UCTE POWER BALANCE

RETROSPECT 2001

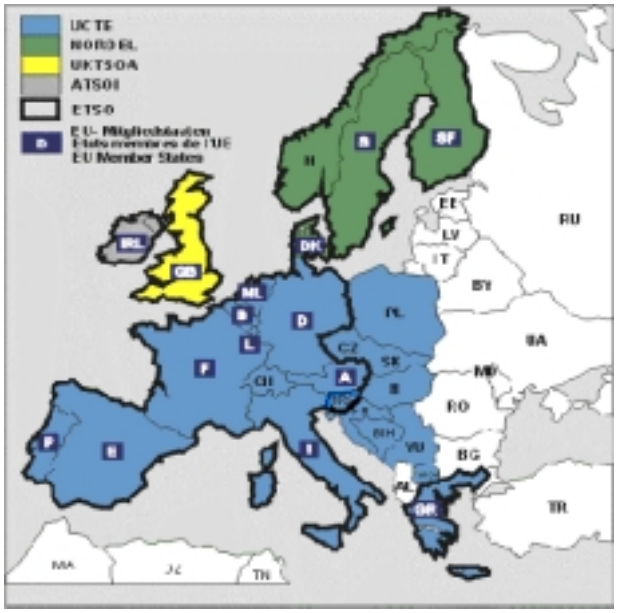
Union for the Co-ordination of Transmission of Electricity
May 2002

WHAT IS THE UCTE ?

The Union for the Co-ordination of Transmission of Electricity (UCTE) co-ordinates the interests of transmission system operators in 20 European countries. Their common objective is to guarantee 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, 400 million people are supplied with electric energy; annual electricity consumption totals approx. 2100 TWh.
As of July 2001, in accordance with the new Articles of Association, the member companies of the UCTE come from the following countries :

B	Belgium	BiH	Bosnia-Herzegovina
D	Germany	L	Luxembourg
E	Spain	NL	The Netherlands
F	France	A	Austria
GR	Greece	P	Portugal
I	Italy	CH	Switzerland
SLO	Slovenia	CZ	Czech Republic
HR	Croatia	H	Hungary
YU	Federal Republic of Yugoslavia	PL	Poland
FYROM	Former Yugoslav Republic of Macedonia	SK	Slovakia

With regard to the other members of the ETSO (European Transmission System Operators, 35 Transmission System Operators in 17 countries), the geographical extension of UCTE is represented in the picture below :



Optimum 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 in the future to set standards in terms of security and reliability 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 preserving the system security.

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.

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Executive summary

The UCTE Energy and Power Balance retrospect aims at :

- providing all players on the European power market with an overall overview of the operational conditions of the year 2001;

- identifying the trends which affect the UCTE system and their possible influence on system security in the medium term.

Energy balance

The most significant results of the energy balance concern the high level of demand, the increase of the generation issued from renewable energy sources, and the development of international exchanges.

- During the year 2001, the total consumption in the UCTE system reached, 2163.4 TWh, that means a 2.4% increase compared with 2000. This ratio is due to the general economic conditions of this year, as well as to the cold period which affected the whole system at the end of the year.
  In some countries the increase rate is higher than 5%: Spain, Greece, Portugal, Slovenia, Croatia.

- Concerning generation, a significant increase in hydro-generation - +11.3% - has to be noticed, as well as an increase of 22% in the generation from new renewable energy sources (wind, biomass, photovoltaics…) which represents 20TWh (i.e. about 1% of total generation).
  During this year, generation from renewable energy sources (hydro generation included) represents 16,4% of the total consumption compared to 15.2% for the previous year. This is to be compared with the average objective of 22% in 2010 fixed by the European directive 2001/77/EC of September 27th 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.

- If the balance of exchanges with non - UCTE countries is stable compared to previous year and represents only 5 TWh, international exchanges inside UCTE reached a total amount of around 260 TWh, compared to 240 TWh in 2000.

Power balance

The most interesting aspects of the Power Balance Retrospect concern the figures for the month of December which correspond to a period where a cold wave affected the whole Europe. During this period, prices on the various markets (LPX, APX, Powernext, …) reached extremely high levels with a peak on December the 17th.

The analysis of the answers of the UCTE correspondents shows that in such cases, there is a strong correlation of the load in the various countries for a large part of the European system.
Thus it has to be noticed that the maximum load in 2001 has been observed on December the 17th in the following countries: Belgium, Germany, Spain, France, Croatia, Luxembourg, Portugal ; in most of these countries, peak load has been observed between 6 and 7 p.m..
Another interesting day is December the 13th ; at this time maximum load has been observed in Slovenia, Czech Republic, Poland, Slovak Republic.

The data collected in December corresponds to the 19th at 11 a.m. At this time the prices on the markets were still high, even if they were lower than on December the 17th.
The analysis of the power balance at this time shows that the remaining capacity in the whole UCTE was of 43.2 GW, compared to a load of 336.4 GW. UCTE was in addition importing 7.8 GW from non UCTE countries. This synchronous load is however lower than the highest value observed during this period. This value is not is not known from the UCTE statistics but we know for each country from the correspondents the margin between this synchronous load and the peak load observed during the month, which for most of them occurred on December the 17th or on December the 13th.

The sum of these margins against peak load is 39 GW. Thus, the remaining capacity at peak load should have been between 43 GW and 4 GW (i.e. the difference between the remaining capacity at the reference load - 43 GW - and the sum of the margin against peak load - 39 GW -).

Considering the non simultaneity of the peak in the different countries, we can estimate on the basis of the data available that the peak load on December the 17th was around 20 GW higher than the synchronous load at 11 a.m. on December the 19th. It can be reasonably concluded that the remaining capacity at the peak time, when market prices reached extremely high levels, should have been of 25 GW, which means around 5% of the total generating capacity.

It should be reminded that a margin of 5% is considered as the minimum level of margin required by power station operators to guarantee the reliability of supply to their clients, and compensate, for instance, long duration power plant failures or high levels of demand.

In addition it has to be noticed that:
- when for the whole UCTE this margin was around 5%, it was less than 5% in some parts of the UCTE system;
- moreover, the climatic conditions were not extremely cold, as the average temperature in the UCTE countries was only 5 °C lower than the temperature in normal conditions. In case of lower temperature, the total consumption should increase of many GW reducing, consequently, the power margin in the same proportion.

In conclusion, during this period the power margins reached in some parts of the system values lower than the limit which is considered as necessary to ensure the security of supply, although the climatic conditions were not exceptional.

1. Introduction

1.1 Objectives

The present report contains a retrospect of power and energy balances in UCTE countries in 2001. The total results of the retrospect, comments on the results and the notes of national correspondents are presented in the report.

In response to developments in the European electricity market, the UCTE introduced in 2000 fundamental methodology changes in the preparation of the Power balances.

With the unbundling of production, transmission and distribution operations, which has either taken effect or is in progress in all European countries, the UCTE became an association of transmission system operators with effect from 1st July 1999.

The UCTE Power balance Retrospect aims at:

- providing all players on the european power market with an overall overview of the operationnal conditions of the year 2001;

- identifying the trends which affect the UCTE system and their possible influence on system security in the medium term.

1.2 Content of the balance

The retrospect for 2001 includes balances for the following countries and electricity systems:

B	Belgium	**BiH**	Bosnia-Herzegovina
D	Germany [1]	**L**	Luxembourg
E	Spain	**NL**	The Netherlands
F	France	**A**	Austria
GR	Greece	**P**	Portugal
I	Italy	**CH**	Switzerland
SLO	Slovenia	**CZ**	Czech Republic
HR	Croatia	**H**	Hungary
YU	Federal Republic of Yugoslavia	**PL** [2]	Poland
FYROM	Former Yugoslav Republic of Macedonia	**SK**	Slovakia

[1] At the time of data collection for the 2001 Energy Balance Retrospect (date: March 5, 2002), there were no data available from the official statistics. The values given here have been based on projected provisional statistics which will be successively replaced by official statistics during the year 2002. Consequently, the values given in the report may still differ from actual results.

[2] At the time of data collection for 2001 Energy Retrospect (date:March5,2002) there were no data available from the official statistics. The values given here have been based on technical operating data and they all are gross values, so the values given in the report may still differ from actual official statistics.

In order to allow the simultaneous consideration of capacity being operated in parallel at the same frequency in the various member countries, the third Wednesday of each month at 11:00 a.m. (Central European Time) has been selected as the reference point for the balance.

For statistical reasons, data on electricity supplies in a number of countries have not been recorded in full. Depending upon the country concerned, the sectors included in this analysis represent between 85 (the Netherlands) and 100% of total consumption.

In order to ensure the coherence of the power and energy balances, the retrospect for the energy balance generally relates to the same statistical base as the power balance.

All data indicated in the power and energy balances are net values.

Regarding the representativeness of the power balance, it should be noted that the latter provides an instantaneous picture of the structure of production and consumption in the UCTE interconnected network.

2. Summary of results

In the following tables, retrospective data for 2001 are compared to the results of the 2001 forecast and of the 2000 retrospect.

The main overall results of the power balance are shown in Table1. Values are given in GW.

Table 1	UCTE - power balance, Retrospect 2001	Results in GW

	December 2000 [3]	December 2001	Changes (GW) 2000-2001	Changes % 2000-2001
National generating capacity	510.2	513.3	3.1	0.6
Guaranteed capacity	371.2	379.6	8.4	2.3
Load at 11:00 a.m.	312.7	336.4	23.7	7.6
Balance of physical exchange	- 1.3	7.8	9.1	-
Remaining capacity, with exchange	57.2	51.0	- 6.2	- 10.8

[3] These figures are different from the figures of the Retrospect 2000 because of the difference in representativeness of data from The Netherlands

In the UCTE, the results of the "Power Balance - Retrospect for 2001" for the month of December show an increase in the generating capacity (0.6%) and the guaranteed capacity (2.3%) in comparison to the previous year.

