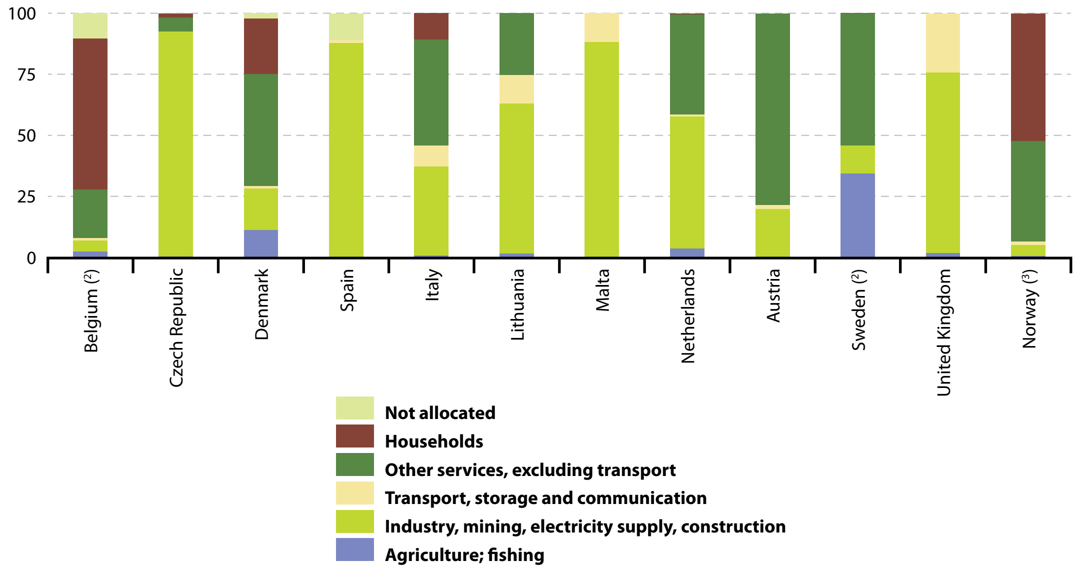
Figure 11.8.6: Transport taxes by economic activity, 2008 ([1])
(% of transport tax revenue) based on data in EUR million



([1]) No information available for those Member States that are not shown. ([2]) 2007. ([3]) 2006.

Source: Eurostat (online data code: env_ac_taxind)

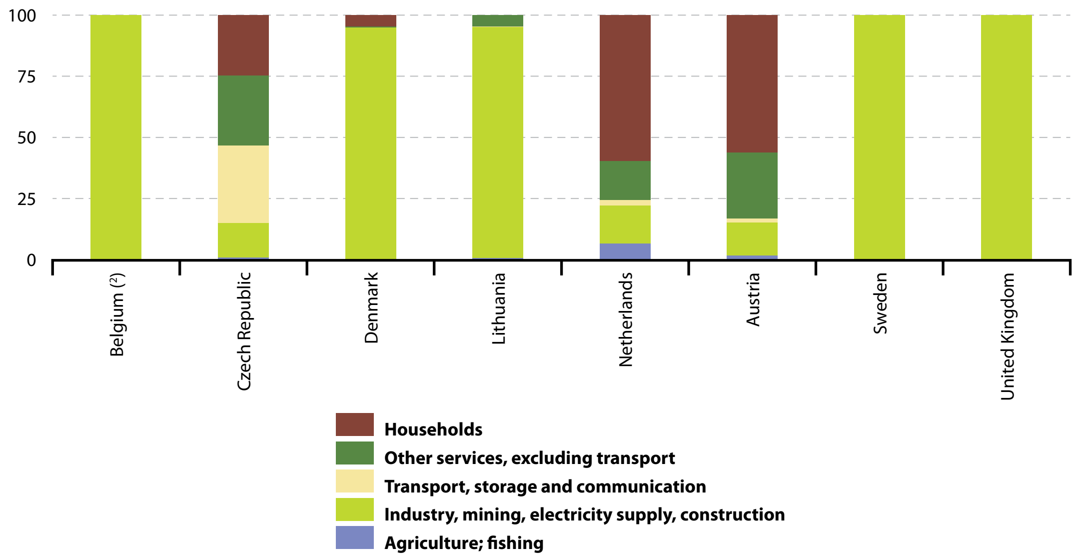
Figure 11.8.7: Pollution taxes by economic activity, 2008 (¹)
(% of pollution tax revenue) based on data in EUR million



(¹) No information available for those Member States that are not shown.
(²) 2007.
(³) 2006.

Source: Eurostat (online data code: env_ac_taxind)

Figure 11.8.8: Resource taxes by economic activity, 2008 (¹)
(% of resource tax revenue) based on data in EUR million



(¹) No information available for those Member States that are not shown.
(²) 2007.

