Environment

11

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 implementation and monitoring of the European Union's (EU's) environmental legislation, including its sixth environment action programme (EAP). The action programme, laid down by the European Parliament and Council of Ministers 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.

Climate change: the action programme foresees an 8 % cut in greenhouse gas emissions in the period 2008-2012 compared with 1990 levels. Furthermore, the EU adopted a climate action and renewable energy package in December 2008, obliging it to cut emissions to at least 20 % below 1990 levels by 2020.

Nature and biodiversity: although the original goal of halting biodiversity loss by 2010 was not reached, a new target was adopted in March 2010: to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and to restore them insofar as feasible – while stepping up the EU's contribution to averting global biodiversity loss. Policies include completion of the Natura 2000 network, which is the largest network of protected areas in the world. Other actions concern developing new sectoral biodiversity action plans; paying greater attention to protecting landscapes, the marine environment and soils; and establishing measures to prevent industrial and mining accidents.

Environment and health: the EU strives to engender closer cooperation between health, environment and research areas. Its policies in this domain include a complete overhaul of the EU's risk-management system for chemicals, developing a strategy for reducing risks from pesticides, protection of water quality in the EU, noise abatement, and a thematic strategy for air quality.

Sustainable use of natural resources and the management of waste: the EU's policies in this area include increasing resource efficiency and decoupling resource use from economic growth, increasing recycling and waste prevention with the aid of an integrated product policy and measures targeting specific waste streams, such as hazardous waste, sludges and biodegradable waste.

In order to implement the sixth environment action programme, 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 action programme 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 and 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. 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. 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, increase the use of renewable energy sources, modernise the transport sector, and promote energy efficiency. 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.

11.1 Air emissions accounts

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

Air emissions accounts are a statistical information system that combines air emissions data and economic data from national accounts. The main purpose of these accounts is to provide data for integrated environmental-economic analyses and modelling, by supplementing traditional economic data with environmental indicators.

Main statistical findings

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. When considering the six economic activities presented in Figure 11.1, there were only modest changes in the economic weight of each activity in EU-25 gross monetary output during the period from 1996 to 2006.

The largest activity was the grouping of construction and other services (both private and public) which comprises construction, retail and wholesale trade, real estate, renting, financial services, hotels and restaurants, as well as public administration, education, health and social work, that accounted for 56.8 % of the EU-25's gross monetary output in 2006. Manufacturing activities accounted for 30.2 % of output in 2006, followed by transport, storage and communication with 8.1 %. The shares of electricity, gas and water supply (2.9 %) and the primary activities of agriculture, hunting, forestry and fisheries (1.5 %) and mining and quarrying (0.5 %) were relatively small.

When looking at the air emissions that stem from economic activity across the EU economy, the image has a very different structure to that of economic output – as shown in Figures 11.2 to 11.4. This was particularly the case for the construction and other services grouping, as these activities were responsible for 11.3 % of EU-27 direct greenhouse gas (GHG) emissions, for 4.9 % of acidifying emissions, and for 12.8 % of ground ozone precursors in 2006. In the same year, manufacturing industries accounted for 25.9 % of GHG emissions, 15.5 % of acidifying substances and 27.0 % of ground ozone precursors. These shares for construction and other services and for manufacturing represented a reduction when compared with data for 1996; the biggest reduction being recorded for ground ozone precursors from construction and other services which fell by 2.8 percentage points from 1996 to 2006.

The main emitting activities in the EU-27 in 2006 were agriculture, hunting, forestry and fishing, electricity, gas and water supply, and transport services (which are reported together with storage and communications but exclude the use of private cars, reported under households). These three activity groupings together contributed the majority of the EU-27's greenhouse gas emissions (59.9 %), acidifying emissions (78.7 %), and ground ozone precursors (58.4 %), while their share of EU-25 monetary output was 12.5 %. Note that the EU increasingly imports metals and industrial minerals, whose production potentially generates pressures on the environment in non-member countries (see Subchapter 11.4 on material flow accounts).

There was a rapid increase in the relative importance of emissions from transport, storage and communication activities between 1996 and 2006, its share of acidifying emissions rising by 8.2 percentage points (mainly due to increased sulphur dioxide and nitrous oxide emissions resulting from the combustion of fossil fuels in vehicle engines, in particular from road freight transport). The share of transport, storage and communication activities in EU-27 ground ozone precursors rose by 4.7 points between 1996 and 2006, and its share of greenhouse gases rose by 3.2 points (note that the figures presented do not include greenhouse gas emissions from private transport, principally passenger cars as these emissions are produced by households).

In contrast, the relative importance of emissions from manufacturing fell between 1996 and 2006 for each of the three types of emissions covered in Figures 11.2 to 11.4. Furthermore, the share of manufacturing in EU-25 output was higher than manufacturing's share of any of the three types of emissions covered – indicating that its relative contribution to emissions was lower than the average across all economic activities.

Among the economic activities covered, electricity, gas and water supply was the largest contributor of greenhouse gas emissions in the EU-27 in 2006 (35.1 %); these activities also had the highest greenhouse gas emissions intensity (as measured by the volume of carbon dioxide equivalent emissions per unit of monetary output). Indeed, the relatively small contribution of electricity, gas and water supply to economic output was in stark contrast to providing the biggest share of EU-27 greenhouse gas emissions.

Electricity, gas and water supply was also the largest contributor of acidifying emissions in the EU-27 in 1996 (37.2 %), mainly due to sulphur dioxide emissions from fossil fuel combustion. It was followed by agriculture, hunting, forestry and fishing (27.3 %), mainly due to ammonia emissions. The picture was quite different in 2006, as agriculture, hunting, forestry and fishing contributed the largest share (32.3 %), principally due to emissions of ammonia. The share of electricity, gas and water supply fell to 26.4 %, followed by transport, storage and communication services (20.0 %); this reduction may reflect a change in the energy mix and a switch from traditional fossil fuels to cleaner fuels and technologies.

More than one quarter (28.6 %) of the EU-27's ground level ozone precursors came from transport, storage and communication services in 2006 (mainly non-methane volatile organic compounds and nitrous oxides).

Data sources and availability

The compilation of air emissions accounts is based on information that is already available; it does not require any new statistical surveys. The two main sources of data 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 emissions inventories is published and distributed by the European Environment Agency (EEA). In order to produce air emissions accounts, this 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).

The activity headings 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.

The scope for air emissions accounts encompasses all nationally registered businesses (including those operating 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.

Emissions of individual greenhouse gases and air pollutants may be aggregated to provide information on 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 these units allows the relative effect of different gases to be accounted for in a single, aggregated value – for example, a single kilogram of methane has 21 times the global warming effect of a kilogram of carbon dioxide.

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 information is available for perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) or sulphur hexafluoride, as most EU Member States are unable to provide a breakdown for these gases by economic activity (NACE).

Eurostat is working on the establishment of a legal base for the compilation of environmental accounts and the European Commission has put forward a proposal for a Regulation on European environmental economic accounts COM(2010) 132. The proposal provides a framework for the development of various types of accounts, initially based on three modules with a view of adding other modules as they reach methodological maturity. Air emissions accounts are one of the three modules, alongside modules for material flow accounts (see Subchapter 11.4) and environmentally related taxes by economic activity (see Subchapter 11.7). It is expected that this proposed legal base will 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.

Context

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 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. 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.

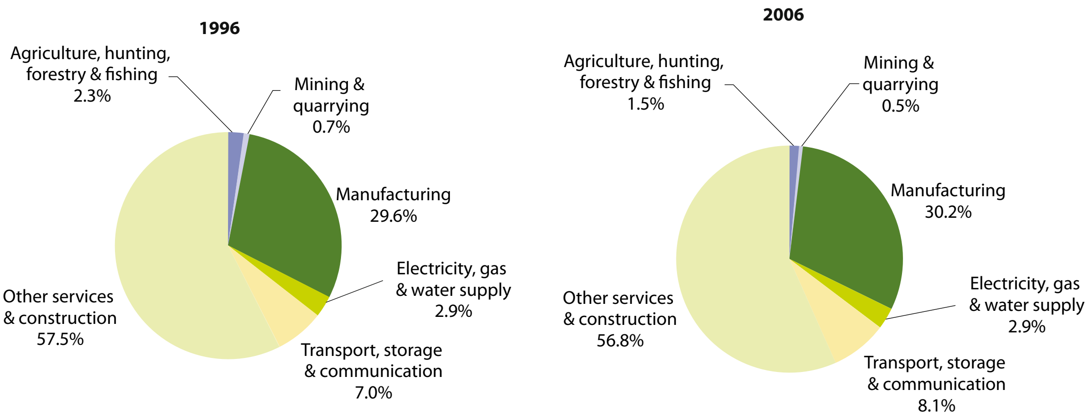
In order to have such a holistic view of the various aspects of sustainable development, the already existing frameworks of measuring the economy – in other words, the system of national accounts – is supplemented by satellite systems representing environmental or social indicators. These satellite accounts 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. If carried out at an unsustainable rate, there will, in the long-run, be a detrimental effect not only on the environment but also on the economy – as the fundamental resources for production and consumption activities would be irreversibly depleted.

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.

Table 11.1: Differences between inventories and accounts

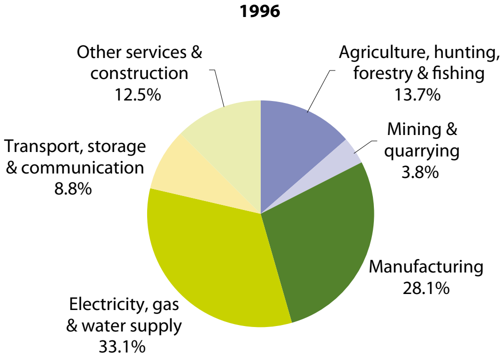
	National emissions inventories (territory principle)	Air emissions accounts (residence principle)
Scope of national emissions reported	Direct emissions within the geographical national territory and: - emissions from international bunkers allocated to countries where the fuel is sold and not to the nationality 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)

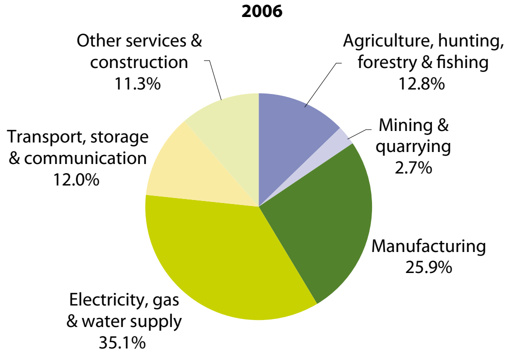
Figure 11.1: Gross monetary output, analysis by activity, EU-25
(% of total, based on EUR million in constant prices from 2000)



Source: Eurostat (EUKLEMS, http://www.euklems.net/data/09I/eu25_output_09I.xls)

Figure 11.2: Greenhouse gas emissions, analysis by activity (excluding households), EU-27 (1)
(% of total, based on CO_2 equivalents of CO_2, CH_4 and N_2O)

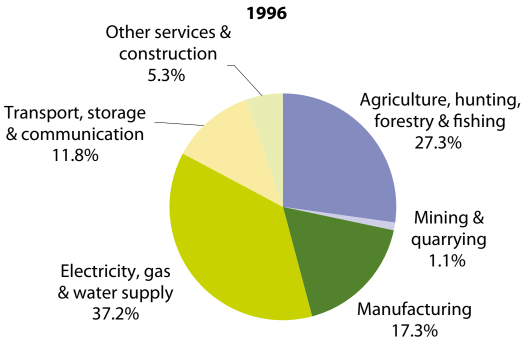


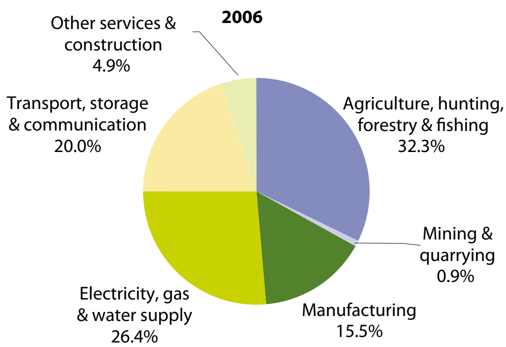


(1) Estimates.

Source: Eurostat (env_ac_ainacehh)

Figure 11.3: Emissions of acidifying substances, analysis by activity (excluding households), EU-27 (1)
(% of total, based on acid equivalents of SO_x, NH_3 and NO_x)

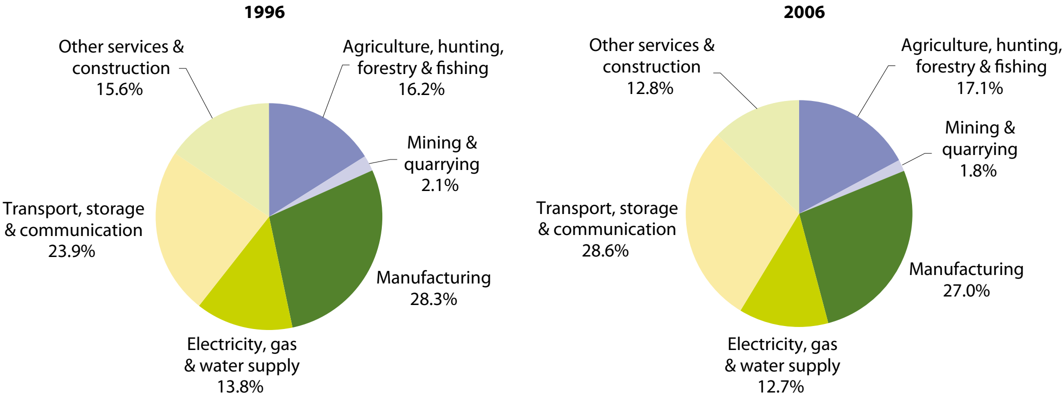




(1) Estimates.

Source: Eurostat (env_ac_ainacehh)

Figure 11.4: Emissions of ground level ozone precursors, analysis by activity (excluding households), EU-27 (1)
(% of total)



(1) Estimates; values are based on tropospheric ozone formation potential equivalents of NO_x, NMVOC, CO, CH_4.

Source: Eurostat (env_ac_ainacehh)

Table 11.2: 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	

11.2 Waste

Waste refers to materials for which the generator has no further use for its own purpose of production, transformation or consumption. The large majority of waste in the European Union (EU) is landfilled, incinerated or recycled. There have been considerable efforts in waste prevention and management in the EU in recent years. Unless properly regulated, the disposal of waste may have a serious environmental impact: landfills, for example, can take up land space and may cause air, water and soil pollution, while incineration might result in emissions of dangerous air pollutants.

Main statistical findings

In 2008, about 2 600 million tonnes of waste was generated in the EU-27 (see Table 11.3), of which some 98 million tonnes constituted hazardous waste. Relative to the size of the population, the waste generated in the EU-27 averaged 5 300 kg per inhabitant (see Figure 11.3).

EU-27 waste generation was 240 million tonnes lower in 2008 than it had been in 2006. However, this decrease may be linked more to the application of the statistical classification on waste rather than any real difference in the amount of waste generated. For example, the substantial decrease in agricultural waste may well have resulted from manure no longer being considered as a waste stream (if used for soil improvement in agriculture).

Waste generated by households

Households in the EU-27 generated an average of 444 kg of waste per inhabitant in 2008. The quantity of household waste generated ranged between 300 kg and 500 kg per inhabitant in most of the EU Member States in 2008, with Poland (180 kg per inhabitant) and Latvia notably below this range, and the Netherlands (578 kg per inhabitant), Luxembourg, Cyprus, Italy, Spain and the United Kingdom above (see Figure 11.4).

Waste generated by businesses

In 2008, more than half (54.6 %) of the waste generated in the EU-27 by businesses could be attributed to industrial activities(manufacturing, mining and quarrying), while a little over one third (35.8 %) was from the construction sector. Mining and quarrying produced more than half of the waste generated by industry, although it should be noted that this activity, and as a consequence its waste, is unevenly spread across the EU. Services accounted for 6.7 % of the waste generated by business within the EU-27 in 2008, while the share for agriculture was 1.9 % (see Figure 11.5).

Lithuania reported a substantial proportion of its business waste from agriculture (23.5 %), whereas Bulgaria and Sweden reported most of their business waste from industry (98.6 % and 92.9 % respectively). Luxembourg and Malta reported high shares from construction (88.9 % and 82.6 %) and Portugal reported 34.1 % of its business waste from services. These differences between countries in the structure of the source of waste may be partly explained by differences in the structure of their economies.

