

# Competition indicators in the electricity market of the European Union and Norway

## Statistics in focus

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### Highlights

- The liberalisation of the electricity market is on-going: historic national particularities and differences in policies lead to a mixed picture across the European Union, however, full liberalisation for all customers should be reached on 1 July 2007.
- The freedom of choice of an electricity supplier currently exists mainly for non-household consumers in the majority of the EU Member States; 9 Member States have reached the status of full market opening, i.e. for all types of customers.
- In countries that declared full market opening by 1.1.2005, the number of generating enterprises is generally high, except for Spain and Sweden.
- The highest number of electricity retailers in 2003 was found in Germany: 940 distributors. The Czech Republic, Spain and Italy registered between 300 and 400 retailers. In most cases however, only few enterprises have a noticeable market share.

Table 1: Degree of market opening at 1<sup>st</sup> January 2005

Country	2001	2005		
	Declared market opening	Declared market opening	Eligibility threshold	Size of open market TWh
EU-25	:	66%		2162
EU-15	59%	88%		2094
BE	35%	90%	Full*	60
CZ	:	47%	*	25
DK	33%	100%	Full	33
DE	100%	100%	Full	500
EE	:	10%	>40GWh	1
EL	30%	62%	non HH*	29
ES	54%	100%	Full	210
FR	30%	70%	non HH	275
IE	30%	56%	>1GWh	12
IT	45%	79%	non HH	225
CY	:	35%	>350MWh	1
LV	:	76%	non HH	4
LT	:	n.k.	n.k.	:
LU	0%*	57%	>20GWh	3
HU	:	67%	non HH	22
MT	0%	0%	.	.
NL	33%	100%	Full	100
AT	100%	100%	Full	55
PL	:	52%	>1GWh	50
PT	30%	100%	Full	42
SI	:	75%	non HH	10
SK	:	66%	non HH	15
FI	100%	100%	Full	80
SE	100%	100%	Full	135
UK	100%	100%	Full	335
NO	:	100%	Full	110

Note: EU15/25 are computed as weighted average of the 15/25 countries.

\*BE : Full only in Flanders region; non-households in other regions.

\*CZ : Only if hourly metered.

\*EL : All customers in non-interconnected islands are non-eligible.

\* LU is considered as 0 due to the delay on answering.

n.k: not known.

Source: DG TREN, on the basis of information provided by Regulators / Member States.

## Introduction

The data presented in this publication are essentially based on the results of a voluntary, questionnaire-based data collection aiming at monitoring competition in the electricity market. The liberalisation of the market is on-going: Directive 96/92/EC of December 1996 concerning common rules for the internal market in electricity constituted the first milestone at EU-level. Certain countries already anticipated the liberalisation process. The Directive fixed February 1999 as the deadline to bring into force the necessary national regulations. Certain countries were granted derogations. A political agreement (November 2002) was reached on completing the liberalisation process: the objective was to make all non-household customers eligible by 1 July 2004 and all customers by 1 July 2007.

Table 1 on the cover page outlines the state of progress of the liberalisation process and expresses, in %, the degree of market opening. The market opening is defined as the percentage of the total

electricity consumed by those customers that are given the choice of their electricity supplier.

At the beginning of 2005, full market liberalisation was completed in nine Member States and in Norway. The eligibility threshold shows that for certain countries, the freedom to choose the supplier is still limited to non-household customers. In other countries the threshold is linked to a certain quantity, quantities that are normally not reached by household consumers.

The following pages attempt to give a picture of the situation in the individual countries and notably outline the number and importance of electricity generating companies, the installed capacity of the various electricity generating power plants as well as the number of suppliers to end-customers. As the information in this publication is based on a voluntary data collection, a complete picture of the situation in all individual countries can sometimes not be obtained.