The reference load has increased by a more important proportion (7.6%).

The remaining capacity, including the physical exchanges has decreased by 10.8%.

The main overall results of the Energy Balance are summarised in Table2.

Although hydroelectric power is a renewable energy source (according also to the definition from relevant EU Directive no 2001/77/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.

According to the UCTE Power Balance methodology, "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:
1. wind energy,
2. photovoltaics/solar energy,
3. geothermal energy,
4. energy from biomass and waste (e. g. biogas, damp gas, municipal waste, industrial waste, wood and waste of wood).

In 2001, total production in the UCTE showed a 48.7 TWh increase compared to 2000 (+2.6%). The increase in the UCTE consumption is in the same proportion and accounts for 51 TWh (+2.4%)

Production from hydroelectric plants showed a significant increase, +34 TWh i.e. +11.3%, essentially due to the exceptional hydro conditions in the continental Europe in the beginning of 2001, while production from nuclear plants has increased by 1.8% (13.3 TWh).

Table 2	UCTE - energy balance, Retrospect 2001	Results in TWh

	Situation 2000 [3]	Situation 2001	Change in situation 2001 %
National generating: hydro power stations	300.5	334.5	11.3
National generating: nuclear power stations	731.1	744.4	1.8
National generating: conventional thermal power stations	1105.3	1102.3	- 0.3
National generating: renewable energy sources	17.1	20.8	21.7
National generating: not clearly identifiable energy sources	2.5	4.8	92.0
National generation	**2157.9**	**2206.6**	**2.6**
Physical exchanges balance (import-export)	- 6.6	- 5.3	- 18.2
Pumped storage	- 38.6	- 38.0	- 1.6
Consumption	**2112.4**	**2163.4**	**2.4**

[3] These figures are different from the figures of the Retrospect 2000 because of the difference in representativeness of data from The Netherlands

Production from renewable sources has increased by 21.7% when compared to 2000 situation, but significantly less than expected. This production (without the contribution of hydro power production) represents less than 1% of the total consumption. If the hydro power is taken into account, the total renewable production reach 355.3 TWh which represent 16.4% of the total consumption in 2001 for the UCTE.
This point has to be kept in mind when looking at the new European environmental requirements (Directive 2001/77/EC, September the 27th 2001, on the promotion of electricity produced from renewable energy sources) which ask for an average 22% of the total consumption satisfied by renewable sources.

3. Power Balance: Comments on results

3.1 National generating capacity

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

Movements in national generating capacity between December 2000 and December 2001 are shown in Table3.

No significant increases in generating capacity can be noticed in the UCTE (less than 1%). However in some countries changes occurred : this is the case in Spain (+ 1.1 GW) and Italy (1.1 GW).

Newly-commissioned conventional thermal capacity represents more than 230 MW in Austria and more than 200 MW in Belgium (where 385 MW new generating capacity has been in part balanced by 174 MW decommissioned).
In Croatia, a new CCGT power plant is in service since July 2001.
In Italy the new conventional thermal power plants represent 900 MW.
A 385 MW new conventional thermal power plant is in operation since October 2001 in Luxembourg.
In Poland, more than 370 MW of new conventional thermal power plants have been commissioned, mainly as a result of a modernisation, and more than 230 MW decommissioned.

Table 3 | **National generating capacity, Situation December 2001** | **Results in**

Country	Hydro power stations	Nuclear power stations	Conv. thermal power stations	Other sources	National generating capacity	Changes 2001/2000 GW
B	1.4	5.7	8.2	0.3	15.6	- 0.1
D	9.8	20.7	67.3	8.0	105.8	- 0.7
E	17.7	7.4	21.2	3.9	50.2	1.1
F	24.3	63.2	23.7	-	111.2	0.4
GR	3.1	-	6.3	0.2	9.5	0.1
I	20.3	-	54.4	1.1	75.8	1.1
SLO	0.8	0.7	1.2	-	2.7	0.0
HR	2.0	-	1.6	-	3.6	0.2
JIEL System	3.9	-	6.7	-	10.6	- 0.1
L	1.1	-	0.4	-	1.5	0.4
NL	0.0	0.4	17.3	1.7	19.4	- 0.2
A	11.2	-	5.6	0.0	16.8	0.2
P	4.4	-	5.1	0.2	9.7	0.0
CH	13.2	3.2	0.6	0.3	17.3	0.1
CZ	2.1	1.6	10.6	-	14.3	-
H	0.0	1.8	5.6	0.4	7.8	0.1
PL	2.2	-	31.2	0.0	33.4	0.1
SK	2.4	2.6	2.3	0.7	8.0	-
UCTE	**119.9**	**107.3**	**269.4**	**16.9**	**513.3**	**4.1**

For the Netherlands the generating capacity for the year 2000 had to be corrected, for the reason that the representativeness was brought from 75% for December 2000 to 100% for December 2001.
In Poland, more than 370 MW of new thermal capacity have been commissioned (mainly as a result of modernisation projects in existing power plants) and more than 230 MW decommissioned.

New renewable generating capacity has been commissioned in Italy (waste and wind, + 0.15 GW); wind power installations have been commissioned in various countries: in Spain approximately 1200 MW of new wind power plants have been commissioned in 2001, but are not taken into account in table 3, due to the voltage level of the grid to which they are connected.
In Germany 2.6 GW new renewable generating capacity has been commissioned in 2001.

At the end of 2001, the national generating capacity in the UCTE countries was 513.3 GW, which represent an increase of 3.1 GW compared to the previous year (+0.6%).
The generating plant mix and the increase in capacity are shown in Table4:

Table 4 | **Generating plant mix and changes in capacity** | **Results in GW**

	Capacity December 2000 GW	%	Capacity December 2001 GW	%	Changes 2001/2000 GW
Hydro power stations	119.1	23.4	119.9	23.3	0.8
Nuclear power stations	107.1	21.0	107.3	20.9	0.2
Conventional thermal power stations	271.2	53.3	269.4	52.4	- 1.8
Other sources	12.8	2.3	16.9	3.3	4.1
National generating capacity	**510.2**	**100.0**	**513.3**	**100.0**	**3.1**

A number of individual UCTE member countries have submitted detailed information which is relevant in the development of generating capacity:

E As far as conventional sources, there have been only enlargements of existent plants. Approximately 1200 MW of new small size wind power plants have been commissioned.
Because of the new environmental requirements and the favourable politics for renewable sources, the trend in the construction of new plants has shitfted to wind power and combined cycle plants. There are projects to construct 10.000 MW of combined cycles and 9.000 MW of wind plants until 2010.

GR A new conventional thermal power plant (combined cycle system) of 492 MW is under construction in the north of the Greece (KOMOTINI Thermal Power Plant).
- A remarkable increase in the number of renewable power plants (277 MW) installed by independent generators.
- The contribution of natural gas to the total generation is going to increase, as it is the fuel of the new conventional thermal power plant (combined cycle system) of 492 MW, which is under construction in KOMOTINI.
- Beyond the impact of reduced rainfalls to the availability of the hydropower capacity, also the liberalisation of the market renders this availability strongly dependent on the owner' s decision how to use it and therefore there is a great amount of uncertainty concerning the non-usable capacity related to hydro-power.
- The impact of the market deregulation in the values concerning the year 2001 is not important.

PL Several renewable sources (wind) have been built in 2001. Most of them are located in the north of Poland.

NL From the 1st of January of 2001 on, the co-operation between the four generating companies in The Netherlands within Sep expired and also their central guided production system and what's more the operational agreement between Sep and TenneT ended too.
Values in earlier power balance retrospect were based on the generation and consumption data of Sep. The values of this retrospect 2001 are national values or where appropriate professional based best estimates.

3.2 Unavailable capacity and reserves management

The generating capacity is not completely available. In the power balance unavailable capacity is divided into the following:
- non-usable capacity,
- capacity which is not available in thermal power plants as a result of overhauls or outages,
- reserve capacity for network services.

3.2.1 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 April (73.9 GW) and its highest value in August (90.3 GW). This represents a rate of between 14.3% and 17.5% of the total national generating capacity (516.0 GW in April and 514.4 GW in August).

Percentage figures for the various components of non-usable capacity in each country are shown in Table5. These components are different according to the generating plant mix.

Table 5 **Components of non usable capacity in June and December 2001**

Country	3rd Wednesday in June 2001		3rd Wednesday in December 2001	
	Hydro power stations	Thermal and other power stations	Hydro power stations	Thermal and other power stations
	%	%	%	%
B	n.a.	n.a.	n.a.	n.a.
D	n.a.	n.a.	n.a.	n.a.
E	65.0	35.0	62.0	38.0
F	48.0	52.0	65.0	35.0
GR	95.0	5.0	95.0	5.0
I	33.0	67.0	36.0	64.0
SLO	100.0		100.0	
HR	100.0		100.0	
JIEL System	70.0	30.0	65.0	35.0
L	n.a.	n.a.	n.a.	n.a.
NL		100.0		100.0
A	35.0	65.0	89.0	11.0
P	77.0	23.0	84.0	16.0
CH	98.0	2.0	99.0	1.0
CZ	25.0	75.0	15.0	85.0
H	3.0	97.0	5.0	95.0
PL	9.0	91.0	19.0	81.0
SK	62.0	38.0	69.0	31.0

B This information are commercially sensible and giving them for Belgium means giving them for the main producer. The figures in the annexed table A/1 represent an order of magnitude and not a precise value. The detailed values that should be mentionned in this table are not at disposal.

D According to the new methodology, the German TSOs do not collect detailed information on these items. As a result of statutory 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.

F The water availability observed in the first 8 months of 2001 was high. The annual energy capability factor in 2001 was equal to 0.93.

