UCTE

2 / 2004

Half-yearly Report

union for the co-ordination of transmission of electricity

What is the UCTE ?

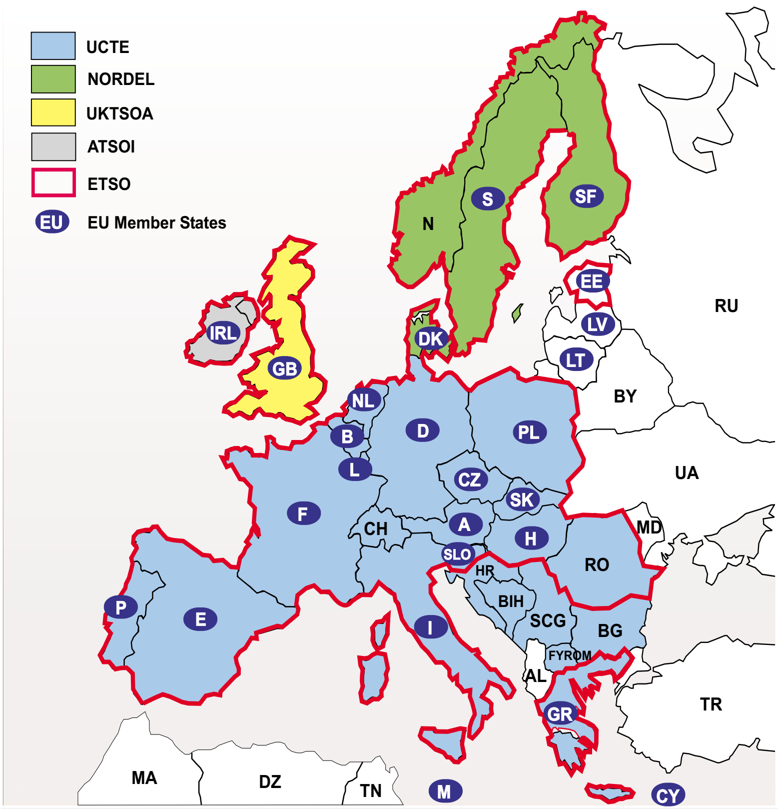
The Union for the Co-ordination of Transmission of Electricity (UCTE) co-ordinates the interests of transmission system operators in 22 European countries. Their common objective is to maintain the security of operation of the interconnected power system.
50 years of joint activities laid the basis for a leading position in the world which the UCTE holds in terms of the quality of synchronous operation of interconnected power systems. Through the networks of the UCTE, 450 million people are supplied with electric energy; annual electricity consumption totals approx. 2300 TWh.

As of June 2003, the member companies of the UCTE come from the following countries :

- Belgium (B)
- Germany (D)
- Spain (E)
- France (F)
- Greece (GR)
- Italy (I)
- Slovenia (SLO)
- Croatia (HR)
- Bosnia-Herzegovina (BiH)
- Former Yugoslav Republic of Macedonia (FYROM)
- Serbia and Montenegro (SCG)
- Luxembourg (L)
- The Netherlands (NL)
- Austria (A)
- Portugal (P)
- Switzerland (CH)
- Czech Republic (CZ)
- Hungary (H)
- Poland (PL)
- Slovak Republic (SK)
- Romania*
- Bulgaria*

*Bulgaria and Romania are UCTE members since 8th May 2003, but statistically taken into account since January 2003. In addition data from Western Ukrainia which is synchronously operated with UCTE are integrated in this report.

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



Optimal Co-operation requires joint action

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

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

From the very outset of liberalisation in the European electricity markets, the UCTE has intensively pursued the development of schemes for the promotion of competition in the electricity sector. The aim is to support the electricity market without accepting restrictions in the security of supply. The liberalisation of electricity markets cannot be implemented without a transparent and non-discriminatory opening up of electric networks. The UCTE sets the prerequisites that enable a compromise to be ensured between competition and security of supply.

HALF-YEARLY REPORT II - 2004

Table of contents

Chapter I -VI are based on values from the UCTE database as of 24 February 2005

1.1 Introduction

This half-yearly report deals with the electricity supply situation, exchanges and load curves during the summer period 2004, i.e. from 1 April 2004 to 30 September 2004.
The electricity consumption values in this report are net values unadjusted for climatic factors and seasonal variations.

1.2 Electricity supply situation and peak load

The consumption of electricity on the UCTE interconnected system amounted to **1112.6 TWh** during this summer period. The increase of 1.6 % in comparison with the same period in 2003 is mainly due to new UCTE members in RO and BG. The highest consumption increase in the period of report was registered in September with 2.9 %, the lowest was registered in July with 0.7 %.
The peak load from all UCTE countries in the period of report amounted to 313.9 GW at 12:00 p.m.on 21th July, this was 0.9% lower above value of June 2003.
The highest utilisation factor of maximum load was reported in August with 98.7%, while it reached 97.8% in September 2003.

1.3 Generation and hydraulicity

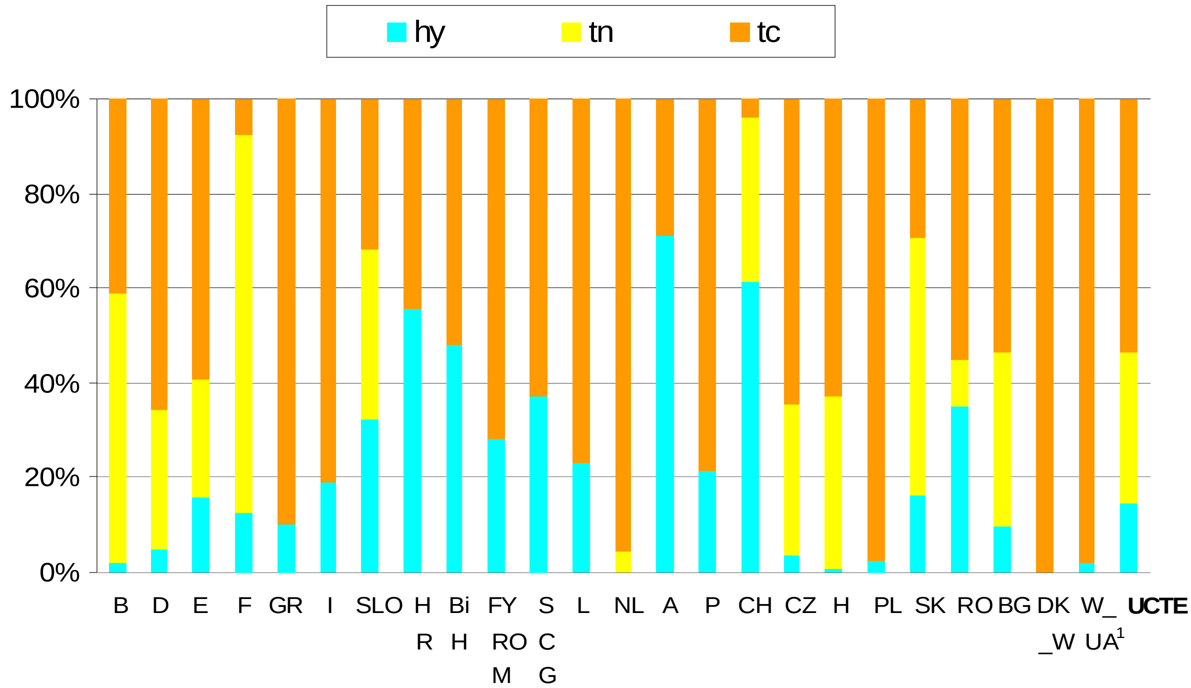
Total generation within UCTE in the period of report amounted to 1140.5 TWh and was made up by 14.3% generation from hydro power, 53.8% non-nuclear thermal generation and 31.9% nuclear generation.

G1 — Generation within UCTE in the summer period 2004 — Results in TWh

	Hydro power	Nuclear power	Conventional power	National production
B	0.7	21.8	16.5	39.0
D	11.8	71.2	158.7	241.7
E	19.2	30.7	72,6	122.5
F	30.6	192.4	18.3	241.3
GR	2.4	0	21.9	24.4
I	27.0	0	115.2	142.2
SLO	2.1	2.4	2.1	6.5
HR	3.4	0	2.7	6.1
BiH	2.6	0	2.8	5.5
FYROM	0.7	0	1.9	2.7
SCG	6.2	0	10.4	16.6
L	0.4	0	1.4	1.9
NL	0	1.9	42.8	44.8
A	20.2	0	8.3	28.4
P	3.9	0	14.3	18.2
CH	20.2	11.3	1.4	32.9
CZ	1.3	11.4	23.0	35.7
H	0.1	5.1	8.9	14.1
PL	1.7	0	63.3	65.0
SK	2.1	7.0	3.8	12.8
RO	8.3	2.3	13.1	23.6
BG	1.7	6.6	9.7	18.0
UCTE	**163.3**	**364.1**	**613.1**	**1140,5**
DK West	0	0	9.7	9.7
West UA[1]	0.1	0	3.4	3.5

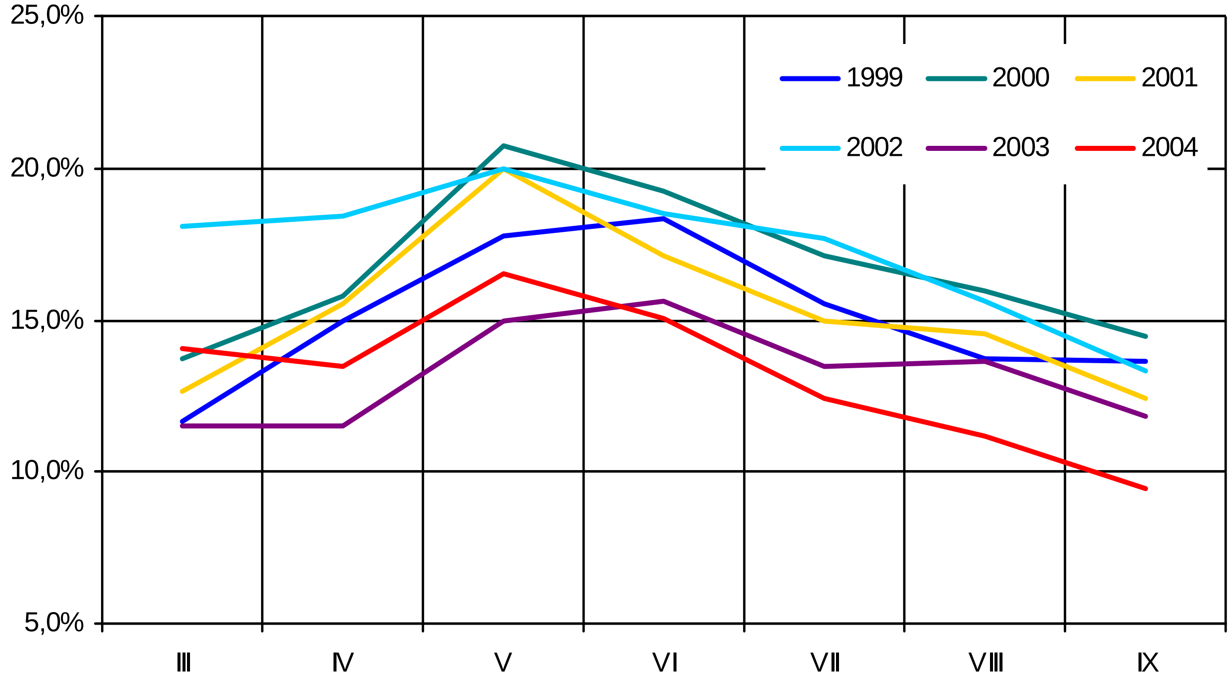
[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

G2	Structure of generation within UCTE in the summer period 2004



[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

G3	Percentage of hydropower generation in the aggregate consumption of all countries



1.4 Electricity exchanges

The total of electricity exchanges, including third countries, was 136 384 GWh, corresponding to an decrease of - 4.8% as compared to the summer period 2003.

France continues to remain the main exporting country with 32.20 TWh where as the highest imports in the period of report were recorded in Italy with 21.04 TWh.

T1 **Balance[1] of exchanges within UCTE summer period 2004 Results in GWh**

Country	Import	Export	Balance
B	6665	3951	**2714**
D	23171	19941	**3230**
E	3653	5584	**- 1931**
F	2853	32203	**- 29350**
GR	2489	644	**1845**
I	21045	526	**20519**
SLO	3606	4052	**- 446**
HR	4197	2912	**1285**
BiH	757	1384	**- 627**
FYROM	951	532	**419**
SCG	2090	1508	**582**
L	3191	1516	**1675**
NL	9598	2142	**7456**
A	6030	6666	**- 636**
P	4520	794	**3726**
CH	9633	12542	**- 2909**
CZ	4007	12209	**- 8202**
H	6459	2438	**4021**
PL	2094	6209	**- 4115**
SK	3796	4734	**- 938**
RO	943	1075	**- 132**
BG	349	2988	**- 2639**
UCTE	**122097**	**126550**	**- 4453**
DK West	3270	3210	**60**
West UA [2]	604	2708	**- 2104**

[1] Balance = Import - Export
[2] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

T3 Electricity supply situation in summer period 2004

Total consumption[1]			04/03-09/03	04/04-09/04	04/04	05/04	06/04	07/04	08/04	09/04
	A	**TWh**	1095,0	1112,6	189,3	185,5	183,0	189,7	178,3	186,8
Increase		**%**		1,4	1,2	2,2	1,1	0,5	0,8	2,8
Peak load [2]	B	**GW**	311,0	313,9	307,0	300,0	305,9	313,9	281,7	309,4
Increase		**%**		0,9	3,5	-0,7	-1,6	1,4	-0,3	3,0
Utilisation factor of maximum load	$C^3 = \frac{A}{h \times B}$	**%**	80,2	80,7	85,6	83,1	83,1	81,2	85,1	83,8
Total Generation[1]										
Volume		**TWh**	1120,5	1140,5	193,6	189,9	187,9	194,5	183,5	191,0
Increase		**%**		1,9	1,5	2,2	2,1	1,2	1,0	3,2
Hydroelectric generation	D	**TWh**	142,4	163,3	27,2	31,7	31,5	28,0	23,7	21,2
Increase		**%**		14,7	7,7	6,1	16,2	19,6	20,5	23,7
Thermal generation [4]	T	**TWh**	978,1	977,2	166,5	158,3	156,4	166,5	159,8	169,8
Increase		**%**		-0,1	0,5	1,4	-0,4	-1,5	-1,4	1,0
Non nuclear	Tc	**TWh**	613,2	613,1	101,9	98,2	99,0	103,8	100,6	109,7
Increase		**%**		0,0	0,2	2,8	0,5	-2,7	-2,7	2,2
Nuclear	Tn	**GWh**	364,9	364,1	64,6	60,1	57,4	62,8	59,2	60,1
Increase		**%**		-0,2	1,0	-0,7	-2,0	0,6	0,9	-1,1

T3 Electricity supply situation in summer period 2004

Electricity exchanges			04/03-09/03	04/04-09/04	04/04	05/04	06/04	07/04	08/04	09/04
Volume total	Y	**TWh**	143,2	136,4	24,3	22,2	21,6	22,5	22,1	23,8
Increase		**%**		-4,8	-3,4	-7,8	-9,5	-7,1	-1,4	0,6
Volume of UCTE countries		**TWh**	126,5	115,8	20,7	18,8	18,1	19,2	18,6	20,5
Increase		**%**		-8,4	-6,5	-10,9	-14,0	-11,4	-4,0	-3,4
Share in consumption	$L = \frac{Y}{A}$	**%**	13,08	12,26	12,81	11,98	11,78	11,85	12,37	12,75
Maximum parallel power [2]	M	**GW**	319,1	325,7	316,4	311,4	313,2	325,7	288,8	317,5
Load flow **day** [5]	N	**MW**	32597	30714	29284	29647	26479	29950	26840	30714
last year		**MW**		32597	32597	30022	32246	28988	27360	29350
Load flow **night** [5]	N	**MW**	31203	28708	26784	25067	24757	26091	23333	28708
last year		**MW**		31203	31203	28734	29933	28929	26184	29104

[1] Percentage as referred to total values (%)

	B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA
Consumption	99	94	94	100	100	100	95	100	99	100	96	99	100	90	93	100	100	100	100	100	100	100	99	100
Load	100	91	94	100	100	100	95	100	99	100	96	99	90	82	93	100	100	100	100	100	100	100	99	100
Production	99	94	94	100	100	100	95	100	99	100	96	98	100	84	93	100	100	100	100	100	100	100	99	100

[2] on the 3rd Wednesday

[3] h = number of hours in the considered period

[4] including deliveries from industries of UCTE countries

[5] sum of exchange balances on all frontiers within the territory of UCTE on the 3rd Wednesday