Hazardous waste

Some 3.7 % of the waste generated in the EU-27 in 2008 was hazardous – meaning it was harmful for health or the environment (see Figure 11.6). This share ranged from less than 1 % in Greece and Romania to 9.2 % in Portugal and 9.9 % in Belgium; the very high share of hazardous waste in Estonia (38.5 %) is due to energy production from shale oil.

Waste treatment

Figure 11.7 summarises the quantity of waste treated by the three main treatment types: disposal, incineration (including energy recovery) and recovery (including all treatment of biodegradable matter, for example composting). In the EU-27, 5.4 % of waste was incinerated in 2008, 45.7 % was recovered and 48.9 % was disposed. Bulgaria and Malta disposed of more than 96 % of their waste, much of which came from mining and quarrying or construction (including demolition) activities; Denmark and Belgium incinerated a high percentage of their waste, as did Norway.

Composition of waste by treatment

The characteristics of different sorts of waste determine their suitability for various types of treatment. Table 11.4 shows the composition of EU-27 waste by treatment type for 2008. Both recovery and disposal were dominated by mineral waste (for example glass, or waste from construction). The largest category of incinerated waste was household and similar waste, but in general the composition of waste for incineration was more diverse than for the other treatment types. About 8 % of the waste treated by incineration was hazardous, whereas for recovery and disposal this share was roughly 3 %.

Treatment of municipal waste

A time series for municipal waste is available from 1999 to 2009. The quantity of municipal waste generated per inhabitant in the EU-27 grew by 0.4 % overall between 1999 and 2009 to reach 513 kg. There was a significant change in the way municipal waste was treated during this period. Landfilling was the most common option at the start of the period under consideration, with a 59 % share of municipal waste treatment within the EU-27 in 1999; in 2004 the share of landfilling fell below 50 %, and by 2009 it had fallen still further to 38 %. Some 16 % of municipal waste was incinerated in 1999 and this share rose to 20 % by 2009, while the share of waste that was recycled or composted rose from 25 % to 42 % during the same period. Note that the amount of municipal waste indicated as not allocated in Figure 11.8 is the quantity that was generated but not reported in any treatment operation. This is due to incomplete coverage of the population by municipal waste collection schemes in some countries, but also results from weight losses in (pre-)treatment operations.

Data sources and availability

Reliable statistics on the production and management of waste from businesses and private households are used to monitor the implementation of waste policy – in particular, compliance with the principles of recovery and safe disposal. In 2002, Regulation (EC) 2150/2002 on waste statistics was adopted, creating a framework for harmonised Community statistics on waste. Member States are required to provide data on the generation, recovery and disposal of waste every two years; the first reference period for the data collection exercise was 2004. As such, the Regulation on waste statistics has replaced a voluntary Eurostat/OECD joint questionnaire as the main source of waste data for the EU.

Care should be taken when comparing waste levels between Member States. In some countries, households are considered as sources of discarded vehicles, or sources of mineral waste from construction activities, or as a source of sewage sludge; in other countries, specialised services take care of these waste streams. Waste is attributed to the household or business that hands over the waste to the waste collection system. Differences in household waste levels may be partly explained by the problems some countries face to distinguish between waste generated by households and municipal waste.

The implementation of the Regulation replaced the concept of municipal waste with the category of waste generated by households. However, data on municipal waste is still collected annually as part of the structural indicators database. Municipal waste is defined as waste collected by or on behalf of municipalities and includes waste produced by households; it may also include similar waste from offices, small businesses and so on, depending on the arrangements in the municipality. For areas not covered by a municipal waste scheme, estimates have been made as to the amount of waste generated. The treatment of municipal waste can be classified into its principal categories:

- landfill, which is defined as the depositing of waste into or onto land, including specially engineered landfills, and temporary storage of over one year on permanent sites;
- incineration, which refers to the thermal treatment of waste in a specifically designed plant;
- recycling, which refers to any reprocessing of material in a production process that diverts it from the waste stream, except reuse as fuel;
- composting, which is defined as a biological process that submits biodegradable waste to anaerobic or aerobic decomposition, and that results in a product that is recovered.

Context

The EU's sustainable development strategy and its sixth environment action programme (EAP)identify waste prevention and management as one of four top priorities. The objective of these policies 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. EU policy promotes the incineration of waste that cannot be recycled or reused, with landfills only used as a last resort. Both of these latter two methods of waste treatment often require close monitoring because of their potential for causing environmental damage.

The European Commission has defined several specific waste streams for priority attention, the aim being to reduce their overall environmental impact. These include packaging waste, end-of-life vehicles, batteries, and electrical and electronic waste. EU Directives require Member States to legislate for waste collection, reuse, recycling and disposal of these waste streams.

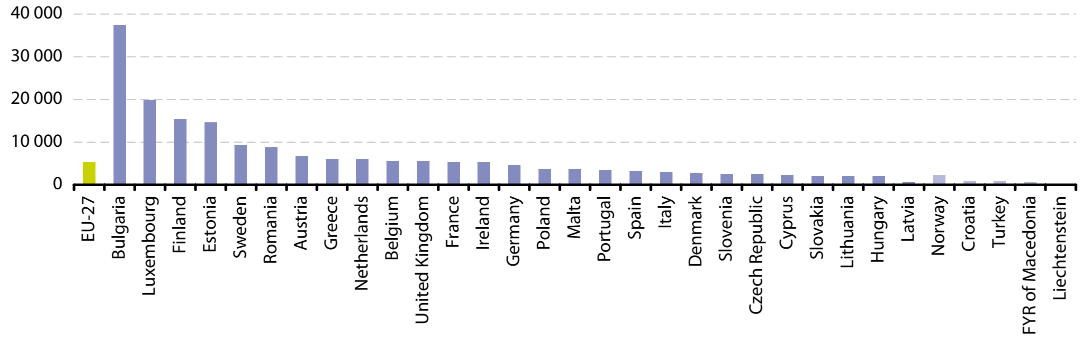
Table 11.3: Generation of waste, total arising and by selected activities
(1 000 tonnes)

	Total waste from economic activities and households		Manufacturing		Mining & quarrying		Construction		Services (1)	
	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008
EU-27	2 864 450	2 626 450	360 130	342 700	740 670	727 050	969 730	870 420	155 800	137 700
Belgium	59 352	59 542	15 308	10 090	*159*	503	*13 090*	26 362	*7 039*	*4 402*
Bulgaria	242 489	286 093	4 316	3 447	225 338	267 559	1 023	1 829	1 473	1 462
Czech Republic	24 746	25 420	5 932	5 293	472	167	8 380	10 651	1 025	881
Denmark	14 703	15 155	1 643	1 454	2	2	5 802	5 674	1 486	1 680
Germany	363 786	372 796	31 705	52 322	47 222	28 288	196 536	197 207	15 107	10 067
Estonia	18 933	19 584	3 981	3 772	5 961	7 198	717	1 099	*1 601*	706
Ireland	*29 599*	*23 637*	4 067	4 026	*4 766*	*2 061*	16 599	*0*	1 327	*0*
Greece	51 325	68 644	5 285	5 703	14 888	*38 152*	6 829	*6 828*	1 518	*1 796*
Spain	160 947	149 254	22 427	19 369	26 015	25 716	47 323	44 926	15 376	12 742
France	445 865	345 002	22 973	21 640	1 040	1 195	358 878	252 980	*24 158*	24 083
Italy	155 025	*179 034*	39 997	43 086	1 005	*1 263*	52 316	*69 732*	5 534	*5 550*
Cyprus	1 249	1 843	174	138	28	505	298	431	247	191
Latvia	1 859	1 495	570	501	0	3	19	12	239	166
Lithuania	7 665	6 835	2 948	2 758	6	3	349	412	586	625
Luxembourg	9 586	9 592	604	673	56	10	6 775	8 282	243	184
Hungary	*22 287*	*20 385*	5 528	4 789	*27*	*578*	*3 045*	*5 240*	*2 445*	*1 232*
Malta	2 861	*1 499*	2	13	0	0	2 493	1 099	195	*210*
Netherlands	93 808	99 591	15 562	15 824	213	270	56 610	59 477	5 349	5 784
Austria	54 287	56 309	11 470	13 077	1 043	678	31 322	31 390	3 458	3 396
Poland	170 230	140 340	61 131	56 746	38 671	33 666	14 141	6 930	3 512	4 977
Portugal	*34 953*	36 480	10 929	9 001	*3 563*	1 891	*3 607*	8 085	*10 353*	10 344
Romania	344 425	189 323	9 161	11 064	199 127	140 677	34	330	5 593	4 139
Slovenia	6 036	5 038	2 385	1 735	377	55	995	1 376	429	547
Slovakia	14 501	11 472	5 527	4 469	332	151	916	1 302	3 236	829
Finland	72 205	81 793	17 977	16 948	21 501	31 796	23 146	24 455	1 668	799
Sweden	115 583	86 169	30 363	11 927	62 084	58 702	8 943	3 310	1 517	1 320
United Kingdom	346 144	334 127	28 161	22 837	86 779	85 963	109 546	100 999	41 088	39 584
Liechtenstein	:	348	:	33	:	11	:	0	:	0
Norway	9 051	10 427	3 519	3 689	136	113	1 248	1 498	1 472	1 675
Croatia	:	4 172	:	1 727	:	34	:	129	:	87
FYR of Macedonia	:	1 362	:	1 362	:	0	:	0	:	0
Turkey	46 092	64 770	0	10 741	:	:	:	:	:	:

(1) Except wholesaling of waste and scrap.

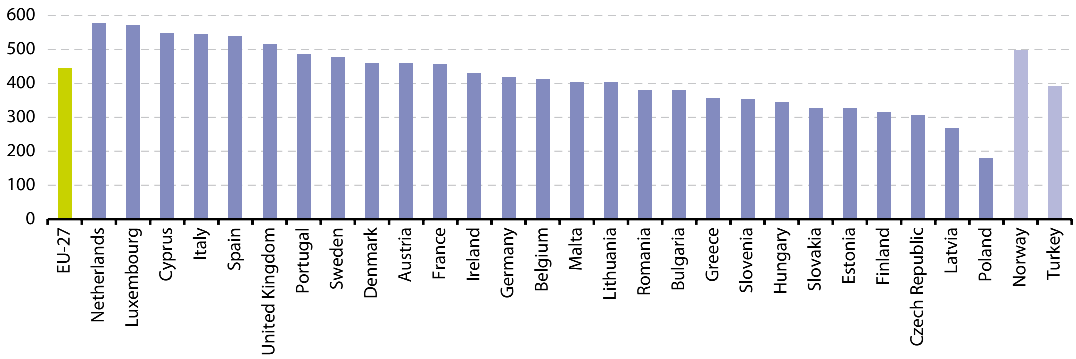
Source: Eurostat (env_wasgen)

Figure 11.5: Waste generated, 2008
(kg per inhabitant)



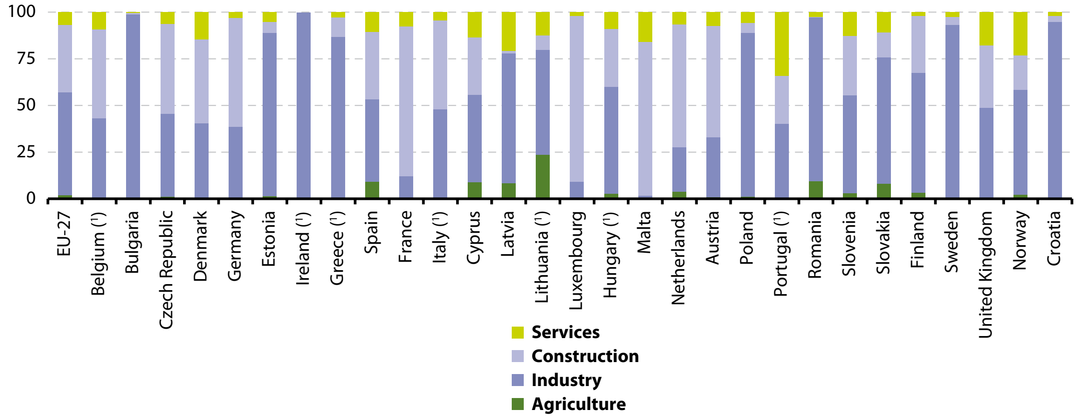
Source: Eurostat (env_wasgen and tps00001)

Figure 11.6: Waste generated by households, 2008
(kg per inhabitant)



Source: Eurostat (env_wasgen and tps00001)

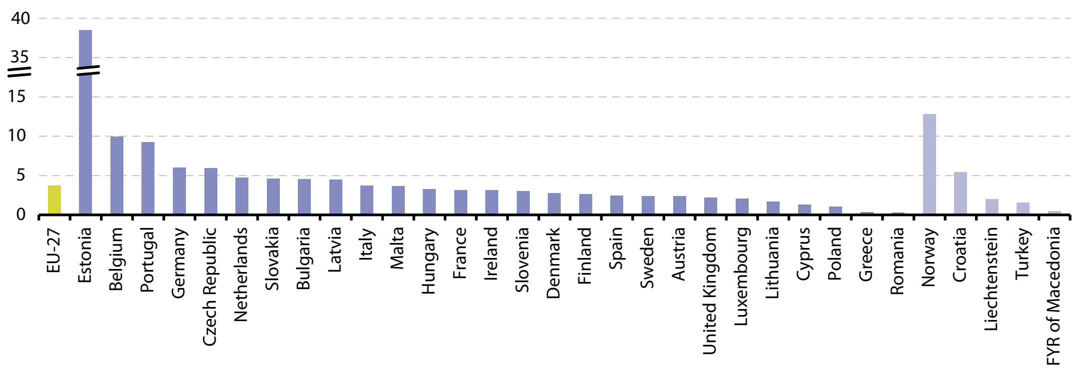
Figure 11.7: Waste generated by activity, 2008
(% of total)



(¹) Including estimates or provisional data.

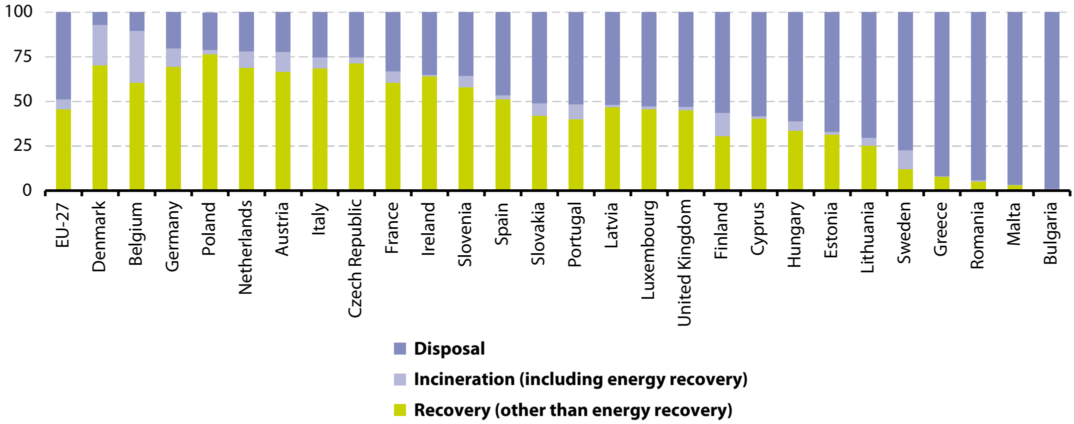
Source: Eurostat (env_wasgen)

Figure 11.8: Hazardous waste generated, 2008
(% of total waste generated)



Source: Eurostat (env_wasgen)

Figure 11.9: Types of waste treatment, 2008
(% of total waste treated)



Source: Eurostat (env_wastrt)

Table 11.4: Composition of waste by treatment type, EU-27, 2008

	(million tonnes)	(% of treatment type)
Recovery (other than energy recovery)	1 092.4	-
Mineral wastes	764.7	70
Metallic wastes	76.5	7
Animal and vegetal wastes	65.5	6
Paper and cardboard wastes	43.7	4
Incineration (including energy recovery)	129.1	-
Household and similar wastes	50.4	39
Sorting residues	12.9	10
Chemical wastes	9.8	8
Mixed and undifferentiated materials	3.3	3
Disposal	1 168.9	-
Mineral wastes	970.2	83
Household and similar wastes	97.7	8
Common sludges	39.6	3
Sorting residues	27.4	2

Source: Eurostat (env_wastrt)

Table 11.5: Waste treatment (non-hazardous), recovery other than energy recovery, 2008
(1 000 tonnes)