GR Low water reserves due to extremely bad hydro conditions. The energy capability factor ranges from 0.16 to 0.63 for the year 2001. The non-usable capacity is mainly due to the limited reservoir capacity. Due to the limited reservoir capacity the hydro production has been used just for covering the peaks of the load. Actually there was not a lack of capacity but there was a lack of energy. This lack of energy has been covered by imported energy.

I The end of 2001 has been marked by a very low rainfalls. This phenomena has caused a sensible decreasing in the energy capability factors.

SLO Hydro conditions in November and December 2001 were extremely dry, the hydro production was below normal.

A The energy capability factor of the run of river power stations was 1.11 for 2001 compared to 1.16 for 2000. The production was therefore higher than in average but nevertheless 5% less compared with last year.

3.2.2 Thermal power plant overhauls

Tabble6 shows the maximum and average capacity of plants in overhaul on the third Wednesday of the month in the UCTE countries. Since only a single reference point has been agreed for each month, it is not possible to provide an exact indication of overhauls completed in 2001 using data from the power balance only.

In the UCTE countries, non-available capacity due to overhauls reached a peak of 57.8 GW in May which this represents 15.4% of the generating capacity of thermal power plants for that month.

Table 6 | Characteristic values of overhaul programs in the UCTE | Results in GW

	Max.capacity therm.power stations	Overhaul capacity, 3rd Wednesday at 11:00 a.m				
		Average value		Max.value		
	December 2001	Retrospect	Percent of thermal capacity	Retrospect	Percent of thermal capacity	month
Country	GW	GW	%	GW	%	
B	13.9	1.2	8.8	2.3	16.3	V
D	88.0	6.5	7.4	12.0	13.6	V
E	28.6	0.8	2.9	2.4	8.3	IV
F	86.9	10.2	11.7	17.6	20.3	V
GR	6.3	0.4	6.5	0.8	12.9	X
I	54.4	4.5	8.3	7.4	13.6	VIII
SLO	1.9	0.1	6.6	0.8	39.4	V
HR	1.6	0.3	19.8	0.5	31.3	V-IX
JIEL System	6.7	1.7	24.6	3.1	46.3	V
L	0.4					I-XII
NL	17.6	0.7	4.3	1.5	8.5	VII
A	5.6	0.4	7.7	1.1	20.3	V
P	5.1	0.2	3.9	0.6	12.4	II
CH	3.8	0.4	10.7	2.7	71.1	VIII
CZ	12.2	1.2	9.5	2.3	18.9	VII
H	7.4	0.5	7.3	1.1	14.8	V
PL	31.2	3.1	9.8	5.5	17.6	V
SK	4.9	0.8	16.7	1.5	30.6	V
UCTE	**376.5**	**33.1**	**8.8**	**57.8**	**15.4**	**V**

Comments:

B The figures represent an order of magnitude and not precise value. This is due to commercial sensibility of this kind of information.

D According to the new methodology, the German TSOs do not collect detailed information on these items. As a result of statutory 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. In 2001, the energy capability factor was 1.21. Thus, hydro conditions were above average.
The share of renewable energy sources in the installed generating capacity has again considerably increased in 2001. This increase also explains the growth in non-usable capacity.

E The unavailability due to the overhaul program has been greater in 2001 than in 2000. This difference has been caused by the conventional thermal power plants program, especially fuel-oil plants (1.8% in 2000 versus 2.56% in 2001).

F The difference between the performed and the scheduled overhauled is caused by new constraints and disturbance.
No remarkable difference with last year. The overhauls take place in summer time with a maximum in May.

GR The overhaul program of thermal units is nearly the same as that of the year 2000. Most overhauls are carried out during spring and autumn when the load is low, while in heavy load periods (winter and summer) the overhauls are reduced.

I Non sensible differences compared to the last year.

SLO Nuclear Power Plant was in maintenance from mid-May to mid-June 2001.

H Actually performed overhauls were about 30 MW higher than scheduled.
As compared to 2000, the overhaul program in 2001 was 8 MW lower, thus the difference is insignificant.

NL TenneT is not any longer informed about the performed overhauls. Consequently, the values given correspond to the scheduled overhauls.

3.2.3 Thermal power plant outages

Table A/1 in the annex show the non-available thermal capacity due to outages for each month of the year 2001.

The maximum value of capacity not available in the UCTE as a result of outages was 24.5 GW in August. This figure represents about 6% of power generated by nuclear power plants and conventional thermal plants.

Comments:

B The figures represent an order of magnitude and not precise value. This is due to commercial sensibility of this kind of information.

D Same remark as for thermal power plant overhauls.

E Comments on the significant differences from the forecasts:
During 2001, the unavailability of thermal power stations has been:
- Coal plants: 4.87%
- Fuel-gas plants: 11.05%
- Fuel-oil plants: 24%

The number of outages of fuel-oil plants has increased abnormally from October onwards.

F Important outages in March and August (9.4 GW).

GR The outage capacity of thermal power plants is less in comparison to the forecasts due to the effective maintenance of the thermal units.

I Non sensible difference when compared to 2000.

H On a yearly average, outages were about 50 MW lower than scheduled. The yearly average in 2001 was 30 MW higher than in 2000.

NL No values for outages are given, as data are not any longer available for TenneT.

P The combined cycle power plant of Tapada do Outeiro has been having a high unavailability rate since the commissioning in 1999.

3.2.4 Reserve for network services

The reserve for system services is the estimated reserve capacity which is required for system operation. 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 2001, the reserve for network services ranged from 25.1 GW in May (approximately 9% of the synchronous load - 276.6 GW-) to 28.9 GW in November (approximately 9.2% of the synchronous load - 315.7 GW -).

Comments:

D In Germany, the TSOs' system reserve (formerly included in the total reserves) shows a relatively constant value over the year, varying between 7.5% and 7.9% of the installed generating capacity.

E The system reserve has been very low in December and very high in summer.

F The values for power balance are the requested values.

GR There is an estimate of the figures concerning the system services reserve. This reserve is provided mainly by hydro power stations.

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

3.2.5 Guaranteed capacity

Guaranteed capacity is obtained by deducting non-usable capacity, overhauls, outages and system reserve from the national generating capacity.
Guaranteed capacity represents the capacity which is available to power plant operators and electricity traders for meeting their clients' demand.

The guaranteed capacity in the UCTE reached a peak value of 386.4 GW in January - this figure represents around 75% of the total generating capacity (513 GW in January). The lowest value of 321.7 GW was reached in August - this represents 63% of the total generating capacity (5110.8 in August).

3.3 Load

The load at the reference point for the UCTE countries reached a maximum of 336.4 GW in December. This figure is 23.4 GW higher than the maximum reference load recorded in December 2000 (313 GW).

Maximum load demand in the UCTE countries is generally recorded during the winter months. Maximum loads recorded in the various countries in 2001 (not at the same time) are shown in TABLE 7.

Table 7 **Time of maximum load in the various UCTE countries in 2001**

Country	Day	Date	Time maximum	Peak load	Difference from 2000 peak load	Observed T	Deviation from average T
				MW	%	°C	°C
B	Monday	17/01/01	17:45	12953	2.3	1.0	- 3.9
D	Monday	17/12/01	18:00	78200	1.8	- 1.5	- 2.1
E	Monday	17/12/01	19:00	34930	5.0	4.0	3.0
F	Monday	17/12/01	19:00	77080	0.8	34.0	- 1.0
GR	Monday	17/07/01	13:00	8600	6.5	- 1.7	- 5.8
I	Tuesday	11/12/01	17:00	51980	6.0	5.0	- 6.0
SLO	Thursday	13/12/01	18:00	1838	8.0	- 7.0	- 10.0
HR	Monday	17/12/01	18:00	2796	5.0	- 10.0	n.a.
JIEL System	Tuesday	18/12/01	16:00	8100	3.6	- 8.2	20.8
L	Monday	17/12/01	12:00	925	3.0	- 4.0	6.0
NL	Wednesday	12/12/01	17:15	14242	2.2	13.0	9.0
A	Wednesday	19/12/01	18:00	8168	- 1.0	- 6.3	n.a.
P	Monday	17/12/01	17:45	7466	8.4	7.2	- 4.9
CH	Monday	17/01/01	11:45	9167	1.5	1.0	n.a.
CZ	Thursday	13/12/01	13:00	9756	3.6	- 11.7	- 12.6
H	Tuesday	11/12/01	17:00	5518	3.3	- 2.5	- 6.5
PL	Thursday	13/12/01	17:00	22868	3.0	- 12.4	9.9
SK	Thursday	13/12/01	12:00	4393	3.0	- 11.0	- 12.0

Comments:

E In 2001, the peak load has increased with respect to 2000 by 5%. The temperature factor does not seem to be significant in this increment because, in 2000, the peak load occurred in similar conditions (a series of cold days with a mean temperature of 4ºC). On the other hand, the increase in consumption during 2001 has been approximately 5.5%, similar to the increment of the peak load.

F The rise of internal power consumption is due to the increased power consumption of industrial and residential customers supplied by power distribution networks, the result of the economic growth witnessed in France in 2001. The maximum load corresponding to the absolute national consumption was recorded on the 17th of December 2001, with a deviation from average temperature of -5.8°C ; difference with the previous maximum load (72.4 GW, recorded on January 2000), can be explained both by the colder temperature and a lower load shedding capacity.

GR The peak observed in 2001 is not significantly different from last year's peak load.

I The value represents the maxim historical value for Italy. Exceptional weather conditions in terms of cool have favourite this performances.

SLO Hydro conditions in November and December 2001 were extremely dry, the hydro production was below normal.

NL As the representativeness of the load observed by TenneT changed at the beginning of 2000 from 74% to 85%, the peak load of 2000 was upgraded to 85%.

A Only 3rd Wednesday is available.

PL Low temperatures have been reordered in December.

