

POWER AND ENERGY BALANCE OF THE UCTE RETROSPECT OF THE YEAR 2000

1. Introduction

1.1 Objectives

The present report contains a retrospect of power and energy balances in UCTE countries in 2000. 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 has introduced fundamental changes in the methodology used for the preparation of 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.

In this context, the preparation of the retrospective UCTE balance will serve the functions of transmission system operators, namely, the maintenance of network security and the promotion of conditions for market operation.

The objectives of the retrospective UCTE balance are therefore as follows:

- to provide transmission system operators who cooperate within the UCTE with an overall view of developments in the reliability of supplies throughout the network;
- to provide all players on the European electricity market with an overall view of movements in capacity requirements, together with the resources available for the satisfaction of these requirements.

1.2 A new methodology

It has also been necessary to adapt the methodology applied in order to take account of the conditions under which the requisite data are to be obtained. In the light of competition, the entry of new players on the market, the emergence of electricity stock exchanges and new contractual relations with customers, it has emerged that it will no longer be possible to obtain certain data regarding the management of generating facilities. Moreover, a number of recently-established transmission system operators, and those who have yet to be established, will not yet have access to all the information to which they are entitled.

The methodology applied is therefore based upon those data which are available to transmission system operators in the conduct of their functions.

Consequently, in contrast to the retrospect for 1999, data on electricity production per type of fuel are no longer collected.

Likewise, there has been a change in the methodology applied for the calculation of reserves. For this year, only the available reserve to transmission system operators for network services has been taken into account rather than, as previously, the overall operating reserve, including the cold reserve constituted by power plant operators for the guaranteed maintenance of supplies.

Consequently, the guaranteed capacity does not have the same meaning as in previous years, and should be somewhat higher as a result of the application of the new methodology.

1.3 Content of the balance

The retrospect for 2000 includes balances for the following countries and electricity systems:

B	Belgium	L	Luxembourg
D	Germany	NL	Netherlands
E	Spain	A	Austria
F	France	P	Portugal
GR	Greece	CH	Switzerland
I	Italy	CZ	Czech Republic
SLO	Slovenia	H	Hungary
HR	Croatia	PL	Poland
JIEL*	JIEL system	SK	Slovakia

* JIEL = RFY + FYROM (Federal Republic of Yugoslavia and Former Yugoslav Republic of Macedonia)

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 75 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 2000 are compared to the comparable results of the 2000 forecast and of the 1999 retrospect.

The main overall results of the power balance are shown in TABLE 1.

In the UCTE, the results of the "Power Balance - Retrospect for 2000" for the month of December show an increase in the generating capacity and the guaranteed capacity in comparison to the previous year.

The reference load has increased by the same proportion.

The surplus available capacity, which must be interpreted with caution as a result of the change in methodology applied, has remained stable.

The installed capacity and the load in CENTREL countries have remained stable.

The main overall results of the Energy Balance are summarised in TABLE 2.

Table 1	UCTE energy balance, Retrospect 2000	Total results (TWh)		
		December 1999	December 2000	Variation
UCTE				
National generating capacity	430,3	445,9	15,6	
Guaranteed capacity	309,1	321,5	not comparable*	
Load at 11a.m.	263,6	276,2	12,6	
Balance of physical exchange	1,1	1,8	0,7	
Surplus of available capacity, excluding exchange	45,5	45,3	not comparable*	
CENTREL				
National generating capacity	62,1	63,3	1,2	
Guaranteed capacity	45,0	49,7	not comparable*	
Load at 11a.m.	36,9	36,5	- 0,4	
Balance of physical exchange	- 2,2	- 3,1	- 0,9	
Surplus of available capacity, excluding exchange	8,1	13,2	not comparable*	
UCTE + CENTREL				
National generating capacity	492,4	509,2	16,8	
Guaranteed capacity	354,1	371,2	not comparable*	
Load at 11a.m.	300,5	312,7	12,2	
Balance of physical exchange	- 1,1	- 1,3	- 0,2	
Surplus of available capacity, excluding exchange	53,6	58,5	not comparable*	

Although hydroelectric power is a renewable energy source, it is shown separately on the grounds that hydroelectric capacity is foreseeable and contributes substantially to the reserve capacity available to transmission system operators.

"Sources which cannot be reliably identified" include a proportion of power generated by industrial autoproducers or supplied by the latter to the public electric supply system. Discrepancies in relation to the forecast stem from differences in classification applied in certain countries between the forecast and the retrospect.

Table 2	UCTE energy balance, Retrospect 2000			Total results (TWh)	
	Situation	Forecast	Situation	Variation in situation 2000	
	1999	2000	2000	Situation 1999	Forecast 2000
UCTE					
Hydroelectric power plants	294,9	281,1	291,5	- 3,4	10,4
Nuclear power stations	669,2	677,2	690,4	21,2	13,2
Conv. thermal power stations	831,5	850,4	862,7	31,2	12,3
Renewables	309,6	303,4	307,6	- 2,0	4,2
Other sources	1,6	33,5	1,3	- 0,3	- 32,2
National production	1811,9	1864,5	1862,0	50,1	- 2,5
Exchange balance (imports-exports)	- 0,5	7,6	8,6	9,1	1,0
Pumped storage	31,2	28,2	34,7	3,5	6,5
Consumption	1780,2	1843,9	1835,7	55,5	- 8,2
CENTREL					
Hydroelectric power plants	11,5	11,1	11,5	0,0	0,4
Nuclear power stations	37,9	40,0	41,2	3,3	1,2
Conv. thermal power stations	206,8	205,8	219,3	12,5	13,5
Renewables	-	-	-	-	-
Other sources	5,3	3,6	1,2	- 4,1	- 2,4
National production	261,5	260,5	273,2	11,7	12,7
Exchange balance (imports-exports)	- 7,1	0,9	- 15,7	- 8,6	- 16,6
Pumped storage	3,9	3,6	3,9	0,0	0,3
Consumption	250,5*	257,8	253,6	3,1	- 4,2

* These data include corrections in relation to those published in the statistical yearbook.

In 2000, total production and consumption in the UCTE showed a 50 TWh increase over 1999.

Production from hydroelectric plants showed a slight decrease, while production from nuclear plants has increased by 3%.

Production from renewables has increased by 10%, but is still lower than forecast.

Consumption and exports in CENTREL countries show an increase over 1999; in consequence, production has increased by approximately 4%.