## Number of companies and their relative importance

A distinction should be made between the number of electricity generating companies and the number of electricity distribution companies. An electricity generator is not necessarily a distributor. Whereas information in Table 2 refers to the generating companies, information on the number of electricity retailers can be found in Table 5 and the related comments

In the framework of the process of moving from an often state-monopoly to open competition, certain Member States adopted the indicative timetable mentioned in the EU Directive, while others anticipated this schedule. Table 1 shows that five Member States already declared full market opening in 2001 (Germany, Austria, Finland, Sweden and the United Kingdom); by the 1st of January 2005, four more countries could be added to the list.

The increasing number of electricity generating companies represents a challenge with regards to statistical data compilation, as many smaller enterprises enter the market. Mainly for this reason the information in Table 2 refers to the number of companies representing 95% of the net electricity

generation. Here, it appears that in 11 Member States, the number of companies remains limited to 5 or less. In countries that declared full market opening by 1.1.2005, this number is significantly higher, except for Spain and Sweden, where 5 and 7 companies were responsible for 95% of the electricity generation.

The second line of Table 2 displays the number of companies that are each responsible for at least 5% of the total national net electricity generation. The number of enterprises is generally very limited, partially still reflecting the former situation where often one single company was responsible for the quasi-totality of electricity generation. Eight EU Member States still declared a single enterprise to have a significant share. Conversely, in Austria and Poland, 7 electricity generating companies are of considerable importance, the highest number of enterprises with a market share of at least 5%.

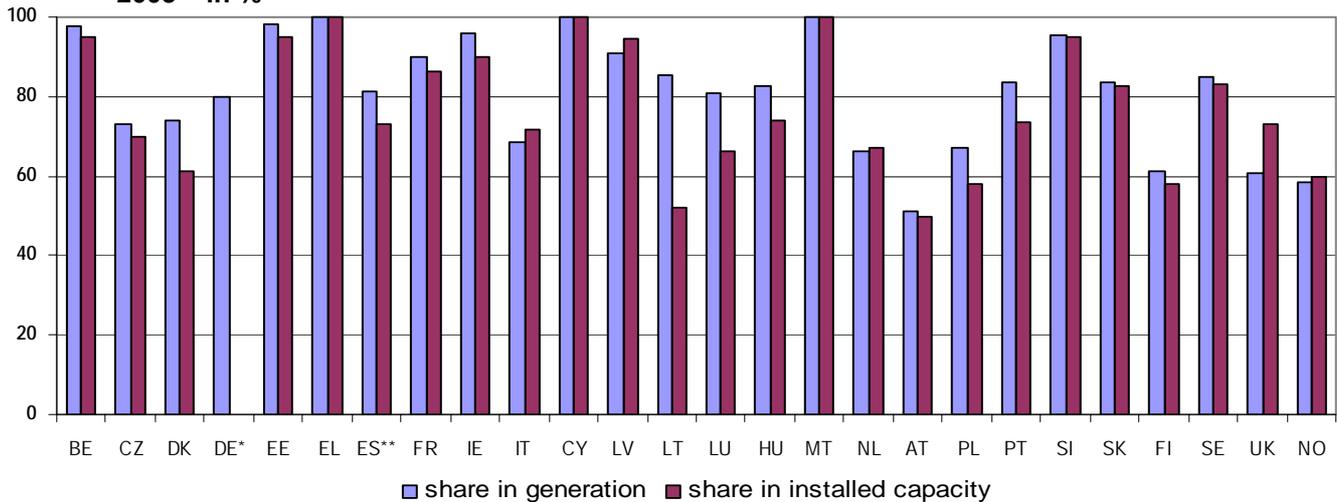
It should be noted that due to its limited size and the fact that it is an island, the liberalisation process of the electricity market of Malta is very limited.

