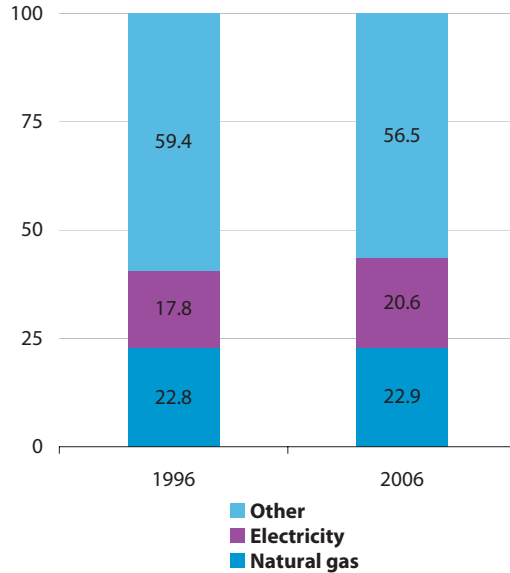


**Network supply of electricity,
gas and steam**

14

Figure 14.1: Electricity, gas, steam and hot water supply (NACE Division 40)
Final energy consumption: share of selected network fuels, EU-27 (%)



Source: Eurostat (Energy statistics (ES) - quantities)

This chapter focuses on the production and distribution of electricity, whether generated from fossil, nuclear or renewable fuels (NACE Group 40.1), and the manufacture and distribution of gas via mains (NACE Group 40.2). The manufacture of gas includes the manufacture of gas from the carbonisation of coal, from by-products of agriculture or from waste, but does not include the manufacture of refined petroleum products, or of industrial gases. The distribution of gas concerns only distribution through a mains network, and does not include the bulk sale and transport of gaseous fuels, or its distribution in canisters.

This chapter also covers steam and hot water supply (NACE Group 40.3), normally for district heating, also known as city heating. District heating is the distribution of heat through a network to one or several buildings using hot water or steam produced centrally, often from co-generation plants, from waste heat from industry, or from dedicated heating systems. Large scale district heating in Europe is commonly found in central and eastern Europe and in the Nordic countries.

The gas and electricity markets in the EU have been changing through the requirements of the second electricity and gas directives adopted in 2003. In September 2007 the European Commission adopted proposals for a third package of legislation⁽¹⁾. This proposed the effective separation of production and transmission/distribution, harmonisation of the powers of national regulators, measures to facilitate and promote cross-border collaboration and trade, as well as investment.

Final energy consumption in the EU-27 was 1 176 million tonnes of oil equivalent in 2006, an overall increase of 5.5 % compared with the level in 1996. When comparing the situation in 2006 with ten years earlier, the two main network fuels, natural gas and electricity, both witnessed an increase in their share of final energy consumption, particularly electricity.

Structural profile

There were 22.2 thousand enterprises in the electricity, gas, steam and hot water supply sector (NACE Division 40) across the EU-27 in 2006 which employed 1.2 million persons. Together these enterprises generated EUR 180.4 billion of value added. This sector clearly benefitted from a

(1) COM(2007) 530.

Table 14.1: Electricity, gas, steam and hot water supply (NACE Division 40)
Structural profile: ranking of top five Member States, 2006

	Highest value added (1)			Largest number of persons employed (2)			Most specialised: share in the non-financial business economy (%) (3)	
	Country	(EUR million)	(% of EU-27)	Country	(thousand)	(% of EU-27)	Value added	Persons employed
1	Germany	39 198	21.7	Germany	234.7	19.1	Slovakia (13.7)	Slovakia (2.7)
2	United Kingdom	30 173	16.7	France	159.9	13.0	Bulgaria (8.8)	Romania (2.6)
3	France	23 261	12.9	Poland	159.4	12.8	Czech Republic (6.6)	Bulgaria (2.2)
4	Italy	18 096	10.0	United Kingdom	110.6	9.0	Romania (6.4)	Poland (2.1)
5	Spain	13 031	7.2	Romania	96.0	7.8	Poland (6.3)	Lithuania (2.1)

(1) Ireland, Greece, Cyprus, Malta and the Netherlands, not available; Poland, 2005.

