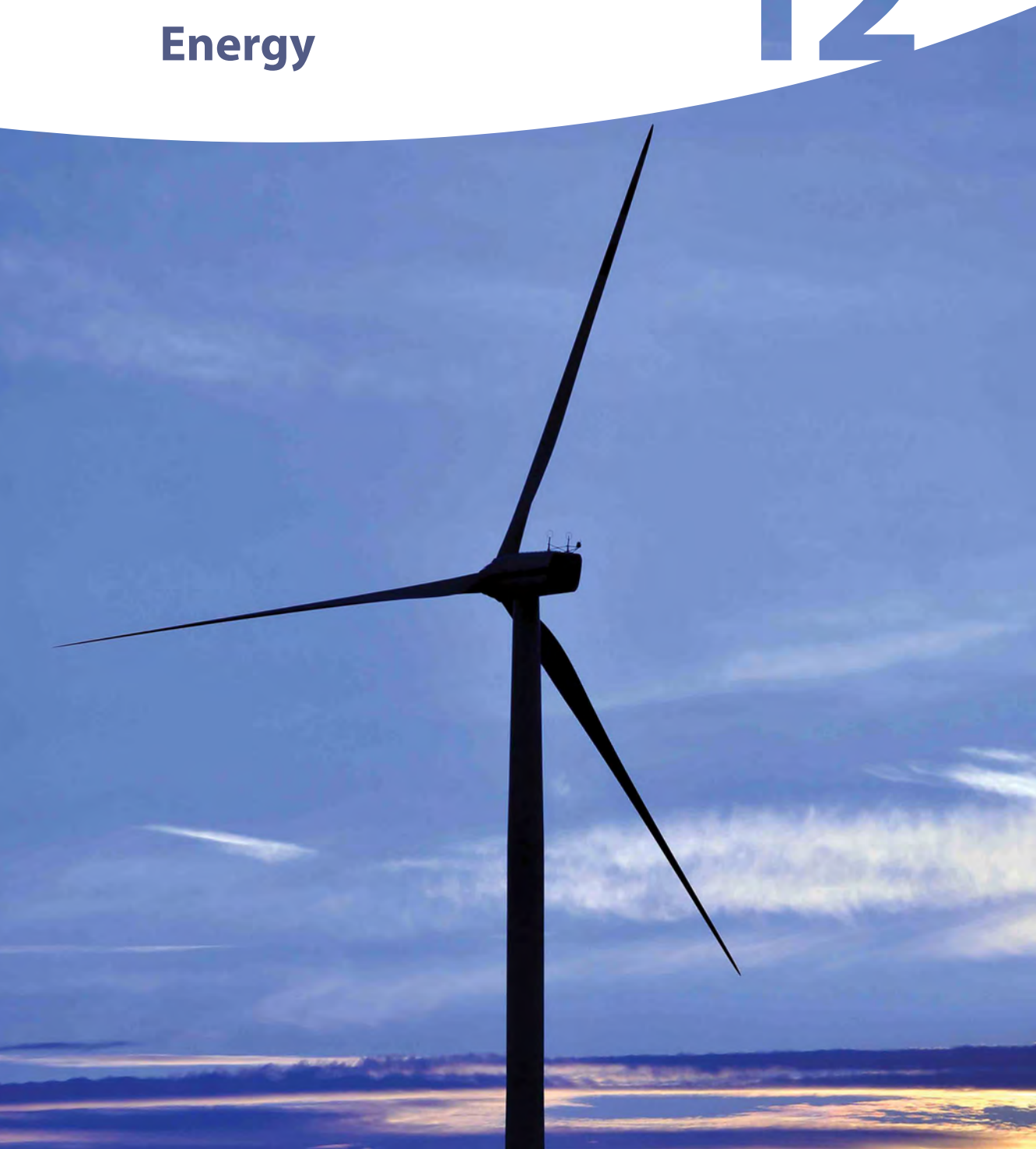


Energy

12





Introduction

A competitive, reliable and sustainable energy sector is essential for all advanced economies. The energy sector has been under the spotlight in recent years due to a number of issues that have pushed energy to the top of national and [European Union \(EU\)](#) political agendas, these include:

- the volatility of oil prices;
- interruption to energy supplies from non-member countries;
- blackouts aggravated by inefficient connections between national electricity networks;
- the difficulties of market access for suppliers in relation to gas and electricity markets;
- increased attention to anthropogenic (human-induced) effects on [climate change](#), in particular, increased greenhouse gas emissions.

The use of [renewable energy sources](#) is seen as a key element of the EU's energy policy and should help to: reduce dependence on fuel from non-member countries; reduce emissions from carbon-based energy sources, and; decouple energy costs from oil prices. Another key aspect of the EU's energy policy is to constrain consumption by promoting energy efficiency, both within the energy sector itself and among end-users. Indeed, the EU is putting in place an ambitious energy policy – covering a broad range of energy sources from fossil fuels (oil, gas and coal) to nuclear energy and renewables (solar, wind, biomass, geothermal, hydroelectric and tidal). This policy is designed to bring about a new industrial revolution that will result in a low-energy economy, whilst making the energy consumed more secure, competitive and sustainable, with the goal of the EU becoming a world leader in renewable energy and low-carbon technologies.

In January 2007, the [European Commission](#) adopted a Communication (COM(2007) 1) proposing a new energy policy for Europe, with the goal of combating climate change and boosting the EU's energy security and competitiveness through the development of a more sustainable and low-carbon economy. Based on the European Commission's

proposal, the European Council endorsed the following targets in March 2007, namely, to:

- reduce [greenhouse gas](#) emissions by at least 20 % (compared with 1990 levels) by 2020;
- improve energy efficiency by 20 % by 2020;
- increase the share of renewable energy in final energy consumption to 20 % by 2020;
- increase the share of renewable energy sources in the fuel used by the transport sector to 10 % by 2020.

Europe 2020

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. A number of key proposals have been adopted that are specific to energy.

In November 2010 the initiative 'Energy 2020 a strategy for competitive, sustainable and secure energy' (COM(2010) 639 final) was adopted by the European Commission. This strategy defines energy priorities for a period of ten years and proposes actions to be taken in order to tackle the challenges of saving energy, achieving a market with competitive prices and secure supplies, boosting technological leadership, and effectively negotiating with international partners.

The same month the European Commission adopted the initiative 'Energy infrastructure priorities for 2020 and beyond – a blueprint for an integrated European energy network' (COM(2010) 677 final). This defines EU priority corridors for the transport of electricity, gas and oil.

Energy efficiency is at the heart of the transition to a resource efficient economy and is considered to be one of the most cost effective ways to enhance security of energy supply and to reduce emissions of greenhouse gases and other pollutants. While substantial steps have been taken towards the target



for 2020 of saving 20% of primary energy consumption compared with projections – notably in the appliances and buildings markets – European Commission estimates indicated that the EU was on course to achieve only half of the 20% objective. As a consequence the European Commission developed the ‘Energy efficiency plan 2011’ (COM(2011) 109 final) which was adopted in March 2011 – see the subchapter on the [consumption of energy](#); the intention is to pursue this plan in conjunction with other policy actions under the Europe 2020 flagship initiative for a resource efficient Europe, including the ‘Roadmap for moving to a competitive low carbon economy by 2050’ (COM(2011) 112 final) – see the introduction for [environment](#).

Energy statistics

In order to meet the increasing requirements of policymakers for energy monitoring, the legislation relating to energy statistics has in recent years undergone a period of renewal. The new legal basis is Commission Regulation (EU) 844/2010 on energy statistics. The data collection exercise covers all EU Member States, Iceland, Norway, Switzerland, Croatia, the former Yugoslav Republic of Macedonia and Turkey. [Time series](#) for energy statistics go back to 1985 for some countries, but are more generally available from 1990 onwards; monthly data are also available for certain indicators.

12.1 Energy production and imports

The dependency of the [European Union \(EU\)](#) on energy [imports](#), particularly of oil and more recently of gas, forms the backdrop for policy concerns relating to the security of energy supplies. This subchapter looks at the [production of primary energy](#) in the EU and, as a result of the shortfall between production and consumption, the EU’s increasing dependency on energy imports from non-member countries. Indeed, more than half (53.9%) of the EU’s [gross inland energy consumption](#) in 2009 came from imported sources.

Main statistical findings

Primary production

Production of primary energy in the [EU-27](#) totalled 812.2 million [tonnes of oil equivalent \(toe\)](#) in 2009. This continued the generally downward trend of EU-27 production, as supplies of raw materials become exhausted and/or producers considered the exploitation of limited resources uneconomical. Production was dominated by the United Kingdom with a 19.2% share of the EU-27 total, although this marked a considerable reduction when compared with a decade earlier (29.3% of the EU-27 total in 1999). The largest producers of primary energy in 2009 were the United Kingdom, France and Germany, followed by Poland and the Netherlands (see

Table 12.1.1). The United Kingdom experienced by far the largest reduction in its output of primary energy, with production falling by 122.2 million toe over the period from 1999 to 2009; the next largest declines were recorded in Poland (16.2 million toe) and Germany (9.7 million toe). The largest expansions in the production of primary energy during the ten years to 2009 were in the Netherlands (3.7 million toe), France (2.6 million toe) and the Czech Republic (2.4 million toe).

Primary energy production in the EU-27 in 2009 was spread across a range of different energy sources, the most important of which was nuclear energy (28.4% of the total); the significance of nuclear fuel was particularly high in Belgium, France, Lithuania and Slovakia – where it accounted for more than half of the national production of primary energy. Around one fifth of the EU-27’s total production of primary energy was accounted for by solid fuels (20.4%, largely coal), by natural gas (18.8%) and by [renewable energy sources](#) (18.3%), while crude oil (12.8%) made up the remainder of the total (see Figure 12.1.1).

The growth of primary production from renewable energy sources exceeded that of all the other energy types, with particularly strong growth since 2002 (see Figure 12.1.2). Indeed, there appears to be something of a watershed since this date, as the



production of renewables accelerated, rising by 52.4 % between 2002 and 2009 and an overall 60.2 % between 1999 and 2009. In contrast, the production levels for the other primary sources of energy generally fell between 1999 and 2009. The largest reductions in the production of primary energy were recorded for crude oil (–42.3 %), solid fuels (–26.1 %) and natural gas (–24.6 %), with a more modest fall of 5.2 % for nuclear energy.

Imports

The downturn in the primary production of hard coal, lignite, crude oil, natural gas and more recently nuclear energy has led to a situation where the EU is increasingly reliant on primary energy imports in order to satisfy demand. The EU-27's imports of primary energy exceeded exports by some 943.6 million toe in 2009. The largest net importers of primary energy were generally the most populous Member States, with the exception of the United Kingdom and Poland (where indigenous reserves of oil/natural gas and coal remain). Since 2004 the only net exporter of primary energy among the EU Member States has been Denmark (see Table 12.1.2).

The origin of EU-27 energy imports has changed rapidly in recent years, as Russia has maintained its position as the main supplier of crude oil and natural gas and emerged as the leading supplier of hard coal (see Table 12.1.3). In 2009, some 33.1 % of the EU-27's imports of crude oil were from Russia; this was a return to the shares that it had provided in 2006 and 2007, having fallen to 31.4 % in 2008. Russia became the principal supplier of hard coal in 2006, overtaking South Africa, having overtaken Australia in 2004 and Colombia in 2002; Russia's share of EU-27 hard coal imports rose from 11.5 % in 2001 to 30.2 % by 2009, well ahead of the next highest share recorded by Colombia (17.6 %). In contrast, Russia's share of EU-27 imports of natural gas declined from 47.7 % to 34.2 % between 2001 and 2009, while Norway's share rose from 22.8 % to 30.7 %.

The security of the EU's primary energy supplies may be threatened if a high proportion of imports are concentrated among relatively few partners. Close to four fifths (79.1 %) of the EU-27's imports

of natural gas in 2009 came from Russia, Norway or Algeria. A similar analysis shows that 57.3 % of EU-27 crude oil imports came from Russia, Norway and Libya, while 77.5 % of hard coal imports were from Russia, Colombia, South Africa and the United States. Although their import volumes remain relatively small, there was some evidence of new partner countries emerging between 2001 and 2009. This was notably the case for hard coal imports from Indonesia, crude oil imports from Kazakhstan and Azerbaijan, or natural gas imports from Qatar, Libya, and Trinidad and Tobago.

EU-27 dependency on energy imports increased from less than 40 % of **gross energy consumption** in the 1980s to 45.1 % in 1999 and then to 53.9 % by 2009 (see Table 12.1.4). The highest **energy dependency rates** were recorded for crude oil (84.1 %) and for natural gas (64.2 %). The dependency on non-member countries for supplies of solid fuels and natural gas grew at a faster pace in the last decade than the dependency on crude oil (which was already at a high level). Since 2004, the EU-27's net imports of energy have been greater than its primary production; in other words, more than half of the EU-27's gross inland energy consumption was supplied by net imports.

As it was a net exporter, Denmark was the only EU-27 Member State in 2009 with a negative dependency rate (see Figure 12.1.3). Among the other Member States, the lowest dependency rates were recorded by Romania, Estonia, the United Kingdom and the Czech Republic (the only other countries to report dependency rates below 30 %); meanwhile, Malta, Luxembourg and Cyprus were almost entirely dependent on primary energy imports.

Data sources and availability

Energy **commodities** extracted or captured directly from natural resources are called primary energy sources, while energy commodities which are produced from primary energy sources in transformation plants are called derived products. Primary energy production covers the national production of primary energy sources and takes place when natural resources are exploited, for example, in coal mines, crude oil fields, hydropower plants, or in



the fabrication of **biofuels**. Whenever consumption exceeds primary production, the shortfall needs to be accounted for by imports of primary or derived products.

The heat produced in a reactor as a result of nuclear fission is regarded as primary production of nuclear heat, alternatively referred to as, nuclear energy. It is calculated either on the basis of the actual heat produced or on the basis of reported **gross electricity generation** and the thermal efficiency of the nuclear plant. Primary production of coal and lignite consists of quantities of fuels extracted or produced, calculated after any operation for the removal of inert matter.