	Metallic waste	Glass waste	Paper and cardboard waste	Rubber waste	Plastic waste	Wood waste	Textile waste
EU-27	73 980	12 680	38 260	1 480	7 150	24 970	1 210
Belgium	2 673	377	574	13	99	565	11
Bulgaria	1 085	66	196	50	22	19	1
Czech Republic	1 406	38	246	36	108	113	15
Denmark	781	107	782	51	73	891	0
Germany	9 612	2 855	5 908	234	1 387	2 642	99
Estonia	272	11	35	1	7	319	0
Ireland	10	21	6	19	29	159	3
Greece	2 386	24	440	35	30	88	2
Spain	4 082	1 184	5 060	286	1 709	1 737	52
France	9 143	1 902	5 659	179	183	4 583	370
Italy	11 159	2 009	4 450	134	1 357	1 790	233
Cyprus	17	5	23	0	7	2	0
Latvia	15	0	19	0	13	0	0
Lithuania	32	36	146	12	36	60	1
Luxembourg	3 086	31	18	0	35	69	0
Hungary	940	42	354	18	58	135	1
Malta	1	0	3	2	1	0	0
Netherlands	2 576	672	2 268	118	321	1 422	86
Austria	943	273	1 401	30	67	3 565	35
Poland	6 751	609	1 326	108	1 091	2 194	34
Portugal	1 649	811	303	79	107	981	81
Romania	1 131	97	325	1	30	761	4
Slovenia	719	15	380	12	26	165	1
Slovakia	597	30	102	7	41	151	2
Finland	57	52	468	22	6	115	39
Sweden	1 613	98	2 339	4	51	178	0
United Kingdom	11 251	1 320	5 430	32	257	2 272	142
Norway	879	118	683	49	40	418	15
Croatia	124	5	7	0	8	19	0
FYR of Macedonia	302	0	16	0	0	0	0
Turkey	1 522	273	1 040	169	401	117	96

Source: Eurostat (env_wastrt)

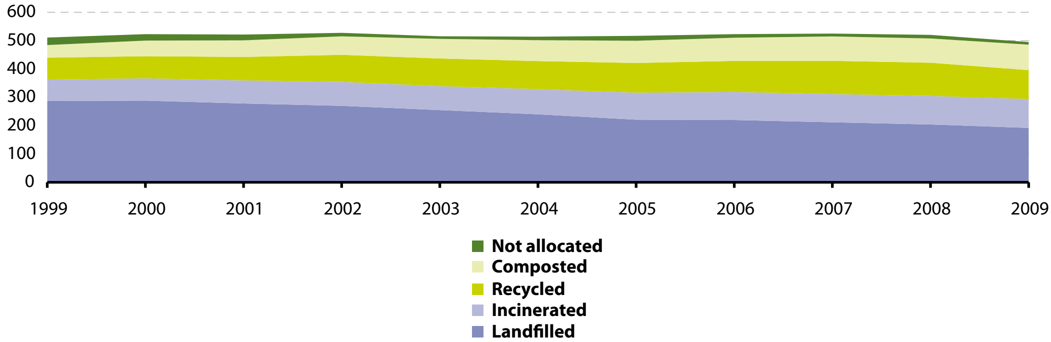
Table 11.6: Municipal waste
(kg per inhabitant)

	Municipal waste generated (1)			Municipal waste landfilled (2)			Municipal waste incinerated (3)		
	1999	2004	2009	1999	2004	2009	1999	2004	2009
EU-27	511	514	514	287	240	192	76	89	102
Belgium	463	487	491	91	35	25	147	163	168
Bulgaria	503	490	468	388	396	450	0	0	0
Czech Republic	327	278	316	277	222	228	30	39	33
Denmark	627	696	822	68	31	29	315	379	420
Germany	638	587	587	180	104	2	125	144	189
Estonia	413	449	346	412	283	214	0	0	0
Ireland	581	745	742	517	452	449	0	0	19
Greece	393	433	478	358	389	389	0	0	0
Spain	615	608	547	331	309	285	36	32	48
France	509	521	536	224	189	173	169	181	182
Italy	498	538	541	382	306	267	37	61	69
Cyprus	670	739	778	605	659	671	0	0	0
Latvia	256	311	333	236	259	307	0	6	0
Lithuania	650	366	360	350	334	326	0	0	0
Luxembourg	650	683	707	140	132	122	311	269	254
Hungary	482	454	430	404	381	320	34	15	41
Malta	477	625	647	410	540	617	0	0	0
Netherlands	599	625	616	40	11	4	203	202	204
Austria	563	620	591	195	46	4	57	154	174
Poland	319	256	316	312	241	206	0	1	3
Portugal	442	436	488	303	291	301	62	95	90
Romania	314	345	396	255	273	304	0	0	0
Slovenia	551	417	449	455	313	309	0	8	7
Slovakia	261	274	339	185	222	256	32	34	30
Finland	485	470	481	208	273	222	38	55	87
Sweden	428	464	485	108	42	7	163	217	235
United Kingdom	570	605	529	469	419	260	40	49	59
Iceland	457	506	554	345	365	379	62	45	56
Norway	596	416	473	328	82	67	92	128	196
Switzerland	637	662	706	66	3	0	298	337	344
Turkey	463	421	392	354	345	332	0	0	*0*

(1) Breaks in series: between 1999 and 2004 for Bulgaria, Estonia, Spain, Latvia, Hungary, Portugal, Slovenia, Slovakia, Norway, Switzerland and Turkey; between 2004 and 2009 for the Netherlands.
(2) Breaks in series: between 1999 and 2004 for Estonia, Latvia, Hungary, the Netherlands, Austria, Portugal, Norway and Turkey.
(3) Breaks in series: between 1999 and 2004 for Italy, Austria, Portugal and Switzerland.

Source: Eurostat (tsien120 and tsien130)

Figure 11.10: Municipal waste, EU-27
(kg per inhabitant)



Source: Eurostat (tsien120 and tsien130)

11.3 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, water use 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 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 11.7), 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 m^3 and 175 000 million m^3. When expressed in relation to population size (see Figure 11.11), Finland and Sweden recorded the highest freshwater annual resources per capita (20 000 m^3 per inhabitant or more). In contrast, relatively low levels (below 3 000 m^3 per capita) were recorded in the six largest Member States (Germany, Spain, France, Italy, Poland and the United Kingdom), as well as Belgium, Denmark and the Czech Republic, with the lowest level in Cyprus (410 m^3 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 11.8). In Bulgaria, Lithuania and Romania surface water abstraction accounted for ten or more times the volume of water abstracted from groundwater resources. At the other end of the range, larger volumes of water were abstracted from groundwater resources in Latvia, Slovakia, Cyprus, the United Kingdom (England and Wales only) and Malta.

The United Kingdom (England and Wales only), Spain and France recorded the highest amounts of groundwater extracted in 2006 (subject to data availability), all with in excess of 6 000 million m³. Looking at the development of groundwater abstraction during the ten-year period to 2007, the volume of groundwater extracted generally fell, although Greece and Slovenia recorded abstraction levels that were between 15 % and 20 % higher, and Spain reported an increase of over 40 %.

Spain, France and Germany headed the ranking of Member States in relation to surface water abstraction, with more than 25 000 million m³ in 2006 or 2007. Developments in surface water abstraction levels were somewhat more pronounced than for groundwater, with Cyprus reporting an increase of 89 % in the nine-year period to 2007, and the Netherlands an increase of 63 % in the ten-year period to 2006; the volume of surface water abstracted in Latvia, Lithuania and Slovakia in 2007 was around half the level recorded some ten years earlier.

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 calculate annual rates of freshwater abstraction of between 50 m³ and 100 m³ per capita (see Figure 11.12), 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 (134 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 has partially replaced groundwater by desalinated seawater.

An analysis of the development of abstraction rates over time is shown for selected Member States in Figure 11.13. 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 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 11.9). 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, 95 % in Germany and 94 % in Italy, while Switzerland (97 %) also recorded a very 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 11.14), tertiary wastewater treatment was most common (again mixed reference periods) in the Netherlands, Germany, Austria, Italy and Sweden, where more than four in every five persons were connected to this type of wastewater treatment, and in Greece the share was just below this level. In contrast, less than one in ten persons was connected to tertiary wastewater treatment in Romania, Bulgaria and Malta (no data reported for seven of the Member States).

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 is illustrated by Figure 11.15. 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, Ireland and the United Kingdom, while another five Member States (Spain, Lithuania, Luxembourg, France and Latvia) reported agricultural use for between one and two thirds of the total mass disposed. In contrast, more than 40 % of sewage sludge was composted in Finland, Slovakia, Hungary and the Czech Republic. Alternatives that reduce or eliminate the spread of pollutants on agricultural or gardening land include incineration and landfill. While the Netherlands, Germany, Austria and Switzerland reported incineration as their primary pathway for disposal, its discharge into controlled landfills was practised as the primary pathway in Italy and Bulgaria, and was used almost exclusively in Malta, Greece and Iceland.

Data sources and availability

Water statistics are collected through the inland waters section of a joint OECD/Eurostat questionnaire which is frequently adapted to the relevant policy frameworks. It currently reports on the following:

- freshwater resources in groundwater and surface water – these can be re-

plenished 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 – 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

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.

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, the river basins. An important step in the course of its implementation is the establishment of river basin management plans in 2010.

A study on water saving potential conducted for the European Commission estimates 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.

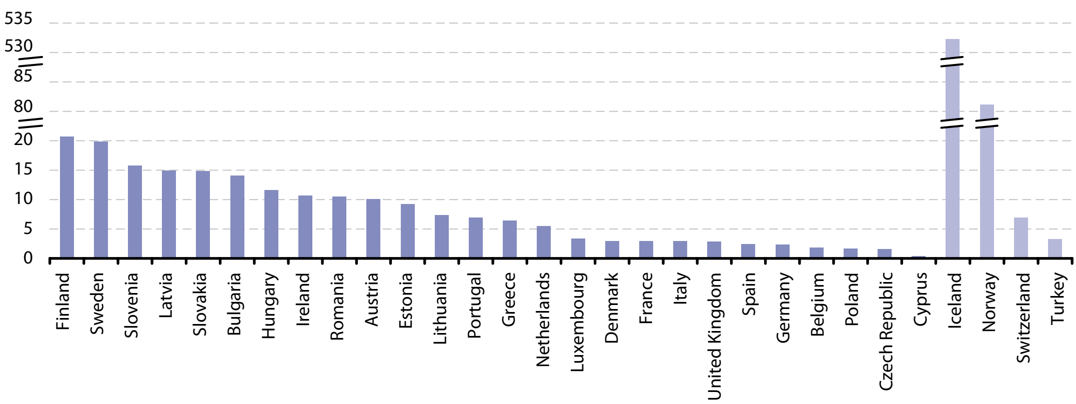
In a Communication addressing water scarcity and droughts (COM(2007) 414), the European Commission identified an initial set of policy options to be taken at European, national and regional levels to address water scarcity within the EU. This set of proposed policies aims to move the EU towards a water-efficient 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 2009 and shows that 95.6 % of Europe's coastal bathing waters and 89.4 % of its inland bathing waters met the minimum water quality standards. 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.

Figure 11.11: Freshwater resources per capita - long-term average (1)
(1 000 m^3 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 (env_watq1a)

Table 11.7: Water resources - long-term annual average ([1])
(1 000 million m³)

	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 (env_watq1a)

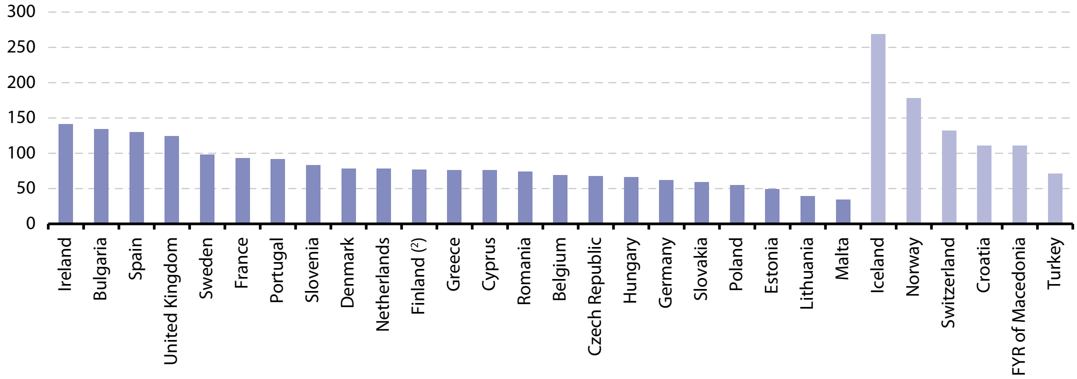
Table 11.8: Groundwater and surface water abstraction
(million m^3)

	Groundwater abstraction			Surface water abstraction		
	1997	2002	2007	1997	2002	2007
Belgium	646	662	:	6 929	6 076	:
Bulgaria	798	493	473	6 735	6 096	5 708
Czech Republic	587	540	381	1 906	1 368	1 589
Denmark	917	650	:	16	18	:
Germany (¹)	6 710	6 204	5 825	33 880	31 802	26 476
Estonia	322	236	:	1 306	1 177	:
Ireland	:	:	213	:	:	517
Greece (²)	3 119	3 188	3 651	4 603	6 072	5 821
Spain (³)	4 250	5 310	6 022	30 353	32 210	27 738
France (³)	:	6 240	6 184	:	26 923	26 368
Italy	:	:	:	:	:	:
Cyprus (⁴)	143	145	145	34	62	64
Latvia	167	115	108	196	142	104
Lithuania	234	158	175	4 552	2 966	2 094
Luxembourg	:	:	:	:	:	:
Hungary (³)	851	730	541	:	:	:
Malta	20	16	14	0	0	0
Netherlands (⁵)	1 153	977	1 059	5 354	7 938	8 720
Austria	1 148	:	:	2 496	:	:
Poland	2 871	:	:	9 928	:	:
Portugal	:	:	:	:	:	:
Romania	1 260	860	508	8 000	6 379	5 426
Slovenia	159	208	191	:	691	745
Slovakia	498	410	358	812	684	330
Finland	:	*285*	:	:	:	:
Sweden	654	628	346	2 057	2 048	2 285
United Kingdom (⁶)	10 524	7 503	7 005	2 383	2 379	2 266
Iceland	154	160	:	6	5	:
Norway	:	:	:	:	:	:
Switzerland (³)	880	854	788	1 678	1 674	:
Croatia	:	:	1 162	:	:	:
FYR of Macedonia	:	48	116	:	585	435
Turkey (⁷)	9 330	10 990	12 096	*26 222*	*33 780*	:

(¹) 1998 instead of 1997; 2001 instead of 2002.
(²) 1996 instead of 1997.
(³) 2006 instead of 2007.
(⁴) 1998 instead of 1997.
(⁵) 1996 instead of 1997; 2001 instead of 2002; 2006 instead of 2007.
(⁶) England and Wales only; 2006 instead of 2007.
(⁷) 2001 instead of 2002 for surface water abstraction.

Source: Eurostat (env_watq2_1)

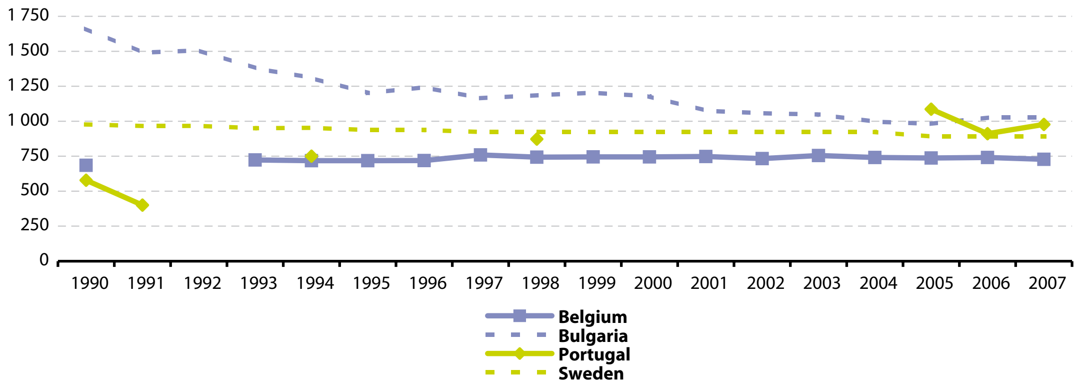
Figure 11.12: Total freshwater abstraction by public water supply, 2007 (¹)
(m³ per inhabitant)



(¹) Spain, France, Hungary, the Netherlands, Switzerland and Turkey, 2006; Finland and Iceland, 2005; Denmark, Estonia and the United Kingdom, 2004; Austria, Italy, Latvia and Luxembourg, not available.
(²) Estimate.