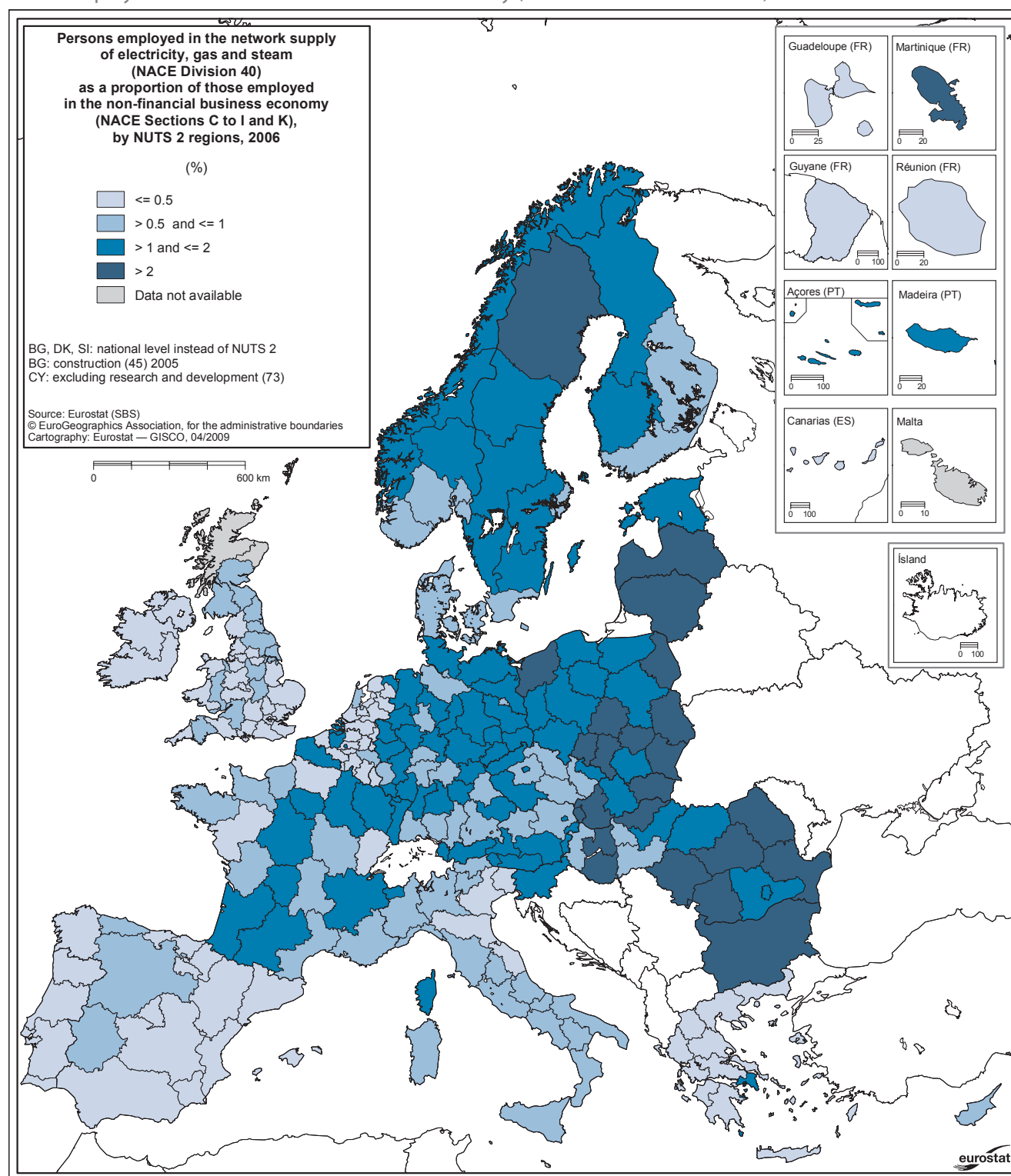
(2) Ireland, Greece, Cyprus and Malta, not available; the Netherlands and Poland, 2005.

(3) Ireland, Greece, Cyprus, Malta and the Netherlands, not available; Bulgaria, Poland and Romania, 2005.

Source: Eurostat (SBS)

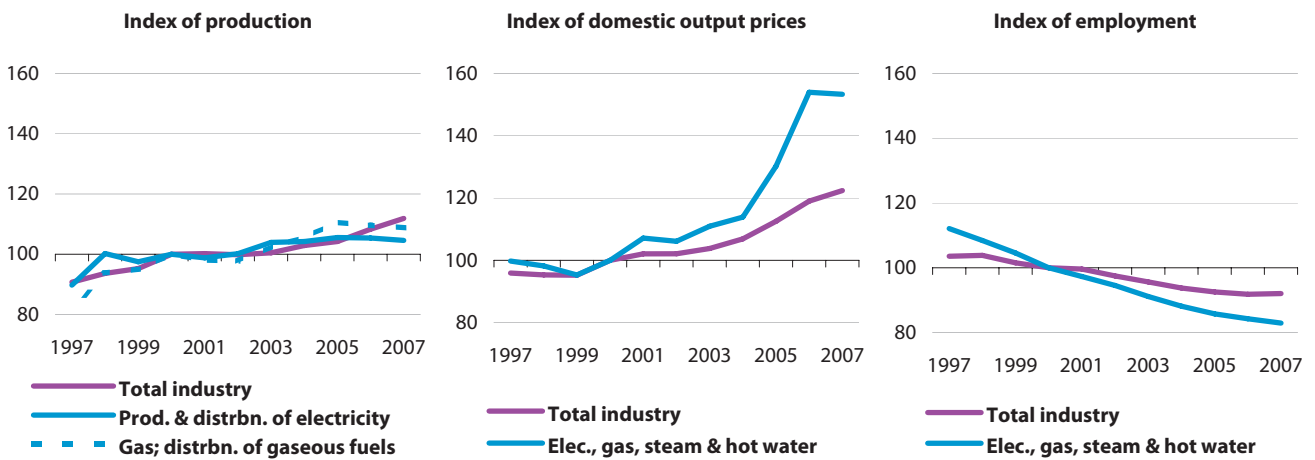
Map 14.1: Electricity, gas, steam and hot water supply (NACE Division 40)

