UCTE

System Adequacy Retrospect 2005

union for the co-ordination of transmission of electricity

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UCTE SYSTEM ADEQUACY RETROSPECT 2005

Union for the Co-ordination of Transmission of Electricity

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This UCTE System Adequacy retrospect report aims at providing all participants in the European power market with an overall overview of:

- Generation and demand in the UCTE system in 2005, on the point of view of power balance and margins and on the point of view of the energy mix evolution
- The situation and main changes in the UCTE Transmission grids and a focus on the congestion on interconnection tie-lines including the main incidents that have affected the UCTE system and their possible influence on system security.

Power Balance

Power balance analysis is made at the reference time 11 am (CET) on the third Wednesday of every month. Reliably available capacity results by deducing unavailable capacity from generating capacity. It is compared to load at the reference time point.

Total generating capacity on UCTE grid is 611.3 GW in December 2005. This value is higher than 2004 figure by 18 GW thanks to new commissioning. Most of capacity developments were made of combined cycle plants and renewable power sources, whose capacity increased by more than 20% in 2005, especially thanks to wind energy development.

The availability of generating plants in December 2005 was quite similar as in 2004.

In 2005, the reference load is 369.5 GW, 8.9 GW higher than 2004 (but also partly because of perimeter changes in some countries).

In these conditions, the remaining capacity without exchanges in December 2005 was quite similar to December 2004 level. Furthermore, the level of imports was higher than in previous year.

During the rest of the year, margins at reference time have been slightly higher in 2005 than in 2004.

Table 1 UCTE - Power Balance - Retrospect 2005, 3rd Wednesday, 11:00

	December 2004	December 2005	Variation 2004-2005	
	GW	GW	GW	%
	593.2	611.3	18.1	3.0%
Reliably available capacity	431.6	440.3	8.7	2.0%
Reference Load	360.6	369.5	8.9	2.5%
Remaining capacity	70.6	70.8	0.2	0.2%
Balance of physical exchanges (imports)	3.4	8.2	4.8	-

It is usually admitted in the provisional approaches that the remaining capacity without exchange, after covering a margin against the peak load, is supposed to be at least 5% (or 10% for some countries) of the global generating capacity.

When calculated *ex-post,* this remaining margin (i.e. remaining capacity without exchange minus margin against peak load) is not supposed to fulfil the provisional adequacy reference

margin of 5%. Nevertheless, it is interesting to calculate it in percentage of generating capacity, as an indicator of the overall system margin met in the year.

In December 2005, this margin was about 6.9% of generating capacity. The lowest rate over the year 2005 has been reached in March (4.6%); it is similar to the lowest values observed in the previous years.

In conclusion it appears that security of supply has not been at risk in 2005.

It must be underlined that the rise of electricity prices in 2005 was not linked to a lack of generation capacity leading to stress the security of supply, but to the rise of generation costs, in relation with oil, gas and CO_2 prices.

Energy Balance

Consumption in UCTE system reached 2491 TWh in 2005. The global increase in the electricity consumption in 2005 is 1.5%. This is less than in 2004 because of mild weather conditions in 2005. The highest growth rates were reached in Spain, Portugal, Greece, Macedonia, Croatia and Serbia & Montenegro.

Total generation in UCTE reached 2547 TWh in 2005.

Non-favourable hydro conditions have dumped the decrease of hydroelectric generation in South of Europe. As a consequence, conventional thermal power generation in these countries was higher than in 2004.

Non-hydro renewable generation has once again increased by 21 %, mainly thanks to wind generation development. The overall part in the UCTE consumption of renewable energy, including hydro generation, is now approximately 15 % (the global European Union target being 22 % in 2010). This strong evolution is specially noticed in Spain and in Germany. This development also has significant impacts on transmission system (see below).

Overall UCTE remains approximately balanced in energy, as total amount of net imports is negligible compared to overall consumption.

Table 2 UCTE - Energy Balance - Retrospect 2005

	Energy 2004	Energy 2005	Variation 2005 - 2004	
	TWh	TWh	TWh	%
Generation				
Hydro power stations	321.3	291.9	-29.4	-9.1%
Nuclear power stations	797.4	795.2	-2.2	-0.3%
Conventional thermal power stations	1296.4	1358.5	62.1	4.8%
Renewable energy	76.5	92.9	16.4	21.5%
Not clearly identified	9.4	8.5	-0.9	-9.5%
Total Generation	**2501.0**	**2547.0**	**46.1**	**1.8%**
Physical exchanges balance (import-export)	-11.5	5.5	17.0	-
Consumption from pumped storage	43.8	56.0	12.3	28.1%
Consumption	**2453.8**	**2491.5**	**37.6**	**1.5%**

Table 3	UCTE - Generation mix evolution - Energy table		
	2003	2004	2005
Hydro power stations	12.90%	13.00%	11.5%
Nuclear power stations	32.50%	32.10%	31.3%
Conventional thermal power stations	52.40%	52.20%	53.5%
Renewable energy	2.20%	2.70%	3.7%

Transmission System Adequacy

The analysis of congestion on cross borderlines shows that the eastern part of UCTE is still the main area of congestion. Interconnection lines in and around Centrel area have been used at their maximum capacities almost 100% of the time in 2005.

Very high flows were recorded in 2005 on trans-border lines in Benelux and between Germany and Poland. The integration of wind power farms increased congestions on these lines. This phenomenon leaded to adaptation in system operation.

In Greece, grid adaptations were made in order to by-pass low voltage period in Athens area due to intensive use of air-coolers.

Unusual and punctual situation of imports have been recorded in France during the cold wave of February, or in Switzerland in spring and summer due to nuclear outages.

Only a few new interconnections were built in 2005; they lead to an increase of France / Belgium and Italy / Switzerland transfer capacities.

INTRODUCTION AND METHODOLOGY

1

1 INTRODUCTION AND METHODOLOGY

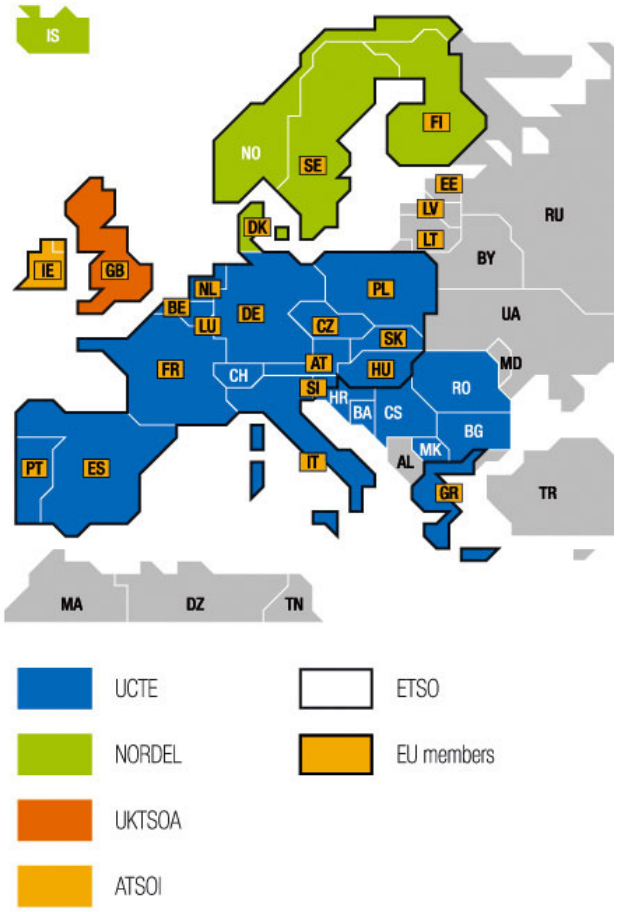
1.1 Presentation of UCTE

The Union for the Co-ordination of Transmission of Electricity (UCTE) co-ordinates the interests of transmission system operators in 23 European countries. Their common objective is to maintain the security of operation of the interconnected power system.

50 years of joint activities laid the basis for a leading position in the world which the UCTE holds in terms of the quality of synchronous operation of interconnected power systems.

Through the networks of the UCTE, 450 million people are supplied with electric energy ; annual electricity consumption exceeds 2500 TWh.

With regard to the other members of ETSO (European Transmission System Operators, 36 Transmission System Operators in 23 countries), the geographical perimeter of UCTE in 2005 is represented in the picture below:



Optimal Co-operation requires joint action

Close co-operation of member companies is imperative to make the best possible use of benefits offered by interconnected operation. For this reason, the UCTE has developed a number of rules and recommendations that constitute the basis for the smooth operation of the power system. Only the consistent maintenance of the high demands on quality will permit to set standards in terms of security and reliability in the future as well as in the past.

The UCTE – Security of electric power supply and promotion of competition

From the very outset of liberalisation in the European electricity markets, the UCTE has intensively pursued the development of schemes for the promotion of competition in the electricity sector. The aim is to support the electricity market without accepting restrictions in the security of supply.

The liberalisation of electricity markets cannot be implemented without a transparent and non-discriminatory opening up of electric networks. The UCTE sets the prerequisites that enable a compromise to be ensured between competition and security of supply.

As of June 2005, the member companies of the UCTE come from the following countries:

Table 4 UCTE - Perimeter

Complete name	Abbreviation
Austria	AT
Bosnia - Herzegovina	BA
Belgium	BE
Bulgaria	BG
Switzerland	CH
Serbia and Montenegro	CS
Czech Republic	CZ
Germany	DE
Western Denmark (*)	DK-W
Spain	ES
France	FR
Greece	GR
Croatia	HR
Hungary	HU
Italy	IT
Luxembourg	LU
Former Yugoslav Republic of Macedonia	MK
Netherlands	NL
Poland	PL
Portugal	PT
Romania	RO
Slovenia	SI
Slovak Republic	SK

(*) not included in present figures

1.2 Objectives of the retrospect

This UCTE System Adequacy Retrospect aims at presenting an overall view of :

- Generation and demand in the UCTE system in 2005, on the point of view of power balance and margins and on the point of view of the energy mix evolution

- The situation and main changes in the UCTE Transmission grids and a focus on the congestion on interconnection tie-lines including the main incidents that have affected the UCTE system and their possible influence on system security.

These elements are collected from UCTE representatives in each country. Synthesis of all answers is presented hereafter, completed by comments and notes of national correspondents.

Additional information concerning network and generation developments and significant events that occurred in the UCTE network in the year 2005 can also be found in the report of the UCTE sub-group “TSO-Forum” (see UCTE web site – living grid).

Specific reports on security and incidents, as well as the monthly statistics of UCTE, may also be consulted on UCTE web site http://www.ucte.org/.

1.3 Definitions

In this note, CIGRE definitions for reliability, adequacy and security are used.

Reliability – a general term encompassing all the measures of the ability of the system, generally given as numerical indices, to deliver electricity to all points of utilisation within acceptable standards and in the amounts desired. Power system reliability (comprising generation and transmission facilities) can be described by two basic and functional attributes: adequacy and security.

Adequacy – a measure of the ability of the power system to supply the aggregate electric power and energy requirements of the customers within component ratings and voltage limits, taking into account planned and unplanned outages of system components. Adequacy measures the capability of the power system to supply the load in all the steady states in which the power system may exist considering standards conditions.

Security – a measure of power system ability to withstand sudden disturbances such as electric short circuits or unanticipated losses of system components or load conditions together with operating constraints. Another aspect of security is system integrity, which is the ability to maintain interconnected operations. Integrity relates to the preservation of interconnected system operation, or the avoidance of uncontrolled separation, in the presence of specified severe disturbances.

The above definitions are described in detail in the following two CIGRE reports:
Power System Reliability Analysis – Application Guide, Paris, 1987,
Power System Reliability Analysis – Composite Power System Reliability Evaluation, Paris, 1992.

Hydroelectric power and renewable energy sources :

Although hydroelectric power is a renewable energy source (according also to the definition from the relevant EU Directive n° 2002/77/EC dated September 27th, 2002), it is shown separately on the grounds that hydroelectric capacity is foreseeable and contributes substantially to the reserve capacity available to transmission system operators.

“Renewable energy sources” and “not clearly identifiable energy sources” comprise capacities which, as a function of the primary energy used, do not correspond to the categories of hydro power stations, nuclear power stations and conventional thermal power stations, and which can be used for public/general supply and can thus be transported across the distribution and/or transmission networks.
“Renewable energy sources” comprise the following primary energies:

- wind energy,
- photovoltaics/solar energy,
- geothermal energy,
- energy from biomass and waste (e. g. biogas, damp gas, municipal waste, industrial waste, wood and waste of wood).

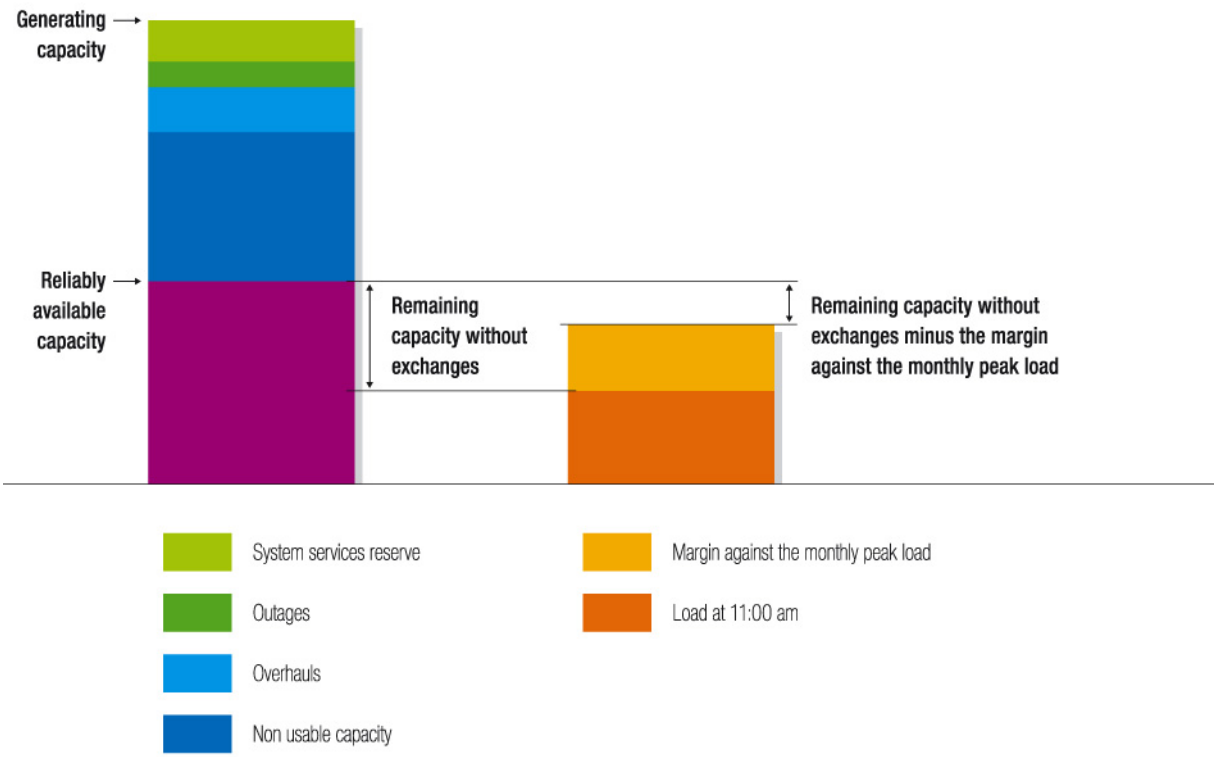
Other explanation concerning system adequacy methodology and terms used may be found on UCTE web site – statistics.

1.4 Methodology for margin assessment

The power balance analysis aims at determining global margin on UCTE system. Scheme below summarises the methodology for comparing generation to load :

- Reliably available capacity is the available generation once taken into account non usable capacity, overhauls, outages and system reserve,
- Load at the reference time (3rd Wednesday of each month at 11:00 am) is completed by a margin against the monthly peak load to take into account the fact that reference time does not coincide with exact peak load.

Figure 1 | **Margin calculation methodology**



As a simplification of language, the “remaining capacity without exchanges minus margin against monthly peak load” will be referred to as “remaining margin”.
This value may be compared to the amount of 5% or 10% of generation capacity that is supposed to be the provisional margin used in the forecast to assess generation adequacy.

This method is obviously very simplified and may contain uncertainties (see below) but its interest is to allow to follow the evolution in time - or at least, assuming that the data perimeter is stable enough over the period (see § 1.5).

1.5 Caution concerning data representativeness

Statistical data used for the year 2005 are in most countries still provisional, as “official” data are available only many months later. For the same reason data of the year 2004 can differ from the data published in last year report because they have been updated in the meantime.

Moreover, for statistical reasons, data on electricity supplies in a number of countries are not completely recorded by TSO's. Depending upon the country concerned, the sectors included may represent only a part of total consumption and / or total generation.

Table below gives these indexes for 2004 and 2005 when they differ from 100% or when changes occurred in the perimeter covered in the present retrospect compared to the previous one.

Table 5	**UCTE - Representativeness of consumption and generation data***			
	Index 2004		Index 2005	
	Generation (%)	Load (%)	Generation (%)	Load (%)
BE	**99**	**99**	**100**	**100**
ES	94	94	94	94
MK	n.a.	n.a.	n.a	n.a
CS	96	96	100	100
LU	**96**	**98**	**99**	**100**
NL	100	85	100	100
AT	**90**	**100**	**90**	**88**
PT	**94**	**94**	**92**	**92**
BA	99	99	100	100
BG	**100**	**100**	**100**	**100**
UA-W**	100	100	100	100

*Only countries with perimeter variation between 2004 and 2005. And for non-100% perimeter countries.
** UA_W is the part of Ukraine synchronously working with the UCTE. The representativeness of the results in consumption, peak load and generation as part of UCTE is 100%. But, as part of the overall Ukrainian represents only 2% of energy consumption, 4% of the peak load and 4% of generation.

All data indicated in the power and energy balances are supposed to be net values, that is :
- Excluding auxiliary consumption concerning generation data
- Including losses concerning consumption data.

Nevertheless, in some mentioned cases, this principle is not respected.

Considering these uncertainties on data collection, following warnings must be kept in mind:

1. *Comparison between 2004 and 2005 figures must be carefully considered due to changes in perimeter of data between both studies.*

2. *An uncertainty on figures of the overall generation / load of UCTE of about 5 GW is highly probable. As a consequence, the value of UCTE margins given in the report must be considered with plus or minus 10 % uncertainty.*

Note: due to rounding of figures, slight differences may be observed in following tables between the sum of individual values and the associated total value of lines or columns.

POWER BALANCE RESULTS 2

2 POWER BALANCE RESULTS

2.1 Generating capacity

The maximum national generating capacity represents the maximum potential net generating capacity of electric utility companies and auto-producers in the countries concerned.

At the end of 2005, the total generating capacity of UCTE was 611.3 GW. This value is higher than previous year by 18 GW, partly because of significant commissioning of new plants:

- **in Spain with the development of wind generation, of combined cycle plants and hydro,**
- **in Italy with a strong increase in combined cycles releases and**
- **in Portugal with an increase of hydro and conventional thermal generating capacity**

The most remarkable trend is the continuous increase of generation from renewable sources: plus 21% in 2005.

Table 6 UCTE - Generating plant mix and changes in capacity

	Capacity December 2004		Capacity December 2005		Variation 2005 - 2004	
	GW	%	GW	%	GW	%
Hydro power stations	132.6	22.4	134.7	22.0	2.1	1.6
Nuclear power stations	113.3	19.1	112.7	18.4	-0.6	-0.6
Conventional thermal power stations	312.6	52.7	322.6	52.8	10.0	3.2
Renewable energy sources	32.9	5.5	39.9	6.5	7.0	21.3
Not clearly identified sources	1.8	0.3	1.4	0.2	-0.4	-22.4
Total Generating Capacity	**593.2**	**100.0**	**611.3**	**100.0**	**18.1**	**3.0**

Figure 2 Generating plant mix

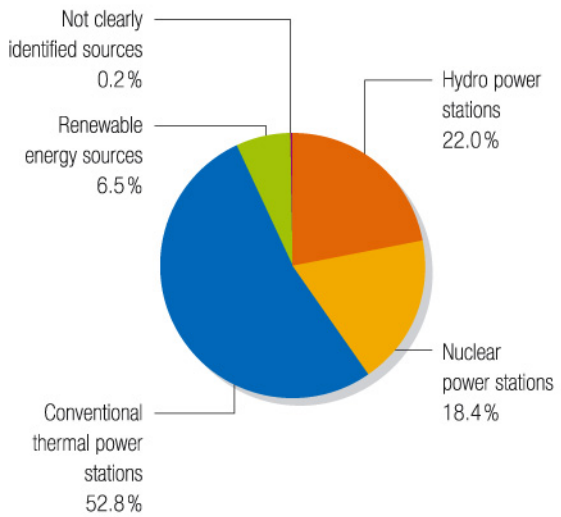


Table 7	National generating capacity - December 2005							
	Hydro Power stations GW	Nuclear Power stations GW	Conventional Thermal plants GW	Renewable Energy sources GW	Not Identified sources GW	NGC GW	Variation 2005 / 2004 GW	%
BE	1.4	5.8	8.1	0.8	-	16.1	0.4	2.3
DE	9.1	20.2	70.4	19.6	-	119.3	4.4	3.8
ES	19.3	7.6	35.6	10.3	-	72.8	5.5	8.1
FR	25.4	63.3	25.3	1.5	-	115.5	-1.2	-1.0
GR	3.1	-	7.6	0.6	-	11.3	0.7	6.1
IT	21.0	-	63.4	2.4	-	86.8	5.1	6.2
SI	0.9	0.7	1.3	-	-	2.8	-	-0.5
HR	2.1	-	1.7	-	-	3.7	-	-
MK	0.5	-	0.9	-	-	1.4	-	0.9
CS	3.5	-	6.4	-	-	9.9	-	-
LU	1.1	-	0.5	0.1	-	1.7	-	0.7
NL	-	0.4	19.5	2.0	-	22.0	1.3	6.4
AT	11.2	-	6.0	0.7	-	17.9	0.6	3.5
PT	4.9	-	6.5	1.3	-	12.8	1.1	9.1
CH	13.2	3.2	0.6	0.3	-	17.3	-	-
CZ	2.1	3.5	10.5	-	-	16.1	-	-
HU	-	1.8	5.4	0.2	0.7	8.1	-0.2	-2.4
PL	2.2	-	29.7	0.1		32.1	0.4	1.3
SK	2.4	2.6	2.3	-	0.7	8.0	-	0.5
BA	2.1	-	2.0	-	-	4.0	-	-
RO	6.2	0.7	10.1	-	-	17.0	0.3	1.5
BG	2.9	2.9	6.4	-	-	12.2	-0.1	-0.6
UA-W	-	-	2.5	-	-	2.5	-	-
UCTE	**134.7**	**112.7**	**322.6**	**39.9**	**1.4**	**611.3**	**18.2**	**3.1**

National comments:

AT The difference between the values for fossil fuel power plants 2004 and 2005 results in updated official data.

BG Only small hydro projects have been commissioned - total capacity 10 MW

ES In addition to the new thermal capacity (4.000 MW of new combined cycle plants), about 1.300 MW of new wind power plants have been also commissioned in year 2005.

DE As a result of legal unbundling, the German transmission system operators do not receive detailed data on these power balance items from power plant operators. The data have partly been determined on the basis of estimations made prior to the liberalisation of the German electricity market.
It is noticeable that Obrigheim nuclear power plant (340MW) and Rudow thermal power plant were shut down in 2005. A new 500MW thermal power plant was commissioned in May in Ludwigshafen (Mitte).

FR It is to be noted that the total capacity of wind farms connected on both public transmission and distribution networks reached 640 MW at the end of the year 2005.

About 1700MW of thermal power stations were shut down in 2005.
As of 31st December 2005, 4829 MW of fossil fuel power stations connected to the RTE network are mothballed.

GR The Lavrion Gas plant is an open cycle gas turbine unit of 106 MW and it was commissioned to face the high demand and the low level of tension in summer in the area of Athens.
The ENTHES power plant is a combined cycle unit using natural gas. It was constructed in the area of Thessaloniki (in the North) by an independent generator.

IT About 4400 MW of conventional thermal power plants and over than 500 MW of wind power plants were commissioned in 2005. The increase of generating capacity is due to legislative measures that enable the building up of new power capacity under simplified authorisation procedure.

LU The global figures don't reflect the physical reality of the situation in Luxembourg. They include the large pumped storage power plant of Vianden (1.1 GW maximum power output), situated in Luxembourg but connected directly by dedicated lines to DE and the CCGT of Esch (0.38 GW maximum output), directly injecting power to BE.
Due to a deficiency of power plants directly connected to the grid (0.15 GW compared to reference load of 1GW), Luxembourg has to import a large part of energy (more than 90% in 2005) from the neighbouring countries (BE and DE).
The national consumption without Vianden is about 6.5TWh whereas the local production directly injected on the grid only reaches 0.6TWh.

PL About 480 MW of fossil fuel power plants was commissioned in 2005. Various hydro power units were built for a total amount of 50MW.

PT About 400MW of fossil fuel power units have been built in 2005. In 2005 about 30 Wind farms were commissioned totalizing about 400 MW. Ribatejo 3rd unit (combined cycle) commissioning was initially expected for 2006.

RO Comment: In January 2005 the national generating capacity from fossil fuel power stations was 10.127 GW. This value is higher with 46 MW than the value in December 2004, 10.081 GW, due to the declarations of the self-producers.

2.2 Unavailable capacity and reserves management

The generating capacity is not completely available. In the power balance, unavailable capacity is divided into:

- *non-usable capacity,*
- *capacity which is not available in thermal power plants as a result of overhauls or outages,*
- *reserve capacity for network services.*

2.2.1 Non-usable capacity

Non-usable capacity is the part of generating capacity which cannot be scheduled, for different reasons: a temporary shortage of primary energy sources (hydroelectric plants, wind farms), power plants with multiple functions, in which the generating capacity is reduced in favour of other functions (co-generation, irrigation, etc.), reserve power plants which are only scheduled under exceptional circumstances, unavailability due to cooling-water restrictions, etc.