Source: Eurostat (env_watq2_1)

Figure 11.13: Total freshwater abstraction for public water supply, selected countries
(million m³)



Source: Eurostat (env_watq2_1)

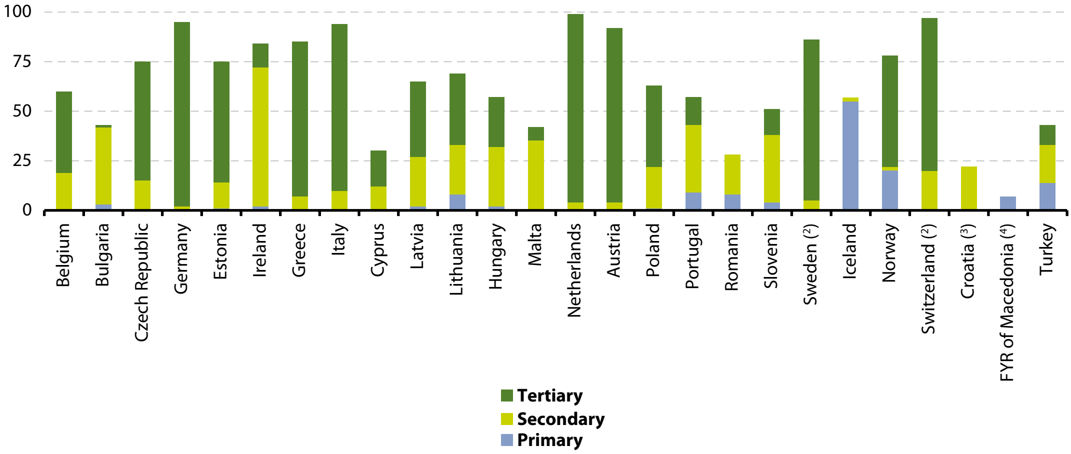
Table 11.9: Population connected to urban wastewater treatment
(% of total)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	35	38	39	41	46	48	52	53	55	56	60
Bulgaria	36	36	36	37	38	39	40	40	41	41	42
Czech Republic	59	62	62	64	65	70	71	71	73	74	75
Denmark	88	89	:	:	:	:	:	:	:	:	:
Germany	:	91	:	:	93	:	:	94	:	:	95
Estonia	72	69	69	69	69	70	70	72	74	74	74
Ireland	:	:	66	:	70	:	:	:	84	:	:
Greece	56	:	:	:	:	:	:	:	:	:	85
Spain	:	:	:	:	:	:	:	:	:	:	:
France	:	77	:	:	79	:	:	80	:	:	:
Italy	:	:	69	:	:	:	:	:	94	:	:
Cyprus	12	13	13	14	16	18	23	28	30	:	:
Latvia	:	:	:	:	:	65	70	66	66	65	65
Lithuania	:	:	:	:	:	57	59	:	69	69	69
Luxembourg	:	:	93	:	:	:	95	:	:	:	:
Hungary	24	26	29	46	50	57	:	:	54	57	:
Malta	13	13	13	36	36	36	36	36	36	36	35
Netherlands	98	98	98	98	98	99	99	99	99	99	:
Austria	:	81	:	85	86	86	89	89	:	92	:
Poland	47	50	52	54	55	57	58	59	60	61	62
Portugal (1)	:	42	:	:	:	57	60	:	65	72	68
Romania	:	:	:	:	:	:	:	27	27	28	28
Slovenia	:	19	21	23	25	25	26	34	37	52	51
Slovakia	49	49	50	51	51	52	53	54	55	55	57
Finland	78	79	80	80	81	81	:	:	:	:	:
Sweden	:	93	:	86	:	85	:	86	:	86	:
United Kingdom (2)	86	91	92	95	99	98	96	97	97	99	99
Iceland	4	8	16	33	33	50	50	50	57	:	:
Norway	70	73	73	73	74	74	75	76	77	78	78
Switzerland	95	96	96	96	96	96	:	:	97	:	:
Croatia	:	:	:	9	:	:	:	15	28	28	29
FYR of Macedonia	:	:	:	5	6	6	6	6	7	7	7
Turkey	14	17	*23*	*26*	27	28	30	36	36	42	:

(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 (env_watq4)

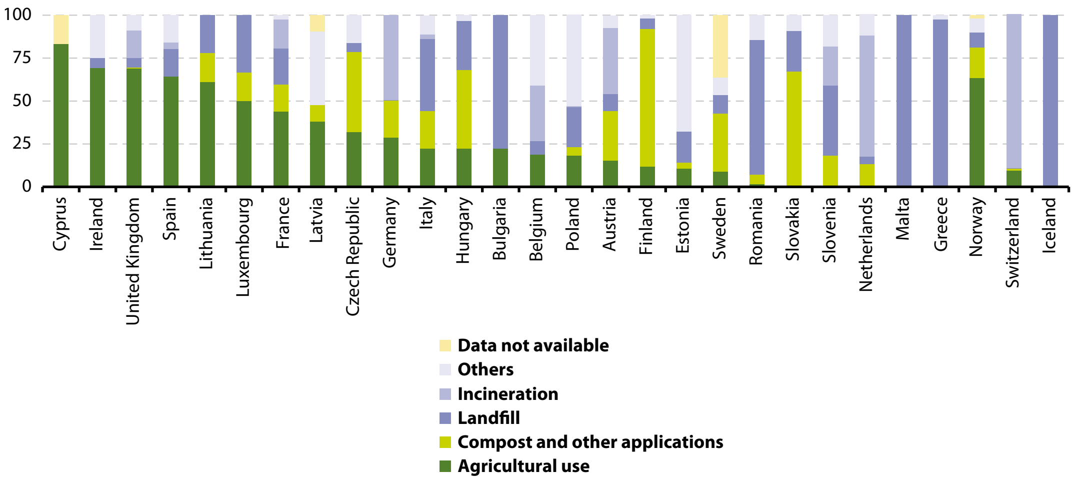
Figure 11.14: Population connected to wastewater treatment, 2007 ([1])
(% of total)



([1]) Malta, 2008; Hungary, the Netherlands, Austria, Sweden and Turkey, 2006; Ireland, Italy, Cyprus, Romania (only tertiary treatment), Iceland and Switzerland, 2005; Denmark, Spain, France, Luxembourg, Slovakia, Finland and the United Kingdom, not available.
([2]) Primary, not available.
([3]) Primary and tertiary, not available.
([4]) Secondary and tertiary, not available.

Source: Eurostat (env_watq4)

Figure 11.15: Sewage sludge disposal from urban wastewater treatment, by type of treatment, 2007 ([1])
(% of total mass)



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

Source: Eurostat (env_watq6)

11.4 Material flow accounts

Economy-wide material flow accounts provide information about the physical flows of materials through economies. The accounts provide an aggregate overview of the annual extraction of raw materials as well as of the physical amounts of imports and exports.

Typically as economies grow, more materials such as fossil fuels, biomass, construction materials and metals are needed, but the rate of increase is less than that of GDP, a phenomenon known as 'decoupling' which can also be observed for the EU-27.

A 'resource-efficient Europe' is an initiative the European Commission launched as part of the Europe 2020 strategy aiming to deliver smart, sustainable and inclusive growth. The initiative aims at decoupling economic growth from the use of resources.

In the EU-27, the average material consumption per inhabitant was 16.5 tonnes in 2007, an increase of 5 % since 2000.

Main statistical findings

Resource productivity and direct material inputs

Resource productivity is the total amount of materials used by an economy in relation to economic activity. The development of resource productivity over time provides insights into whether decoupling between the use of natural resources and economic growth is taking place.

Resource use is measured as domestic material consumption (DMC). Resource productivity of the EU is expressed by the amount of gross domestic product (GDP) generated per unit of material consumed, in other words GDP / DMC in euro per kg.

Resource productivity in the EU-27 rose 7 % from 2000 to 2003, decreased in 2004 by 2 %, and then increased gradually during the next three years to reach a level in 2007 that was slightly above that recorded in 2003 (Figure 11.16). Over the entire period from 2000 to 2007 resource productivity in the EU-27 increased by almost 8 %. While the EU-27's GDP continuously increased during the 2000 to 2007 period, DMC declined until 2003. When an economy grows at the same time as DMC is decreasing, this is called 'absolute decoupling' of resource use from economic growth. This situation was observed for the period from 2000 to 2003. From 2003 to 2007, however, DMC increased together with GDP at nearly the same rate (11 %).

The level of DMC increased by about 8 % from 2000 to 2007, while on a per capita basis DMC increased somewhat less, by about 5 %.

Another indicator often used is direct material input (DMI) which measures the direct input of materials for use into the economy, in other words all materials which are of economic value and are used in production and consumption activities (excluding water flows). The relation of DMC to DMI indicates to what extent material resources inputs are used for own domestic consumption or are exported for consumption in other economies. The difference between DMC and DMI (the two bars shown for each country in Figure 11.17) is exports.

Ten of the countries (nine EU Member States and Switzerland) had direct material inputs (DMI), between 6 and 20 tonnes per capita in 2007. Their share of direct material inputs (DMI) that was used for own domestic consumption (DMC) ranged from two thirds for Slovakia to 90 % for Greece and Malta.

A second group of 11 EU Member States had a DMI between 20 and 30 tonnes per capita. Their share of direct material inputs used for own domestic consumption ranged from 38 % for the Netherlands to 95 % for Romania. Another group of seven EU Member States and Norway had a DMI higher than 30 tonnes per capita.

By making a comparison of these concepts, different types of economies can be characterised, namely:

(a) through-transport countries with both high imports and exports;
(b) countries where domestic extraction is used mostly at home;
(c) extraction exporting countries.

Belgium, the Netherlands and Luxembourg are economies with high DMI but significantly lower DMC due to a high level of imports that are again exported. In contrast, the economy of Ireland is characterised by high resource requirements (its DMI was the second highest per capita) which are predominantly for domestic use. Finland shows a similar pattern also due to a high use of extracted natural resources in its own economy. In contrast, Norway shows a unique pattern with the highest DMI per capita of all European countries studied, calculated at 82 tonnes in 2007. Norway has a high resource extraction based economy with the majority of the material being largely exported. This is seen with DMC being only 45 % of DMI. Norway was the largest net exporter of natural resources among the EU and EFTA Member States.

Due to limited data availability only the DMC can be derived for the EU-27, which was 16.5 tonnes per capita in 2007.

Domestic material consumption

Domestic material consumption is composed of two elements, namely the domestic extraction and the physical trade balance (equal to imports less exports). From 2000 to 2003, the EU-27's domestic material consumption – the total amount of materials directly used within the economy – declined from 7 600 million tonnes to 7 400 million tonnes, before rising again to 8 200 million tonnes by 2007, an overall increase of nearly 8 % when compared with 2000 (see Figure 11.18).

Domestic extraction accounted for an estimated 84 % of the EU-27's domestic material consumption in 2007, with the physical trade balance accounting for the remainder, thereby confirming the EU-27 as a net importer. From 2000 to 2003, the domestic extraction decreased from 6 600 million tonnes to 6 300 million tonnes but then increased to 6 900 million tonnes by 2007, which was 5 % higher than in 2000. In contrast, the physical trade balance rose almost constantly during the period 2000-2007, rising from 1 000 million tonnes to 1 300 million tonnes, an overall increase of 27 %.

Figure 11.19 shows the main components of the EU-27's domestic extraction in 2007. The main materials extracted from the national territories of the EU-27 Member States were non-metallic minerals including sand and gravel (61 %), fossil energy materials/carriers (13 %), other biomass (13 %), grazed biomass and crop residues (11 %) and metal ores (2 %). From this breakdown, the importance of the construction activity – which uses much of the sand, gravel and other non-metallic minerals – can be seen. Thus, when there are large construction projects (such as building new tunnels, repairing dykes, dredging harbours, building highways, etc.) there can be a noticeable impact on the figures. Note that water flows are excluded from economy-wide material flow analyses as they would be so large that they would dominate all other materials.

Domestic extraction and external trade

The material requirements of most economies are dominated by domestic extraction of raw materials, but the EU is no longer self-sufficient for all of the materials that it needs. Materials that are not available or whose domestic production is not competitive are typically obtained through external trade. Most EU Member States are net importers of materials, in other words, they require more resources from the rest of the world than they provide to the rest of the world.

From 2000 to 2007 the domestic extraction in the EU-27 increased moderately, rising overall by 5 % (see Figure 11.20). In contrast, the EU-27's external trade rose substantially, with imports increasing by 21 % and exports by 18 %.

Within the EU Member States, only Sweden was a net exporter of materials in 2007, while Latvia had almost equal exports and imports of materials (see Figure 11.21). The largest net importers of materials among the EU Member States were Italy, Germany, Spain and France. Among the EU and EFTA countries, Norway was the only significant net exporter of materials as it has a natural resource-based economy with high levels of extraction and exports of oil and gas, as well as other resources such as fish or timber.

Data sources and availability

Economy-wide material flow accounts are provided to Eurostat by all EU Member States, Norway, Switzerland and the candidate countries based on a gentleman's agreement. The data sources used for the compilation of these accounts may differ in scope and quality between countries.

Eurostat is working on the establishment of a legal base for the compilation of environmental accounts. The European Commission has put forward a proposal for a Regulation on European environmental economic accounts (COM(2010) 132) which provides a framework for the development of various types of accounts. The current proposal includes three modules with a view of adding other modules as these subject areas reach methodological maturity. Material flow accounts are one of the first three modules being proposed, alongside modules for air emissions accounts (see Subchapter 11.1) and environmentally related taxes (see Subchapter 11.7) by economic activities. It is expected that this proposed legal base will 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.

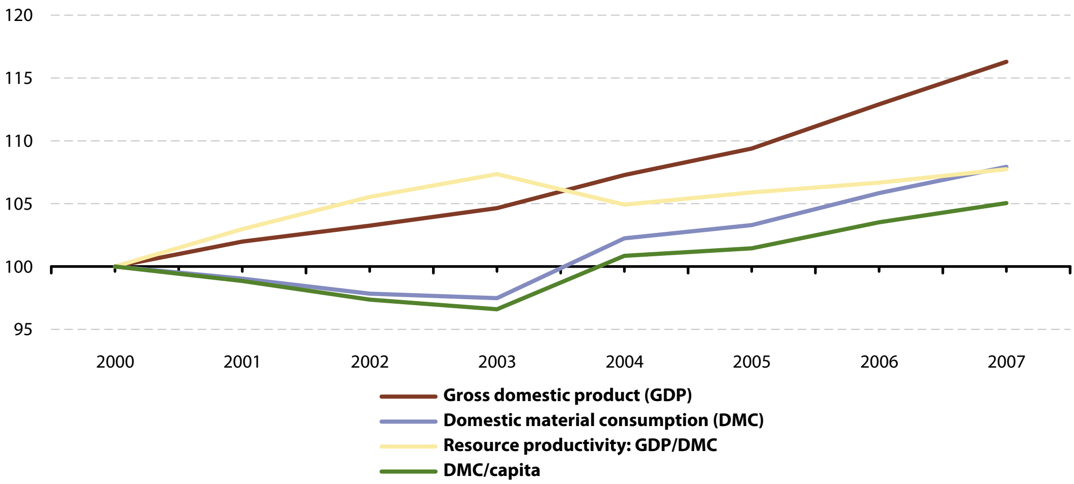
Context

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 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 – in other words, the system of national accounts – is supplemented by satellite systems representing environmental or social indicators. These satellite accounts are largely 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.

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 a report by the Commission on the measurement of economic performance and social progress, an initiative of the French government. 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.

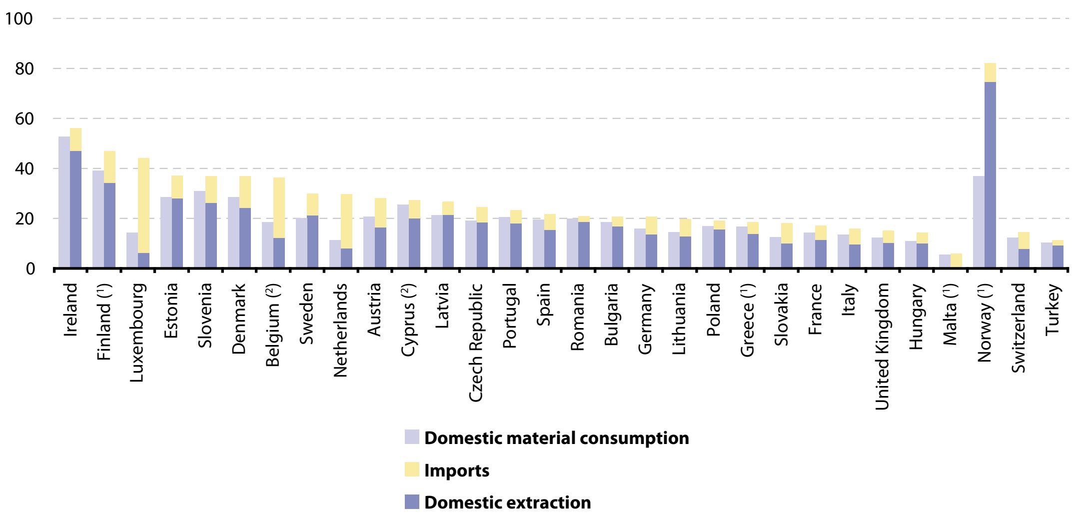
Figure 11.16: Index of resource productivity, EU-27 (1)
(2000=100)



(1) Estimates..