In 2001, the simultaneity factor (the maximum common reference load divided by the sum of the individual peak loads) in the UCTE countries was 93.7% (as against 91.5% in 2000, 90.8% in 1999, 91.2% in 1998 and 93.6% in 1997).

3.4 Remaining capacity without exchanges

This value is obtained by deducting the reference load from the guaranteed capacity, and corresponds to the surplus of capacity, available to power plant operators.
However, this should not be classified 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.

In fact, it is interesting to compare this capacity with both generating capacity and margin against monthly peak load (differences between synchronous peak load and sum of non synchronous peak loads). Remaining capacity can be interpreted as the capacity that the system needs to assure 5 % of installed capacity availability - a margin of 5% is considered by many operators as the level necessary by suppliers to guarantee the reliability of supply to their clients, and compensate, for instance, longer power plant failures. and, at the same time, the capacity necessary to cover the "margin against monthly peak load [4] .

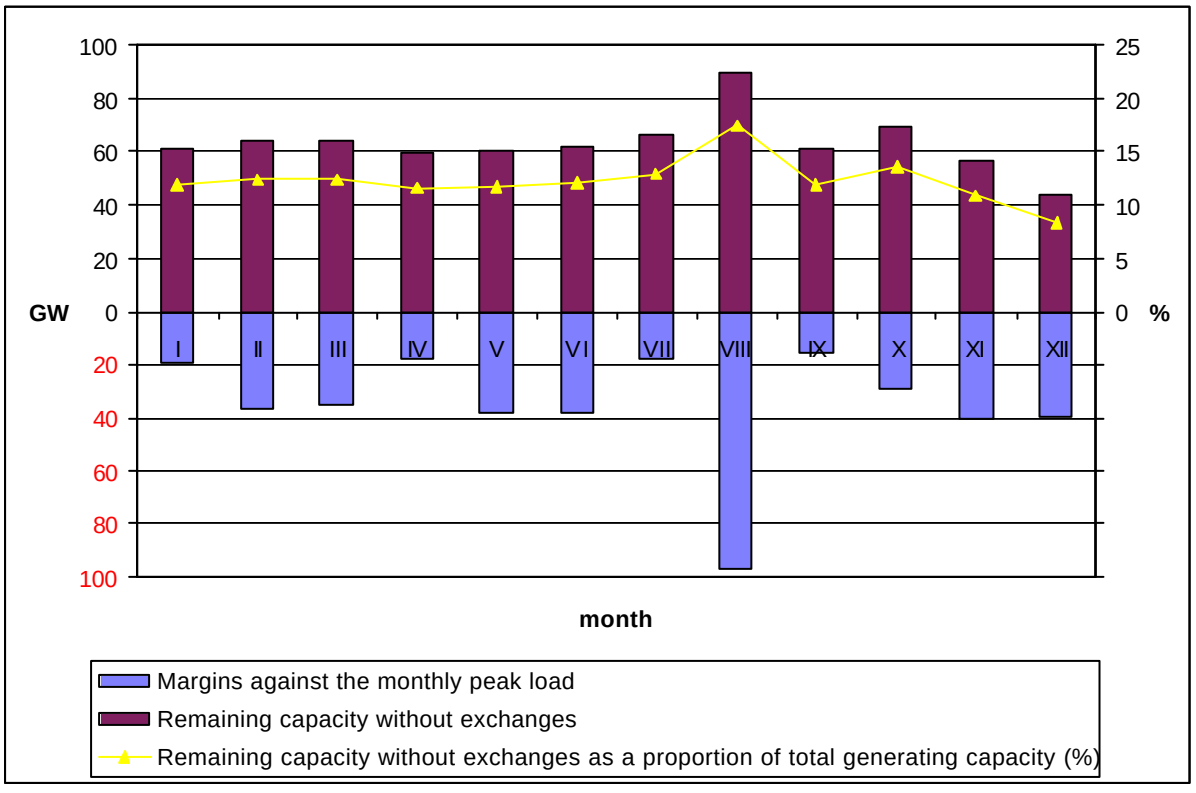
Monthly values for the remaining capacity without exchanges in proportion to total generating capacity in all countries are shown in Table8.

Table 8 **Remaining capacity without exchanges 2001 in % of total generating capacity**

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
UCTE 2001	11.9	12.4	12.4	11.6	11.7	12.0	13.0	17.5	11.9	13.5	10.9	8.4
UCTE 2000	9.1	10.5	13.1	12.2	12.4	11.1	13.1	15.7	9.7	11.1	10.6	11.5

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 which the remaining capacity would be required to cover.

Figure 3 **Remaining Capacity**



[4] The margin against the peak load represents the difference between the reference load and the peak load.

Focus on December 2001

It can be noticed that, in December, the remaining capacity was hardly sufficient to match the margin against the peak load.

As noticed above, the maximum load in 2001 has been observed on December the 17th in the following countries: Belgium, Germany, Spain, France, Croatia, Luxembourg, Portugal ; in most of these countries, peak load has been observed between 6 and 7 p.m..
Another interesting day is December the 13th ; at this time maximum load has been observed in Slovenia, Czech Republic, Poland, Slovak Republic.

The data collected in December corresponds to the 19th at 11 a.m. At this time the prices on the markets were still high, even if they were lower than on December the 17th.
The analysis of the power balance at this time shows that the remaining capacity in the whole UCTE was of 43.2 GW, compared to a load of 336.4 GW. UCTE was in addition importing 7.8 GW from non UCTE countries.

This synchronous load is however lower than the highest value observed during this period. This value is not is not known from the UCTE statistics but we know for each country from the correspondents the margin between this synchronous load and the peak load observed during the month, which for most of them occurred on December the 17th or on December the 13th.

The sum of these margins against peak load is 39 GW. Thus, the remaining capacity at peak load should have been between 43 GW and 4 GW (i.e. the difference between the remaining capacity at the reference load - 43 GW -and the sum of the margin against peak load - 39 GW -).

Considering the non simultaneity of the peak in the different countries, we can estimate on the basis of the data available that the peak load on December the 17th was around 20 GW higher than the synchronous load at 11 a.m. on December the 19th. It can be reasonably concluded that the remaining capacity at the peak time, when market prices reached extremely high levels, should have been of 25 GW, which means around 5% of the total generating capacity.

It should be reminded that a margin of 5% is considered as the minimum level of margin required by power station operators to guarantee the reliability of supply to their clients, and compensate, for instance, long duration power plant failures or high levels of demand.

In addition it has to be noticed that:
- when for the whole UCTE this margin was around 5%, it was less than 5% in some parts of the UCTE system;
- moreover, the climatic conditions were not extremely cold, as the average temperature in the UCTE countries was only 5 °C lower than the temperature in normal conditions. In case of lower temperature, the total consumption should increase of many GW reducing, consequently, the power margin in the same proportion.

In conclusion, during this period the power margins reached in some parts of the system values lower than the limit which is considered as necessary to ensure the security of supply, although the climatic conditions were not exceptional.

In comparison, in December 2000, the remaining capacity without exchanges accounted for 58.6 GW which represented 11.5% of the total generating capacity (509.2 GW in December) for the UCTE.

Focus on the situation in the Netherlands in June-July 2001

In the Netherlands the APX witnessed at the end of June and the beginning of July extraordinary price spikes. Also for balancing power price spikes were experienced within the same period. An analysis of the circumstances afterwards learned that these spikes were caused by plant outages in Belgium and The Netherlands, combined with a lack of sufficient transparency.
It was concluded that it will be necessary to inform the market in a better way about availability of power and that the system operator should get more rights to forbid on forehand sudden maintenance programs of power plants. The issue of transparency to the market has therefore become more important.

The following Table8.bis gives the detail of the remaining capacity values for the UCTE countries for every month in 2001.

Table 8.bis — **Remaining capacity without exchanges 2001**
Net values at the reference time 11:00 a.m. every month — **Results in GW**

Country	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
B	0.7	0.9	- 0.3	0.5	0.4	0.8	1.7	3.8	0.5	1.4	0.4	0.6
D	8.3	8.2	7.7	5.3	6.2	6.3	6.8	6.2	4.4	7.4	6.9	6.9
E	8.1	8.8	9.3	7.5	8.8	7.8	7.9	10.1	7.6	8.5	3.3	1.5
F	12.1	13.4	14.6	12.1	12.4	13.2	16.0	25.7	14.5	14.6	15.2	1.0
GR	0.4	0.0	0.4	0.5	0.2	0.2	- 0.2	1.3	- 0.2	- 0.3	- 0.3	0.3
I	5.4	5.0	2.9	3.8	3.1	3.9	3.5	10.3	5.9	6.9	5.5	6.2
SLO	0.3	0.5	0.5	0.7	0.0	0.6	0.6	0.8	0.5	0.5	0.4	0.3
HR	0.7	0.9	1.1	1.0	1.0	1.1	1.0	1.3	0.9	1.2	1.0	0.8
JIEL System	- 0.9	- 0.7	0.2	- 0.3	0.4	0.6	0.6	0.2	0.4	0.5	0.1	- 0.5
L	0.8	0.9	0.8	0.8	0.9	0.9	0.8	1.1	0.7	0.8	0.8	0.8
NL	4.9	5.4	5.0	5.3	5.5	5.2	5.1	4.5	4.6	5.4	4.5	3.9
A	4.2	4.6	4.8	4.8	4.9	4.0	3.9	4.2	4.2	4.5	4.2	4.9
P	1.5	0.4	1.8	2.5	1.8	1.8	2.7	2.5	1.5	2.2	2.0	1.5
CH	3.5	3.9	4.1	4.7	5.4	5.6	5.3	4.8	5.6	4.5	4.1	3.7
CZ	1.4	1.7	1.9	1.9	2.0	1.8	1.3	1.4	1.3	2.2	1.2	1.1
H	1.3	1.8	1.0	1.5	1.2	1.5	1.9	0.9	1.2	1.3	1.1	1.5
PL	8.0	7.5	7.2	6.6	5.4	5.6	6.7	9.4	6.9	6.9	5.1	7.8
SK	0.4	0.5	0.4	0.4	0.6	0.4	0.6	0.6	0.4	0.5	0.6	0.7
UCTE	**60.9**	**63.7**	**63.4**	**59.5**	**60.2**	**61.4**	**66.1**	**89.3**	**60.9**	**69.2**	**56.1**	**43.2**

The following information from individual UCTE countries is relevant in the interpretation of the remaining capacity:

D During most of the months, the remaining capacity without exchanges totalled more than 5% of the installed generating capacity. Only during one month it was slightly below this value.