Non-usable capacity for all UCTE countries reached its lowest value in February and its highest value in August. These values respectively represent a rate of 16.8% and 21.1% of the total UCTE generating capacity. These relatively high values, especially in comparison with 2004, may partly be explained by the increase of wind power in the generation mix that is only partly usable and the unfavourable hydro conditions.

Table 8					**Non usable capacity**							in GW
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
BE	0.7	0.7	1.1	1.4	1.2	1.5	1.3	1.6	1.4	1.4	1.1	0.7
DE	19.8	20.9	20.3	21.0	21.3	21.5	22.0	23.5	21.9	21.8	21.8	22.8
ES	17.4	17.7	21.4	18.1	17.6	20.8	21.4	22.7	23.9	24.5	22.4	23.1
FR	26.8	21.3	28.0	27.3	27.4	29.2	30.0	31.4	27.2	27.9	24.3	22.9
GR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
IT	16.6	16.6	17.2	18.1	18.1	18.3	17.5	18.5	16.1	16.6	17.1	17.5
SI	0.4	0.4	0.4	0.1	0.2	0.3	0.2	0.1	0.1	0.2	0.3	0.4
HR	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MK	-	-	-	-	-	-	-	-	-	-	-	-
CS	0.8	0.5	0.8	1.0	0.8	1.5	0.9	1.2	1.5	0.8	0.5	0.6
LU	-	-	-	-	-	-	-	-	-	-	-	-
NL	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
AT	3.0	3.0	3.0	5.0	5.0	5.0	4.0	4.0	4.0	3.0	4.0	4.0
PT	2.1	1.5	2.5	1.7	2.1	3.4	3.7	4.6	4.3	3.8	2.4	1.3
CH	2.5	3.0	4.2	4.1	3.2	3.3	3.1	2.8	2.5	3.4	2.8	2.0
CZ	2.6	2.3	2.2	2.1	2.1	1.7	2.2	2.1	2.3	2.1	2.5	2.4
HU	1.1	1.1	0.9	1.0	1.1	1.3	1.1	1.1	0.9	0.8	0.8	0.7
PL	2.1	1.9	2.6	3.4	3.1	3.4	3.8	3.2	3.6	3.0	2.9	2.2
SK	2.0	1.8	1.8	1.4	1.5	2.0	2.1	1.6	1.9	2.0	2.0	1.9
BA	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
RO	4.3	3.7	3.6	3.6	3.2	3.3	3.2	3.4	3.1	3.3	2.9	3.1
BG	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
UA-W	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.3	0.4	0.4	0.4	0.4
UCTE 2005	**106.7**	**100.7**	**114.3**	**113.6**	**112.4**	**120.8**	**120.9**	**126.0**	**119.1**	**118.9**	**112.3**	**110.0**
UCTE 2004	*100.7*	*101.4*	*106.6*	*108.6*	*109.0*	*112.8*	*117.0*	*119.8*	*114.4*	*106.4*	*107.6*	*109.7*
UCTE 2003	*84.8*	*87.6*	*98.6*	*103.5*	*102.0*	*106.9*	*111.4*	*111.9*	*108.1*	*97.5*	*95.3*	*92.5*

National comments:

CH The outage of the nuclear power plant Leibstadt led to an extensive usage of water in Swiss accumulations. This caused a significant decline of the accumulations filling coefficient. Beginning with the month of May the difference compared to the last year values progressed to over -10% in the month of September. Besides, a long dry period from September until the end of the year prolonged the low water level situation in the accumulations and also affected the production of the run of river hydro power plants.

DE The share of renewable energy sources in the installed generating capacity has again considerably increased in 2005. This increase also explains the high level in non-usable capacity.

ES Hydro conditions were very severe in year 2005. Hydro generation decreased 35% compared to year 2004. The lack of hydro production was balanced by a significant increase of thermal generation (mainly new combined cycle capacity).
Year 2005 was one of the driest of the history in Spanish System (19.442 GWh of energy production) (Average year: 30.000 GWh)

FR Non usable capacity has been lower in January and February, and higher from June to September. This is partly due to weather conditions.

GR The energy capability factor ranged from 0,47 in June and September to 1,84 in March and December 2005. The hydro reserves were high throughout the whole year due to the favourable hydro conditions resulting in an increase of the hydro production. The adequacy of the hydro reserves contributed to the system adequacy because the hydro production covered the peaks of the load and the availability of the system services was guaranteed.
In 2005 the hydro conditions were more favourable than those in 2004 and the hydro production higher.

IT Non usable capacity has been higher compared to the spring period of the 2004 mainly cause by a not favourable hydro conditions.

HR Hydro conditions during the year 2005 were relatively favorable (6.4 TWh) which contributed to higher production of hydro units and more flexible operation of Croatian power system.

RO In autumn and the beginning of winter, the hydro power stations were in overhauls programs, because in the 2005 summer the weather conditions were not favourable for this purpose.
During the 2005 year, there were accomplished both the system reliability and the exchange balance requirements, in despite of the fact that it was a long flood time interval.

SI Hydro conditions were very good during April, but the limitations due to the transmission network constraints were significant, as high amounts of hydro energy in Balkan caused high flows and congestions on the Slovenian Italian tie-lines.

SK Better hydro conditions in 2005 had good impact on the hydro production compared to 2004.

2.2.2 Thermal power plant overhauls

In the UCTE countries, non-available capacity due to overhauls reached a synchronous peak of 56.2 GW in May that represents 13% of the generating capacity of thermal power plants for that month. This amount is quite similar to 2004 values.

Table 9	Thermal power plant overhauls											in GW
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
UCTE 2005	**12.2**	**17.2**	**29.8**	**48.3**	**56.2**	**51.7**	**42.9**	**44.6**	**47.0**	**33.7**	**25.8**	**11.8**

Table 10	Characteristic values of overhauls programs in UCTE					
	Max. capacity (nuclear & conventional)	**Overhaul capacity, 3rd Wed. At 11:00**				
		Average value		**Maximum value**		
	December 2005	**GW**	**%**	**GW**	**%**	**Month**
BE	13.9	0.8	5.9	2.0	14.0	Sept.
DE	90.6	6.2	6.9	11.3	12.5	June
ES	43.2	1.5	3.4	4.4	10.1	April
FR	88.6	8.7	9.8	14.3	16.1	Aug.
GR	7.6	0.5	6.4	1.2	15.7	Nov.
IT	63.4	4.7	7.5	5.3	8.4	Nov.
SI	1.9	0.1	4.3	0.2	12.8	July
HR	1.7	0.1	8.0	0.4	24.0	Sept.
MK	0.9	0.1	11.5	0.3	34.6	May
CS	6.4	0.8	13.1	1.8	28.6	July
LU	0.5	0.0	6.7	0.4	80.1	Feb.
NL	19.9	1.1	5.8	2.5	12.7	May
AT	6.0	0.0	0.0	0.0	0.0	Jan.
PT	6.5	0.2	2.3	0.4	6.3	Oct.
CH	3.8	0.2	5.0	1.3	34.2	July
CZ	14.0	1.6	11.5	3.2	22.9	Sept.
HU	7.2	0.5	7.4	1.0	14.6	Sept.
PL	29.7	2.3	7.9	4.6	15.4	July
SK	4.9	0.5	11.0	1.2	24.6	April
BA	2.0	0.3	17.0	0.7	37.3	May
RO	10.8	2.0	18.3	3.3	30.2	June
BG	9.2	2.2	24.3	3.5	37.3	July
UA-W	2.5	0.4	15.4	0.6	23.2	July
UCTE	**435.2**	**35.1**	**8.1**	**63.9**	**14.7**	

National comments:

BG The scheduled maintenance of the units in the system for 2005 was met 92 %

CH Due to the long duration of the outage of the nuclear power plant Leibstadt the decision was taken to use that time in order to execute all the necessary overhaul work there.

CZ The average value of outages, we calculated in the "UCTE System Adequacy Forecast 2005-2015", is about 500 MW. But actual values varied from 0 MW (in January, February, March and October) to maximal value 1300 MW in December.

FR The overhaul program was less charged in 2005 than in 2004.

GR There is no significant difference between the performed and the scheduled overhauls.
In 2005, the majority of the unit overhauls took place in spring and autumn in order to make the units reliably available in summer and winter that are the heavy load periods.

HR Overhauls were reasonably rescheduled in accordance with favorable hydro conditions, consumption and capabilities of production units during the year 2005.
Overhauls of major Thermal Power Plants (TPP Rijeka, TPP Sisak and TPP Plomin 2) were not planned in 2005 at all, respectively to 2004.

IT Overhauls have no significant differences respect to the previous year. A sensible increase has been observed on June and July.

LU The overhaul of the major power plant was first scheduled for 10 days in July, but in fact it had been performed between 6th and 25th of February 2005.

MK Before the beginning of the year 2005, the Planning Department made a yearly forecast for overhauls of the Power plants and 400, 220 and 110kV lines. All planned overhauls were performed according to that plan.

NL Only scheduled overhauls are given, TenneT isn't informed about performed overhauls.

PL In general overhauls are kept on the same level as in 2004. The biggest difference can be noticed in April and May (increase) and in June, August and December (decrease).

RO In summer 2005, the weather conditions allowed a higher value for the fossil fuel power stations overhauls than the value that was scheduled.
For the difference from the last year overhaul program of the fossil fuel power stations is responsible the same 2005 rainy summer.

SI Most overhauls of hydro power plants were finished in January and February as in year 2004.
Hydro conditions in 2004 were good during the period from March till August, while in 2005 the hydrology was good in the period from April till November (except June). In 2005 Nuclear Power Plant has no maintenance period. The main maintenance work was performed on the TE Sostanj unit 4 in the period from July to September.

SK Reasons of changes in programs of overhauls (2004 versus 2005) are treated by producers. Such information is not available to TSO.

2.2.3 Thermal power plant outages

In 2005, the maximum value of not available capacity in the UCTE as a result of outages was 24.5 GW in July. This value represents 5.7% of the nuclear and conventional thermal generating capacity for the same month. This value was of 5% to 7% in the previous years.

Table 11 Characteristic values of outages programs in UCTE

	Max. capacity (nuclear & conventional) December 2005	Outage capacity, 3rd Wed. At 11:00 Average value GW	%	Minimum value GW	%	Month	Maximum value GW	%	Month
BE	13.9	0.6	4.2	-	-	Feb.	1.5	10.7	June
DE	90.6	3.1	3.4	1.5	1.7	April	4.6	5.1	Nov.
ES	43.2	2.4	5.5	0.6	1.4	Jan.	4.6	10.7	Aug.
FR	88.6	4.5	5.0	1.1	1.2	Jan.	8.4	9.4	July
GR	7.6	0.3	4.4	-	-	April	0.9	11.6	June
IT	63.4	2.2	3.5	1.9	3.0	Jan.	2.5	3.9	Aug.
SI	1.9	-	0.5	-	-	Jan.	0.1	5.4	Dec.
HR	1.7	-	0.5	-	-	Jan.	0.1	6.0	Nov.
MK	0.9	-	-	-	-		0.0	0.0	
CS	6.4	1.0	15.9	0.6	9.0	May	1.8	27.8	Nov.
LU	0.5	-	-	-	-		-	-	
NL	19.9	1.0	5.0	1.0	5.0	n.r.	1.0	5.0	n.r.
AT	6.0	-	-	-	-		-	-	
PT	6.5	0.1	2.2	-	0.1	May	0.3	4.6	April
CH	3.8	0.5	13.2	-	-	Jan.	1.2	31.6	April
CZ	14.0	0.4	3.1	-	-	Jan.	1.3	9.3	Dec.
HU	7.2	0.2	2.4	-	0.1	Feb.	0.8	10.6	March
PL	29.7	0.9	2.9	0.3	1.0	March	1.8	6.1	Oct.
SK	4.9	0.1	1.4	-	-	Jan.	0.2	4.5	April
BA	2.0	0.2	11.3	-	-	May	0.4	20.4	Aug.
RO	10.8	0.4	3.7	-	0.3	July	1.6	14.8	Feb.
BG	9.2	0.5	5.9	0.5	4.9	April	0.6	6.6	Jan.
UA-W	2.5	-	1.0	-	-	Jan.	0.2	6.0	Sept.
UCTE	**435.2**	**18.5**	**4.3**	**7.5**	**1.7**		**33.8**	**7.8**	

National comments:

BG The total duration of forced outages was 1 % higher than the forecasted value.

CH On March 28th, 2005 the nuclear power plant Leibstadt (1.2 GW) was put off the operation due to the serious generator damage. It remained under repair up to the end of August 2005.

ES Forced outage rate of nuclear plants in year 2005 was much higher than in year 2004.

FR Outages were lower in 2005 than in 2004.

GR There is an increase of outages comparing to the forecasts.

HR TPP Plomin 1 was outaged due to turbine vibrations.

IT A sensible increase has been observed in July and October.

NL As TenneT isn't informed about outages, an average estimation for outage of thermal power plant is given based on historical known values.

PL The biggest differences with forecasts and year 2004 can be observed in June and October.

RO The outages of the thermal power stations were diminished in 2005 in opposition to the forecasts, due to better maintenance services.

2.2.4 Reserve for system services

The reserve for system services is the estimated reserve capacity which is required for system operation, for example to face outages above average conditions or abnormal load situation. It is therefore the reserve capacity which is available to TSOs from power plant operators, and includes the following specific elements:

- *The "second reserve" and the "minute reserve", which are made available to TSOs under the contractual terms of the network frequency control service, using the requisite technical facilities;*
- *"Other reserves", such as reserves for voltage control or the management of bottlenecks, which are managed by TSOs under the terms of contracts.*

However, the reserve for system services does not include reserves for long-term outages, which are to be covered by power plant operators.

During 2005, the reserve for system services ranged from 25.7 GW in June (approximately 7% of the synchronous load) to 32.6 GW in March (approximately 10% of the synchronous load). These values are stable over the years because they are the result of the application of the UCTE rules.

Table 12	Reserve for system services											in GW
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
BE	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6
DE	7.4	7.4	7.5	7.6	7.3	7.1	7.4	7.1	7.1	7.4	6.8	7.1
ES	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
FR	7.3	4.6	5.4	4.5	4.0	2.8	4.2	3.7	4.2	4.2	4.5	4.5
GR	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
IT	3.5	3.8	4.5	4.9	4.1	3.0	4.9	4.3	2.9	3.2	2.5	1.5
SI	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
HR	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
MK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
CS	0.4	1.0	1.2	1.4	1.7	0.7	0.9	1.2	0.6	1.0	0.9	1.2
LU	-	-	-	-	-	-	-	-	-	-	-	-
NL	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
AT	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
PT	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7
CH	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
CZ	0.8	1.0	1.0	0.7	0.6	0.6	0.7	1.0	0.9	0.7	1.1	0.8
HU	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8
PL	2.5	2.1	3.1	1.0	1.2	1.6	1.4	2.3	2.1	1.7	1.8	1.7
SK	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BA	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
RO	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
BG	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.2	1.2	1.2	1.2
UA-W	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
UCTE	**32.0**	**29.9**	**32.6**	**30.0**	**28.8**	**25.7**	**29.5**	**29.4**	**27.7**	**28.3**	**27.6**	**27.0**

National comments:

BG The values correspond to the predefined optimal values calculated on the basis of probability models.

DE In Germany, the TSOs' system services reserve (formerly included in the total reserves) shows a relatively constant value over the year (around 6% of the generating capacity).

ES System service reserve was sometimes affected by the sudden changes in the wind power plants production, with a maximum ramp (increase/decrease) of 1.000 MW/hour (10% of wind power capacity)

GR We keep as a reserve all the available generating capacity according to the financial offers submitted by the generators in order to use it for voltage and flow congestions. The gas turbines of HERON and the temporarily commissioned gas turbines of LAVRION Gas supported the high demand and the level of voltage in the area of Athens.

IT No sensible differences with respect to the expected values.

NL The given system services reserve is only a part of the total capacity for system services reserve. About another 300 MW is available as sheddable load.

PL It seems very difficult to observe any stable trend in changes of values for year 2005 referred to 2004.

RO The system services reserve fulfilled the needs of the power system all the 2005 year.

UA-W Possibility of load shedding by 45 MW (agreement with distribution companies in case of reserve deficiency) may be added to reserve.

2.2.5 Reliably Available Capacity

Reliably available capacity is obtained by deducting non-usable capacity, overhauls, outages and system reserve from the national generating capacity.

Reliably available capacity represents the capacity that is available to power plant operators and electricity traders for meeting their clients' demand.

The Reliably available capacity in the UCTE reached a peak value of 440.3 GW in December – this value represents 73.7% of the total generating capacity (611.3 GW in December). The lowest value of 381.1 GW was reached in August – this represents 63.8% of the total generating capacity (604.4 GW in August). These figures are quite similar to the ones observed in the previous years.

Table 13 Monthly reliably available capacity in GW

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
BE	13.6	14.4	12.2	13.0	13.3	11.5	12.8	11.9	11.9	11.4	12.8	13.9
DE	87.0	85.7	83.8	81.7	73.9	74.8	75.2	76.2	75.0	80.5	81.6	83.9
ES	50.2	48.7	43.1	43.8	44.5	43.2	43.8	42.0	42.5	43.0	48.5	46.9
FR	78.2	81.5	71.5	69.0	66.7	68.8	63.4	60.4	66.7	70.9	76.1	80.1
GR	8.8	8.4	8.4	8.3	7.9	8.5	9.5	9.0	8.9	8.8	8.2	9.4
IT	54.6	55.0	54.2	52.8	54.3	56.0	55.5	55.9	60.1	59.2	59.4	60.6
SI	2.0	2.0	2.0	2.2	2.2	2.1	2.1	2.1	2.1	2.3	2.1	1.9
HR	3.2	3.2	3.2	3.1	3.1	3.0	3.0	3.0	2.8	2.8	3.1	3.2
MK	1.2	1.2	1.2	1.1	0.9	0.9	1.0	1.0	1.1	1.2	1.2	1.2
CS	7.4	6.7	6.6	5.6	5.4	5.2	5.0	4.9	5.8	7.0	6.6	7.1
LU	1.7	1.3	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
NL	17.2	17.0	17.3	16.6	16.2	17.2	18.5	19.0	18.1	18.2	18.8	19.1
AT	14.1	14.1	14.1	12.1	12.1	12.1	13.2	13.2	13.2	14.2	13.2	13.2
PT	8.7	9.5	8.6	9.1	9.0	7.9	7.9	6.9	7.7	7.8	9.5	10.5
CH	13.9	13.5	12.2	11.1	12.0	12.0	10.8	11.7	13.6	13.0	13.6	14.4
CZ	12.6	12.8	11.9	10.5	10.4	9.9	10.6	10.2	9.5	12.1	10.9	11.0
HU	5.8	5.8	4.6	5.4	5.4	5.8	5.9	5.8	5.1	5.7	5.5	6.4
PL	26.6	26.8	24.6	22.7	22.5	21.8	21.2	22.0	22.9	23.4	25.4	26.9
SK	4.8	5.0	5.1	4.2	4.4	4.1	4.0	4.5	4.2	4.5	5.0	5.0
BA	3.0	3.0	3.0	3.0	2.8	2.9	3.1	3.0	3.1	3.1	2.9	2.8
RO	10.9	9.7	10.2	10.0	9.4	9.3	10.1	9.7	10.7	10.5	11.0	11.7
BG	8.0	7.9	7.0	6.3	5.7	5.7	5.7	5.8	6.0	6.2	7.4	8.0
UA-W	1.5	1.5	1.4	1.4	1.2	1.3	1.1	1.2	1.2	1.2	1.5	1.4
UCTE	**434.7**	**434.7**	**408.1**	**394.7**	**384.8**	**385.7**	**384.8**	**381.1**	**393.7**	**408.9**	**426.0**	**440.3**

2.3 Load

The load at the reference point for the UCTE countries reached a maximum of 369.5 GW in December. This value is 9 GW higher than the maximum reference load recorded in 2005 (December).

Table 14 Load in net values at reference time 11:00, 3rd Wednesday of every month in GW

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
BE	12.3	12.4	11.3	11.4	11.3	10.8	9.5	10.7	11.1	11.4	11.9	12.3
DE	71.4	72.0	68.6	69.0	67.0	66.1	65.2	62.7	66.3	68.7	70.3	69.5
ES	37.7	35.6	33.9	31.2	30.5	36.4	34.8	29.3	30.0	31.2	34.7	38.4
FR	74.0	75.1	62.6	63.6	57.6	56.0	56.4	47.8	56.2	60.1	67.0	80.3
GR	7.3	6.9	6.3	6.3	7.1	7.2	8.8	7.5	6.8	6.7	6.9	7.7
IT	52.1	51.0	47.4	46.9	45.8	48.0	52.8	31.8	47.1	47.8	48.8	51.7
SI	1.9	1.8	1.7	1.7	1.8	1.7	1.7	1.6	1.7	1.8	1.8	1.9
HR	2.5	2.5	2.1	2.1	2.0	1.9	2.1	2.0	2.1	2.1	2.1	2.5
MK	1.3	1.2	0.9	0.9	0.8	0.8	0.8	0.8	0.8	1.0	1.1	1.4
CS	6.3	6.6	5.6	5.1	4.3	4.2	4.2	4.2	4.6	5.5	5.7	6.7
LU	0.8	0.9	0.9	0.9	0.5	0.5	0.9	0.7	0.9	0.8	0.8	0.9
NL	16.1	16.4	14.7	15.1	14.6	14.5	13.9	13.8	14.4	15.1	16.1	16.2
AT	8.6	8.5	8.0	7.8	7.8	7.4	7.4	7.4	7.5	7.9	8.4	8.9
PT	7.1	7.2	6.5	6.3	6.2	6.6	6.8	5.5	6.3	6.4	6.8	7.5
CH	9.5	9.5	9.1	8.9	8.5	8.5	7.8	7.8	8.6	8.9	9.0	9.7
CZ	9.2	9.4	8.6	8.0	7.9	7.5	7.2	7.4	7.8	8.4	9.0	9.1
HU	5.4	5.3	5.3	5.2	5.0	5.0	5.0	4.8	5.0	5.1	5.4	5.1
PL	18.8	18.7	18.1	16.7	16.6	15.9	15.5	15.9	16.5	18.0	18.5	20.0
SK	4.2	4.1	3.9	3.5	3.4	3.2	3.2	3.2	3.4	3.8	4.0	4.3
BA	1.7	1.7	1.5	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.7
RO	7.3	7.2	6.6	6.5	6.1	6.0	5.8	6.0	6.4	6.7	7.0	7.1
BG	5.4	5.1	4.4	3.8	3.6	3.6	3.8	3.8	4.0	4.7	5.0	5.8
UA-W	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.7	0.7	0.8
UCTE	**361.6**	**359.9**	**328.8**	**322.6**	**310.1**	**313.8**	**315.5**	**276.6**	**309.4**	**324.1**	**342.6**	**369.5**

Fourteen countries met their historical peak load in 2005 (bold lines in table 15). Only Greece has its peak load occurring during summer period.

The simultaneity factor (the common reference load of December divided by the sum of the individual peak loads) in the UCTE countries was 91%. As the synchronous peak load of UCTE may be higher than the common reference load, the actual simultaneity factor may be a little higher than this value.

Table 15 Time of maximum load in each UCTE countries - 2005

	Day	Date	Time	Peak Load 2005 MW	Difference from2004 peak load %	Observed temp. °C	Deviation from average temp. °C	Historical Peak Load MW
BE	Tue	13/12/2005	18:00	13731	-0.9	6.8	3.2	13852
DE	Thu	15/12/2005	17:45	76700	-0.6	4.4	3.8	79700
ES	**Thu**	**27/01/2005**	**20:00**	**43378**	**15**	**1.9**	**-6.7**	**43378**
FR	**Mon**	**28/02/2005**	**19:15**	**86024**	**5.7**	**-3**	**-10.6**	**86024**
GR	**Wed**	**03/08/2005**	**13:00**	**9491**	**1.29**	**35**	**3**	**9491**
IT	**Tue**	**20/12/2005**	**18:00**	**55015**	**2.6**	**4.6**	**-2.7**	**55015**
SI	**Thu**	**24/11/2005**	**19:00**	**2073**	**3.3**	**-2**	**-4**	**2073**
HR	**Wed**	**02/03/2005**	**20:00**	**2900**	**3.8**	**-**	**-**	**2900**
MK	**Sat**	**31/12/2005**	**18:00**	**1490**	**4**	**8**	**8**	**1490**
CS	Wed	09/02/2005	20:00	7621	6	-10	-13	7799
LU	**Tue**	**29/11/2005**	**19:00**	**1046**	**5.2**	**0.5**	**-3.9**	**1046**
NL	Fri	09/12/2005	17:30	16916	-2.5	-3	1	17334
AT	**Mon**	**12/12/2005**	**17:30**	**9190**	**2.54**	**-**	**-**	**9190**
PT	**Thu**	**27/01/2005**	**20:30**	**8528**	**3.4**	**6.2**	**-2.1**	**8528**
CH	**Wed**	**21/12/2005**	**11:45**	**9783**	**1.9**	**-**	**-**	**9783**
CZ	Mon	28/11/2005	17:00	10011	-1.4	-0.9	-4.4	10484
HU	**Thu**	**24/11/2005**	**15:00**	**6080**	**1**	**0.3**	**-3.3**	**6080**
PL	Wed	21/12/2005	17:00	21680	2.5	-2.5	-3.4	24685
SK	Mon	12/12/2005	17:00	4346	0.6	-3.29	-2.39	4471
BA	**Sat**	**31/12/2005**	**18:00**	**2005**	**5.7**	**-**	**-**	**2005**
RO	Thu	15/12/2005	17:00	8102	1.07	1	-	10248
BG	Wed	09/02/2005	19:00	6502	1.7	-12.1	-14.4	8332
UA-W	**Fri**	**11/02/2005**	**18:00**	**1024**	**4.5**	**-9.7**	**5.5**	**1024**

National comments:

DE The temperatures observed during the day of the peak load and during the whole month have been higher as compared with the previous year. This may be the main reason for the decrease.