Transformation of energy from one form to another, such as electricity or heat generation from thermal power plants, or coke production from coke ovens is not considered as primary production.

Net imports are calculated as the quantity of imports minus the equivalent quantity of exports. Imports represent all entries into the national territory excluding transit quantities (notably via gas and oil pipelines); exports similarly cover all quantities exported from the national territory.

Context

More than half of the EU-27's energy comes from countries outside the EU – and this proportion is rising. Much of this energy comes from Russia, whose disputes with transit countries have threatened to disrupt supplies in recent years – for example, between 6 and 20 January 2009, gas flows from Russia via Ukraine were interrupted.

The **European Commission** adopted its second strategic energy review in November 2008. This addressed how the EU could reduce its dependency on imported energy, thereby improving its security of supply, as well as reducing its emissions of **greenhouse gases**. The review encouraged energy solidarity among Member States, proposed an action plan to secure **sustainable** energy supplies, and adopted a package of energy-efficiency proposals aimed at making energy savings in key areas, such as buildings and energy-using products.

In response to the Russian-Ukrainian gas crisis of January 2009, the legislative framework concerning the security of supplies was reviewed and in September 2009 the **European Council** adopted Directive 2009/119/EC imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products. These measures for oil and gas markets were designed to ensure that all parties take effective action to prevent and mitigate the consequences of potential disruptions to supplies, while also creating mechanisms for Member States to work together to deal effectively with any major oil or gas disruptions which might arise; a coordination mechanism was set-up so that Member States can react uniformly and immediately in emergency cases.

A broad mix of energy sources and diversity in suppliers, transport routes and transport mechanisms may each play an important role in securing energy supplies. Building reliable partnerships with supplier, transit and consumer countries is seen as a way to reduce the risks associated with the EU's energy dependency and in September 2011 the European Commission adopted Communication COM(2011) 539 final titled 'The EU energy policy: engaging with partners beyond our borders'.

In November 2010, an initiative titled 'Energy 2020 a strategy for competitive, sustainable and secure energy' (COM(2010) 639 final) was adopted by the European Commission. This strategy defines the energy priorities for a period of ten years and sets the actions to be taken in order to tackle a variety of challenges, including achieving a market with competitive prices and secure supplies, boosting technological leadership, and effectively negotiating with international partners.

The same month the European Commission adopted an initiative titled 'Energy infrastructure priorities for 2020 and beyond – a blueprint for an integrated European energy network' (COM(2010) 677 final). This defines EU priority corridors for the transport of electricity, gas and oil. A toolbox is also proposed in order to facilitate a timely implementation of these priority infrastructures.

There are a number of on-going initiatives to develop gas pipelines between Europe and its



eastern and southern neighbours. These include the Nord Stream (between Russia and the EU via the Baltic Sea) which was due to become operational in the autumn of 2011, the south stream (between

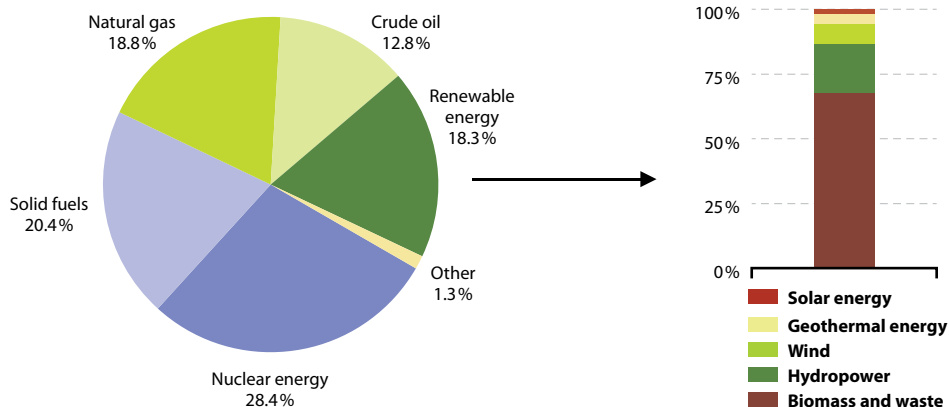
Russia and the EU via the Black Sea) scheduled to be completed by 2015 and Nabucco (connecting the Caspian region and Middle East to the EU) scheduled to be operational by 2017.

Table 12.1.1: Energy production, 1999 and 2009
(million tonnes of oil equivalent)

	Total production of primary energy		Share of total production, 2009 (%)				
	1999	2009	Nuclear energy	Solid fuels	Natural gas	Crude oil	Renewable energy
EU-27	949.4	812.2	28.4	20.4	18.8	12.8	18.3
Euro area	447.9	448.4	39.8	14.6	17.1	3.3	23.4
Belgium	13.6	14.6	83.7	0.0	0.0	0.0	11.4
Bulgaria	9.1	9.7	40.8	47.0	0.1	0.3	11.6
Czech Republic	28.7	31.1	22.6	67.0	0.5	1.0	8.3
Denmark	23.8	23.9	0.0	0.0	31.5	55.4	11.5
Germany	137.2	127.5	27.3	35.9	8.7	3.6	21.7
Estonia	3.0	4.2	0.0	79.2	0.0	0.0	20.8
Ireland	2.5	1.5	0.0	38.2	20.8	0.0	40.2
Greece	9.5	10.1	0.0	81.1	0.1	0.8	17.9
Spain	30.5	29.6	46.0	12.3	0.0	0.4	40.2
France	125.8	128.5	82.3	0.0	0.6	1.0	15.2
Italy	29.4	27.3	0.0	0.2	24.0	19.0	54.0
Cyprus	0.0	0.1	0.0	0.0	0.0	0.0	91.5
Latvia	1.6	2.1	0.0	0.3	0.0	0.0	99.6
Lithuania	3.5	4.0	71.7	0.4	0.0	2.9	25.0
Luxembourg	0.1	0.1	0.0	0.0	0.0	0.0	75.5
Hungary	11.9	11.0	36.4	14.2	20.9	11.0	16.9
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands	59.5	63.2	1.7	0.0	89.2	3.5	4.4
Austria	9.7	11.4	0.0	0.0	12.6	9.2	73.3
Poland	83.4	67.2	0.0	83.5	5.5	1.0	9.0
Portugal	3.4	4.9	0.0	0.0	0.0	0.0	97.2
Romania	28.1	28.5	10.6	23.0	31.4	16.4	18.5
Slovenia	2.9	3.5	42.0	32.9	0.1	0.0	24.5
Slovakia	5.5	5.7	64.5	11.4	1.5	0.3	21.4
Finland	15.4	16.4	37.1	13.3	0.0	0.9	47.8
Sweden	32.7	29.9	45.0	0.7	0.0	0.0	52.8
United Kingdom	278.6	156.3	11.4	6.4	34.4	44.2	3.3
Norway	209.7	215.9	0.0	0.8	42.0	51.5	5.6
Switzerland	12.0	12.7	56.5	0.0	0.0	0.0	37.5
Croatia	3.6	4.1	0.0	0.0	54.0	20.4	25.3
Turkey	27.5	30.3	0.0	57.3	1.9	8.1	32.7

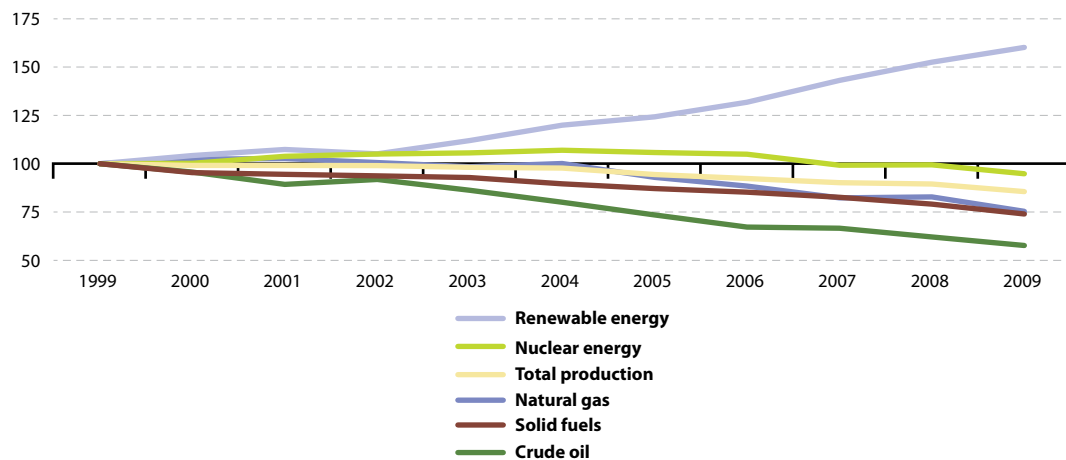
Source: Eurostat (online data codes: [ten00076](#), [ten00080](#), [ten00077](#), [ten00079](#), [ten00078](#) and [ten00081](#))

Figure 12.1.1: Production of primary energy, EU-27, 2009
(% of total, based on tonnes of oil equivalent)



Source: Eurostat (online data codes: [ten00080](#), [ten00077](#), [ten00079](#), [ten00078](#), [ten00081](#) and [ten00082](#))

Figure 12.1.2: Development of the production of primary energy (by fuel type), EU-27, 1999-2009
(1999=100, based on tonnes of oil equivalent)



Source: Eurostat (online data codes: [ten00076](#), [ten00081](#), [ten00080](#), [ten00079](#), [ten00078](#) and [ten00077](#))



Table 12.1.2: Net imports of primary energy, 2001-2009

	(1 000 tonnes of oil equivalent)					(tonnes of oil equivalent per inhabitant)				
	2001	2003	2005	2007	2009	2001	2003	2005	2007	2009
EU-27	856569	903284	983448	986455	943604	1.77	1.86	2.00	1.99	1.89
Euro area	806186	836382	866700	842788	794996	2.56	2.62	2.68	2.58	2.41
Belgium	51476	52914	53362	51037	48383	5.02	5.11	5.11	4.82	4.50
Bulgaria	9045	9179	9590	10455	8060	1.11	1.17	1.24	1.36	1.06
Czech Republic	10733	11296	12792	11589	11368	1.05	1.11	1.25	1.13	1.09
Denmark	-6075	-6895	-10450	-5370	-3735	-1.14	-1.28	-1.93	-0.99	-0.68
Germany	216740	213397	213906	201278	202708	2.63	2.59	2.59	2.45	2.47
Estonia	1697	1475	1442	1501	1166	1.24	1.09	1.07	1.12	0.87
Ireland	13671	13614	13715	14167	13163	3.57	3.43	3.34	3.29	2.96
Greece	22447	22632	23473	24801	22522	2.05	2.06	2.12	2.22	2.00
Spain	99932	109055	123978	123275	110244	2.47	2.62	2.88	2.77	2.41
France	136296	138688	144391	137802	136002	2.24	2.24	2.30	2.17	2.11
Italy	148272	156335	160223	158591	141905	2.60	2.73	2.74	2.68	2.36
Cyprus	2502	2663	2822	2878	2920	3.59	3.72	3.77	3.70	3.66
Latvia	2531	2791	2990	3037	2706	1.07	1.20	1.30	1.33	1.20
Lithuania	3917	4099	5100	5791	4340	1.12	1.18	1.49	1.71	1.30
Luxembourg	3728	4153	4684	4487	4260	8.49	9.26	10.16	9.42	8.63
Hungary	13879	16410	17501	16526	14878	1.36	1.62	1.73	1.64	1.48
Malta	1594	1809	1606	1798	1985	4.07	4.55	3.99	4.41	4.80
Netherlands	32033	35824	38102	39551	34913	2.00	2.21	2.34	2.42	2.12
Austria	19935	23127	24620	23276	21002	2.49	2.86	3.00	2.81	2.51
Poland	9396	12081	16437	25039	30255	0.25	0.32	0.43	0.66	0.79
Portugal	21844	22391	24768	21939	20584	2.13	2.15	2.35	2.07	1.94
Romania	9817	10229	10848	12790	7190	0.44	0.47	0.50	0.59	0.33
Slovenia (1)	3389	3700	3830	3876	3436	1.70	1.85	1.92	1.93	1.69
Slovakia	11711	12196	12491	12239	11164	2.18	2.27	2.32	2.27	2.06
Finland	18919	22410	19289	20293	18637	3.65	4.30	3.68	3.85	3.50
Sweden	19166	22879	20206	18981	17951	2.16	2.56	2.24	2.08	1.94
United Kingdom	-22027	-15168	31733	44830	55597	-0.37	-0.26	0.53	0.74	0.90
Norway	-202595	-206812	-197031	-188179	-187746	-44.99	-45.43	-42.77	-40.20	-39.12
Switzerland	15262	14739	16254	14129	15646	2.12	2.02	2.19	1.88	2.03
Croatia	4171	4987	5255	5334	4461	0.94	1.12	1.18	1.20	1.01
Turkey (2)	46335	56794	62138	76096	70635	0.68	0.81	0.87	1.09	0.99

(1) Tonnes of oil equivalent per inhabitant, break in series, 2009.

(2) Tonnes of oil equivalent per inhabitant, break in series, 2007.