E Although 2001 has been a humid year and the hydraulic reserves have increased during the first semester, the lack of rainfalls, the high number of outages of conventional plants, the very low new capacity commissioned and the increase of the consumption during the last term have caused an important decrease on the reserves. This may be a short term problem since an important number of combined cycle plants will be commissioned in the next years.

GR The values concerning the remaining capacity without exchanges are very low and sometimes negative. The reason is the limited reservoir capacity caused by the extremely poor hydro conditions in Greece during the last two years.

NL The given remaining capacity is only of limited significance, as the values of outages are not any longer available, and as the load of the monthly statistics represents about 85% of the total load of The Netherlands.

A In the Austrian data the Remaining Capacity is increased by reserves for the German control block included in the installed generating capacity of Austrian hydro power stations.

3.5 Balance of physical exchanges

In the UCTE countries, the balance of physical exchanges represents the net exchange. It is generally an import balance (March, April, July, and August are the months where the balance is an export).
The maximum value recorded is 7.8 GW import in December - this represents nearly 2.3% of the load (336.4 GW in December).

Comments:

D The trend of the past year towards increased import has continued.

E There seems to be a decreasing tendency both in net value and in quantity of the exchanges during the last years. From 1999 to 2000 there was a decrease on the net value of a 22% and from 2000 to 2001 a 18%.

F The physical flows at the frontiers were subject to major fluctuations according to the activity of the European electricity market; thus, the export balance of physical exchanges in power and energy bettered its absolute record on several occasions in 2001.

GR In past years, the amount of electrical energy exported during the winter to neighbouring countries, was re-imported during summer to meet the increased demand due to high temperatures.
In 2001 electrical energy was imported to meet the demand all the year round due to the unavailability of the energy in hydro power plants.

I During the 2001 we have noted a sensible increase with the exchanges as regards the 2000, the amount of the energy has reached the value of 48.9 billions kW. Mainly reasons are the great request to connection by eligible customers and the improvements on the electrical network which have favourite an increase in terms of maximum capacity.

L As the new conventional thermal plant is in service since october 2001, the export value to Belgium has increased.

NL In some months greater exports than normal were realised in the market, and those resulted in a export situation of the Netherlands on some early mornings in December, deviant from our normal importing pattern.

3.6 Remaining capacity with exchanges

Since the balance of exchanges is relatively low (except for December 2001), the remaining capacity including exchanges shows the same variations as the remaining capacity excluding exchanges.

For the UCTE, this figure ranges from 51 GW in December to 86.6 GW in August.

Comments:

E Due to the special conditions on the last term of the year, the imports have increased and the exports have decreased in order to maintain an acceptable level of remaining capacity with exchanges.

F The level of export is the same as the last year except in December, due to the load's increase.

GR The difference between the values is due to abnormal hydro conditions.
The remaining capacity in 2001 is low throughout the year due to unavailability of hydro power plants. The positive values shown on the power balance table must not be considered as a surplus capacity. There was lack of energy and the demand was covered by the national production together with imported energy. In the previous years when hydro conditions were above average, the remaining capacity was positive in the winter and exports were carried out, while in the summer there was the need to import energy in order to cover the peaks of the load.

NL Since the year 2001 it isn't any longer possible for different reasons to compose an exact power balance for The Netherlands, what makes the values of the remaining capacity of a limited significance.
On the first hand TenneT isn't any longer informed about the availability of power plants by producers. There isn't any longer an optimisation of maintenance schedules like before.
On the second hand there are a lot of smaller industrial producers which bring their power surplus onto the network, but the exact amounts are not known and can be very variable in relation to industrial activity, climatic conditions, etc.
On the third hand should be remarked that the load observed by TenneT is only the load of the high voltage grid, load of embedded or dispersed generation isn't visible and estimated at about 15% of the national load.

A The remaining capacity was estimated at a lesser level: January 3.3 GW forecast vs. 4.2 GW actual, July 4.4 GW vs. 3.9 GW.
The main causes for the differences are:
1. about 0.5 GW of thermal power have not been shutdown,
2. the hydro-electric production was sensibly over average (+11%).

4. Energy Balance: comments on results

The constituent elements of the energy balance for individual UCTE countries in 2001 and 2000 are presented in the annexes to the Report (Table B/1).

4.1 Electricity production

In 2001, net electricity production in the UCTE countries was 2206.6 TWh, which represents an increase of 2.6% compared to the generation for the previous year.

The respective contributions of hydroelectric, nuclear and conventional thermal plants, together with other sources, to total electricity production in each country are shown in table 9 .

Table 9 | **Structure of generation 2001** | **Results in TWh**

Country	National generation 2000 TWh	Hydro power stations %	Nuclear power stations %	Conv. power stations %	Other sources %	National generating 2001 TWh	Variation 2001/2000 %
B	80.1	2.0	58.0	40.0	-	76.0	- 5.5
D	496.6	5.0	32.0	62.0	1.0	501.5	1.0
E	194.8	21.0	30.0	45.0	4.0	206.4	5.6
F	502.9	15.0	78.0	7.0	-	511.8	1.7
GR	44.7	6.0	-	93.0	1.0	44.5	- 0.4
I	263.3	18.0	-	80.0	2.0	266.5	1.2
SLO	12.1	27.0	39.0	34.0	-	12.9	6.2
HR	9.8	58.0	-	42.0	-	11.3	13.3
JIEL System	41.1	32.0	-	68.0	-	41.7	1.4
L	1.1	60.0	-	40.0	-	1.5	26.7
NL	85.8	-	4.0	95.0	1.0	89.8	4.7
A	52.6	74.0	-	26.0	-	54.7	3.8
P	37.6	35.0	-	63.0	2.0	40.3	6.7
CH	60.5	61.0	36.0	4.0	-	71.2	15.0
CZ	67.7	4.0	20.0	76.0	-	68.8	1.6
H	32.4	1.0	40.0	54.0	5.0	33.6	3.6
PL	144.4	3.0	-	97.0	-	144.5	0.1
SK	28.7	16.0	53.0	22.0	9.0	29.7	3.4
UCTE	**2157.9**	**15.0**	**34.0**	**50.0**	**1.0**	**2206.6**	**2.6**

4.1.1 Hydroelectric power plants

In 2001, electricity production from hydroelectric plants was 334.5 TWh, which represents an increase of 34 TWh with regard to the previous year value.

Figure G1 shows annual electricity production in the various countries.

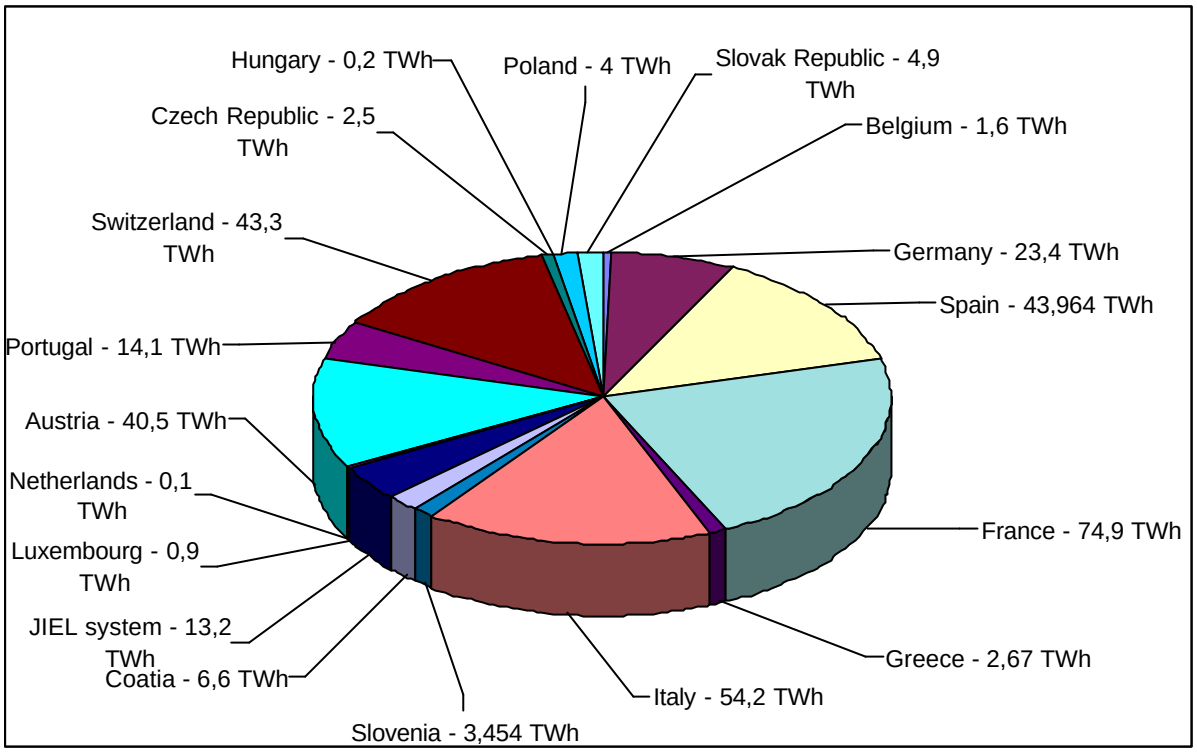
Table 10 shows the capacity utilisation factor of hydroelectric plants in 2001, compared to the results of the 2000 retrospect, for the UCTE countries.