ES The increase of peak load in 2005 was very high (15% of increase related to the peak of 2004) because the temperatures of the last week of January were extremely low.

FR Very cold climatic conditions (temperatures 10°C below normal conditions) led to a new load record.

GR On 3/8/2005 the annual peak was recorded. The mean hourly value of the load that our energy meters recorded is 9491 MW. The increase of the load compared to the peak of

the previous year is 1,29%. Taking into account that there was a voluntary load reduction of nearly 160MW because of load reduction measures, the real increase of the peak load is 3%. The average temperature observed during the day in Athens was 35 °C but the highest was 40 °C.

IT Very low temperatures observed during December lead to a new all-time peak load on the national power system (+2,6%)

MK The value of load depends of the consumption of the households, so when the temperature is very low, there are very high value of consumption and according to this the hourly load is big.

NL The peak load of 2005 was 2,5 % lower than the peak load of 2004, but 4,9 % higher than the peak load of 2003. The sky on the 9th of December was cloudy for the most hours, but there was no precipitation.

SI Temperatures during December, when usually peak load is reached, were not as low as normal, the peak load was reached already in November – external temperature was below normal. Trend of the higher load in the summer months is noticeable.

SK Deviation from normal or average temperature (line 3) was calculated by taking into account historical average temperature of the month December (input of 10 years back).

2.4 Analysis of margins

2.4.1 Remaining capacity without exchanges

This value is obtained by deducting the reference load from the reliably available capacity and corresponds to the surplus of capacity available to power plant operators.

*However, **this should be considered as an over-capacity**. In practice, power plant operators need to have reserve capacity available in addition to the capacity for system service reserve. This capacity is required by power station operators to guarantee the reliability of supply to their clients, and compensate, for instance, longer power plant failures*

The lowest values of remaining capacity are observed in April, June, July and December (12 %), but are still quite higher than in 2004 (excepted in April and in June).

The remaining capacity observed at the monthly reference points was sufficient to meet the reference adequacy margin for the whole UCTE level (i.e. provide a 5% generation reserve while at the same time covering the peak load).

Table 16	Remaining capacity without exchanges – 2005 monthly net values at reference time 11:00											in GW
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
RAC	434.7	434.7	408.1	394.7	384.8	385.7	384.8	381.1	393.7	408.9	426.0	440.3
Load	361.6	359.9	328.8	322.6	310.1	313.8	315.5	276.6	309.4	324.1	342.6	369.5
Remaining Capacity 2005	**73.1**	**74.7**	**79.2**	**72.1**	**74.7**	**71.9**	**69.3**	**104.5**	**84.3**	**84.8**	**83.4**	**70.8**
Remaining Capacity 2004	*71.2*	*70.5*	*78.9*	*74.6*	*74.4*	*73.8*	*67.6*	*91.6*	*77.2*	*80.9*	*74.0*	*70.6*

When looking at the situation of individual countries, it can be noticed that remaining capacity without exchanges has met negative values mainly in winter period for Hungary, Macedonia and France. At these periods the supply of these countries partly relied on imports. Severe winter climatic conditions can explain such situations

Table 17	Remaining capacity without exchanges – 2005 monthly net values at reference time 11:00											in GW
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
BE	1.3	2.0	1.0	1.6	2.0	0.7	3.3	1.2	0.8	-	0.8	1.5
DE	15.6	13.7	15.2	12.7	6.9	8.7	10.0	13.5	8.7	11.8	11.3	14.4
ES	12.5	13.1	9.2	12.5	14.0	6.9	9.0	12.7	12.5	11.8	13.8	8.5
FR	4.2	6.4	8.9	5.4	9.1	12.8	7.0	12.6	10.5	10.8	9.1	-0.3
GR	1.5	1.4	2.1	2.0	0.9	1.2	0.6	1.5	2.0	2.2	1.3	1.7
IT	2.5	4.0	6.8	5.9	8.5	8.0	2.7	24.1	13.0	11.4	10.6	8.9
SI	0.2	0.2	0.3	0.5	0.4	0.4	0.3	0.5	0.4	0.5	0.3	0.1
HR	0.7	0.7	1.1	1.1	1.2	1.1	1.0	1.0	0.7	0.7	1.0	0.7
MK	-	-	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.2	0.1	-0.1
CS	1.1	0.1	1.0	0.6	1.0	1.0	0.9	0.7	1.2	1.5	1.0	0.3
LU	0.8	0.4	0.7	0.8	1.2	1.2	0.7	1.0	0.8	0.9	0.8	0.8
NL	1.1	0.5	2.7	1.5	1.6	2.7	4.6	5.1	3.7	3.2	2.7	2.9
AT	5.5	5.6	6.1	4.3	4.3	4.7	5.8	5.8	5.7	6.3	4.8	4.3
PT	1.6	2.3	2.1	2.8	2.8	1.4	1.1	1.5	1.4	1.4	2.7	3.0
CH	4.4	4.0	3.1	2.2	3.5	3.5	3.0	3.9	5.0	4.1	4.6	4.7
CZ	3.4	3.4	3.3	2.5	2.5	2.4	3.4	2.8	1.7	3.7	1.9	1.9
HU	0.4	0.5	-0.7	0.2	0.4	0.9	0.9	0.9	-	0.6	0.1	1.2
PL	7.8	8.2	6.4	6.1	6.0	5.9	5.7	6.1	6.4	5.4	6.9	6.9
SK	0.6	0.9	1.2	0.8	1.0	0.8	0.8	1.3	0.8	0.7	0.9	0.7
BA	1.3	1.3	1.5	1.7	1.5	1.6	1.8	1.7	1.7	1.7	1.4	1.1
RO	3.6	2.5	3.6	3.6	3.3	3.3	4.3	3.7	4.2	3.8	3.9	4.6
BG	2.6	2.8	2.6	2.6	2.1	2.1	1.9	2.0	2.1	1.6	2.5	2.3
UA-W	0.7	0.7	0.6	0.7	0.6	0.7	0.5	0.6	0.7	0.5	0.8	0.5
UCTE	**73.1**	**74.7**	**79.2**	**72.1**	**74.7**	**71.9**	**69.3**	**104.5**	**84.3**	**84.8**	**83.4**	**70.8**

When considered as a proportion of national generation capacity, values lower than 5% have been met for Belgium in October, France in January and December (cold wave), Italy during winter period, The Netherlands in January and February and all year in Hungary (excepted during summer).

Table 18	**Remaining capacity without exchanges – 2005** monthly net values at reference time 11:00										in %	
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
BE	8.3	12.7	6.3	10.1	12.7	4.6	20.3	7.5	5.0	-	5.1	9.6
DE	13.3	11.6	12.9	10.8	5.9	7.4	8.5	11.4	7.3	9.9	9.5	12.1
ES	18.1	18.8	13.2	17.9	19.9	9.8	12.8	18.0	17.5	16.3	19.0	11.7
FR	3.6	5.5	7.6	4.6	7.9	11.0	6.1	10.9	9.1	9.4	7.9	-0.2
GR	13.5	13.2	19.0	18.7	7.9	11.4	5.8	14.0	18.6	19.9	11.8	15.2
IT	3.1	4.9	8.2	7.1	10.2	9.5	3.2	28.2	15.2	13.3	12.2	10.3
SI	5.7	7.9	11.2	17.2	14.9	13.2	11.9	18.0	13.3	18.8	11.9	1.8
HR	18.7	19.3	29.6	28.5	31.2	29.6	25.6	27.2	19.6	19.6	26.9	19.2
MK	-2.3	3.3	22.1	15.7	6.3	4.8	12.9	14.2	18.5	17.4	5.3	-9.8
CS	10.9	1.3	10.1	5.6	10.3	10.5	8.7	7.0	12.0	14.8	9.7	3.5
LU	50.6	25.5	44.3	46.7	69.4	70.2	44.4	57.5	45.0	52.4	49.7	45.4
NL	5.2	2.5	12.9	7.0	7.5	12.6	21.5	23.9	17.0	14.5	12.5	13.1
AT	30.7	31.3	34.0	24.3	24.3	26.1	32.6	32.6	31.8	35.3	26.8	24.0
PT	13.7	19.5	17.9	23.1	23.0	11.1	8.7	11.5	11.0	11.3	21.1	23.3
CH	25.3	22.8	18.1	13.0	20.0	19.9	17.1	22.3	28.8	23.4	26.5	27.4
CZ	21.1	21.1	20.6	15.7	15.7	15.1	21.3	17.6	10.8	23.2	12.0	12.0
HU	4.3	6.3	-8.9	2.6	4.4	10.6	10.8	11.9	0.6	8.0	1.5	15.4
PL	24.3	25.6	20.2	19.0	18.7	18.4	17.9	19.2	20.2	16.9	21.6	21.5
SK	7.9	11.5	15.3	9.8	12.5	10.3	10.2	16.5	9.9	8.1	11.7	8.5
BA	31.9	32.3	37.5	41.4	37.5	39.3	44.9	43.3	43.4	41.7	35.9	28.4
RO	21.2	14.5	21.3	21.0	19.5	19.7	25.2	21.6	24.9	22.2	23.2	26.8
BG	21.6	22.9	21.6	21.1	17.4	16.9	15.3	16.6	17.1	12.8	20.3	18.8
UA-W	26.9	27.7	24.6	27.2	22.7	27.7	20.1	25.0	26.4	19.6	30.0	21.2
UCTE	**16.4**	**15.7**	**18.2**	**17.8**	**18.2**	**17.8**	**17.6**	**20.7**	**18.4**	**18.7**	**17.9**	**15.6**

National comments :

CZ These values include minimum 500MW reserves in hydro power stations (Vltava Cascade especially). However its real usage is limited by the current water supplies in the reservoirs.

DE During all the months, the remaining capacity without exchanges totalled more than 5 % of the generating capacity. It was higher than anticipated in the forecast of January and July 2005 due to the fact that the real load was lower than expected. And because reliably available capacity was higher than expected (i.e. overhauls, outages and system services reserves were lower than expected).

FR The Remaining Capacity is higher than in 2004 for off-peak months. Concerning winter months, RC is quite lower than last year results. Severe climatic conditions can explain such phenomenon.

GR The remaining capacity without exchanges was low in heavy load periods. Imported electrical energy covered the peaks of the load.

HU Overhauls and outages caused temporary shortage in March. It was covered by import.

NL The given remaining capacity has a limited significance, because values of exact outages are not available, and as the load of the monthly statistics represents about 85% of the total load of the Netherlands.

PL The lowest level of remaining capacity was observed in October (5.4GW) and it was about 23% of Reliably Available Capacity.

RO In 2005 *t*he remaining capacity was 22 % of generating capacity. The lowest value was reached in February (14.5 %).

SI Without the exchanges the remaining capacity was between 158 MW (in January) and 522 MW (in October). In October there were good hydro conditions, the load was not as high and no overhauls were scheduled.

2.4.2 Remaining capacity without exchanges minus margin against peak load

It is interesting to analyse the remaining capacity without exchanges in comparison with two figures :

- *a margin against peak load, which is the difference between the actual peak load (unknown) and the load at reference time, thus necessary to face the actual peak load.*
- *a 5% of generating capacity availability which is considered by many operators as the level necessary to guarantee the reliability of supply to their clients, and compensate, for instance, longer power plant failures.*

As a simplification, remaining capacity without exchanges minus margin against peak load is called "remaining margin*". Expressed as a percentage of generating capacity, this quantity is checked to be at least 5%.*

Let us finally note that the objective to have a 5% margin on the provisional point of view may be respected even if the realised margin is eventually lower.

The remaining margin (remaining capacity without exchange minus margin against peak load), as a proportion of total generation capacity, has reached its lowest level in March (4.6%), November and December (6 %).

Table 19	Remaining margin - 2005											in GW
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
BE	0.2	1.3	-0.8	1.3	1.7	-0.1	1.4	0.3	0.5	-0.7	-0.5	0.3
DE	11.4	10.2	8.8	10.8	3.4	5.4	5.4	7.4	3.8	7.5	5.0	7.2
ES	5.7	6.2	6.6	1.9	2.7	2.1	3.7	7.1	6.3	2.6	5.6	3.3
FR	-6.7	-4.9	-10.7	4.2	8.7	8.9	6.1	4.0	9.7	10.1	-3.9	-1.9
GR	0.7	0.1	0.5	1.0	0.7	-0.4	0.3	-0.5	0.8	1.3	-0.2	0.7
IT	1.3	1.9	2.0	4.9	5.7	1.8	1.5	7.8	10.2	10.2	5.2	5.6
SI	0.1	0.1	-2.4	0.4	0.4	0.3	0.3	0.3	0.2	0.4	-	-0.1
HR	0.5	0.5	0.8	0.9	1.1	1.0	0.8	0.8	0.5	0.4	0.7	0.4
MK	-	-	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.2	0.1	-0.1
CS	0.2	-0.9	-0.8	-0.3	-0.2	-0.1	0.1	-0.1	0.4	0.6	-0.3	-0.4
LU	0.8	0.4	0.7	0.8	0.8	0.8	0.7	0.9	0.7	0.7	0.6	0.7
NL	0.4	-0.2	2.0	0.8	0.9	2.0	3.9	4.4	3.0	2.5	2.0	2.2
AT	5.1	5.1	5.4	4.3	4.3	4.4	5.4	5.6	5.4	6.2	4.2	4.0
PT	0.2	1.2	0.2	2.3	2.3	0.5	0.6	0.2	0.8	0.9	1.3	2.0
CH	4.2	3.8	2.9	2.0	3.3	3.3	2.8	3.7	4.8	3.9	4.4	4.5
CZ	2.8	3.1	2.3	2.5	2.4	2.2	3.2	2.6	1.7	3.3	0.9	1.1
HU	-0.1	0.1	-1.1	0.2	0.1	0.6	0.4	0.6	-0.2	0.1	-0.6	0.3
PL	5.8	6.3	4.2	4.7	5.5	5.6	4.9	4.4	4.6	3.6	4.2	5.2
SK	0.5	0.7	1.0	0.6	1.0	0.7	0.7	1.3	0.7	0.6	0.6	0.7
BA	1.1	1.0	1.1	1.4	1.3	1.4	1.7	1.5	1.5	1.4	1.0	0.8
RO	2.9	1.7	2.2	2.8	2.9	3.0	3.8	3.2	3.8	3.2	3.0	3.6
BG	1.8	2.0	1.9	1.8	1.2	1.2	1.0	1.1	1.2	0.7	1.7	1.4
UA-W	0.5	0.5	0.4	0.5	0.4	0.6	0.4	0.6	0.4	0.3	0.5	0.4
UCTE	**39.2**	**40.2**	**27.5**	**50.1**	**50.7**	**45.2**	**49.3**	**57.5**	**61.1**	**60.1**	**35.6**	**41.9**

These values, together with the margin against peak load, expressed as a proportion of the monthly peak load, are shown in Figure 3. This margin provides an estimate of the potential fluctuations in demand that the remaining capacity would be required to cover.

Table 20	Remaining capacity without exchanges – 2005 monthly net values at reference time 11:00											in GW
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Remaining capacity	73.1	74.7	79.2	72.1	74.7	71.9	69.3	104.5	84.3	84.8	83.4	70.8
Margin against the monthly peak load	33.9	34.5	51.7	22.1	24.0	26.7	20.0	47.0	23.2	24.7	47.8	28.9
Remaining margin 2005	**39.2**	**40.2**	**27.5**	**50.1**	**50.7**	**45.2**	**49.3**	**57.5**	**61.1**	**60.1**	**35.6**	**41.9**
Remaining margin 2004	*39.7*	*40.1*	*33*	*39.9*	*45.4*	*49.7*	*46.5*	*46.3*	*51.8*	*56.5*	*38.8*	*39.6*

Figure 3 UCTE - Remaining capacity and margins

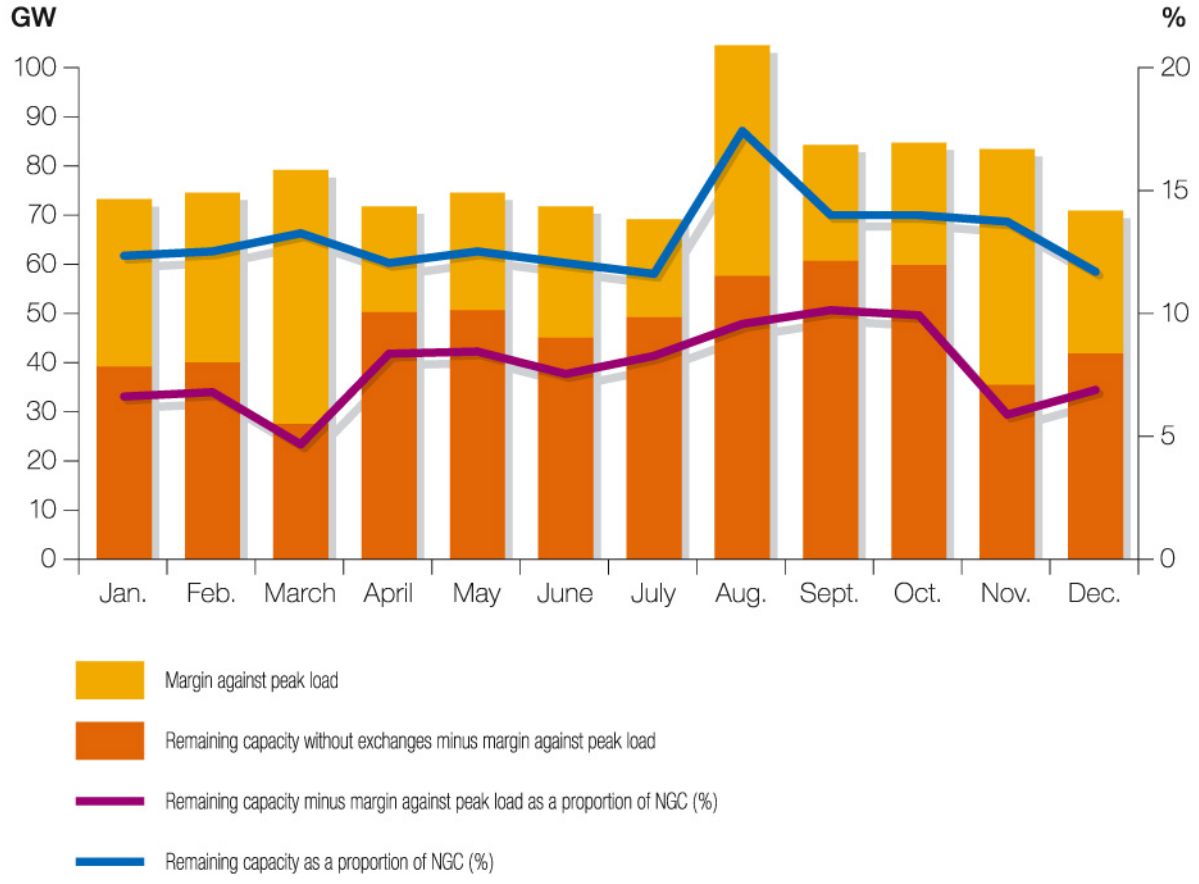
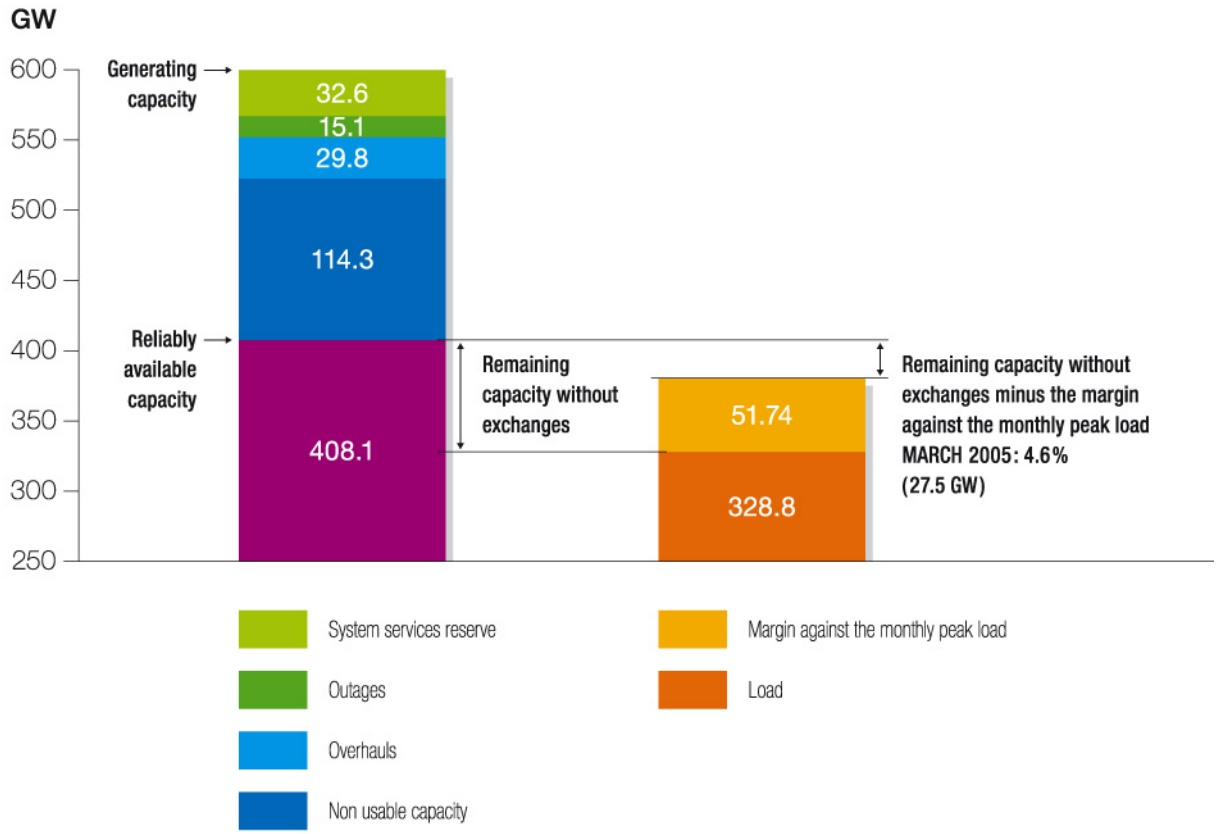


Figure 4 Remaining Capacity minus margin against the peak load in March



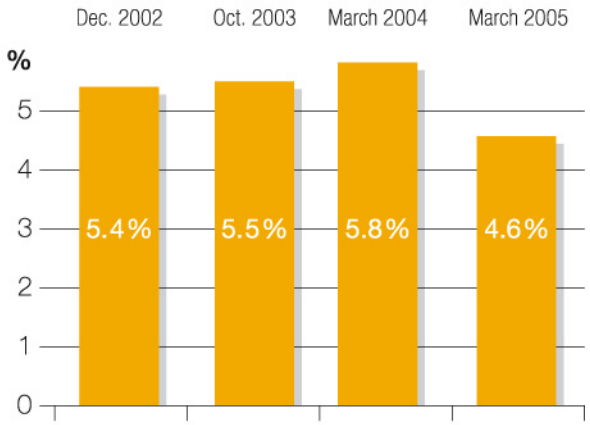
As shown in tables and bar charts above the remaining capacity was sufficient during the whole year. The lowest value was met in March with 4.6% of the global generation capacity.

This indicator of 4.6% may be compared with the level of 5% targeted for constitution of provisional margin and followed along years.

Nevertheless it must be handled carefully:

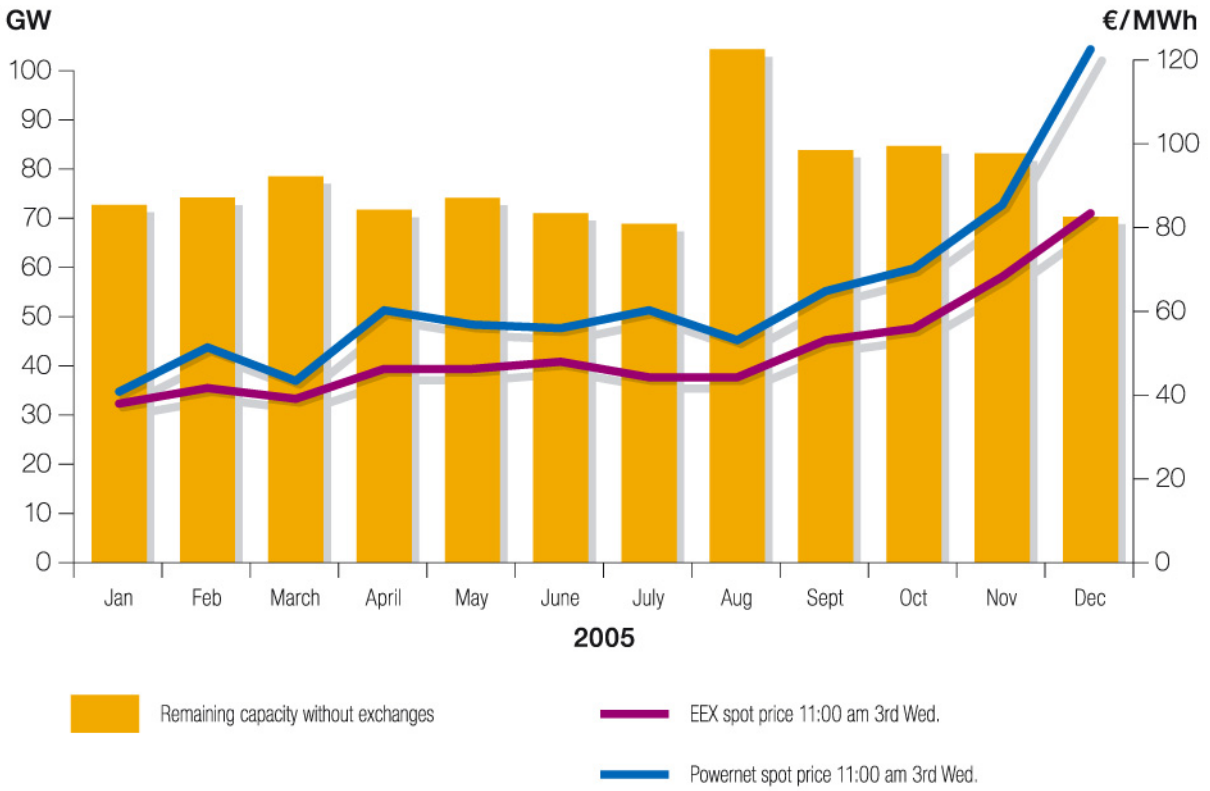
- representativeness of every country is variable and total UCTE perimeter covered in this note is not 100% of load. In fact the error of estimation may be around 5 GW on total UCTE load and generation at 11:00 am, so that the actual margin in March would better be presented as 4.6 % ± 1%.
- Weather conditions especially in western Europe were very cold during February and March 2005.