Source: Eurostat (tsieb020 and env_ac_mfa)

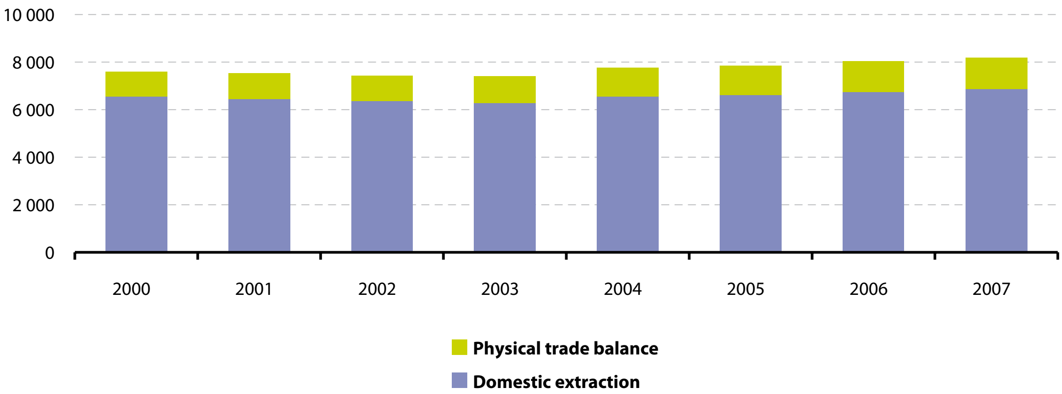
Figure 11.17: Domestic material consumption and inputs, 2007
(tonnes per inhabitant)



(1) Trade data are estimated using external trade statistics.
(2) Estimates.

Source: Eurostat (env_ac_mfa and demo_gind)

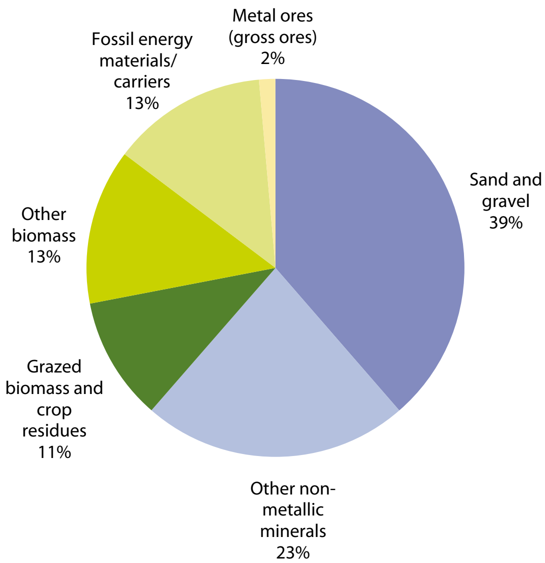
Figure 11.18: Domestic material consumption by components, EU-27 ([1])
(million tonnes)



([1]) Estimates.

Source: Eurostat (env_ac_mfa)

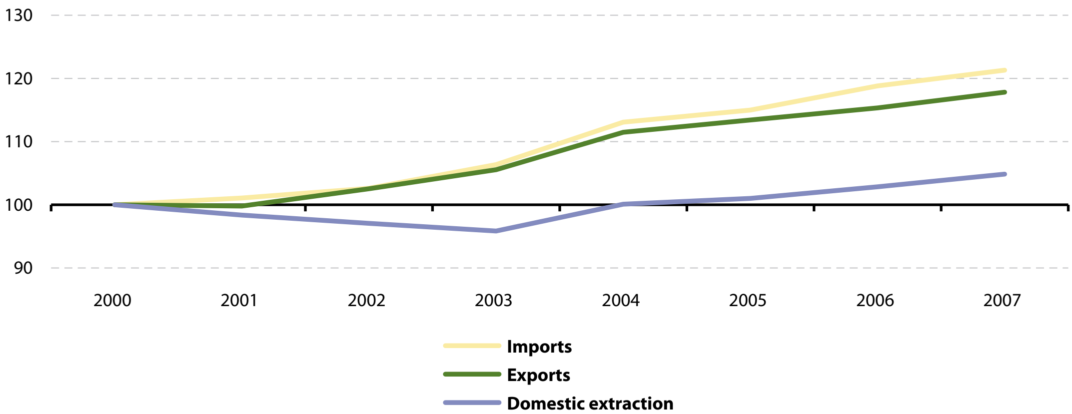
Figure 11.19: Domestic extraction by materials, EU-27, 2007 ([1])
(% of total)



([1]) Estimates; figures do not sum to 100 % due to rounding.

Source: Eurostat (env_ac_mfa)

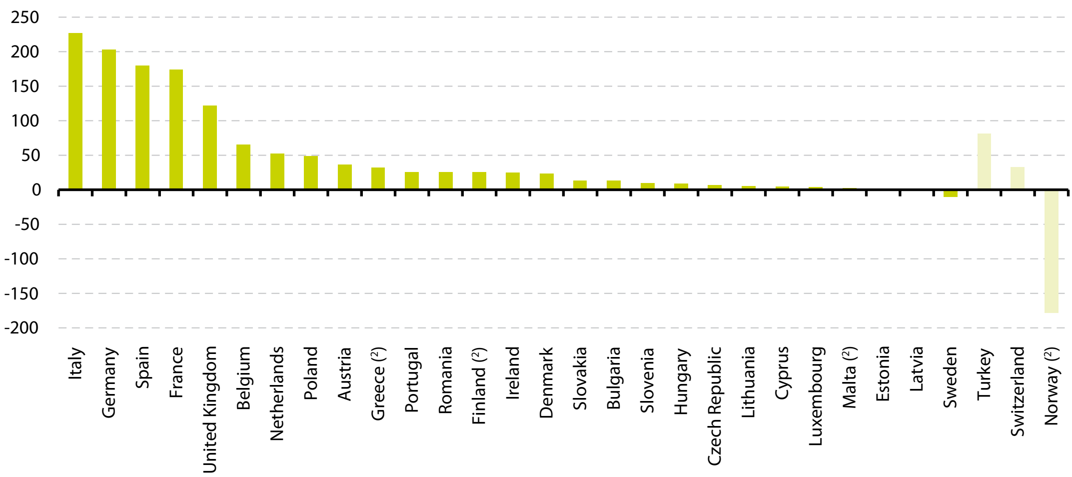
Figure 11.20: Indices of domestic extraction, imports and exports, EU-27 (1)
(2000=100)



(1) Estimates.

Source: Eurostat (env_ac_mfa)

Figure 11.21: Physical trade balances, 2007 (1)
(million tonnes)



(1) Negative values indicate net exporters, positive values indicate net importers.
(2) Trade data are estimated using external trade statistics.

Source: Eurostat (env_ac_mfa)

11.5 Chemicals management

Work on European Union (EU) statistics concerning hazardous substances started in the mid-1990s when some 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 some of these chemicals.

Main statistical findings

Total production of chemicals

Figure 11.22 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 is the largest producer in the EU, 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 2009; adding Spain, the Netherlands, Belgium and Ireland, the overall share was raised to 88 %.

In the EU-15, between 1995 and 2007, the total production of chemicals increased by 65 million tonnes (26.2 %) to reach a total of 313 million tonnes. In 2008, production decreased by 27 million tonnes (-8.7 %) and in 2009 by a further 34 million tonnes (-11.8 %) to reach a level of 252 million tonnes.

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, the EU-27's production of chemicals fell by 25 million tonnes (-6.9 %) in 2008 and by another 46 million tonnes (-13.6 %) in 2009 to reach a level of 291 million tonnes.

Production of environmentally harmful chemicals

Figure 11.23 presents the development of production of environmentally harmful chemicals. Aggregated production of these environmentally harmful chemicals in the EU-27 grew from 2002 to 2007 by 10.1 % overall to a peak of 194 million tonnes. Production fell by 31 million tonnes (-16.5 %) over the next two years to a level of 162 million tonnes, which was 8.1 % lower than in 2002.

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. However, by 2009 the EU-15's output stood at 138 million tonnes and was 4.7 % lower than in 1996.

The share of environmentally harmful chemicals in total EU-27 chemical output was 53.3 % in 2002 and 55.7 % in 2009. The 12 Member States that joined the EU in 2004 and 2007 produced 24.0 million tonnes of environmentally harmful chemicals, equivalent to 14.8 % of the EU-27 total.

Production of toxic chemicals

Figure 11.24 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 % overall between 2002 and 2007 to reach a peak of 218 million tonnes. Production fell by 17 million tonnes in 2008 (-7.9 %) and by a further 21 million tonnes (-10.4 %) in 2009 to reach a level of 180 million tonnes.

The overall share of chemicals classified as toxic (all five classes) in total EU-27 chemicals production was 62 % in 2009 – which was the same ratio that had been recorded in 2002. EU-27 production of the most toxic carcinogenic, mutagenic and reprotoxic (CMR) chemicals reached 38 million tonnes in 2004. The level of production in 2007 was just below this recent peak, at 37 million tonnes, but output fell substantially in 2008 to 32 million tonnes and remained at that level in 2009. The relative share of CMRs in total EU-27 chemical production fell from 10.8 % in 2004 to 9.4 % in 2008 before increasing to 11.0 % in 2009. A more detailed analysis shows that most CMRs were produced in lower volumes in 2009; however, a higher production of chlorine compounds, such as vinyl chloride, compensated for these reductions to produce a stable overall quantity of CMR production.

The 12 Member States that joined the EU in 2004 or 2007 produced 15.0 % (27 million tonnes) of the EU-27's toxic chemicals in 2009, compared with an 11.0 % 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 2009 provides little indication that EU-27 production of chemicals that are toxic to human health and/or harmful to eco-systems is being significantly decoupled from the overall production level for 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 2008, while statistics on environmentally harmful substances start in 1996. EU-27 data are available for the years 2002 to 2009 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 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 eco-toxicity 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.

This indicator 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.

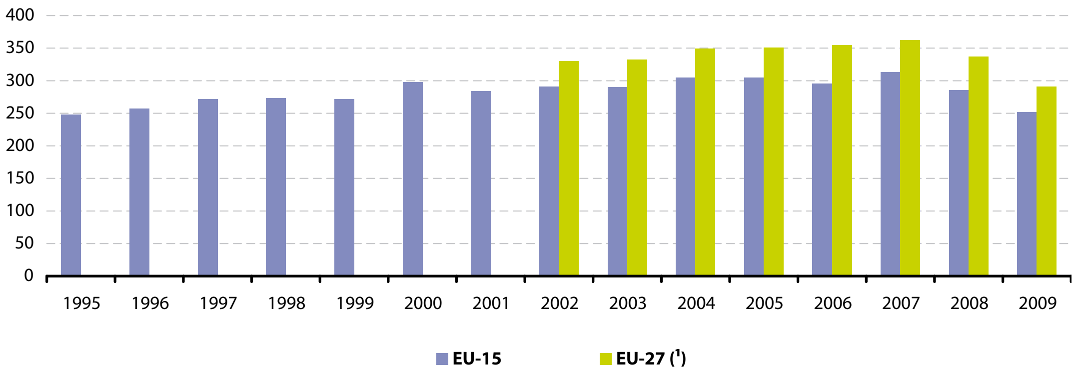
Eurostat has recently, in collaboration with the Directorate-Generals of the European Commission responsible for industry and for the environment, published a baseline study providing a set of indicators to monitor the effectiveness of the REACH Regulation.

Context

The sixth environment action programme (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 EU's sixth environment action programme (EAP).

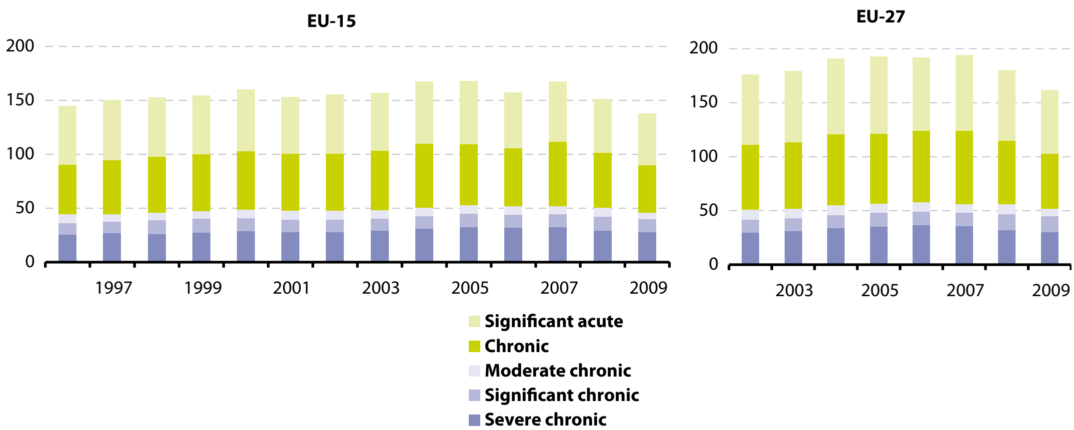
Figure 11.22: Total production of chemicals
(million tonnes)



(1) Not available, 1995 to 2001.

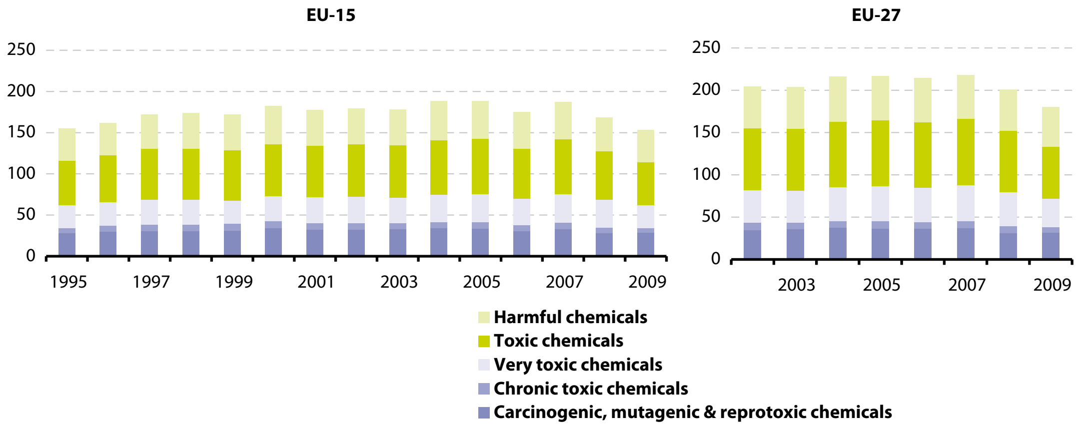
Source: Eurostat (tsdph320)

Figure 11.23: Production of environmentally harmful chemicals
(million tonnes)



Source: Eurostat (tsdph330)

Figure 11.24: Production of toxic chemicals
(million tonnes)



Source: Eurostat (tsdph320)

11.6 Environmental protection expenditure

The protection of the environment is integrated within all European Union (EU) policy fields with the general aim of attaining sustainable development. Clean air, water and soils, healthy ecosystems, and rich 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.

This subchapter provides details on expenditure carried out with the purpose of protecting the environment (total environmental protection investment and current expenditure). It refers to the money spent by the public sector, private and public specialised producers, and industry on activities directly aimed at the prevention, reduction, and elimination of pollution resulting from the production or consumption of goods and services.

Main statistical findings

Figure 11.25 shows that in 2006, private and public specialised producers (providing environmental protection services) had the highest environmental protection expenditure within the EU-25. Their expenditure accounted for 0.86 % of gross domestic product (GDP), which was equal to EUR 214 per inhabitant. The public sector and industry spent roughly similar amounts on environmental protection (0.47 % and 0.44 % of GDP respectively), or EUR 116 and EUR 109 per inhabitant respectively. Combining the expenditure of these three activities gives a total of 1.76 % of the EU-25's GDP allocated to protecting the environment in 2006.