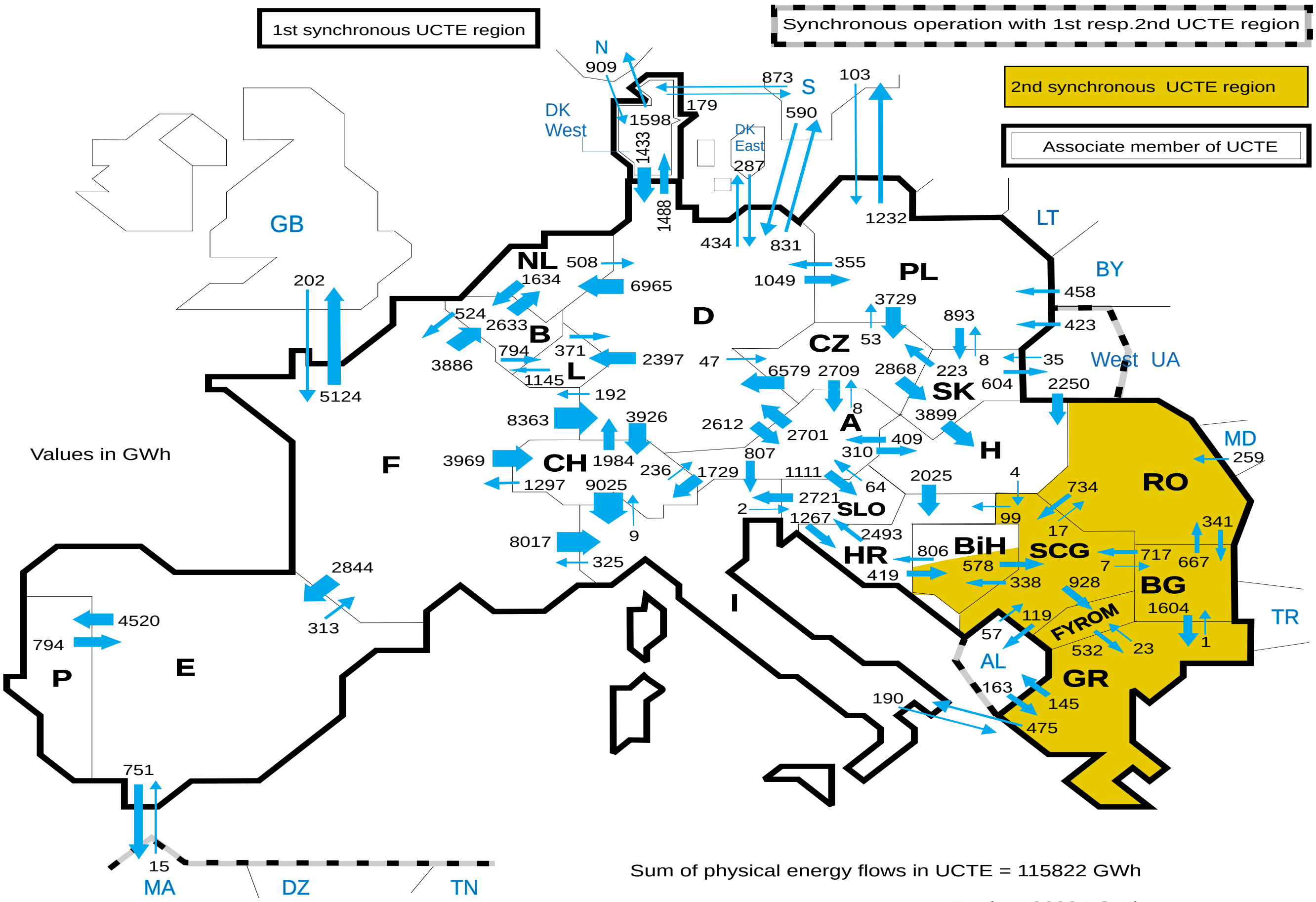
T1 Electricity supply situation in summer April 2004 - September 2004

Country	National electricity consumption TWh	National electricity consumption Δ %[1]	Persentage as refered total values[2] consumption %	Persentage as refered total values[2] load %	Peak load on the 3rd Wednesday MW	Date	Time
B	40.9	2.5	99	100	11366	21 April	12:00 a.m.
D	240.4	0.8	94	91	69100	19 May	12:00 a.m.
E	114.8	4.5	94	94	35326	21 July	01:00 p.m.
F	207.8	3.8	100	100	60334	21 April	10:00 a.m.
GR	25.8	-6.3	100	100	8507	21 July	01:00 p.m.
I	157.8	-1.2	100	100	52356	21 July	11:00 a.m.
SLO	6.1	3.1	95	95	1745	21 July	12:00 a.m.
HR	7.3	3.1	100	100	2177	21 July	01:00 p.m.
BiH	4.8	-11.9	99	99	1447	21 April	09:00 p.m.
FYROM	3.1	0.9	100	100	951	21 April	09:00 p.m.
SCG	16.8	3.5	96	96	5391	21 April	09:00 p.m.
L	3.0	3.3	99	99	866	15 September	12:00 a.m.
NL	52.2	-0.2	100	90	13405	21 July	02:00 p.m.
A	26.0	11.5	90	82	7781	15 September	12:00 a.m.
P	21.7	2.2	93	93	6673	16 June	01:00 p.m.
CH	28.4	4.6	100	100	8493	15 September	11:00 a.m.
CZ	27.2	3.6	100	100	7634	21 April	08:00 a.m.
H	18.1	-1.3	100	100	5543	21 July	03:00 p.m.
PL	59.9	-4.4	100	100	17526	15 September	08:00 p.m.
SK	11.9	1.2	100	100	3479	15 September	07:00 p.m.
RO	23.5	2.1	100	100	6439	21 July	09:00 p.m.
BG	15.2	-0.4	100	100	4378	21 April	10:00 p.m.
UCTE	**1112.6**	**1.4**			**313872**	**21 July**	**12:00 a.m.**
DK West	9.7	n.a.	99	99	3041	18 August	11:00 a.m.
West UA [3]	1.8	11.9	100	100	702	21April	09:00 p.m.

[1] As compared to the last year
[2] Percentage as referred to the total values of a country.
(The total values of a country are defined as the synchronously interconnected system plus the areas directly connected via AC or DC to the mainland system.)
[3] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

The fact that the maximum peak load occured in different months in the individual countries is due the different climatic and economic conditions as well as to particular national and contractual measures.

G1



Sum of physical energy flows in UCTE = 115822 GWh

Total = 136384 GWh

T1

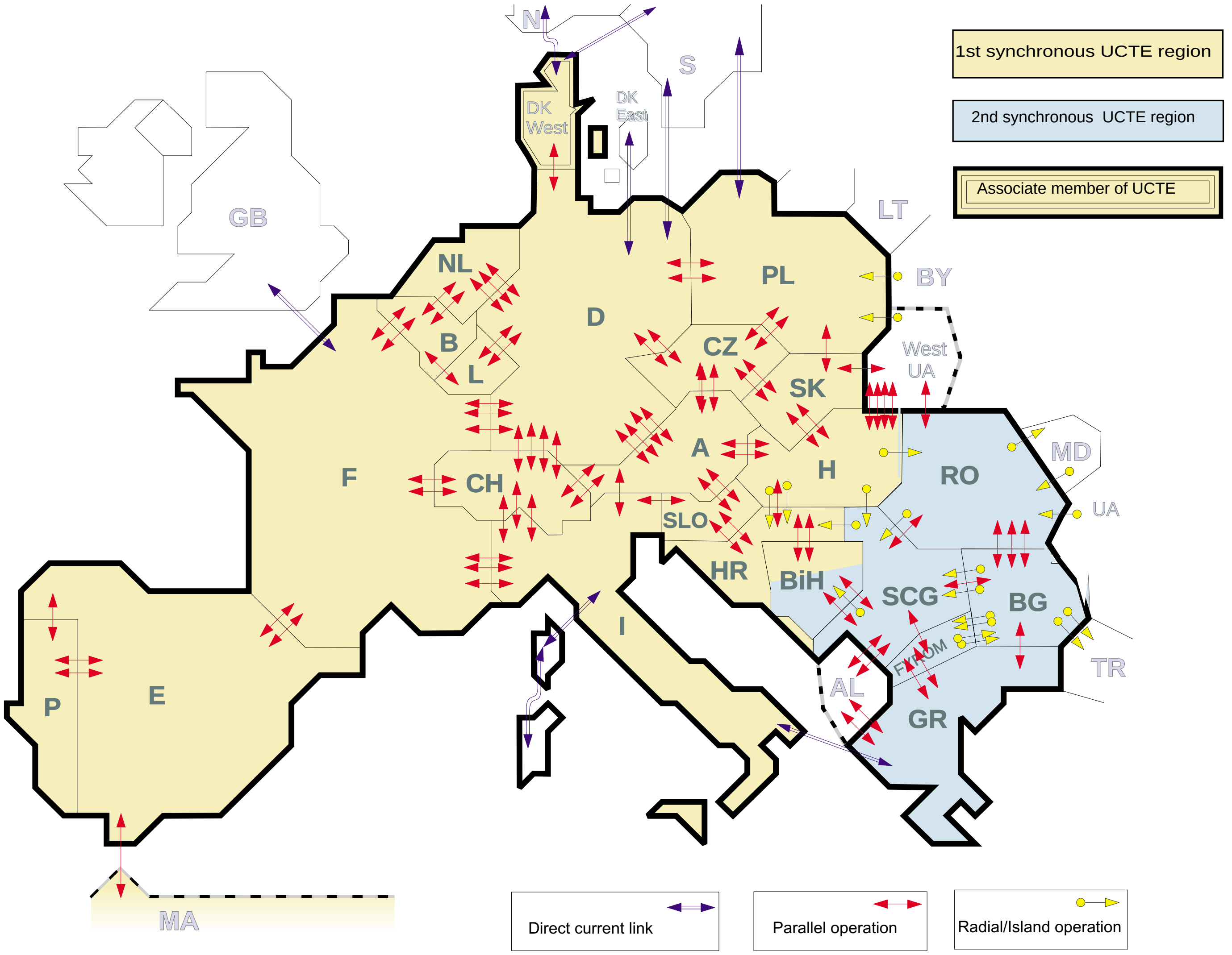
Importing countries (columns) / Exporting Countries (rows)

	B	D	E	F	GR	I	SLO	HR	BiH	FYROM	SCG	L	NL	A	P	CH	CZ	H	PL[1]	SK	RO	BG	DK_ West	West _UA	III[2]
B	-	-	-	524	-	-	-	-	-	-	-	794	2633	-	-	-	-	-	-	-	-	-	-	-	-
D	-	-	-	192	-	-	-	-	-	-	-	2397	6965	2612	-	3926	47	-	1049	-	-	-	1488	-	1265
E	-	-	-	313	-	-	-	-	-	-	-	-	-	-	4520	-	-	-	-	-	-	-	-	-	751
F	3886	8363	2844	-	-	8017	-	-	-	-	-	-	-	-	-	3969	-	-	-	-	-	-	-	-	5124
GR	-	-	-	-	-	475	-	-	-	23	-	-	-		-	-	-	-	-	-	-	1	-	-	145
I	-	-	-	325	190	-	2	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-
SLO	-	-	-	-	-	2721	-	1267	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	-	-
HR	-	-	-	-	-	-	2493	-	419	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-
BiH	-	-	-	-	-	-	-	806	-	-	578	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FYROM	-	-	-	-	532	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCG	-	-	-	-	-	-	-	99	338	928	-	-	-	-	-	-	-	-	-	-	17	7	-	-	119
L	1145	371	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	1634	508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A	-	2701	-	-	-	807	1111	-	-	-	-	-	-	-	-	1729	8	310	-	-	-	-	-	-	-
P	-	-	794	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CH	-	1984	-	1297	-	9025	-	-	-	-	-	-	-	236	-	-	-	-	-	-	-	-	-	-	-
CZ	-	6579	-	-	-	-	-	-	-	-	-	-	-	2709	-	-	-	-	53	2868	-	-	-	-	-
H	-	-	-	-	-	-	-	2025	-	-	4	-	-	409	-	-	-	-		0	0	-	-	0	-
PL	-	355	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3729	-	-	893	-	-	-	0	1232
SK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	223	3899	8	-	-	-	-	604	-
RO	-	-	-	-	-	-	-	-	-	-	734	-	-	-	-	-	-	0	-	-	-	341	-	-	0
BG	-	-	-	-	1604	-	-	-	-	-	717	-	-	-	-	-	-	-	-	-	667	-	-	-	0
DK_West	-	1433	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1777
West_UA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2250	423	35	0	-	-	-	-
III[2]	-	877	15	202	163	-	-	-	-	-	57	-	-	-	-	-	-	-	561	-	259	0	1782	-	-

[1] Corresponds to the supply of a passive island in Poland with Belarus

[2] Third countries: Albania, Belarus, Denmark East, Great Britain, Morocco, Republic of Moldava, Norwey, Sweden, and Republic of Turkey

21.07.2004, 11:00 a.m. (CET*)



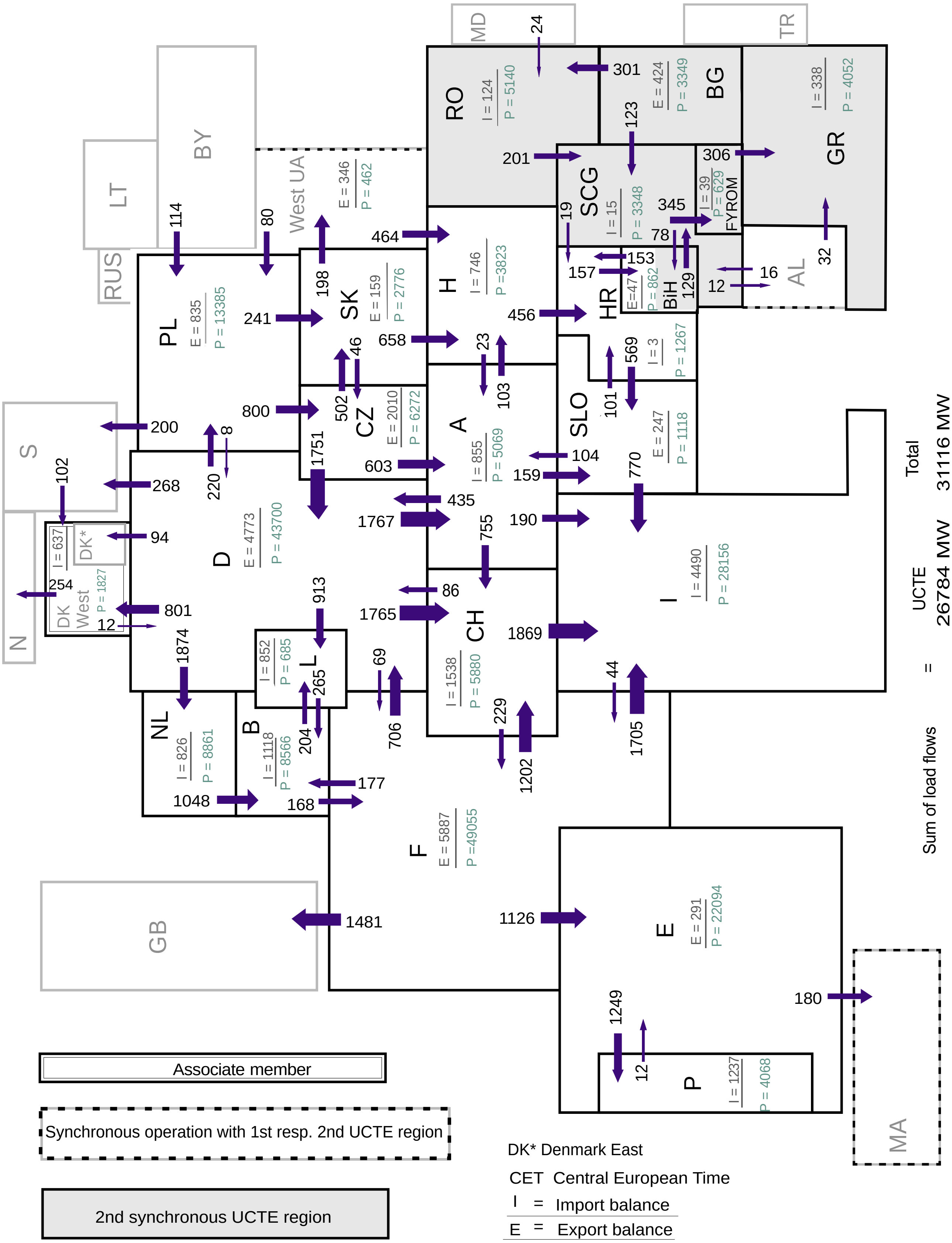
*** CET Central European Time**

T1 Power produced in parallel operation at 11:00 a.m.(CET) (including autoproduction) in MW

Day	B	D	E	F	GR	I	SLO	HR	BiH	FYROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA[1]
21.04.04	9955	73500	31178	66502	6044	39025	2103	1890	1416	839	4635	762	10461	7556	4933	9128	10029	3759	17667	3111	5487	4261	3026	977
19.05.04	9706	74900	30554	62673	5944	39170	1952	1861	1429	631	4294	747	10468	6110	5025	10566	9431	3699	17026	3421	6156	4099	4041	1098
16.06.04	9894	72700	31536	60882	7081	41821	1814	1880	1165	610	3970	804	9873	7983	5269	11040	8717	3875	16945	3420	6003	4152	4371	1087
21.07.04	9039	73000	35326	61428	7432	46194	1799	2039	1343	626	3945	818	11619	7526	5540	12228	9123	4345	17253	3196	6331	4136	2315	1078
18.08.04	9509	70500	29414	54262	6312	31667	1508	1943	1438	614	3885	720	11594	6598	3859	10173	9546	3873	16585	3068	5830	4324	2360	1017
15.09.04	9614	74200	32569	60638	6624	42712	1457	1712	1371	604	3959	849	11284	7998	5161	10353	9386	3944	17626	3122	5815	4481	4289	1066