Figure 5 **Lowest values of remaining capacity minus margin against the peak load as proportion of total grid generation capacity from 2003 to 2005**



2.4.3 Correlation between margin and market prices

Figure 6 **Market prices – remaining capacity without exchanges**



2.5 Balance of physical exchanges

The balance of physical exchanges represents the net exchange in the UCTE as a whole.

The UCTE balance of physical exchanges is generally import – oriented.

Table 21	Balance of physical exchanges										In GW	
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
BE	1.1	0.3	1.0	0.3	0.2	1.1	-0.6	0.8	1.0	1.1	1.3	1.2
DE	0.2	1.6	-0.6	-0.8	5.5	7.3	4.0	5.0	5.8	4.0	4.0	1.2
ES	0.5	1.1	0.5	-0.5	-0.2	0.4	0.2	-0.2	-0.4	-0.5	-1.4	-0.3
FR	-2.7	-3.6	-5.8	-3.5	-7.3	-9.4	-3.6	-9.0	-8.0	-7.8	-8.1	0.3
GR	0.5	0.5	-	0.5	0.6	0.5	1.0	0.6	0.5	0.4	0.5	0.4
IT	6.0	7.1	7.6	7.1	6.1	6.0	5.6	3.6	6.2	6.9	7.3	3.2
SI	-0.1	-	-	-0.3	-	-0.2	-0.2	0.4	-0.1	-0.4	-0.2	0.1
HR	0.7	0.7	0.6	0.5	0.4	0.6	0.6	0.4	0.5	0.6	0.2	0.6
MK	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.2	0.1	0.1	0.3	0.3
CS	-0.1	0.9	0.3	0.3	-	0.1	0.1	0.1	-0.1	-0.1	0.2	0.6
LU	0.2	0.5	0.5	-	0.2	0.2	0.4	0.1	0.4	0.1	0.3	0.6
NL	3.2	3.2	2.6	3.3	2.2	2.7	2.5	2.4	2.3	2.7	2.8	3.0
AT	-1.0	1.0	-1.7	0.1	0.7	2.2	0.6	0.7	1.9	0.9	1.1	-0.1
PT	0.7	0.3	0.4	0.9	1.1	0.6	0.6	0.5	1.0	0.9	1.3	-
CH	-1.2	-1.6	1.5	0.2	-2.1	-1.3	-0.9	0.1	-1.7	-0.8	-0.7	0.1
CZ	-1.5	-1.4	-1.4	-1.5	-1.6	-1.9	-1.5	-1.7	-1.1	-1.6	-0.9	-1.3
HU	1.2	1.1	1.2	1.3	1.4	1.1	0.6	0.8	1.3	1.2	1.2	1.0
PL	-0.9	-1.6	-1.5	-2.1	-1.4	-1.6	-1.6	-0.6	-1.5	-2.0	-1.9	-1.9
SK	-0.3	-0.3	-0.1	-0.2	-0.1	-0.2	-0.4	-0.4	-0.2	-0.2	-0.2	-0.2
BA	-0.2	0.0	-0.2	-0.3	-0.1	-0.1	-0.3	-0.2	-0.4	-0.2	-	-0.2
RO	-0.5	-0.8	-0.5	-0.4	-0.3	-0.3	-0.3	-0.5	-0.4	-0.3	-1.1	-1.1
BG	0.9	1.3	1.2	1.0	1.0	1.0	1.0	0.6	0.9	0.7	1.1	1.1
UA-W	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5
UCTE	**6.4**	**10.3**	**5.2**	**5.8**	**5.9**	**8.5**	**7.8**	**3.1**	**7.3**	**5.1**	**6.5**	**8.2**

CH Due to the outage of the nuclear power plant Leibstadt Switzerland was regarding the energy balance an importing country during the spring and summer months (may to august). That is unusual for that period of the year.

DE During 10 months of the year 2005, a positive exchange balance at reference time could be observed just as during the previous years.

ES The exchange balances were very similar to year 2004.

FR As far as France is concerned, it should be noticed that the instantaneous balance of exchanges remained largely export-orientated over 2005. However, in tight situations (December) imports were necessary to cover peak loads.

GR The opening of the market in the electricity sector has caused an increase of the exchanges through the interconnections. In 2005 the exchange balance was intensively positive as for the import direction. The main volume of imports was carried out through the

northern interconnections while the exchanges between Greece and Italy took place in both directions but the total exchange balance was positive as for the export direction.

HR Exchanges between Croatia and neighboring countries were higher mainly due to increased transits and import of cheaper electrical energy.

IT Physical exchange mounted by 7,7% on the previous year.

PL During all the year 2005 the overall exchange balance (just like in previous years) was negative value (export-oriented).

RO In 2005 the values of export were higher in those months when the maintenance programs allowed higher values for the reliable monthly NTCs that could be used simultaneously on Romanian border.

SI Variations between export and import are the same as in 2004. Between 100 and 200 MW of export (similar as in the year 2004).

SK Exports are higher than in 2004 (increase 0.861 TWh, + 46.3 %).

UA-W In second part of August total level of exchange program increased from 500MW to 520MW, in September – to 550MW, other months of the year – 500MW

ENERGY BALANCE RESULTS 3

3 ENERGY BALANCE RESULTS

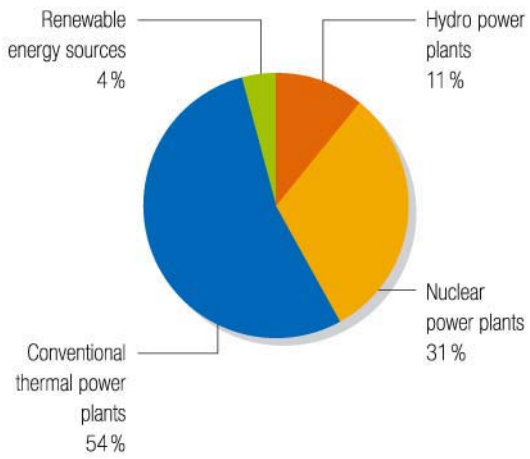
3.1 Electricity production

In 2005, total generation in the UCTE countries was 2547 TWh, which represents an increase of 1.8 % compared to 2004 (2500 TWh).
Graphic below shows the weight of every kind of generation in 2005. 85% of total UCTE generation is covered by conventional and nuclear thermal power plants.

Table 22 UCTE - Energy Balance - Retrospect 2005

	Energy 2005 TWh
Hydro power stations	291.9
Nuclear power stations	795.2
Conventional thermal power stations	1358.5
Renewable energy	92.9
Not clearly identified	8.5
Total Generation	**2547.0**

Figure 7 Generation mix



3.1.1 Hydroelectric power plants

The capacity utilisation factor (in %) is calculated as the ratio of electricity produced over the period considered to the theoretical electricity production under conditions of maximum potential capacity.

In 2005, the production has been characterised by an extreme dryness in Spain and Portugal, and to a lesser extend in France and Italy. On the opposite, hydro conditions were more favourable in South eastern UCTE (Greece, Romania).

Figure 8 | Electricity production by hydroelectric power plants

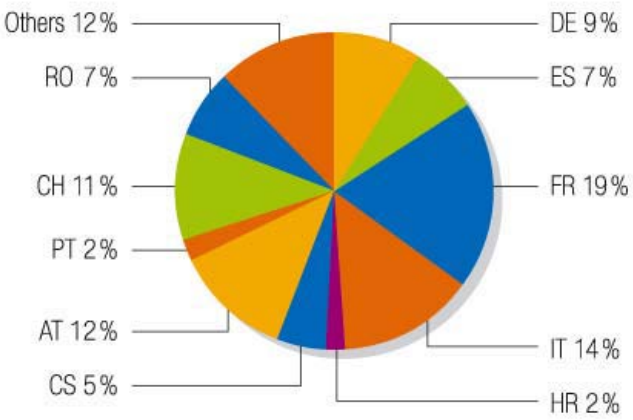


Table 23 **Hydro power plants**

	Maximum capacity January		Production		Capacity utilisation	
	2004	2005	2004	2005	2004	2005
	GW	GW	TWh	TWh	%	%
BE	1.4	1.4	1.6	1.6	13.0	12.9
DE	8.7	9.1	27.2	27.7	35.7	34.7
ES	18.3	19.2	33.9	19.4	21.1	11.6
FR	25.4	25.4	64.5	56.0	29.0	25.2
GR	3.1	3.1	4.9	5.6	18.0	20.5
IT	20.7	20.8	47.9	41.9	26.4	23.0
SI	0.9	0.9	3.6	3.0	45.7	40.3
HR	2.1	2.1	7.0	6.4	38.1	35.2
MK	0.4	0.5	1.5	1.5	42.8	33.6
CS	3.5	3.5	13.4	13.9	43.7	45.4
LU	1.1	1.1	0.8	0.9	8.3	8.8
NL	0.0	0.0	0.1	0.1	30.9	30.9
AT	11.2	11.2	34.4	34.2	35.1	34.9
PT	4.6	4.7	9.9	4.9	24.6	11.9
CH	13.2	13.2	35.1	32.8	30.4	28.3
CZ	2.1	2.1	2.6	3.0	14.1	16.4
HU	0.0	0.0	0.2	0.2	49.6	49.6
PL	2.2	2.2	3.5	3.6	18.2	18.5
SK	2.4	2.1	4.0	4.6	19.0	24.6
BA	2.0	2.1	6.0	6.0	34.2	33.2
RO	6.0	6.0	16.3	19.9	31.0	37.8
BG	2.9	2.9	3.3	4.7	13.0	18.2
UA-W	0.0	0.0	0.1	0.1	47.6	46.5
UCTE	**132.3**	**133.7**	**321.8**	**291.9**	**27.8**	**24.9**

National comments:

CH The production of the Swiss hydro power plants was 35.115 TWh in 2004. The dry period in 2005 led to a diminution of this kind of generation of about 7 %.

DE A slight increase in hydro generation of about 2 % has been observed as compared to the previous year.

ES Difference with respect to the generation in 2004: -34,7% (Very dry year)

FR The hydroelectric generation fell by 13 % compared with 2004. This phenomenon is due to the drought observed throughout 2005.

GR Due to the fact that the overhauls of the hydro power plants usually take place in period of low load, the level of the hydro production only depends upon the water reserves. In 2005 the favourable hydro conditions resulted in an important increase of hydro production.

HR Production of hydro power stations was only a bit lower (approximately 11% than in the year 2004) due to relatively favorable hydro conditions during the year 2005.

IT Production from hydro sources sharply dropped (-14,9%). Low hydro conditions have marked the year with a historical minimum of the hydro capability factor on July with respect to its multi-year average value.

LU The hydro power is greatly influenced by the implementation of pump storage plant of Vianden.

NL Hydro is only a small share, the given value is an estimation, no specific information available.

PT In 2005 the hydro power production was reduced to 50% of the previous year production. The hydroelectric capacity factor that had been 0.81 in 2004 was just 0.41 in 2005, matching 1992, the driest year of our records (since 1975).

RO In 2005 the generation of the hydro power stations increased with 22% due to the fact that 2005 had a high hydrological level.

SI Lower production of hydro, higher production of the Nuclear Power Plant (no maintenance in 2005) and similar production of thermal power plants according to the year 2004.

SK Better hydro conditions in 2005 allowed an increase of production (+ 0.5 TWh). Especially in April, May and August the production exceeded the forecasts. But in November the production was lower than forecasted.

3.1.2 Nuclear power plants

Generation from nuclear power stations has been approx. 2.2 TWh lower in 2005 as compared to 2004, because of worst availability in Switzerland, Germany, Spain and Czech Republic,.

Table 24	Nuclear power plants*					
	Maximum capacity January		Production		Capacity utilisation	
	2004	2005	2004	2005	2004	2005
	GW	GW	TWh	TWh	%	%
BE	5.8	5.8	44.9	45.3	88.4	89.1
DE	20.5	20.5	158.4	154.6	88.2	86.1
ES	7.7	7.6	60.9	57.5	90.3	86.4
FR	63.4	63.4	426.8	430.0	76.8	77.4
SI	0.7	0.7	5.2	5.6	84.8	95.6
NL	0.4	0.4	3.6	3.8	91.5	96.6
CH	3.2	3.2	25.4	22.0	90.6	78.6
CZ	3.5	3.5	24.8	23.3	80.9	75.8
HU	1.8	1.8	11.2	13.0	71.0	84.6
SK	2.6	2.6	15.7	16.3	68.9	70.5
RO	0.7	0.7	5.1	5.1	83.2	89.4
BG	2.9	2.9	15.4	18.7	60.6	73.9
UCTE	**113.2**	**113.1**	**797.4**	**795.2**	**80.4**	**80.3**

* Only for countries exploiting nuclear power plants.

National comments:

CH The production of the Swiss nuclear power plants amounted 25.432 TWh in 2004. The outage of the nuclear power plant Leibstadt led to a significantly less production in 2005 – a diminution of about 13 %.

CZ The lower production in nuclear power plants is caused by failures in Temelín Nuclear power station and post-failures repairs.

DE Nuclear power stations generation decreased by about 2% as compared to the preceding year. Accounting for 27% of electricity production it still has the highest share in total generation. The decrease is attributable to the shutdown of one nuclear power plant.

ES Difference with respect to the generation in 2004: -9,5% (Forced outage rate very high).

FR The energy availability factor of nuclear power stations was stable in 2005 compared to 2004. The nuclear power stations generation grew by 0.8 %.

SI As Nuclear Power Plant has no maintenance in 2005 the production was higher by approximately 7%

SK Production increased (+ 0.6 TWh) and exceeded the forecast.

3.1.3 Conventional thermal power plants

In 2005, electricity production from conventional thermal power plants in the UCTE was 1358.5TWh, which represents an increase of 62 TWh (+5%) with regards to the previous year.

A strong increase can be observed in Spain (+28 TWh) due to bad hydro conditions, Italy (+9TWh), France (+7 TWh) and in Portugal (+5TWh).

Table 25 Conventional thermal power plants

	Maximum capacity January		Production		Capacity utilisation	
	2004	2005	2004	2005	2004	2005
	GW	GW	TWh	TWh	%	%
BE	8.1	8.0	33.5	33.6	47.2	48.0
DE	68.1	70.1	356.6	358.9	59.8	58.4
ES	29.3	32.8	129.4	158.1	50.4	55.0
FR	26.1	26.3	51.8	58.9	22.7	25.6
GR	7.1	7.2	43.2	43.3	69.5	68.5
IT	56.0	59.0	231.8	240.8	47.3	46.6
SI	1.3	1.3	4.6	4.6	40.4	42.3
HR	1.7	1.7	5.4	4.6	36.3	31.3
MK	0.9	0.9	4.7	5.0	59.6	62.8
CS	6.4	6.4	25.3	27.5	45.1	49.1
LU	0.5	0.5	3.1	3.1	70.8	74.3
NL	17.5	18.7	86.4	88.4	56.4	54.1
AT	5.6	6.0	17.2	18.4	35.1	35.0
PT	5.7	6.1	27.8	32.9	55.7	61.1
CH	0.6	0.6	2.9	2.2	55.2	41.9
CZ	10.5	10.6	50.5	49.9	54.9	53.7
HU	5.7	5.7	16.6	17.4	33.2	34.9
PL	29.4	29.6	138.3	140.2	53.7	54.0
SK	2.3	2.3	6.0	5.5	29.8	27.7
BA	2.0	2.0	6.6	6.6	37.7	38.5
RO	9.8	10.1	30.5	29.8	35.5	33.6
BG	6.4	6.4	16.7	20.9	29.8	37.6
UA-W	2.5	2.5	7.5	8.0	34.2	36.1
UCTE	**303.5**	**314.7**	**1296.4**	**1358.5**	**48.8**	**49.3**

National comments:

CH For the first time the data concerning the renewable energy sources has been extracted from the total of the production of the fossil power stations.

DE The generation of conventional thermal power stations has increased by about 0.5%. (Decease in hard coal and lignite, increase in gas and oil.)

ES Difference with respect to the generation in 2004: +20% (New combined cycle capacity and, as a result, higher production)

FR The fossil fuel power stations generation rose by 11% due to its role of achieving balance between demand and generation (compensation of drought).

GR There is no significant difference since 2004. In 2005, the total fossil fuel generation represents the 86,71 % of the total generation. The contribution of the different fuels is: lignite 74,03 %, natural gas 18,35 % and oil 7,62 %.

HR Production of fossil fuel power stations was approximately 12% lower than in the year 2004 due to higher import that was influenced by lower prices of electricity in the region.

IT Productions from thermal sources was up by 2,6%. The fossil fuel represents the 70,1% of the total electricity supplied.

NL The given share is derived from data of National Statistics Organisation. TenneT isn't informed with specific information such as fuelling, performance and constraints.

PT With the commissioning of the 3rd unit of the Ribatejo Combined Cycle Power Station, the natural gas becomes the main fuel in terms of installed capacity. In spite of that the coal power stations remain the main ones in terms of production. Due to the very dry year the fuel oil power stations still represented 10% of the consumption.

SI Similar production and similar contribution of the different fuels. No significant environmental constraints.

SK Production decreased in 2005 (- 0.5 TWh). It was mainly caused by higher production in nuclear and hydro power plants.

3.1.4 Renewable energy sources generation

Electricity production from renewable sources accounts for 92.9 TWh in 2005; it represents a nearly 21% increase compared to 2004.

Average capacity utilization for this kind of generation is 30% for the whole UCTE. The maximum value for capacity utilization is observed in Belgium (57%), the worst in Greece and Luxembourg (20.4%).

The overall part of renewable energy, including hydro generation, is now approximately 15% of UCTE consumption[1] (the global European Union target being 22 % in 2010).

Table 26 Renewable energy sources*

	Maximum capacity January		Production		Capacity utilisation	
	2004	2005	2004	2005	2004	2005
	GW	GW	TWh	TWh	%	%
BE	0.3	0.4	1.5	2.0	57.1	56.8
DE	15.3	17.7	35.6	40.1	26.6	25.9
ES	6.8	9.4	18.7	28.0	31.4	33.9
FR	0.9	1.2	3.5	4.3	44.4	40.9
GR	0.3	0.6	1.0	1.1	39.1	20.4
IT	1.5	1.7	6.9	6.9	52.5	46.3
LU	0.0	0.1	0.1	0.1	24.8	20.4
NL	1.2	1.5	4.0	3.9	37.2	29.7
AT	0.4	0.6	1.4	0.0	39.0	0.0
PT	0.5	0.9	1.7	3.9	37.5	49.3
CH	0.3	0.3	0.9	0.9	34.2	35.6
CZ	0.0	0.0	0.0	0.1	0.0	36.5
HU	0.1	0.1	0.8	1.4	182.6	159.8
PL	0.1	0.1	0.4	0.2	41.9	19.6
UCTE	**27.8**	**34.6**	**76.5**	**92.9**	**31.5**	**30.6**

* Only for countries exploiting a significant renewable energy installed capacity.

National comments:

CZ This production is more than triple in comparison with the year 2004, but its share in the overall production is still negligible.

DE Due to an increase of about 1800 MW additional capacity, wind power generation increased by 4%. Its share in total production amounted to more than 4%.

ES Wind energy: +27,6% (1.300 MW of new wind power plants capacity)

FR Renewable energy sources generation rose by 11.5 %, of which wind generation's rise achieve 64 %.

[1] This figure is only indicative, especially because "not clearly identified energy sources" is likely to include renewable. Furthermore, the method used by European Union to compute this ratio is slightly different as it includes the consumption of the power plants auxiliaries.

GR There was no significant contribution of the renewable generation to the total generation. In the monthly statistics the renewable generation is included in the figures showing the conventional thermal generation since there is no appropriate field for these figures.

HR The first commercial wind power plant started to deliver electrical energy to Croatian power system in October 2004 and therefore production in 2005 was higher than in 2004.

IT Production from renewable energy sources was up by 2,4%. The source represents the 2,35 of the total electricity supplied.

NL The given value is estimation, no specific information is available.

PL Generation in RES decreased. It is the consequence of lower number of these units (compared to year 2004), which was caused by withdrawing of concessions for being such source for several companies.

PL The thermal generation from renewable energy sources and wind production increased 130% compared to previous year. The wind production increased by 120%, reaching 3.6% of the consumption

SK Available data on renewable energy sources show a decrease in wind power plants production compared to 2004(- 1.5 GWh).

3.2 Electricity consumption

Electricity consumption in the UCTE countries in 2005 reached 2491.5 TWh and exceeded last year's consumption by +38 TWh (+1.5%). This demand growth rate is lower than in 2004 (1.7%).
Table 26 shows that in many countries this growth rate is limited. At the UCTE level the growth rate is approximately 1.4% in winter and 1.7% in summer.

Table 27 Electricity consumption

	2004		2005		Year 2004	Year 2005	Variation 2005 - 2004	
	Summer TWh	Winter TWh	Summer TWh	Winter. TWh	TWh	TWh	Summer %	Winter %
BE*	41.0	46.6	40.7	46.1	87.6	86.8	-0.7	-1.1
DE	263.1	298.1	264.2	299.3	561.2	563.5	0.4	0.4
ES	115.0	120.4	118.9	126.7	235.4	245.7	3.4	5.2
FR*	209.8	269.4	209.7	272.7	479.2	482.4	0.0	1.2
GR	25.8	25.4	26.7	26.2	51.2	52.9	3.4	3.1
IT*	159.9	165.4	161.9	167.5	325.3	329.4	1.3	1.3
SI	6.1	6.5	6.2	6.6	12.6	12.8	1.6	1.5
HR	7.3	8.7	7.7	9.0	16.0	16.7	5.0	4.4
MK	3.1	4.3	3.4	4.7	7.4	8.1	10.7	9.6
CS	16.8	23.1	18.3	25.3	39.9	43.6	8.9	9.5
LU	3.0	3.3	3.0	3.3	6.3	6.2	-1.3	-0.8
NL	52.7	58.5	54.8	59.7	111.1	114.6	4.1	2.2
AT	26.0	30.6	26.1	31.0	56.6	57.1	0.4	1.3
PT	21.7	23.8	22.8	25.2	45.5	48.0	5.1	5.9
CH*	27.6	32.8	28.2	33.1	60.4	61.3	2.2	0.9
CZ	27.2	34.3	27.8	34.9	61.5	62.7	2.2	1.7
HU	18.1	20.2	18.5	20.3	38.3	38.8	2.2	0.5
PL	60.0	70.6	60.0	70.6	130.6	130.6	0.0	0.0
SK	11.9	14.4	11.9	14.4	26.3	26.3	0.0	0.0
BA	4.7	6.0	5.1	6.0	10.7	11.1	8.5	0.0
RO	23.5	27.2	24.0	27.9	50.7	51.9	2.1	2.4
BG*	15.3	20.3	15.9	20.7	35.6	36.6	3.9	2.0
UA-W	1.8	2.6	1.8	2.6	4.4	4.4	0.0	0.0
UCTE	**1141.4**	**1312.5**	**1157.6**	**1333.9**	**2453.8**	**2491.5**	**1.4**	**1.6**

** 2004 data were updated since UCTE – System Adequacy Retrospect 2005*

National comments:

ES There was a higher sensitivity of the load to the temperature in 2005 because summer temperature was higher and winter temperature was lower. These combined two effects determined a higher load value (energy and peak values).

FR The rise of the 2005 consumption compared with 2004, is partly due to the winter weather conditions that led to a greater use of heating equipment. Indeed, the average temperature over the first and last quarter of 2005 was 0,4 °C lower than during the same period in 2004.
Important cold time periods occurred in 2005 : end of January, end of February/beginning of March and end of November/December.

GR In 2005, the increase in consumption with respect to 2004 was 3,5%. This level of increase is higher than the one in the previous year but it is considered as average.

HR Increase of consumption was 4.7%, which is faster increase rate than the one observed last year (3.4%).
Consumption growth in summer semester was somewhat higher (5.0%) than in winter semester (4.4%).

IT During the year, electricity demand reached the 329.4 TWh (+1,3% on 2004) with a fairly variable monthly performance.

LU It seems that the higher temperature, especially during summer, had an influence on the consumption.

NL The growth of the consumption in the two years before 2005 was lower than in previous years but in 2005 the growth of consumption recovered in dependence of an improving economic situation. In general no exceptional trends towards climatic conditions can be concluded.

PL Consumption stayed approximately on the same level as in 2004. Comparing the time of the year and related temperature deviation it is difficult to observe any exceptional trend in consumption evolution.

RO The 2005 consumption was a little bit greater than the 2004 consumption, and it cannot be explained only in relation with the climatic conditions due to a relative economical growing of 2005

SI Consumption in 2005 was higher for only 1,4 %, mostly because the winter temperatures were not extreme in the second part of the year. The summer consumption was higher than in the year 2004, influence of the air-conditioning devices is more significant.

3.3 Electricity exchanges

The internal exchanges between UCTE countries are very active: sum of imports of all UCTE countries represent 309.8 TWh and sum of exports represent 304.3 TWh. This shows that, as an average, 12 % of UCTE countries national consumption comes from imports from other UCTE countries.