3. 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 1999 and December 2000 are shown in TABLE 3:

Table 3 National generating and purchase power capacity Situation December 2000 (GW)						
Country	Hydro power stations	Nuclear power stations	Conv. power stations	Other sources	Total	Changes 2000 / 1999
B	1,4	5,7	8,4	0,2	15,7	0,0
D	9,3	20,5	71,1	5,6	106,5	5,0
E	17,7	7,5	21,7	2,2	49,1	1,7
F	24,3	63,2	23,3	0,0	110,8	2,5
GR	3,1	0,0	6,3	0,0	9,4	0,5
I	20,4	0,0	53,3	1,0	74,7	1,0
SLO	0,8	0,7	1,2	0,0	2,7	0,3
HR	2,0	0,0	1,7	0,0	3,7	0,2
JIEL-Netz	3,9	0,0	6,8	0,0	10,7	0,0
L	1,1	0,0	0,1	0,0	1,2	0,0
NL	0,0	0,4	17,1	1,1	18,6	4,4
A	10,9	0,0	5,0	0,0	15,9	- 0,3
P	4,4	0,0	4,9	0,4	9,7	0,1
CH	13,2	3,1	0,6	0,3	17,2	0,2
UCTE	112,5	101,1	221,5	10,8	445,9	15,6
CZ	2,1	1,6	10,6	0,0	14,3	0,5
H	0,0	1,8	5,6	0,3	7,7	0,4
PL	2,1	0,0	31,2	0,0	33,3	- 0,1
SK	2,4	2,6	2,3	0,7	8,0	0,4
CENTREL	6,6	6,0	49,7	1,0	63,3	1,2
UCTE + CENTREL	119,1	107,1	271,2	11,8	509,2	16,8

Increase in conventional thermal generating capacity have been recorded in Germany (2 GW), France (1.2 GW), Italy (0.8 GW), Hungary (0.5 GW), Slovenia (0.2 GW) and Greece (0.6 GW).

Newly-commissioned capacity is balanced by decommissioned capacity in Belgium (approximately 300 MW) and in Poland (approximately 600 MW).

There has been a reduction in nuclear generating capacity in Germany (- 1.2 GW) and increases in France (1.4 GW) and Slovakia (0.4 GW).

Renewable generating capacity has been commissioned in Italy (0.2 GW); wind power installations have been commissioned in various countries, including Germany and Spain.

At the end of 2000, the national generating capacity of UCTE countries totalled 446 GW, an increase of 16 GW over the previous year.

In CENTREL countries, the generating and purchase power capacity totalled 63 GW, an increase of 1.2 GW over 1999.

The generating plant mix and the increase in capacity, for all countries combined, are shown in TABLE 4:

Table 4	Generating plant mix and changes in capacity					
	Capacity Dec. 1999		Capacity Dec. 2000		Variation 2000/99	
UCTE	GW	%	GW	%	GW	
Hydro power stations	111,4	25,9	112,5	25,2	1,1	
Nuclear power stations	100,9	23,4	101,1	22,7	0,2	
Conv. power stations	213,2	49,5	221,5	49,7	8,3	
Other sources	4,8	1,1	10,8	2,4	6,0	
National generating capacity	430,3	100,0	445,9	100,0	15,6	
CENTREL	GW	%	GW	%	GW	
Hydro power stations	6,5	10,5	6,6	10,4	0,1	
Nuclear power stations	5,6	9,0	6,0	9,5	0,4	
Conv. power stations	49,0	78,9	49,7	78,5	0,7	
Other sources	1,0	1,6	1,0	1,6	0,0	
National generating capacity	62,1	100,0	63,3	100,0	1,2	

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

- D The proportion of renewables in the installed capacity increased by 1300 MW in 2000. The non-usable capacity has increased in consequence (accounting for approximately 10% of the installed capacity in 2000).
- F Approximately 40 cogeneration units of total capacity 1200 MW have been commissioned.
- GR The Lavrion combined cycle gas turbine plant (560 MW) has been commissioned, albeit behind schedule.
- NL Changes in the management of the electricity system were introduced at the end of 2000 and early in 2001. Collaboration between the four major generating companies within SEP was brought to an end, together with the optimum management of generating facilities as a whole. Hitherto, data on capacity related only to those power plants which were operated by SEP. From the end of 2000 [Translator's note: the French text has "2001", but 2000 is consistent with the remainder of the document], all power plants of capacity exceeding 2 MW are to be taken into account.

3.2 Non-available capacity and reserve management

The availability of generating capacity can only be guaranteed in part. In the power balance, non-available 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 that part of the generating capacity which cannot be called up, for various reasons: a temporary shortage of primary energy sources (hydroelectric plants, wind power installations), power plants with multiple functions, in which the generating capacity is reduced in favour of other functions (cogeneration, irrigation, etc.), reserve power plants which are only called up under exceptional circumstances, etc..

Non-usable capacity for all UCTE countries reached its lowest value in November (69 GW) and its highest value in March (79 GW). This represents a proportion of between 15.5% and 17.5% of the total national generating capacity.

In CENTREL countries, the lowest value was reached in February (6.4 GW or 11% of total capacity) and the highest value in August (11.6 GW or 18.5% of total capacity).

For the UCTE and CENTREL combined, the lowest value was reached in December and the highest value in September.

Percentage figures for the various components of non-usable capacity in each country are shown in TABLE 5. These components will vary, according to the generating plant mix.

Table 5

Components of non-usable capacity in June and December 2000

Country	3rd Wednesday in June 2000 ^{3rd}		Wednesday in December 2000	
	Hydro power stations %	Thermal power stations %	Hydro power stations %	Thermal power stations %
UCTE				
B	*)	*)	*)	*)
D	*)	*)	*)	*)
E	73	27	69	31
F	52	48	50	50
GR	10	90	10	90
I	23	77	23	77
SLO	100	-	100	-
HR	50	50	-	100
JIEL-Netz	70	30	65	35
L	*)	*)	*)	*)
NL	-	100	-	100
A	57	43	88	12
P	95	5	12	88
CH	98	2	99	1
CENTREL				
CZ	15	85	5	95
H	1	99	4	96
PL	11	89	17	83
SK	50	50	65	35

*) Values not available

E Hydraulicity in December was double the average value, leading to a significant reduction in the figure for non-usable capacity in this month.

GR Hydraulicity has been very low (factor of 0.59) and the reservoir fullness factor at the end of the year was only 47%.

L The non-usable capacity from March to November was associated with the general overhaul of one of the forced conduits in the Vianden power plant.

NL The non-usable capacity can be broken down into the following elements:

- restrictions associated with district heating systems (0 - 200 MW)
- restrictions associated with cooling water (0 - 2,500 MW)
- restrictions in the capacity of gas turbines associated with air temperature (+200 to -200 MW).

PL Network congestion has been higher, and a higher than usual number of hydroelectric facilities have been undergoing maintenance.

3.2.2 Thermal power plant overhauls

TABLE 6 shows the maximum and average capacity of plants in the course of overhaul on the third Wednesday of the month in individual UCTE and CENTREL 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 2000 using data from the power balance only.