Source: Eurostat (online data codes: [nrg_100a](#) and [tps00001](#))



Table 12.1.3: Main origin of primary energy imports, EU-27, 2001-2009
(% of extra EU-27 imports)

Hard coal									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
Russia	11.5	13.1	13.5	18.7	24.1	25.4	25.1	26.3	30.2
Colombia	12.5	12.6	12.5	12.1	12.1	12.0	13.0	12.5	17.6
South Africa	27.0	31.4	31.5	26.6	25.7	24.3	20.8	17.1	16.0
United States	11.2	8.2	7.0	7.5	7.8	8.0	9.3	14.3	13.7
Australia	16.3	16.9	17.0	15.3	13.5	12.4	13.5	12.0	7.6
Indonesia	5.7	6.7	7.1	7.0	7.4	9.7	7.9	7.4	7.1
Ukraine	1.6	2.0	1.3	2.0	2.1	1.6	1.7	2.2	1.6
Canada	3.8	3.2	2.9	2.5	3.3	2.8	3.1	2.7	1.4
Norway	0.9	1.0	1.2	0.6	0.6	0.3	0.6	0.6	0.8
Others	9.7	5.0	6.0	7.8	3.5	3.7	5.0	4.8	3.9
Crude oil									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
Russia	25.5	29.2	31.1	32.2	32.5	33.4	33.2	31.4	33.1
Norway	20.1	19.4	19.2	18.8	16.9	15.5	15.1	15.1	15.2
Libya	8.2	7.5	8.4	8.8	8.8	9.2	9.8	9.9	9.0
Saudi Arabia	10.8	10.1	11.3	11.3	10.6	9.1	7.2	6.9	5.7
Kazakhstan	1.6	2.4	2.7	3.4	4.5	4.6	4.6	4.8	5.4
Iran	5.9	4.9	6.4	6.3	6.1	6.2	6.2	5.4	4.7
Nigeria	4.8	3.5	4.3	2.6	3.2	3.6	2.7	4.0	4.5
Azerbaijan	0.9	1.0	1.0	0.9	1.3	2.2	3.0	3.2	4.0
Iraq	3.8	3.0	1.6	2.2	2.1	2.9	3.4	3.3	3.8
Others	18.3	18.8	14.2	13.4	14.0	13.2	14.7	16.1	14.6
Natural gas									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
Russia	47.7	45.0	45.1	43.8	40.6	39.3	38.4	37.6	34.2
Norway	22.8	26.2	25.5	25.0	24.4	25.5	28.2	28.9	30.7
Algeria	21.2	21.2	20.0	18.2	18.0	16.4	15.4	14.7	14.1
Qatar	0.3	0.9	0.7	1.4	1.6	1.8	2.2	2.2	4.6
Libya	0.4	0.3	0.3	0.4	1.7	2.5	3.0	2.9	2.9
Nigeria	2.3	2.2	3.1	3.7	3.5	4.3	4.7	4.0	2.4
Trinidad and Tobago	0.3	0.2	0.0	0.0	0.2	1.3	0.8	1.6	2.2
Egypt	0.0	0.0	0.0	0.0	1.6	2.5	1.8	1.7	2.1
Oman	0.4	0.4	0.2	0.5	0.6	0.3	0.1	0.1	0.4
Others	4.6	3.7	5.1	7.0	7.8	6.1	5.4	6.3	6.4

Source: Eurostat (online data codes: [nrg_122a](#), [nrg_123a](#) and [nrg_124a](#))

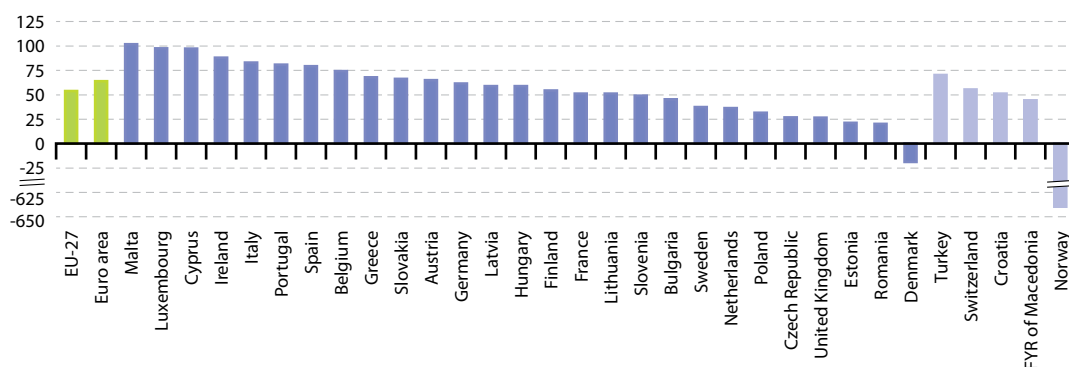


Table 12.1.4: Energy dependency rate, EU-27, 1999-2009
(% of net imports in gross inland consumption and bunkers, based on tonnes of oil equivalent)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
All products	45.1	46.7	47.4	47.6	49.0	50.2	52.5	53.7	53.0	54.7	53.9
Solid fuels	27.5	30.5	33.7	33.1	34.9	38.1	39.3	41.0	41.3	44.7	41.1
Crude oil	74.2	75.6	77.7	76.4	78.7	80.9	82.4	83.9	83.6	85.0	84.1
Natural gas	47.9	48.9	47.2	51.1	52.4	53.9	57.7	60.8	60.3	62.3	64.2

Source: Eurostat (online data codes: [nrg_100a](#), [nrg_101a](#), [nrg_102a](#) and [nrg_103a](#))

Figure 12.1.3: Energy dependency rate – all products, 2009
(% of net imports in gross inland consumption and bunkers, based on tonnes of oil equivalent)



Source: Eurostat (online data codes: [tsdcc310](#) and [nrg_100a](#))

12.2 Consumption of energy

The [European Union \(EU\)](#) has pledged to cut its energy consumption by 20% (compared with projected levels) by 2020. This subchapter explains how the consumption of energy in the EU has evolved, highlighting a gradual shift from [fossil fuels](#) to [renewable energy sources](#), such as solar energy, wind power, and [biofuels](#); it also looks at the evolution of energy use by various transport modes.

In tandem with supply-side policies, the EU has launched a number of initiatives which aim to increase the efficiency of energy use, reduce energy demand and attempt to decouple it from economic growth. Several instruments and implementing measures exist in this field, including the promotion of [co-generation](#), the energy performance of

buildings (whether private or public buildings), and energy labelling of domestic appliances.

Main statistical findings

Consumption

[Gross inland energy consumption](#) of primary energy within the EU-27 in 2009 was 1 703 million tonnes of oil equivalent (toe). While gross inland consumption had remained relatively unchanged throughout the period from 2003 to 2008 the data for 2009 indicate a substantial decrease, -5.5% compared with 2008 (see Table 12.2.1); much of the decrease may well be attributed to a lower level of economic activity as a result of the financial and



economic crisis, rather than a structural shift in the pattern of energy consumption.

The gross inland consumption of each Member State depends, to a large degree, on the structure of its energy system, the availability of natural resources for **primary energy production**, and the structure and development of each economy (general trends in economic growth); this is true not only for conventional fuels and nuclear power, but also for renewable energy sources. Despite falls in 2009 in all EU Member States, gross inland consumption of primary energy had increased at a rapid annual average rate in Luxembourg and Cyprus throughout the period from 1999 to 2009, and at a slower average rate in Greece, Austria and Spain. The largest reduction in gross inland consumption of primary energy (during the same ten-year period) was recorded in the United Kingdom (-10.1%).

Over the period 1999 to 2009 there was a gradual decline in the share of crude oil and petroleum products, solid fuels, and nuclear energy in total gross inland consumption, while an increasing share of EU-27 consumption was accounted for by natural gas and renewable energy sources (see Figure 12.2.1). The combined share of crude oil, petroleum products and solid fuels fell from 57.5% of total consumption in 1999 to 52.3% in 2009, reflecting changes in the EU-27's energy mix and a move away from the most polluting fossil fuels. During the same period, the relative importance of natural gas rose by 2.1 percentage points, reaching 24.5% of the EU-27's gross inland consumption by 2009 while the relative importance of renewable energy sources rose 3.5 percentage points to reach 9.0%. The relative importance of renewable energy sources was over one third of gross inland consumption in Latvia (36.2%) and Sweden (34.4%), and was over one quarter of the total in Austria (27.3%).

EU-27 **final energy consumption** (in other words, excluding energy used by power producers) was equivalent to just under two thirds (65.4%) of gross inland consumption, at 1 114 million toe in 2009. Almost one fifth (19.2%) of the EU-27's final energy consumption was accounted for by Germany (see Table 12.2.2).

The lowest levels of **energy intensity** – a measure of an economy's energy efficiency – were recorded for Denmark and Ireland in 2009, while the most energy-intensive Member States were Bulgaria, Estonia and Romania (see Figure 12.2.2). It should be noted that the economic structure of an economy plays an important role in determining energy intensity, as post-industrial economies with large service sectors will, a priori, have considerably lower energy use than economies characterised by heavy, traditional industrial activities. Between 1999 and 2009, substantial energy savings were made in the Bulgarian and Romanian economies, as well as in the **Baltic Member States**, Malta, Poland and Slovakia, as the amount of energy required to produce a unit of economic output (as measured by gross domestic product (GDP)) was reduced by 25% or more; Ireland, Sweden and the United Kingdom also achieved reductions of just under one quarter.

End-users

An analysis of the final end use of energy shows three dominant categories, namely, transport, industry and **households**. The share consumed by transport was around one third of the EU-27's final energy consumption in 2009 (see Figure 12.2.3), while the shares of households and industry were nearer to one quarter. The total energy consumption of all **transport modes** in the EU-27 amounted to 367.6 million toe in 2009. There were, however, considerable differences in the development of energy consumption across transport modes, with the most rapid growth recorded for international aviation (18.9% between 1999 and 2009) and an upward trend for road transport (7.3%) and domestic aviation (5.0%), while the energy consumption of rail fell 14.5% and that of inland waterways by 5.6% – see Figure 12.2.4. The largest increase in energy consumption among the different transport modes, in absolute terms, was recorded for road transport, where EU-27 consumption rose by 20.4 million toe between 1999 and 2009, compared with a 6.8 million toe increase for international aviation and a 0.4 million toe increase for domestic aviation. These changes in energy consumption reflect the



use of each transport mode, but can also be influenced by technological changes, especially when these relate to fuel-efficiency gains.

Data sources and availability

Gross inland energy consumption represents the quantity of energy necessary to satisfy inland consumption of the geographical entity under consideration. It may be defined as primary production plus imports, recovered products and stock changes, less exports and fuel supply to maritime bunkers (for seagoing ships of all flags). It describes the total energy needs of a country (or entity), covering: consumption by the energy sector itself; distribution and transformation losses; final energy consumption by end-users; and statistical differences.

Final energy consumption includes the consumption of energy by all users except the energy sector itself (whether for deliveries, for transformation, and/or its own use), and includes, for example, energy consumption by agriculture, industry, services and households, as well as energy consumption for transport. It should be noted that fuel quantities transformed in the electrical power stations of industrial auto-producers and the quantities of coke transformed into blast-furnace gas are not part of overall industrial energy consumption but of the transformation sector.

Energy intensity is measured as the ratio between gross inland consumption of energy and GDP; this indicator is a key indicator for measuring progress under the Europe 2020 strategy for smart, sustainable and inclusive growth. The ratio is expressed in kilograms of oil equivalent (kgoe) per EUR 1 000, and to facilitate analysis over time the calculations are based on GDP at constant prices (currently chain-linked 2000 prices). If an economy becomes more efficient in its use of energy and its GDP remains constant, then the ratio for this indicator should fall. The economic structure of an economy plays an important role in determining energy intensity, as post-industrial economies with large service sectors will, a priori, display relatively low energy intensity rates, while developing economies may

have a considerable proportion of their economic activity within industrial sectors, thus leading to higher energy intensity.

Context

As well as supply-side policies to influence the production of energy, there is a growing trend for policy initiatives to focus on improving energy efficiency in an attempt to reduce energy demand and decouple it from economic growth. This process was given impetus by the integrated energy and climate change strategy that committed the EU to cut its energy consumption by 20% by 2020 (in relation to projected levels) and, in so doing, simultaneously address the issues of import dependency, energy-related emissions, and energy costs. The European Commission adopted the 'Energy Efficiency Plan 2011' (COM(2011) 109 final) in March 2011. The stated aim is to pursue this plan in conjunction with other policy actions under the Europe 2020 flagship initiative for a resource-efficient Europe, including the 'Roadmap for moving to a competitive low carbon economy by 2050' (COM(2011) 112 final) – see the [introduction to the environment](#) chapter. The energy efficiency plan proposes several actions to:

- promote the exemplary role of the public sector and propose a binding target to accelerate the refurbishment rate of the public sector building stock; introduce energy efficiency criteria in public procurement;
- trigger the renovation process in private buildings and improve the energy performance of appliances;
- improve the efficiency of power and heat generation;
- foresee energy efficiency requirements for industrial equipment, improved information provision for SMEs, and energy audits and energy management systems for large companies;
- focus on the roll-out of smart grids and smart meters providing consumers with the information and services necessary to optimise their energy consumption and calculate their energy savings.



The EU harmonises national measures relating to the publication of information on the consumption of energy by household appliances, thereby allowing consumers to choose appliances on the basis of their energy efficiency – a range of different products (for example, light bulbs, refrigerators, washing machines) carry the EU's energy label that details the energy efficiency of products, rating them according to a scale that ranges from A to G, with 'A' as the most energy efficient products and 'G' the least efficient.

Despite falls in the amount of energy consumed for transport in 2008 and 2009 (at least, in part, reflecting the impact of the financial and economic crisis), an analysis of a longer time series shows that transport was the fastest growing consumer of energy and producer of greenhouse gases, even if advances in transport technology and fuel have resulted in marked decreases in emissions of certain

pollutants. There are many factors that impact on energy use for transport, for example, overall economic growth, the efficiency of individual transport modes, the take-up of alternative fuels, and lifestyle choices. The globalised nature of the economy has fuelled demand for international freight movements (principally by ship), while within the Single Market there has been a considerable expansion in the use of road freight transport. The growth in demand for energy for transport is not confined to business, as it has been accompanied by an expansion in personal travel. The growth of low-cost airlines, an increase in motorisation rates (the average number of motor vehicles per inhabitant), a trend for living in suburban areas, or the expansion of tourism (more frequent breaks, and more long-haul destinations) are among some of the factors that have contributed to increase the demand for energy as a result of personal travel.