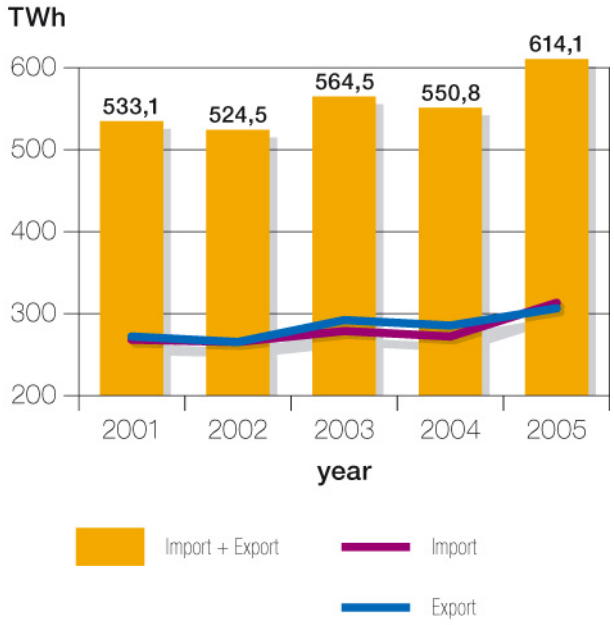
The resulting balance of electricity exchanges (imports - exports) in the UCTE countries in 2005 represented 5.5 TWh import.
In 2004, the balance was globally export oriented (11.5 TWh).

Table 28 Balance of physical exchanges

	Imports		Exports		Balance (Import - Export)		Balance as % of national consumption	
	2004	2005	2004	2005	2004	2005	2004	2005
BE	14.6	14.2	6.8	8.0	7.8	6.2	8.9	7.1
DE	44.2	53.4	51.5	61.9	-7.3	-8.5	1.3	1.5
ES	8.1	6.5	11.1	7.9	-3.0	-1.4	1.3	0.6
FR	6.6	8.1	68.7	68.3	-62.1	-60.2	13.0	12.5
GR	4.9	5.6	2.0	1.8	2.8	3.8	5.5	7.2
IT	46.5	50.1	0.8	1.1	45.7	49.0	14.0	14.9
SI	4.3	9.3	5.0	9.5	-0.8	-0.2	6.3	1.7
HR	10.1	8.8	6.4	3.6	3.7	5.2	23.2	30.9
MK	2.0	1.7	0.8	0.0	1.2	1.7	16.2	20.3
CS	6.0	8.5	4.0	1.3	2.0	7.2	5.0	16.5
LU	6.5	6.4	3.1	3.2	3.4	3.3	54.0	52.2
NL	21.4	23.7	5.2	5.4	16.2	18.3	14.6	16.0
AT	16.5	20.3	13.3	17.6	3.2	2.7	5.7	4.7
PT	8.6	9.6	2.1	2.8	6.5	6.8	14.3	14.2
CH	26.1	37.6	25.3	29.8	0.8	7.8	1.3	12.7
CZ	9.8	12.4	25.5	25.0	-15.7	-12.6	25.5	20.1
HU	13.8	15.6	6.3	9.4	7.5	6.2	19.6	16.0
PL	5.3	5.0	14.6	16.2	-9.3	-11.2	7.1	8.6
SK	8.7	8.6	10.6	11.3	-1.9	-2.7	7.2	10.3
BA	1.7	1.1	3.6	2.5	-1.9	-1.4	17.8	12.7
RO	1.7	1.6	3.0	4.5	-1.1	-2.9	2.2	5.6
BG	0.7	0.0	6.6	7.6	-5.9	-7.6	16.6	20.9
UA-W	1.6	1.8	4.9	5.5	-3.3	-3.7	75.0	84.5
UCTE	**269.7**	**309.8**	**281.2**	**304.3**	**-11.5**	**5.5**	**0.5**	**0.2**

NB: Some of 2004 data were updated since UCTE – System Adequacy Retrospect 2004

Figure 9 Physical exchanges evolution since 2001



National comments:

CZ The value of the exchange balance (export) was lower than in previous two years, but it remains relatively high. The possibility of the export increasing was limited by the congestions in the direction of Austria and Germany.

DE In 2005, electrical energy imports totalling 53.4 TWh had a share of about 9% in the electricity output of total supply in Germany. As compared to the preceding year, imports strongly increased by 9.2 TWh, i.e. +21%. A distinct increase was recorded for imports from Sweden (+144%), Poland (+132%) and Denmark (+93%) (physical flows). A strong decrease was registered for imports from Switzerland (-44%) and the Netherlands (-42%). France remains the country with the highest exports to Germany, measured against physical energy flows across national frontiers. Its share in Germany's total imports amounts to 30%, followed by the Czech Republic (24%), and Denmark (19%).

Germany's physical exports to neighbouring countries strongly increased as well by +20% to 61.9 TWh as compared to the previous year. The highest increase in percent was recorded for exports to the Czech Republic (+181%), Austria (+72%) and Switzerland (+53%). The highest share in German exports was registered for the Netherlands with 31%, followed by Switzerland (29%) and Austria (25%). However, Germany's physical exports also include transits from other countries through Germany. In particular, large parts of the physical imports from France are likely to have passed through Germany over Switzerland and Austria to Italy, or through Germany to the Netherlands.

In 2005, the export surplus of 8.5 TWh accounts for more than 1% of the total German electricity generation. The exchange volume (i.e. the sum of imports and exports) corresponds to approx. 20% of Germany's total generation.

To some extent, physical energy flows for an agreed exchange across national frontiers do not take a direct way between the sending and the receiving country due to the close

meshing of the West European EHV system. However, accounting of deliveries between the individual countries is made on the basis of the relevant contractual supply agreements.

ES The main figures in year 2005 were he following:

- Net import balance from France (6,5 TWh)
- Net export balance to Portugal (6,7 TWh)
- Net export balance to Morocco (0,9 TWh)
- Net export balance to Andorra (0,3 TWh)

Net total balance: 1,4 TWh export

FR The values of exchanges with countries outside the UCTE include the exchanges with abroad countries (Jersey Island, Belgium, Germany, Switzerland, Italy, Spain), which do not transit on UCTE lines, the exchanges on the public distribution network, and the trade to compensate water rights relative to power plants located on borders.
The level of French physical exportation is increasing over 2004-2005 period.
Contractual exports towards Belgium, Germany, Switzerland and Italy have globally are quite stable, while contractual imports have significantly increased, especially from Germany and United Kingdom. With Spain, exports increased by 3% and imports decreased by 53%.

GR There was an increase of imports throughout 2005. The imported electrical energy, on the one hand, covered the peak load and on the other hand, contributed to an efficient management of the water reserves.

IT In 2005 the import of the electricity from neighbouring countries grew by 8,3%, while export were up by as much as 40.2%. Export increased significantly during the last two months of the year.

PL Such difference in exchanges is mainly caused by significant increase of import combined with decrease (about 50%) of export on Polish-Sweden profile.
Slight decrease in import combined with increase in export (especially to Czech Republic) resulted in increase of exchanges in export direction.

PT In 2005 the imports and the exchange balance were the largest ever observed.

RO In 2005 the physical value for export / import was higher with 57.2% / 35% than in the previous year because of the interconnection with the UCTE system realized in Oct. 2004.

SI In 2005 import (9326 GWh) and export (9548 GWh) were quite balanced.

TRANSMISSION SYSTEM ADEQUACY 4

4 TRANSMISSION SYSTEM ADEQUACY

Transmission system adequacy is analysed regarding three aspects :

- *the **main developments** of the network during the year with information about the newly commissioned lines or transmission devices having a direct or indirect impact on the interconnections and on congestion (by increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, …). Appendix 1 shows in detail these main developments in the different UCTE countries,*
- *the **main disturbances** which have affected the transmission lines: this information is partly issued from the UCTE "TSO-Forum" sub-group's Report,*
- *the situation of the transmission system during the year, considering the main **congestion** observed, especially on the internal interconnections. **Information is given about the criticality of congestion seen by each country on interconnection, according to a common index** (see here below : "representation of congestion").*

4.1 Main results

4.1.1 Main developments

Only a few new interconnections were built in 2005.

NTC between Belgium and France improved by 700 to 1000 MW thanks to the second circuit on the Avelgem – Avelin line.
Creation of San Fiorano – Robbia line reinforce the grid connection between Switzerland and Italy.

Interconnections developments

Countries	Line or Equipment name	Voltage Level	Commissioning Date	Main Characteristics single or double circuit line, length, AC lines or DC lines
BE, FR	Second circuit of the line Avelgem-Avelin	380	Oct. 2005	Second circuit, 23 km, AC line
BE, FR	Mastaing – Avelgem	380	Nov. 2005	Replacement of old line between Avelin and Avelgem
IT, CH	S.Fiorano-Filisur	380		
IT, CH	Gorlago – Sils/Pradella	380		
IT, CH	San Fiorano – Robbia	380	Jan. 2005	
IT, CH	Ponte – Airolo/Fiesch	380		Second circuit
DE, AT	Hauzenberg – Ranna – Passau 147	110	02.11.2005	Interconnection between APG power system and E.ON Netz

4.1.2 Main disturbances

Cross-border situation in CENTREL seems to be more constrained than in the western part of UCTE, especially in Slovak Republic, Hungary and Czech Republic.

National comments are collected via the UCTE "TSO Forum" fully downloadable on http://www.ucte.org

National comments:

BE From end of August until beginning of October the Elia grid was submitted to very high flows from the south to the north. The highest flows were reported on 09.09.2005 when the combined load on the lines between France and Belgium reached more than 90 % of the installed capacity, whereas the capacity given out to the market was at the same time limited to less than 40 % of that capacity. N-1 was only supported with extensive curative measures, including possible load shedding. Also, standard DACF calculations were too optimistic by about 1000 MW. The security management group of North-west Europe (FR, DE, NL, BE) discussed and approved action items such as improving the quality of DACF, developing an inter TSO alarm for congestion problems, studying the influence of opening a border of Belgium on the UCTE grid, combined NTC determination over different borders, and developing a procedure for re-dispatching between members of UCTE.

FR On the 30.12.2005 at 12:51 (CET): tripping of 2 nuclear power plants (2 x 1300 MW). A first tripping of 1300 MW occurred at 10:37 (CET) and a third tripping of 1300 MW occurred at 13:06 (CET). The total amount of the loss of generation was 5 200 MW. All trippings were due to a flashover on transformers on the output lines (very bad weather conditions with frost and heavy snow).

GR To support the very low level of the voltage in Athens area due to the increasing use of the air conditioning, a lot of capacitors and autotransformers had been installed in transmission substations of Athens area during summer 2004 (in the view also of the coming Olympic Games). As a result the level of tension did not fall lower than 153kV under the same conditions that provoked the voltage collapse and the black out at South Greece on 12.07.2004.

The most serious disturbance of the Hellenic system during 2005 was on 27.03.2005 at 13:31 CET due to an isolator damage at the substation Iasmos in east Greece (Thrace), during planned operations, the thermal power unit Komotini (450MW) and a lot of 150kV substations (Xanthi, Orestiada, Didymotiho, Provatonas, Alexandroupoli, Komotini, Iasmos, Patriarch, Kerveros, Kechros and Keramoti) were put out of operation for a period from 5 minutes till 2 hours 25 minutes.

PL During all the year Polish power system was several times seriously affected by increased loop flows resulting from high wind generation in neighboring system. As a result of loop flows the level of congestions on cross-border interconnections increased significantly.
The most extreme cases occurred on 25-26.10.2005 and 14-18.12.2005.
The countermeasures undertaken by PSE-Operator were as follows:

- Generation re-dispatching inside the power system;
- Changing of the network topology;
- Cancelling maintenance works;
- Reducing NTC value on cross-border interconnections.

CH A Blackout affected the distribution power system in the region of Geneva on 18.01.2005. The blackout concerned about 500 000 people with a total loss of load of about 700 MVA. The power system was completely restored within 2 hours.
In March 2005 the nuclear power plant of Leisbstadt in the North of Switzerland felled out of service, because of damage at the generator. After reparation the nuclear power plant was reconnected to the transmission grid in September 2005.

4.1.3 Overall view of congestion on interconnection tie lines

The Retrospect report includes an overview of the congestion on interconnections. This gives information on how these congestions are managed, and presents the main congestion on national networks.

Congestions are still very important towards Italy.

On the eastern side, congestion became more severe in 2005 on cross-borders lines between Germany, Poland, Czech Republic, Slovak Republic, Austria and Hungary.

The effect of large amount of wind generation has effects on exchanges between Germany and its neighbours (Belgium, Poland).

In the following comments, details are given about the state of congestion for each country with its interconnected neighbours; for each border, and each direction through it, the nature of congestion seen by countries involved is appreciated according to the following index :

Severity Index	Arrow's colour	Annual Frequency of Occurrence
na	White	na
0	Green	0%
1	Dark green	1-25%
2	Orange	26-50%
3	Orange	51-75%
4	Red	76%-99%
5	Black	100%

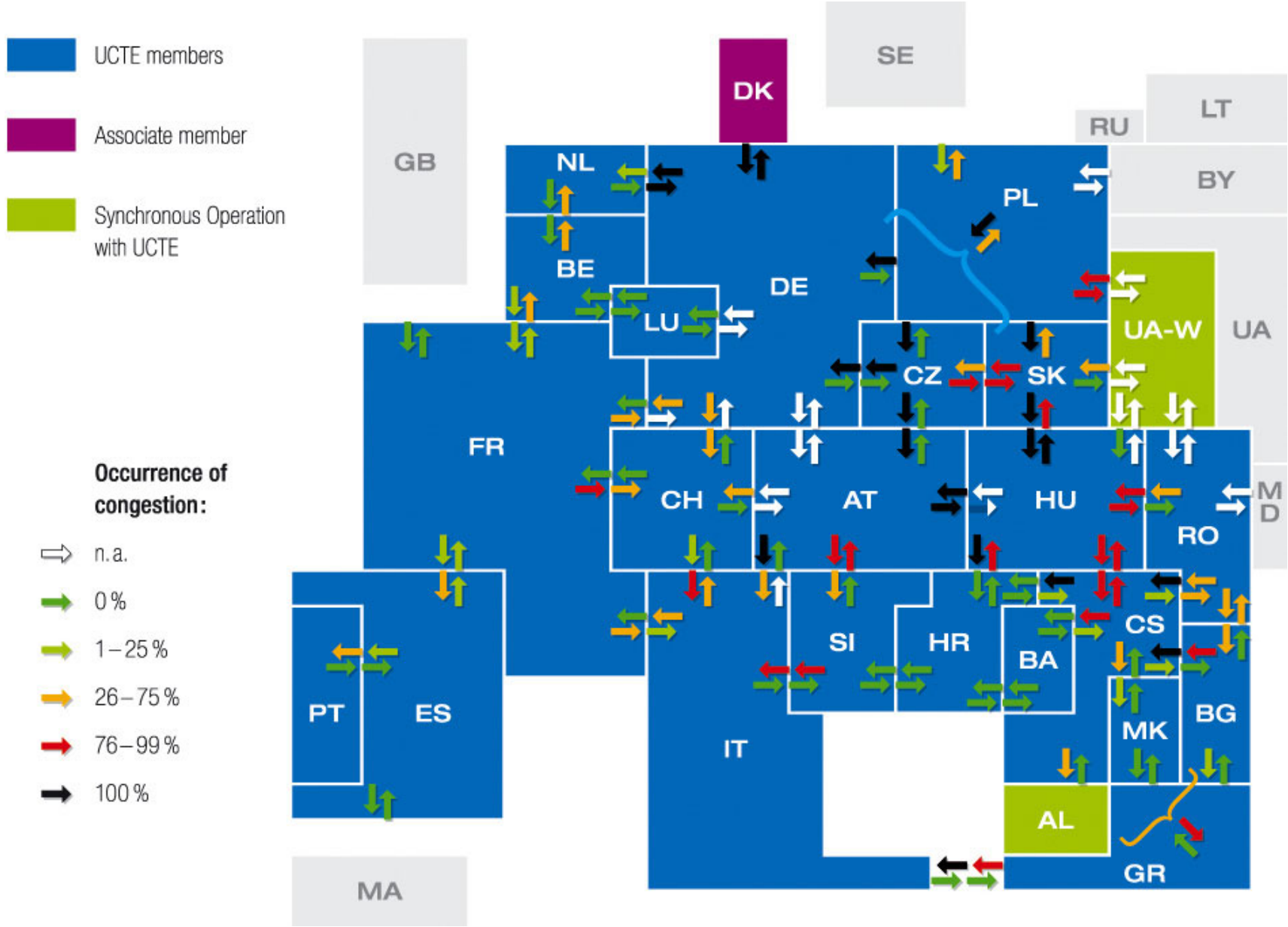
In order to qualify more precisely the congestion, the table here below has been used to classify more precisely when possible the occurrence according to the season, and hour of the day:

Season	Hours
Never (**N**)	Never (**N**)
Spring (**Sp**)	Varying (**V**)
Autumn (**Au**)	Peak hours (**P**)
Summer (**Su**)	Night hours (**Ni**)
Winter (**W**)	Day hours (**D**)
All year (**AY**)	All day (**A**)

As complement to this topic, it can be useful for readers to download the ETSO report *"Overview of current cross-border congestion management – Sept. 2004"*

This document is downloadable at:
http://www.etso-net.org/upload/documents/Current_CM_methods_final_20040908.pdf

Figure 10	Trans-border congestion on UCTE transmission system

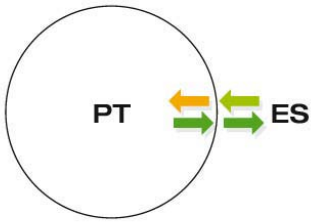


4.2 Detailed comments

In order to provide a more comprehensive view of the situation in the European power system, the following comments are organised on a geographical logic taking into account the different areas issued from the congestion observed in the UCTE system. Methods for congestion management in each country are specified.

PT – Portugal

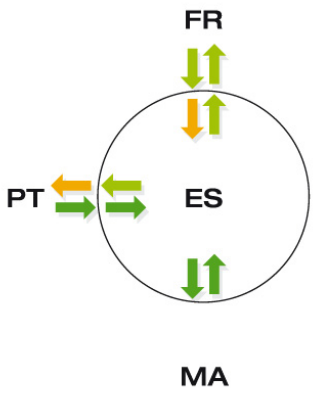
Congestions



Border		Severity of congestion
From	**To**	(0 to 5 – Season - Hours)
PT	ES	0
ES	PT	1/W/A
ES	PT	1/Sp/A
ES	PT	2/Su/A
ES	PT	2/Au/Ni
ES	PT	3/Au/D

ES - Spain

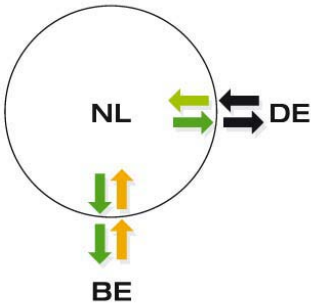
Congestions



Border		Severity of congestion
From	**To**	(0 to 5 – Season - Hours)
FR	ES	W, Au, Sp 2 Su 3
ES	FR	Sp, Su 0 W, Au 1
PT	ES	N
ES	PT	AY 1
MA	ES	N
ES	MA	N
And	ES	N
ES	And	N

NL – The Netherlands

Congestions



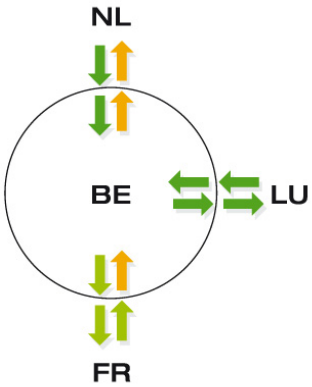
Border		Severity	Remarks
From	To		
NL	BE	0/N/N	
BE	NL	2/AY/V	In relation to France-Belgium border
NL	DE	0/N/N	
DE	NL	1/W/V	Due to high transits from wind-generation NTC-values were exceeded for some hours

National networks

There are no notorious bottlenecks on the Dutch/Belgium cross-border lines themselves, but sometimes imports from Belgium/France or transports from France towards Germany should be restricted in operational planning because of expected high loads on the France/Belgium cross-border lines. So it can be said that bottlenecks on other borders lower our import/export capacity.

BE - Belgium

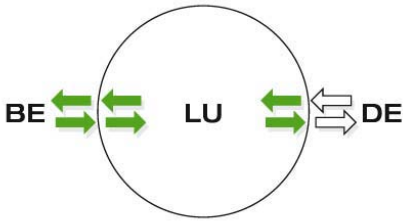
Congestions



Border		Severity of congestion (0 to 5 – Season - Hours)
From	To	
FR	BE	2-SuW-D
BE	FR	1-W-D
NL	BE	0-N-N
BE	NL	2-SuW-D
LU	BE	0-N-N
BE	LU	0-N-N

LU - Luxembourg

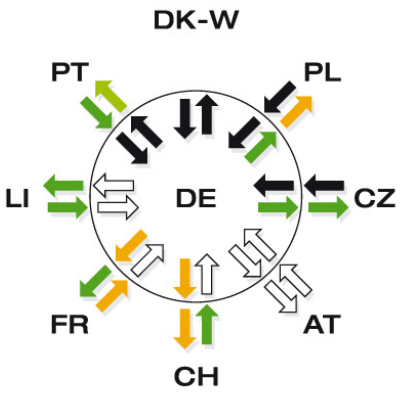
Congestions



Border		Severity of congestion (0 to 5 – Season - Hours)
From	To	
LU	BE	0/N/N
BE	LU	0/N/N
LU	DE	0/N/N
DE	LU	0/N/N

DE - Germany

Congestions



Border		Severity	Remarks
From	To		
CZ/PL	DE	5/AY/A	figures relate only to the German network or to the transmission grid of VE-T, respectively
DE	CZ/PL	0/N/N	figures relate only to the German network or to the transmission grid of VE-T, respectively
DK_East	DE		congestion management implemented by the Danish network operator
D	DK_EastA		congestion management implemented by the Danish network operator
DE	FR	5/AY/A	auctions
DE	CH	2/A and W/A	pro-rata curtailment
DE	NL	5/AY/A	auctions Tennet
DE	DK_W	5/AY/A	
DK_W	DE	5/AY/A	
DE	CZ	0/ AY/A	
CZ	D	5/ AY/A	
DE	NL	5/ AY/A	
NL	DE	5/ AY/A	
DE	CH	1/ W/A	pro-rata curtailment by EnBW (TSO) and RWE (TSO)
DE	FR	2/Sp/A	coordinated auction by RWE (TSO) and EnBW (TSO)
DE	FR	2/Sp/A	pro-rata curtailment by RWE (TSO)and EnBW (TSO)
DE	FR	2/Su/A	auction by RWE (TSO)and EnBW (TSO)
DE	FR	2/A/A	auction by RWE (TSO)and EnBW (TSO)
DE	FR	2/Wi/A	auction by RWE (TSO)and EnBW (TSO)

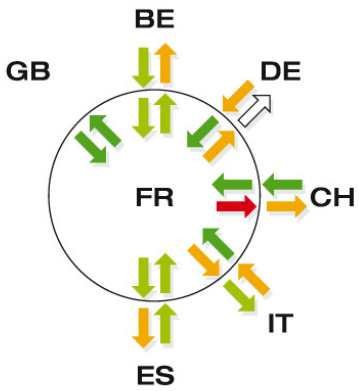
National networks

EnBW transmission grid:
Where extremely high load flows occurred from North to South (strong feed-in of wind energy in Northern/Eastern- Germany, load drain in Switzerland/Italy/France) the n-1 security of the EnBW transmission grid was temporarily endangered. Topology and re-dispatching measures were necessary to restore the n-1 security.

RWE transmission grid:
Due to high load flows from North to South (strong feed in of wind energy in Northern/Eastern-Germany and high demand in the South of Europe), topology and re-dispatching measures (changes of power plant scheduling) have been implemented to comply with the n-1 criterion in the RWE transmission grid.

FR - France

Congestions



Disturbances:

Along the year 2005, the French system has been operated without specific difficulties except during cold periods (January, February, March and November 2005).

Border		Severity of congestion (0 to 5 – Season - Hours)
From	**To**	
FR	GB	0
FR	BE	1/AY/P
BE	FR	1/W/D
FR	DE	3/AY/Ni
DE	FR	0
FR	CH	4/AY/Ni
CH	FR	0
FR	IT	3/AY/A
IT	FR	0
FR	ES	1/AY/A
ES	FR	1/AY/A

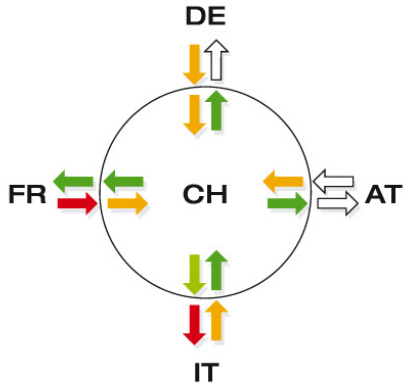
National networks

AVELGEM-AVELIN 2, AVELGEM-MASTAING 1 interconnection lines and LONNY-MASTAING 2 overhead line were commissioned in October and November 2005 as part of work to strengthen exchange capacity between France and Belgium.

A mechanical reinforcement of the double circuit 400 kV Cantegrit-Saucats near the Spanish border was done in 2005.

CH - Switzerland

Congestions



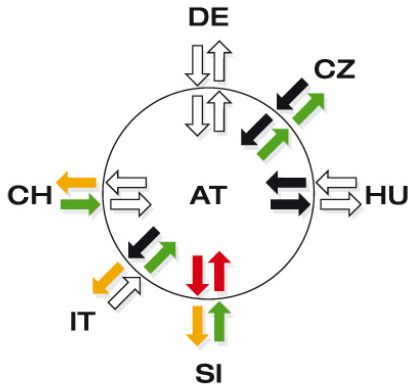
Border		Severity of congestion
From	To	(0 to 5 – Season - Hours)
CH	I	1 / AY / A
I	CH	0
CH	D	0
D	CH	2 / W / Ni
CH	F	0
F	CH	2 / W / Ni
CH	A	0
A	CH	2 / W / Ni

National networks

The new “Bernina” line significantly increased the transport capacity to Italy and the security of the network.