**Table 2: Number of electricity generating companies per country, 2003**

	BE	CZ	DK	DE	EE	EL	ES*	FR	IE	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK	NO
Number of companies representing at least 95% of the net electricity generation	2	20	16	60	2	1	5	4	5*	79	1	5	5	9*	30	1	87	34	31	36	3	6	25	7	22	161
Number of companies producing at least 5% of the national net electricity generation	2	1	2	4	2	1	4	1	3	4	1	1	2	1	6	1	4	7	7	3	3	1	4	3	6	6

\* ES: does not consider a multitude of small generating companies operating within a special regime. LU: Generating over 1.5 MW. IE: based on installed capacity. Source: Eurostat.

**Graph1: Cumulated share of companies with at least 5% of the national electricity generation and capacity, 2003 – in %**



\* Four enterprises are responsible for generating 80% of German electricity generation – source: RWE.

\*\* Does not consider a multitude of small generating companies operating under the so-called 'special regime'.

Source: Eurostat.

Graph 1 displays the cumulated shares of the companies of a given country that have a share of at least 5% on their respective national markets, both with regards to the electricity actually generated in 2003 and the installed capacity of the generating power plants.

It is no surprise that Cyprus and Malta report a kind of monopoly situation, where a single company (see Table 2) is responsible for the totality of electricity generation, and thus the installed capacity. For Greece, two companies share the entire market.

Globally, an inverse relationship between the degree of market opening and the aggregated share of companies with at least 5% of the total generation/capacity can be observed. In Italy for instance, the four major companies (i.e. those which have at least a 5% share in total national electricity generation) were together responsible for 69% of the total electricity generated. The remaining electricity was generated by smaller enterprises (i.e. each with

a share of under 5% in total electricity generation). Similarly, those major Italian companies represented 72% of the total installed capacity of the country.

In Austria, where full liberalisation was already achieved years ago, 34 generating enterprises together were responsible for at least 95% of the total net Austrian electricity generation in 2003. The seven major companies together had a share of 50% in total generation and 51% in installed capacity.

In a balanced situation, shares in electricity generation and those in installed capacity of the generating plants should be equal or near equal. Noticeable differences were observed in Denmark, Lithuania and Luxembourg, where the share in production exceeded that of installed capacity. This is an indicator that the potential of smaller electricity "generators" is less well used than those of the major enterprises. The opposite situation occurred in the United Kingdom.

## Power plant capacity and electricity trade

The average installed capacity of the various electricity generating stations available in 2003 is shown in Table 3. The information is given by type of power plant. At EU level the total installed capacity amounted to nearly 698 thousand MW.

The installed capacity of a power plant is the target output when a plant is operating at its design conditions. For instance, a temporary close down of a generating plant for maintenance will make the production drop but does not affect the declaration of the installed capacity.

On the basis of available data and all types of electricity generating plants considered, it appears that Germany has the highest capacity with 125 000 MW, followed by France with 116 000 MW. But whereas the majority of the capacity is conventional thermal in Germany (64% of the total), it contributes only 24% (27 387 MW) in France. The latter country's nuclear power plants are responsible for 54% of its total installed capacity (63 363 MW).

**Table 3: Installed capacity (net in MW) of electricity generating power plants, by type of plant – 2003**

	EU-25	EU-15	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV
Conv. thermal	404 055	346 089	8 166	11 423	10 187	80 365	2 165	9 012	37 310	27 387	4 763	56 047	988	591
Nuclear	134 725	122 803	5 761	3 760	-	21 439	-	-	7 581	63 363	-	-	-	-
Hydro	129 599	119 171	1 415	2 149	11	8 256	4	3 056	18 943	25 475	528	20 660	-	1 538
Wind	27 535	27 455	67	11	3 115	14 609	2	397	5 945	214	160	870	-	26
Other*	1 949	1 690	200	-	2	388	-	261	0	8	-	672	-	-
<b>TOTAL</b>	<b>697 862</b>	<b>617 207</b>	<b>15 608</b>	<b>17 343</b>	<b>13 315</b>	<b>125 057</b>	<b>2 171</b>	<b>12 725</b>	<b>68 879</b>	<b>116 447</b>	<b>5 451</b>	<b>78 249</b>	<b>988</b>	<b>2 155</b>
Added capacity	17 272	15 255	70	1 080	328	3 779	-	532	3 369	286	734	2 302	0	15
Decommissioned cap.	4 552	4 360	9	47	33	1 668	-	-	538	533	5	628	0	-
Capacity change	12 720	10 895	62	1 033	295	2 111	-	532	2 831	-248	739	1 674	0	15