[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

G1 21.04.2004 - 03:00 a.m. (CET) (in MW)



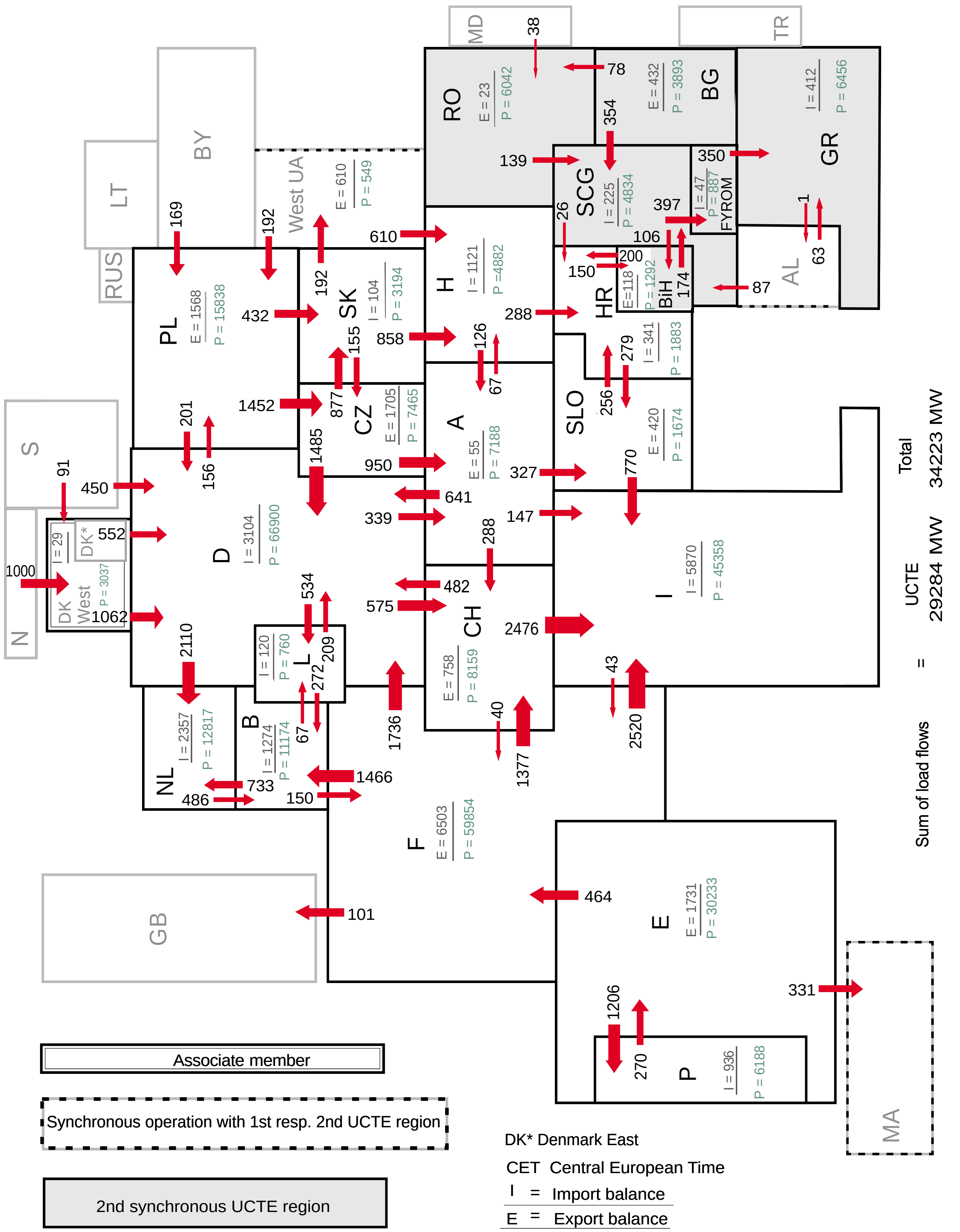
DK* Denmark East

CET Central European Time

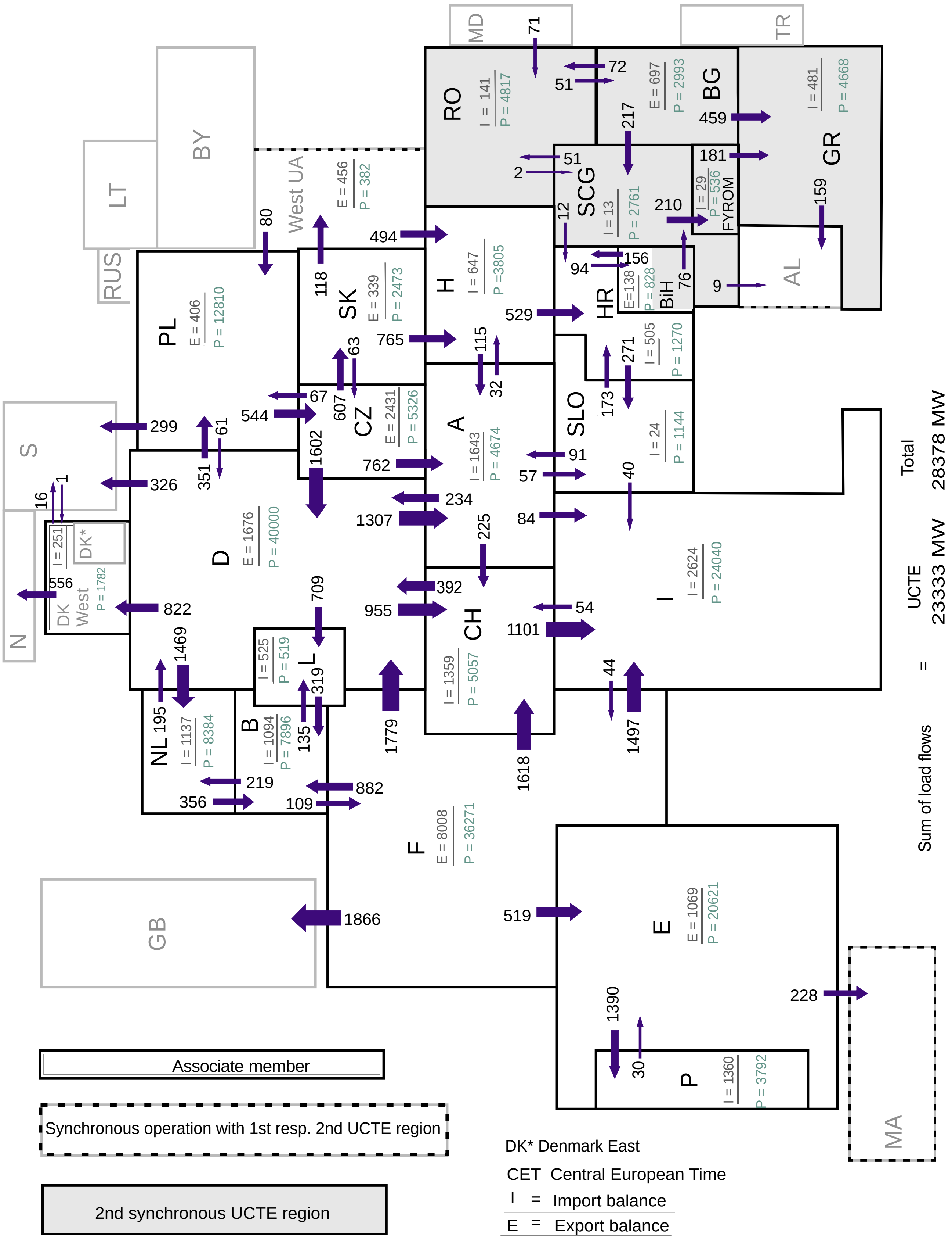
I = Import balance

E = Export balance

G2 21.04.2004 - 11:00 a.m. (CET) (in MW)



G3 18.08.2004 - 03:00 a.m. (CET) (in MW)



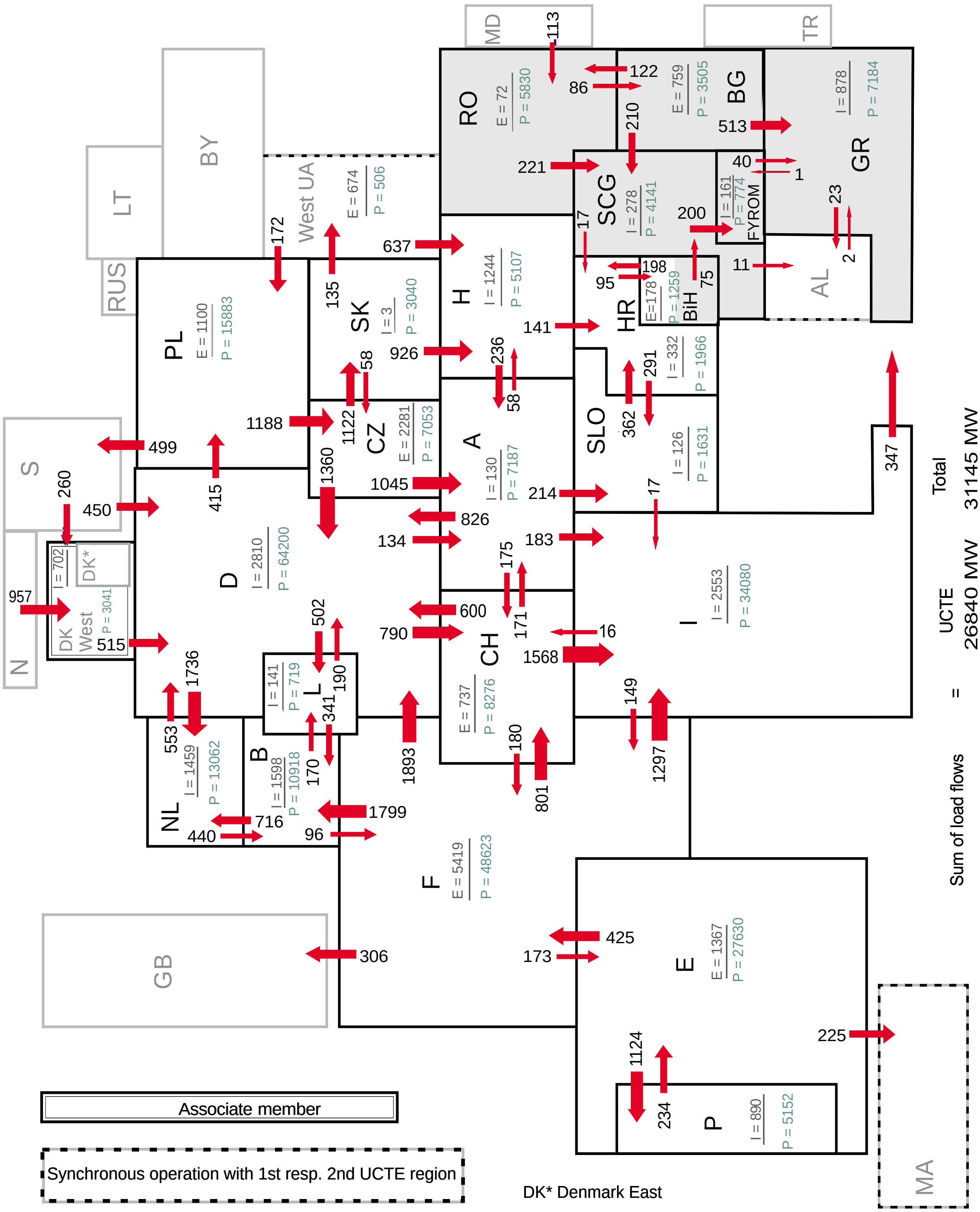
DK* Denmark East

CET Central European Time

I = Import balance

E = Export balance

G4 18.08.2004 - 11:00 a.m. (CET) (in MW)



Associate member

Synchronous operation with 1st resp. 2nd UCTE region

2nd synchronous UCTE region

DK* Denmark East

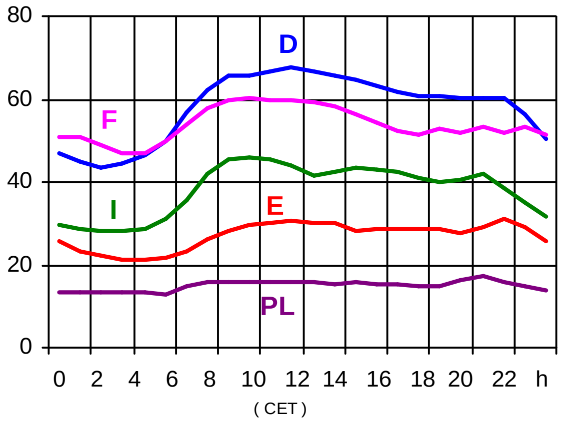
CET Central European Time

I = Import balance

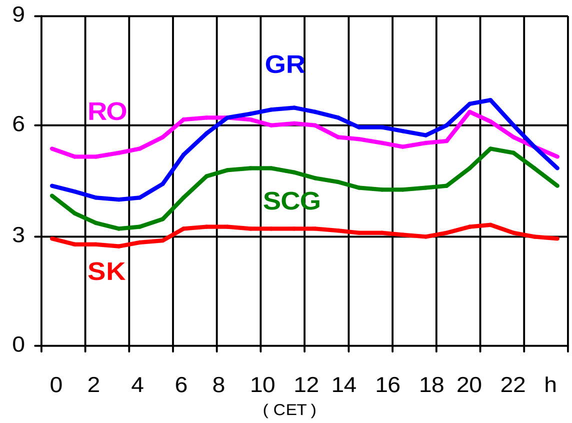
E = Export balance

Load diagrams [1]

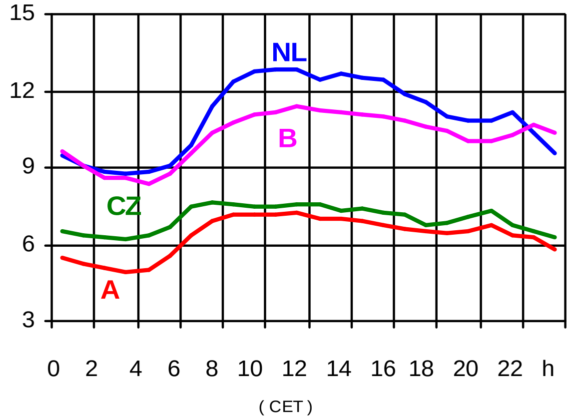
G1 21.04.2004 (in GW)



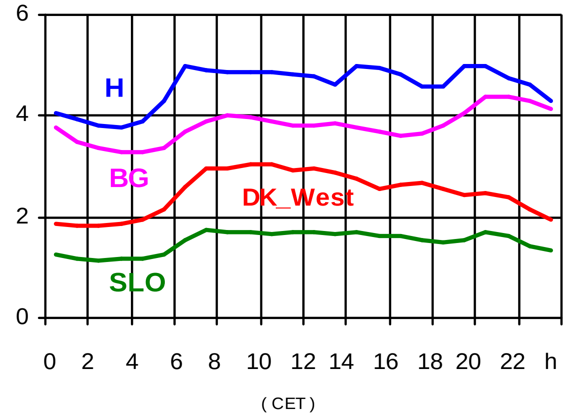
G4 21.04.2004 (in GW)



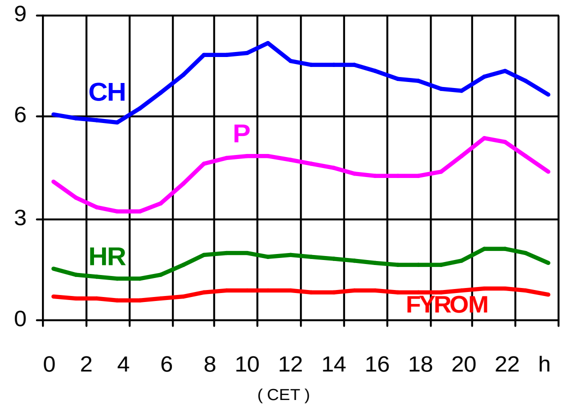
G2 21.04.2004 (in GW)



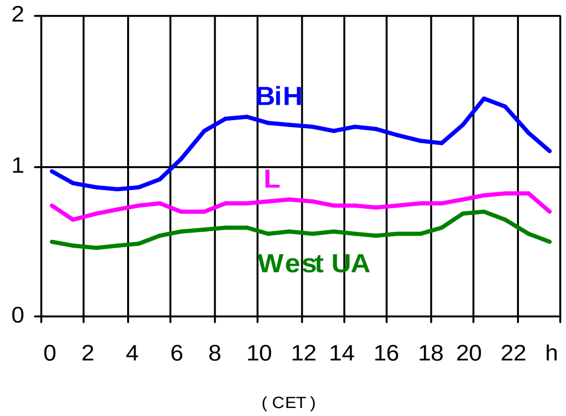
G5 21.04.2004 (in GW)