AT - Austria

Congestions

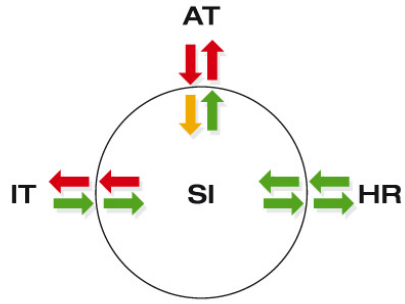


Border		Severity of congestion
From	To	(0 to 5 – Season - Hours)
A	CZ	0 - AY - A
CZ	A	5 - AY - A
A	I	5 - AY - A
I	A	0 - AY - A
A	SLO	4 - AY - A
SLO	A	4 - AY - A
A	H	5 - AY - A
H	A	5 - AY - A

Auction: The allocation of the capacity is organized by an auction office. Splitting of capacity: Each country (TSO) is responsible for 50% of the available capacity. The allocation of each share takes place according to the national laws. Capacity according to pentalateral agreement on the Italian northern interconnection: mean values 110 MW peak, 100 MW off peak, January-April, October-December
mean values 100 MW peak, 90 MW off peak, May-Sept, except August
Base: 01.01.2005 00:00h – 31.12.2005 24:00h
Peak: 02.01.2005 – 31.12.2005 Monday to Friday daily 08:00h – 20:00, excepting Austrian holidays

SI - Slovenia

Congestions

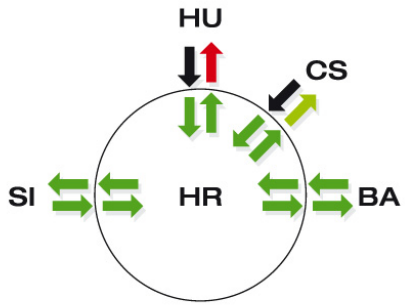


Border		Severity of congestion
From	To	(0 to 5 – Season - Hours)
I	SI	0, N
SI	I	4,AY
A	SI	2,AY
SI	A	0, N
HR	SI	0,N
SI	HR	0,N

National networks

Main congestions are in the internal corridor between Podlog and Beričevo (1x220 kV and 1x400 kV).
Because of high amounts of hydro energy in Balkan causing high flows and congestions on the Slovenian Italian tie-lines the NTC values on the northern Italian border (on IT/AT, IT/CH, IT/FR and IT/SI borders) have to be reduces pro-rata according to the pentalateral procedure four times in April.
No limitations were due to the environmental reasons.

HR - Croatia



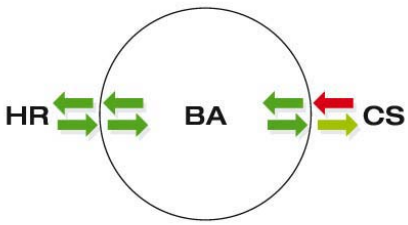
Border		Severity of congestion
From	To	(0 to 5 – Season - Hours)
HR	HU	O/N/N
HU	HR	O/N/N
HR	CS	O/N/N
CS	HR	O/N/N
HR	BA	O/N/N
BA	HR	O/N/N
HR	SI	O/N/N
SI	HR	O/N/N

National networks

After reconnection of UCTE 1st and 2nd synchronous zones the congestion does not exist within Croatian power system except when 400 kV lines Konjsko - Velebit and Velebit – Melina are out operation. In that chase problem is usually solved by changes in network configuration.

BA – Bosnia & Herzegovina

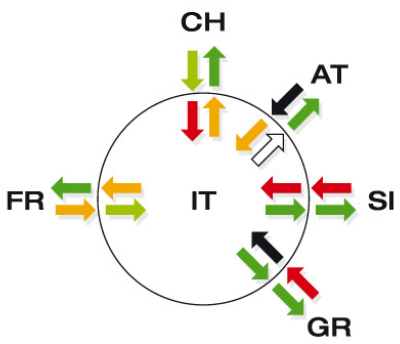
Congestions



Border		Severity of congestion
From	To	(0 to 5 – Season - Hours)
BA	HR	0 – N - N
HR	BA	0 – N – N
BA	CS	0 – N – N
CS	BA	0 – N – N

IT – Italy

Congestions



Border		Severity of congestion
From	To	(0 to 5 – Season - Hours)
FR	IT	1/AY/A
IT	FR	3/AY/Ni
CH	IT	4/W/SP/A
IT	CH	3/W/Ni
AT	IT	2/W/A
IT	AT	0/AY/A
SI	IT	4/AY/D
IT	SI	0/AY/A
GR	IT	5/AY/A
IT	GR	0/AY/A

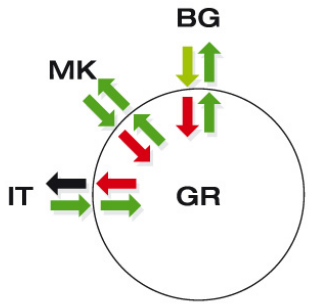
National networks

FR Border
N-1 criterion not satisfied when the limit of the export goes over or when some internal lines are switched-off for critical conditions.

CH-SI-GR Border
An automatic switching-off of the one of internal line involved in these exchange areas reduce automatically the internal production and prevents the overload with consequent risk of failure.

GR - Greece

Congestions



1. AL + FYROM+BG ---→ GR 2/SU/D AND 2/W/D
   GR ---→ AL+FYROM+BG 0/N/N

Once a year, there is an auction for the capacity allocation concerning the total capacity of the northern interconnections as for the import direction. In 2005, the capacity allocated to the participants of the market at the price of 5000EURO/MW per year.

2. As far as the exchange between Greece and Italy is concerned the exports were regulated throughout the year as follows :

January to May AND September to December 2005
50MW - Day hours
150MW – Night hours
June –July –August 2005
0 MW
The price for the capacity allocation of the interconnection GR-IT as for the export direction was 0 euros/mw/year.

The capacity of 250MW of the cable GR-IT that corresponds to Greece as for the import direction

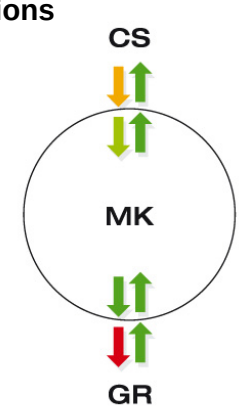
allocated to the participants of the market at the price of 1000 EUROS/MW/YEAR but throughout the year no congestion was observed in the daily market.

Exploiting the system

The rules of the new market introduce a transmission congestion criterion concerning the energy flow from the North to the South that may lead to a market splitting, no congestion occurred in 2005.
In summer the Lavrion Gas unit has been temporarily commissioned to support the high demand and the level of voltage in the area of Athens. In addition, the transmission devices installed in the same area as well as the new power plant of HERON ensured the system adequacy and security when the system experienced high peaks of load mainly because of the use of air conditioning.

MK – Former Yugoslav Republic of Macedonia

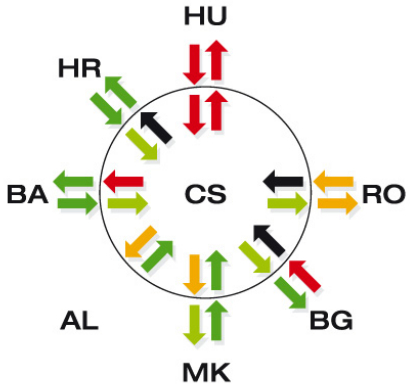
Congestions



Macedonia is a member of SETSO NACMPF SG (Network Acess Congestion Management Power Flow SubGroup). The auctions in the region haven't been organized yet, but the process of coordinated auction is in dry-run period. When good results will be acheved, the process of coordinated auction will start.

CS – Serbia & Montenegro

Congestions



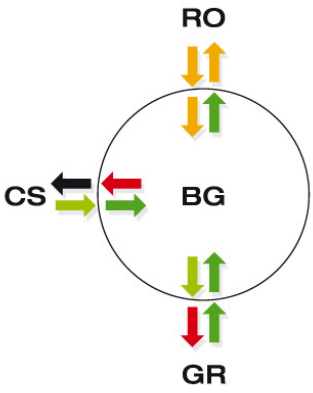
Border		Severity	Remarks
From	To		
CS	RO	1/AY/A	EMS: pro-rata monthly allocation of 50% of ATC
RO	CS	5/AY/A	EMS: pro-rata monthly allocation of 50% of ATC
CS	BG	1/AY/A	EMS: pro-rata monthly allocation of 50% of ATC
BG	CS	5/AY/A	EMS: pro-rata monthly allocation of 50% of ATC
CS	MK	3/AY/A	EMS: pro-rata monthly allocation of 50% of ATC
MK	CS	0/N/N	EMS: pro-rata monthly allocation of 50% of ATC
CS	AL	2/W/A	EMS, EPCG: pro-rata monthly allocation of 50% of ATC
AL	CS	0/N/N	EMS, EPCG: pro-rata monthly allocation of 50% of ATC
CS	BA	4/AY/A	EMS: pro-rata monthly allocation, EPCG: priority list of 50% of ATC
BA	CS	1/AY/A	EMS: pro-rata monthly allocation, EPCG: priority list of 50% of ATC
CS	HR	5/AY/A	EMS: pro-rata monthly allocation of 50% of ATC
HR	CS	1/W/A	EMS: pro-rata monthly allocation of 50% of ATC
CS	HU	4/AY/A	EMS: pro-rata monthly allocation of 50% of ATC
HU	CS	4/AY/A	EMS: pro-rata monthly allocation of 50% of ATC

National networks

1. Direction 400 kV Sofia (BG) – Nis (CS), usually congested; n-1 problems in Nis area
2. Direction CS→MK, n-1 problems; interdependent with direction BG→GR
3. Direction CS→HR+BA, n-1 problems in case of tripping 400 kV line S.Mitrovica(CS) – Ernestinovo (HR)

BG - Bulgaria

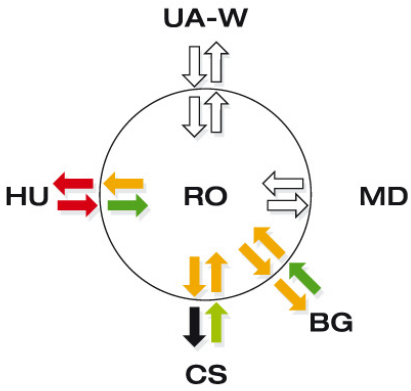
Congestions



Border		Severity of congestion (0 to 5 – Season - Hours)
From	To	
BG	RO	0/N/N
RO	BG	2/Sp Au/A
BG	CS	4/AY/A
CS	BG	0/N/N
BG	GR	1/Au Su/D
GR	BG	0/N/N
BG	MK	1/W/D
MK	BG	0/N/N

RO - Romania

Congestions

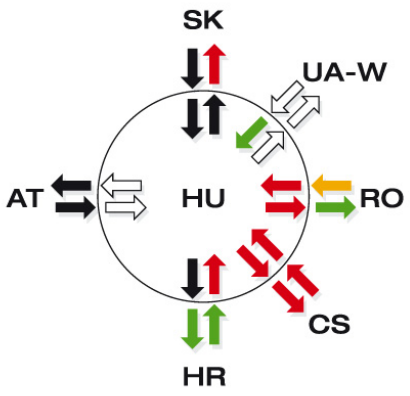


Border		Severity	Remarks
From	To		
BG	RO	3 (58%) AY - A	Internal congestion in North area reflected in low NTC values
RO	BG	2 (50%) AY - A	Congestion due to maintenance works on tie-lines or significant internal lines
SC	RO	2 (37%) AY - A	Internal congestion in North area reflected in low NTC values
RO	SC	3 (58%) AY - A	Congestion due to maintenance works on tie-lines or significant internal lines
HU	RO	1 (20%) AY - A	Internal congestion in North area reflected in low NTC values
RO	HU	3 (62.5%) AY - A	Congestion due to maintenance works on tie-lines or significant internal lines

National networks

A bottlenecks – congestion is occurred in the first 400 kV loop on power system, seen from West-North border , due to performing of some reinforcement works in power stations. This situation leads to decreasing of the import NTC values for all borders.

HU – Hungary



Border		Severity of congestion
From	To	(0 to 5 – Season - Hours)
SK	H	5/AY/V
H	SK	5/AY/V
CR	H	4/AY/V
H	CR	5/AY/V
UA	H	0
H	UA	-
RO	H	4/AY/V
H	RO	4/AY/V
YU	H	4/AY/V
H	YU	4/AY/V

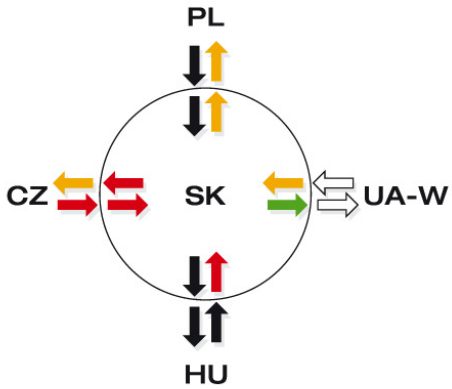
National networks

Outaged element
Győr 400/120 kV transformer
Győr-Litér 400 kV line
Göd-Levice 400 kV line
Győr-Gabcikovo 400 kV line
Paks-Toponár 400 kV line
Hévíz-Toponár 400 kV line
Paks-Sándorfalva 400 kV line

Overloaded element
Győr 400/120 kV transformer
Győr 400/120 kV transformer
Győr-Gabcikovo 400 kV line
Göd-Levice 400 kV line
Litér-Hévíz 400 kV line
Hévíz-Litér 400 kV line
Alberitsa-Békéscsaba 400 kV line

SK – Slovak Republic

Congestions

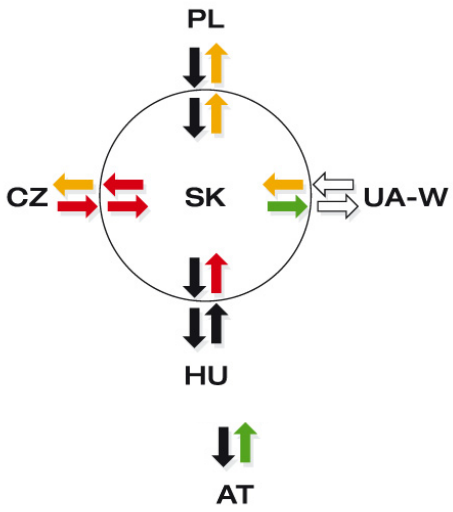


Border		Severity	Remarks
From	To		
SK	CZ	5/AY/A	yearly and monthly auctions
SK	CZ	0/AY/A	daily auctions
CZ	SK	5/AY/A	yearly and monthly auctions
CZ	SK	0/AY/A	daily auctions
SK	PL	5/AY/A	yearly auction
SK	PL	3/SpAuW/A	monthly auctions
SK	PL	0/AY/A	daily auctions
PL	SK	0/AY/A	yearly auction
PL	SK	5/AY/A	monthly and daily auctions
SK	UA	0/AY/A	yearly and daily auctions
SK	UA	1/SpSu/A	monthly auctions
UA	SK	5/AY/A	yearly auction
UA	SK	3/SpSuAu/A	monthly auctions
UA	SK	0/AY/A	daily auctions
SK	HU	5/AY/A	yearly and monthly auctions
HU	SK	5/AY/A	yearly auction
HU	SK	3/SpSuW/A	monthly auctions

On SK - HU border daily auction mechanism has not been introduced yet.
In the previous table the methodology of auctions was choose because it has much better information value than just comparing available capacities and nominations of traders for the day ahead.
The highest auction price in auction processes was observed on the SK - H border in the direction from Slovakia to Hungary, both in yearly and monthly auctions.

CZ – Czech Republic

Congestions



The trade is liberalised on the interconnection. Explicit auctions are used on the cross-border with Germany (E.ON), Austria (APG) and Slovakia (SEPS). There is a common coordinated auction on the cross-border with Germany (VE-T) and Poland (PSE-O).

Maximal **monthly** auction prices were as follows:

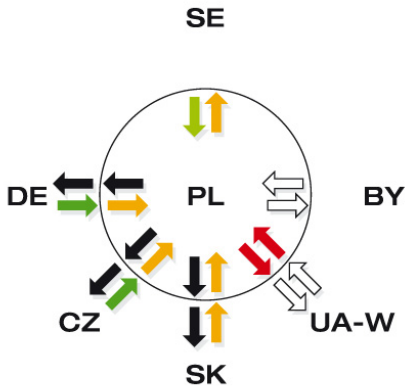
CZ -> D (VE-T):	18922 €/MW in November
CZ -> D (E.ON):	11799 €/MW in December
D (E.ON) -> CZ:	6 €/MW in April
CZ -> A:	7301 €/MW in June
PL -> CZ:	21336 €/MW in August
CZ -> PL	1795 €/MW in August
CZ -> SK:	210 €/MW in November
SK -> CZ:	289 €/MW in November

National networks

Bottleneck congestion	**Severity of congestion** (0 to 5 – Season - Hours)	**Remarks**
V243,4	1 / Sp/P, Su / D, A/P	Tie lines 220kV CZ-A – unexpected flows
T Sokolnice	1 / Sp / D	Transformer 400/220 kV– unexpected flows
V245,6	1 W / P	Tie lines 220kV CZ-PL– unexpected flows
V253,4	1 AY/V	Internal lines located between tie lines mentioned above – unexpected flows

PL – Poland

Congestions



Border		Severity	Remarks
From	To		
PL	D/CZ/SK	5AY_V	*) **)
D/CZ/SK	PL	2AY_V	*)
PL	S	2AY_V	Commercial DC link
S	PL	1AY_V	Commercial DC link
PL	UA	-	NTC = 0
UA	PL	4AY_A	Radial operation
PL	BY	-	Out of operation in 2005
BY	PL	-	Out of operation in 2005

*) in 2005 as in the previous years PSE-Operator managed congestion on all synchronous international tie lines (to D, CZ, and SK) together and thus the description of congestion situation is given for this whole profile.
**) The congestion on the PL-D/CZ/SK profile is caused by loop-flows resulted by high wind generation in North part of Germany.

On the Slovak and Czech profile the highest prices were in July and August and exceeded respectively 13000 and 21000 €/MW (export direction) while during the rest of year the prices ranged from about 50 €/MW (in February) to over 8500 €/MW (in October), both in export direction. The difference was caused by the maintenance season and therefore limited transfer capacities.

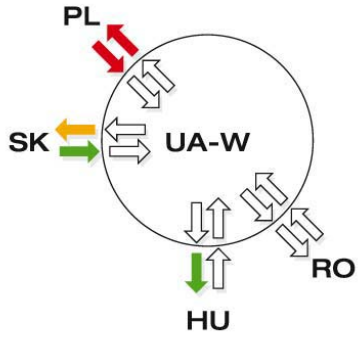
On the German profile high prices are kept up since May 2005 when they exceeded 10000 €/MW in export direction. The highest value reached over 21000 €/MW (export) on August 2005. This is caused by a high demand for transfer capacities, which is an effect of energy price difference in markets in Poland and Germany.

Prices in import direction for all profiles are much lower comparing to export ones. Their highest value was on August and reached over 1700 €/MW.

National networks

Although many network constraints occur In Polish transmission system it is difficult to determinate any structural bottlenecks (i.e. those related to the particular sets of lines over longer periods of time). The actual network constraints heavily depend on given system load; network configuration and generation pattern and vary according to their changes. Most of network constraints result from limitations related to voltage stability in a given area, not from permissible loading of transmission lines themselves (apart from some cases of the sub transmission 110 kV lines). To manage congestion coming from these network constraints Polish TSO has to redispatch the generation.

UA-W – Western Ukraine (Burshtyn Island)



5 COMMENTS ON MARKET DEREGULATION AND ELECTRICITY MARKET DEVELOPMENTS

5 COMMENTS ON MARKET DEREGULATION AND ELECTRICITY MARKET DEVELOPMENTS

This chapter gives some general information on the opening up of the internal market in terms of implementation of the EU Electricity Directive and market developments occurred in the UCTE countries.

BE Market organization

Belgium's electricity transmission grid operator Elia, Dutch energy exchange APX, French energy exchange Powernext and Dutch electricity transmission grid operator TenneT have incorporated Belpex NV/SA, in July 2005. Elia has 60% of the Belpex shares, while APX, Powernext, RTE and TenneT each hold 10%. Belpex will be the operator of the Belgian power exchange. In January 2006, the Belgian minister of Energy has given a market license to Belpex. The minister has also approved the market rules. Belpex will become active as a day-ahead market. Belpex will also be coupled with APX and Powernext. This means that the available daily capacity on the interconnections between Belgium and France and between Belgium and the Netherlands will be allocated by the power exchanges. The regulators of the three countries still have to approve the mechanism of market coupling. Belpex will become active two months after receiving the approval of the regulators.

The Belpex Day-Ahead Market (DAM) will provide standardized products (hourly instruments) for producers, distributors, industrial groups, traders and brokers to sell and purchase electricity. The prices for electricity will be determined via a double-sided blind auction and published daily on the Belpex website (www.belpex.be).

The main characteristics of this Belpex DAM are:

- Voluntary market
- Anonymous trading, fixing of contracts via a double-sided blind auction
- Delivery on the Belgian hub via the Elia nomination system (Elia being the Belgian transmission system operator)
- Price transparency
- Electronic trading platform compatible with Excel
- Clearing and settlement facilities provided by central counterparty

Opening process of the market

The Belgian law of 1 June 2005 has transposed the European directive 2003/54 into Belgian law.

Timetable for the opening up of the Belgian electricity market - situation as at 31 December 2005

	Federal level	Flemish Region	Walloon Region	Brussels-Capital Region
All high-voltage customers >10GWh (≥ in Walloon Region)	Eligible	Eligible	Eligible	Eligible
All high-voltage customers ≤10GWh (< in Walloon Region)	Eligible	Eligible	Eligible	Eligible
All professional, low-voltage customers	Eligible	Eligible	Eligible	Eligible

All household low-voltage customers	Eligible	Eligible	January 2007	July 2007

BG 23 Market Players were active on the open market in 2005, among them 6 Independent Producers, 14 Eligible Customers, 1 public supplier – NEK and 2 traders. The total energy supplied under bilateral contracts in 2005 is 2607023 MWh.
Step by step the model shall be developed further and a complex market incorporating a spot "day-ahead market" for short-term deals with electricity and ancillary services will be put in place.

CH Auctioning on trans-boarding lines

The auctioning process of the capacity allocation on the Swiss/German border started in December 2005.

In September 2005 the Head of the Federal Department of the Environment, Transport, Energy and Communication, Mr. Moritz Leuenberger, and the European Commissioner for Energy, Mr. Andris Piebalgs, announced that a bilateral agreement between Switzerland and EU concerning electricity trade, access to markets, security of electricity supply, utilisation of interconnection capacity and origin authentication for "green" electricity would be negotiated in 2006.
The foundation of SWISSGRID as the TSO responsible for the operation of the whole Swiss transmission network was delayed due to the decision of the Competition Commission that stipulated the following requirements:
- SWISSGRID is obliged to grant free access to the network installation in its possession and/or under its operation.
- SWISSGRID is obliged to create a cost account for its activities.
- The founder companies of SWISSGRID (ATEL, BKW, CKW, EGL, NOK, EOS and EWZ) are obliged to create cost accounts for their own network installations that are under SWISSGRID operation.
- SWISSGRID is obliged to publish its network tariffs and the conditions for the use of the network.
- SWISSGRID is not allowed to produce, to sell, to trade electricity and to posses or to operate distribution installations unless the later are necessary for its own consummation, safe network operation or for the purpose of reserve capacity.
- SWISSGRID is not allowed to posses shares of companies that produce, sell or trade electricity and of companies possessing or operating distribution installations.
- The members of the SWISSGRID governing board are not allowed to be board or management members of companies that produce, sell or trade electricity and of companies possessing or operating distribution installations if this companies perform activities on commercial basis.
The organization of Swiss electricity grid companies "Swisselectric" (its members comprise ATEL, BKW, CKW, EGL, EOS and NOK) decided to appeal against the first and the last issue of this decision.
"Swisselectric" recognise the necessity of granting free access to the transmission network, but it pleads for a transition period of time for the implementation.
As to the SWISSGRID governing board, "Swisselectric" points out that only members that are active in the electricity industry are capable of taking qualified decisions concerning activities of a TSO.
The final decision of the Competition Commission is expected in spring 2006.

The Electricity supply Low that intends to open the Swiss electricity market gradually will be probably passed by the Parliament in spring 2006.

Additional remarks

The Federal Department of the Environment, Transport, Energy and Communication appointed a high level working group "Transmission Lines and Security of Supply" to deal with the needs of the network development in the future. The members are representatives of cantons, Swiss Federal Railways, electricity utilities, organisations for environmental protection and governmental institutions. The main tasks of the WG will be the following: optimisation of the transmission network and improvement of its connections to the railway network, priority settings for construction projects, investigation of reasons for long authorisation procedures and recommendations for an improvement of the legislation concerning the construction of lines. The WG started its activities on the 13 of December 2005.

CZ Opening process of the market

The electricity market is completely deregulated since 1.1.2006 even for the households.

DE Electricity Market

The European Energy Exchange (EEX) managed to continue the positive trend in trading without any abatement and can now look back on its most successful year so far: A total of 602 TWh was traded on the EEX Spot and Derivatives Market for power during the year 2005. This corresponds to an increase of 52 per cent compared to the volume of 397 TWh achieved during the preceding year.

The volume of electricity traded on the Derivatives Market, which increased by 53 per cent to 517 TWh from 338 TWh during the preceding year, displayed a particularly good development. On the Derivatives Market for power the base load for the year 2006 (Phelix Base Year Future) in Germany was quoted at EUR 53.36 per MWh and the peak load for the year 2006 (Phelix Peak Year) in Germany was quoted at EUR 73.85 per MWh on 28 December 2005.