	LT	LU	HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK	NO
Conv. thermal	2 570	452	6 388	350	19 357	6 178	29 099	6 749	1 340	3 052	10 867	7 378	61 872	255
Nuclear	3 000	-	1 866	-	449	-	-	-	656	2 640	2 671	9 441	12 098	-
Hydro	920	1 139	54	-	37	11 698	2 273	4 588	983	2 507	2 966	16 143	4 256	27 700
Wind	-	22	3	-	884	141	35	268	-	3	52	399	312	100
Other*	-	15	-	221	113	9	28	16	-	10	-	-	6	-
<b>TOTAL</b>	<b>6 490</b>	<b>1 628</b>	<b>8 311</b>	<b>571</b>	<b>20 840</b>	<b>18 026</b>	<b>31 435</b>	<b>11 621</b>	<b>2 979</b>	<b>8 212</b>	<b>16 556</b>	<b>33 361</b>	<b>78 544</b>	<b>28 055</b>
Added capacity	4	27	130	0	318	-	609	533	32	148	71	1 140	1 766	-
Decommissioned cap.	-	0	0	0	495	-	135	152	0	10	44	42	213	-
Capacity change	4	27	130	0	-178	-	474	381	32	138	27	1 098	1 553	-

\* Geothermal, solar, other.  
Source: Eurostat.

Conventional thermal installed capacity makes up the totality of the power generation in Cyprus, the near totality in Estonia (99.7%) and has a share of well over 90% in the Netherlands and Poland.

Hydroelectric electricity generation largely depends on the quantity of rainfall and on the topographic particularities of a country. As such, relatively flat countries like the Netherlands or Denmark will not offer the same potential as countries with mountainous regions such as Italy, France or Austria. Norway excels with a hydro-electric share in total installed capacity of 99% (27 700 MW). Among the Member States, Latvia and Luxembourg displayed shares of 71% and 70% respectively. 65% of Austria's installed capacity is taken by hydro-electric generating stations.

The capacity of electricity generation through wind is very limited at EU-level; there are however two noticeable exceptions: the 3 115 MW installed capacity in Denmark represents 23% of the country's total. In Germany, the 14 609 MW capacity corresponds to 12%, significantly more than the capacity of hydro-electric power stations (8 256 MW). This note withstanding, it should be borne in mind that the output will vary on availability of wind, although a certain level of installed capacity is available.

When looking at newly installed capacity an increase of more than 10 000 MW or nearly 60% can be observed comparing 2003 with 2001 figures. This

new capacity was mainly installed in Germany (5855 MW). In relative terms, significant windmill capacity increase can be observed between 2001 and 2003 in Portugal (+257%), Belgium (+179%) and France (+104%).

The category 'Other' in Table 3 includes the capacity of geothermal, solar and other (such as biomass) generating stations. In this category only Malta declared a noticeable share: the proportion amounted to 39% of total installed capacity.

Compared with 2002, all countries but France (-248 MW) and the Netherlands (-178 MW) displayed a higher installed capacity.

In absolute terms, Spain, Germany and the United Kingdom displayed the highest increases with an additional 2831 MW, 2111 MW and 1553 MW respectively. In relative terms, Ireland, Spain and the Czech Republic stand out, as their new capacity constitutes 14%, 6% and 5% of the total available capacity respectively.

The general image obtained illustrates well the electricity generation infrastructure of the EU. Whereas a country like the United Kingdom heavily relies on conventional thermal electricity generation (especially gas-powered), nuclear electricity generation is dominant in France. In Denmark, and to a lesser degree in Germany, the capacity of wind power has been increasing at a fast pace.