G3 21.04.2004 (in GW)



G6 21.04.2004 (in GW)

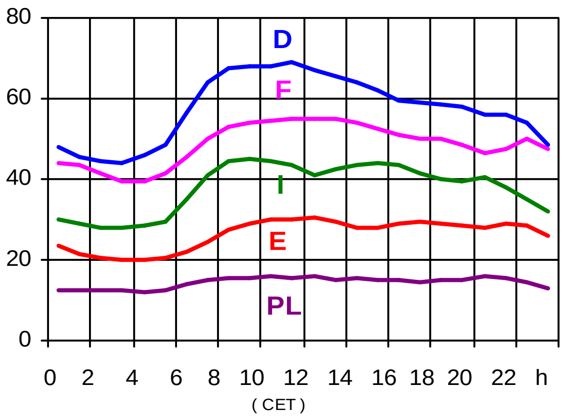


[1] Percentage as referred to total values (%)

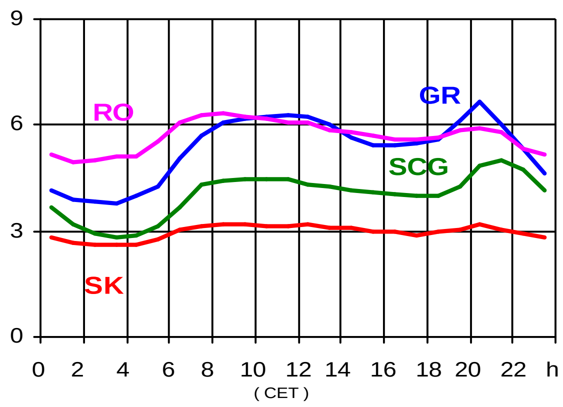
B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA[1]
100	91	94	100	100	100	95	100	99	100	96	99	90	82	93	100	100	100	100	100	100	100	99	100

[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

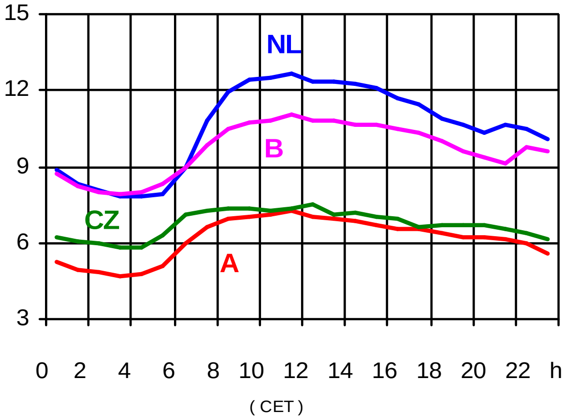
G7 19.05.2004 (in GW)



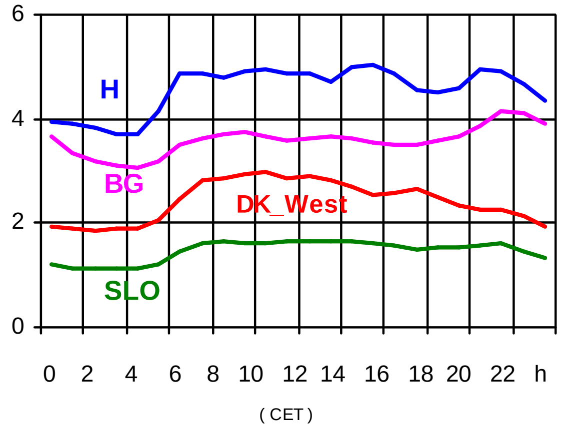
G10 19.05.2004 (in GW)



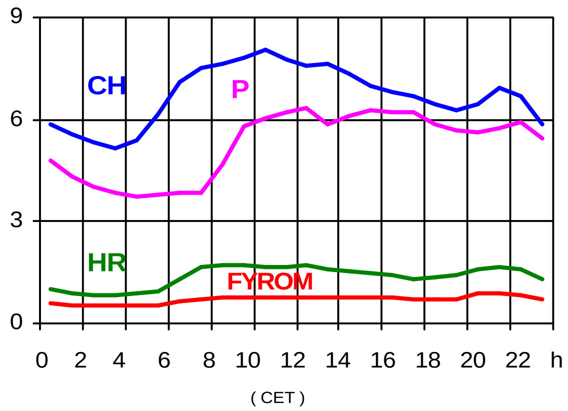
G8 19.05.2004 (in GW)



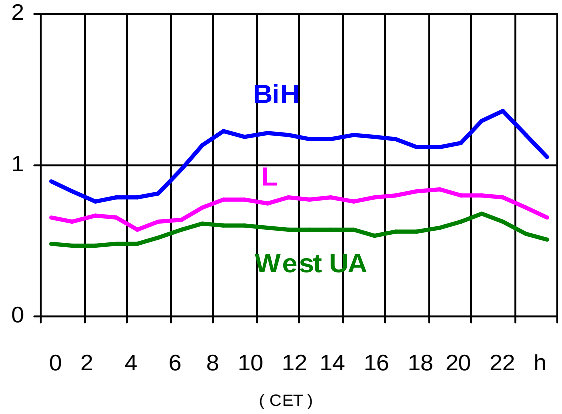
G11 19.05.2004 (in GW)



G9 19.05.2004 (in GW)



G12 19.05.2004 (in GW)



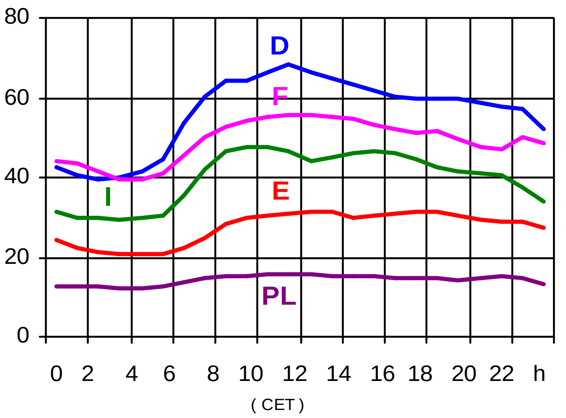
[1] Percentage as referred to total values (%)

B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA[1]
100	91	94	100	100	100	95	100	99	100	96	99	90	82	93	100	100	100	100	100	100	100	99	100

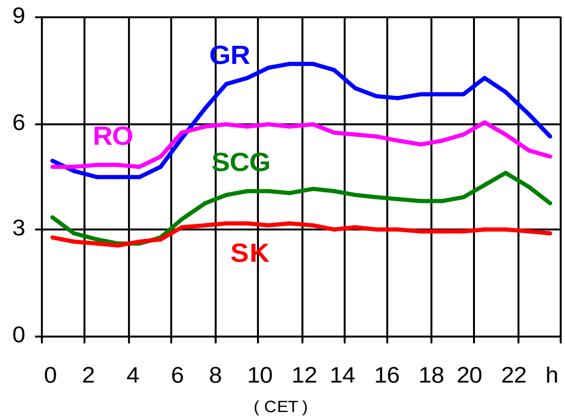
[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

Load diagrams [1]

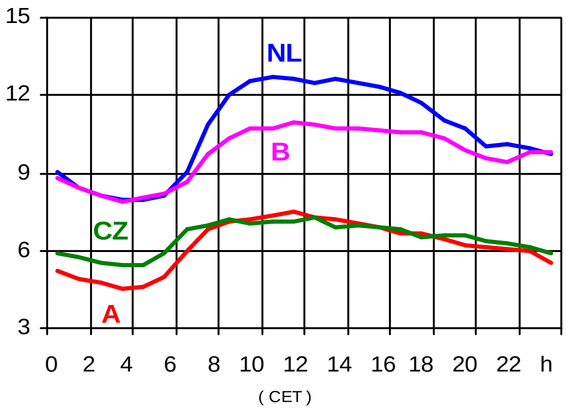
G13 16.06.2004 (in GW)



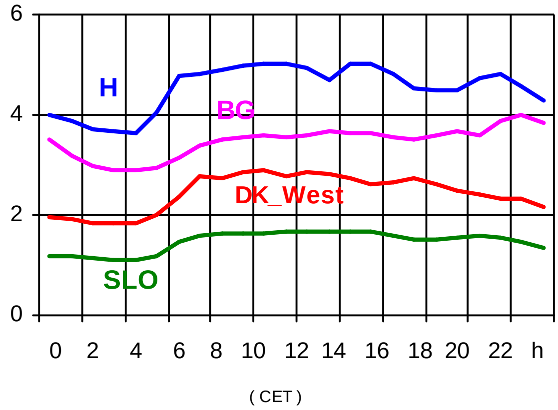
G16 16.06.2004 (in GW)



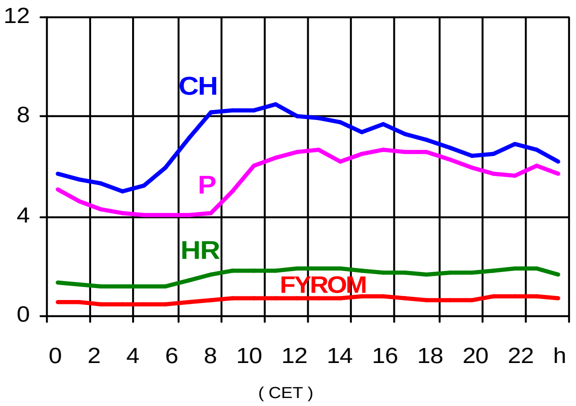
G14 16.06.2004 (in GW)



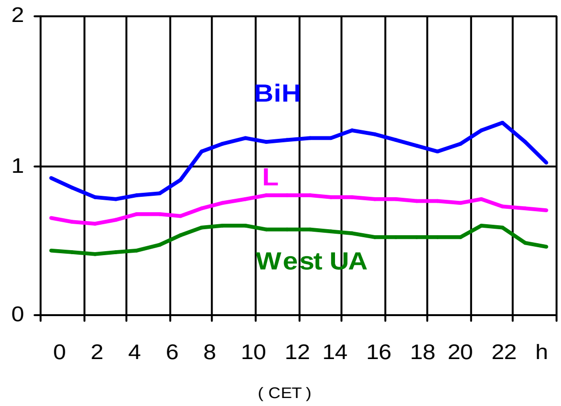
G17 16.06.2004 (in GW)



G15 16.06.2004 (in GW)



G18 16.06.2004 (in GW)

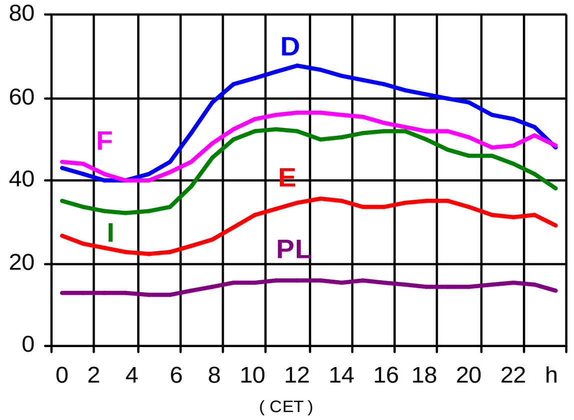


[1] Percentage as referred to total values (%)

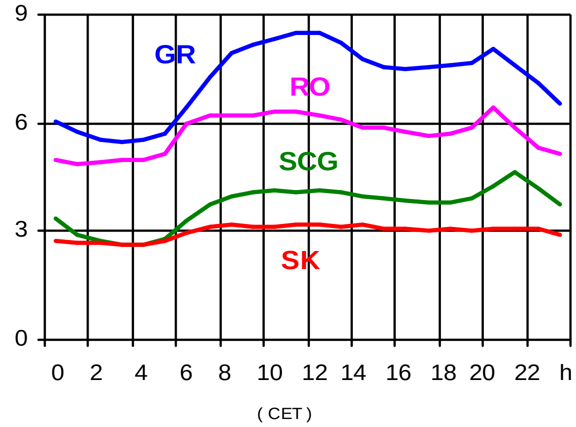
B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA[1]
100	91	94	100	100	100	95	100	99	100	96	99	90	82	93	100	100	100	100	100	100	100	99	100

[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

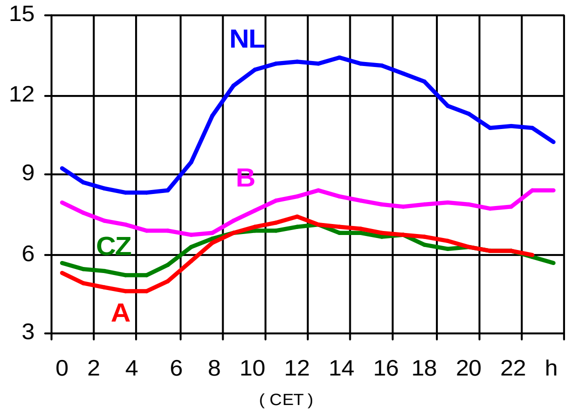
G19 21.07.2004 (in GW)



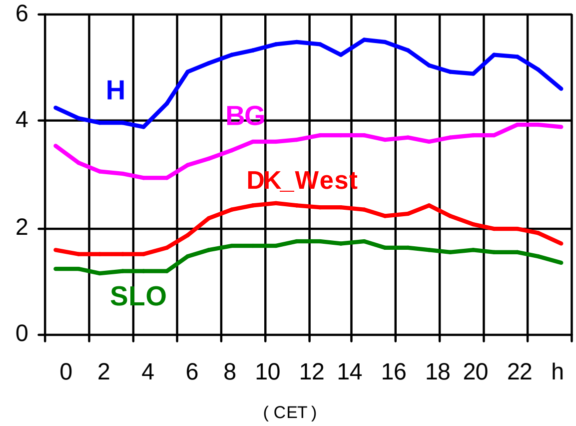
G22 21.07.2004 (in GW)



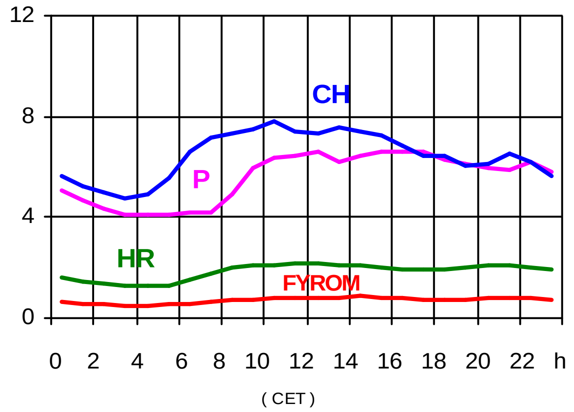
G20 21.07.2004 (in GW)



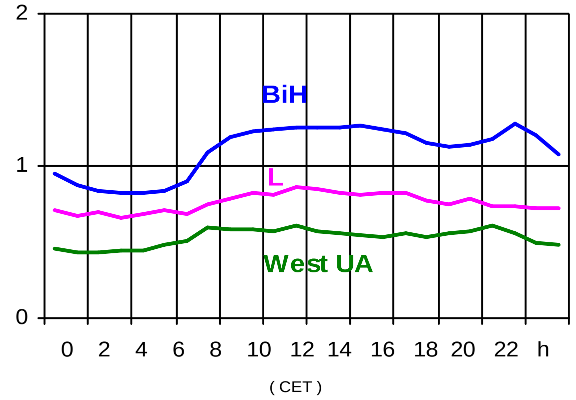
G23 21.07.2004 (in GW)



G21 21.07.2004 (in GW)



G24 21.07.2004 (in GW)

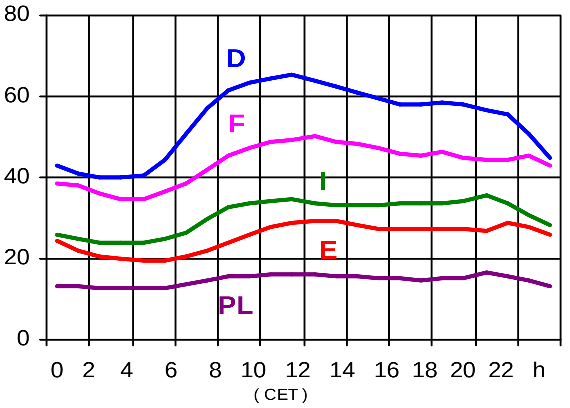


[1] Percentage as referred to total values (%)

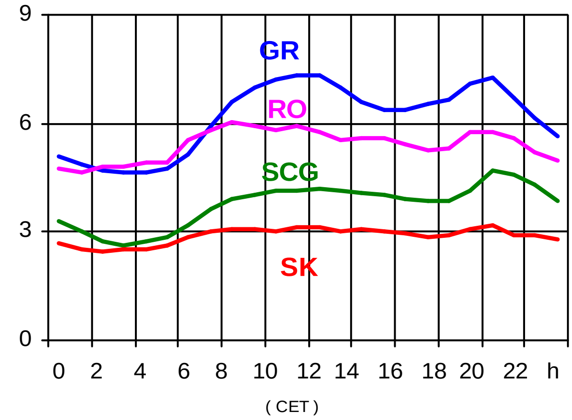
B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA[1]
100	91	94	100	100	100	95	100	99	100	96	99	90	82	93	100	100	100	100	100	100	100	99	100