Between 2000 and 2006, environmental protection expenditure by private and public specialised producers, industry and the public sector grew in absolute and per inhabitant terms, but decreased relative to GDP for the public sector and for industry. For private and public specialised producers, environmental protection expenditure grew relative to GDP (see Figure 11.26). This increase and the corresponding decrease for the public sector could, in part, be due to outsourcing or the (semi-) privatisation of some environmental activities such as waste collection and wastewater treatment.

Public sector's expenditure

In 2006, some 42.4 % of public sector environmental protection expenditure in the EU-25 was devoted to non-core domains, 39.6 % to waste management activities, and 16.8 % to wastewater management (see Figure 11.27). Only a fraction (1.1 %) of public sector environmental protection expenditure was destined for air protection activities (these activities are almost exclusively conducted by industry).

In most EU Member States public sector environmental protection expenditure ranged between 0.3 % and 0.7 % of GDP (see Figure 11.28). The Netherlands (2005 data) devoted 1.4 % of its GDP to such expenditure and Denmark 1.1 % (2007 data), while Latvia (2005 data) and Estonia allocated less than 0.2 %.

Current expenditure generally accounted for the majority of the public sector's environmental protection expenditure. Most of the Member States that joined the

EU in 2004 or 2007 recorded investment shares in public sector environmental protection expenditure that were above the EU average (see Figure 11.29), Cyprus and Slovakia being notable exceptions. These relatively high shares of investment may, in part, be attributed to higher levels of expenditure in fixed assets that could have been needed to start a variety of activities in order to comply with more stringent EU environmental legislation. For EFTA countries and Turkey, the investment share of public sector environmental protection expenditure was generally close to the average across the EU Member States, although in Croatia it reached 96.7 % in 2007 (much higher than in previous years).

Public sector environmental protection expenditure is mainly focused on waste management and wastewater treatment (see Figure 11.30). However, in several EU Member States a substantial share is devoted to other domains. This was notably the case in Spain (for the protection of biodiversity and other environmental domains, 2005 data), as well as in Cyprus (2004 data), France, Italy and Finland (where the 'others' category had a relatively important role; this category includes general environmental administration and management, education, training and information for the environment, as well as activities leading to indivisible expenditure and activities not elsewhere classified). The analysis of public sector environmental protection expenditure by domain also highlights the particular case of Croatia where more than 95 % of expenditure in 2007 was devoted to soil and groundwater protection.

Private and public specialised producers' expenditure

In 2006, the environmental protection expenditure of private and public specialised producers represented 0.86 % of the EU-25's GDP; when compared with 2000 this ratio increased by almost 8 %. Slovakia (2004 data) and Finland were the only Member States where the environmental protection expenditure of private and public specialised producers was less than 0.2 % of GDP (see Figure 11.31). Conversely, in Austria (2007 data) and Romania (2004 data), the share rose to more than 1.7 % of GDP. This large range may reflect the degree of internalisation by industry of some environmental activities, such as waste and wastewater management. This could particularly be the case for industrial activities with in-house waste management services aiming to recycle part of the discarded materials for reintroduction into their production process. In 15 of the 19 countries for which data are available (see Figure 11.32), expenditure for waste management and wastewater management together accounted for close to or more than 90 % of private and public specialised producers' environmental protection expenditure. The remaining expenditure was for soil and groundwater protection (for example, soil decontamination activities) or was classified in the 'other' domain.

On average, approximately 60 % of the environmental protection expenditure of private and public specialised producers in 2007 was estimated to be directed towards waste management, with wastewater treatment the second most common domain. In Latvia (2005 data), Finland and Portugal (both 2006 data) wastewater treatment was the majority beneficiary of environmental protection expenditure among private and public specialised producers. Spain recorded an atypical structure, as around 40 % of its expenditure was devoted to domains other than waste and wastewater.

Industry's expenditure

Industrial environmental protection expenditure depends, to some extent, on the industrial structure of each country. It was generally equivalent to 0.25 % or more of GDP, with only France (2004 data), Latvia (2005 data) and Cyprus below this level – among those Member States for which data are available. This proportion rose to more than 0.8 % of GDP for six of the EU Member States, with the highest share being recorded in Bulgaria (1.0 %, 2007 data).

In most of the EU Member States, current expenditure represented a higher share of industrial environmental protection expenditure than investment. For example, in Italy, Belgium, and the Netherlands more than 80 % of the total took the form of current expenditure. The main exception was Portugal, where current expenditure accounted for only 35 % of industrial environmental protection expenditure.

As well as differences in the levels and types of industrial environmental protection expenditure, differences also emerge when analysing expenditure by subsector (see Figure 11.33). The manufacturing subsector accounted for the largest share of industrial expenditure in all but one of the EU Member States: in Slovakia the highest level of expenditure was accounted for by electricity, gas and water supply. The manufacturing subsector accounted for more than 90 % of industrial environmental protection expenditure in Belgium (2004 data), the highest proportion among the EU Member States.

Some Member States that joined the EU in 2004 or 2007 recorded relative high proportions of their environmental protection expenditure being accounted for by the electricity, gas and water supply subsector; this may, in part, be due to efforts made to reduce emissions from electricity generation. The share of the electricity, gas, and water supply subsector was lowest in Belgium (9.0 %, 2004 data) and Hungary (10.4 %, 2007 data). Romania, Poland and the Czech Republic (all 2007) accounted for the highest shares of industrial environmental protection expenditure contributed by the mining and quarrying subsector and these were the only Member States where the share of this activity rose into double-digits, peaking at 24.6 % in Romania (compared with an EU-27 average of 3.8 %).

Data sources and availability

Eurostat works towards systematically collecting environmental statistics for all economic sectors within the EU. These statistics are used to assess the effectiveness of new legislation and policies and to analyse the links between environmental pressures and the structure of the economy.

For many years, European statistical services have collected data on air pollution, energy, water consumption, wastewater, solid waste, and their management. The links between these data and environmental data of an economic nature, such as environmental expenditure enable policymakers to consider the environmental impacts of economic activities, for example on resource consumption, air or water pollution, and waste production, and to assess actions (such as investment and current expenditure) that may be carried out to limit the causes and risks of pollution.

Data on environmental expenditure are collected through a joint OECD/Eurostat questionnaire on environmental protection expenditure and revenues (EPER). The Member States are free to decide on the data collection methods used, and the main options are: surveys, administrative sources, statistical estimations, the use of already existing sources, or a combination of methods.

Traditionally, data availability has been better for the public sector as many countries have collected data in this area for a number of years. However, problems concerning data comparability across countries exist; these are often related to the structure of expenditure. For industrial activities (mining and quarrying, manufacturing, electricity, gas and water supply) most countries provide data, while the comparability of the information is considered to be good. For private and public specialised producers (mainly NACE Rev. 1.1 Divisions 37 and 90), while overall data availability is considered to be satisfactory, there are a number of countries that have so far not provided any data.

The data currently published on Eurostat's website covers:

- four economic sectors, namely the public sector, industry, private and public specialised producers and households;
- several economic variables concerning current expenditure, investment, fees and purchases, receipts from by-products, subsidies/transfers and revenues;
- nine environmental domains according to the classification of environmental protection activities (CEPA 2000) – protection of ambient air and climate; wastewater management; 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.

Total environmental protection expenditure is the sum of investment (with the distinction between pollution treatment and pollution prevention) and current expenditure for industry and private and public specialised production sectors, while for the public sector it equates to the sum of investment, current expenditure, and subsidies/transfers. As such, environmental protection expenditure is an indicator of the total resources used by a particular sector to protect the environment.

Investment expenditure includes all outlays in a given year (purchases and own-account production) for machinery, equipment and land used for environmental protection purposes and is the sum of two categories: end-of-pipe (pollution treatment) investment and investment in integrated technologies (pollution prevention investment). Current expenditure is the sum of internal current expenditure and fees/purchases. Subsidies/transfers (given or received) include all types of transfers financing environmental protection activities in other sectors, including transfers to or from other countries: these constitute expenditure for the paying sector (public sector), and revenue for the receiving sector (industry sector and private and public specialised producers sector).

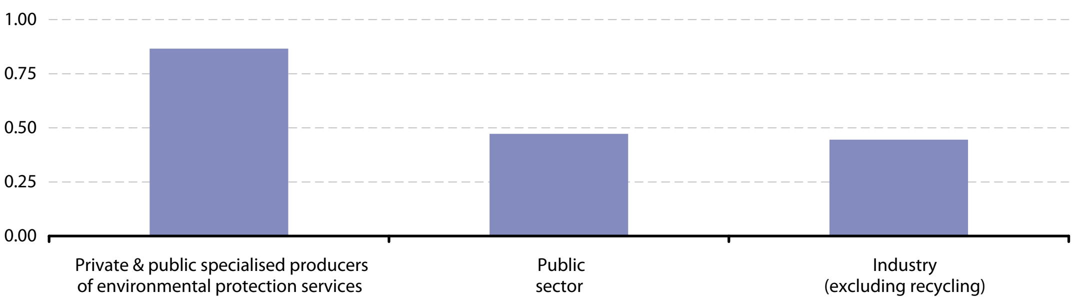
In order to compare expenditure between countries as well as over time, environmental protection expenditure can be expressed in EUR per inhabitant and as a percentage of gross domestic product (GDP), or as a percentage of gross value added when analysing environmental protection expenditure within industrial subsectors.

Context

Businesses and households both pay to safely dispose of waste; businesses spend money to mitigate the polluting effects of production processes; governments pay to provide environmental public goods, such as the basic levels of sanitation required to safeguard health. Governments subsidise environmentally beneficial activities and use public funds to make it easier to borrow money on financial markets for environmental projects.

The analysis of spending on environmental protection has a strategic interest and allows an evaluation of environmental policies already in place. A low level of expenditure does not necessarily mean that a country is not effectively protecting its environment. Indeed, information on expenditure tends to emphasise clean-up costs at the expense of cost reductions which may have resulted from lower emissions or more effective protection measures.

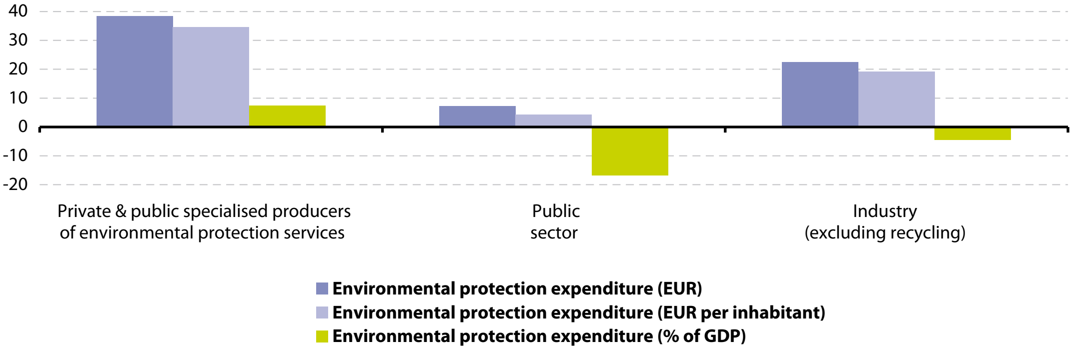
Figure 11.25: Environmental protection expenditure, EU-25, 2006 (1)
(% of GDP)



(1) Including estimates made for the purpose of this publication.

Source: Eurostat (env_ac_exp1 and env_ac_exp2)

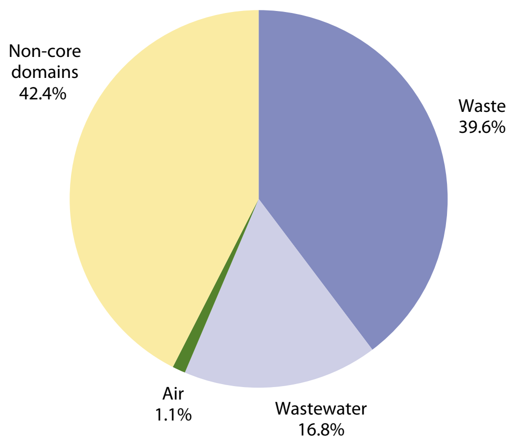
Figure 11.26: Environmental protection expenditure, rate of change between 2000 and 2006, EU-25 (1)
(%)



(1) Including estimates made for the purpose of this publication.

Source: Eurostat (env_ac_exp1 and env_ac_exp2)

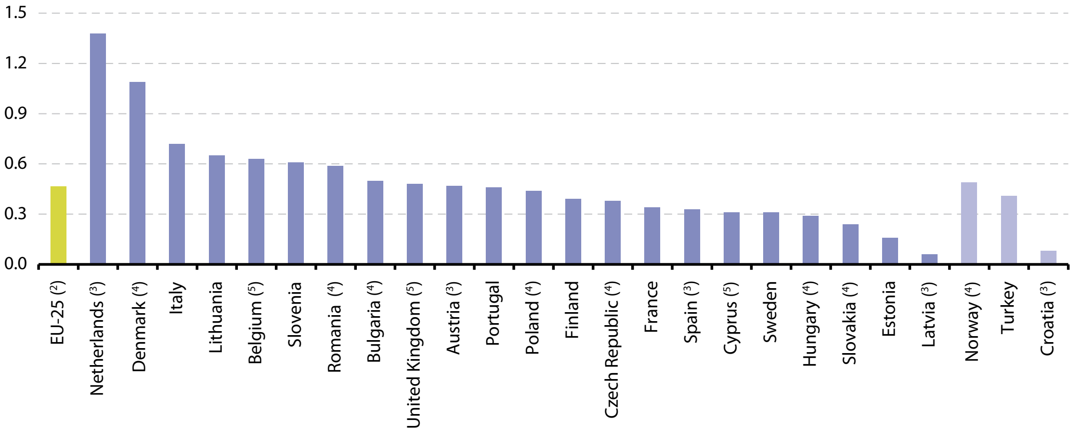
Figure 11.27: Public sector environmental protection expenditure by environmental domain, EU-25, 2006 (1)
(%)



(1) Including estimates made for the purpose of this publication.

Source: Eurostat (env_ac_exp1)

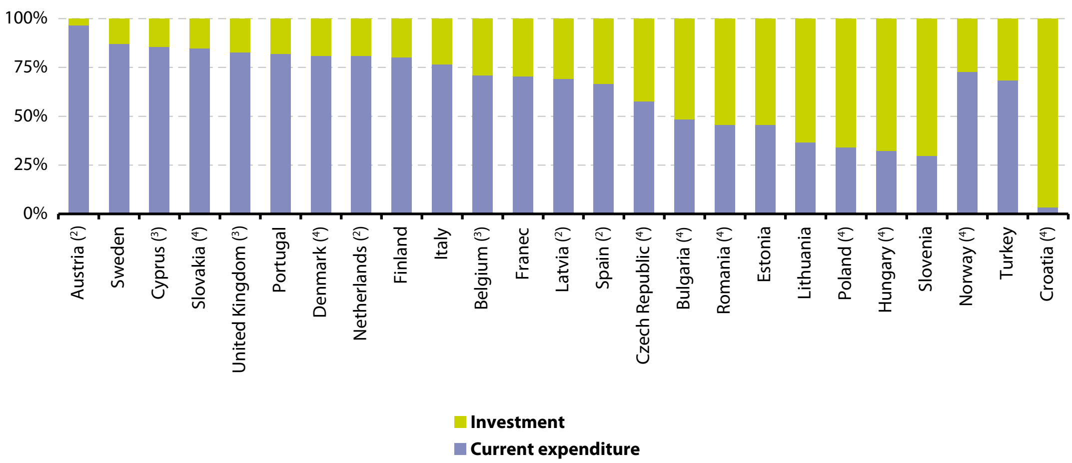
Figure 11.28: Public sector environmental protection expenditure, 2006 (1)
(% of GDP)



(1) Germany, Greece, Ireland, Luxembourg and Malta, not available.
(2) Estimate made for the purpose of this publication.
(3) 2005.
(4) 2007.
(5) 2004.