Source: Eurostat (online data code: env_ac_taxind)

11.9 Biodiversity

Biodiversity – a contraction of biological diversity – encompasses the number, variety and variability of living organisms, including mankind. Preventing a loss of biodiversity is important for mankind, given that humans depend on the natural richness of the planet for the food, energy, raw materials, clean air and clean water that make life possible and drive economies and societies. As such, a reduction or loss of biodiversity may not only undermine the natural environment but also economic and social goals. The challenges associated with preserving biodiversity have made this topic an international issue. This subchapter presents some main indicators for biodiversity, such as the number of protected areas and bird populations, and examines the development of these indicators in the European Union (EU).

Main statistical findings

Habitats

Areas protected for the preservation of biodiversity are proposed by the Member States under the EU's Habitats Directive; they are indicated as a percentage of the total area of each country. About 14 % of the EU-27's territory was proposed for protection under the Habitats Directive as of 2010. Additional areas were proposed for protection under the Birds Directive. Since there is some overlap between the two types of protected areas, the joint area for both Directives was estimated to amount to approximately 18 % of the EU-27's terrestrial area in 2010. Figures for the Member States show that areas protected under the Habitats Directive range between 31 % of the total area of Slovenia and 30 % of that in Bulgaria to less than 10 % of the total area of France, the Netherlands, Denmark or the United Kingdom. In general, these protected areas adequately cover the biogeographical regions present in the Member States, with an EU-27 average of 89 % of sufficiently covered species and habitats in 2010; using this measure, only Cyprus reported less than 50 % sufficiency (see Figure 11.9.1).

Birds

Since 1990 there has been a general downward trend in the abundance of both common farmland and forest species of birds, as measured by common bird indices (see Figure 11.9.2). Part of the relatively steep decline (– 20 % between 1990 and 2009) in numbers of common farmland birds may be attributed to changes in land use and agricultural practices. There was a more rapid reduction in numbers of common forest birds between 1990 and 2000 across the EU (– 21 % between 1990 and 2000). However, recent years have seen a recovery in forest bird numbers, with the index rising from a relative low of 79 to reach 87 by 2009. The index of all common bird species has been relatively stable since 1995, some 10 % below its 1990 level, and stood at 90 in 2009.

Data sources and availability

Habitats

Annual data are available on areas protected under the Habitats Directive. The data are presented as the percentage of compliance with the obligation to protect habitats and species that are typical for the wider biogeographical regions of the EU. The indicator is based on the extent of the area proposed by countries for the protection of natural and semi-natural habitats, wild fauna and flora according to annexes I and II of the Habitats Directive. The index of sufficiency measures the extent to which sites of Community importance proposed by the Member States adequately cover the species and habitats listed in those annexes, in proportion to the share of the biogeographical region that falls within the territory of the country.

Birds

Birds are considered good proxies for measuring the diversity and integrity of ecosystems as they tend to be near the top of the food chain, have large ranges and the ability to move elsewhere when their environment becomes unsuitable; they are therefore responsive to changes in their habitats and ecosystems. The bird indicators presented in this subchapter measure trends of bird populations.

The indicators are designed to capture the overall, average changes in population levels of common birds to reflect the health and functioning of the ecosystems they inhabit. The population index of common birds is an aggregated index (with base year 1990 or the first year the Member State entered the scheme) of population trend estimates for a selected group of common bird species. Indices are calculated for each species independently and are then combined to create a multi-species EU indicator by averaging the indices with an equal weight using a geometric average. Indices rather than bird abundance are averaged in order to give each species an equal weight in the resulting indicator. The EU index is based on trend data from 20 Member States (Greece, Cyprus, Lithuania, Luxembourg, Malta, Romania and Slovenia, not available), derived from annually operated national breeding bird surveys collated by the Pan-European Common Bird Monitoring Scheme (PECBMS); these data are considered as a good proxy for the whole of the EU-27.

Three different indices are presented:

- common farmland birds (36 species);
- common forest birds (33 species);
- all common birds (145 species).

For the first two categories, the bird species have a high dependence on agricultural or on forest habitats in the nesting season and for feeding. Both groups comprise both year-round residents and migratory species. The aggregated index comprises farmland and forest species together with other common species that are generalists, meaning that they occur in many different habitats or are particularly adapted to life in cities.

Context

People depend on natural resources and the variety of species found on the planet for tangible goods that make life possible and drive economic development, such as food, energy, wood, raw materials, clean air and water. Many aspects of the natural environment are public goods, in other words they have no market value or price. As such, the loss of biodiversity can often go undetected by economic systems. However, the natural environment also provides a range of intangibles, such as the aesthetic pleasure derived from viewing landscapes and wildlife, or recreational opportunities. In order to protect this legacy for future generations, the EU seeks to promote policies in a range of areas to ensure that biodiversity is protected through the sustainable development of, among others, agriculture, rural and urban landscapes, energy provision and transport.