The trading volume on the Spot Market for power also increased by 43 per cent from 60 TWh in the year 2004 to 85.7 TWh. Compared to the consumption of electricity in Germany the Spot Market volume achieved in 2005 corresponds to approx. 15 per cent of the total annual consumption. On average, the Spot Market prices (Phelix Day Base) amounted to EUR 45.98 per MWh during the year 2005 compared to EUR 28.52 per MWh during the preceding year.

During the first year of the EEX Spot and Derivatives Market for CO2 emission allowances (EUA) a volume of in total 3,196,791 EUA was already traded on these markets – of which a total of 2,748,791 EUA was traded on the Spot Market (commencement of trading on 09 March 2005) and of 448,000 EUA was traded on the Derivatives Market (commencement of trading 04 October 2005).

In the course of the year 2005 the number of trading participants increased from 123 to 132 companies from a total of 16 countries. Since January 2006 Elnord SA became the first company with registered offices in Poland to be admitted to the exchange. This means the number of countries from which the trading participants of EEX come has now increased to 17.

Federal Network Agency

On 13 July 2005, the former German RegTP (regulatory authority for telecommunications and postal services) was renamed to Federal Network Agency. The regulatory authority under the guiding responsibility of the Federal Ministry of Economics and Technology is now

responsible for representing the interests of competitors and customers in the fields of electricity, gas, telecommunications, postal services and railways.
In the field of electricity, the Agency is to provide for compliance with the German Energy Industry Act. It takes care of secure, cost-efficient and environmentally compatible electricity supply. Focus is also on undistorted competition in the electricity market and on the control of network charges. It ensures non-discriminatory access to electricity networks and controls the adequateness of use-of-system charges.
As from next year, another central issue of the Agency will be regulation through incentives.

FR TSO Organization

RTE was set up on July 1st 2000, as an EDF department with independent accounts, management and finances. Since the law of August 9th, 2004 on public electric and gas services, RTE has been shifted as a state-owned limited company, subsidiary of the EDF-Group.

The Law of 9 August 2004 states that the network operator is responsible for operating and developing the electricity transmission system, becomes owner of its industrial assets an continues to be held entirely by “EDF, the State or other firms or institutions belonging to the public sector".

The Decree approving the company's articles of association appeared in the Official Journal of the French Republic on 31 August 2005. Among other things, it specifies the legal form, name and purpose of the new company, the composition of its capital and its method of corporate governance.

The missions entrusted to it under the Laws of 10 February 2000 and 9 August 2004 are reaffirmed.

Legal issues

The law of July 13th, 2005 fixing the orientations of the energy policy:

This law is the result of a long committed process started in January 2003 with the national Debate on Energies. The Government produced a “White paper” on energy.

Four aims:
- To contribute to national energy independence and to guarantee the security of supply;
- To ensure a keen price of energy;
- To preserve human health and the environment, in particular fighting against the aggravation of the greenhouse effect.
- To guarantee social and territorial cohesion by ensuring the access to energy for everyone.

In order to reach these goals, four major axes were defined:
- To control the request for energy;
- To diversify the energy mix
- To develop research and the innovation in the energy sector;
- To ensure the storage and means of transport adapted to the needs.

This law gives quantitative objectives and defines programs for energy saving and development of renewable energies:
- Division by 4 or 5 of the CO^2 emissions for the developed countries;
- Production of 10 % of the French energy needs starting from renewable sources of energy by 2010; (interior production from renewable electricity will have to be 21 % of consumption in 2010 against 14 % in 2005).

- The setting of three mobilizing plans for energy saving and the development of renewable energies:
    - Energy for the development plan,
    - Southern face buildings program,
    - Ground energy plan.

This law also envisages the maintenance of the nuclear option in France. In order to keep all the open options for the replacement of the current nuclear thermal power stations, project will arise around 2015 for the construction of an engine EPR from here to 2012.

Lastly, a very particular place is reserved for the development and research projects on new technologies of energy. A national strategy of research will be published by the Government and will be revised every 5 years.

The law contains measurements to start the achievement of the transposition of the legislative provisions of European directives:

- A device of certificates of energy saving ("white certificates") which will mobilize the actors of the energy sector towards energy saving.
- Increase of the role of the local communities to intervene in the field of the control of wide energy.
- Companies selling energy or energy services will have to introduce promotion of energy saving into their advertisements.
- A certificate of origin for renewable energy was created
- Measurements suitable to guarantee the quality of the electric supply, to improve safety of the networks electrical supply and gas, and to consolidate the security of supply. The law provides that the TSO must check that the security of supply remains guaranteed in the medium term and alarm the minister in charge of the energy of the risks of imbalance.
- The law creates the Higher Council of Energy which will be able to treat questions relating to gas or electricity and development of renewable energies. It will be consulted in particular on the texts relating to the certificates of energy saving.

The law provides finally that all the provisions relating to the right of energy will be gathered in an Energy Code.

GR Market prices

In heavy load periods, especially in summer, the market prices get high due to expensive units that are usually committed to meet the high demand.
In Greece, the bulk of electrical energy is produced in the North while the consumption is concentrated in the South. The new Power Exchange code has set an additional congestion criterion concerning the energy flow from the North to the South. This criterion may lead in a market splitting with different prices of electrical energy between the North and the South. In 2005 no congestion in the flow of energy from the North to the South occurred.

Opening process of the market

In order to comply with the EU Directives concerning the energy market liberalisation, the Greek Government issued new Laws for the electrical energy and natural gas market liberalisation and a new Power Exchange and Grid Code. In addition, the bodies and the authorities involved are working on implementing the new legislation, promoting the RES and planning the reduction of the emissions.

New Laws concerning the Liberalisation of the electricity market, and the Trade of Natural Gas as well as a new Power Exchange and Grid Code were activated in 2005. The new

legislation aims at restructuring significantly the energy market, promoting of the liberalisation, and offering incentives to the stakeholders to invest in the energy sector .

The restructure of the market started on 1st October 2005 and it is going to be implemented in four steps by the end of 2007.

The introduction of the new legislation mainly includes:

- A Day – Ahead Market and a future market of reserves
- A full reconsideration concerning the market prices, methods of calculation, North–South market splitting in case of congestion.
- Fundamental changes concerning the definitions of the imbalances.
- Introduction of a capacity availability market via the trade of capacity certificates issued by the generators and held by the suppliers, to promote the construction of new power plants. The HTSO is the operator of the capacity availability market.
- Generators and suppliers have the right to trade electrical energy through the interconnections.

- On 1.7. 2007 the Greek TSO becomes the operator not only of the Greek Transmission System but also of the Distribution System of the mainland-interconnected system, with the exception of the remote systems of the Greek Islands.

HR Electricity Market process

On April 4 2005 were established HEP – OPS member of the HEP Group(Transmission System Operator) and HROTE (Croatian Energy Market Operator).

According to The Law on Electricity Market from December 2004, eligible customers are customers with annual consumption larger than 20 GWh and all customers directly connected to transmission network. This law also sets the time schedule for further opening of electricity market in Croatia:

- from 1 July 2006 eligible customers will also become customers with annual consumption larger than 9 GWh,
- from 1 July 2007 eligible customers will also become small enterprises,
- from 1 July 2008 all customers will be eligible (full opening of electricity market).

HU Opening process of the market

First step of market opening (on 1 January 2003):

Customers with consumption of above 6.5 GWh/year are eligible to purchase electricity on the competitive market.

Second step:

From 1 July 2004, all customers except household customers are eligible.

Next step - pursuant to the Directive 2003/54/EC:

From 1 July 2007, also the household customers will be eligible, i.e. 100% of the market will be open.

MK Opening process of the market

In December 2004 the Government of Macedonia approved an Electricity Market Design Plan. Based on this Plan, an Amendment on Electricity Market to the Energy Law was created and adopted in June 2005. It introduces competition in the electricity sector, right of non-discriminatory third party access to the network and establishes thresholds for opening of the market.

According to this Amendment, the eligible customers are defined as those whose energy consumption is more than 20 GWh/year. Thus, approximately 27% of the market is opened. The category of eligible customers can be changed by decision of the Macedonian Government.

On 26 October 2005, Republic of Macedonia, as well as the rest of the SEE countries, and representatives of the EU Commission, has signed the Energy Community Treaty whose main objective is to ensure free energy trade under transparent conditions among the countries of the region and with the EU countries. According to the Treaty, the markets shall be opened till 1 January 2008 for non-household customers and till 1 January 2015 for all customers.

TSO organization

On 9 December 2005 the Government of Macedonia launched a pre-qualification procedure for participation in the tender for privatisation of the JSC "ESM" – distribution and supply of electricity. A total of 7 companies submitted pre-qualification applications, and 4 of them have qualified for the tender.

According to the timetable, by the end of March the privatisation process should be completed.

Deregulation of electricity market

Based on the formal decision, that was adopted by the Government on 1 October 2004, and in accordance with the Law on transformation of the JSC "Electric Power Company of Macedonia", that went into effect in March 2004, the process of separation of the JSC "Electric Power Company of Macedonia" was successfully completed on 31 December 2004 by registration of the two new companies: AD MEPSO – owner and operator of the national Power System and Electricity Market and AD "ESM" (new) – generation, distribution and supply of electricity.

In September 2005, the Government brought formal decision to separate AD "ELEM" – power generation and TPP Negotino – power generation plant from the AD "ESM" (new). At that time, AD "ESM" (new) was registered as AD "ESM" – distribution and supply of electricity.

By the end of 2005, the following licenses have been granted to the above-mentioned main entities in the electricity market:

- AD MEPSO
  1) Electricity transmission
  2) Transmission System Operator
  3) Market Operator
  4) Regulated Wholesale Supplier of Tariff Customers

- AD ESM
  1) Electricity distribution
  2) Distribution System Operator
  3) Regulated Retail Supplier of Tariff Customers
  4) Distributed Power Generation

- AD ELEM
  1) Power Generation

- TPP Negotino
  1) Power Generation

Organizational restructuring of the companies was performed in accordance with the granted licenses. Separate accounts are maintained for each license as requested by the Law.

NL Opening process of the market

The Minister of Economic Affairs has brought in the Parliament a bill on splitting up all networks from Energy Trading Companies.
Related to this bill is the intention to bring all the HV-networks ≥ 110 kV under the accountability of TenneT-TSO in order to better the manageability of the electricity transport infrastructure. The expectation is that will be decided on the restructuring of the sector in the first months of 2006.

PL Management of interconnections

During 2005 a coordinated trilateral auction procedure for cross-border capacities was conducted following agreements concluded in 2004 among PSE-Operator from Poland, CEPS, a.s. from Czech Rebublic and Vattenfall Europe Transmission from Germany. Capacities were allocated in common explicit auction organized by a common Auction Office in yearly, monthly and daily auctions, in compliance with EC Regulation 1228/2003.
The regional cooperation was significantly developped in 2005 in terms of extension the TSO group up to 8 TSOs and creation of regular framework for dialogue with 8 Regulators. As result of this cooperation 5 TSOs from Central Eastern Europe region entered to the agreement on coordinated auction rules for 2006. The new partners in this agreement are E.ON. from Germany and SEPS, a.s. from Slovakia.
Activities of the Polish Power Exchange include: day-ahead market, proprietary rights market, futures market and block market.

Energy Policy

In April 2005 new amendments to the Polish Energy Law Act as adopted in March were published in the Official Law Gazette, introducing inter alia provisions on supplier of last resort, universal service, increase in regulator's tasks and strengthening unbundling requirements. They came into force in May 2005, leading to final adjustment of the Polish law to the Directive 2003/54/EC with the aim of convergence and harmonisation of the Polish market rules with the EU model. On the basis of these amendments a system of the green certificates for the RES production was introduced in October 2005 as a method of confirmation of meeting the RES energy purchase obligation. Polish Power Exchange (Towarowa Gielda Energii SA) was appointed to conduct the Register of the Certificates of Origin and to organize trade in proprietary rights relating to the Certificates.

On 4 January 2005 the document "Energy Policy in Poland till 2025" was adopted by the Polish government. This document specifies main aims of the energy policy including provision of the national energy security, increase in competitiveness of the economy and its energy efficiency, and environmental protection.

Electricity market structure

Restructuring of the power market in Poland continued with further consolidation of the distribution companies resulting in limiting the number of the distribution companies into nine being active in the market, including five consolidated groups. The Polish government in June 2005 adopted state's ownership policy programme in relation to the power sector in Poland. Further consolidation of generation and distribution companies is considered.

RO Opening process of the market

Starting with 1st of July 2005, the market opening degree reached 83.5% and the eligibility threshold decreased correspondingly (meaning that industrial consumers themselves can choose their suppliers). To provide a well suited for competition environment, the structure and model of the electricity market were oriented towards a full competitive market, the secondary legislation issued by the Romanian Electricity and Heat Regulatory Authority being in line with these requirements. Set up of the New Commercial Code and related procedures for market operation, was followed in June 30 by the effective launching of the spot trading based on the new electronic system delivered by AREVA T&D and developed under PHARE 2000 program, financed by the European Commission.
Romanian electricity market has the following components:
a) *Day Ahead Market* (covering up to 8 % of the transacted energy) is administered by OPCOM, the Romanian Electricity Market Operator, in ongoing process to become a full operational power exchange. Participation on this market was decided to be voluntary, with no obligation for the participants to sell or buy in the day-ahead market. It is based on simple price-quantity bids for each trading interval of the next day expressing the willingness to buy or sale, no matter if the participant is generator or supplier. Consequently, a better matching of spot trading product with the market participant's expectations was achieved, those ones being supported to undertake the daily opportunities.
b) *Centralized Green Certificates Market* is administered also by OPCOM . The quota system combined with trading of green certificates was established as support scheme for RES by Romanian Government Decision. There is a mandatory yearly quota fixed by Regulatory Authority which is applied for all suppliers to final consumers. The green certificates price is market based set: either bilateral contracts concluded between producers and suppliers or centralized auction within the market operated by OPCOM. All trades are registered in the register kept by OPCOM. There is a scale for offer price between a lowest price limit in order to protect the E-RES generators and a highest price limit in order to protect the consumers.
c) The *3rd centralized* market administered by OPCOM since December 2005 is the *bilateral contracts market*, with public auctions. Establishment of this bilateral contracts market has the purpose to create a transparent framework to conclude electricity selling/purchase contracts. These contracts comprise both the general terms and the specific extension with related clauses that must be proposed by the seller and agreed by the purchaser, intended to be further improved based on the standard frame contracts issued by EFET (European Federation of Energy Trades). The new launched product is not only providing transparency but also time saving.
d) *Balancing* Market (representing up to 4% from internal consumption), administrated by Transelectrica company, is controlling:

- exchanges between Balancing Market Participants;
- energy offers provided by each producer;
- dispatchable units physical notification and availabilities;

The data flow is controlled by three software:

- Scheduler Software: capable to take over all the energy transactions between the BRP (and also to signal eventual mismatches between the transactions or imbalances), Physical Notifications and availabilities by dispatchable units);
- Balancing Market Offer software: capable to take over the offers coming from the Producers and displays dispatch orders by Dispatch Units and energy type;
- Balancing Market clearing order software: a tool which loads all dispatch orders by energy type for each dispatchable unit.

Figure 11 Consumption curve (brut values) - Winter Weekday [MW]

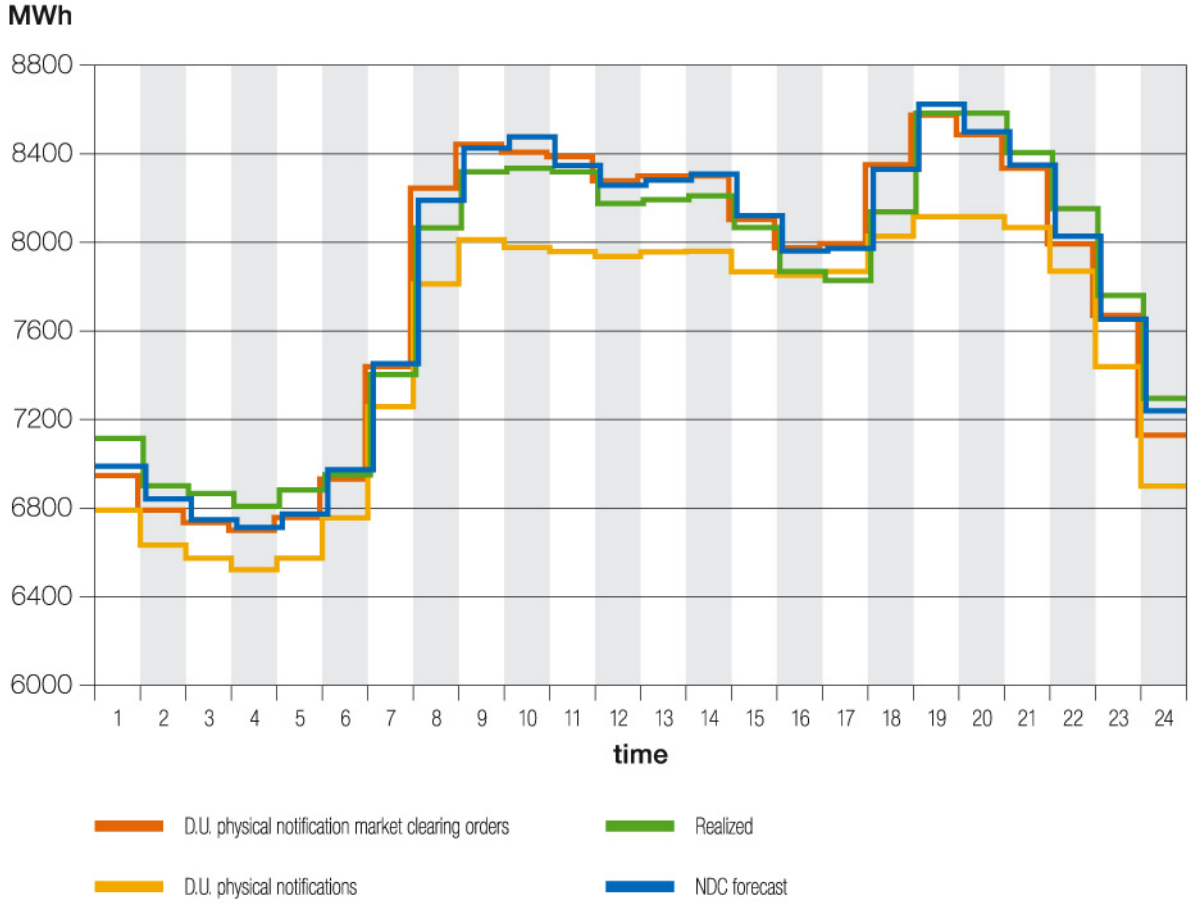
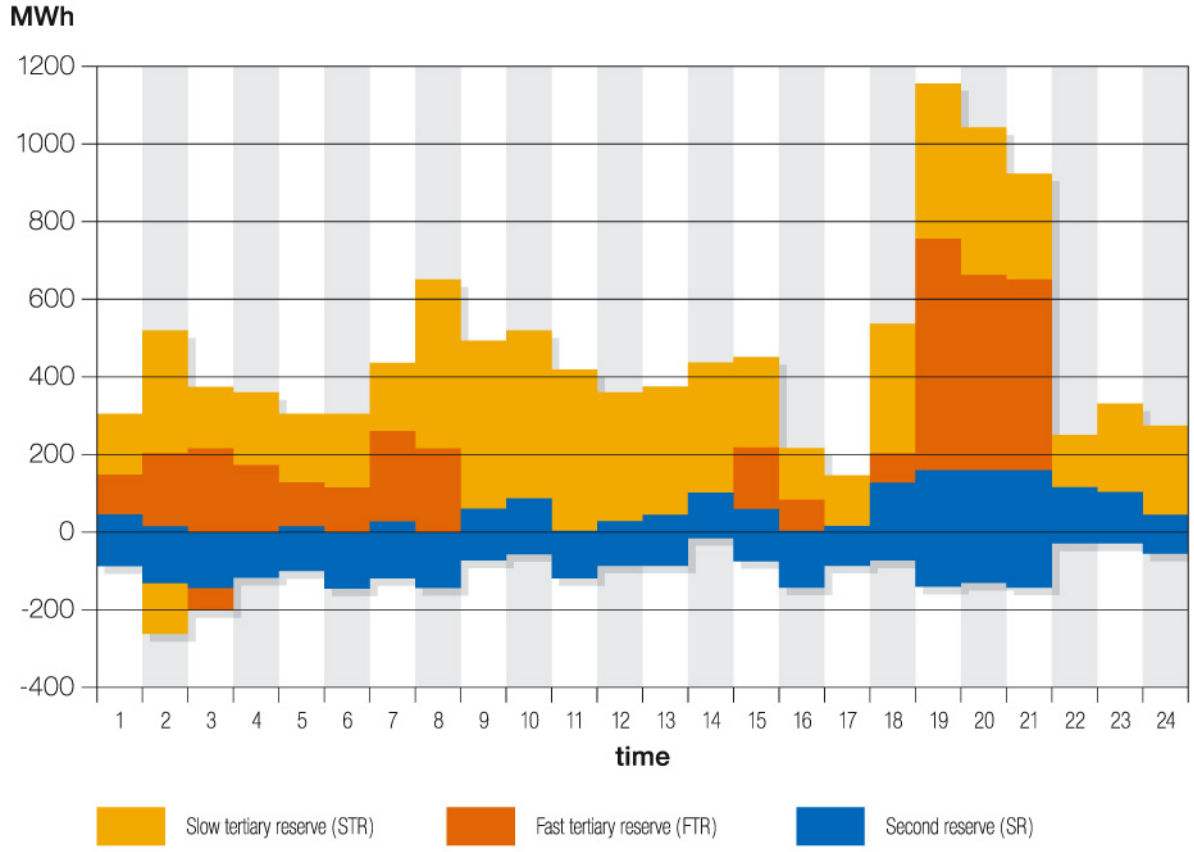


Figure 12 Balancing Energy by type



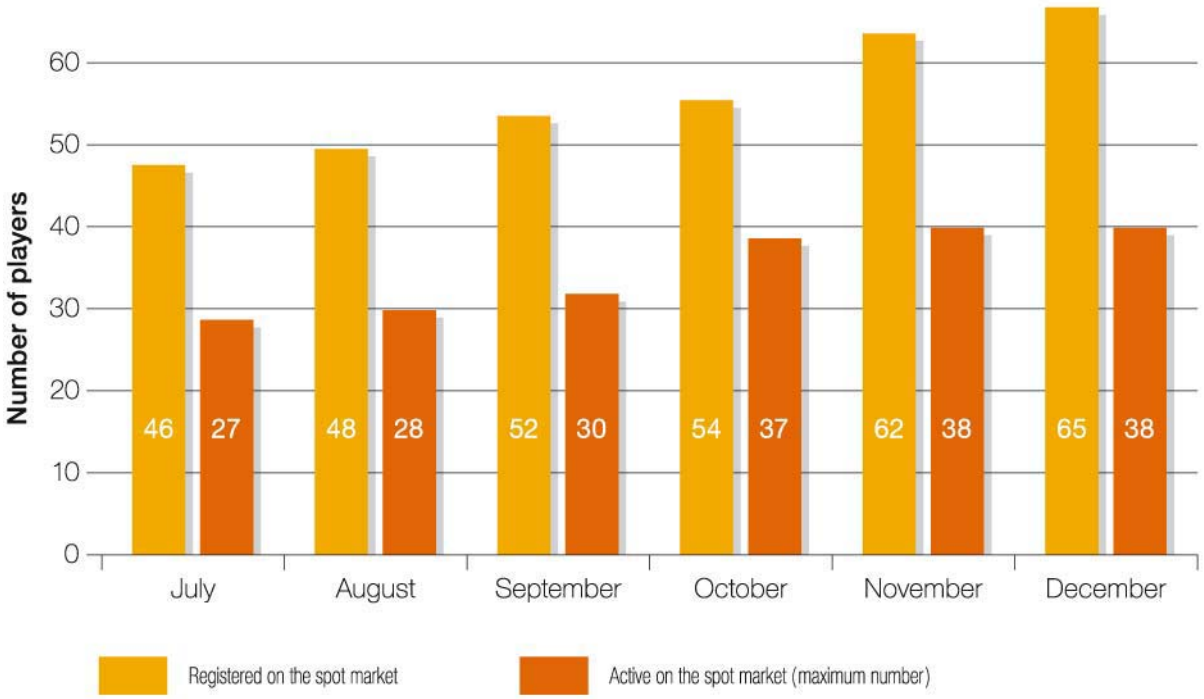
The development of the Balancing Market begun in practice in January 2005, when the first version of the schedule software was deployed.
Since the first version of the first software was delivered, people from Balancing Market made a constant effort to correct and improve the functionality on one hand, and to train the market participants representing on the other hand.
The Balancing Market had a training period, in witch the transaction quantities increased with constant rate, and every participant was advised to submit the required data into the Balancing Market systems.