**Table 4: Imports and Exports, 2003, GWh**

2003, GWh		
Imports	Exports	Balance
BE	14 665	8 254
CZ	10 086	26 299
DK	7 023	15 568
DE	49 110	52 379
EE	93	1 989
EL	4 219	2 063
ES	9 520	8 257
FR	6 177	72 175
IE	1 175	10
IT	51 486	518
CY	-	-
LV	2 671	38
LT	4 144	11 674
LU	5 386	1 967
HU	14 077	7 138
MT	-	-
NL	19 802	3 809
AT	19 003	13 389
PL	4 985	15 146
PT	5 898	3 104
SI	5 975	5 811
SK	8 623	10 878
FI	11 882	7 030
SE	24 367	11 202
UK	5 119	2 959
NO	13 420	5 547

Source: Eurostat.

The electricity networks in the EU are closely interconnected and feature more or less significant exchanges. Although a pan-European Electricity market will certainly become a reality, intermediate markets such as the Iberian, Nordic and Western European electricity markets are a fact today. Among the EU Member States, only Cyprus and Malta do not exchange electricity, due to their geographical position as islands. This does not mean that these countries are autonomous as such, as

their largely conventional thermal electricity generating plants have to be fuelled by another energy source.

Looking at the electricity balance, it appears that in 16 out of 24 countries for which data are available, the electricity balance in 2003 was negative. The highest deficit was recorded for Italy (51 000 GWh), followed by the Netherlands (16 000 GWh) and Sweden (13 000 GWh). Slovenia displays a near-balance, as its deficit was only marginal (164 GWh).

Conversely, France was the most important electricity exporting country in 2003 with close to 66 000 GWh. The balances of the Czech Republic and Poland were also positive at 16 000 GWh and 10 000 GWh respectively.

For a large country such as the United Kingdom, the trade balance might be negative, but in absolute terms, the electricity volumes imported remain limited. At 5 119 GWh, it remains even below the quantity imported by Luxembourg.

Italy, the most important importer among the Member States, bought most of its electricity from Switzerland (51% of the total) and from France (35%). Germany imported notably from France (40%) and the Czech Republic (26%). Sweden covered its needs mainly from its Nordic neighbours Denmark (30%), Finland (30%) and Norway (20%).

As mentioned earlier, France was clearly the largest exporter, the source used in this publication does however not reveal the main destination countries. Germany exports slightly more than it buys from abroad; the main destination countries being the Netherlands (29% of total exports) and Switzerland (26%). Nearly half of the Czech Republic's electricity exports (48%) go to Germany, 29% to Austria and 20% to Slovakia.

### Retailing: consumers increasingly have the choice.

As mentioned earlier, an electricity generator is not necessarily a distributor, too. With regards to the sales of electricity to end consumers, the latter increasingly have the choice as market opening has

clearly given an impulse to the creation of new distributors. However, one should refer to Table 1 to recall the current state of market opening and the conditions currently applied.

**Table 5: Retailing: number of electricity suppliers to final customers, 2003**

	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT
<b>Total number of suppliers</b>	45	365	113	940	42	5	375	166	6	390	1	1	8
<b>Suppliers having a share of at least 5% of the total</b>	2	8	5	4	1	1	6	1	4	3	1	1	3
	LU	HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK	NO
<b>Total number of suppliers</b>	11	12	1	42	160	175	5	8	18	100+	127	24	223
<b>Suppliers having a share of at least 5% of the total</b>	3	7	1	3	:	3	1	6	5	3	3	7	4

Source: Eurostat.

Although not applicable to all countries, it can be noted that the number of electricity suppliers is generally highest in those countries in which full liberalisation has already been achieved. Obviously, the size of the country has an influence on the number of electricity retailers. Germany registered 940 different retailers but only 4 reached a notable size (at least 5% of the total quantity of electricity supplied at national level).