Persons employed in the network supply of electricity, gas and steam (NACE Division 40) as a proportion of those employed in the non-financial business economy (NACE Sections C to I and K)



Source: Eurostat (SBS)

Figure 14.2: Electricity, gas, steam and hot water supply (NACE Division 40)
Evolution of main indicators, EU-27 (2000=100)



Source: Eurostat (STS)

very high level of labour productivity, as it contributed far more to the non-financial business economy (NACE Sections C to I and K) in terms of value added (3.2 %) than in terms of employment (0.9 %).

An analysis of the subsectors is difficult due to generally weak data availability. Nevertheless, the production and distribution of electricity (NACE Group 40.1) was clearly the largest in value added terms, as it contributed approximately four fifths of the sector's value added. The manufacture of gas and distribution of gaseous fuels through mains (NACE Group 40.2) subsector was the next largest, certainly with more than one tenth of the sectoral value added, while the steam and hot water supply subsector (NACE Group 40.3) was the smallest subsector.

In a number of Member States this sector was particularly important in terms of its contribution to value added within the non-financial business economy. In Slovakia the electricity, gas, steam and hot water supply sector contributed 13.7 % of non-financial business economy value added in 2006, making this the largest of all the sectors presented in Chapters 2 to 26 of this publication in that country. Furthermore, this was the sector where both the Czech Republic and Slovakia recorded their highest levels of specialisation in value added terms. Several of the Member States that were particularly specialised in the

electricity, gas, steam and hot water supply sector were net exporters of electricity – while the least specialised Member State⁽²⁾, Luxembourg, was also the biggest net importer (in relative terms).

For reasons of statistical confidentiality the exact regional specialisation data for this sector is rather limited. Nevertheless, the map shows several Hungarian, Polish, Slovak and Romanian regions, one Swedish region as well as Lithuania, Latvia and Bulgaria (which are each considered as a single region at the level of detail in the map) that are specialised in the supply of electricity, gas, steam and hot water in employment terms.

Over the ten years between 1997 and 2007, electricity, gas, steam and hot water supply output in the EU-27 increased more or less in line with that for total industry, but employment fell faster and output prices grew much faster. Over the same period, output from the production and distribution of electricity grew by 1.5 % per annum on average, while for the manufacture of gas and its distribution through mains growth averaged 2.9 % per annum: the latter was well above the industrial average of 2.1 % per annum.

The decrease in employment averaged 3.0 % per annum in the ten years to 2007 for electricity, gas, steam and hot water supply, a rate of decline that was approximately two and a half times as fast as the industrial average.

(2) Bulgaria, Poland and Romania, 2005; Ireland, Greece, Cyprus, Malta and the Netherlands, not available.

Table 14.2: Electricity, gas, steam and hot water supply (NACE Division 40)
Share of value added and persons employed by enterprise size class, EU-27, 2006 (%)

	Value added		Persons employed	
	Non-financial business economy (1)	Electricity, gas, steam and hot water supply	Non-financial business economy	Electricity, gas, steam and hot water supply
1 to 9 persons employed	21.0	5.1	29.7	2.2
10 to 49 persons employed	18.9	4.4	20.7	4.3
50 to 249 persons employed	17.8	10.3	17.0	11.2
250 or more persons employed	42.1	80.2	32.6	82.4

(1) 1 to 9 persons employed and 50 to 249 persons employed, 2005.

Source: Eurostat (SBS)

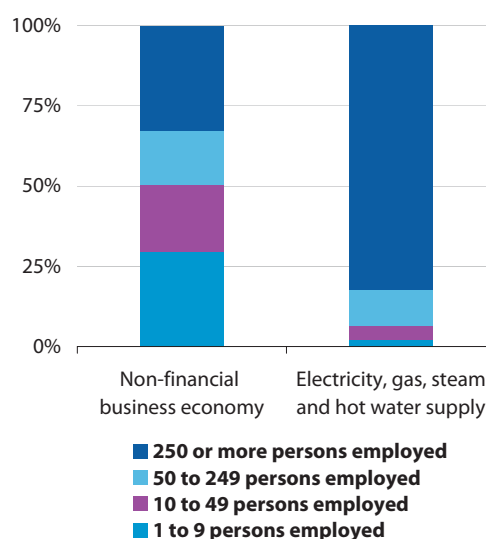
The most remarkable characteristic of the developments over time for these activities was however the change in prices. Between 2003 and 2006 electricity, gas, steam and hot water supply output prices rose every year, particularly in 2005 and 2006 when double-digit growth was recorded. In 2007 output prices for these activities fell very slightly (-0.4 %) while industrial prices as a whole continued to increase (2.8 %). Note that output prices are valued at basic prices, therefore excluding taxes on products.