Biodiversity strategy is based on the implementation of two landmark Directives, the Habitats Directive (92/43/EEC) of 21 May 1992 and the Birds Directive (79/409/EEC) of 2 April 1979. Implementation of these Directives has involved the establishment of a coherent European ecological network of sites under the title Natura 2000. The EU wants to expand Natura 2000, which currently counts around 26 000 sites and a land area of more than 750 000 km² (and an area of almost 930 000 km² including marine sites) where plant and animal species and their habitats are protected. Establishing the Natura 2000 network may be seen as the first pillar of action relating to the conservation of natural habitats. However, EU legislation also foresees measures to establish a second pillar through strict protection regimes for certain animal species (for example, the Arctic fox and the Iberian lynx, both of which are under serious threat of extinction).

In 1998, the EU adopted a biodiversity strategy. Four action plans covering the conservation of natural resources, agriculture, fisheries, and economic and development cooperation were subsequently agreed as part of this strategy in 2001. The European Commission released a Communication ((2006) 216) on 'halting the loss of biodiversity by 2010 – and beyond'; this underlined the importance of biodiversity protection as a pre-requisite for sustainable development and set out an action plan which addressed the challenge of integrating biodiversity concerns into other policy areas.

In May 2011 the European Commission adopted the Communication 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020'

(COM(2011) 244); this aims to halt the loss of biodiversity and ecosystem services in the EU by 2020. There are six main targets and 20 actions to help reach this goal. Biodiversity loss is seen as an enormous challenge in the EU, with around one in four species currently threatened with extinction and 88 % of fish stocks over-exploited or significantly depleted. The six targets cover:

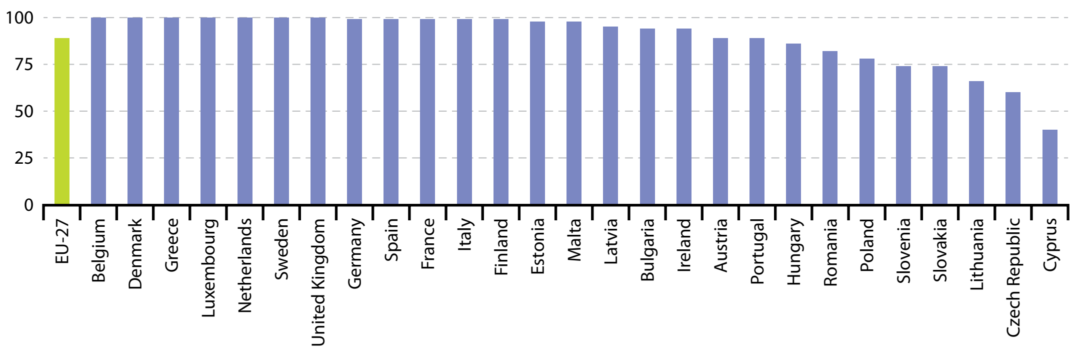
- full implementation of EU nature legislation to protect biodiversity;
- better protection for ecosystems and more use of green infrastructure;
- more sustainable agriculture and forestry;
- better management of fish stocks;
- tighter controls on invasive alien species;
- a bigger EU contribution to averting global biodiversity loss.

The strategy is in line with two commitments made in March 2010:

- the 2020 headline target – halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them insofar as feasible, while stepping up the EU contribution to averting global biodiversity loss;
- the 2050 vision – which foresees that by 2050, the EU's biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value, and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.

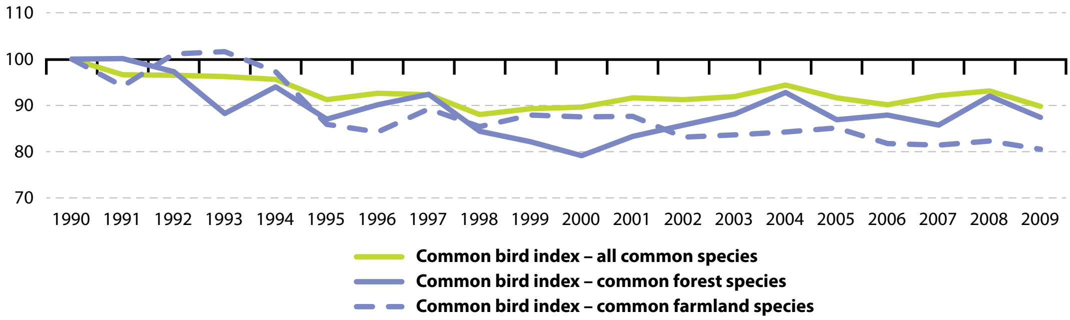
The strategy is also in line with global commitments made in Nagoya in October 2010, in the context of the Convention on Biological Diversity, where world leaders adopted a package of measures to address global biodiversity loss over the coming decade.

Figure 11.9.1: Protected areas for biodiversity – sufficiency of sites, 2010
(%)



Source: EEA/European topic centre on biodiversity, Eurostat (online data code: env_bio1)

Figure 11.9.2: Common bird indices, EU, 1990-2009 (1)
(aggregated index of population estimates of selected groups of breeding bird species, 1990 = 100)



(1) Estimates; 'all common species' covers information on 145 different bird species; 'common farmland species' covers 36 bird species; 'common forest species' covers 33 bird species.

Source: EBCC/RSPB/BirdLife/Statistics Netherlands, Eurostat (online data code: env_bio2)