Market development trends

a). Day-Ahead Market (DAM) Liquidity Parameters

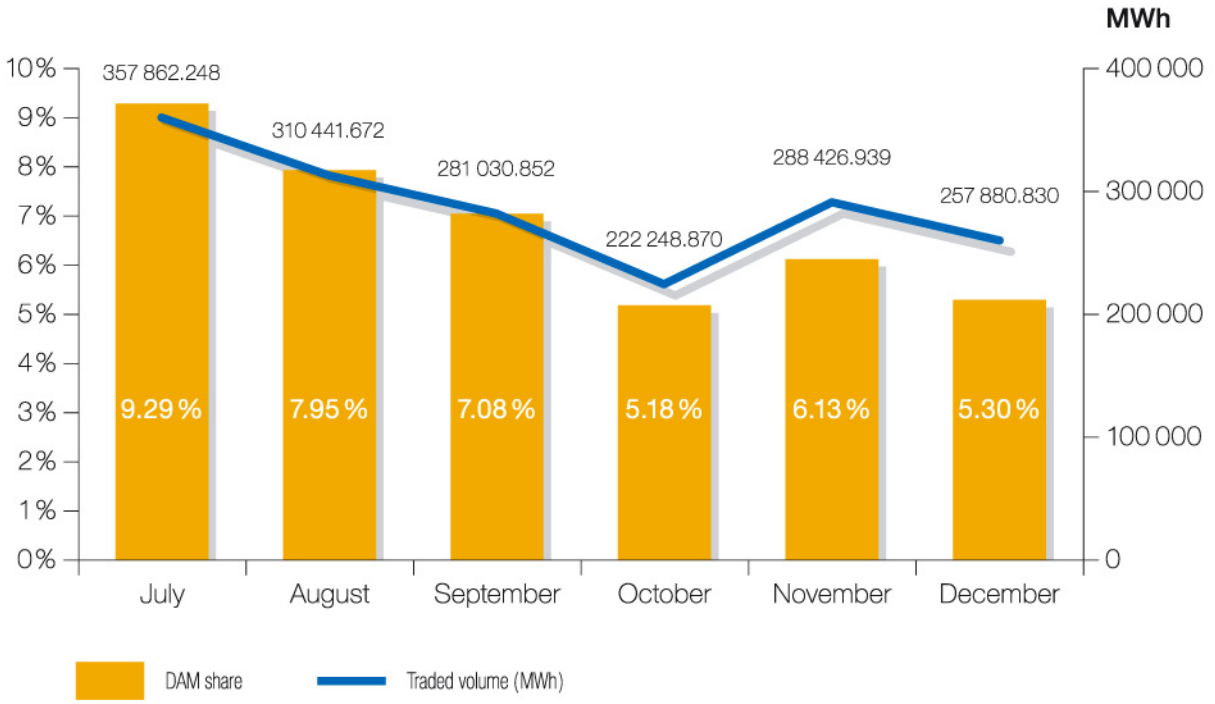
Number of players - The number of DAM participants constantly grew up, starting with 48 participants in the first stage of day-ahead market operation (July 2005) and reaching at the end of 2005 the amount of 65. The best signal as product efficiency is the permanent interest of participants expressed by an average number of 30 participants daily trading whichever the total traded volumes there are.

Figure 13 Participant Number Development. Registration and interest in DAM



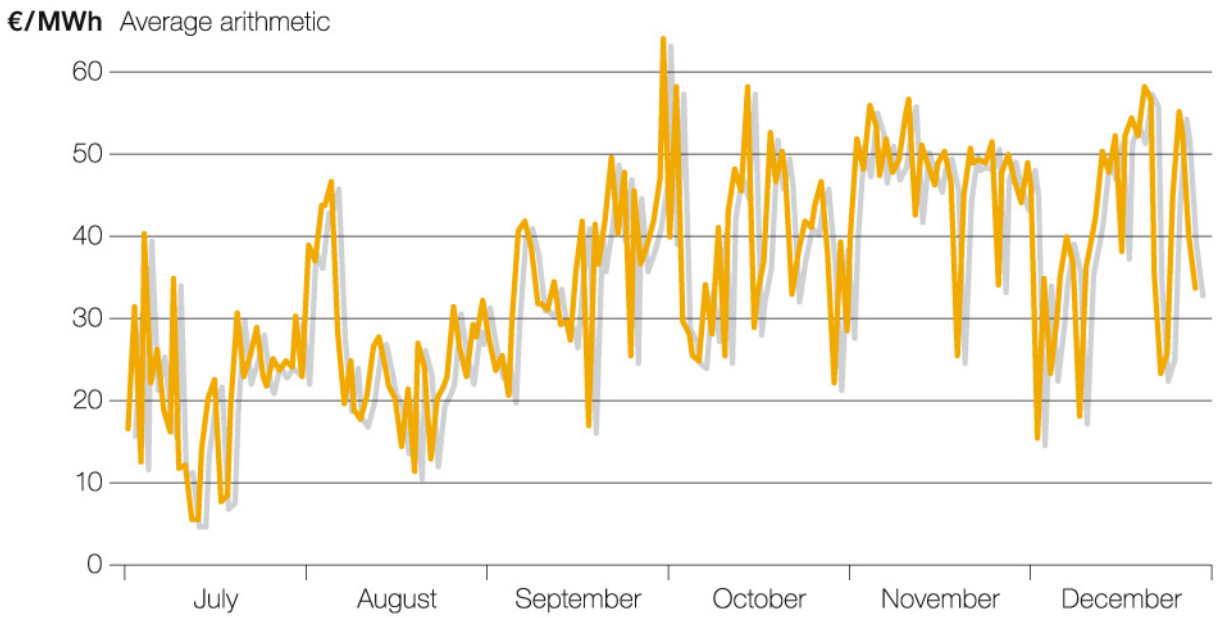
Volumes - It is probably too early to conclude about the volumes and quota evolution, the yearly cycle not being closed, because this evolution could be influenced by seasonality, needs or opportunities. An insufficient volume may be a sign of an illiquid market. It isn't the case of Romanian DAM which the results place it in the medium liquidity area of the European power exchanges, after North Pool - Oslo, EEX - Leipzig, APX - Amsterdam and Powernext - Paris. Anyhow, the level of the traded volumes and related quota still can be improved and OPCOM is in ongoing process to deal with reasons that hinder the volumes to grow up.

Figure 14 Trades Evolution. DAM Share in Domestic Consumption



Market price fluctuations - Generally speaking, DAM price should be well correlated with the price of the predominant fuel type used in generation for each different month of the year. Thus hydro energy / thermal energy (based mainly on coal), used principally in Romania, induced seasonal variations in linear medium term trends in Romanian prices. Last period, the OPCOM market clearing price was placed at a lower level among the European prices, the Romanian generation not being as dependent on gas as other European countries generation.

Figure 15 Price Volatility Evolution



b). Balancing Market:
As a first step after the electricity legislation was approved, Transelectrica created a new department responsible with the Balancing Market activities. This department was equipped with the necessary means according to the latest European requests.
The next step was to invite all the Romanian societies who owned a license in the electricity domain (traders, producers, and suppliers) to register as an active participant according to the recent approved legislation.
The invitation had a positive reaction from the license owners and the registration process begun. Till now, there are 52 registered Romanian Balance responsible Parties, 4 foreign Balance Responsible Parties, and 21 producers, all active on the market.
The imbalances dropped down constantly, excluding the flood period.

c). Green Certificates Market (GCM) Figures

The number of green certificates traded through this centralized market grew month by month, reaching at the beginning of 2006 the impressive amount of 5,997.

d). Bilateral Contracts Market (BCM) Figures

The total amount traded on the bilateral contract market organized by OPCOM was up to 554,392 GWh against the offered quantity of 3,199.208 GWh. Since 8 December until the end of 2005 for the traded quantity have been concluded 9 bilateral contracts which strictly complied with the provisions of the contracts published together with the sell offers.

SI Environmental requirements

In the national energy plan, the wind energy is foreseen in the next 10 years of total capacity around 200 MW.
The new interconnection lines (2x400 kV) between Hungary and Slovenia and 2x400 kV line between Slovenia and Italy are planned – to solve the congestions on the Italian border.

SK Electricity market organization

In Slovak Republic there is no Power Exchange. SEPS, a.s. as Slovak TSO is responsible for short term balance of the system and imbalances accounting according to the new Energy Act.

Legal issues

The mission of SEPS, a.s. is to ensure electricity transmission from the main producer to customers in Slovakia, as well as electricity imports, exports, and transits via the Slovak territory.

In October 2004 the new energy legislation package (The Energy Act, The Heat Delivery Act and The Regulation Act) was adopted by the Parliament. These acts came into force on 1st of January 2005. The need of these laws arose from the necessity of harmonisation of national legislation with the EU legislation.

The Energy Act redefined competences of individual decision makers. Responsibilities of the Ministry of Economy are namely authorisation to build new capacities, imposing obligations in general interest and elaborating The Energy Policy and its regular update. Its competence is also to monitor the respecting of the security of electricity supply.

Operation of issuing the permissions to run a business in power industry, price regulation and approval of cross-border capacity allocation methods become among main responsibilities of the Regulatory Authority. This Authority also issues certificates of origin for electricity produced in renewable energy sources, monitors the respecting the rules for

operation of energy market and lays down quality standards of delivered goods and provided services.

In the connection to laws mentioned before, there were resolved several important documents in the first half of year 2005, inter alia Ordinance of the government of the Slovak Republic No. 124/2005, which lays down rules for electricity market and Edict No. 337/2005 of Ministry of Economy. This lays down details of scope of technical requirements and rules for connection and access to the grid and for operation of the system.

SEPS, a.s. shall elaborate and publish documents, which are in connection to the secondary legislation. Namely:

- Technical requirements of SEPS, a.s. for the connection and access to the grid and rules for system operation,
- Trading Code of SEPS, a.s.

Technical requirements for the access and connection to the system and the grid and rules for operation of the system and the grid (Technical requirements) were elaborated and published by SEPS, a.s on its internet site on 30th of September 2005. Technical requirements came into force on 1st of November 2005, are available at www.sepsas.sk and according to the Energy Act is this document obligatory for all electricity market participants.

The Trading Code of SEPS, a.s. comprises trading, organisation and competence conditions for electricity market. During 2005 this document was elaborated by SEPS, a.s. and after approval by Regulatory Authority comes into force from 1 January 2006. The document is available at www.sepsas.sk .

In 2005 in accordance with the new Energy Act, the new Energy Policy of the Slovak Republic was processed and approved in January 2006. It includes, besides others, the environment protection and energy savings.

Management on interconnections

Slovak Republic is via 400 kV and 220 kV lines connected with all the neighbouring countries, except of Austria. Due to its geographic location the Slovak Republic is significantly involved in electricity transits, especially in the north-south direction (from Poland to Hungary), as well as in east- west direction.

Cross-border allocation capacity mechanism varies in different border profiles. The SEPS, a.s. practiced in 2005 with its partner from Czech Republic yearly and monthly auctions as well as day-ahead capacity allocation. With the Hungarian partner there were in use the yearly and monthly auctions, with the Polish and Ukrainian TSO the yearly, monthly and daily one-way auctions.

In late 2005 SEPS, a.s. decided of joining coordinated auctioning system within the Central Europe region in cooperation with VET, E.ON, PSE and CEPS. Since 1st January 2006 there are realised co-ordinated yearly, monthly and daily auctions on all profiles in the region.

Deregulation of the electricity market

The Energy Act (Act. No. 656/2004) and amendment of the Regulation Act (Act. No. 658/2004) reflect relevant EU Directives (2003/54/EC, 2001/77/EC) to the full extent. These acts came into force on 1st of January 2005.

According to the new Energy Act since 1st of January 2005 electricity market is opened for eligible customers (all customers except households) in compliance with Directive 2003/54/EC.

In 2005 the Regulatory Authority regulated eletricity prices for the households. Since 1st of January 2005 price of electricity supply of dominant producer is no longer regulated, however ancillary services are further regulated

APPENDIX

APPENDIX 1

Table A/1	UCTE – Power balance retrospect 2005, power data											GW
	Net values at the reference time 11 :00 of each 3rd Wednesday of each month											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
National generating capacity												
hydro power stations	133.7	134.0	134.3	134.4	134.5	134.6	134.4	134.3	134.6	134.7	134.7	134.7
nuclear power stations	113.1	113.1	113.1	113.1	112.7	112.7	112.7	112.7	112.7	112.8	112.8	112.7
conventional thermal power stations	314.7	315.6	315.4	315.9	316.2	316.8	316.8	318.3	319.7	320.6	321.5	322.6
renewable energy sources	34.6	35.1	35.5	36.1	36.6	36.8	37.4	38.1	38.5	39.1	39.4	39.9
not clearly identifiable energy sources	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.3	1.3	1.3	1.3	1.4
National generating capacity	**597.5**	**599.3**	**599.8**	**601.0**	**601.4**	**602.4**	**602.7**	**604.6**	**606.8**	**608.5**	**609.7**	**611.3**
non-usable capacity	106.7	100.7	114.3	113.6	112.4	120.8	120.9	126.0	119.1	118.9	112.3	110.0
overhauls (thermal power stations)	12.2	17.2	29.8	48.3	56.2	51.7	42.9	44.6	47.0	33.7	25.8	11.8
outages (thermal power stations)	11.9	16.9	15.1	14.3	19.3	18.6	24.5	23.4	19.3	18.7	18.0	22.3
system services reserve	32.0	29.9	32.6	30.0	28.8	25.7	29.5	29.4	27.7	28.3	27.6	27.0
Reliable Available Capacity	**434.7**	**434.7**	**408.1**	**394.7**	**384.8**	**385.7**	**384.8**	**381.1**	**393.7**	**408.9**	**426.0**	**440.3**
Load	**361.6**	**359.9**	**328.8**	**322.6**	**310.1**	**313.8**	**315.5**	**276.6**	**309.4**	**324.1**	**342.6**	**369.5**
margin against the monthly peak load	**33.9**	**34.5**	**51.7**	**22.1**	**24.0**	**26.7**	**20.0**	**47.0**	**23.2**	**24.7**	**47.8**	**28.9**
Remaining capacity without exchanges	**73.1**	**74.7**	**79.2**	**72.1**	**74.7**	**71.9**	**69.3**	**104.5**	**84.3**	**84.8**	**83.4**	**70.8**
Physical exchanges												
Import	**39.9**	**44.7**	**43.9**	**41.2**	**34.8**	**41.0**	**40.2**	**34.3**	**37.9**	**39.9**	**42.1**	**39.5**
Export	**33.5**	**34.4**	**38.8**	**35.5**	**28.9**	**32.5**	**32.4**	**31.1**	**30.5**	**34.8**	**35.6**	**31.3**
Physical exchanges balance	**6.4**	**10.3**	**5.2**	**5.8**	**5.9**	**8.5**	**7.8**	**3.1**	**7.3**	**5.1**	**6.5**	**8.2**
Remaining capacity with exchanges	**79.5**	**85.0**	**84.4**	**77.9**	**80.6**	**80.4**	**77.1**	**107.6**	**91.6**	**89.9**	**90.0**	**78.9**

APPENDIX 2

Table A/2	UCTE – Power balance retrospect 2005, energy data																						TWh
	BE	DE	ES	FR	GR	IT	SI	HR	MK	CS	LU	NL	AT	PT	CH	CZ	HU	PL	SK	BA	RO	BG	UA-W	UCTE
Generation																								
Hydro power stations	1.6	27.7	19.4	56.0	5.6	41.9	3.0	6.4	1.5	13.9	0.9	0.1	34.2	4.9	32.7	3.0	0.2	3.6	4.6	6.0	19.9	4.7	0.1	291.9
Nuclear power stations	45.3	154.6	57.5	430.0	-	-	5.6	0.0	0.0	0.0	-	3.8	0.0	-	22.0	23.3	13.0	0.0	16.3	0.0	5.1	18.7	-	795.2
Conventional thermal power stations	33.6	358.9	158.1	58.9	43.3	240.8	4.6	4.6	5.0	27.5	3.1	88.4	18.4	32.9	2.2	49.9	17.4	140.2	5.5	6.6	29.8	20.9	8.0	1358.5
Renewable energy sources	2.0	40.1	28.0	4.3	1.1	6.9	0.0	0.0	0.0	0.0	0.1	3.9	0.0	3.9	0.935	0.1	1.4	0.2	0.0	0.0	0.0	0.0	0.0	92.9
Not clearly identified sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.6	0.0	2.7	0.0	0.0	0.0	0.0	8.5
TOTAL	**82.5**	**581.3**	**263.1**	**549.2**	**49.9**	**289.6**	**13.3**	**11.0**	**6.5**	**41.4**	**4.1**	**96.2**	**57.8**	**41.7**	**57.9**	**76.2**	**32.6**	**144.0**	**29.1**	**12.6**	**54.8**	**44.3**	**8.1**	**2547.0**
Exchanges	**6.2**	**-8.5**	**-1.4**	**-60.2**	**3.8**	**49.0**	**-0.2**	**5.2**	**1.7**	**7.2**	**3.3**	**18.3**	**2.7**	**6.8**	**7.8**	**-12.6**	**6.2**	**-11.2**	**-2.7**	**-1.4**	**-2.9**	**-7.6**	**-3.7**	**5.5**
Import	14.2	53.4	6.5	8.1	5.6	50.1	9.3	8.8	1.7	8.5	6.4	23.7	20.3	9.6	37.6	12.4	15.6	5.0	8.6	1.1	1.6	0.0	1.8	309.8
Export	8.0	61.9	7.9	68.3	1.8	1.1	9.5	3.6	0.0	1.3	3.2	5.4	17.6	2.8	29.8	25.0	9.4	16.2	11.3	2.5	4.5	7.6	5.5	304.3
Pumped storage	1.8	9.2	15.8	6.6	0.8	9.3	0.0	0.1	0.0	1.0	1.1	0.0	3.3	0.6	2.6	0.9	0.0	2.2	0.1	0.0	0.0	0.5	0.0	56.0
Consumption	**86.8**	**563.5**	**245.7**	**482.4**	**52.9**	**329.4**	**12.8**	**16.7**	**8.1**	**43.6**	**6.2**	**114.6**	**57.1**	**48.0**	**61.2**	**62.7**	**38.8**	**130.6**	**26.3**	**11.1**	**51.9**	**36.6**	**4.4**	**2491.5**

APPENDIX 3

The following tables show the main grid developments in the different UCTE countries.

Country	Line or Equipment name	Voltage level	Commissioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines, …)
BA	Kakanj - Prijedor	220	Dec. 2005	Single circuit line. This line was damaged during the war.
BE	Second circuit of the line Avelgem-Avelin	380	27.11.2005	Second circuit, 23 km, AC line
BE	Koksijde	150/36	15.11.2005	Additional transformator
BE	Zeebrugge	150	09.02.2005	GIS station
BE BE	Cable Izegem-Oostrozebeke	150	28.04.2005	AC cable, 8.1 km
BE	Aubange	220/150/15	06.07.2005	New transformator replacing an existing one
BE	Second circuit of the line Baisy-Thy-Corbais	150	01.03.2005	Second circuit, 13.3 km, AC line
BE	Second circuit of the line Beerst-Koksijde	150	01.06.2005	Second circuit, 15 km, AC line
BE	Awirs	220/70	12.09.2005	Additional transformator
CH	Commissioning of the “Bernina” line with the T-connection Sils/Pradella – Gorlago and the circuit Filisur – San Fiorano	380	Jan. 2005	AC double circuit line in 380 kV operation
CH	Commissioning of the station Robbia positioned between the existing stations Sils, Filisur and Pradella on the one side and Gorlago and San Fiorano on the other side	380	Oct. 2005	Station in 380 kV operation. The commissioning of the station Robbia led to a topology change on the route of the “Bernina” line. The following circuits have been thus created: Filisur – Robbia ; Sils/Pradella – Robbia ; Robbia – Gorlago ; Robbia – San Fiorano

CH	Commissioning of the "Nufenen" line between. All' Acqua and Ulrichen	380	Oct. 2005	AC double circuit line in 220 kV operation. Using this line topological changes have been introduced resulting in the creation of the T-connection: Fisch/Airolo – Ponte and the circuit Mörel - Airolo
CS	Sremska Mitrovica-Ugljevik	380	28.12.2005	Single line, AC, l=35km
CZ	Cebin T401	400/110	20.09.05	new 350 MVA transformer
DE	Connection Eula	380	26.10.2005	Double circuit, < 1 km, AC
DE	Connection Weida	380	23.11.2005	Double circuit, 2 km, AC
DE	Röhrsdorf – Weida	380	23.11.2005	Upgrading of an AC- circuit from 220 auf 380 kV, 61 km
DE	Connection Schönewalde	380	30.11.2005	Double circuit, < 1 km, AC
DE	Connection Großschwabhausen	380	19.12.2005	Single circuit, 4 km, AC
ES	E/S Morella L/Aragón – La Plana	400	21.03.2005	0,469 km
ES	E/S Olmedo L/Mudarra - Lastras	400	03.09.2005	0,562 km
ES	E/S La Espulga L/Ascó - Begues	400	03.06.2005	2 x 1,46 km
ES	L Sentmenat – Can Barba 2	400		0,2 km
ES	E/S La lora L/Barcina - Herrera	400	17.11.2005	0,8 km
ES	E/S Rubió L/Pierola - Pobla	220	13.03.2005	2 x 0,2 km
ES	E/S Júndiz L/Mercedes - Puentelarrá	220	31.03.2005	2 x 0,105 km
ES	E/S Camino Fregacedos L/Moraleja – T Fortuna I	220	13.04.2005	2,4 km
ES	E/S Polígono L/Los Ramos - Tajo	220	03.05.2005	2 x 4,35 km
ES	E/S Aljarafe L/Quintos – Santiponce	220	17.05.2005	2 x 0,455 km
ES	L Cartelle - Frieira	220		18,5 km
ES	E/S Chantada L/Belesar - Castrelo	220	Dec. 2005	2 x 2,25 km
ES	L San Sebastián de los Reyes - AENA	220		3,5 km
ES	E/S Vilafranca L/Constantí - Viladecans	220	Dec. 2005	2 x 0,082 km

ES	E/S Olivares L/Atarfe - Guadame	220	11.11.2005	2 x 8,18 km
ES	E/S Riera L/Sentmenat – Sant Fost	220		2 x 0,25 km
ES	E/S Fuenlabrada L/Moraleja - Retamar	220		2 x 0,4 km
ES	E/S Vall d'Uxó L/La Plana - Sagunto	220	28.12.2005	0,8581 km
ES	E/S Pinto L/Aceca - Villaverde	220		2 x 0,6 km
ES	L / Norte - Hortaleza	220		9,6 km
ES	L / Cartuja – Puerto de Santa María	220		17,7 km
ES	L / Hospital - Motors	220		7,4 km
ES	E/S Tánger L/Besós Nuevo - Mata	220	18.12.2005	0,6 km
ES	E/S Torre del Segre L/Mangraners - Mequinenza	220	14.08.2005	2 x 0,047 km
ES	SE Espluga	400	10.07.2005	
ES	SE Lora	400	17.11.2005	
ES	SE El Cereal	400/220		600 MVA
ES	SE Torremendo	400/220		900 MVA
ES	SE Rubió	220	13.03.2005	
ES	SE Chantada	220	Dec. 2005	
ES	SE Villafranca	220	Dec. 2005	
ES	SE Polígono	220	03.05.2005	
ES	SE Aljarafe	220	17.05.2005	
ES	SE Olivares	220	11.11.2005	
ES	SE Amorebieta	220		
ES	SE Fuenlabrada	220		
ES	SE Vall d'Uxó	220	28.12.2005	
ES	SE Júndiz	220	31.03.2005	
ES	SE Camino de Fregacedos	220	13.04.2005	
ES	SE Tánger	220	18.12.2005	
ES	SE Sotonera	220	24.05.2005	
ES	SE Olmedo	400	03.06.2005	

ES	SE Guadame	400/220	14.06.2005	600 MVA
ES	SE Guillena	400/220	23.06.2005	600 MVA
ES	SE Rubió	220	13.03.2005	
ES	SE Morella	400	21.03.2005	
ES	SE Torre del Segre	220	14.08.2005	
ES	SE Puerto de Santa María	220	24.07.2005	
ES	SE La Rabosera	220	04.08.2005	
ES	SE Castelnou	400	06.10.2005	
ES	SE Puente de la Princesa	220	18.10.2005	
ES	SE Belchite	220	22.11.2005	
ES	SE Santo Cristo	220	28.11.2005	
FR	AVELGEM-AVELIN 2	400	Oct. 2005	Length of the line: 19.6 km
FR	AVELGEM-MASTAING 1	400	Nov. 2005	Length of the line: 0.5 km
FR	LONNY-MASTAING 2	400	Nov. 2005	Length of the line: 0.5 km
FR	CANTEGRIT-SAUCATS 2	400	Oct. 2005	Length of the line: 71.9 km
FR	CANTEGRIT-SAUCATS 3	400	Dec. 2005	Length of the line: 71.8 km
GR	HT s/s MAGIKO	150	10.03.2005	NEW SUBSTATION
GR	HT s/s SAPKA	150	28.05.2005	NEW SUBSTATION
GR	HT s/s ANDROS	150	04.07.2005	NEW SUBSTATION
GR	EHT s/s ENTHES	400	22.07.2005	NEW POWER PLANT CC–NATURAL GAS
GR	HT s/s DIDYMA	150	25.09.2005	NEW SUBSTATION
GR	HT s/s PANACHAIKO	150	19.12.2005	NEW SUBSTATION
GR	EHT s/s TRIKALA	400	30.06.2005	AUTOTRANSFORMER 280MVA
GR	EHT s/s THESSALONIKI	400	02.07.2005	AUTOTRANSFORMER 280MVA
IT	Feroleto-Rizziconi	380		Single line 68 Km
IT	Gorlago-Robbia	380		Dual _line 118 km
IT	S.Fiorano-Robbia	380		Dual-Line 57 km
IT	Pian della Speranza-Montaldo	380		Single line 117 km
IT	Suvereto-Valmontone	380		Single line 270 km
IT	Altomonte-Feroleto	380		Single line 108 km
IT	Other 380 kV lines	380		For a total of 340 km
IT	Vellai-Linz	220		Single line 140 km
IT	Airolo-Fiesch	220		Single line 59 km
IT	Other 220 kV lines	220		For a total of 120 km

IT	150/132 kV lines	120/132		45 lines
IT	150/132 kV lines	120/132		45 lines
IT	S/E substation	380		Four substation
IT	S/E substation	150		Four substation
IT	Transformer	380/150-132		Total capacity of 1250 MVA
IT	Transformer	220/132		Total capacity of 570 MVA
IT	Capacitor banks	-		Total of 330 MVAr
PL	Tarnów – Krosno Iskrzynia	400	Dec. 2005	new single line
RO	Sibiu Sud Transformer	400/110	25.11.2005	250 MVA
SK	Choke coils	10,5	Nov. 2005	2 x 45 MVAr (new)
SK	Substation Stupava	220	March - April 2005	reconstruction
SK	Line V 273	220	Nov. 2005	exchange of wires

End of document

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