In UCTE countries, non-available capacity due to overhauls reached a peak of 39 MW in August - this represents 12% of the net maximum capacity of thermal power plants during that month.

It should be noted that average and maximum values for non-available capacity due to overhauls in CENTREL countries, considered in proportion, are of the same order of magnitude as those recorded in UCTE countries, reaching a figure of 8 GW in May.

Table 6

**Characteristic values of overhaul programmes in the various countries
Retrospect of 2000**

	Max. capacity therm. power stations (december 2000)	Overhaul capacity, 3rd Wednesdays at 11:00 a.m.				month
		Average value:		Max. Value:		
		Retrospect	Percent of thermal capacity	Retrospect	Percent of thermal capacity	
	GW	GW	%	GW	%	
B	14,1	1,0	6,8	2,0	14,2	V,VI,IX
D	91,1	6,5	7,2	9,4	10,3	VIII
E	28,4	0,8	2,8	2,4	8,5	V
F	84,0	8,8	10,5	13,5	16,1	VI
GR	5,8	0,4	6,8	0,8	13,8	XI
I	52,6	4,4	8,3	9,2	17,5	VIII
SLO	1,6	0,2	10,9	0,6	37,5	IV,V
HR	1,5	0,1	6,7	0,3	20,0	III-V,IX
JIEL	6,8	1,0	15,1	1,8	26,5	VI,X
L	0,1	0,0	0,0	0,0	0,0	I-XII
NL	14,2	0,6	4,0	2,0	14,1	X
A	5,3	0,7	13,5	2,0	37,7	VIII
P	4,9	0,2	4,6	0,7	14,3	VIII,IX
CH	3,7	0,3	8,8	1,8	48,6	VIII
UCTE	314,1	25,0	8,0	39,4	12,5	VIII
CZ	11,8	0,7	5,5	1,7	14,4	V
H	7,0	0,6	8,0	1,2	17,1	VII
PL	31,3	2,5	7,9	4,4	14,1	VIII
SK	4,5	0,8	17,4	1,4	31,1	V
CENTREL	54,6	4,5	8,2	8,0	14,7	V
UCTE + CENTREL	368,7	29,5	8,0	47,2	12,8	VIII

Comments:

F There are no significant variations over the previous year.

H Overhauls are some 40 MW higher than forecast.

GR Overhauls are lower than forecast.

L Since generating facilities consist mainly of cogeneration installations of limited capacity (units of capacity less than 6 MW), overhauls have no influence over values expressed in GW.

3.2.3 Thermal power plant outages

The maximum value of capacity not available in the UCTE as a result of outages was 18 GW in November. This figure represents 6% of power generated by nuclear power plants and conventional thermal plants.

In CENTREL countries, the maximum value recorded was 1.4 GW in May, or 2.2% of generating capacity.

Comments:

F Major outages occurred between August and December, reaching a maximum of 7.9 GW. However, these figures were lower than forecast at the start of the year.

GR Outages were lower than forecast.

H Outages were some 50 MW lower than forecast.

CZ Outages were far less significant than forecast.

3.2.4 Reserve for network services

The reserve for network services is the estimated reserve capacity which is required for network operation. This is therefore the reserve capacity which is made available to transmission system operators by power plant operators, and includes the following specific elements:

- the second reserve (primary and secondary control reserves) and the minute reserve, which are made available to transmission system operators 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 transmission system operators under the terms of contracts.

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

During 2000, the reserve for network services ranged from 21 GW in June and September to 25.7 GW in November. This represents approximately 9.5% of the synchronous load.

In CENTREL countries, this figure ranged from 3.6 GW in May to 5.3 GW in March and December, or 12 - 14% of the load. In some countries, however, this figure includes a proportion of the reserve capacity available to power plant operators.

3.2.5 Guaranteed capacity

The guaranteed capacity is obtained by the deduction from the national generating capacity of all reductions in available capacity and reserves for network services. This is therefore the remaining capacity which is available to power plant operators and electricity traders for the satisfaction of customer demand.

The guaranteed capacity in the UCTE reached a peak value of 321 GW in December - this figure represents 72% of the total generating capacity. The lowest value of 291 GW was reached in August and September - this represents 66% of the total generating capacity.

In CENTREL countries, the guaranteed capacity reached its peak value of 50 GW in December - this figure represents 80% of the total generating capacity. The lowest value of 37 GW was reached in August - this represents 60% of the total generating capacity.

3.3 Load

The common reference load for all UCTE countries reached a maximum of 276 GW in December. This figure is 12.5 GW higher than the maximum reference load in 1999.

In CENTREL countries, the maximum reference load reached 38 GW in January.

For the UCTE and CENTREL combined, the maximum load was 313 GW, recorded in December.

Maximum load demand in UCTE and CENTREL countries is generally recorded during the winter months. Maximum loads recorded in the various countries in 2000 (not at the same time) are shown in TABLE 7.

Table 7 | **Time of maximum load in the various UCTE countries in 2000**

Country	Day	Date	TimeMaximum	Peak load %	Change °C	Texternal °C	Tnormal °C
UCTE							
B	Wednesday	12.01.00	17:45	12 653 MW	-0,2	-0,4	-4,1
D	Tuesday	14.11.00	18:00	76800 MW	8,3	7,4	2,9
E	Tuesday	25.01.00	20:00	33236 MW	6,3	3,9	-4,6
F	Tuesday	12.01.00	19:00	72400 MW	0,7	2,4	-1,3
GR	Thursday	06.07.00	12:00	8531 MW	15,8	37	*)
I	Wednesday	20.12.00	17:00	49019 MW	2,8	7,9	-0,9
SLO	Friday	15.12.00	14:00	1705 MW	1,1	8	3
HR	Wednesday	26. 01.00	19:00	2661 MW	8,0	-15	15
JIEL	Monday	24. 01.00	15:00	8268 MW	-5,5	-6,4	14,2
L	*)	*)	*)	*)	*)	*)	*)
NL	Monday	27.11.00	17:25	12 558 MW	1,8	8	6
A	*)	*)	*)	*)	*)	*)	*)
P	Tuesday	25.01.00	19:45	6557 MW	7,1	6,5	-4,5
CH	Wednesday	19.01.00	11:45	9027 MW	0	2	*)
CENTREL							
CZ	Wednesday	26.01.00	13:00	9428 MW	2,2	-5,6	-4,5
H	Friday	01.12.00	15:00	5340 MW	-1,8	3,3	-0,7
PL	Tuesday	11. 01.00	17:00	21646 MW	-5,0	*)	*)
SK	Wednesday	26.01.00	12:00	4275 MW	0,5	-7	-4

*) Values not available

Comments:

- E Temperatures recorded at the end of January were substantially below average. In general, the Mediterranean region was affected by a rare spell of cold weather. This resulted in an unexpectedly high value for the peak load, which was substantially higher than that indicated in the 2000 - 2002 forecast.
- F The peak load, an overall record for national consumption, was reached on 12th January 2000 with a value of 72,400 MW. The temperature was 1.3°C lower than the normal statistical value.
- D The peak load for the German electricity system as a whole was reached on Tuesday 14th November 2000 at 6:00 p.m. with a value of 76,800 MW. Comparison with the peak load for 1999 (70,900 MW on 18th November 1999) shows an increase of 8%. This is due, in part, to the new methodology applied for the recording of the load, which includes small power plants of capacity less than 1 MW and the load which they supply in the balance. It should be noted, however, that the annual movement in the peak load (in MW) is more erratic than the movement in electricity consumption (in TWh). While the peak load has shown only modest increases in recent years (and even a 2% fall in 1999), electricity consumption over the same period has shown a sustained increase of 1 - 2% per annum.
- GR The peak load shows a significant increase over the previous year. The peak load was recorded in July, and is associated with the operation of air conditioning systems. On the day of the peak load, the temperature reached 43°C.
- NL Since December 2000, the load recorded by TenneT has changed, following the movement of points of measurement used. Since the load is no longer restricted to data managed by the SEP, there has since been a slow shift in the representative proportion of the load.

In 2000, the simultaneity factor (the maximum common reference load divided by the sum of the individual peak loads) in UCTE countries was 91.5% (as against 90.8% in 1999, 91.2% in 1998 and 93.6% in 1997). The figure for CENTREL countries was 89.7% (89.4% in 1999).

3.4 Surplus available capacity excluding exchanges

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

However, this should not be classified as an overcapacity. In practice, power plant operators will need to have access to reserve capacity over and above the capacity made available for network services. This reserve capacity is required, e.g. for the coverage of long-term power plant outages or the coverage of demand in excess of the reference load.

Various countries are therefore of the view that power plant operators should maintain an additional reserve of approximately 5% of the national generating capacity.

On the third Wednesday in December 2000, the surplus available capacity, excluding exchanges, in UCTE countries reached 45 GW, or approximately 10% of the total generating capacity.

In CENTREL countries, the surplus available capacity excluding exchanges reached 13 GW, or 21% of the total generating capacity.

Monthly values for the surplus available capacity, excluding exchanges, in proportion to total generating capacity in all countries are shown in TABLE 8.

Table 8**Surplus available capacity 2000 in %**

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
UCTE*	8,2	9,3	12,6	11,3	11,9	10,5	12,7	16,1	9,3	10,3	9,0	10,2
CENTREL*	15,4	18,3	16,8	18,3	16,2	15,1	15,6	12,9	12,4	16,5	21,8	20,9
UCTE + CENTREL*	9,1	10,5	13,1	12,2	12,4	11,1	13,1	15,7	9,7	11,1	10,6	11,5

* Surplus available capacity, excluding exchanges, as a proportion of total generating capacity.

These values, together with the margin 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 surplus available capacity will be required to cover.

The following information from individual UCTE countries is of significance in the interpretation of the surplus available capacity:

- D The reserve for network services includes contracts concluded with foreign storage or pumped storage power plants. Consequently, while the surplus available capacity is realistic for the UCTE as a whole, German figures for this capacity are under-estimated.
- E In order to arrive at a correct interpretation of results for Spain, the very substantial discrepancy between the reference load and the monthly peak load (in excess of 4 GW), particularly in winter, must be taken into account. It is therefore difficult to draw conclusions regarding the surplus available capacity.
- GR The guaranteed capacity (excluding exchanges) does not cover the peak load in July and August.
- L The surplus available capacity, excluding exchanges, shows significant variations, which are governed by the non-usable capacity.
- A A proportion of the surplus available capacity (excluding exchanges) is exported as control capacity.

3.5 Balance of physical exchanges

In UCTE countries, the balance of physical exchanges is generally an import balance. The maximum value recorded is 4.6 GW in October - this represents nearly 2% of the load.

In CENTREL countries, there is a 2 - 3 MW export balance of physical exchanges throughout the year. This represents between 8 and 10% of the load.

For the UCTE and CENTREL combined, the balance ranges from a 1.4 GW import balance in October to a 4.9 GW export balance in August.

Comments:

- E There has been an increase in the number of players conducting international transactions. However, no significant variation over previous years has been observed in the balance of exchanges at the reference time.
- I The year 2000 was characterised by an increase in demand, leading to an increase in imports. The balance of exchanges therefore shows a 5.6% increase over the previous year.

- PL In previous years, only contractual exchanges were taken into account. These values differed substantially from physical exchanges. Consequently, the balance of exchanges is not comparable to that recorded in previous years.
- CZ There has been a significant increase in exports.
Unscheduled transits on the Czech system have been relatively high.

3.6 Surplus available capacity including exchanges

Since the balance of exchanges is relatively low, the surplus available capacity including exchanges shows the same variations as the surplus available capacity excluding exchanges.
For the UCTE and CENTREL combined, this figure ranges from 43 GW in January to 74 GW in August.

Comments:

- D Although the surplus available capacity including exchanges, in common with the surplus available capacity excluding exchanges, is realistic, this figure is somewhat under-estimated as a result of contracts for network services concluded with foreign power plant operators.
- E Values for the surplus available capacity are very similar to those calculated for the 2000 - 2002 forecast. The surplus available capacity still exceeds the values recorded in 1999, given that the increase in generating capacity has exceeded the increase in load.
- L Since the major proportion of national electricity consumption is covered by supply contracts concluded with foreign suppliers, there is virtually no surplus available capacity excluding exchanges. The surplus available capacity, including exchanges, originates from Vianden pumped storage facility, and is used for export.
- GR In general, the surplus available capacity is sufficient in the course of the year, and has shown improvements over previous years. A shortfall in capacity is possible in July and August, as a result of high temperatures. These peak loads are covered by imports.
- A Although the surplus available capacity including exchanges, in common with the surplus available capacity excluding exchanges, is realistic, this figure is somewhat over-estimated as a result of contracts for network services concluded with foreign power plant operators.
- PL The surplus available capacity has shown an increase. It may be assumed that the deregulated electricity market has a significant role to play in this situation.

4. Comments on results

4.1 Electricity production

In 2000, net electricity production in UCTE countries totalled 1862 TWh, an increase of 2.5% over production for the previous year.