[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

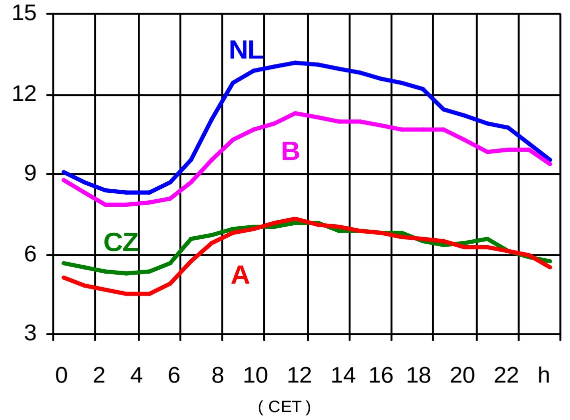
G25 18.08.2004 (in GW)



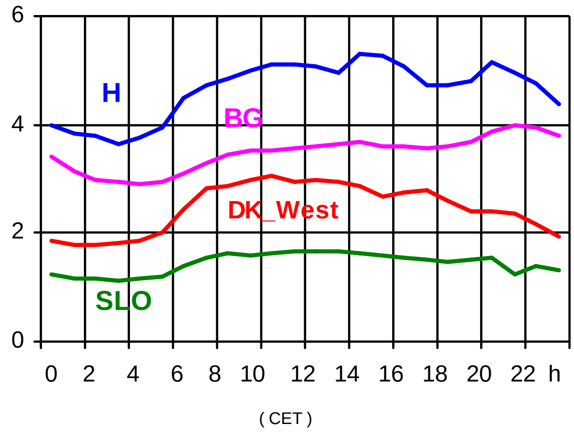
G28 18.08.2004 (in GW)



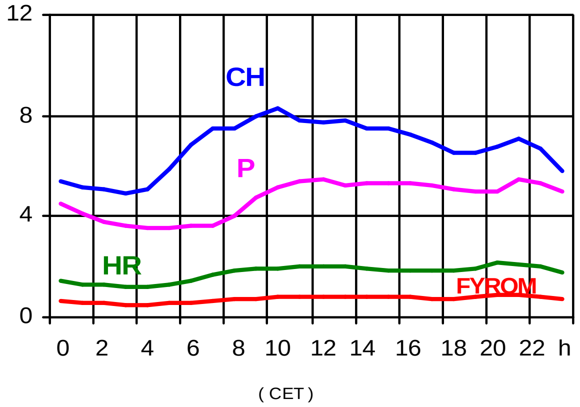
G26 18.08.2004 (in GW)2



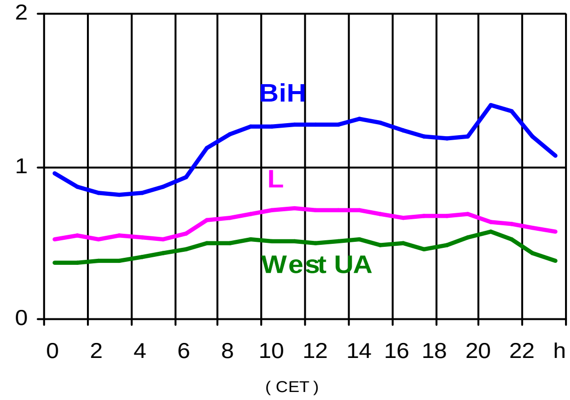
G29 18.08.2004 (in GW)



G27 18.08.2004 (in GW)



G30 18.08.2004 (in GW)



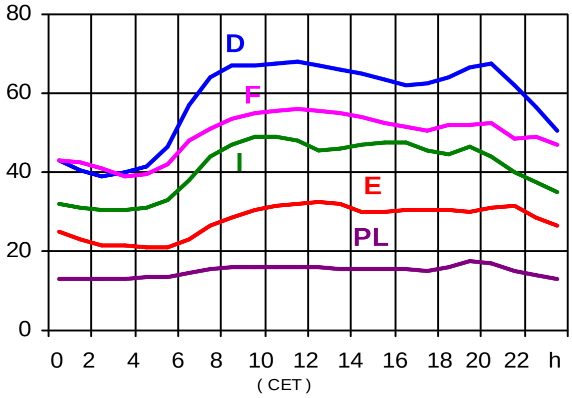
[1] Percentage as referred to total values (%)

B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA[1]
100	91	94	100	100	100	95	100	99	100	96	99	90	82	93	100	100	100	100	100	100	100	99	100

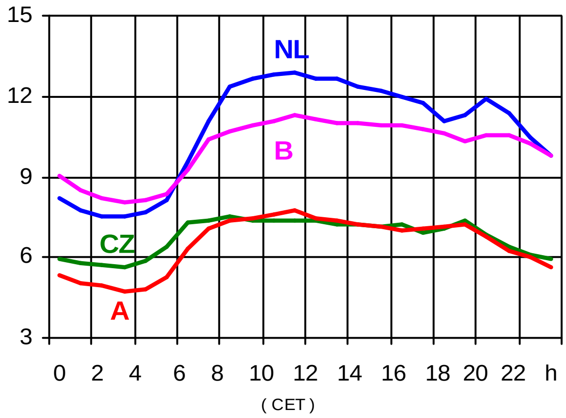
[1] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

Load diagrams [1]

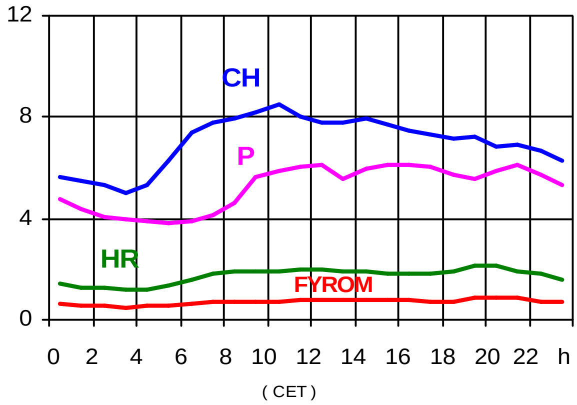
G31 15.09.2004 (in GW)



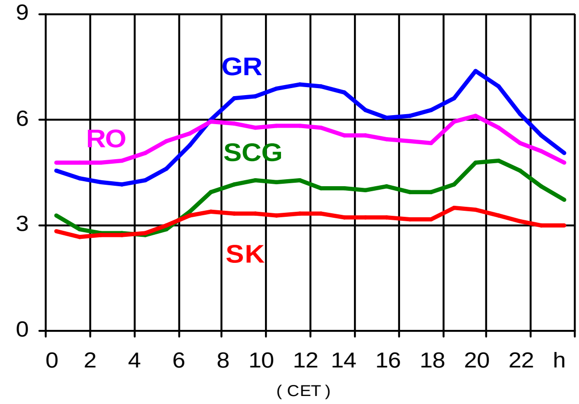
G32 15.09.2004 (in GW)



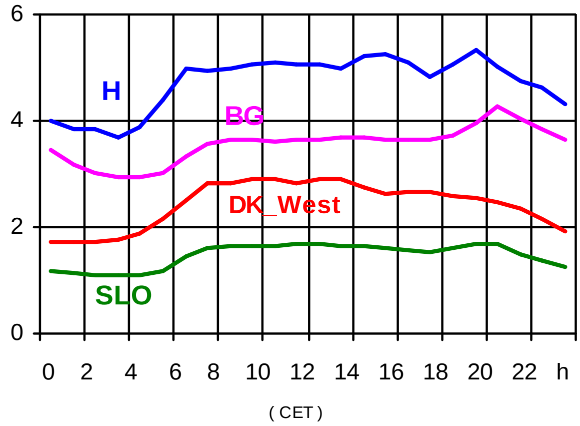
G33 15.09.2004 (in GW)



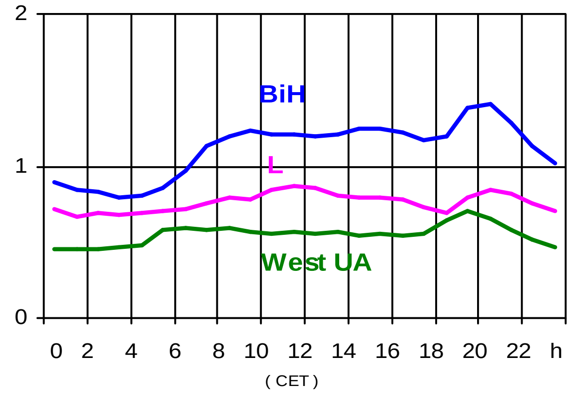
G34 15.09.2004 (in GW)



G35 15.09.2004 (in GW)



G36 15.09.2004 (in GW)

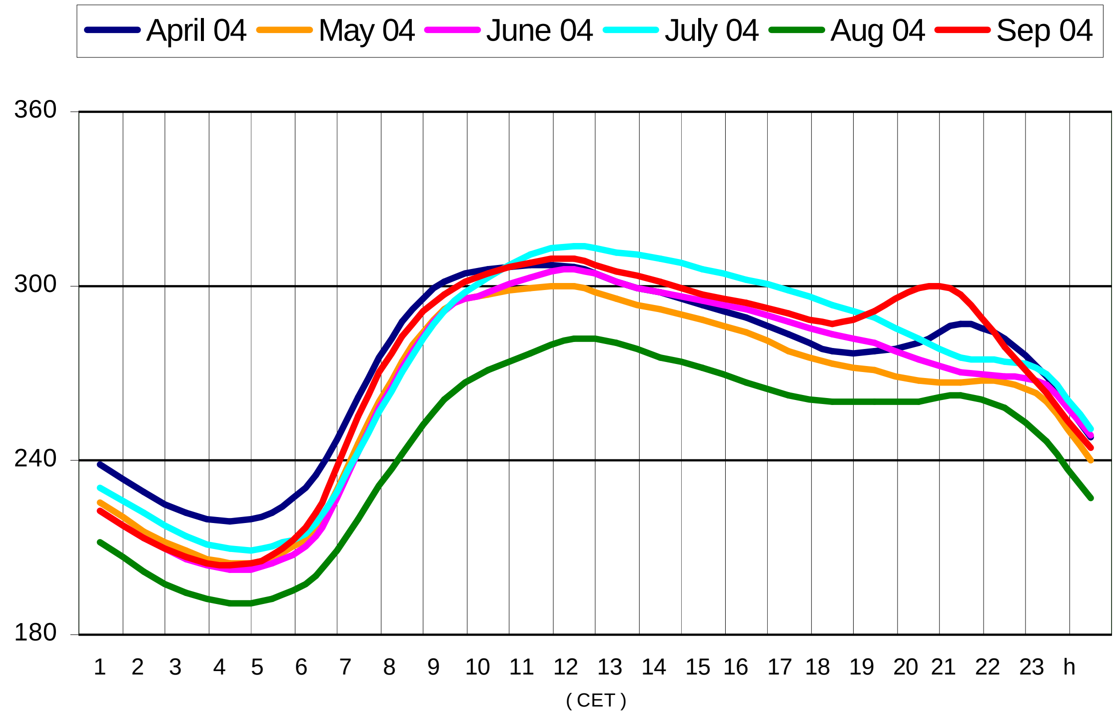


[1] Percentage as referred to total values (%)

B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	West UA[2]
100	91	94	97	93	100	95	100	100	100	96	99	90	82	91	100	100	100	100	100	100	100	100

[2] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

G 37 **Monthly load diagrams UCTE [3]** (in GW)



[1] Percentage as referred to total values (%)

B	D	E	F	GR	I	SLO	HR	BiH	FY ROM	SCG	L	NL	A	P	CH	CZ	H	PL	SK	RO	BG	DK West	West UA[2]
100	91	94	100	100	100	95	100	99	100	96	99	90	82	93	100	100	100	100	100	100	100	99	100

[2] West UA represents the so-called Burshtyn Island synchronously interconnected with UCTE

[3] As sum load values of all countries on each third Wednesday in the summer period 2004

UCTE System Adequacy Forecast 2005 - 2015

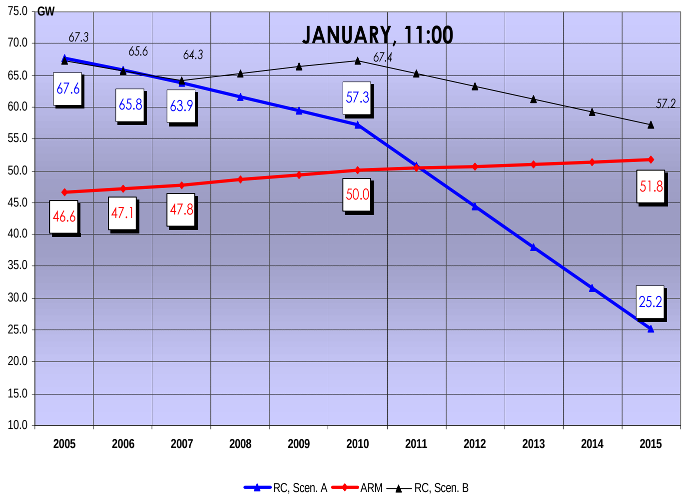
Executive summary

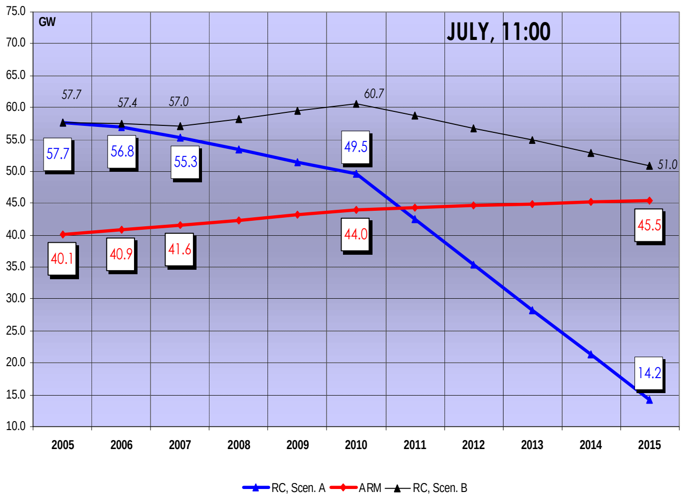
Over the past years UCTE has made continuous efforts to improve the system adequacy forecasts reports.
The present report marks a new step of these improvements with the extension of the time horizon up to ten years ahead, the introduction of a new reference point (January 19.00) closer to the peak load, and a new method to assess generation adequacy, based on a probabilistic approach.

Method for UCTE System reliability assessment

The reliability of the UCTE system is assessed taking into account both generation and transmission aspects.
Generation adequacy assessment is based on the estimation of the so called “Remaining capacity” (RC) which can be interpreted as the capacity that the system needs to cover the difference between the peak load of each country and the load at the UCTE synchronous reference time (so called “margin against peak load”), and, at the same time, exceptional demand variation and longer term unplanned outages which the power plant operators are responsible to cover with additional reserves. Developments have been performed by UCTE in order to estimate the level of RC necessary to provide a given level of security of supply taking into account the characteristics of every subsystem. A probabilistic approach has been used which allowed to define the statistical characteristics of the RC as the result of the probabilistic characteristics of each component: load and unavailability of generation.
Considering a level of risk for each national system corresponding to 1%, it results that for the UCTE system and some national systems, RC at peak load representing 5% of the national generating capacity is the condition to provide a reliable supply. For some other national systems, more sensitive to random factors (load variations or unavailability of generation), RC should represent around 10% of the national generating capacity. This level of RC plus the difference between peak load and reference load is called Adequacy Reference Margin (ARM). Thus when considering individual countries, generation adequacy will be assessed on the basis of the comparison between RC and ARM. This method is also applied to assess generation adequacy for the whole UCTE system or for larger geographical blocks; in this case the synchronous peak load of the blocks is estimated by the sum of the peak loads of the individual countries. But it is important to keep in mind that uncertainties affect these results especially for the year 2010 and 2015. Because one of the objectives of this exercise is to provide early warning signals concerning system reliability and to highlight opportunities or necessity to invest in generation, only future generation capacities whose construction and commissioning are considered as “firm” are included.
On the opposite, because decisions concerning decommissioning of generating units are notified to TSOs very little in advance, the generating capacity can be overestimated. This approach is called “conservative scenario”. It has been asked to TSOs to provide a second scenario (B) for generation developments, based on estimations by TSOs of probable commissioning for time horizons further than investment horizon. This information allows to reflect uncertainties about generation capacity in the long term. This approach is called “best estimate scenario”. After the generation adequacy assessment has underscored how each country could satisfy its interior load with the available national capacity, **transmission adequacy assessment** consists in investigating if the transmission system is sufficiently sized in order to enable the potential imports and exports resulting from the various national power balances, improving by this way the reliability of the European power system. At the UCTE level the transmission system adequacy analysis is focused on the interconnections and on the internal lines which have a direct effect on the international exchanges.
At this stage the methodology does not aim at identifying the cross border flows that would be originated by market price differences resulting for example from differences in fuel mix between countries.