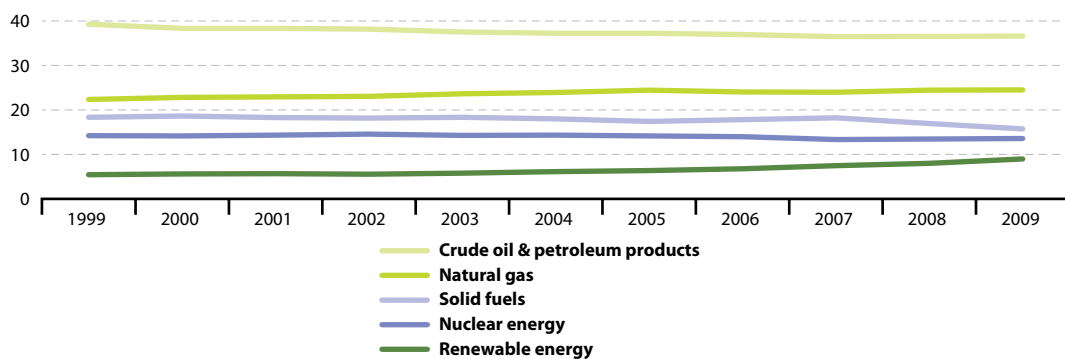
Table 12.2.1: Gross inland consumption of primary energy, 1999-2009
(million tonnes of oil equivalent)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Share in EU-27, 2009 (%)
EU-27	1 711	1 725	1 763	1 758	1 799	1 818	1 823	1 825	1 806	1 802	1 703	100.0
Euro area	1 185	1 203	1 232	1 231	1 261	1 277	1 280	1 277	1 269	1 267	1 202	70.6
Belgium	59.0	59.2	58.6	56.4	59.6	59.2	59.0	58.4	57.0	59.6	58.2	3.4
Bulgaria	18.3	18.7	19.5	19.1	19.5	19.0	20.1	20.6	20.3	20.1	17.6	1.0
Czech Republic	39.2	41.3	42.3	42.7	44.7	45.8	45.3	46.3	46.3	45.1	42.3	2.5
Denmark	20.3	19.8	20.3	20.0	20.9	20.3	19.8	21.1	20.7	20.1	19.4	1.1
Germany	341.5	343.6	353.3	345.4	348.5	350.1	346.0	348.9	339.8	342.8	326.6	19.2
Estonia	5.0	5.0	5.2	5.0	5.5	5.7	5.6	5.4	6.1	5.9	5.3	0.3
Ireland	13.7	14.2	15.1	15.2	15.0	15.2	15.2	15.5	15.9	15.9	14.9	0.9
Greece	27.0	28.3	29.1	29.6	30.3	30.8	31.4	31.6	31.6	31.8	30.6	1.8
Spain	118.0	124.0	127.1	130.9	135.3	141.4	144.4	144.6	146.4	142.0	130.2	7.6
France	255.0	257.8	266.2	266.7	271.5	275.7	276.6	273.6	271.1	274.3	262.7	15.4
Italy	172.6	175.8	176.3	176.7	184.2	185.1	187.7	186.3	183.6	180.8	168.9	9.9
Cyprus	2.2	2.4	2.4	2.4	2.7	2.5	2.5	2.6	2.7	2.9	2.8	0.2
Latvia	4.0	3.7	4.1	4.0	4.3	4.4	4.5	4.6	4.8	4.6	4.3	0.3
Lithuania	7.9	7.1	8.2	8.7	9.1	9.2	8.7	8.5	9.2	9.2	8.3	0.5
Luxembourg	3.4	3.6	3.8	4.0	4.2	4.7	4.8	4.7	4.6	4.6	4.4	0.3
Hungary	25.9	25.3	25.9	25.9	26.5	26.2	27.7	27.5	27.0	26.8	25.3	1.5
Malta	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	1.0	0.9	0.8	0.0
Netherlands	74.8	76.6	78.9	79.0	81.3	82.7	82.5	80.2	85.8	83.8	81.6	4.8
Austria	29.2	29.2	30.7	31.1	32.8	33.1	34.5	34.4	33.9	34.2	32.3	1.9
Poland	93.5	89.8	90.5	89.4	91.6	91.9	93.1	97.7	97.3	99.0	95.3	5.6
Portugal	25.0	25.1	25.3	26.3	25.7	26.7	27.4	25.7	26.3	25.2	25.0	1.5
Romania	36.7	36.8	37.3	38.7	40.3	39.5	39.3	40.8	40.6	40.5	35.4	2.1
Slovenia	6.4	6.4	6.7	6.8	6.9	7.1	7.3	7.3	7.3	7.8	7.0	0.4
Slovakia	17.8	18.0	18.8	19.0	18.9	18.6	19.1	18.9	17.9	18.4	16.8	1.0
Finland	33.3	32.8	33.5	35.3	37.4	37.6	34.8	37.9	37.6	36.1	34.0	2.0
Sweden	50.2	47.7	50.6	51.7	50.7	52.8	51.7	50.5	50.3	50.0	45.9	2.7
United Kingdom	230.0	231.7	232.4	227.0	230.9	232.0	233.4	230.2	221.5	219.4	206.8	12.1
Norway	26.8	26.1	27.2	25.3	27.4	26.9	27.3	27.7	28.1	30.3	28.9	–
Switzerland	26.7	26.4	27.9	27.1	27.1	27.1	27.0	28.2	27.0	28.1	28.2	–
Croatia	8.0	7.8	8.0	8.3	8.9	8.9	9.0	9.0	9.4	9.1	8.7	–
Turkey	71.2	76.7	71.0	75.5	79.2	82.0	85.7	94.4	101.5	100.2	100.0	–

Source: Eurostat (online data code: [ten00086](#))



Figure 12.2.1: Gross inland consumption, EU-27, 1999-2009
(% of total consumption)



Source: Eurostat (online data codes: [ten00086](#), [nrg_102a](#), [nrg_103a](#), [nrg_101a](#), [nrg_104a](#) and [nrg_1071a](#))

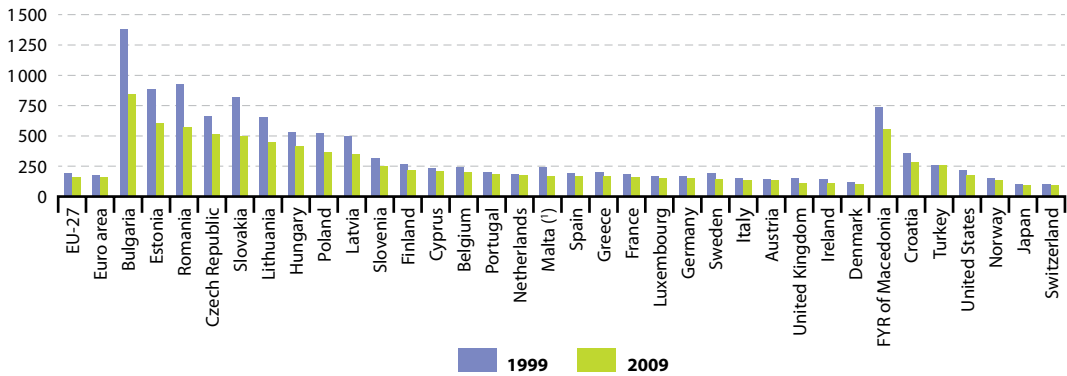


Table 12.2.2: Final energy consumption, 1999-2009
(million tonnes of oil equivalent)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Share in EU-27, 2009 (%)
EU-27	1 113	1 120	1 144	1 132	1 172	1 186	1 193	1 193	1 167	1 175	1 114	100.0
Euro area	774	784	804	799	831	841	845	844	821	831	789	70.9
Belgium	37.0	37.4	37.9	36.1	38.3	37.7	36.6	36.1	34.6	37.5	34.5	3.1
Bulgaria	8.9	8.8	8.8	8.9	9.5	9.4	9.9	10.4	10.1	9.9	8.6	0.8
Czech Republic	23.7	24.7	25.2	24.4	25.7	26.2	26.0	26.4	25.8	25.5	24.4	2.2
Denmark	15.0	14.7	15.1	14.8	15.1	15.4	15.5	15.7	15.7	15.5	14.8	1.3
Germany	220.8	219.1	222.7	219.2	230.8	230.9	229.6	233.3	215.7	224.2	213.3	19.2
Estonia	2.4	2.4	2.7	2.6	2.7	2.8	2.9	2.9	3.1	3.1	2.8	0.2
Ireland	9.9	10.7	11.1	11.2	11.5	11.9	12.5	13.2	13.2	13.2	11.8	1.1
Greece	18.1	18.6	19.2	19.5	20.5	20.3	20.8	21.4	21.9	21.3	20.5	1.8
Spain	74.4	79.4	83.4	84.7	90.0	94.3	97.4	96.1	98.8	95.8	89.0	8.0
France	152.4	154.5	161.0	157.6	161.2	162.8	162.3	161.5	158.6	160.7	155.5	14.0
Italy	124.5	124.7	126.0	125.5	131.0	132.5	134.4	132.3	129.3	128.3	120.9	10.9
Cyprus	1.6	1.6	1.7	1.7	1.8	1.8	1.8	1.8	1.9	2.0	1.9	0.2
Latvia	3.4	3.2	3.6	3.6	3.8	3.9	4.0	4.2	4.4	4.2	3.9	0.4
Lithuania	4.1	3.7	3.9	4.0	4.1	4.3	4.5	4.8	5.0	4.9	4.4	0.4
Luxembourg	3.3	3.5	3.7	3.7	3.9	4.4	4.5	4.4	4.3	4.4	4.1	0.4
Hungary	16.3	16.1	16.9	16.9	17.6	17.5	18.2	17.9	16.9	17.1	16.4	1.5
Malta	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.0
Netherlands	49.2	50.5	51.3	51.3	52.0	52.8	52.3	50.9	49.8	51.1	50.4	4.5
Austria	23.3	23.7	25.0	25.3	26.6	26.9	28.3	27.6	27.4	27.6	26.3	2.4
Poland	58.9	55.6	56.0	54.5	56.0	58.1	58.2	60.8	61.7	62.2	60.9	5.5
Portugal	16.8	17.7	18.0	18.4	18.4	18.9	19.0	18.7	19.0	18.5	18.2	1.6
Romania	22.5	22.5	22.9	22.9	24.0	24.4	24.7	24.9	24.1	24.6	22.1	2.0
Slovenia	4.4	4.4	4.6	4.6	4.7	4.8	4.9	4.9	4.9	5.3	4.7	0.4
Slovakia	10.9	11.0	11.5	11.6	11.2	11.1	11.5	11.4	11.2	11.5	10.7	1.0
Finland	24.2	23.9	24.3	25.3	26.0	26.4	25.5	26.9	26.7	25.9	24.0	2.2
Sweden	35.1	34.9	34.3	34.1	34.0	33.9	33.6	33.2	33.3	32.6	31.6	2.8
United Kingdom	151.0	152.4	153.3	148.8	150.5	152.3	153.3	151.2	148.7	148.2	137.5	12.3
Norway	18.6	18.1	18.4	18.1	18.0	18.5	18.6	18.5	18.9	18.9	18.1	–
Switzerland	20.8	20.6	20.9	20.4	20.9	21.0	21.3	21.2	20.6	21.5	20.9	–
Croatia	5.4	5.4	5.5	5.6	6.0	6.2	6.3	6.5	6.5	6.6	6.3	–
Turkey	49.6	56.1	50.4	55.3	59.2	61.2	63.6	69.6	74.1	73.1	68.7	–

Source: Eurostat (online data code: [ten00095](#))

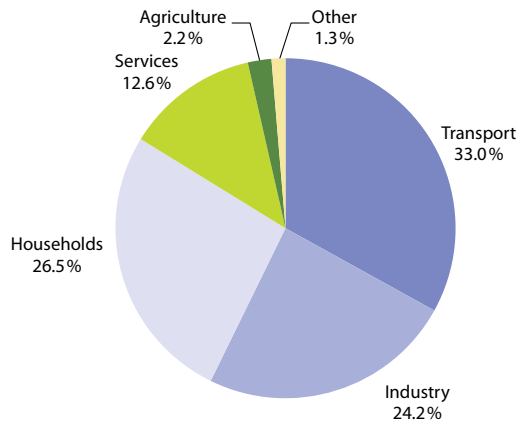
Figure 12.2.2: Energy intensity of the economy, 1999 and 2009
(kg of oil equivalent per EUR 1 000 of GDP)



(¹) 1999, provisional.

Source: Eurostat (online data code: [t2020_32](#))

Figure 12.2.3: Final energy consumption, EU-27, 2009 (¹)
(% of total, based on tonnes of oil equivalent)

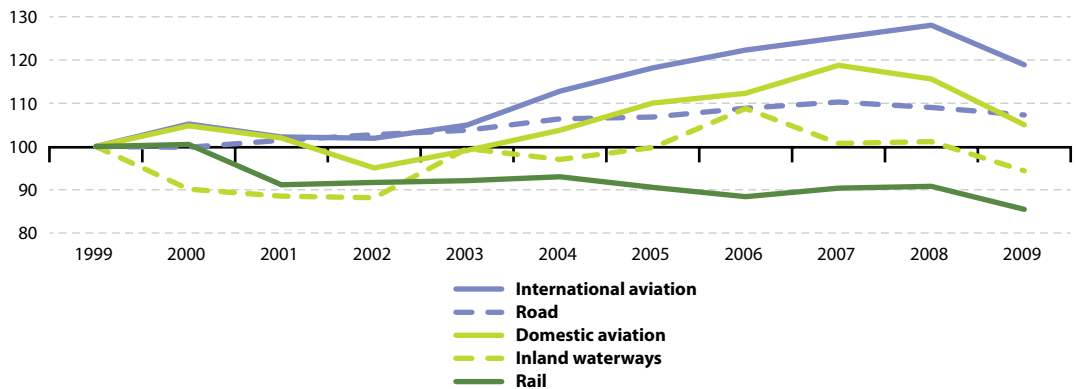


(¹) Figures do not sum to 100 % due to rounding.