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.

Table 10 | **Hydro power plants**

Country	Maximum capacity January		Production		Capacity utilisation	
	2000 GW	2001 GW	2000 TWh	2001 TWh	2000 %	2001 %
B	1.4	1.4	1.7	1.6	13.9	13.0
D	9.2	9.8	23.6	23.4	29.3	27.3
E	17.6	17.7	31.4	44.0	20.4	28.4
F	24.3	24.3	67.5	74.9	31.7	35.2
GR	3.1	3.1	4.0	2.7	14.7	9.9
I	20.3	20.3	50.2	54.2	28.2	30.5
SLO	0.8	0.8	3.5	3.5	49.9	49.8
HR	2.0	2.0	5.8	6.6	33.1	37.7
JIEL System	3.9	3.9	13.1	13.2	38.3	38.6
L	1.1	1.1	0.9	0.9	9.3	9.3
NL	-	0.0	-	0.1	-	30.9
A	10.9	11.2	40.7	40.5	42.6	41.4
P	4.4	4.4	11.4	14.1	29.6	36.5
CH	13.2	13.2	35.2	43.3	30.4	37.4
CZ	2.1	2.1	2.3	2.5	12.5	13.6
H	-	0.0	0.2	0.2	-	49.6
PL	2.1	2.2	4.0	4.0	21.7	21.1
SK	2.4	2.4	5.0	4.9	23.8	23.3
UCTE	**118.8**	**119.9**	**300.5**	**334.5**	**28.9**	**31.9**

Figure G1 | Electricity production in hydroelectric power plants Retrospect 2001



Comments:

D Hydraulicity amounting to 1.21 was again considerably above the multi-annual average

E 2001 has been a humid year during the first semester. Therefore, it has been possible to generate a 42% more energy than in 2000.

F Increase of hydro power station generation up to 10.8% due in particular to the high water availability observed during the first 8 months of 2001.

GR In 2001 the hydro generation is significantly decreased with respect to the hydro generation in 2000, due to the limited energy stored in the reservoirs.

I The values of the energy capability factors during the year 2001 show an behaviour very variable. We have noted high factors during the first period of the year consequent a very high rainfall phenomena. A very low indicators has been observed in the last term of the year. In term of production the hydro generation has increased by the 8% with relation the year 2000.

SLO The production was higher in the year 2001 with respect to the production in the year 2000 mostly because of the higher production of the Nuclear power Station (new steam generator from July 2000), the consumption was higher for 4.5% in the year 2001 - more than expected.

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

A The energy capability factor for run of river was 1.11 for the year 2001 vs. 1.16 for 2000. The production therefore was 5% less than in 2000.

P In 2001 with inflows 19% over the average value the hydro power stations' generation was higher than in 2000. The inflows were exceptionally high in the first months of the year and exceptionally low in the last months of the year.

4.1.2 Nuclear power plants

In 2001, electricity production from nuclear power plants in the UCTE was 744.2 TWh, which represents an increase of 13.1 TWh (»2%) with regard to the previous year value.

Table 11 shows the capacity utilisation factor of nuclear power plants in 2001, compared to the results of the 2000 retrospect, for the UCTE countries.

Table 11 Nuclear power stations

Country	Maximum capacity January		Production		Capacity utilisation	
	2000 GW	2001 GW	2000 TWh	2001 TWh	2000 %	2001 %
B	5.7	5.7	45.7	44.0	91.5	88.5
D	21.8	20.7	158.9	161.1	83.2	88.8
E	7.4	7.4	59.4	61.0	91.6	93.9
F	63.2	63.2	395.0	401.3	71.3	72.5
GR	-	-	-	-	-	-
I	-	-	-	-	-	-
SLO	0.6	0.7	4.6	5.0	87.5	85.7
HR	-	-	-	-	-	-
JIEL System	-	-	-	-	-	-
L	-	-	-	-	-	-
NL	0.4	0.4	3.7	3.7	94.1	94.1
A	-	-	-	-	-	-
P	-	-	-	-	-	-
CH	3.1	3.2	22.6	25.3	83.2	90.3
CZ	1.6	1.6	12.7	13.8	90.6	98.5
H	1.8	1.8	13.3	13.3	84.3	86.3
PL	-	-	-	-	-	-
SK	2.2	2.6	15.2	15.7	78.9	68.9
UCTE	**107.8**	**107.3**	**731.1**	**744.2**	**77.4**	**79.2**

Comments:

D The record result of the German nuclear power stations exceeded again the high level already recorded in the previous year.

E The total energy generated by nuclear power stations has increased slightly (2.4%) with respect to 2000 due to the increment of the capacity of existing plants.

F Increase up +1.5%.

CZ The value of the Capacity utilisation of Czech Republic (98.5%) has increased owing to the fact the NPP Temelin 1 has a share in the production however it has not been officially commissioned (operational tests in progress).

4.1.3 Conventional thermal power plants

In 2001, electricity production from conventional thermal power plants in the UCTE was 1102.3 TWh, which represents a decrease of 3 TWh (» - 0.3%) with regard the previous year.

Table 12 shows the capacity utilisation factor of conventional thermal power plants in 2001, compared to the results of the 2000 retrospect, for the UCTE countries.

Table 12 **Conventional thermal power plants**

Country	Maximum capacity January		Production		Capacity utilisation	
	2000 GW	2001 GW	2000 TWh	2001 TWh	2000 %	2001 %
B	7.9	8.2	32.7	30.4	47.3	41.9
D	68.4	67.3	311.1	312.9	51.9	53.1
E	21.1	21.2	98.6	93.1	53.3	50.2
F	22.7	23.7	39.4	34.8	19.8	16.8
GR	5.8	6.3	40.7	41.4	80.1	75.1
I	54.2	54.4	208.1	207.3	43.8	43.5
SLO	6.8	1.2	28.0	4.4	47.0	40.6
HR	1.0	1.6	4.0	4.7	45.7	33.5
JIEL System	1.7	6.7	4.0	28.5	26.9	48.6
L	0.1	0.4	0.2	0.6	22.8	24.0
NL	17.6	17.3	80.7	84.5	52.3	55.8
A	5.0	5.6	11.9	14.2	27.2	28.8
P	4.9	5.1	24.3	25.5	56.6	57.5
CH	0.6	0.6	2.3	2.6	43.8	49.5
CZ	10.4	10.6	52.7	52.5	57.8	56.5
H	5.1	5.6	17.7	18.0	39.6	36.6
PL	31.3	31.2	140.4	140.5	51.2	51.4
SK	2.3	2.3	8.5	6.4	42.2	31.8
UCTE	**266.9**	**269.4**	**1105.3**	**1102.3**	**47.2**	**46.7**

Comments:

D The generation of conventional thermal power stations includes the quantities generated in plants of industrial auto-producers and supplied to the public/general supply network, and which are thus not used for auto-producers' own consumption.

E The total energy generation from conventional thermal power plants has decreased 8% with respect to 2000 due to overhauls and outages.
The contribution of the different fuels has changed with respect to 2000 in the following way:
- coal: -10.9%
- fuel-oil: +9.4%
- gas: +19.6%

F Conventional thermal power stations generation has dropped -7.6%, due to its role in providing power during peak load periods so as to achieve balance between power generation and consumption.

GR An increase of the thermal production with respect to the production in 2000. The contribution of the different fuels is nearly the same as in 2000: lignite 68.2%, natural gas 12.43%, and oil 7.72%.

I The conventional thermal power stations generation has decreased during the year 2001 by the 0.6%.

L As the new conventional thermal plant is in service since October, the generation value has increased.

NL The given share is obtained from our National Statistics Organisation. Specific information about fuels, performance, constraints etc. aren't any longer brought by producers to the knowledge of TenneT. The representativeness of the figures was brought from 75% to 100% for the year 2001 as well as for the year 2000. Thus the figures include now also the power and energy supplied to the public network by industrial producers.

A In 2001 the thermal power production was increased by 19%:
- Hard Coal: +16%
- Brown Coal: +29%
- Natural Gas: +22%
- Oil: -1%
- Others +29%

4.2 Electricity exchanges

The volume of electricity exchanges (imports - exports) in the UCTE countries in 2001 represented 5.3 TWh export, lower than the corresponding figure for the previous year by 1.3 TWh.

Table13 shows the balance of electricity exchanges and the proportion of the electricity consumption in 2001 for the UCTE countries. Results are compared with the balance for 2000.

Table 13 **Balance of physical exchanges (import - export)** **Results in TWh**

Country	Balance (import - export)		Proportion of electricity consumption	
	2000 TWh	2001 TWh	2000 %	2001 %
B	4.3	9.0	5.2	10.7
D	3.1	0.1	0.6	0.0
E	4.4	3.5	2.3	1.7
F	- 69.9	- 68.9	- 16.4	- 15.8
GR	- 0.01	2.5	- 0.03	5.4
I	44.3	48.4	14.9	15.8
SLO	- 1.4	- 1.7	- 13.1	- 14.7
HR	4.0	3.2	29.0	22.1
JIEL System	3.1	4.2	7.1	9.4
L	5.7	5.4	98.3	91.5
NL	18.9	17.3	18.1	16.2
A	- 1.3	0.2	- 2.6	0.4
P	0.9	0.1	2.4	0.3
CH	- 7.0	- 12.0	- 13.5	- 21.0
CZ	- 10.0	- 9.5	- 17.5	- 16.2
H	3.4	3.2	9.5	8.7
PL	- 6.4	- 6.7	- 4.7	- 5.0
SK	- 2.7	- 3.6	- 10.5	- 14.0
UCTE	**- 6.6**	**- 5.3**	**- 0.3**	**- 0.2**

Table B/1 shows the detail of the export and import in 2001 for the UCTE.