The enterprise size class structure of the electricity, gas, steam and hot water supply sector was very different from that of the non-financial business economy as a whole. The sector was dominated by large enterprises (with 250 or more persons employed) that employed more than four fifths of the sector's workforce in the EU-27, some 2.5 times as much as the non-financial business economy average: this was the highest employment share contributed by large enterprises among the sectors used for the chapter aggregates in the present publication. The contribution of the other size classes, in particular micro and small enterprises with less than 50 persons employed, was extremely low.

Employment characteristics

The EU-27's workforce in the electricity, gas, steam and hot water supply sector contained a particularly high proportion of men, 76.8 % in 2007, 6.8 percentage points above the industrial (NACE Sections C to E) average and 11.9 percentage points above the non-financial business economy average. The incidence of full-time employment was also above the industrial and non-financial business economy averages, at 94.5 %.

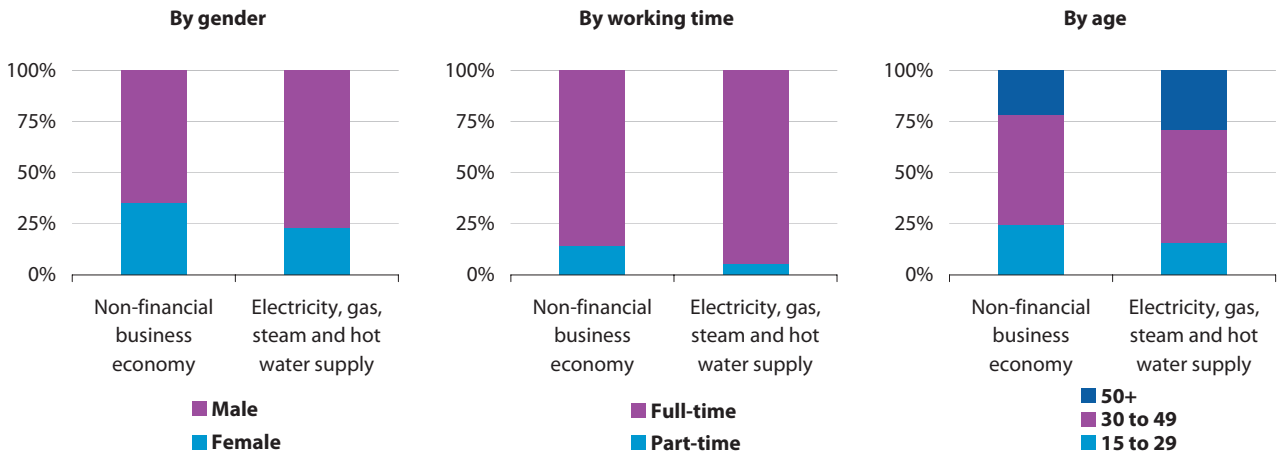
Figure 14.3: Electricity, gas, steam and hot water supply (NACE Division 40)
Share of employment by enterprise size class, EU-27, 2006



Source: Eurostat (SBS)

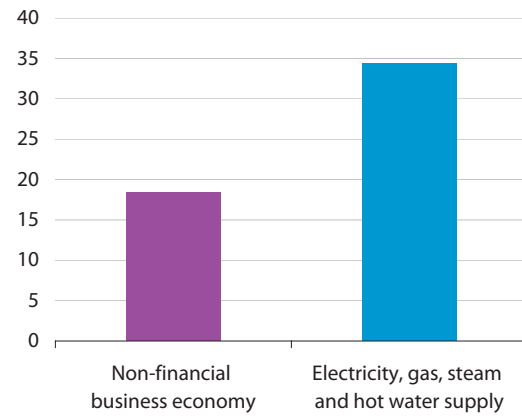
The age profile of the EU-27's electricity, gas, steam and hot water supply sector was also very different from that for the non-financial business economy. The proportion of the workforce aged less than 30 was particularly low, just 15.6 %, the fourth lowest among the industrial NACE divisions. Consequently the proportions of the workforce in the other two age classes were high: the 29.0 % of the workforce aged 50 or over was the third highest among all non-financial business economy NACE divisions in 2007.