Source: Eurostat (online data code: [tsdpc320](#))



Figure 12.2.4: Energy consumption by transport mode, EU-27, 1999-2009
(1999 = 100, based on tonnes of oil equivalent)



Source: Eurostat (online data code: tsdtr250)

12.3 Electricity production, consumption and market overview

This subchapter describes the electricity market in the [European Union \(EU\)](#) with an analysis of electricity generation according to a range of different energy sources used for generation. It also provides statistics on the level of market liberalisation (as measured by the share of the largest generator) within electricity markets and concludes with information concerning electricity consumption by [households](#).

The [European Commission](#) launched its third legislative package to liberalise energy markets in September 2007. The proposals were designed to: create a competitive energy market; expand consumer choice; promote fairer prices; result in cleaner energy; and promote the security of supply. In order to reach these goals, the proposals sought to: separate production and supply from transmission networks; facilitate cross-border collaboration, investment and trade in energy; introduce more effective regulation; encourage greater market transparency; and increase solidarity between EU Member States.

Main statistical findings

Electricity generation

Total [net electricity generation](#) in the [EU-27](#) was 3.0 million [gigawatt hours \(GWh\)](#) in 2009 – which marked a decrease of 4.9% compared with the year before, reflecting in part the impact of the financial and economic crisis. This large fall in the level of electricity generation effectively undid the increases built up over the five previous years, as the level of electricity generation in 2009 was approximately the same as it had been in 2003 (see [Table 12.3.1](#)). The reduction in 2009 was the first year on year fall in net electricity generation since 1992 (–0.5%); in the years between 1992 and 2008 net electricity generation in the EU-27 grew, on average, by 1.7% per annum. Among the Member States the most substantial decreases in net electricity generation in 2009 (compared with 2008) were recorded in Estonia, Romania and Hungary, all in excess of 10%. Only Lithuania (10.7%) recorded a double-digit increase in net electricity generation in 2009,



although increases in Portugal (9.3%) and Luxembourg (9.0%) were only slightly lower.

More than one quarter of the net electricity generated in the EU-27 in 2009 came from nuclear power plants (27.8%) while almost exactly double this share (55.4%) came from power stations using combustible fuels such as natural gas, coal and oil. Among the [renewable energy sources](#) shown in Figure 12.3.1, the highest share of net electricity generation in 2009 was from hydropower plants (11.6%), followed by wind turbines (4.3%) and solar power (0.5%).

The relative importance of combustible fuels rose from 54.1% in 1999 to 58.1% in 2007, before falling back to 55.4% in 2009. Over the same period the share of net electricity generation from nuclear energy fell from 32.1% in 1999 to just less than 28% in the period from 2007 to 2009. Among the renewable energy sources the share of net electricity generation from geothermal sources remained small and constant (0.15% to 0.17%) between 1999 and 2009, while the share from hydropower stations increased initially from 13.0% in 1999 to 13.5% in 2001, before stabilising in a range from 10.6% to 11.6% between 2002 and 2009. In contrast, the shares from solar and wind increased greatly although the share of solar remained small: the share of net electricity generation from solar power increased from close to nothing in 1999 to 0.5% by 2009; the share from wind turbines increased from 0.5% in 1999 to 4.3% by 2009.

Market shares

Germany and France were the principal electricity generators in the EU-27 in 2009, with shares of 18.3% and 17.0% respectively, while the United Kingdom was the only other Member State to report a share in double-digits (11.8%). The relative weight of Spain in EU-27 electricity generation rose quickly between 1999 and 2009, gaining 2.1 percentage points to reach 9.3% (see Table 12.3.1).

One measure that is used to monitor the extent of electricity market liberalisation is the market

share of the largest generator in each country (see Figure 12.3.2). The small island nations of Cyprus and Malta were both characterised by a complete monopoly in 2009, with 100% of their electricity being generated by the largest (sole) generator. Two other Member States – Estonia and Greece – reported shares for the largest generator of 90% or more. In 11 of the 23 Member States for which data are available, the largest generator provided less than 50% of the total electricity generated, with the lowest share (18.1%) being recorded in Poland.

Household electricity consumption

During the ten-year period from 1999 to 2009, the consumption of electricity by households rose in the EU-27 by 18.5% overall (see Figure 12.3.3). There was much faster growth in a number of Member States, in particular Cyprus, Spain, Portugal, Romania and all three of the [Baltic Member States](#) where growth was at least double the EU-27 average. At the other end of the range, household electricity consumption fell in two of the Member States (Belgium and Slovakia). These figures on overall household electricity consumption are likely to be influenced, in part, by the average number of persons living in each household and by the total number of households – both of which are linked to demographic events.

Data sources and availability

Electricity is produced as a primary or secondary product in power plants. The total amount of electricity produced is called gross electricity production. However, power plants consume some electricity for their own use (in plant auxiliaries and in other transformers) and net electricity production is obtained by deducting this amount from gross production. The net production is distributed through national transmission and distribution grids to final consumers, transformed to heat in boilers or heat pumps, stored using pumped storage, or traded (exported or imported).



Final consumption of electricity covers the electricity delivered to the consumer's door (industry, transport, households and other sectors); it excludes deliveries for transformation and/or own use of energy producing activities, as well as network losses.

The market share of electricity generators is based on their net electricity production, and as such the electricity used by generators for their own consumption is not taken into account.

Context

Since July 2004, small business consumers in the EU have been free to switch their gas or electricity supplier, and in July 2007 this right was extended to all consumers. Independent national regulatory authorities have been established across the Member States to ensure that suppliers and network companies operate correctly. However, a number of shortcomings were identified in the opening-up of markets, and it was therefore decided to embark upon a third legislative package of measures with the aim of ensuring that all users could take advantage of the benefits provided by a truly competitive energy market. The European Commission launched its third legislative package to liberalise energy markets in September 2007. These proposals were designed to: create a competitive energy market; expand consumer choice; promote fairer prices; result in cleaner energy; and promote the security of supply. During 2009, a number of these

proposals were adopted by the [European Parliament](#) and the [Council](#). This raft of legislation came into effect as of March 2011:

- Regulation 713/2009 of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators;
- Regulation 714/2009 of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation 1228/2003;
- Directive 2009/72/EC of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.

The use of nuclear power for electricity generation has received renewed attention amid concerns about an increasing dependency on imported primary energy, rising oil and gas prices, and commitments to reduce greenhouse gas emissions. These have been balanced against long-standing concerns about safety and waste from nuclear power plants. On 25 June 2009, a European Council Directive 2009/71 was adopted concerning a framework for the nuclear safety of nuclear installations. The safety aspects of nuclear energy were highlighted by the Fukushima Dai-ichi disaster, following the Great East Japan (or Tōhoku) earthquake and subsequent tsunami in March 2011. While some Member States have continued with existing reactors or plans to construct new nuclear reactors others decided to review, and in some cases, changed policies for existing plants, as well as cancelling planned nuclear constructions.



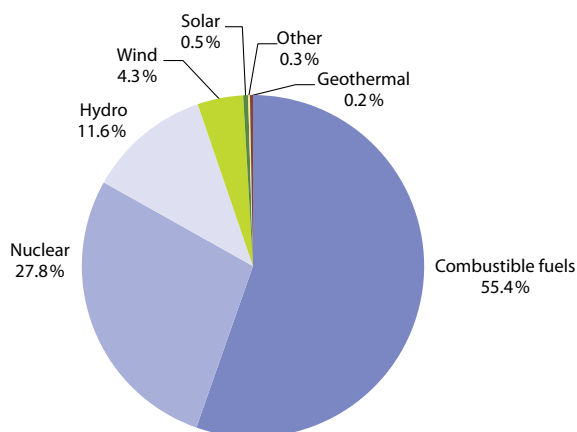
Table 12.3.1: Net electricity generation, 1999-2009
(1 000 GWh)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Share in EU-27, 2009 (%)
EU-27	2779	2863	2943	2964	3050	3119	3140	3182	3196	3203	3046	100.0
Euro area	1919	1995	2040	2069	2136	2194	2204	2245	2257	2275	2161	70.9
Belgium	80.8	80.3	76.2	78.1	80.9	81.7	83.4	82.0	85.1	81.4	87.5	2.9
Bulgaria	34.3	36.9	39.6	38.6	38.5	37.5	40.3	41.6	39.1	40.7	38.7	1.3
Czech Republic	60.1	68.0	68.8	70.4	76.7	77.9	76.2	77.9	81.4	77.1	76.0	2.5
Denmark	37.0	34.4	36.2	37.3	43.8	38.4	34.4	43.2	37.4	34.8	34.4	1.1
Germany	518.2	538.5	548.2	549.3	567.9	576.8	581.6	597.2	598.4	598.9	556.8	18.3
Estonia	7.4	7.6	7.6	7.7	9.2	9.2	9.1	8.7	11.0	9.5	7.9	0.3
Ireland	20.9	22.7	23.7	23.9	24.1	24.4	24.8	26.1	26.9	28.9	27.1	0.9
Greece	45.8	49.9	49.7	50.6	54.3	54.9	55.7	56.5	59.1	59.4	56.1	1.8
Spain	199.1	214.4	226.0	232.7	250.2	268.7	282.1	287.7	293.2	301.5	282.9	9.3
France	500.6	516.9	526.3	534.9	542.5	549.7	550.3	549.1	544.6	549.6	518.2	17.0
Italy	252.7	263.3	266.0	270.8	280.2	290.0	290.6	301.3	301.3	307.1	281.1	9.2
Cyprus	3.0	3.2	3.4	3.6	3.8	4.0	4.1	4.4	4.6	4.8	4.9	0.2
Latvia	3.6	3.7	3.7	3.5	3.5	4.2	4.4	4.5	4.4	4.9	5.2	0.2
Lithuania	11.9	10.0	13.2	16.1	17.9	17.7	13.6	11.4	12.9	12.8	14.1	0.5
Luxembourg	1.0	1.1	1.6	3.6	3.5	4.1	4.1	4.3	4.0	3.5	3.8	0.1
Hungary	34.9	32.3	33.7	33.5	31.4	31.3	33.2	33.3	37.2	37.4	33.3	1.1
Malta	1.7	1.8	1.8	1.9	2.1	2.1	2.2	2.1	2.2	2.2	2.0	0.1
Netherlands	83.2	86.0	89.9	92.1	93.0	98.4	96.2	94.4	100.9	103.4	108.9	3.6
Austria	58.6	59.1	60.2	60.0	57.4	61.4	63.5	61.8	62.7	64.2	66.7	2.2
Poland	129.5	132.2	132.7	131.4	138.4	140.8	143.6	147.7	145.4	141.5	137.9	4.5
Portugal	41.7	42.2	44.8	44.4	45.4	43.5	45.0	47.5	45.9	44.6	48.7	1.6
Romania	46.2	48.6	50.4	51.1	51.3	52.7	55.5	58.4	56.2	60.1	52.8	1.7
Slovenia	12.5	12.8	13.6	13.7	12.9	14.3	14.1	14.1	14.0	15.4	15.4	0.5
Slovakia	25.4	27.7	29.6	30.0	28.7	28.2	29.3	28.9	25.8	26.6	24.1	0.8
Finland	66.7	67.3	71.2	71.6	80.4	82.2	67.8	78.6	77.8	74.5	69.2	2.3
Sweden	150.5	141.6	157.6	143.2	132.5	148.5	154.6	140.4	145.1	146.4	133.3	4.4
United Kingdom	351.4	360.8	367.4	370.1	380.1	376.9	380.5	378.8	379.1	372.4	359.2	11.8
Norway	121.8	139.4	118.8	130.1	106.9	109.9	137.4	121.0	136.6	141.5	131.7	–
Switzerland	67.7	65.5	70.3	65.1	65.3	63.6	57.8	62.0	65.8	66.8	66.4	–
Croatia	11.7	10.2	11.7	11.7	12.1	12.8	12.0	12.0	11.7	11.8	12.4	–
Turkey	110.7	118.7	116.3	123.7	135.2	145.1	155.5	169.5	183.3	189.8	186.6	–

Source: Eurostat (online data code: [nrg_105a](#))



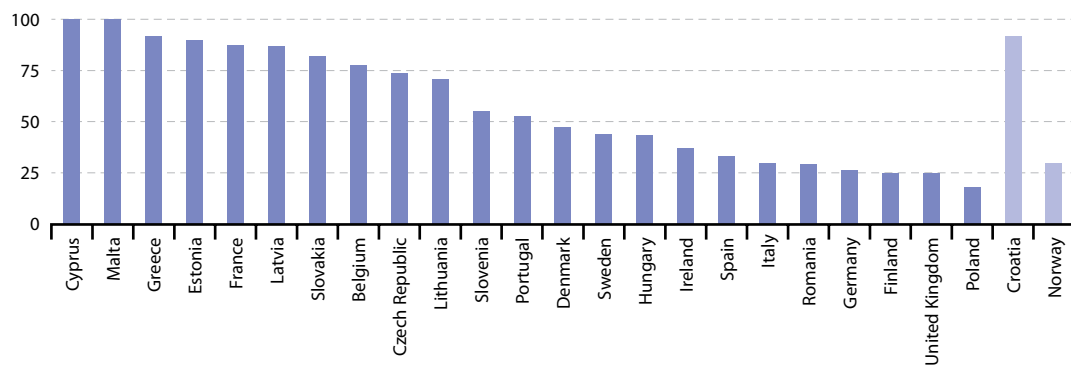
Figure 12.3.1: Net electricity generation, EU-27, 2009 ⁽¹⁾
(% of total, based on GWh)



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

Source: Eurostat (online data code: [nrg_105a](#))

Figure 12.3.2: Market share of the largest generator in the electricity market, 2009 ⁽¹⁾
(% of total generation)

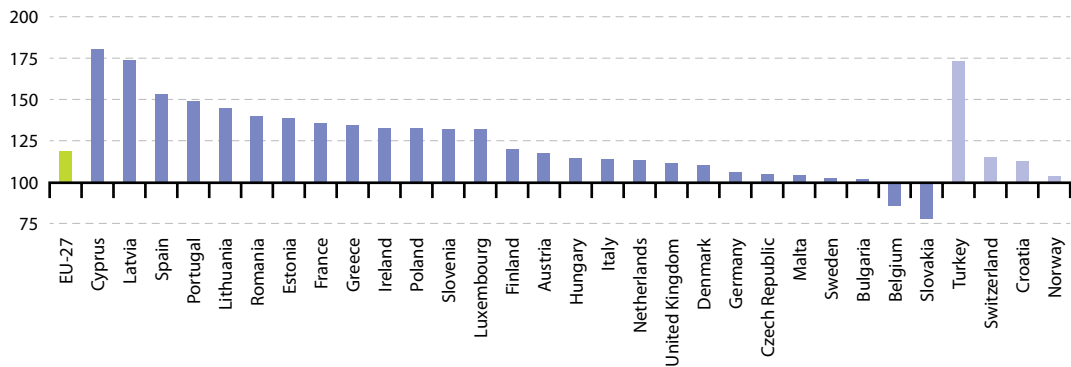


⁽¹⁾ Bulgaria, Luxembourg, the Netherlands and Austria, not available.