Comments:

E In 2001, there has been a substantial decrease in export (-29%) with regard to the exports in 2000.

F The physical flows at the frontiers were subject to major fluctuations according to the activity of the European electricity market. The export balance of physical exchanges with foreign countries has shown a decrease compared with 2000, following a drop in physical exports while physical imports rose.

GR Extremely poor hydro conditions have caused an increase of imports.

I The import balance in 2001 has reached the amount of 48.9 GWh. This is the maximum historical value for Italy.

CZ The value of the balance is relatively high (likewise in the last year)

4.3 Electricity consumption

Electricity consumption in the UCTE countries in 2001 reached 2163.4TWh and exceeded the last year's consumption by 51TWh (increase of 2.4%).
Figure 2 shows the variation between 2000 and 2001 of the national electricity consumption, during the summer and the winter semester.

Figure 2 **Variation of national electricity consumption during the summer and winter semesters in 2001 with regard to 2000**

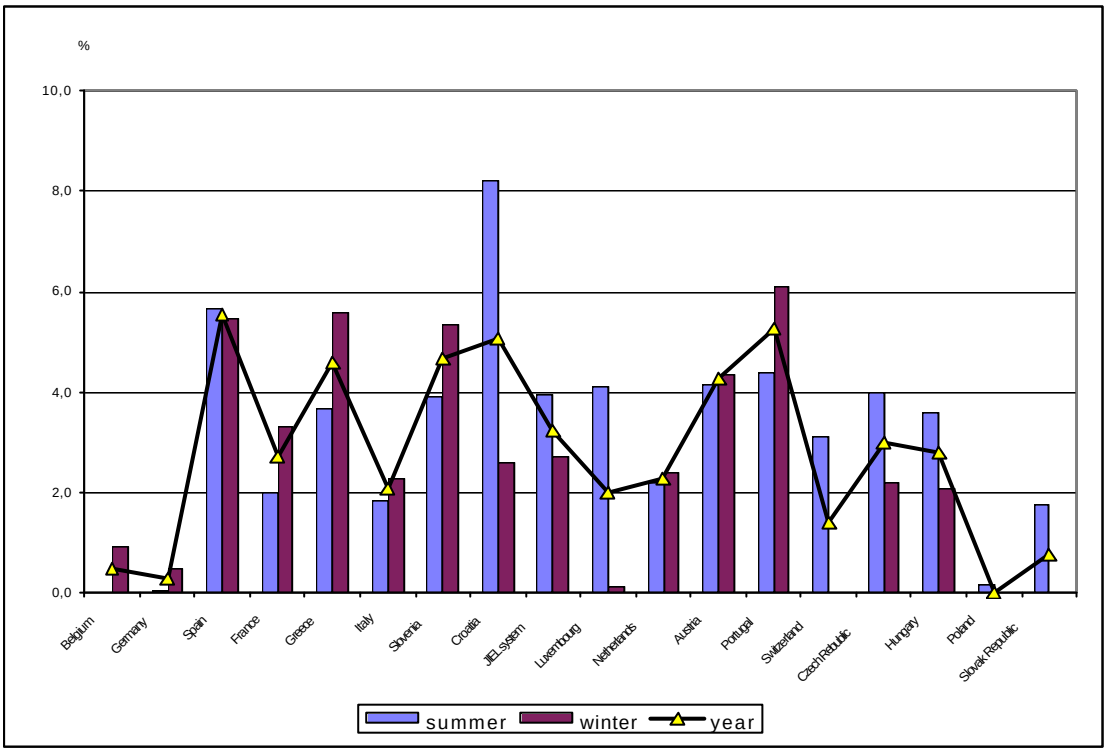


Table14 shows the relative contributions to annual consumption of consumption during the summer and winter months , together with variations in relation to corresponding values for the previous year.

Table 14 **Electricity consumption (%)**

Country	2000		2001		Variation 2001/2000	
	Summer %	Winter %	Summer %	Winter %	Summer %	Winter %
B	46.9	53.1	46.6	53.4		0.9
D	46.6	53.4	46.5	53.5	0.0	0.5
E	48.7	51.3	48.8	51.2	5.7	5.5
F	45.1	54.9	44.8	55.2	2.0	3.3
GR	51.2	48.8	50.8	49.2	3.7	5.6
I	49.1	50.9	49.0	51.0	2.1	2.4
SLO	47.7	52.3	47.3	52.7	3.9	5.4
HR	44.2	55.8	45.5	54.5	8.2	2.6
JIEL System	40.9	59.1	41.2	58.8	3.9	2.7
L	46.8	53.2	47.8	52.2	4.1	0.1
NL	48.0	52.0	48.0	52.0	2.4	2.3
A	45.7	54.3	45.6	54.4	4.1	4.4
P	48.2	51.8	47.8	52.3	4.4	6.1
CH	45.7	54.3	46.5	53.5	3.1	
CZ	43.9	56.1	44.3	55.7	4.0	2.2
H	46.6	53.4	47.0	53.0	3.6	2.1
PL	45.0	55.0	45.0	55.0	0.2	- 0.1
SK	44.5	55.5	45.0	55.0	1.8	
UCTE	**46.7**	**53.3**	**46.6**	**53.4**	**2.1**	**2.3**

Table 14.bis shows the detail of the electricity consumption in the UCTE countries for each months of 2001:

Table 14.bis **Electricity consumption 2001** **Results in TWh**

Country	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	2001
B	8	7	8	7	7	6	6	6	7	7	7	8	83
D	47	42	45	41	40	36	37	37	39	42	44	45	495
E	18	16	17	16	17	17	18	17	16	17	18	18	206
F	43	38	38	36	33	32	33	31	33	35	40	45	437
GR	4	3	4	3	3	4	5	4	4	4	4	4	46
I	27	24	26	24	25	25	27	23	25	26	26	26	305
SLO	1	1	1	1	1	1	1	1	1	1	1	1	11
HR	1	1	1	1	1	1	1	1	1	1	1	2	14
JIEL System	5	4	4	4	3	3	3	3	3	3	4	5	45
L	1	0	1	0	0	0	0	0	0	1	1	1	6
NL	10	9	9	8	9	8	8	9	9	9	10	9	107
A	5	4	5	4	4	4	4	4	4	4	5	5	53
P	4	3	3	3	3	3	3	3	3	3	3	4	40
CH	6	5	5	5	5	4	4	4	5	5	5	5	57
CZ	6	5	6	5	4	4	4	4	4	5	6	6	59
H	3	3	3	3	3	3	3	3	3	3	3	3	37
PL	13	12	13	11	10	10	10	10	10	11	12	13	135
SK	3	2	2	2	2	2	2	2	2	2	2	3	26
UCTE	**204**	**181**	**191**	**174**	**171**	**164**	**170**	**163**	**169**	**180**	**193**	**204**	**2163**

Comments:

E The increment on the consumption has been caused by the economic activity and the temperature factor has not been very influent.

F French internal power consumption came to 452.5 TWh in 2001, an increase of about 12 TWh compared with the previous year, which corresponds to a growth rate of +2.7%. This rise is due to the increased power consumption of industrial and residential customers supplied by power distribution networks, the result of the economic growth witnessed in France in 2001, as well as climatic disparities between 2001 and 2000, particularly at the end of the year. Consumption adjusted for weather contingencies came to 457.5 TWh for 2001, i.e. a growth rate of +1.9% compared with 2000 adjusted for the leap year effect.

GR The increase of 4.6% in consumption in 2001 with respect to the 2000 consumption is normal and very close to the forecasts.

SLO Consumption in 2001 was higher with the respect to the year 2000 for 4.5%, one of the reason are below normal temperatures in November and December 2001.

NL Contrary to the values given in the Power Balance Retrospect of last year, these values represent the whole of the consumption in the Netherlands including network-losses.
The growth of the consumption is a normal value and no exceptional trends towards climatic conditions can be concluded.

Comments on Market Deregulation

B The timetable for evaluation of eligibility of customers is the following:

2001: customers > 10GWh on Federal and regional levels
1/1/2002: Flanders : all high voltage customers
1/1/2003: Flanders : all residential customers
Federal & other regions : customers > 1 GWh
1/7/2005: Federal & other regions : all residential customers.

D In the 100% open German power market, some 1.3 million customers have switched suppliers by now. There are very few complaints by individual customers about the handling by the network operators (only several 100, despite a new government telephone hotline), although intense discussions continue between suppliers, network operators and various government entities regarding the level of network usage fees and details of the customer switching processes (see below).

On June 13, 2001, the association of German electricity network operators ("Verband der Netzbetreiber - VDN - e.V. beim VDEW") was founded as a merger of DVG Deutsche Verbundgesellschaft e. V. and the network division of the German electricity industry association ("Verband der Elektrizitätswirtschaft - VDEW - e.V."). VDN, located in Berlin, represents the interests of the German transmission and distribution system operators. It currently has some 300 member companies which together operate about 94% of the German electricity networks. Concentration on network issues corresponds with account unbundling in the power companies where electricity generation, distribution and trading were separated in the course of liberalisation. VDN also focuses on the co-operation of transmission with distribution system operators, where for example many data handling issues need to be solved.

After several months of negotiations, the refinement of the "Associations' Agreement on Criteria to Determine Use-of-System Charges for Electric Energy and on Principles of System Use" (VV II +) was finalised on December 13, 2001. The Agreement was adopted by the participant associations of utilities (VDEW, VDN, ARE, VKU) and of industrial companies (BDI, VIK). The consumer advocate association vzbv partipated in the negotiations and supported the result. VV II + is the basis for agreements between system operators and system users on the use of the system on a contractual basis (NTPA) and related access charges, in order to comply with the German Energy Industry Act which implements the EU Directive 96/92/EC into German law. Some of the main innovations compared to VV II of December, 1999 are a trial run for intra-day trading, planned auctions for the procurement of balancing energy by all TSOs (two large TSOs are already running such auctions), changes in the pricing of balancing energy, streamlined contractual relationships for household customer switching, and much improved transparency about network usage fees as a function of regional structural differences.