Main results





Over the period **2005-2007**, the reliability of the UCTE system seems not to be at risk. Substantial developments of the generation capacity are expected, among which capacity from renewable energy sources represents a growing share. Given the lesser availability ratio of such generation, Remaining Capacity is though decreasing from 2005 to 2007, but remains at acceptable levels when compared to the UCTE Adequacy Reference Margin.
In **2010**, foreseen power plants commissioning help to cover part of the load increase; however Remaining Capacity continues to decrease, but is still higher than what is considered as a reasonable security margin.
Between **2010 and 2015**, when net increase of generation capacity relies on renewable energy sources, Remaining Capacity decreases more drastically ; without any additional commissioning on top of those already foreseen as sure by TSOs, Remaining Capacity at UCTE level may not meet the Adequacy Reference Margin. This situation could occur at the very beginning of the period from 2010 to 2015.

Existing investment decisions seem sufficient, at UCTE's level, to allow a reasonable level of adequacy from now on to 2010. Nevertheless, security will be at risk after 2010 if further investments are not decided in due time, even before if extra decommissioning occur before that time horizon.

It is noticeable that the mismatch between Remaining Capacity and the Adequacy Reference Margin, expected in 2010 in last year's System Adequacy Report, has been postponed to the period 2010-2012 in this year's forecasts.

The analysis of these overall results has to be completed by a focus on the different geographical blocks1, which may be connected by transmission links of limited capacity ; in that case, it may be difficult for some blocks to take advantage of potential extra capacity from neighbouring blocks.
As far as ARM for individual countries or geographical blocks is concerned, it must be reminded that referring to 5% or 10% of generating capacity may give results in overestimating the adequacy reference margin, especially for countries referring to 10% of NGC.

The main UCTE block:
Remaining Capacity is decreasing from **2005 to 2007**, but the Adequacy Reference Margin is met over the whole period for the block. Nevertheless, as far as national situations are concerned, it can be noticed that some countries do not meet the national ARM : it is the case for the whole period in Germany, the Netherlands, Slovenia, and Belgium in winter. ARM is not met anymore in France in 2006 and 2007. As in last year's forecasts, ARM is not met anymore for the whole block in winter **2010 but expected commissioning in scenario B should restore an adequate level of generation.** Croatia, Luxembourg, Austria, Switzerland and Bosnia & Herzegovina are the countries that meet the national ARM. In **2015**, an additional Remaining Capacity of 12 to 14 GW would be necessary to match the ARM. For some countries, network reinforcements will be the way to compensate national potential lack of Remaining Capacity at peak load.

Spain + Portugal :
This year's forecasts for 2005 and 2010 show an improvement of Remaining Capacity as compared to last year's ; nevertheless, the Adequacy Reference Margin (that, for this block, refers to 10% of generating capacity), is not met from **2005 to 2007, especially in summer.** Very few reliably available capacities are expected to be commissioned in **2010,** and Remaining Capacity is dropping. It reaches negative values in **2015.** Extra commissioning proposed in scenario B fall by 2 GW to meet the ARM.

Italy :
Since expected commissioning are higher than in last year's forecasts, Remaining Capacity is improving in **2005** and on, so as Adequacy Reference Margin should be met from 2005 to 2007, and further on in **2010** when Reliably Available Generation increase is sufficient to cover load's increase. In **2015**, without help of interconnection, an extra commissioning of 5 to 7 GW would be necessary to ensure the proper security standards.

JIEL[2]+ Greece :
The situation is not improving when looking at last year's forecasts in summer. Remaining Capacity is just below the Adequacy Reference Margin from **2005 to 2007**. In **2010**, RC matches ARM in winter, and is lower by approx. 1.4 GW in summer. In **2015,** there is a need for approx. 3 GW in Reliably Available Capacity in summer. If the investments foreseen are not realised, this area will be in a weak position concerning generation adequacy. Interconnections should play a crucial role in the coming years to improve the security of supply of this block.

CENTREL block :
This block shows a significantly positive difference between Remaining Capacity, and Adequacy Reference Margin. Remaining Capacity is stable from **2005 to 2007**, and even improves in **2010;** it is sufficient in 2015 despite no extra commissioning.,

Romania & Bulgaria:
Generation capacity is stable from **2005 to 2007,** and the decrease of Remaining Capacity, already expected last year, is confirmed. It should be sufficient to ensure the adequate level of security for the block, as in **2010** thanks to commissioning expected in the meanwhile. In **2015,** long term planned power plants investments will even better Remaining Capacity. When compared to last year's report, the situation of this block improves.

---

[1] It is to be noticed that geographical blocks do not correspond to area control blocks
[2] JIEL Block is made of SCG and FYROM

1. Foreword

Over the past years UCTE has made continuous efforts to improve the content of the system adequacy forecast reports : in 2002 information concerning the transmission grid developments were introduced, in 2003 the time horizon of forecasts has been extended up to 7 years. This was a contribution to the general debate concerning the security of supply in the European power system which arised in the previous years and has been reinforced in 2003 after the blackouts in North America and in Italy.

The present UCTE System Adequacy Forecast report marks a new step of these improvements with three major developments :
- **the extension of the time horizon** up to ten years ahead;
- **the improvement of the method used to assess generation adequacy** in order to take into account the specificity of every individual system;
- **the introduction of a new reference point in January at 19.00**, closer to the synchronous peak load than the usual reference point January 11:00.

Because these longer term forecasts are subject to higher uncertainties, considering that today it takes only two to three years to build new power plants, UCTE has developed **long term scenarios** whose aim is to give an evaluation of the range of uncertainties, and an evaluation of the risks concerning security of supply over the ten coming years.
The first scenario is called "conservative scenario" (scenario A); it only takes into account the new power plants whose commissioning can be considered as sure : plants under construction or whose investment decision is notified as firm to the TSOs. This scenario shows the evolution of the potential unbalances if no new investment decision were taken in the future. It allows to identify the amount of investments which are necessary over the period to maintain a targeted standard of security of supply.
The second scenario is called "best estimate scenario" (scenario B), it takes into account future power plants whose commissioning can be considered as reasonably probable according to the information available for the TSOs: commissioning resulting from governmental plans or objectives, concerning for example the development of renewable sources in accordance with the European legislation, or estimation of the future commissioning resulting from the requests for connection to the grid of from the information given by producers to the TSOs. This scenario gives an estimation of potential future developments, provided that market signals give adequate incentives for investments.

2. Methodology

2.1 Generation adequacy assessment

Generation adequacy[4] assessment consists in investigating the ability of the generating units to match the system load evolution. UCTE approach is based on a comparison between the load and the generating capacity considered as "reliably available" for power plant operators (generating capacity after the deduction of various sources of unavailability - non-usable capacity, scheduled and unscheduled outages - and reserves required by TSOs for system services ; see figure hereafter). The load corresponds to a common synchronous reference for the entire UCTE network. The selected reference points are the third Wednesday of January at 11:00 and 19:00 and the third Wednesday of July at 11:00; the load forecast is based upon the assumption of normal climatic conditions.
In addition the difference between these reference loads and peak load is estimated. The resulting balance, called "remaining capacity" (RC), can be interpreted as the capacity that the system needs to cover the difference between the peak load of each country and the load at the UCTE synchronous reference time, and, at the same time to cover demand variations (resulting for example from weather conditions) and longer term unplanned outages which the power plant operators are responsible to cover with additional reserves.
Developments have been performed by UCTE in order to estimate the level of RC necessary to provide a given level of security of supply taking into account the characteristics of every subsystem. A probabilistic approach has been used which allowed to define the statistical characteristics of the RC as the results of the probabilistic characteristics of each component: load and unavailability of generation.

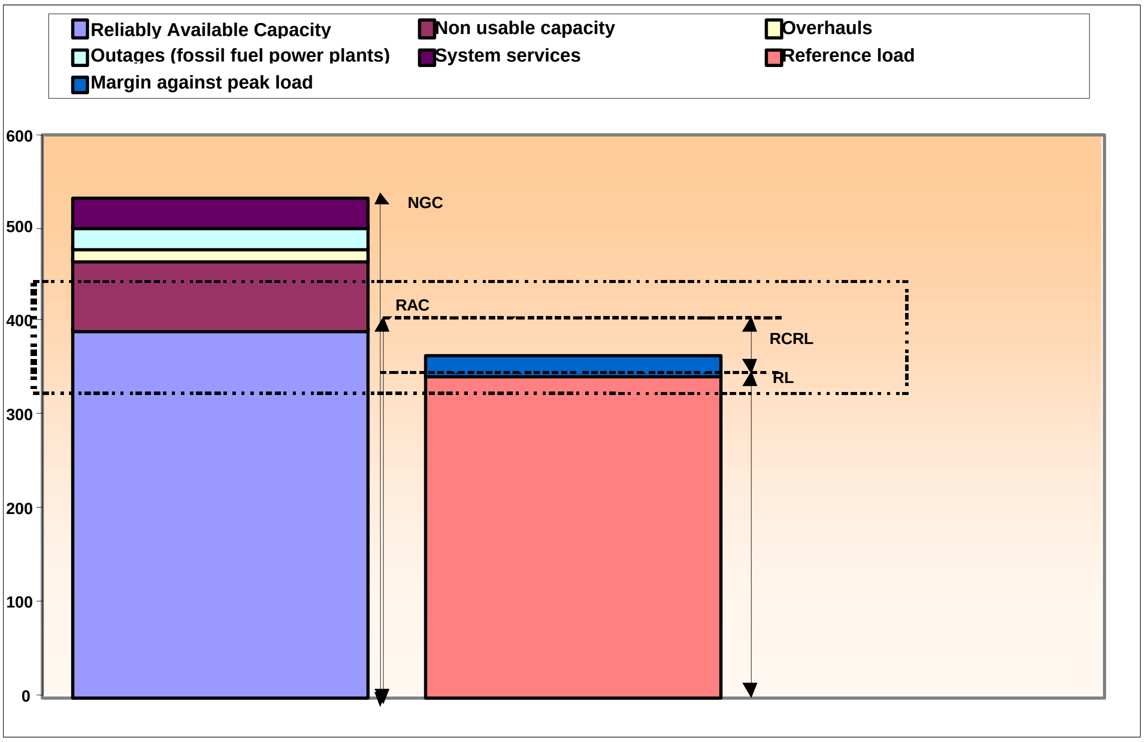
Considering a level of risk for each national system corresponding to 1%, it results that for the UCTE system and some national systems, RC at peak load representing 5% of the national generating capacity is the condition to provide a reliable supply. For some other national systems, more sensitive to random factors (load variations or unavailability of generation), RC should represent around 10% of the national generating capacity. This level of RC plus the difference between peak load and reference load is called Adequacy Reference Margin (ARM). Thus when considering individual countries, generation adequacy will be assessed on the basis of the comparison bet-ween RC and ARM. This method is also applied to assess generation adequacy for the whole UCTE system or for larger geographical blocks; in this case the synchronous peak load of the blocks is estimated by the sum of the peak loads of the individual countries. This approximation leads on one hand to an overestimation of the peak load for the largest geographical blocks and to a conservative view of the level of adequacy. On the other hand, considering the synchronous peak load of large size blocks leads to rely on the assumption that it is always possible to carry where needed the generating power available in a country in any other country of the block, whereas the capacities of the transmission system actually limit these possibilities. The future trends in generation capacity are developed according to the assumptions underlying each scenario.

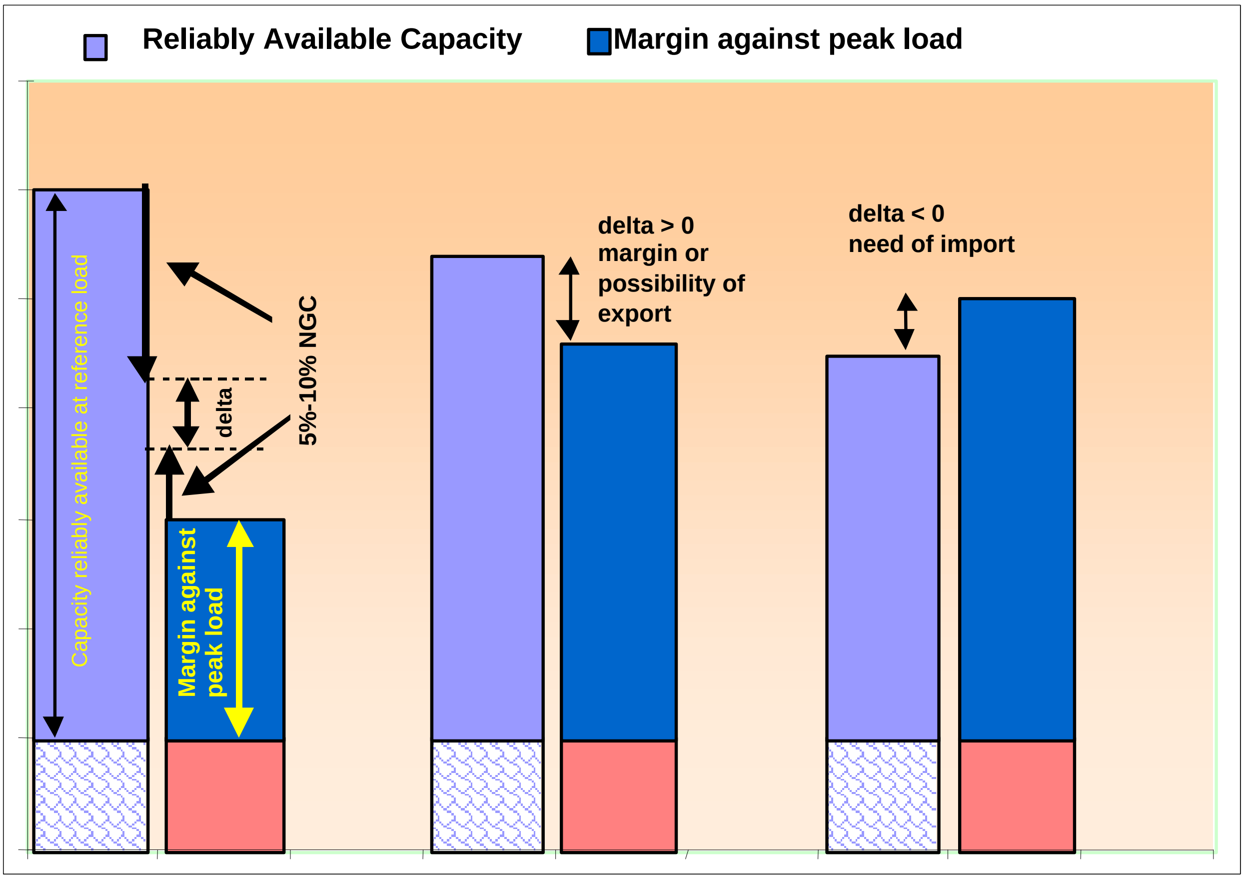
But when considering the results of these scenarios the following simplifications must be taken into account:

- because decommissioning decisions concerning generation units are often notified to TSOs with a short notice, the national generating capacity can be overestimated, especially on the medium long term,
- because cross-border exchanges forecasts are not taken into account in the power balance, the analysis considers neither long term contracts nor the participation in power plants located out of the national territory. However, these contracts can represent a significant and permanent contribution to satisfying the national load in some countries.

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

Here below are shown the graphs illustrating the Power Balance according to UCTE :





2.2 Transmission System Adequacy

After the generation adequacy assessment has highlighted the ability of each country to cover the internal load with the available national capacity, transmission adequacy assessment consists in investigating if the transmission system is sufficiently sized in order to enable the power flows across the European system resulting from the location of loads and generation, and in analysing the role which the internal and the interconnected networks play in terms of system security. **At this stage the methodology does not aim at identifying the cross border flows that would be originated by market price differences resulting for example from differences in fuel mix between countries. At the UCTE level the transmission system adequacy analysis is focused on the interconnection and on the internal lines which have a direct effect on the international exchanges.**
Because the remaining capacity (as a result of the power balance) represents, if positive, a potential possibility for export and, if negative, a potential need for imports, transmission adequacy assessment consists in comparing this remaining capacity with the Net Transfer Capacity at the borders, as published by ETSO or estimated by the TSOs. The comparison is made for each country considered individually, but also at the interfaces of the different regional blocks which can be identified in the UCTE system. For more details about the methodology, the reader can also refer to the document available on the UCTE web site (www.ucte.org).

2.3 Structure of the report

The 2005 - 2015 forecast includes the following countries and electricity systems:

B	Belgium	**NL**	The Netherlands
D	Germany	**A**	Austria
E	Spain	**P**	Portugal
F	France	**CH**	Switzerland
GR	Greece	**CZ**	Czech Republic
I	Italy	**H**	Hungary
SLO	Slovenia	**PL**	Poland
HR	Croatia	**SK**	Slovakia
BiH	Bosnia and Herzegovina	**RO**	Romania
FYROM	Former Yugoslav Republic of Macedonia	**BG**	Bulgaria
SCG	Serbia and Montenegro*	**UA West**	Burshtyn Island** part of Ukrainia
L	Luxembourg		

* SCG and FYROM make the JIEL system up.