In CENTREL countries, net electricity production totalled 273 TWh, an increase of 3.5% over 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 electricity production 2000

Country	Total 1999	Hydro power plants	Nuclear power plants	Conv. thermal plants	Other sources	Total 2000	Variation 2000/99
	Twh	%	%	%	%	TWh	%
B	80,7	2	57	41	-	80,1	- 0,7
D	484,1	5	32	63	-	495,4	2,3
E	181,9	16	30	51	3	194,8	6,6
F	500,0	14	76	10	-	517,0	3,3
GR	41,2	9	-	91	-	44,7	7,8
I	252,7	19	-	79	2	262,3	3,7
SLO	11,8	29	38	33	-	12,1	2,5
HR	11,3	59	-	41	-	9,8	- 15,3
JIEL	40,2	32	-	68	-	41,1	2,2
L	1,0	82	-	18	-	1,1	13,8
NL	52,2	-	7	93	-	52,9	1,3
A	51,2	77	-	23	-	52,6	2,7
P	37,1	30	-	65	5	37,6	1,3
CH	66,5	58	37	4	1	60,5	- 9,9
UCTE	1811,9	16	37	46	1	1862,0	2,7
CZ	59,4	3	19	78	-	67,7	12,3
H	34,8	1	41	55	3	32,4	- 7,4
PL	141,3	3	-	97	-	144,4	2,1
SK	26,0	17	53	21	9	28,7	9,4
CENTREL	261,5	4	15	79	2	273,2	4,3
UCTE +CENTREL	2073,4	14	34	51	1	2135,2	2,9

Comments:

- A The hydraulicity coefficient over the year was 1.16 (as against 1.10 in 1999).
- D Retrospective data for the energy balance are based upon official statistics, and relate to public/general electricity supplies. At 1.14, hydraulicity was once again slightly higher than average, as in the previous year (1.11). Nuclear power plants produced virtually the same quantity of electricity as in the previous year. Figures for conventional thermal production incorporate surplus production from industrial auto-producers which is supplied to the public electricity system, i.e. production which is not required to meet the internal demand of autoproducers. In the interpretation of figures for electricity production from renewables, it should be noted that, in general, official statistics only include data for installations of capacity exceeding 1 MW. Consequently, the major proportion of production from renewables is not taken into account. The majority of data supplied relate to waste incineration which, by definition, is included in renewable energy sources. Power supplies from wind power installations are estimated by the Deutsches Institut für Wirtschaft (German Economics Institute) at 9.2 TWh, an increase of two thirds over 1999. It is very important that these factors should be taken into account in the comparison of the capacity and volume of renewables.
- E Although lower than average, hydraulicity over the year was some 20% higher than that recorded in the previous year. Likewise, hydroelectric production showed an increase of 15%.
- F Hydraulicity was 1.04. However, values recorded in October and November were abnormally high. Nuclear production has increased by 20 TWh over 1999, following the entry into service of new N4 units.
- GR Hydraulicity was low during 2000. The problematic electricity supply situation in adjoining countries precluded any utilisation of reserve capacity in these countries. The annual consumption was therefore covered by national production. Although peak loads in the warm summer months were covered by imports, the annual energy balance shows a balance of exports.

- I Hydraulicity was substantially higher than average during the last quarter of the year; however, production was 2.9% lower than in 1999.
- L Hydraulicity was exceptional, leading to a 22.6% increase in hydroelectric production over 1999.
- NL Power and energy data for 2000 are those supplied by electricity producers within the SEP. Since this cooperative arrangement has now been discontinued, power and energy balances from December 2000 onwards will be prepared using data which represent a greater proportion of the electricity system.
- P In contrast to the previous year, hydraulicity was close to average. Exceptional values were recorded in December.
- PL Hydroelectric power plant overhauls were more extensive than forecast.

4.1.1 Hydroelectric power plants

In 2000, electricity production from hydroelectric plants totalled 303 TWh, a fall of 3 TWh over the previous year.

FIGURE 1 in the annex shows annual electricity production in the various countries.

Table 10 shows the capacity utilisation factor of hydroelectric plants in 2000, compared to the results of the 1999 retrospect, for each UCTE and CENTREL country.

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.

Country	Maximum capacity (GW) Januar/janvier/January		Production TWh		Capacity utilisation %	
	1999	2000	1999	2000	1999	2000
B	1,4	1,4	1,5	1,7	12,2	13,9
D	8,4	9,2	21,0	22,3	28,5	27,7
E	17,4	17,6	27,4	31,4	18,0	20,4
F	24,3	24,3	76,5	72,0	35,9	33,8
GR	3,0	3,1	4,8	4,0	18,3	14,7
I	20,1	20,4	51,0	49,5	29,0	27,7
SLO	0,8	0,8	3,4	3,5	48,5	49,9
HR	2,0	2,0	6,5	5,8	37,1	33,1
JIEL	3,9	3,9	15,1	13,1	44,2	38,3
L	1,1	1,1	0,8	0,9	8,3	9,3
NL	-	-	-	-	-	-
A	10,9	10,9	39,0	40,7	40,8	42,6
P	4,4	4,4	7,4	11,4	19,2	29,6
CH	13,2	13,2	40,5	35,2	35,0	30,4
UCTE	110,9	112,3	294,9	291,5	30,4	29,6
CZ	2,0	2,1	2,3	2,3	13,1	12,5
H	-	-	0,2	0,2	-	-
PL	2,1	2,1	4,2	4,0	22,8	21,7
SK	2,4	2,4	4,8	5,0	22,8	23,8
CENTREL	6,5	6,6	11,5	11,5	20,2	19,9
UCTE + CENTREL	117,4	118,9	306,4	303,0	29,8	29,0

4.1.2 Nuclear power plants

In 2000, electricity production from nuclear power plants in the UCTE totalled 690 TWh, an increase of 21 TWh (3%) over the previous year.

In CENTREL countries, production from nuclear power plants totalled 41 TWh, an increase of 3 TWh over 1999.

Table 11 shows the capacity utilisation factor of nuclear power plants in 2000, compared to the results of the 1999 retrospect, for each UCTE and CENTREL country.

Country	Maximum capacity (GW) Januar/janvier/January		Production TWh		Capacity utilisation %	
	1999	2000	1999	2000	1999	2000
B	5,7	5,7	46,6	45,7	93,3	91,5
D	22,0	21,8	159,6	159,4	82,8	83,5
E	7,3	7,4	56,4	59,4	88,2	91,6
F	61,7	63,2	375,0	395,0	69,4	71,3
GR	-	-	-	-	-	-
I	-	-	-	-	-	-
SLO	0,6	0,6	4,5	4,6	85,6	87,5
HR	-	-	-	-	-	-
JIEL	-	-	-	-	-	-
L	-	-	-	-	-	-
NL	0,4	0,4	3,6	3,7	91,5	91,5
A	-	-	-	-	-	-
P	-	-	-	-	-	-
CH	3,1	3,1	23,5	22,6	86,5	83,2
UCTE	100,8	102,2	669,2	690,4	75,8	77,1
CZ	1,6	1,6	12,5	12,7	89,2	90,6
H	1,8	1,8	13,3	13,3	84,3	84,3
PL	-	-	-	-	-	-
SK	2,2	2,2	12,1	15,2	62,8	78,9
CENTREL	5,6	5,6	37,9	41,2	77,3	84,0
UCTE + CENTREL	106,4	107,8	707,1	731,6	75,9	77,5

4.1.3 Conventional thermal power plants

In 2000, electricity production from conventional thermal power plants in the UCTE totalled 863 TWh, an increase of 32 TWh (3.3%) over the previous year.