The merger of the two German Power Exchanges located in Leipzig (LPX - Leipzig Power Exchange) and in Frankfurt (EEX - European Power Exchange) was decided retroactively as of January 1, 2002 by the shareholders of the companies concerned. The new Power Exchange is located in Leipzig.

The tendency towards power company mergers continued in 2001, both at the level of interconnected companies and on the level local/regional level. Just a few examples include the merger of HEW, VEAG, Bewag and the lignite producer LAUBAG to form "Vattenfall Europe", the merger of Bavarian regional distributors into E.ON Bayern, or the merger of a regional and a municipal distributor in Northern Bavaria to form N-ERGIE.

F Powernext, the first French Power Exchange was launched on November 26th, 2002.
Powernext is a market in standardised contracts for the delivery of electrical power on the French transmission grid. It is responsible for organising and managing the market on behalf of its members. The shareholders of this new market are among the major actors of power trading and financial markets and HGRT, holding of European transmission operators, which includes RTE, the founding shareholder, ELIA and TENNET.

GR The new participants in the market are independent generators with renewable power plants and purchasers who hold licences to supply eligible customers in Greece with energy imported through the interconnections. In addition they have allocated interconnection capacity for long-term use.

NL In The Netherlands TenneT changed since the 1st of January of 2001, from a situation of central generation - with system services included - within Sep, to be a total independent TSO.
Up from July 2001 all the consumers of certified green energy (renewable sources) are set free by law to purchase their energy in the market, in anticipation to the deregulation of all small users which is planned to occur in the autumn of 2003.

A Austria has implemented the electricity directive of the European Union through a federal law, the "Elektrizitätswirtschafts- und -organisationsgesetz (ElWOG)" in 1998. An amendment to this Energy Liberalization Act has been adopted in July 2000, by which the following objectives shall be reached:

1. 100% liberalisation of the Austrian electricity market as of 1st October 2001 and thereby access of all ultimate consumers to the European electricity market
2. Reduction in electricity prices
3. Labelling on the supplier's invoice (detailed breakdown by different primary energy carriers on the basis of which electrical energy was generated)
4. Tightening of the provisions on the unbundling of generation, transmission and distribution of electricity (avoidance of improper subsidisation)
5. Reorganisation of energy monitoring by establishing "independent regulatory authorities" (Electricity Control Ltd., Electricity Control Commission)
6. Setting up of independent clearing and settlement centres (balance group coordinator)
7. Uniting of consumer/producer groups to form balance groups (Scandinavian model)
8. Competition-neutral system of subsidies for the generation of electrical energy on the basis of renewable energy carriers (small hydroelectric plants, tariffs). Installation of regional funds for the subsidisation of renewable energy

P The independent system clients represented in 2001, 1.5% of the total consumption.

PL The year 2001 has been quite successful for the Polish power sector. In the framework of accession negotiations with EU Chapter 14 "Energy" was provisionally closed in July, two months prior to the Chapter 22 "Environment". PSE SA applied for the associated membership in ETSO which was granted starting from November 30, 2001. On the 1st of September 2001, the balancing segment of the electricity market, based on day-ahead hourly mechanism was launched. Rules of the balancing market are defined in the Grid Code and are published on PSE SA website.

Poland plans to fully align with the Electricity Directive by the end of 2002. The draft of the last required amendments to the Polish Energy Law Act and its secondary regulations are currently under the process of broad governmental consultation.

Binding Regulated TPA is being introduced consequently. In the year 2001 the eligible customers, were the final customers with the consumption more than 40 GWh/year (on January 1st, 2002 this threshold was lowered to 10 GWh/year). The trade executed on power exchange was exempted from tariff obligation by Energy Regulatory Office late in 2000. The same has been applied to all generators and electricity traders since June 2001.

A / 1	UCTE Power balance retrospect 2001, Power data (net values at the reference time 11:00 a.m. every month)	Results in GW

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
National generating capacity												
1. Hydro power stations	119.7	119.7	119.8	119.8	119.8	119.8	119.8	119.8	119.9	119.9	119.9	119.9
2. Nuclear power stations	107.3	107.3	107.3	107.3	107.3	107.3	107.3	107.3	107.3	107.3	107.3	107.3
3. Conventional thermal power stations	272.7	272.6	272.6	271.6	275.5	271.7	268.5	268.5	268.5	269.0	269.0	269.4
4. Renewable energy sources	11.0	11.1	11.4	11.5	11.9	12.1	12.5	12.9	13.2	13.8	14.3	14.5
5. Not clearly identifable energy sources	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
6. National generating capacity (6 = 1+2+3+4+5)	**513.0**	**513.0**	**513.3**	**512.5**	**512.8**	**513.2**	**510.4**	**510.8**	**511.2**	**512.3**	**512.8**	**513.3**
7. Non-usable capacity	75.8	76.8	76.0	73.9	75.2	77.1	79.2	90.3	79.8	83.0	76.5	76.4
8. Overhauls (thermal power stations)	12.1	19.3	26.5	40.1	57.8	50.1	41.7	46.7	38.7	30.2	21.2	13.0
9. Outages (thermal power stations)	13.4	16.2	20.4	16.4	17.8	17.2	17.5	24.5	15.2	17.2	14.6	17.7
10. System services reserve	25.4	26.7	26.9	26.4	25.1	25.2	25.3	27.6	26.6	25.8	28.9	26.8
11. Guaranteed capacity (11 = 6-(7+8+9+10))	**38.3**	**374.0**	**363.6**	**355.8**	**336.8**	**343.7**	**346.7**	**321.7**	**350.9**	**356.1**	**371.8**	**379.6**
12. Load	325.5	310.3	300.2	296.3	276.6	282.3	280.6	232.4	290.0	286.9	315.7	336.4
13. Margin against monthly peak load	19.3	36.6	35.0	18.0	38.3	38.3	17.8	96.7	15.9	29.3	40.5	39.3
14. Remaining capacity without exchanges (14 = 11-12)	**60.9**	**63.7**	**63.4**	**59.5**	**60.2**	**61.4**	**66.1**	**89.3**	**60.9**	**69.2**	**56.1**	**43.2**
Physical exchanges												
15. Import	31.1	31.0	28.6	29.1	30.7	31.5	32.5	28.5	31.2	32.6	34.7	34.2
16. Export	29.4	29.6	30.8	29.2	30.4	30.7	32.9	31.1	29.3	29.9	29.0	26.4
17. **Physical exchange balance (17=15-16)**	**1.8**	**1.4**	**- 2.2**	**- 0.1**	**0.2**	**0.8**	**- 0.5**	**- 2.6**	**2.0**	**2.7**	**5.7**	**7.8**
18. Remaining capacity with exchange (18=14+17)	**62.7**	**65.1**	**61.2**	**59.3**	**60.5**	**62.2**	**65.6**	**86.6**	**62.9**	**71.9**	**61.8**	**51.0**

	B	D	E	F	GR	I	SLO	HR	JIEL	L	NL	A	P	CH	CZ	H	PL	SK	UCTE
Generation																			
1. Hydro power stations	1.6	23.4	44.0	74.9	2.7	54.2	3.5	6.6	13.2	0.9	0.1	40.5	14.1	43.3	2.5	0.2	4.0	4.9	**334.5**
2. Nuclear power stations	44.0	161.1	61.0	401.3	-	-	5.0	-	-	-	3.7	-	-	25.3	13.8	13.3	-	15.7	**744.2**
3. Conventional thermal power stations	30.4	312.9	93.1	34.8	41.4	207.3	4.4	4.7	28.5	0.6	84.5	14.2	25.5	2.6	52.5	18.0	140.5	6.4	**1102.3**
4. Renewable energy sources	-	4.0	8.4	0.8	0.4	5.0	-	-	-	-	1.5	-	0.7	0.3	-	-	-	-	**20.8**
of which, wind	-	-	6.0	-	0.4	-	-	-	-	-	-	-	0.2	-	-	-	-	-	**6.6**
5. Not clearly identifable energy sources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	2.7	**4.8**
6. Total (6=1+2+3+4+5)	**76.0**	**501.4**	**206.4**	**511.8**	**44.5**	**266.5**	**12.9**	**11.3**	**41.7**	**1.5**	**89.8**	**54.7**	**40.3**	**71.2**	**68.8**	**33.6**	**144.5**	**29.7**	**2206.6**
7. Exchanges (7 = 7a+7b)	**9.0**	**0.1**	**3.5**	**- 68.9**	**2.5**	**48.4**	**- 1.7**	**3.2**	**4.2**	**5.4**	**17.3**	**0.2**	**0.1**	**- 12.0**	**- 9.5**	**3.2**	**- 6.7**	**- 3.6**	**- 5.3**
7a. Import	15.7	44.0	10.2	3.7	3.6	48.9	0.7	3.8	7.2	6.5	21.5	14.4	3.6	50.2	9.2	10.4	4.3	6.1	**263.9**
7b. Export	6.7	43.9	6.7	72.6	1.1	0.5	2.3	0.6	3.0	1.1	4.2	14.2	3.5	62.2	18.7	7.2	11.0	9.7	**269.2**
8. Pumped storage	1.6	6.1	4.1	5.8	0.9	9.4	-	0.0	1.0	1.0	-	2.0	0.5	2.0	0.6	-	2.6	0.3	**38.0**
9. Consumption (9 = 6+7-8)	**83.4**	**495.4**	**205.7**	**437.1**	**46.1**	**305.5**	**11.2**	**14.5**	**44.9**	**5.9**	**107.1**	**52.9**	**39.9**	**57.2**	**58.7**	**36.8**	**135.2**	**25.8**	**2163.4**