Figure 14.4: Electricity, gas, steam and hot water supply (NACE Division 40)
Employment characteristics, 2007



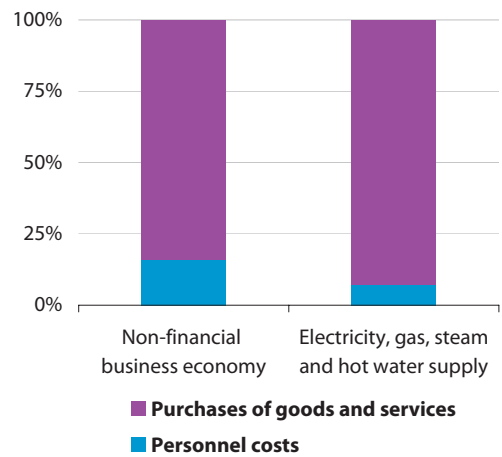
Source: Eurostat (LFS)

Figure 14.5: Electricity, gas, steam and hot water supply (NACE Division 40)
Investment rate, EU-27, 2006 (%)



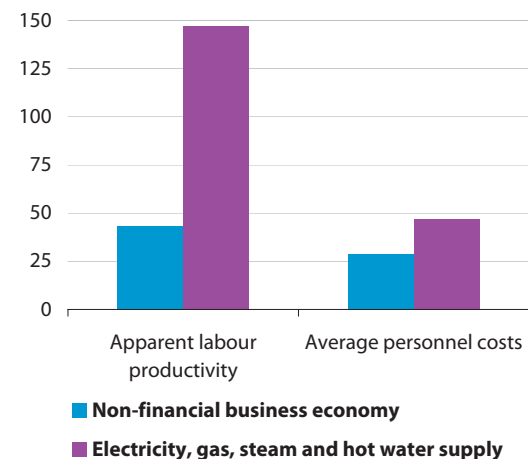
Source: Eurostat (SBS)

Figure 14.6: Electricity, gas, steam and hot water supply (NACE Division 40)
Analysis of operating expenditure, EU-27, 2006 (%)



Source: Eurostat (SBS)

Figure 14.7: Electricity, gas, steam and hot water supply (NACE Division 40)
Labour output and costs, EU-27, 2006
(EUR thousand per capita)



Source: Eurostat (SBS)

Expenditure, productivity and profitability

An analysis of investment and operating expenditure indicates the capital-intensive nature of the electricity, gas, steam and hot water supply sector. Gross tangible investment in the EU-27 was valued at EUR 62.1 billion in 2006, 6.0 % of the non-financial business economy total. This high level

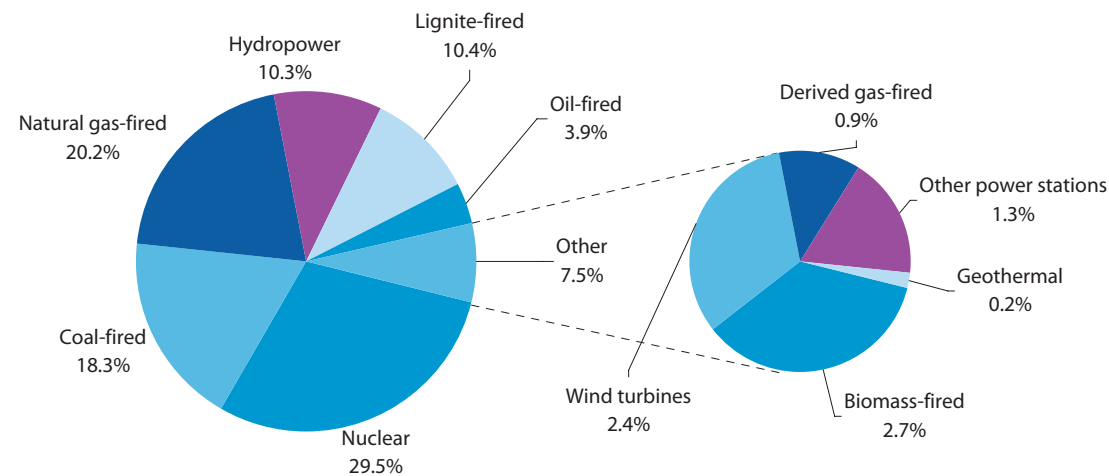
of investment was equivalent to 34.4 % of value added in this sector, the second highest investment rate among the industrial (NACE Sections C to E) NACE divisions. The relatively low labour input in this sector is underlined by the very low share of personnel costs in operating expenditure, just 7.4 % in the EU-27, less than half the non-financial business economy average and the third lowest among the EU-27's industrial NACE divisions.

Average personnel costs in the EU-27's electricity, gas, steam and hot water supply sector were EUR 46.7 thousand per employee in 2006, and the apparent labour productivity was EUR 147.0 thousand per person employed. Both of these were high in comparison with non-financial business economy averages, particularly the apparent labour productivity which was the fourth highest of all non-financial business economy NACE divisions in 2005 or 2006. The resulting wage adjusted labour productivity ratio was 314.4 % indicating that value added per person employed was over three times as high as average personnel costs. In every Member State⁽³⁾ the wage adjusted labour productivity ratio in this sector was higher than the non-financial business economy average.

The EU-27 gross operating rate for the electricity, gas, steam and hot water supply sector, calculated as the ratio of the gross operating surplus to turnover, was 14.0 % in 2006, also above the non-financial business economy (10.8 %) average.