In CENTREL countries, production from conventional thermal plants totalled 217 TWh, an increase of 10 TWh over 1999.

Table 12 shows the capacity utilisation factor of conventional thermal power plants in 2000, compared to the results of the 1999 retrospect, for each UCTE and CENTREL country.

Table 12

Conventional thermal power plants

Country	Maximum capacity (GW) Januar/janvier/January		Production TWh		Capacity utilisation %	
	1999	2000	1999	2000	1999	2000
B	8,3	7,9	32,1	32,7	44,1	47,3
D	69,2	68,4	299,2	310,7	49,4	51,9
E	20,7	21,1	94,6	98,6	52,2	53,3
F	22,3	22,7	48,5	50,0	24,8	25,1
GR	5,8	5,8	36,4	40,7	71,6	80,1
I	51,8	52,6	195,8	206,1	43,1	44,7
SLO	1,0	1,0	3,9	4,0	44,5	45,75
HR	1,3	1,7	4,8	4,0	42,1	26,9
JIEL	6,8	6,8	25,1	28,0	42,1	47,0
L	0,1	0,1	0,2	0,2	22,8	29,8
NL	13,6	13,9	48,6	49,2	40,8	40,4
A	5,2	5,0	2,2	11,9	26,8	27,2
P	4,2	4,9	27,9	24,3	75,8	56,6
CH	0,9	0,6	2,2	2,3	27,9	43,8
UCTE	212,2	212,5	831,5	862,7	44,9	46,2
CZ	9,8	10,4	44,6	52,7	52,7	57,8
H	5,2	5,1	20,3	17,7	44,6	39,6
PL	30,8	31,3	137,1	140,4	50,8	51,2
SK	2,3	2,3	4,8	6,0	23,8	29,7
CENTREL	48,1	49,1	206,8	216,8	49,1	50,0
UCTE + CENTREL	259,3	261,6	1038,3	1079,5	45,7	47,0

Comments:

- L The 13% growth in thermal production stems from the commissioning of a number of small cogeneration units.
- GR Production has shown an increase over 1999. The contributions of natural gas (12%) and oil (10%) have increased at the expense of brown coal (69%). The contribution of renewables to production on the Greek interconnected system is not significant as yet.
- P Thermal production has shown a 13% fall over the previous year, as a result of hydraulicity. There were no significant variations in relation to the forecast. Production from renewables has shown a substantial increase in 2000. This reflects the more consistent operation of the two household waste incineration plants commissioned in 1999, and the substantial increase in the installed wind power capacity. There were no significant variations in relation to the forecast.

4.2 Electricity exchanges

The volume of electricity exchanges (imports + exports) in UCTE countries in 2000 totalled 408 TWh, exceeding the corresponding figure for the previous year by 18 TWh. Overall, there was a balance between third country imports and exports (with imports of 9 TWh).

In CENTREL countries, exchanges totalled 71 TWh, a significant increase of 33 TWh over the previous year, with an export balance of 16 TWh, as against 7 TWh in 1999.

TABLE 13 shows the balance of electricity exchanges and consumption in 2000 for each country. Results are compared to the balance for 1999.

Table 13

Balance of physical exchanges (imports - exports in TWh)

Country	Balance (imports - exports)		Proportion of electricity consumption	
	1999	2000	1999	2000
B	0,7	4,3	0,9 %	5,2 %
D	0,8	2,1	0,2 %	0,4 %
E	5,7	4,4	3,1 %	2,3 %
F	- 63,7	- 69,4	-14,8 %	-15,7 %
GR	0,2	0,0	0,5 %	0,0 %
I	42,0	44,3	14,7 %	14,9 %
SLO	- 1,3	- 1,4	- 12,4 %	- 13,1 %
HR	2,3	4,0	16,9 %	29,0 %
JIEL	1,7	3,1	4,2 %	7,1 %
L	5,6	5,7	98,2 %	98,3 %
NL	18,6	18,9	26,3 %	26,3 %
A	- 2,0	- 1,3	- 4,2 %	- 2,6 %
P	- 0,9	0,9	- 2,5 %	2,4 %
CH	- 10,2	- 7,0	- 18,6 %	- 13,5 %
UCTE	- 0,5	8,6	0,0 %	0,4 %
CZ	- 3,3	- 10,0	- 6,0 %	- 17,5 %
H	1,1	3,4	3,1 %	9,5 %
PL	- 4,9	- 6,4	- 3,7 %	- 4,7 %
SK	0,0	- 2,7	0,0 %	- 10,5 %
CENTREL	- 7,1	- 15,7	- 2,8 %	- 6,2 %
UCTE + CENTREL	- 7,6	- 7,1	- 0,4 %	- 0,4 %

Comments:

- E Players on the market have continued to increase the number of international transactions, particularly since the entry into force in June 2000 of a new legislative decree for the acceleration of market deregulation. This legislation will allow electricity traders to conclude purchase agreements outside the Spanish system. Exports have shown a slight increase, leading to an import balance which is somewhat lower than in the previous year.
- F The export balance is slightly higher than in 1999, as a result of the fall in imports. There has also been an increase in electricity transits through France.
- I Imports have exceeded 44 TWh - this is the highest figure ever recorded.
- L The import balance has increased by 2.6% over 1999. This increase is somewhat lower than the increase in the load, since national electricity production has risen by 16%.
- P Exchanges include power purchases and sales by the REN on the Spanish market, together with purchases by eligible Portuguese customers from the Spanish market.

4.3 Electricity consumption (excluding pumping)

Electricity consumption in UCTE and CENTREL countries in 2000 exceeded consumption for the previous year by 3%. During the summer months, electricity consumption increased by 3.9% and by 2.1% in the winter months.

Detailed figures for each country are shown in Figure 2.