Source: Eurostat (online data code: [tsier060](#))



Figure 12.3.3: Electricity consumption by households, 2009
(1999 = 100)



Source: Eurostat (online data code: [tsdpc310](#))

12.4 Renewable energy

This subchapter provides recent statistics on **renewable energy sources** in the **European Union (EU)**. Renewable energy sources include wind power, solar power (thermal, photovoltaic and concentrated), hydroelectric power, tidal power, geothermal energy and **biomass**.

The use of renewable energy has many potential benefits, including a reduction in **greenhouse gas** emissions, the diversification of energy supplies and a reduced dependency on **fossil fuel** markets (in particular, oil and gas). The growth of renewable energy sources may also have the potential to stimulate employment in the EU, through the creation of jobs in new 'green' technologies.

Main statistical findings

Primary production

The **primary production** of renewable energy within the **EU-27** in 2009 was 148.4 million **tonnes of oil equivalent (toe)** – an 18.3% share of total primary energy production. The volume of renewable energy produced within the EU-27 increased overall by 60.2% between 1999 and 2009, equivalent to an average increase of 4.8% per annum.

Among renewable energies, the most important source in the EU was biomass and **waste**, accounting for 67.7% of primary renewables production in 2009 (see Table 12.4.1). Hydropower was the other main contributor to the renewable energy mix (19.0% of the total). Although its level of production remains relatively low, there was a particularly rapid expansion in the output of wind energy, which accounted for 7.7% of the EU's renewable energy produced in 2009.

The largest producer of renewable energy within the EU in 2009 was Germany, with an 18.7% share of the EU-27 total; France (13.2%) and Sweden (10.7%) were the only other Member States to record double-digit shares, although Italy's share (9.9%) was only just below this level. There were considerable differences in the renewable energy mix across the Member States, which reflect to a large degree natural endowments and climatic conditions. For example, more than three quarters (77.3%) of the renewable energy produced in Cyprus was from solar energy, while more than a third of the renewable energy in the relatively mountainous countries of Austria, Slovenia and Sweden was from hydropower (much higher shares were recorded in Norway, Switzerland and Croatia).



Close to one third of the renewable energy production in Italy was from geothermal energy sources (where active volcanic processes still exist). The share of wind power was particularly high in Ireland (41.4%) and also accounted for more than one fifth of renewable energy production in Spain (27.3%) and Denmark (21.0%).

The output of renewable energy in Germany grew at an average rate of 13.1% per annum between 1999 and 2009, as such its share of the EU-27 total rose by 9.9 percentage points from an 8.7% share in 1999. There were also average growth rates in excess of 10% per annum recorded for Belgium, Ireland and Slovakia.

Consumption

Renewable energy sources accounted for 9.0% of the EU-27's **gross inland energy consumption** in 2009 (see Table 12.4.2). Over one third of the energy consumed in Latvia and Sweden was derived from renewables in 2009, while in Austria more than a quarter of energy consumption was accounted for by renewables.

The EU seeks to have a 20% share of its energy consumption from renewable sources by 2020; this target is broken down between the Member States with national action plans designed to plot a pathway for renewable energies in each Member State. Figure 12.4.1 shows the latest data available for the share of renewable energies in gross **final energy consumption** and the indicative targets that have been set for each country by 2020. The share of renewables in gross final energy consumption stood at 11.7% in the EU-27 in 2009, more than half the target that has been set for 2020.

Among the Member States, the highest share of renewables in gross final energy consumption in 2009 was recorded in Sweden (47.3%), while Latvia, Finland and Austria each reported more than a quarter of their final energy consumption derived from renewables. Compared with the most recent data available for 2009, the indicative targets for Denmark, France, Ireland and the United Kingdom require each of these Member States to increase their share of renewables in final energy consumption by at least 10 percentage points.

Electricity

The latest information available for 2009 (see Figure 12.4.2) shows that electricity generated from renewable energy sources contributed 18.2% of the EU-27's **gross electricity consumption**. In Austria (66.8%) and Sweden (56.4%) more than half of all the electricity consumed was generated from renewable energy sources, largely as a result of hydropower and biomass.

The growth in electricity generated from renewable energy sources during the period 1999 to 2009 (see Figure 12.4.3) largely reflects an expansion in two renewable energy sources; namely, wind turbines and biomass. Although hydropower remained the single largest source for renewable electricity generation in the EU in 2009, the amount of electricity generated was somewhat lower than a decade earlier (-2.4%). In contrast, the volume of electricity generated from biomass more than trebled, while that from wind turbines increased more than nine-fold.

Transport

At the end of 2008, the EU agreed to set a target for each Member State, such that renewable energy sources (including biofuels, hydrogen or 'green' electricity) should account for at least 10% of all fuel used within the transport sector by 2020. The average share of renewable energy sources across the EU-27 was 4.2% in 2009, ranging from a high of 8.6% in Slovakia, and 6.0% or more in Sweden, Austria and France to less than 1% in Bulgaria, Denmark, Estonia and Malta (see Figure 12.4.4).

Data sources and availability

The statistics presented in this subchapter are calculated on the basis of energy statistics covered by Regulation (EC) 1099/2008 on energy statistics.

The share of renewable energies in gross final energy consumption may be considered as an estimate for the purpose of monitoring Directive 2009/28/EC on the promotion of the use of energy from renewable sources – however, the statistical system for some renewable energy technologies is not yet fully developed to meet the requirements of this Directive; for



example, the treatment of energy from heat pumps (and the energy used to drive the pumps). Furthermore the Directive requires hydro and wind energy to be normalised to smooth the effects of climatic variation; given the 15-year normalisation requirement for hydro production and the availability of energy statistics (for the EU-27, starting from 1990), long time series for this indicator are not available. The statistics presented for hydro and wind energy in this subchapter have not been normalised.

Electricity from renewable energy sources is defined as the ratio between electricity produced from renewable energy sources and gross national electricity consumption. Electricity produced from renewable energy sources comprises electricity generation from hydropower plants (excluding pumping), as well as electricity generated from biomass/wastes, wind, solar and geothermal installations.

The share of renewable energies in the fuel consumed by the transport sector is calculated on the basis of energy statistics, according to the methodology as described in Directive 2009/28/EC; the contribution of all biofuels is currently included within the calculation for this indicator and the data are not restricted to biofuels satisfying the sustainability criteria.

Context

The EU has set out plans for a new energy strategy based on a more secure, sustainable and low-carbon economy. Aside from combating climate change through a reduction in greenhouse gas emissions, the use of renewable energy sources is likely to result in more secure energy supplies, greater diversity in energy supply, less air pollution, as well as the possibility for job creation in environmental and renewable energy sectors.

The integrated energy and climate change strategy adopted in December 2008 provided a further stimulus for increasing the use of renewable energy sources to 20% of total energy consumption by 2020, while calling for energy consumption and greenhouse gas emissions to both be cut by 20%. Directive 2009/28/EC of the European Parliament and Council on the promotion of the use of energy from renewable sources set an overall goal across the EU-27 for a 20% share of energy consumption to be derived from renewable sources by 2020, while renewables should also account for a 10% share of the fuel used in the transport sector by the same date. The Directive changes the legal framework for promoting renewable electricity, requires national action plans to show how renewable energies will be developed in each Member State, creates cooperation mechanisms, and establishes [sustainability](#) criteria for biofuels (following concerns over their potential adverse effects on crop prices, food supply, forest protection, [biodiversity](#), water and soil resources).

In November 2010, the European Commission adopted a Communication titled 'Energy 2020: a strategy for competitive, sustainable and secure energy' (COM(2010) 639 final). It defined energy priorities for the next ten years and outlined a set of actions that would need to be taken in order to tackle the challenges of: saving energy, achieving a competitive market with secure supplies, boosting technological leadership, and negotiating with international partners.

The share of renewable energy in gross final energy consumption is identified as a key indicator for measuring progress under the Europe 2020 strategy for smart, sustainable and inclusive growth – for more information see the introduction for [energy](#).

**Table 12.4.1:** Primary production of renewable energy, 1999 and 2009

	Primary production (1 000 toe)		Share of total, 2009 (%)				
	1999	2009	Solar energy	Biomass & waste	Geothermal energy	Hydro- power energy	Wind energy
EU-27	92 674	148 435	1.7	67.7	3.9	19.0	7.7
Euro area	62 261	104 794	2.2	64.4	5.4	18.7	9.2
Belgium	498	1 661	1.5	91.4	0.2	1.7	5.2
Bulgaria	665	1 129	–	68.9	2.9	26.4	1.8
Czech Republic	1 409	2 593	0.5	90.5	–	8.1	1.0
Denmark	1 619	2 754	0.5	78.0	0.4	0.1	21.0
Germany	8 069	27 692	3.5	77.0	1.7	5.8	12.0
Estonia	526	864	–	97.7	–	0.3	2.0
Ireland	222	614	0.7	45.3	–	12.7	41.4
Greece	1 419	1 804	10.4	51.2	1.2	25.1	12.1
Spain	6 031	11 905	5.7	47.9	0.1	19.0	27.3
France	16 528	19 567	0.3	70.2	0.6	25.1	3.5
Italy	9 401	14 746	1.0	34.0	32.6	28.7	3.8
Cyprus	44	75	77.3	21.3	–	–	–
Latvia	1 571	2 089	–	85.6	–	14.2	0.2
Lithuania	656	992	–	94.5	0.5	3.6	1.4
Luxembourg	35	80	2.5	80.0	–	11.3	6.3
Hungary	843	1 851	0.3	92.0	5.2	1.1	1.5
Malta	0	0	:	:	:	–	–
Netherlands	1 210	2 768	0.9	84.4	0.1	0.3	14.2
Austria	6 675	8 352	1.5	54.6	0.4	41.5	2.0
Poland	3 757	6 031	0.0	94.8	0.2	3.4	1.5
Portugal	3 342	4 747	1.1	66.4	3.7	15.0	13.7
Romania	4 400	5 275	–	74.2	0.5	25.3	0.0
Slovenia	551	863	–	53.1	–	46.9	–
Slovakia	458	1 223	–	68.5	0.7	30.7	0.1
Finland	7 256	7 833	0.0	85.8	–	13.9	0.3
Sweden	13 359	15 819	0.1	62.8	–	35.8	1.4
United Kingdom	2 133	5 107	1.4	74.1	0.0	8.9	15.7
Norway	11 872	12 116	–	9.7	–	89.6	0.7
Switzerland	4 693	4 760	0.9	30.1	4.4	64.5	0.0
Croatia	900	1 030	0.5	42.6	0.3	56.2	0.5
Turkey	10 701	9 909	4.3	46.8	16.4	31.2	1.3

Source: Eurostat (online data codes: [ten00081](#) and [ten00082](#))



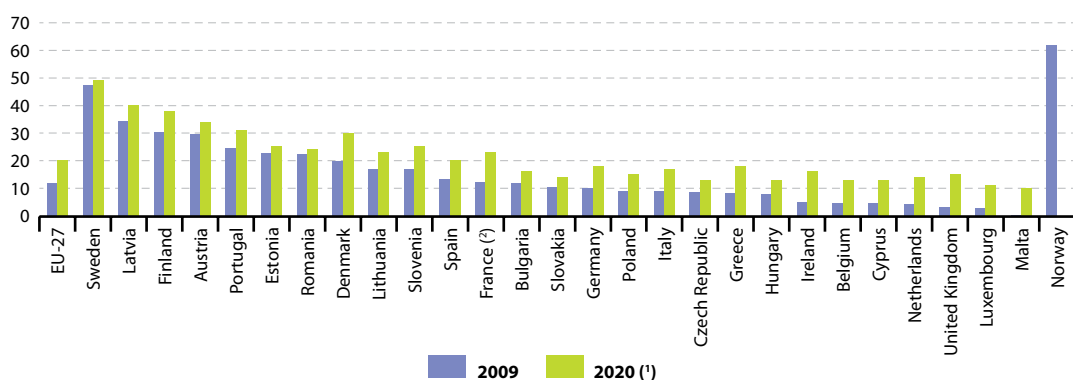
Table 12.4.2: Share of renewables in gross inland energy consumption, 2009
(%)

	Renewables total	Biomass & renewable wastes	Hydro	Geothermal	Wind	Solar
EU-27	9.0	6.1	1.7	0.3	0.7	0.1
Euro area	9.0	5.9	1.6	0.5	0.8	0.2
Belgium	3.9	3.6	0.0	0.0	0.1	0.0
Bulgaria	6.2	4.2	1.7	0.2	0.1	0.0
Czech Republic	5.7	5.2	0.5	0.0	0.1	0.0
Denmark	16.7	13.6	0.0	0.1	3.0	0.1
Germany	8.5	6.5	0.5	0.1	1.0	0.3
Estonia	13.5	13.2	0.1	0.0	0.3	0.0
Ireland	4.3	2.1	0.5	0.0	1.7	0.0
Greece	6.1	3.2	1.5	0.1	0.7	0.6
Spain	9.3	4.5	1.7	0.0	2.5	0.5
France	7.5	5.3	1.9	0.0	0.3	0.0
Italy	9.5	3.7	2.5	2.8	0.3	0.1
Cyprus	3.5	1.4	0.0	0.0	0.0	2.1
Latvia	36.2	29.2	6.9	0.0	0.1	0.0
Lithuania	10.5	9.8	0.4	0.1	0.2	0.0
Luxembourg	2.8	2.4	0.2	0.0	0.1	0.0
Hungary	7.3	6.7	0.1	0.4	0.1	0.0
Malta	0.0	0.0	0.0	:	0.0	:
Netherlands	3.9	3.3	0.0	0.0	0.5	0.0
Austria	27.3	15.5	10.7	0.1	0.5	0.4
Poland	6.6	6.2	0.2	0.0	0.1	0.0
Portugal	19.0	12.6	2.9	0.7	2.6	0.2
Romania	14.9	11.0	3.8	0.1	0.0	0.0
Slovenia	12.7	6.9	5.8	0.0	0.0	0.0
Slovakia	7.2	4.9	2.2	0.1	0.0	0.0
Finland	23.2	19.9	3.2	0.0	0.1	0.0
Sweden	34.4	21.6	12.3	0.0	0.5	0.0
United Kingdom	3.0	2.4	0.2	0.0	0.4	0.0
Norway	42.4	4.5	37.6	0.0	0.3	0.0
Switzerland	16.9	5.1	10.9	0.7	0.0	0.2
Croatia	10.9	4.1	6.6	0.0	0.1	0.1
Turkey	9.9	4.6	3.1	1.6	0.1	0.4

Source: Eurostat (online data codes: [nrg_100a](#), [nrg_1071a](#) and [nrg_1072a](#))


Figure 12.4.1: Share of renewables in gross final energy consumption, 2009

(%)



(¹) Indicative targets for 2020; not available for Norway.