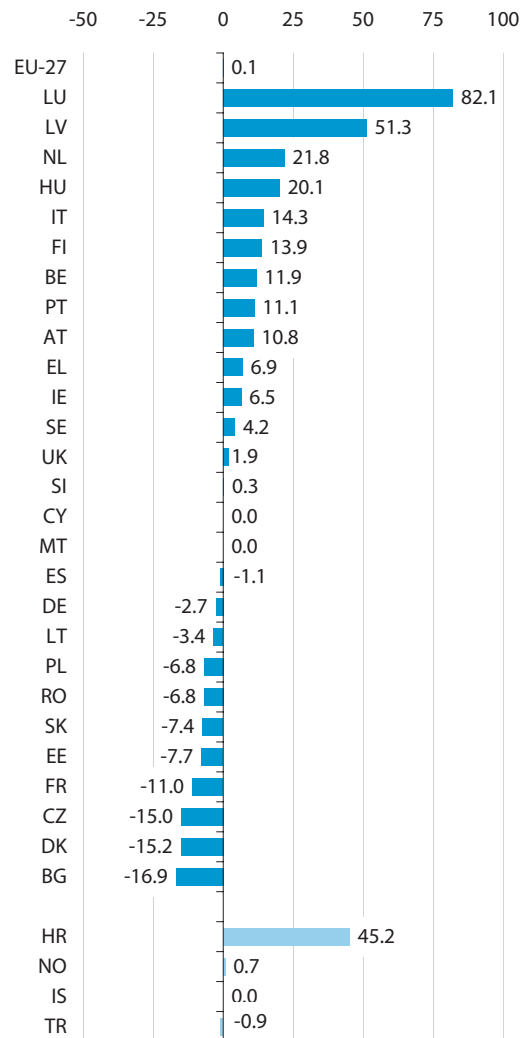
(3) Bulgaria, Poland and Romania, 2005; Ireland, Greece, Cyprus, Malta and the Netherlands, not available.

Figure 14.8: Electricity, gas, steam and hot water supply
Gross electricity generation by type of power plant, EU-27, 2006 (%)



Source: Eurostat (Energy statistics (ES) - quantities)

Figure 14.9: Electricity, gas, steam and hot water supply
Net electricity imports relative to gross electricity generation, 2006 (%) (1)



(1) A negative sign indicates net exports.

Source: Eurostat (Energy statistics (ES) - quantities)

Focus on electricity

Gross electricity generation⁽⁴⁾ in the EU-27 in 2006 was 3 358 TWh. More than half (53.6 %) of this was generated in coal, natural gas, lignite, oil or derived gas-fired thermal power stations and just under three tenths (29.5 %) in nuclear power stations. The largest part of the remaining generation was in hydroelectric power plants (10.3 %), biomass-fired power stations (2.7 %) and wind

turbines (2.4 %).

Within Europe there are some movements of electricity across borders and in fact some smaller Member States and candidate countries are particularly dependent on external sources for their electricity supply. For example, in Luxembourg and Latvia, as well as in Croatia, the level of net imports is very high relative to gross electricity generation. Among the Member States, the largest net exporters of electricity in 2006 (in relative terms) were Bulgaria, Denmark, the Czech Republic and France.

In 2001, a target of 21 % was set for the share of renewable energy sources (wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases) in electricity consumption by 2010. The contribution to electricity generation from renewables in 2006 in terms of gross national electricity consumption (gross national electricity generation from all fuels plus net electricity imports) for the EU-27 as a whole stood at 14.6 %. Several of the Member States recorded a large increase in the contribution of renewables in recent years: notably Denmark and Germany.

Concerns about safety and waste have been issues for nuclear energy for a long time, but the benefits of nuclear fuel have been boosted due to rising concerns about the security of other energy supplies, while at the same time the Member States have committed themselves to reduce emissions. According to the World Nuclear Association⁽⁵⁾, as of February 2009, Bulgaria, France, Romania, Slovakia, Finland and Turkey had started construction or planned new nuclear reactors, as had Russia, Belarus and the Ukraine: outside of Europe most of the countries constructing or planning new nuclear reactors were in Asia or North America.