Source: Eurostat (env_ac_exp1 and tec00001)

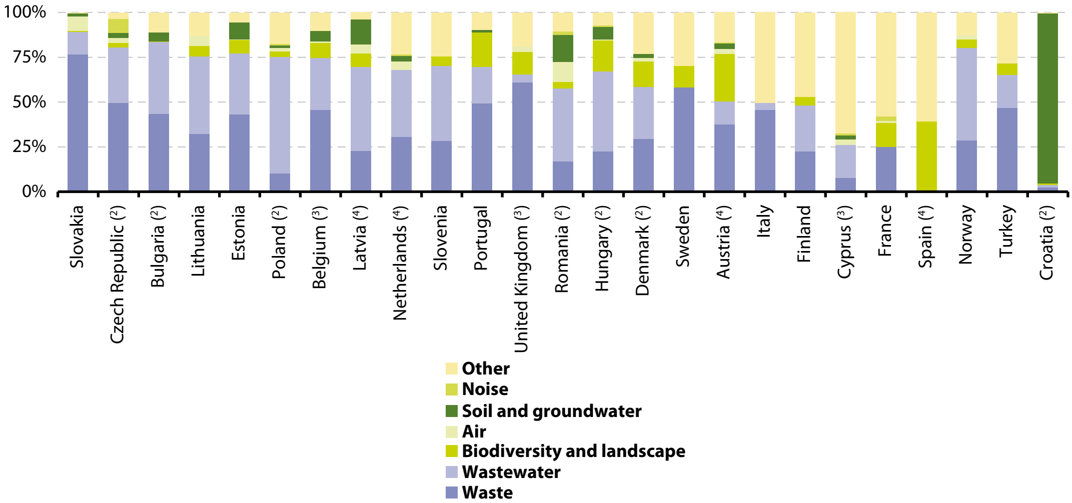
Figure 11.29: Public sector environmental protection expenditure by type of expenditure, 2006 (1)
(% of total)



(1) Germany, Greece, Ireland, Luxembourg and Malta, not available.
(2) 2005.
(3) 2004.
(4) 2007.

Source: Eurostat (env_ac_exp1)

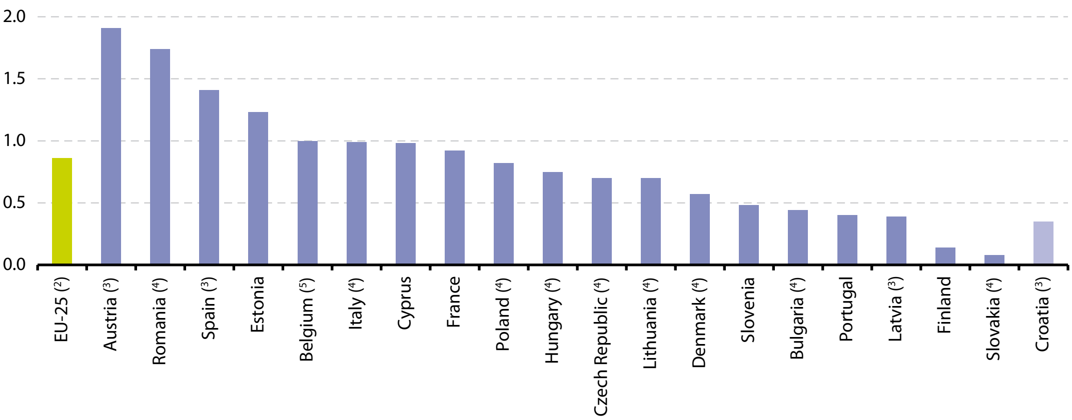
Figure 11.30: Public sector environmental protection expenditure by environmental domain, 2006 (1)
(% of total)



(1) Germany, Greece, Ireland, Luxembourg and Malta, not available.
(2) 2007.
(3) 2004.
(4) 2005.

Source: Eurostat (env_ac_exp1)

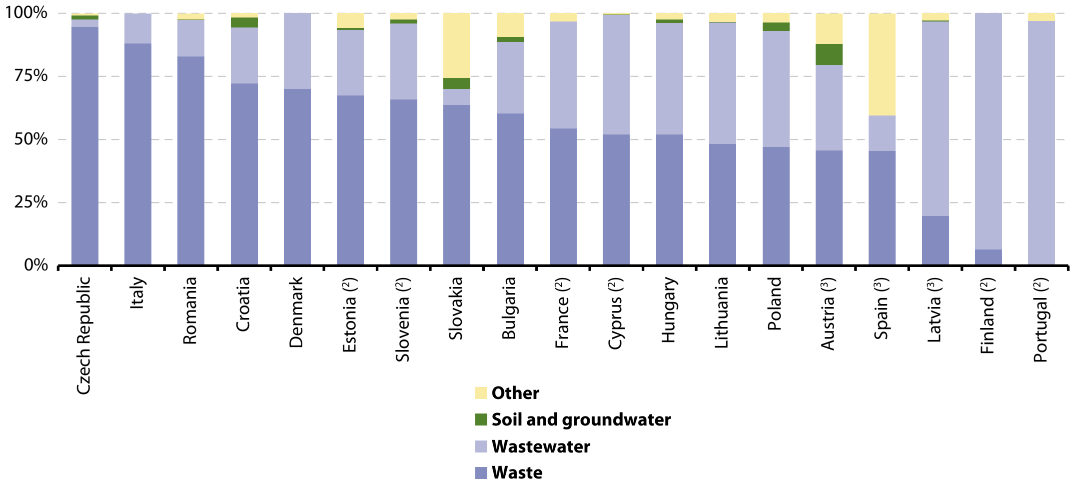
Figure 11.31: Public and private specialised producers environmental protection expenditure, 2006 (1)
(% of GDP)



(1) Germany, Greece, Ireland, Luxembourg, Malta, Netherlands, Sweden and the United Kingdom, not available.
(2) Estimate made for the purpose of this publication.
(3) 2005.
(4) 2007.
(5) 2004.

Source: Eurostat (env_ac_exp1 and tec00001)

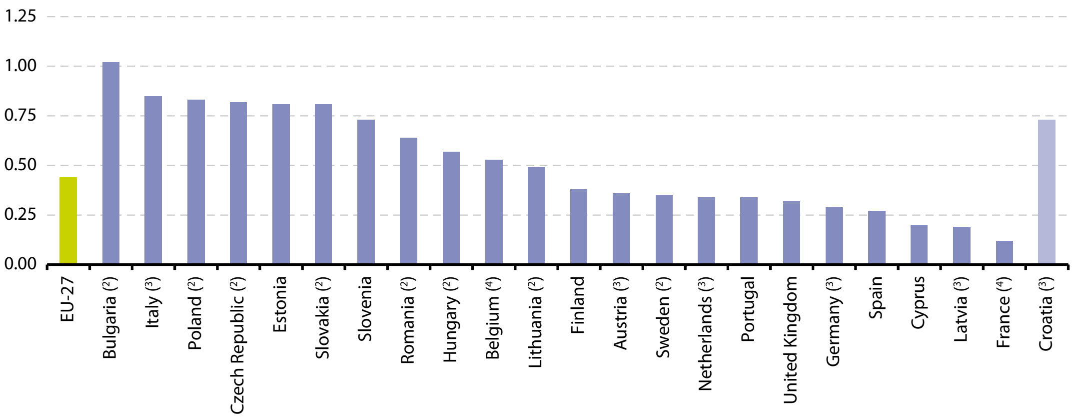
Figure 11.32: Public and private specialised producers environmental protection expenditure by environmental domain, 2007 (1)
(% of total)



(1) Belgium, Germany, Greece, Ireland, Luxembourg, Malta, Netherlands, Sweden and the United Kingdom, not available.
(2) 2006.
(3) 2005.

Source: Eurostat (env_ac_exp1)

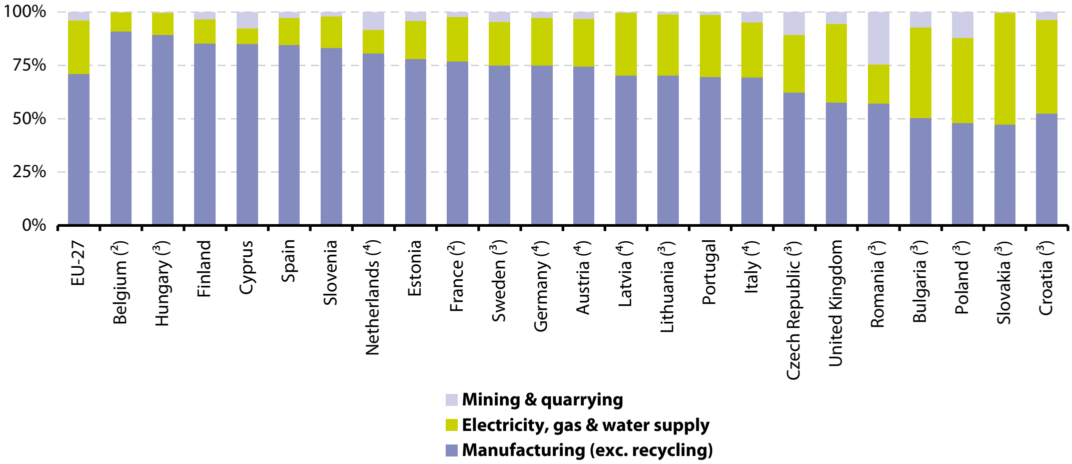
Figure 11.33: Industrial environmental protection expenditure, 2006 (1)
(% of GDP)



(1) Denmark, Greece, Ireland, Luxembourg and Malta, not available.
(2) 2007.
(3) 2005.
(4) 2004.

Source: Eurostat (env_ac_exp1 and tec00001)

Figure 11.34: Industrial environmental protection expenditure by subsector, 2006 (1)
(% of total)



(1) Denmark, Greece, Ireland, Luxembourg and Malta, not available.
(2) 2004.
(3) 2007.
(4) 2005.

Source: Eurostat (env_ac_exp1)

11.7 Environmental taxes

Environmentally related taxes can be used as an economic instrument to discourage behaviour that is potentially harmful to the environment, by integrating the cost of adverse environmental impacts into prices, thereby lessening the impact of polluting substances on the environment. Taxes may be used as a tool for implementing the 'polluter pays' principle, as they allow the pricing-in of environmental externalities. By applying environmental taxes, governments within the European Union (EU) seek to influence the behaviour of consumers and producers, by encouraging them to use natural resources more responsibly and to limit or avoid pollution they might produce. Environmental taxes on polluters may provide incentives for them to innovate, thereby improving the performance of products and processes.

An environmental tax is a tax whose tax base is a physical unit that has a proven, specific, negative impact on the environment; for example, emissions of polluting substances such as carbon dioxide, nitrous oxide, or sulphur dioxide. It may be difficult and expensive to measure emissions directly; so many taxes are based on proxies for emissions, for example volumes of petrol, diesel, or other fuel oils that are used within various activities.

Main statistical findings

Environmental taxes in the EU

Figure 11.35 shows that environmental tax revenues in the EU-27 increased during the period between 1999 and 2007, to reach a relative peak of EUR 304.3 thousand million. However, the effects of the financial and economic crisis were apparent in 2008, with the tax base being reduced and revenues falling to EUR 299.0 thousand million. Increasing revenues from environmental taxes may be related to a range of issues, including: the introduction of new taxes; an increase in tax rates; an expansion of the tax base (for example, a lower emissions ceiling); or greater use of products and processes that have a negative impact on the environment.

The revenue from environmental taxes may be compared with total economic activity by expressing environmental taxes relative to gross domestic product (GDP); alternatively, environmental taxes may be expressed as a share of the total revenue from all taxes and social contributions (see Figure 11.36). In the first case, the comparison provides an insight into the tax burden on products and processes which damage the environment. In the second case, the comparison allows an assessment of tax reforms, and in particular whether or not 'green taxes' account for an increasing share of the tax burden. In 2008, the revenue from environmental taxes in the EU-27 accounted for 2.4 % of GDP and 6.1 % of all taxes and social contributions.

While the value of EU-27 environmental taxes rose by 22.8 % between 1999 and 2008, there was a decrease of 16.1 % in the ratio of environmental taxes to GDP and of 13.0 % in these taxes share of all taxes and social contributions over the same period. The decrease in environmental tax revenue relative to GDP may be explained by several factors, including a reduction in the nominal value of environmental taxation; environmental taxes are generally levied in the form of a specific duty, a tax based on a physical unit (for example, per tonne of carbon dioxide) measured in quantity terms, irrespective of price. As such, revenues from environmental taxes in relation to GDP are likely to fall over time, unless they are adjusted for inflation or increased at regular intervals.

The level of environmental taxation across EU Member States is shown in Map 11.1. Environmental taxes were equivalent to 2 % to 3 % of GDP in 2007 in 20 of the Member States. There were two Member States with environmental tax revenue equivalent to less than 2 % of GDP, namely Spain and Lithuania (both 1.8 %). At the other end of the range, the Netherlands, Malta, Bulgaria and Cyprus had environmental tax revenues that were over 3.4 %, while in Denmark environmental taxation reached 5.9 % of GDP.

The map also shows the relative importance of environmental taxes as a share of total revenue from taxes and social contributions. The same five Member States (as for the ratio of environmental taxes to GDP) were at the head of the ranking in 2007; with environmental taxation accounting for 12.0 % of total taxes and social contributions revenue in Denmark, followed by Malta (10.9 %), Bulgaria (10.1 %), the Netherlands (9.8 %) and Cyprus (8.2 %).

Environmental taxes by tax category

Energy taxes represented almost three quarters (72.1 %) of environmental taxes within the EU-27 in 2008 (see Figure 11.37); this share was above 50 % in the vast majority of European countries. The decrease in the magnitude of environmental taxes relative to GDP or total revenue from taxes and social contributions may be largely attributed to a decline in the total value of energy taxes between 1999 and 2008.

EU-27 transport taxes accounted for 23.0 % of environmental taxes in 2008. There was a wide variation in the contribution of transport taxes across the Member States, with Malta, Cyprus and Ireland reporting that more than 40 % of their environmental taxes were raised from transport taxes, as did Norway.

Resource and pollution taxes represent a small share of total environmental tax revenue in most European countries, although their share rose to more than 10 % of the total environmental tax revenue in Estonia, Slovakia, the Netherlands and Denmark, as well as in Norway; the EU-27 average was 4.9 %.

Environmental taxes by economic activity

On the basis of a limited set of information for 2007 – which covers 15 of the Member States and Norway – businesses (NACE Rev. 1.1 Sections A to K and N and Divisions 90, 92 and 93) generally contributed the highest proportion of energy tax revenues, their share equal to at least 50 % of the total in the Baltic Member States, Bulgaria, Austria, Belgium, Malta and Italy, as well as in Norway.

Households were generally the second most important contributor to energy tax revenues, although the governments of the Netherlands, Denmark, Germany and the

United Kingdom raised more revenues from energy taxes among households than they did from businesses.

Luxembourg and Malta were somewhat atypical insofar as public administration, education, and similar activities (NACE Rev. 1.1 Sections L, M, P and Q and Division 91) were responsible for 40 % of energy tax revenues in Luxembourg, while 31 % of revenues in Malta were attributed to non-residents.

Data sources and availability

Eurostat collects data on environmental tax revenues and on environmental taxes broken down by economic activity. The data are collected using a questionnaire which is sent to the EU-EFTA countries every year. The questionnaire consists of a cross-classification of the main environmental tax categories (total environmental taxes, energy taxes, transport taxes, pollution taxes, and resources taxes) with a breakdown using the NACE Rev. 1.1 classification – generally at the Section level; information is also available for households and non-residents. The European Commission's Directorate-General for Taxation and Customs Union also publishes environmental tax revenue statistics that are based on annual updates of information reported to Eurostat through the national accounts transmission programme.

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); 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).

Environmental tax revenues can also be allocated according to the different actors who pay them – which may be classified by economic activity (NACE). The European strategy on environmental accounts, approved in 2003 and revised in 2008, regards the collection of data and the implementation of estimates for environmental taxes by economic activity as a priority.

Environmental taxes – a statistical guide constitutes the methodological guidelines for filling-in the questionnaire. Taxes are defined as compulsory and unrequited payments to general government. Eurostat and OECD members have agreed on a definition for environmental taxes that is based on all taxes with environmental relevance, regardless of the explicit motives behind their introduction. This means that the purpose of the tax can be something other than environmental protection, while still being classified as an environmental tax (for example, an annual vehicle tax). The main categories of environmentally relevant tax bases are shown in Table 11.10.