(²) Excluding French overseas departments and territories.

 Source: Eurostat (online data code: [t2020_31](#))

Figure 12.4.2: Proportion of electricity generated from renewable sources, 2009

(% of gross electricity consumption)

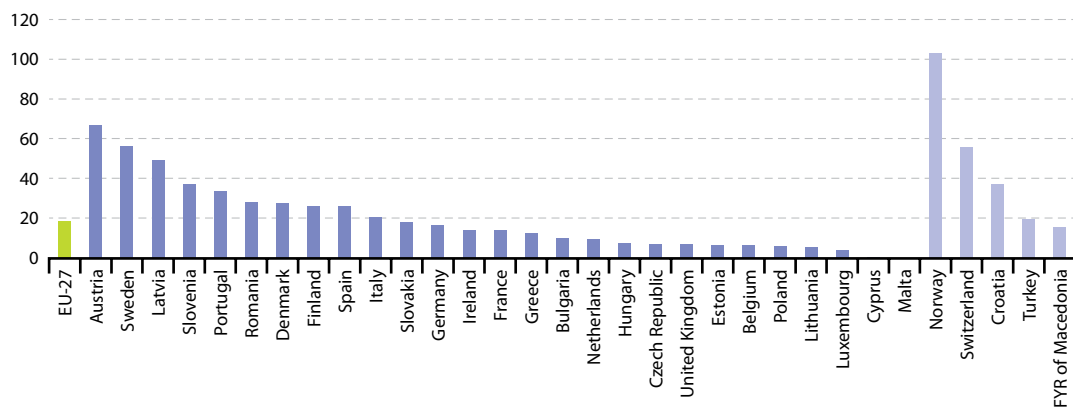
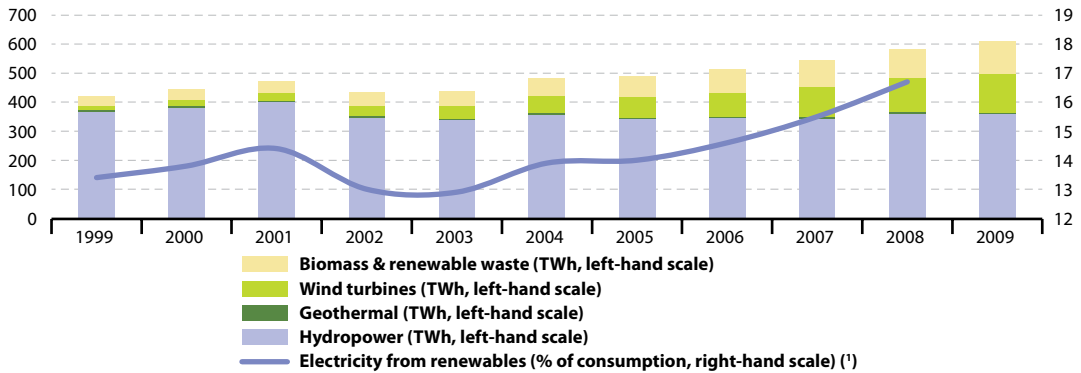
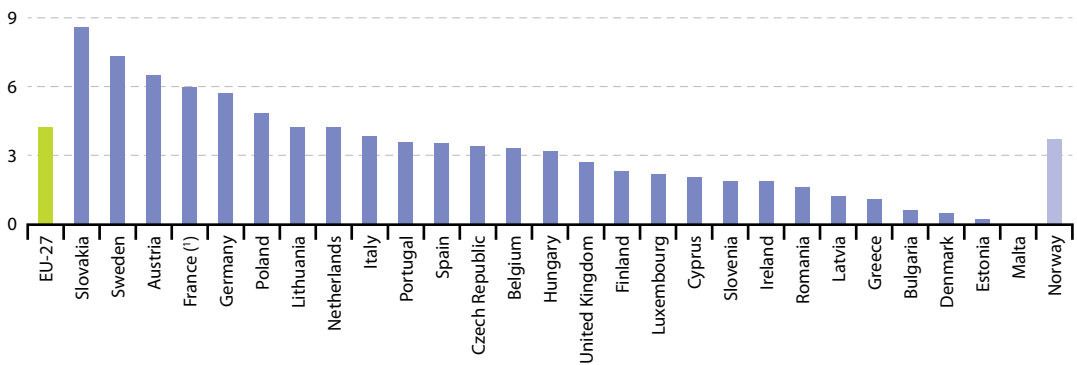

 Source: Eurostat (online data code: [tsien050](#))

Figure 12.4.3: Electricity generated from renewable energy sources, EU-27, 1999-2009

(¹) 2009, not available.

Source: Eurostat (online data codes: [nrg_105a](#) and [tsdcc330](#))

Figure 12.4.4: Share of renewable energy in fuel consumption of transport, 2009 (%)

(¹) Excluding French overseas departments and territories.

Source: Eurostat (online data code: [tsdcc340](#))



12.5 Energy prices

This subchapter highlights the level and development of electricity and natural gas prices for household consumers within the European Union (EU), Norway, Croatia, Turkey and Bosnia and Herzegovina; information on prices for industrial users is also provided.

The price of energy in the EU depends on a range of different supply and demand conditions, including the geopolitical situation, import diversification, network costs, environmental protection costs, severe weather conditions, or levels of excise and taxation; note that all of the prices presented in this subchapter include taxes and VAT for household consumers but exclude refundable taxes and VAT for industrial/business consumers.

Main statistical findings

Household consumers

An overview of the prices in euro of natural gas and electricity for the last three years (first half of each year) is presented in Table 12.5.1. The prices relate to the medium standard household consumption bands: for electricity this equates to annual consumption between 2500 and 5000 kilowatt hours (kWh); for natural gas (network/piped gas only) it equates to annual consumption between 5600 and 56000 kWh (20-200 gigajoules (GJ)).

Between the first half of 2010 and the first half of 2011, electricity prices for households increased in 24 of the EU Member States (see Table 12.5.1) and went down in two others, with prices staying roughly the same in one EU Member State. On average, the price of electricity for households in the EU-27 rose by 6.9%. The highest price increases were experienced by households in Finland (16.2% increase between the first half of 2010 and the first half of 2011) and Sweden (13.8%), while decreases were recorded in the Luxembourg (-2.8%) and Hungary (-1.2%). The price of electricity for households was more than three times as high in the most expensive Member State, Denmark (EUR 0.291 per kWh), as in the cheapest Member State, Bulgaria (EUR 0.083 per kWh) – see Figure 12.5.1.

Table 12.5.2 shows the proportion of taxes in the overall electricity price for household consumers, with information for the basic price excluding all taxes, actual tax contributions in euro per kilowatt hour, as well as the relative share of the tax contribution in the final electricity price. For household consumers, the share of the tax contribution was lowest in the United Kingdom (4.75%) where a relatively low VAT rate was applied to the basic price and no energy or other taxes were applied. The highest share of the tax contribution was charged in Denmark where more than half of the final price (56.57%) was made up of tax contributions.

During the period from the first half of 2010 to the first half of 2011, natural gas prices for household consumers rose in all EU Member States: due to the limited size of the gas markets, gas prices are not available for Finland (for household consumers) and Greece; gas prices are not applicable for Cyprus and Malta. On average, the EU-27 price of natural gas for households rose by 6.9% during the period considered. There were significant price increases for household users of natural gas in Latvia (up 23.2%), Sweden (18.5%) and Luxembourg (17.6%). The highest prices for household consumers of natural gas were registered in Sweden (EUR 0.122 per kWh) and in Denmark (EUR 0.116 per kWh), at nearly four times the lowest price which was recorded in Romania (EUR 0.028 per kWh) – see Table 12.5.1.

Table 12.5.3 shows the proportion of taxes in the overall natural gas price for household consumers, the basic price excluding all taxes, actual tax contributions in euro per kWh, as well as the relative share of the tax contribution in the final natural gas price. As was the case for electricity, the share of the tax contribution in the total price for natural gas was lowest in the United Kingdom and highest in Denmark.

Industrial consumers

For industrial consumers (with an annual electricity consumption between 500 and 2000 megawatt hours (MWh)), electricity prices during the first half



of 2011 were highest in Malta, Cyprus and Italy (see Table 12.5.1) while the lowest prices were found in Bulgaria, Finland and Estonia: the price of electricity for industrial consumers in Malta was 2.6 times as high as that in Bulgaria. For industrial consumers with an annual natural gas consumption of between 2778 and 27778 MWh (10000 and 100000 GJ), prices in the first half of 2011 were highest in Denmark, while they were lowest in Romania and the United Kingdom. The price of natural gas for industrial consumers was 2.6 times as high in Denmark as in Romania. Between the first half of 2010 and the first half of 2011 prices for industrial consumers in the EU-27 increased on average by 5.0% for electricity and 12.6% for natural gas.

Data sources and availability

Due to a change in methodology from 2007 onwards, there is a break in series and hence a relatively short **time series** available for data relating to energy prices. Nevertheless, even in this relatively short timeframe, electricity and gas prices have fluctuated considerably – in particular, gas prices.

The transparency of energy prices is guaranteed within the EU through the obligation for EU Member States to send **Eurostat** information relating to prices for different categories of industrial and business users, as well as data relating to market shares, conditions of sale, and pricing systems; prices for household consumers are provided on a voluntary basis.

Electricity and gas tariffs or price schemes vary from one supplier to another. They may result from negotiated contracts, especially for large industrial users. For smaller consumers, they are generally set according to the amount of electricity or gas consumed along with a number of other characteristics; most tariffs also include some form of fixed charge. There is, therefore, no single price for electricity or gas. In order to compare prices over time and between countries, this subchapter shows information for selected consumption bands for household consumers and for industrial/business users. There are five different types of households for which electricity prices are collected following different annual consumption bands, while

for natural gas statistics information is collated for three different types of household. Across industrial/business users, electricity prices are collected for a total of seven different types of users, while for natural gas prices there are six different types of user distinguished.

Statistics on electricity and natural gas prices charged to industrial/business users are collected under the legal basis of a **European Commission Decision (2007/394/EC)** of 7 June 2007 amending **Council Directive (90/377/EEC)** with regard to the methodology to be applied for the collection of gas and electricity prices. Directive 2008/92/EC of the **European Parliament and Council** of 22 October 2008 concerns procedures to improve the transparency of gas and electricity prices charged to industrial end-users.

The prices presented cover average prices over a period of six months (semester) from January to June and from July to December of each year; the data presented in this subchapter cover the first half of each reference year. Prices include the basic price of the electricity/gas, transmission and distribution charges, meter rental, and other services.

Context

The price and reliability of energy supplies, electricity in particular, are key elements in a country's energy supply strategy. Electricity prices are of particular importance for international **competitiveness**, as electricity usually represents a significant proportion of total energy costs faced by industrial and service-providing businesses. In contrast to the price of **fossil fuels**, which are usually traded on global markets with relatively uniform prices, there is a much wider range of prices applied to electricity and natural gas. These prices are, to some degree, influenced by the price of primary fuels and, more recently, by the cost of carbon dioxide (CO₂) emission certificates.

These issues were touched upon in a Communication from the European Commission titled, 'Facing the challenge of higher oil prices' (COM(2008) 384), which called on the EU to become more efficient in its use of energy, and less



dependent on fossil fuels – in particular, by following the approach laid out in the climate change and renewable energy package.

The EU has acted to liberalise electricity and gas markets since the second half of the 1990s. Directives adopted in 2003 established common rules for internal markets for electricity and natural gas. Deadlines were set for opening markets and allowing customers to choose their supplier: as of 1 July 2004 for business customers and as of 1 July 2007 for all consumers (including households). Certain countries anticipated the liberalisation process, while others were much slower in adopting the necessary measures. Indeed, significant barriers to entry remain in many electricity and natural gas

markets as seen through the number of markets that are still dominated by (near) monopoly suppliers. In July 2009, the European Parliament and Council adopted a third package of legislative proposals aimed at ensuring a real and effective choice of suppliers, as well as benefits for customers: this package came into effect as of March 2011. It is anticipated that increased transparency for gas and electricity prices should help promote fair competition, by encouraging consumers to choose between different energy sources (oil, coal, natural gas and [renewable energy sources](#)) and different suppliers. Energy price transparency can be made more effective by publishing and broadcasting as widely as possible prices and pricing systems.