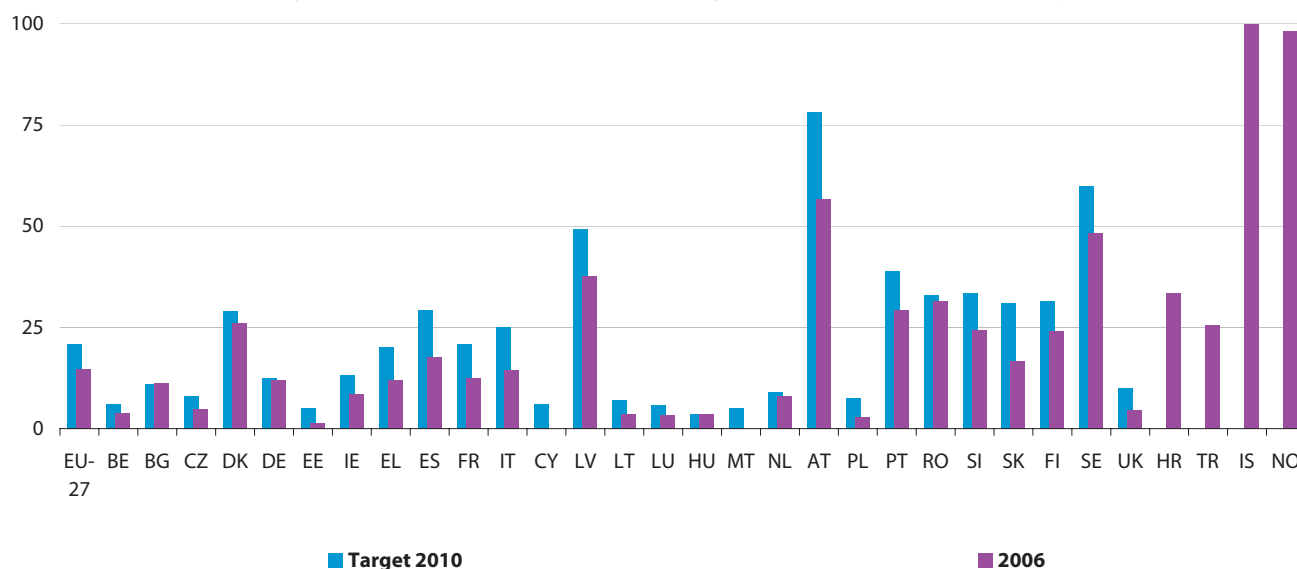
Prices

The price of two types of energy provided to consumers is shown, in this case to industrial consumers, in terms of the price per unit (GJ for gas or kWh for electricity) at the beginning of 2007 across the Member States. Bulgaria, Estonia and Latvia recorded the lowest prices for both products. Ireland, Cyprus and Italy had the highest electricity prices, and Germany, Sweden and the United Kingdom the highest gas prices.

⁽⁴⁾ Gross electricity generation is the electricity measured at the outlet of the main transformers, in other words, including the consumption of electricity in plant auxiliaries and in transformers.

⁽⁵⁾ See www.world-nuclear.org.

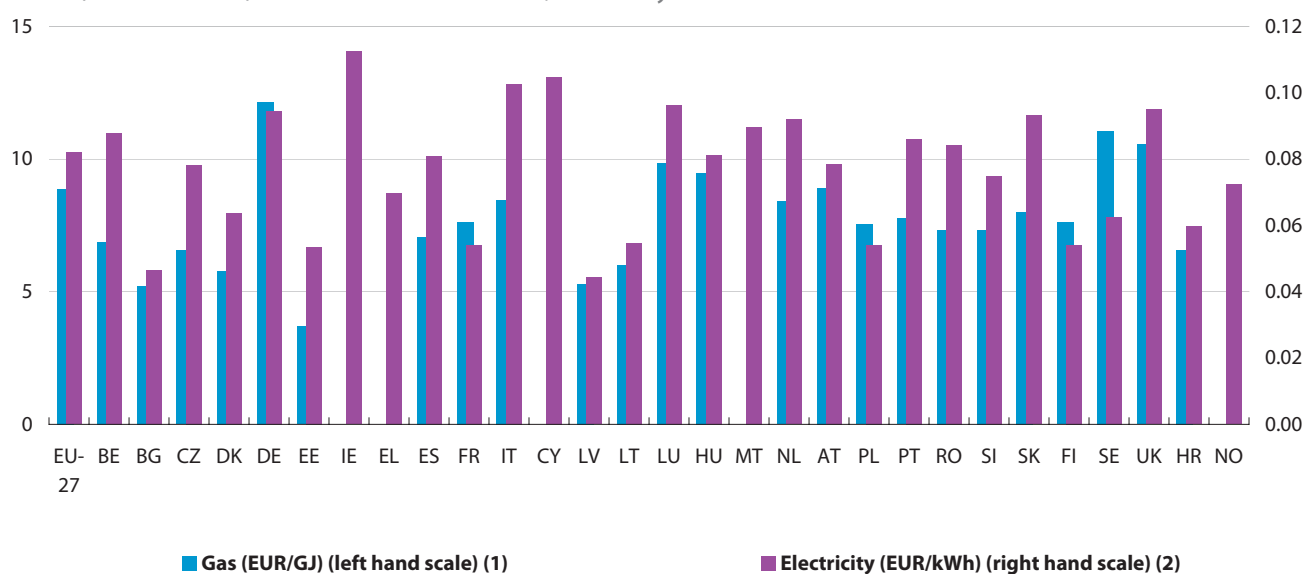
Figure 14.10: Electricity, gas, steam and hot water supply
Contribution of electricity from renewables to total electricity consumption, 2006 and target for 2010 (%) (1)



(1) Target 2010 only for EU-27 Member States.