TABLE 14 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	1999		2000		Variation 2000/99	
	Summer quarters	Winter quarters	Summer quarters	Winter quarters	Summer quarters	Winter quarters
B	46,7	53,3	46,9	53,1	4,5	3,8
D	46,2	53,8	46,7	53,3	3,4	1,3
E	49,1	50,9	49,1	50,9	5,3	5,4
F	44,8	55,2	45,1	54,9	3,1	1,7
GR	49,1	50,9	51,3	48,7	12,2	2,8
I	49,1	50,9	49,2	50,8	4,3	4,0
SLO	47,6	52,4	47,7	52,3	0,3	0,2
HR	44,1	55,9	44,2	55,8	1,6	1,3
JIEL	36,6	63,4	40,9	59,1	19,5	- 0,4
L	47,8	52,2	47,1	52,9	1,8	4,5
NL	48,6	51,4	48,9	51,1	1,9	0,8
A	45,3	54,7	45,6	54,4	4,2	2,7
P	50,0	50,0	50,0	50,0	6,5	5,6
CH	54,6	45,4	53,8	46,2	2,7	3,8
UCTE	46,9	53,1	47,3	52,7	4,0	2,4
CZ	43,0	57,0	43,9	56,1	5,0	1,3
H	46,0	54,0	46,6	53,4	1,2	- 1,5
PL	44,3	55,7	45,0	55,0	3,0	0,0
SK	44,0	56,0	44,5	55,5	0,9	- 1,4
CENTREL	44,2	55,8	44,9	55,1	2,8	- 0,1
UCTE + CENTREL	46,6	53,4	47,0	53,0	3,9	2,1

Comments:

- D Higher temperatures than those recorded in the previous year led to a fall in consumption during the winter months. However, this factor was more than offset by the improvement in economic conditions over the previous year.
- E Although consumption continues to show strong growth, this trend has been moderated by milder climatic conditions during 2000.
- F Consumption has increased in response to economic growth, notwithstanding winter weather conditions which were even milder than in 1999.
- GR Consumption in 2000 showed a 7.1% increase over 1999. During the summer, consumption increased by 12.3%, in response to high temperatures.
- I Consumption showed a 4.2% increase over 1999, with higher growth in the summer peak than in the winter peak.
- L The 3.2% growth recorded was largely due to economic developments.

5. Comments on market deregulation

- A The new Austrian law for the organisation of the electricity sector (Elektrizitätswirtschafts- und organisationsgesetz - ElWOG) was brought into force in December 2000. This law provides for the complete deregulation of the Austrian electricity market with effect from 1st October 2001. After this date, every Austrian electricity customer will be free to select the supplier of their choice. At the same time, the corporate electricity regulator (Elektrizitäts-Control GmbH) and the electricity regulatory commission (Elektrizitäts-Control-Commission) have been constituted as the supervisory authorities for the Austrian electricity industry.
- B As market deregulation gathers pace, the official schedule is now as follows:
- the eligibility of customers of consumption exceeding 20 GWh was enacted at federal level by Royal Decree on 31st December 2000. This eligibility should take effect in all three regions of Belgium (Flanders, the Walloon region and Brussels) early in 2002;
 - for users of consumption exceeding 10 GWh, the date of eligibility at federal and regional level will be 31st December 2002;
 - at federal level, the full deregulation of electricity distribution is scheduled for 1st January 2007, and will be implemented according to the category of customers concerned. In the regions, this will be reflected by specific measures, such as the eligibility of customers who are supplied directly from the high voltage system with effect from 21st December 2004 in the Walloon region and with effect from 1st January 2005 in Brussels. In Flanders, the electricity market should be completely open to competition with effect from July 2003.
- D In Germany, the Associations' Agreement II (VV II - Verbändevereinbarung II) concerning basically the commercial aspects - including pricing - of the grid usage was signed by the associations of grid operators and grid users in December 1999 and implemented from February 2000 on. Approx. 300 balancing group managers were registered at the end of the year. They recorded a very busy and continuously increasing wholesale trade. Compared to the former agreement of May 1998 based on single transactions, VV II changes fundamentally the point of view towards the concept of balancing groups, where many customers and power plant operators are respectively assigned and affiliated to an electricity trader.

The "Transmission Systems" consultation committee developed the GridCode 2000 together with the grid users. The 1998 version was adjusted to the VV II.

At the end of the year, RWE and VEW founded the joint RWE Net AG. Likewise, the networks of the E.ON group which resulted from the merger (VEBA-VIAG) of Bayernwerk and PreussenElektra merged in the E.ON Netz GmbH. In 2000, first approaches between HEW, VEAG and Bewag were initiated with a view to building up the fourth force in the German electricity sector. In October 2000, the consolidated companies announced power plant shut-downs on a large scale in the years to come.

- CH The law on the electricity market has been adopted by the Federal Chambers. In the first three years, customers whose annual consumption exceeds 20 GWh will be free to select the supplier of their choice. This will affect some 110 Swiss undertakings. During the same period, distribution companies will also enjoy access to the market, up to the value of 20% of their annual supplies to non-eligible customers. Thereafter, the threshold for large customers will be reduced to 10 GWh, and the proportion of annual supplies for distributors will be raised to 40%. The electricity market will be completely deregulated after seven years. Within three years of its entry into force, the law on the electricity market requires the constitution of a private law corporation for the operation of the transmission system. A popular initiative (referendum) has been initiated against the law on the electricity market. Should this initiative succeed, the date of entry into force of the law may be postponed by several months.

- E A new decree for the acceleration of the deregulation of the Spanish electricity market was brought into force in June 2000.
- F The transmission system operator RTE was officially constituted with effect from 1st July. The RTE is managed independently of the EDF group. Market deregulation is reflected by the increase in electricity exchanges and an increase in the number of transits via the French system, leading to congestion on interconnectors to Spain and Italy.
- GR Preparations for market deregulation have continued during 2000. Market rules have been established and a new company has been constituted to undertake the function of market administration.
- I Energy policy and ecological constraints argue in favour of an increase in electricity production from renewables. The significant increase in imports may be attributed to the requirements of eligible customers for access to international interconnectors, with a view to purchasing electricity at more competitive prices than those in force on the Italian market.
- L A 350 MW combined cycle plant is to be commissioned during 2001. This will have a significant influence upon the loading of interconnectors. From the start of 2001, the threshold for eligibility has been set at 20 GWh. This reduction in the threshold has led to a significant increase in the number of eligible customers, with a consequent increase in competitive pressures on the market.
- NL During 2000, the electricity market in the Netherlands was still in a state of transition. While the major producers represented by the SEP continued to cooperate in the overall optimisation of production and retained their responsibility for control and reserve capacity, specific contractual arrangements with electricity supply companies were also in force. In consequence, the deregulation of the electricity market had yet to be fully completed. This situation was brought to an end with effect from 1st January 2001.
- P In 2000, customers on the independent system accounted for 1% of consumption supplied by the public electricity system.
- PL The electricity stock exchange began operation during the year covered by this report.
- CZ A new law governing the energy sector was adopted in December 2000. The deregulation of the electricity market is to begin during 2001, and will be completed on 1st January 2006. With effect from 27th January 2001, the CEPS has extended the purchase of network services to include independent generators (excluding the CEZ).