Table 12.5.1: Half-yearly electricity and gas prices, first half of year, 2009-2011
(EUR per kWh)

	Electricity prices						Gas prices					
	Households ⁽¹⁾			Industry ⁽²⁾			Households ⁽³⁾			Industry ⁽⁴⁾		
	2009	2010	2011	2009	2010	2011	2009	2010	2011	2009	2010	2011
EU-27	0.163	0.167	0.178	0.107	0.105	0.110	0.059	0.053	0.056	0.036	0.031	0.034
Euro area ⁽⁵⁾	0.171	0.176	0.187	0.111	0.109	0.116	0.066	0.058	0.062	0.038	0.032	0.036
Belgium	0.192	0.196	0.214	0.111	0.106	0.110	0.061	0.053	0.057	0.033	0.029	0.032
Bulgaria	0.082	0.081	0.083	0.065	0.065	0.065	0.047	0.037	0.043	0.031	0.024	0.029
Czech Republic	0.132	0.135	0.150	0.107	0.103	0.111	0.049	0.047	0.054	0.033	0.031	0.031
Denmark	0.270	0.267	0.291	0.086	0.094	0.099	0.092	0.107	0.116	0.056	0.057	0.067
Germany	0.228	0.238	0.253	0.113	0.112	0.125	0.065	0.057	0.059	0.043	0.036	0.046
Estonia	0.092	0.097	0.097	0.064	0.069	0.072	0.039	0.036	0.042	0.027	0.029	0.028
Ireland	0.203	0.180	0.190	0.121	0.112	0.116	0.064	0.050	0.051	0.033	0.028	0.038
Greece	0.115	0.118	0.125	0.095	0.095	0.101	:	:	:	:	:	:
Spain	0.158	0.173	0.195	0.115	0.117	0.114	0.061	0.053	0.054	0.031	0.028	0.029
France	0.121	0.128	0.138	0.073	0.085	0.085	0.055	0.052	0.058	0.036	0.033	0.037
Italy	0.210	0.197	0.201	0.153	0.139	0.153	0.076	0.062	0.069	0.040	0.030	0.031
Cyprus	0.156	0.186	0.205	0.119	0.151	0.167	:	:	:	:	:	:
Latvia	0.105	0.105	0.117	0.090	0.089	0.098	0.052	0.031	0.039	0.039	0.026	0.029
Lithuania	0.095	0.116	0.121	0.092	0.100	0.105	0.042	0.038	0.043	0.031	0.032	0.035
Luxembourg	0.188	0.173	0.168	0.116	0.102	0.100	0.049	0.043	0.051	0.040	0.037	0.042
Hungary	0.148	0.170	0.168	0.124	0.106	0.095	0.048	0.054	0.056	0.037	0.030	0.033
Malta	0.171	0.170	0.170	0.151	0.180	0.180	:	:	:	:	:	:
Netherlands	0.190	0.170	0.174	0.113	0.104	0.103	0.083	0.070	0.072	0.038	0.032	0.033
Austria	0.191	0.197	0.199	:	:	:	0.065	0.062	0.069	:	:	:
Poland	0.113	0.134	0.147	0.090	0.098	0.101	0.039	0.043	0.046	0.028	0.030	0.033
Portugal	0.151	0.158	0.165	0.094	0.094	0.099	0.060	0.059	0.061	0.035	0.027	0.034
Romania	0.098	0.103	0.108	0.081	0.085	0.080	0.029	0.027	0.028	0.023	0.022	0.023
Slovenia	0.135	0.140	0.144	0.103	0.099	0.099	0.066	0.058	0.067	0.044	0.042	0.045
Slovakia	0.154	0.152	0.168	0.142	0.117	0.128	0.046	0.044	0.047	0.041	0.033	0.035
Finland	0.130	0.133	0.154	0.069	0.069	0.076	:	:	:	0.031	0.030	0.042
Sweden	0.160	0.184	0.209	0.067	0.081	0.089	0.089	0.103	0.122	0.039	0.044	0.052
United Kingdom	0.147	0.139	0.143	0.112	0.099	0.098	0.043	0.041	0.042	0.029	0.023	0.025
Norway	0.157	0.203	0.213	0.079	0.103	0.111	:	:	:	:	:	:
Croatia	0.115	0.115	0.114	0.087	0.094	0.091	0.032	0.038	0.038	0.026	0.034	0.040
FYR of Macedonia	:	:	:	:	:	:	:	:	:	:	:	0.038
Turkey	0.114	0.134	0.122	0.078	0.089	0.079	0.039	0.032	0.029	0.029	0.024	0.022
Bosnia and Herzegovina	:	0.074	0.075	:	0.062	0.061	:	0.038	0.045	:	0.042	0.048

(1) Annual consumption: 2 500 kWh < consumption < 5 000 kWh.

(2) Annual consumption: 500 MWh < consumption < 2 000 MWh; excluding VAT

(3) Annual consumption: 5 600 kWh < consumption < 56 000 kWh (20-200 GJ).

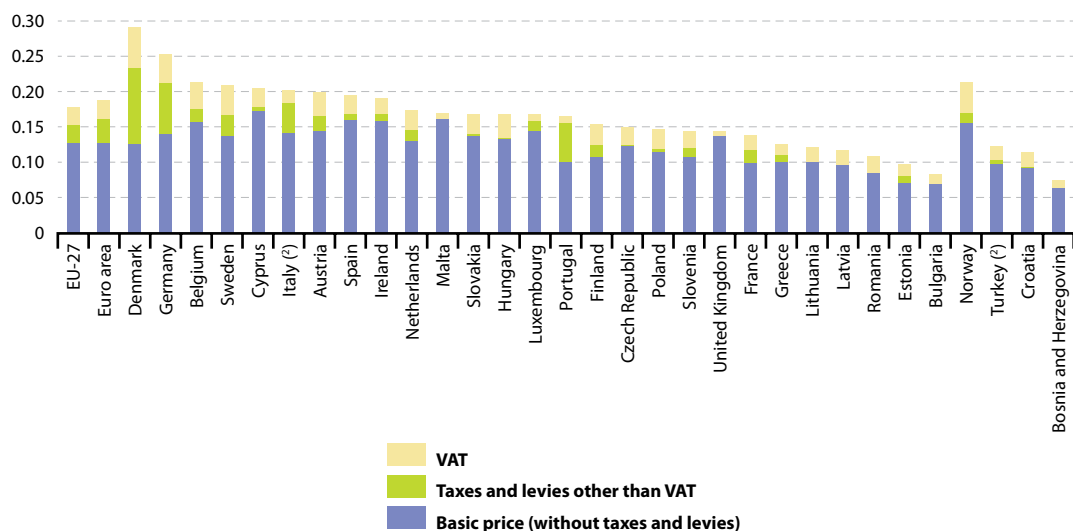
(4) Annual consumption: 2 778 MWh < consumption < 27 778 MWh (10 000-100 000 GJ); excluding VAT.

(5) 2009 and 2010, EA-16.

Source: Eurostat (online data codes: [nrg_pc_204](#), [nrg_pc_205](#), [nrg_pc_202](#) and [nrg_pc_203](#))



Figure 12.5.1: Electricity prices for household consumers, first half 2011 ⁽¹⁾
(EUR per kWh)

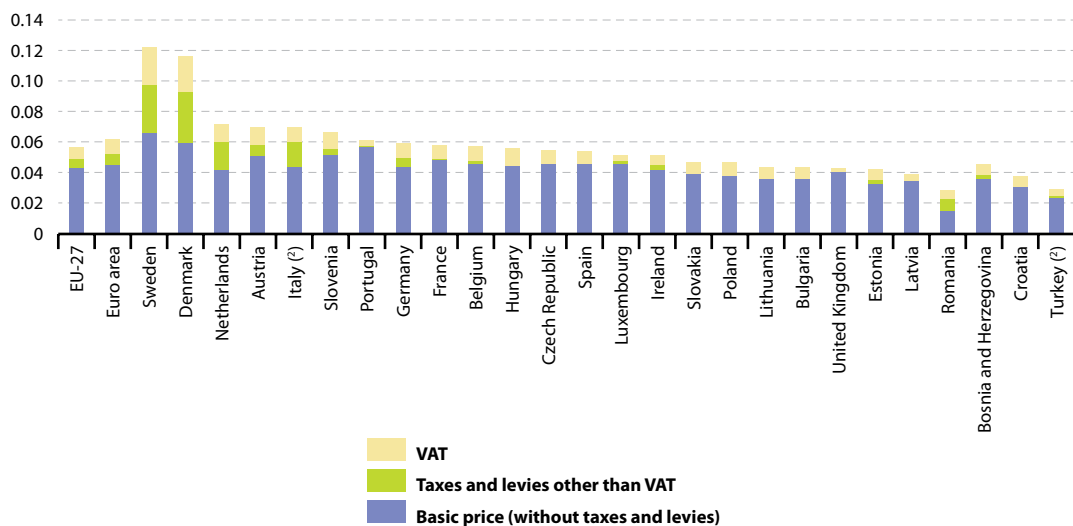


⁽¹⁾ Annual consumption: 2 500 kWh < consumption < 5 000 kWh.

^(?) Provisional.

Source: Eurostat (online data code: [nrg_pc_204](#))

Figure 12.5.2: Natural gas prices for household consumers, first half 2011 ⁽¹⁾
(EUR per kWh)



⁽¹⁾ Annual consumption: 5 600 kWh < consumption < 56 000 kWh (20-200 GJ); Greece and Finland, not available; Cyprus and Malta, not applicable.

^(?) Provisional.

Source: Eurostat (online data code: [nrg_pc_202](#))



Table 12.5.2: Taxes and levies on electricity prices for household consumers; ranked on share in total price, first half 2011 ⁽¹⁾

	Basic price	Taxes & levies other than VAT	VAT	Share of taxes, levies & VAT in total price
	(EUR per kWh)			(%)
EU-27	0.128	0.026	0.025	28.53
Euro area	0.128	0.033	0.027	31.91
Denmark	0.126	0.106	0.058	56.57
Germany	0.141	0.072	0.040	44.38
Portugal	0.102	0.054	0.010	38.63
Sweden	0.138	0.030	0.041	34.23
Finland	0.108	0.017	0.029	29.81
Italy	0.142	0.042	0.018	29.71
France	0.099	0.019	0.020	28.18
Estonia	0.070	0.011	0.016	27.65
Austria	0.144	0.021	0.033	27.39
Belgium	0.157	0.019	0.037	26.40
Netherlands	0.130	0.017	0.028	25.42
Slovenia	0.108	0.012	0.024	25.12
Poland	0.115	0.005	0.028	22.16
Romania	0.085	0.000	0.023	21.63
Hungary	0.134	0.001	0.034	20.58
Greece	0.100	0.011	0.014	19.92
Slovakia	0.137	0.003	0.028	18.43
Latvia	0.096	0.000	0.021	18.07
Spain	0.160	0.008	0.027	17.98
Czech Republic	0.123	0.001	0.025	17.59
Lithuania	0.100	0.000	0.021	17.30
Bulgaria	0.069	0.000	0.014	16.71
Ireland	0.158	0.009	0.023	16.68
Cyprus	0.173	0.006	0.026	15.56
Luxembourg	0.145	0.013	0.010	13.53
Malta	0.162	0.000	0.009	5.00
United Kingdom	0.137	0.000	0.007	4.75
Norway	0.156	0.014	0.043	26.72
Turkey	0.098	0.005	0.019	19.57
Croatia	0.092	0.001	0.021	19.26
Bosnia and Herzegovina	0.064	0.000	0.011	14.46

⁽¹⁾ Annual consumption: 2500 kWh < consumption < 5000 kWh.

Source: Eurostat (online data code: [nrg_pc_204](#))



Table 12.5.3: Taxes and levies on natural gas prices for household consumers; ranked on share in total price, first half 2011 ⁽¹⁾

	Basic price	Taxes & levies other than VAT	VAT	Share of taxes, levies & VAT in total price
	(EUR per kWh)			(%)
EU-27	0.056	1.560	2.153	23.70
Euro area	0.062	2.168	2.603	27.80
Denmark	0.059	0.034	0.023	48.95
Romania	0.015	0.008	0.006	47.56
Sweden	0.066	0.032	0.025	46.05
Netherlands	0.042	0.019	0.011	41.86
Italy	0.044	0.016	0.009	36.43
Austria	0.051	0.007	0.011	26.28
Germany	0.043	0.006	0.009	26.07
Slovenia	0.051	0.004	0.011	23.33
Estonia	0.033	0.002	0.007	22.08
Hungary	0.045	0.000	0.011	20.00
Belgium	0.046	0.002	0.010	19.99
Poland	0.038	0.000	0.009	18.71
Lithuania	0.036	0.000	0.008	17.37
Ireland	0.042	0.003	0.006	17.33
Czech Republic	0.045	0.000	0.009	16.67
Bulgaria	0.036	0.000	0.007	16.65
France	0.048	0.001	0.009	16.64
Slovakia	0.039	0.000	0.008	16.63
Spain	0.045	0.000	0.008	15.25
Latvia	0.035	0.000	0.004	10.79
Luxembourg	0.046	0.002	0.003	10.36
Portugal	0.057	0.001	0.003	7.08
United Kingdom	0.040	0.000	0.002	4.78
Greece	:	:	:	:
Finland	:	:	:	:
Bosnia and Herzegovina	0.036	0.003	0.007	21.55
Croatia	0.031	0.000	0.007	18.67
Turkey	0.023	0.001	0.004	18.63

⁽¹⁾ Annual consumption: 5 600 kWh < consumption < 56 000 kWh (20-200 GJ); Cyprus and Malta, not applicable.

Source: Eurostat (online data code: [nrg_pc_202](#))