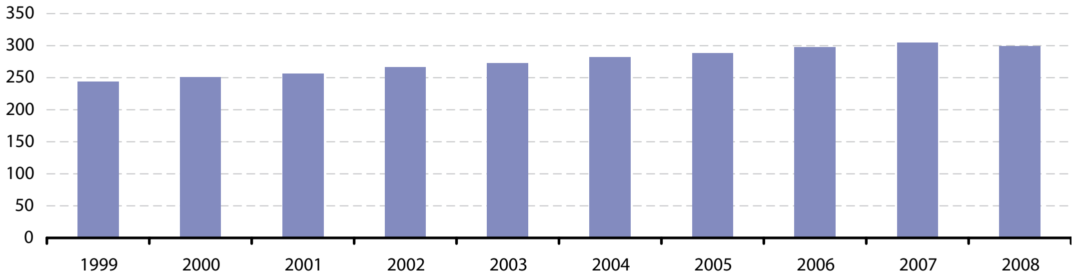
Eurostat is working on the establishment of a legal base for the compilation of environmental accounts and the European Commission has put forward a proposal for a Regulation on European environmental economic accounts (COM(2010) 132). The proposal provides a framework for the development of various types of accounts, initially based on three modules with a view of adding other modules as they reach methodological maturity. Environmental taxes by economic activity are one of the three modules, alongside modules for air emissions accounts (see Subchapter 11.1) and material flow accounts (see Subchapter 11.4). It is expected that this proposed legal base will 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.

Context

Policymakers seek economic instruments that are capable of producing behavioural changes that will limit the damage that is done on the environment. A variety of tools may be used to help the EU achieve its environmental and sustainable development goals; these include fines, charges and taxes, tradable permits, and deposit-refund systems. Generally, such systems are used to penalise those who pollute or misuse the environment – through imposing the costs of use on the user. These systems may also be used to provide incentives to users, so that they adopt more environmentally-friendly behaviour.

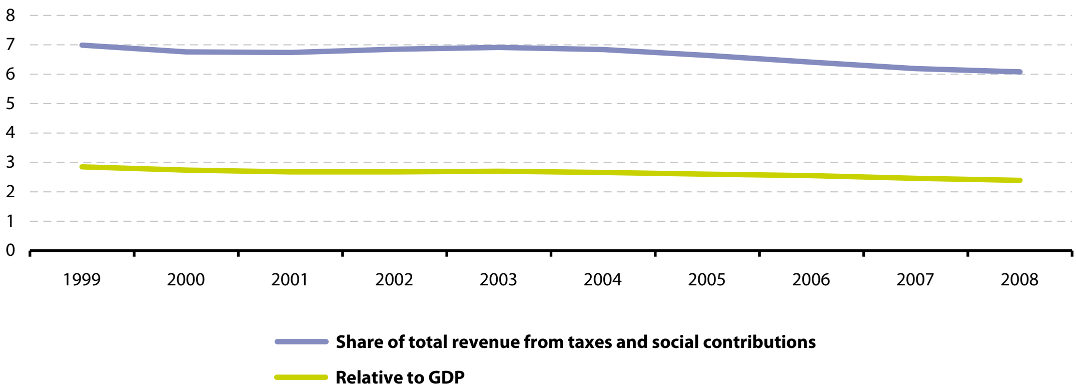
The economic rationale for incentive-based tools for the environment (also called market-based instruments) comes from their ability to correct market failures in a cost-effective way, unlike regulatory or administrative approaches which tackle environmental problems only as technical issues to be resolved by setting emissions limits, banning specific substances, or enforcing the use of specific abatement technologies. Environmental taxes (and to a lesser extent, charges) have been used increasingly to influence behaviour, since they also generate revenue that can be used for environmental protection, which is not the case with tradable permit schemes, for instance. The use of EU-wide market-based tools has been increasing, for example, through the introduction of instruments such as the EU's emissions trading scheme (EU ETS), the energy taxation Directive (2003/96/EC), or, in the field of transport, the Eurovignette Directive (2006/38/EC).

Figure 11.35: Total environmental tax revenue, EU-27
(EUR 1 000 million)



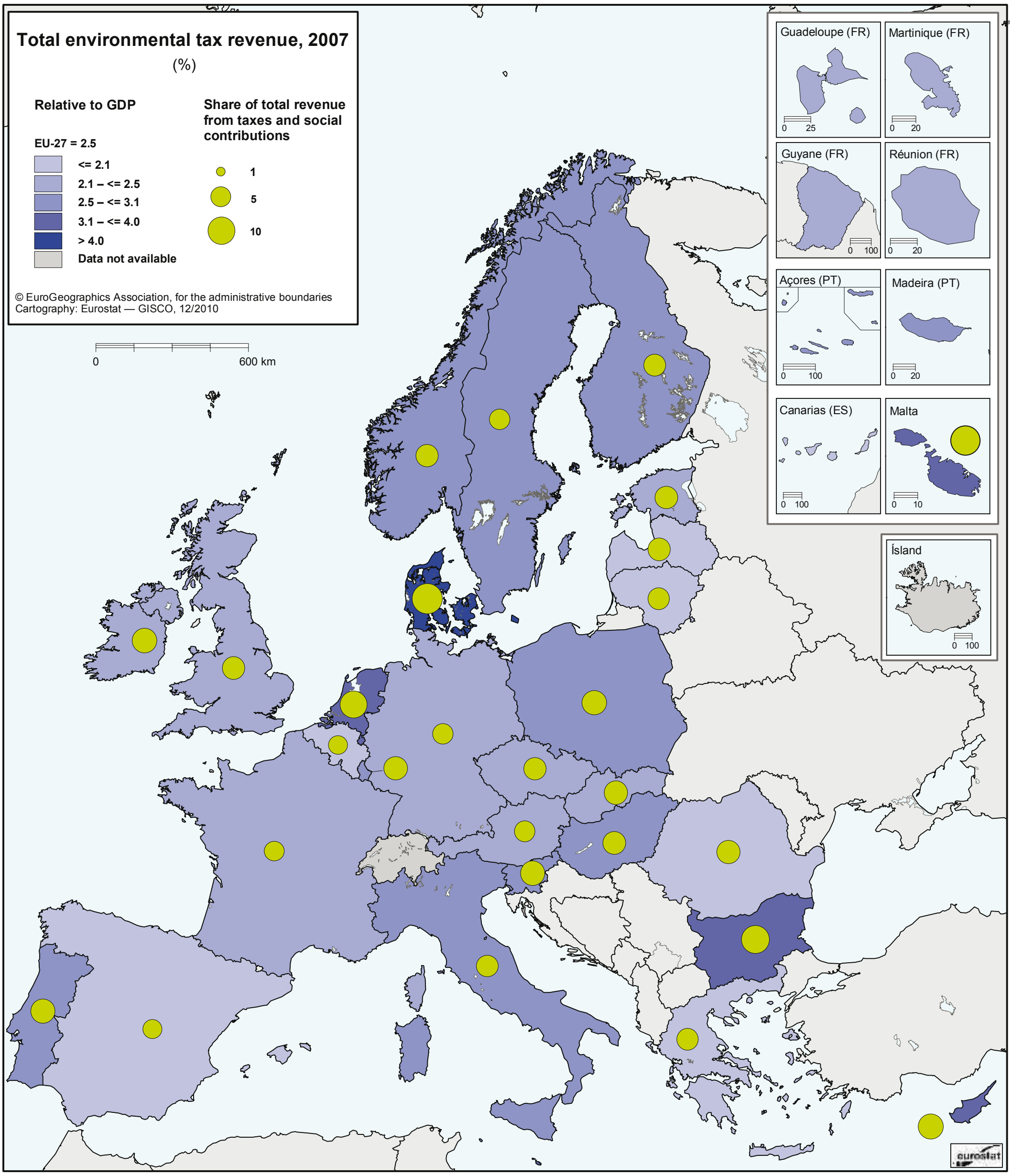
Source: Eurostat (env_ac_tax)

Figure 11.36: Total environmental tax revenue, EU-27
(%)



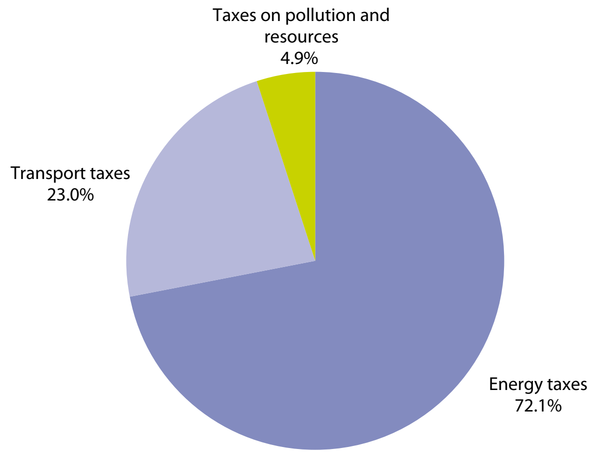
Source: Eurostat (env_ac_tax)

Map 11.1: Total environmental tax revenue, 2007
(%)



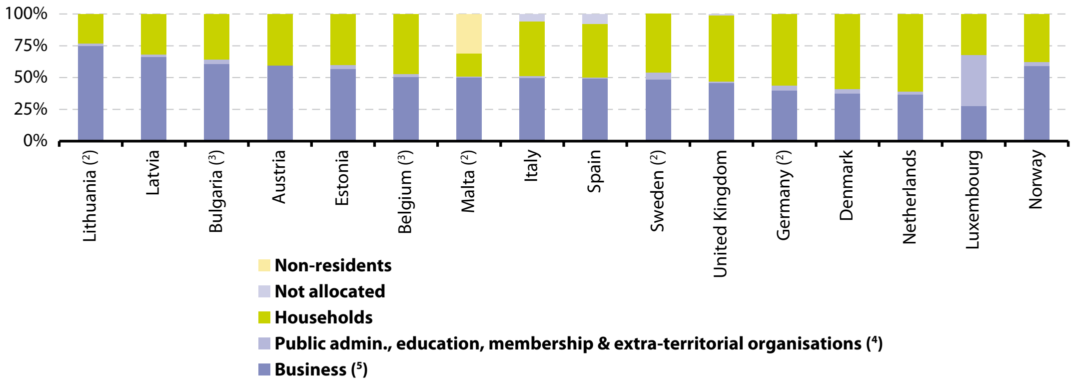
Source: Eurostat (env_ac_tax)

Figure 11.37: Environmental taxes by tax category, EU-27, 2008
(% of total)



Source: Eurostat (env_ac_tax)

Figure 11.38: Energy taxes by economic activity, 2007 (1)
(% of energy tax revenue)



(1) No data available for Member States that are not shown.
(2) 2006.
(3) 2005.
(4) NACE Rev. 1.1 Sections L, M, P and Q and Division 91.
(5) NACE Rev. 1.1 Sections A to K and N and Divisions 90, 92 and 93.

Source: Eurostat (env_ac_taxind)

Table 11.10: Tax bases for environmental taxes

Measured or estimated emissions to air	
Measured or estimated NO_x emissions	
SO_2 content of fossil fuels	
Other measured or estimated emissions to air	
Ozone depleting substances (e.g. CFC or halon)	
Measured or estimated effluents to water	
Measured or estimated effluents of oxydizeable matters (BOD, COD)	
Other measured or estimated effluents to water	
Effluent collection and treatment, fixed annual taxes	
Certain non-point sources of water pollution	
Pesticides (based on e.g. chemical content, price or volume)	
Artificial fertilisers (based e.g. on phosphorus or nitrogen content or price)	
Manure	
Waste management	
Waste management in general (e.g. collection or treatment taxes)	
Waste management, individual products (e.g. packaging, beverage containers)	
Noise (e.g. aircraft take-off and landings)	
Energy products	
Energy products used for transport purposes	
Unleaded petrol	
Leaded petrol	
Diesel	
Other energy products for transport purposes (e.g. LPG or natural gas)	
Energy products used for stationary purposes (mostly CO_2 taxes)	
Light fuel oil	
Heavy fuel oil	
Natural gas	
Coal	
Coke	
Biofuels	
Other fuels for stationary use	
Electricity consumption	
Electricity production	
District heat consumption	
District heat production	
Transport	
Motor vehicles, one-off import or sales taxes	
Registration or use of motor vehicles, recurrent (e.g. yearly) taxes	
Resources	
Water abstraction	
Extraction of raw materials (except oil and gas)	
Other resources (e.g. forests)	

11.8 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 our planet for the food, energy, raw materials, clean air and clean water that make life possible and drive our 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 of the main indicators of biodiversity, such as the number of protected areas and bird populations, and examines the trends for 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 2008. 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 mid-2010. This number will be reviewed using a geographical information system and published shortly. Figures for the Member States show that protected areas range between 31 % of the total area of Slovenia to less than 10 % in six other Member States. In general, these protected areas adequately cover the biogeographical regions present in the Member States, with an EU-27 average of 84 % of sufficiently covered species and habitats in 2008; only Poland and Cyprus reported less than 50 % sufficiency.

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. Part of the relatively steep decline (-17 % between 1990 and 2008) 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 (-26 % between 1990 and 2000). However, recent years have seen a recovery in forest bird numbers, with the index rising from a relative low of 75 to reach 86 by 2008. The index of all common bird species has been relatively stable since 1995, some 10 % below its 1990 level, and stood at 92 in 2008.

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 of a selected group of common bird species. Indices are calculated for each species independently and 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, 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.

Three different indices are presented:

- common farmland birds (36 species);
- common forest birds (29 species);
- all common birds (136 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 71 other common species that are generalists, meaning that they occur in many different habitats or are particularly adapted to life in cities.

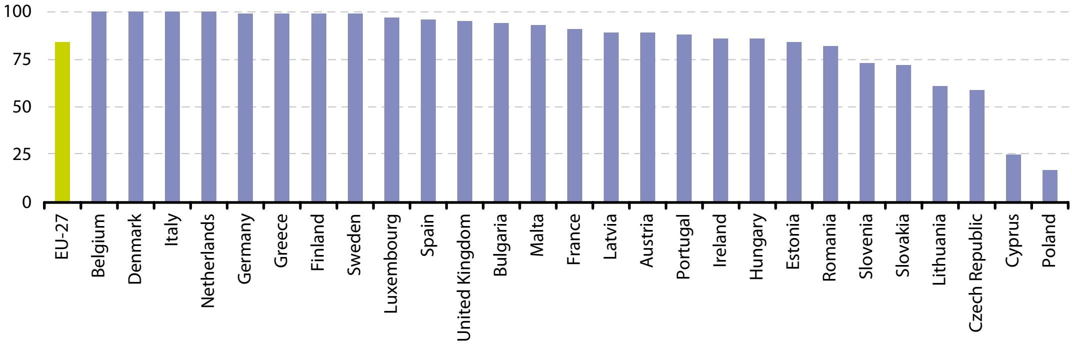
Context

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 our 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. Many of these issues were touched upon by G8 environment ministers in Potsdam in March 2007, where an extensive study of the economics of ecosystems and biodiversity (TEEB) was commissioned.

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 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 under serious threat of extinction).

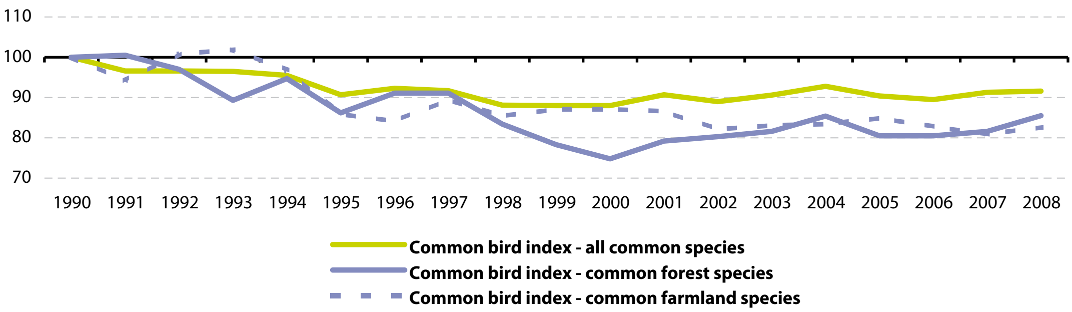
In 1998, the EU adopted a biodiversity strategy. Four action plans covering the conservation of natural resources, agriculture, fisheries, and economic and development cooperation were subsequently agreed as part of this strategy in 2001. The European Commission released a Communication ((2006) 216) 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 addresses the challenge of integrating biodiversity concerns into other policy areas. The Communication also contained indicators to monitor progress and a timetable for evaluations, whereby the European Commission has undertaken to report annually. In March 2010, the Council of the environment ministers of the EU acknowledged that the 2010 targets had not been met and agreed to set a new target, namely, to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, restoring them insofar as feasible, while stepping up the EU's contribution to averting global biodiversity loss.

Figure 11.39: Protected areas for biodiversity - sufficiency of sites, 2008
(%)



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

Figure 11.40: Common bird indices, EU (1)
(aggregated index of population estimates of selected groups of breeding bird species, 1990=100)



(1) Estimates; 'all common species' covers information on 135 different bird species; 'common farmland species' covers 36 bird species; 'common forest species' covers 29 bird species.

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