Similarly, 166 electricity retailers were counted in France, but only one could be considered as 'major'. The Czech Republic, Spain and Italy registered between 300 and 400 retailers in 2003. In Italy only three of them had a market share of at least 5% whereas in the Czech Republic 8 retailers were of notable size.

Disregarding Cyprus and Malta for reasons mentioned earlier, only Latvia still reported a single retailer.

The main point remains the question what makes one retailer different from an other. As the "quality" of the product bought remains strictly the same, it is mainly the price that is likely to make the difference. Reliability of the supplier and clarity of information supplied might also be of influence. Certain electricity retailers also have a distinct character: for instance, some retailers sell electricity generated only by hydro-electric power stations or from wind. Electricity prices might be higher than those of other retailers but the fact of buying 'green' might be of importance for a certain category of customers, especially households. Also, in countries like Estonia, Hungary, Poland and Portugal, certain retailers offer 'long-term power purchasing contracts' that run over long periods.

There are thus various motivations to switch from one electricity supplier to the other. Reliable information on the number of households and non-household customers that have done so is only partially available. But again, it should be kept in mind that liberalisation for household customers is not as far developed as for non-household customers.

**Table 6: Supplier switching – 2003**

	Non-household customers	
	% of consumers	Volume in GWh
DE	41	:
EL	0.006	329
FR	11	34 000
LT	1	81
HU	20.1	6 537
AT	3	1 664
PL	:	6 528
PT	6.5	3 090
SI	6.7	6
NO	15.3	:

Source: Eurostat.

On the basis of available non-household customers data (see Table 6), it appears that Germany experienced a large switch in suppliers, as in 2003 41% of consumers decided to buy electricity from a different retailer.

In Hungary 20% did so; the total quantity of electricity that was thus supplied by a different retailer than previously amounted to 6 537 GWh.

The highest quantity of electricity that was supplied by different retailers was registered in France (34 000 GWh) although only 11% of the non-household consumers decided to change supplier.

## ➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

### Country codes

EU: European Union, including the 25 Member States (EU-25): Belgium (BE), the Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Greece (EL), Spain (ES), France (FR), Ireland (IE), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), the Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and the United Kingdom (UK).

### Symbols and abbreviations

": non available

"c" confidential.

"-" nil or not applicable.

MW: megawatt, or one watt x 10<sup>6</sup>

GWh: gigawatt/hour, one watt x one hour x 10<sup>9</sup>

TWh: terawatt/hour, one watt x one hour x 10<sup>12</sup>

### Definitions

Wind energy: Kinetic energy of wind exploited for electricity generation in wind turbines.

Geothermal energy: energy available as heat emitted from within the earth's crust, usually in the form of hot water or steam.

Solar energy: Solar radiation exploited for electricity generation by photovoltaic cells or solar thermal electric plants. Passive solar energy for the direct heating, cooling and lighting of dwellings and other buildings is not included.

Biomass: covers organic, non-fossil material of biological origin which may be used as fuel for electricity production. It comprises charcoal, wood, wood wastes (wood chips, sawdust, shavings, etc..) and other solid wastes (straw, rice husks, nut shells, poultry litter, crushed grape dregs, etc..).

Imports and Exports: Amounts of electricity are considered as imported or exported when they have crossed the political boundaries of a country, whether customs clearance has taken place or not.

### Data sources

The source of all figures presented in this publication (except Table 1 on the cover page) is based on a questionnaire-survey launched by Eurostat and reflects the state of data availability as of 25 April 2005.

It is recalled that the figures are collected on a voluntary basis. Also, the reader is attended on the fact that the data in this publication might show differences with similar data published by other national and/or international authorities.

Table 1 is based on information obtained from Directorate General Transport and Energy and is based on information provided by Regulators / Member States.

Data as presented in this publication are not included in Eurostat's statistical reference database NewCronos.

## ***Further information:***

### **Databases**

(see page 7, Methodological notes, Data sources)

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