Source: Eurostat (Structural indicators)

Figure 14.11: Electricity, gas, steam and hot water supply
Prices (without taxes) for industrial consumers, 1 January 2007



(1) Natural gas prices charged to final industrial consumers defined as follows: annual consumption of 41 860 GJ, and load factor of 200 days (1 600 hours); Ireland, Greece, Cyprus, Malta and Norway, not available.

(2) Electricity prices charged to final industrial consumers defined as follows: annual consumption of 2 000 MWh, maximum demand of 500 kW and annual load of 4 000 hours.

Source: Eurostat (Structural indicators)

Table 14.3: Electricity, gas, steam and hot water supply (NACE Division 40)
Main indicators, 2006 (1)

	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT
Enterprises	0.1	0.2	0.9	1.9	1.5	0.2	:	:	5.2	2.6	1.9	:	0.3	0.2
Persons employed	16.6	38.4	37.1	13.8	234.7	6.7	:	:	39.2	159.9	88.9	:	13.1	19.4
Turnover	34 445	4 456	19 526	18 479	258 608	1 113	:	:	54 659	73 838	138 088	:	1 042	1 873
Production	34 629	2 205	19 776	12 235	259 120	781	:	:	41 162	75 313	107 807	:	831	1 692
Purch. of goods & serv.	29 472	3 626	16 216	13 316	215 345	829	:	:	43 607	52 620	119 873	:	802	1 380
Value added	4 968	985	4 435	3 032	39 198	423	:	:	13 031	23 261	18 096	:	317	574
Personnel costs	1 745	277	658	608	17 374	74	:	:	2 231	10 312	4 491	:	119	197
Average personnel costs	105.6	7.3	18.1	48.2	74.0	11.2	:	:	64.0	64.5	51.8	:	9.1	10.2
Gross operating surplus	3 223	708	3 777	2 424	21 824	349	:	:	10 800	12 949	13 606	:	198	377
Gross investment	1 242	842	1 053	2 462	7 903	232	:	:	7 229	6 957	5 668	:	241	387
Apparent labour prod.	298.9	25.6	119.7	219.6	167.0	63.6	:	:	332.3	145.4	203.5	:	24.3	29.6
Wage adj. labour prod.	283.1	353.2	660.8	455.3	225.6	566.8	:	:	519.5	225.3	393.2	:	266.2	291.0
Gross operating rate	9.4	15.9	19.3	13.1	8.4	31.3	:	:	19.8	17.5	9.9	:	19.0	20.1
Investment rate	25.0	85.4	23.7	81.2	20.2	54.9	:	:	55.5	29.9	31.3	:	76.1	67.4
	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
Enterprises	0.0	0.4	:	0.5	1.3	1.4	0.5	0.3	0.3	0.2	0.7	1.3	0.4	0.9
Persons employed	0.9	32.9	:	21.5	28.8	159.4	10.5	96.0	7.7	25.9	13.8	29.2	110.6	14.5
Turnover	1 859	11 370	:	:	22 252	27 824	11 967	10 070	2 135	7 196	10 737	22 825	101 117	13 609
Production	1 026	4 227	:	:	22 340	18 081	9 336	8 659	1 518	7 204	6 072	15 742	103 478	14 246
Purch. of goods & serv.	1 646	9 847	:	:	16 942	20 611	9 593	8 781	1 614	4 821	8 072	17 493	71 319	7 179
Value added	253	1 704	:	:	5 584	7 732	2 871	1 868	521	2 472	2 959	6 346	30 173	5 385
Personnel costs	73	665	:	:	1 999	2 210	626	875	214	357	714	1 612	6 124	996
Average personnel costs	77.7	20.4	:	:	71.2	14.0	61.9	9.1	28.6	13.8	51.8	59.8	55.5	68.9
Gross operating surplus	180	1 039	:	:	3 585	5 522	2 245	993	307	2 114	2 245	4 644	24 050	4 389
Gross investment	105	854	:	1 066	1 650	1 884	405	2 171	286	3 223	968	4 125	8 548	1 167
Apparent labour prod.	267.6	51.8	:	:	194.0	48.5	272.8	19.5	67.6	95.5	214.2	217.7	272.8	372.3
Wage adj. labour prod.	344.4	254.0	:	:	272.6	347.4	440.9	213.3	236.3	691.2	413.4	363.9	491.8	540.5
Gross operating rate	9.7	9.1	:	:	16.1	19.8	18.8	9.9	14.4	29.4	20.9	20.3	23.8	32.2
Investment rate	41.5	50.1	:	:	29.6	24.4	14.1	116.2	54.8	130.4	32.7	65.0	28.3	21.7

(1) Netherlands and Poland, 2005; unless otherwise stated, values refer to EUR million; number of enterprises and number of persons employed are given in thousands; average personnel costs and apparent labour productivity are given in EUR thousand per person; wage adjusted labour productivity, gross operating rate and investment are ratios expressed as percentages.

Source: Eurostat (SBS)