Figure G1

Electricity production in hydroelectric power plants
Retrospect 2000

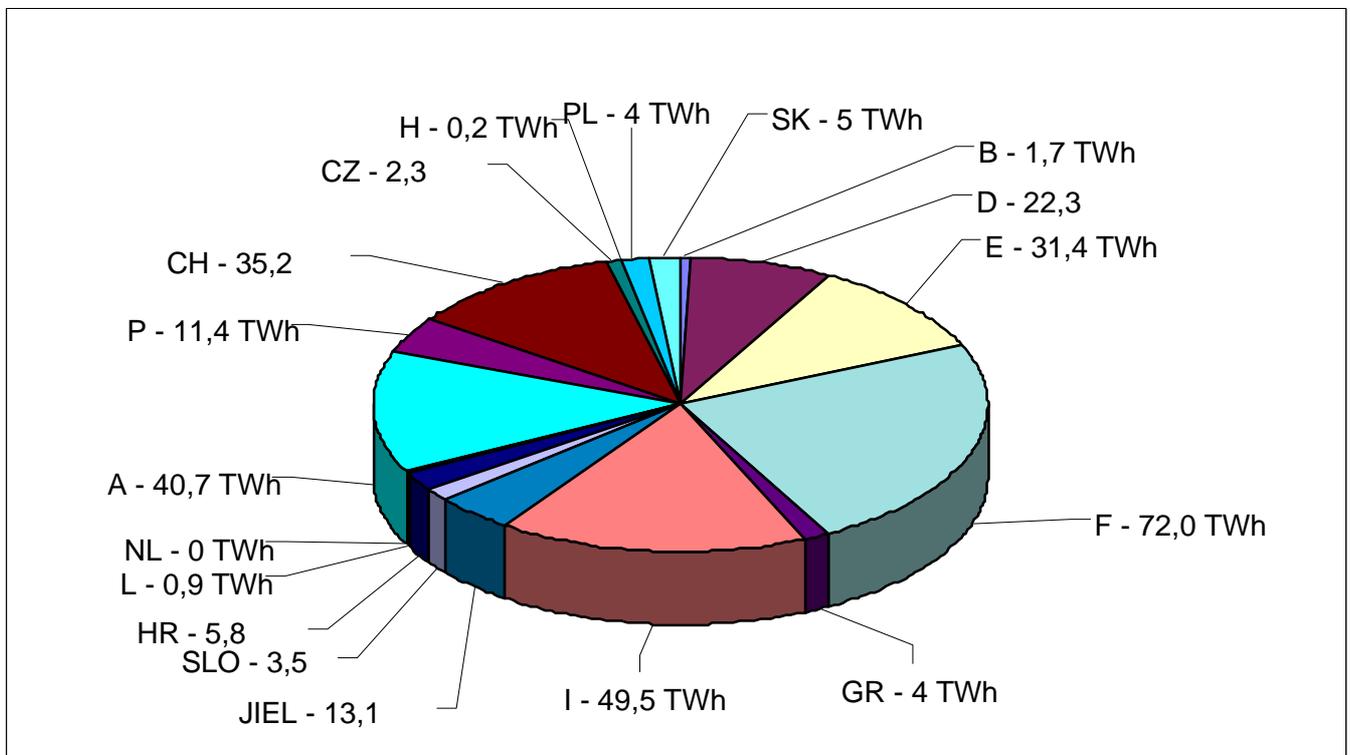


Figure G2

Comparison of national electricity consumption during the summer and winter quarters of 1999 and 2000

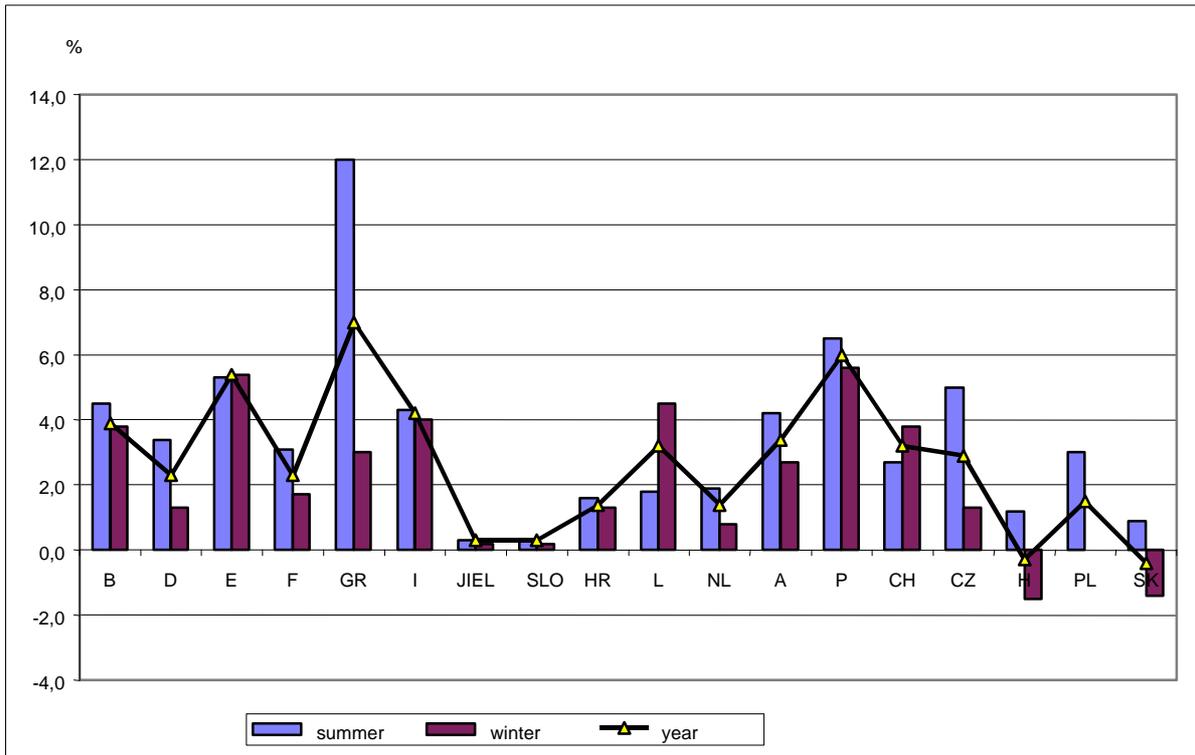


Figure G3

Remaining capacity