** in synchronous operation with UCTE since July 1[1st], 2002

Discrepancies in relation to other national statistics may result from the fact that, for the majority of countries, the UCTE power balance does not cover all the generating capacity and loads, but only the part involved in the synchronous operation of public electricity systems. This so called representativity factor varies between 90 % and 100%.
The **overall results** of the forecasts are shown in **Chapter 3** (with **Appendix A** showing a more detailed analysis of the power balance elements), with a special focus on remaining capacity. **Chapter 4** of the report deals with the **transmission system adequacy** (supported by **Appendix C**). **Appendix D** presents extraordinary **trends and remarks** about the status of deregulation in UCTE countries.
Results are given for scenario A and when necessary, differences with scenario B are shown.
It is to be noticed that power balance elements for 2010 and 2015 do not present the same level of credibility as data for the three years ahead.

2.4 Comparison with EURPROG exercise

Another report showing a general picture of the perspectives of the European electricity system is published by EURELECTRIC in its yearly EURPROG report and can be ordered at www.eurelectric.org.
UCTE is producing its System Adequacy Reports to give accurate information concerning the future situation from a today's operational perspective without considering major macroeconomic changes or political trends and to provide to market players and public authorities early warning signals concerning potential needs for new investments. These assumptions are taken to best meet the aims of the Association focusing on providing a complete overall view on the power system evolution and at in-vestigating system adequacy and not only generating capacity adequacy (in order to match the system load evolution).
Therefore, concerning generating capacity commissioning, only those new projects are taken into account in scenario A, which are considered as sure, according to the information TSOs receive (connection agreement signed or going to be signed, new power plants taken into account in the long-term plan for transmission system development, or signature of other agreements according to country rules). As far as shutdowns are considered, the best estimation is given, being as close as necessary to the present situation.
Scenario B proposes additional commissioning, based on TSO's assumptions of probable further developments of generation capacities at a time horizon when decisions are not yet taken; these estimations are not made in the purpose of satisfying specific adequacy standards.
The EURPROG report of EURELECTRIC is based on the best view of country experts of what is likely to occur in each country with respect to the plant demand balance, taking into account recent trends and projections of economic, social, environmental and technological developments. The capacity projected allows for growth in demand and the adoption of a national plant capacity margin based on historical experience, which is sufficient to meet the security standards regarded as the norm in each country. This may mean the allowance for closures which have not been notified and the building of new plant which is not existing or under construction.
Therefore, both reports are complementary and follow different objectives with different approaches. However, the consistency is closely checked between both involved associations through regular contacts to make sure that the best data quality can be reached in all reports. The volitional differences in the data sets are based on:

- different points of view (pure TSO information versus a more general electricity industry view),
- different assumptions for forecasting values
  ("conservative" estimations from TSO reality versus global industrial estimations),
- different time frames,
- minor methodological differences.

3. Generation Adequacy : main results

3.1. UCTE Power Balance Elements

The most significant overall results of the "System Adequacy Forecast 2005-2015" for the third Wednesdays in January (the representative winter day) and July (the representative summer day) are shown in Table 1, for the entire UCTE. Values are those for scenario A ("Conservative"), difference with scenario B ("Best estimate") is shown in italic (as B-A). Appendix A contains forecasts for national generating capacity, non usable capacity, system service reserves and load for each country.

Table 1 UCTE Power balance forecasts 2005-2015 on the 3rd Wednesday Results in GW

	2005			2006			2007			2010			2015		
	January		July	January		July	January		July	January		July	January		July
	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00
National generating capacity															
1.Hydro power stations	133.0	133.0	133.0	133.1	133.1	133.1	133.6	133.6	133.8	135.1	135.1	135.4	136.4	136.4	1366.4
										0.3	*0.3*	*0.3*	*1.8*	*1.8*	*2.0*
2.Nuclear power stations	113.0	113.0	112.7	112.7	112.7	112.6	112.1	110.7	110.7	110.0	110.0	110.0	105.5	105.0	105.5
													0.8	*0.8*	*0.8*
3.Fossiel fuel power stations	305.8	305.8	307.3	310.2	310.2	312.5	315.4	315.4	318.2	323.3	323.3	327.3	321.8	321.8	321.8
						0.4	*0.5*	*0.5*	*1.7*	*8.0*	*8.0*	*8.6*	*27.2*	*27.2*	*30.5*
4.Renewable energy sources	34.4	34.4	36.4	40.2	40.2	42.4	45.6	45.6	48.4	63.2	63.2	67.1	87.1	87.1	89.9
				0.1	*0.1*	*0.1*	*0.7*	*0.7*	*0.7*	*2.6*	*2.6*	*2.7*	*8.1*	*8.1*	*9.4*
5.Not clearly identifable energy sources	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.8	1.8	1.8	1.8	1.8	1.8
6.National generating capacity (6 = 1+2+3+4+5)	**587.7**	**587.8**	**591.3**	**597.9**	**597.9**	**602.3**	**608.4**	**608.4**	**612.8**	**633.4**	**633.4**	**641.6**	**652.5**	**652.5**	**655.3**
				0.1	***0.1***	***0.5***	***1.2***	***1.2***	***2.4***	***10.9***	***10.9***	***11.6***	***38.0***	***38.0***	***42.7***
7.Non-usable capacity[5]	90.0	90.0	109.8	93.6	93.6	113.2	97.4	97.4	117.6						
									0.1						
Of which , mothballed	*12.0*	*12.0*	*12.8*	*12.1*	*12.1*	*11.7*	*11.6*	*11.6*							
										136.6	136.6	198.6	152.9	152.9	215.2
										0.1	*0.1*	*0.4*	*4.5*	*4.5*	*5.0*
8.Maintenance and overhauls (fossiel fuel power stations)	9.9	9.9	50.2	10.2	10.2	50.7	10.5	10.5	50.9						
									0.1						
9.Outages (fossiel fuel power stations)	17.6	17.6	16.6	18.4	18.4	17.1	18.3	18.3	17.0						
							0.1	*0.1*	*0.2*						
10.System services reserve	31.2	31.0	30.4	31.5	31.5	30.7	31.9	31.9	31.0	33.0	32.8	32.3	34.5	34.5	34.0
										0.2	*0.3*	*0.0*	*0.5*	*0.4*	*0.3*
11.Reliable available capacity (11 = 6-(7+8+9+10))	**439.1**	**439.2**	**384.2**	**444.2**	**444.2**	**390.7**	**450.3**	**450.3**	**396.2**	**463.8**	**463.9**	**410.7**	**465.0**	**465.0**	**406.1**
				0.1	***0.1***	***0.5***	***1.2***	***1.1***	***2.1***	***10.9***	***10.7***	***11.5***	***33.0***	***33.1***	***37.4***
12.Load	**371.5**	**379.7**	**326.5**	**378.4**	**386.6**	**333.8**	**386.5**	**394.0**	**340.9**	**406.5**	**414.9**	**361.1**	**439.8**	**447.8**	**391.9**
13.Margin against monthly peak load	17.2	8.5	10.5	17.2	9.0	10.8	17.4	8.7	10.9	18.4	10.2	11.9	19.2	11.2	12.7
14.Remaining capacity (14 = 11-12)	**67.6**	**59.6**	**57.7**	**65.8**	**57.6**	**56.8**	**63.9**	**56.2**	**55.3**	**57.3**	**49.0**	**49.5**	**25.2**	**17.2**	**14.2**

[5] For 2010 and 2015 non useable capacity, overhauls and outages are aggregated

Changes for scenario A "Conservative" in generating capacity, reliably available capacity, remaining capacity and load are shown in Table 2 ; changes for scenario B (B-A) are shown between brackets.

Table 2 | **UCTE Power balance, 2005 - 2015 forecasts** **Results in GW**

Forecast January - reference time 11:00 a.m.

	Variation 2005 - 2007 GW	Variation 2005 - 2007 %	Variation 2007 - 2010 GW	Variation 2007 - 2010 %	Variation 2010 - 2015 GW	Variation 2010 - 2015 %
UCTE generating capacity	20.6 *(+1.2)*	3.5	25.0 *+9.7)*	4.1	19.1 *(+27.1)*	3.0
Reliable available capacity	11.2 *(+1.2)*	2.6	13.4 *(+9.7)*	3.0	1.3 *(+22.2)*	0.3
Load at 11:00 a.m.	15.0	4.0	20.0	5.2	33.4	8.2
Remaining capacity	-3.7 *(+1.2)*	-5.5	-6.6 *(+9.7)*	-10.3	-32.1 *(+22.2)*	-56.0

Forecast January - reference time 07:00 p.m.

	Variation 2005 - 2007 GW	Variation 2005 - 2007 %	Variation 2007 - 2010 GW	Variation 2007 - 2010 %	Variation 2010 - 2015 GW	Variation 2010 - 2015 %
UCTE generating capacity	20.6 *(+1.2)*	3.5	25.0 *+9.7)*	4.1	19.1 *(+27.1)*	3.0
Reliable available capacity	11.2 *(+1.2)*	2.5	13.4 *(+9.6)*	3.0	1.1 *(+22.4)*	0.2
Load at 07:00 p.m.	14.4	3.8	20.9	5.3	32.9	7.9
Remaining capacity	-3.3 *(+1.2)*	-5.6	-7.2 *(+9.6)*	-12.9	-31.8 *(+22.4)*	-64.9

Forecast July - reference time 11:00 a.m.

	Variation 2005 - 2007 GW	Variation 2005 - 2007 %	Variation 2007 - 2010 GW	Variation 2007 - 2010 %	Variation 2010 - 2015 GW	Variation 2010 - 2015 %
UCTE generating capacity	21.5 *(+2.4)*	3.6	28.8 *+9.2)*	4.7	13.7 *(+31.1)*	2.1
Reliable available capacity	12.0 *(+1.2)*	2.5	13.4 *(+9.6)*	3.0	1.1 *(+22.4)*	0.2
Lad at 11:00 a.m.	14.3	4.4	20.3	5.9	30.8	8.5
Remaining capacity	-2.3 *(+2.1)*	-4.0	-5.8 *(+9.4)*	-10.5	-35.3 *(+25.9)*	-71.3

Period 2005 - 2007

A significant growth in generating capacity (+20.6 GW) is expected over this period (from January 2005 to January 2007). Renewable energy sources account for half (11.2 GW) of this increase; most of these new plants are wind power plants. The contribution of fossil fuel power stations commissioning reaches 9.6 GW. The increase in reliably available capacity (+11.0 GW) from January 2005 to January 2007 represents only 53% of the increase in UCTE generating capacity due to the poor contribution of wind power to reliably available capacity. The increase observed for load at reference time over the same period (+15.0 GW) is higher than the increase in reliably available capacity. **As a consequence, RC decreases from 2005 to 2007**, with values reaching 67.6 GW in January 2005 at 11:00 (59.6 GW at 19:00), 65.8 GW in January 2006 at 11:00 (57.6 GW at 19:00), and 63.9 GW in January 2007 at 11:00 (56.2 GW at 19:00). Remaining capacity in July falls too (from 57.7 GW in 2005 to 56.8 GW in 2006 and 55.3 GW in 2007).
However RC levels are higher than ARM as shown in figures 1 and 2.

In order to assess the level of security over the next years, the following characteristics of the UCTE system should be kept in mind :

- there is a significant sensitivity of the load to the temperature ; it can be estimated at more than 3000 MW /°C in winter and 1800 MW / °C in summer;
- the random nature of the "reliably available capacity" which results from the forced outages of the thermal plants and from variations of the inflows in the hydro power plants. According to the expertise of the TSOs, the standard deviation of each of these factors can be estimated between 2500 and 3000 MW;
- in addition there is a significant correlation between low temperature and low inflows in the hydro plants as a result of anticyclonic meteorological conditions. In the future these periods should also be characterised by a low contribution of wind power generation.

Thus a 65 GW RC aims at supplying the UCTE peak load during a cold wave leading to temperature up to 7°C below normal temperature, while keeping a margin of about 25 GW in order to cover some plants unavailability higher than average.

The forecasted generating capacities seem to be sufficient to cover the load for the 3 coming years without any major risks as shown in figures 1 and 2.

However it must be noticed that this conclusion rely on the assumption that all the plants whose commissioning is expected during this period will actually be put into operation; in addition it is important to note that some decommissioning can still be decided during this period.

Horizon 2010

The generating capacity for UCTE increases from 608 GW in January 2007 to 633 GW in 2010; at that time horizon, expected commissioning in renewable (approx. 18 GW) have the highest share, often resulting from plans engaged by the member states to fulfil the requirements of the European directive on renewable sources. Given the lesser availability ratio of renewable, the additional reliably available capacity over the period (+13 GW) represents only 54% of the increase in generating capacity (the ratio for the overall production system is approx. 74% in January 2007). At UCTE's level load is expected to increase on the same trend as at the beginning of the period, with an average annual growth of 1.7% in winter, and 1.9% in summer.
The additional reliably available capacity doesn't entirely cover the additional load over the period 2007-2010. **Therefore RC drops significantly from 2007 to 2010, by 7 GW in January, and 6 GW in July.**

RC is still higher than ARM for the whole UCTE (by approx. 7 GW in winter and 6 GW in summer). That means that the investments in generation today firmly decided or planned are sufficient to meet this condition in 2010. But the system security is slightly degraded over the period from 2007 to 2010. When drawing this conclusion, two elements must be taken into consideration :

- **it is still possible to decide new investments for this time horizon ; there is a need of approx. 8-10 GW reliably available capacity to maintain this margin at the existing level.**
- **decommissioning (on top of those currently expected) may occur during the period especially as a result of the effects of new environmental requirements on the oldest fossil fuel plants.**

Renewable sources could amount 63-67 GW at the end of the period. This increasing share of renewable in the UCTE system, most of them being wind power, asks for an increasing need of balancing power whereas in the same time some fossil fuel plants able to deliver this kind of service could be decommissioned.

Horizon 2015

From 2010 to 2015, when commissioning cannot be foreseen in most countries, the increase in generating capacity is related to new renewable energy sources power plants, accounting for 23.9 GW. The overall increase in generating capacity is only 19 GW, because of power plants'decommissioning. Renewable energy sources may then represent 13% of the generation capacity in UCTE (against 10% in 2010, and 7.5% in 2005). This growing share results in the stability of the reliably available capacity over the period in summer, and a decrease (approx. –5 GW) in winter. As a consequence, **the drop of RC** expected from 2007 to 2010 **is worsened from 2010 to 2015**, when RC is only 25.2 GW in January at 11:00, 17.2 GW in January at 19:00, and 14.2 GW in July.

According to the current information ARM will not be met in 2015, and RC may be lower than ARM as soon as 2012
Additional investments up to around 30GW would be necessary in order to restore the level of security. Best estimate scenario allows to provide such capacity but the corresponding investments shall still to be confirmed.

Figure 1 and 2 show expected remaining capacity (for scenario A "Conservative" and scenario B "Best estimate"), from 2005 to 2015, in January and July. It can be compared to 5% of UCTE Generating Capacity + margin against peak load, which can be considered at UCTE level as a reasonably low risk of shortfall.

Figure 1 | **Remaining capacity vs. Adequacy reference margin - January** | **Results in GW**

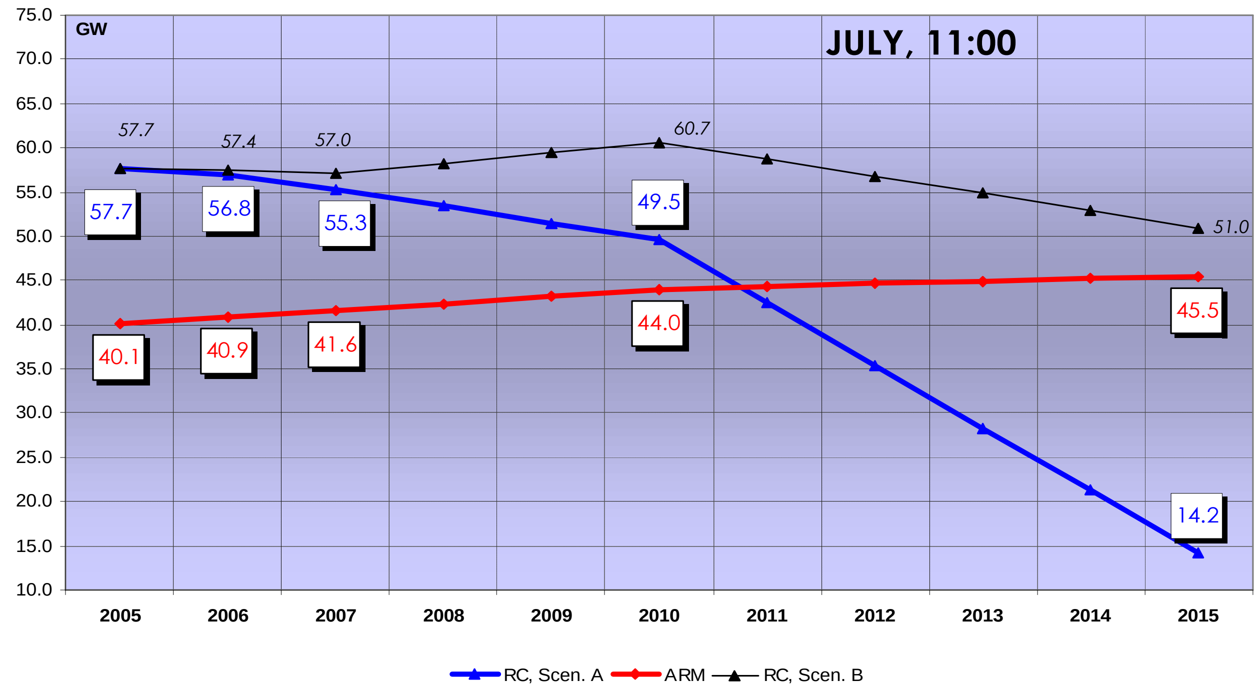
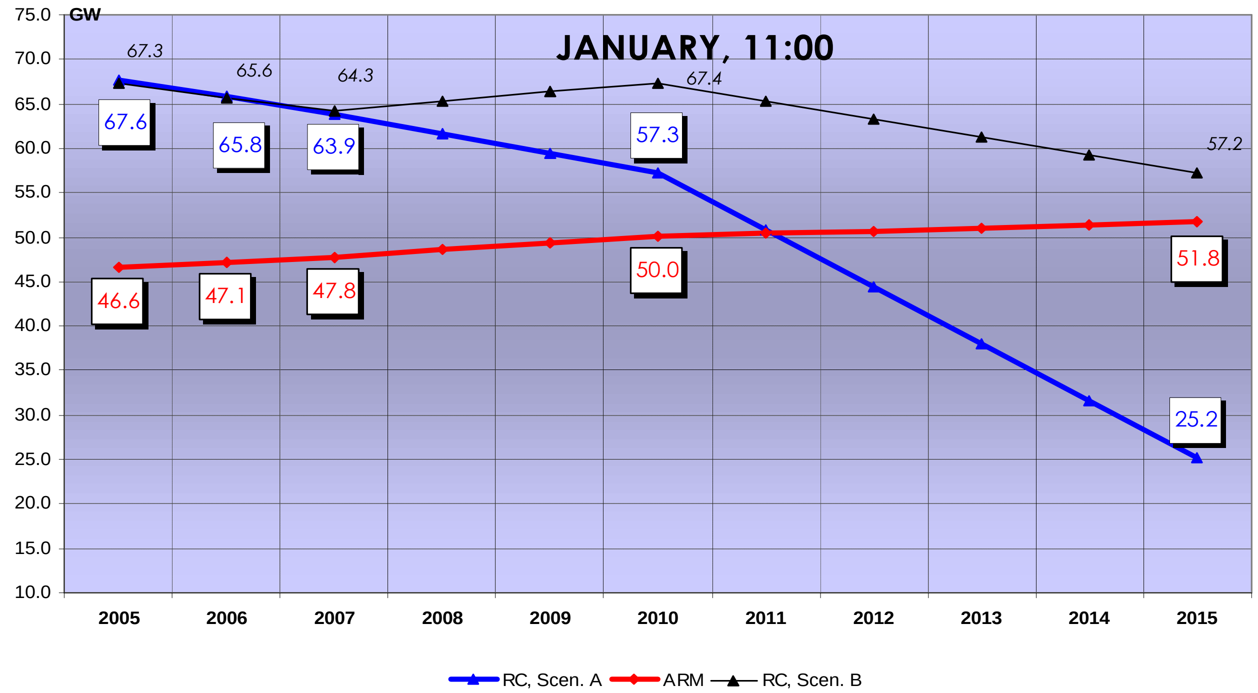


Figure 2 | **Remaining capacity vs. 5% of NGC + margin against peak load - July** | **Results in GW**



Comparison with last year's forecasts

Horizon 2005

Last year's forecasts assessed national generating capacity at 580 GW in January, 8 GW lower than this year value. Main increases concern France, (+5 GW due to a change in the representativity factor which affects load in the same extent), Germany, Belgium, Netherlands, Bulgaria. On the contrary Italy, Spain, Romania show decreases of the national generating capacity compared to last year forecast. Reliably available capacity increases by 10 GW; main increases are observed in France, Spain and Germany. Load forecast at 11:00 is 5 GW higher than last year forecast, main increase resulting from France (new representativity factor) and Spain. However the estimated peak load stay at the same level in both forecasts (389 GW), despite the increase of the reference load in the new forecast. The explanation relies on the change in the methodology. Peak load was last year estimated on the basis of the differences between peak load and reference load at 11:00 provided by each country ; the sum of these "margin against peak load" was estimated at 22.6 GW; however this method lead to an overestimation of the synchronous peak load. This year this estimation results from the difference between peak load and the new reference point at 19:00, which is in most countries closest to the peak; the synchronous load at 19:00 is 8 GW higher than the synchronous load at 11:00. The sum of the margin against peak load is estimated at 8.5 GW. Therefore the margin against peak load at 11:00 is reduced by 5 GW. Last year forecasts assessed RC at 62.4 GW in January, and 59.1 GW in July. When compared to these values, this year's forecasts show an improvement of 5.2 GW in winter, and are slightly lower in summer. At the same time the ARM is 5GW lower than last year estimate due to the decrease of margin against peak load.

Horizon 2010

The comparison is made for the scenario A whose conception is comparable with last year forecast. For 2010 generating capacity is 9 GW higher than last year. It mainly results from increases of the generating capacity in Germany, Spain, France, The Netherlands, Poland and Bulgaria, balanced by a decrease in Italy. The reliably available capacity is 7.9 GW higher. Load is 2 GW higher but margin against peak load is as in 2005 5 GW lower. Then the peak load is 3 GW lower than last year. Expected RC is 5 GW higher in January (slightly lower in summer) than forecasted RC carried out last year. At the same time the ARM decreases from 5 GW due to the decrease of the margin against peak load. The expected mismatch of RC and indicative ARM, expected in 2009-2010 in 2003 SAF Report, is postponed to the period 2010-2011 in this year's forecasts.

3.2.2. Analysis of remaining capacity at national and regional levels

3.2.1 Remaining Capacity

The detailed results concerning remaining capacity for scenario A "Conservative" are displayed in table 3 hereafter :

Table 3 | **Remaining capacity Scenario A"Conservative" on the 3rd Wednesday** | **Results in GW**

	2005			**2006**			**2007**			**2010**			**2015**		
	January		July	January		July	January		July	January		July	January		July
Country	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00
B	0.3	0.1	1.9	0.0	-0.2	1.6	-0.2	-0.5	1.5	-1.9	-2.2	0.3	-5.2	-5.5	-2.6
D	8.2	8.4	3.4	7.5	8.1	4.7	7.7	8.0	4.0	5.5	5.7	3.5	1.4	1.7	-1.6
E	8.5	5.6	5.2	9.6	6.3	5.1	9.0	6.3	5.6	8.3	4.9	3.7	1.8	-1.5	-3.1
F	14.1	11.7	11.9	13.1	10.8	11.5	12.7	10.4	10.8	12.0	9.8	9.3	11.1	8.9	9.7
GR	1.1	0.7	-0.1	0.9	0.5	-0.1	1.4	1.0	0.3	1.9	1.5	0.1	1.3	0.6	-1.1
I	5.4	5.3	5.4	5.7	5.5	5.6	5.7	5.5	5.7	6.3	6.0	8.5	0.6	0.6	-1.8
SLO	0.2	0.2	0.1	0.2	0.2	0.1	0.3	0.3	0.3	0.1	0.1	0.0	0.0	0.0	-0.1
HR	0.8	0.6	1.1	0.8	0.6	1.0	1.0	0.8	1.3	0.9	0.6	1.1	0.3	0.1	0.5
BiH	1.1	0.8	1.2	1.1	0.8	1.2	1.0	0.8	1.1	0.9	0.7	1.0	0.7	0.5	0.8
FYROM	0.1	-0.1	0.1	0.0	-0.1	0.1	0.0	-0.1	0.0	0.1	0.1	0.1	0.3	0.1	0.2
SCG	0.1	-0.1	0.8	0.1	-0.1	0.7	0.1	-0.1	0.7	0.0	-0.1	0.5	-0.5	-0.7	0.0
L	0.8	0.9	0.8	0.8	0.9	0.4	0.7	0.9	0.4	0.6	0.8	0.3	0.4	0.7	0.2
NL	1.3	1.5	1.7	0.9	1.1	1.3	1.5	1.7	1.9	-0.9	-0.7	-0.5	-2.8	-2.6	-2.4
A	5.4	5.5	5.1	4.9	5.0	4.6	4.8	4.9	4.5	4.2	4.3	3.8	3.2	3.3	3.2
P	1.6	1.6	1.6	1.5	1.5	1.8	1.8	1.8	1.7	1.1	1.1	1.2	-2.1	-2.1	-2.2
CH	3.3	3.9	4.9	3.1	3.7	4.7	2.9	3.5	4.6	2.3	2.9	4.1	1.8	2.4	3.6
CZ	2.8	2.7	2.3	2.7	2.6	2.3	2.6	2.5	2.2	2.2	2.1	2.0	1.7	1.6	1.6
H	0.6	0.2	-0.1	0.6	0.3	-0.1	0.5	0.2	-0.1	0.8	0.4	0.2	0.3	0.0	0.0
PL	7.8	6.8	6.4	8.1	7.1	6.6	8.0	6.9	6.2	8.9	8.0	6.8	6.4	5.4	4.6
SK	1.0	0.9	1.0	1.1	1.0	1.0	0.2	0.1	0.3	0.1	0.0	0.1	-0.4	-0.5	-0.3
RO	1.2	0.9	1.2	1.2	0.9	1.1	1.20	0.8	1.0	1.3	1.0	1.1	1.3	1.1	1.3
BG	1.2	0.7	1.0	1.3	0.9	1.1	0.5	0.1	0.9	2.1	1.6	1.9	3.0	2.5	3.0
West UA	0.7	0.6	0.6	0.7	0.6	0.6	0.7	0.6	0.6	0.7	0.6	0.7	0.7	0.6	0.7
UCTE	**67.6**	**59.6**	**57.7**	**65.8**	**57.6**	**56.8**	**63.9**	**56.2**	**55.3**	**57.3**	**49.0**	**49.5**	**25.2**	**17.2**	**14.2**

3.2.2 Remaining Capacity and Adequacy Reference Margin

As already stated, remaining capacity represents 10-12 % of the total generating capacity for the whole UCTE system between 2005 and 2010 but only 5 % in 2015.

Figures 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-7 and 3-8 show the comparison between the RC and the national ARM in 2005, 2007, 2010 and 2015 (respectively January and July), detailed by country for scenario A. Countries have been classified according to the new generation adequacy assessment methodology: countries whose ARM is related to "5% of NGC", and those whose ARM is related to "10% of NGC".

Figure 3-1	"margin against peak load" + 5%(or10%) of the generating capacity, January 2005 11:00 a.m.

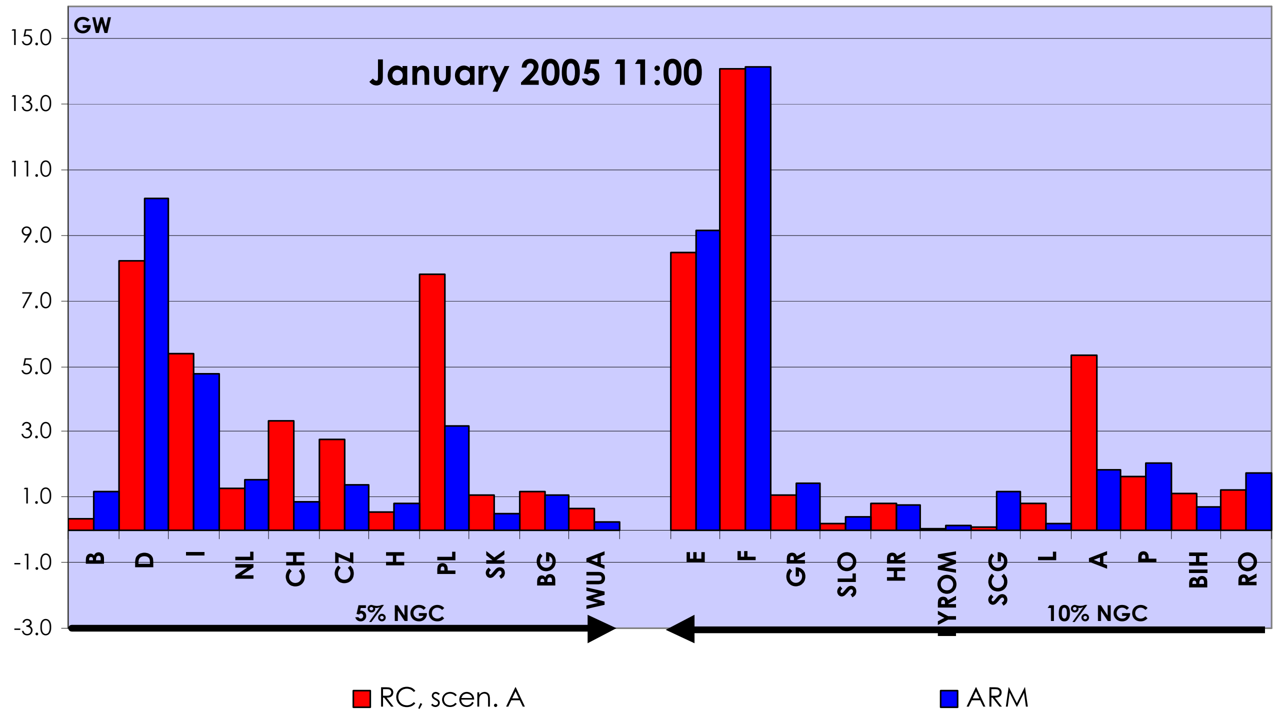


Figure 3-2	"margin against peak load" + 5%(or10%) of the generating capacity, July 2005 11:00 a.m.

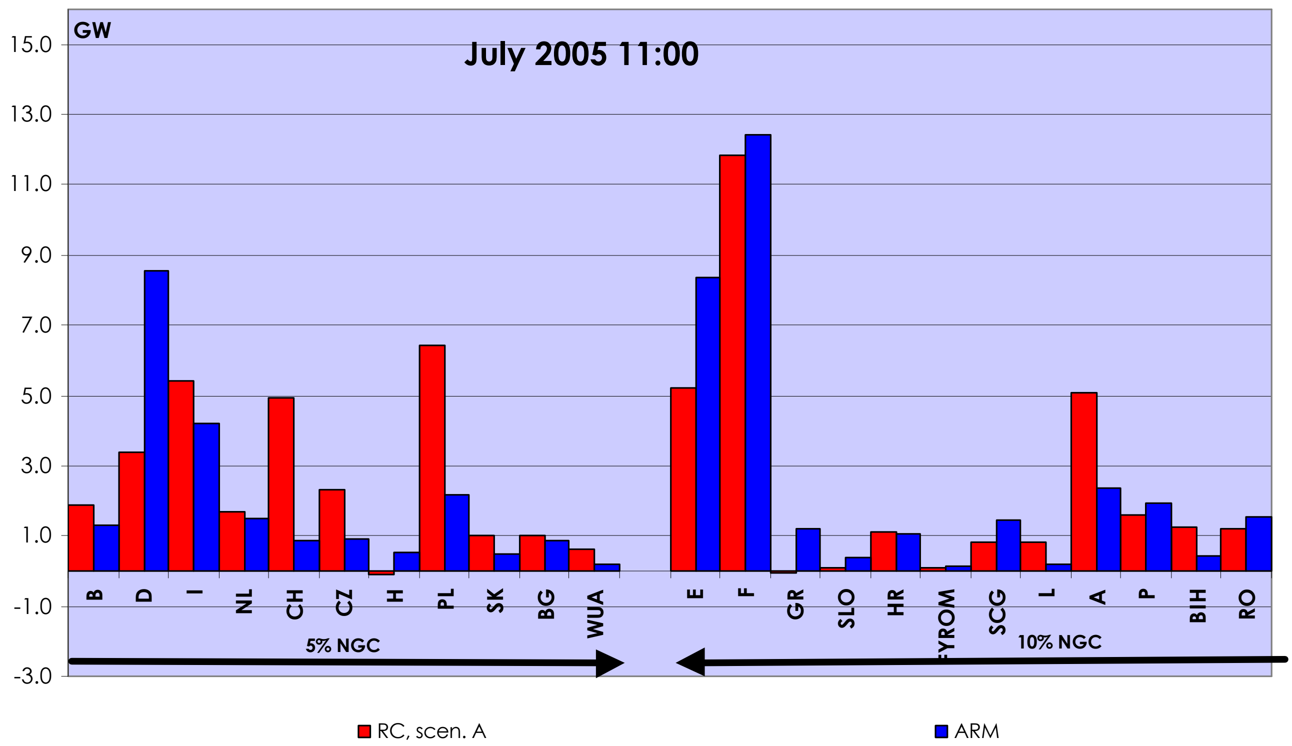


Figure 3-3 | **"margin against peak load" + 5%(or10%) of the generating capacity, January 2007 11:00 a.m.**

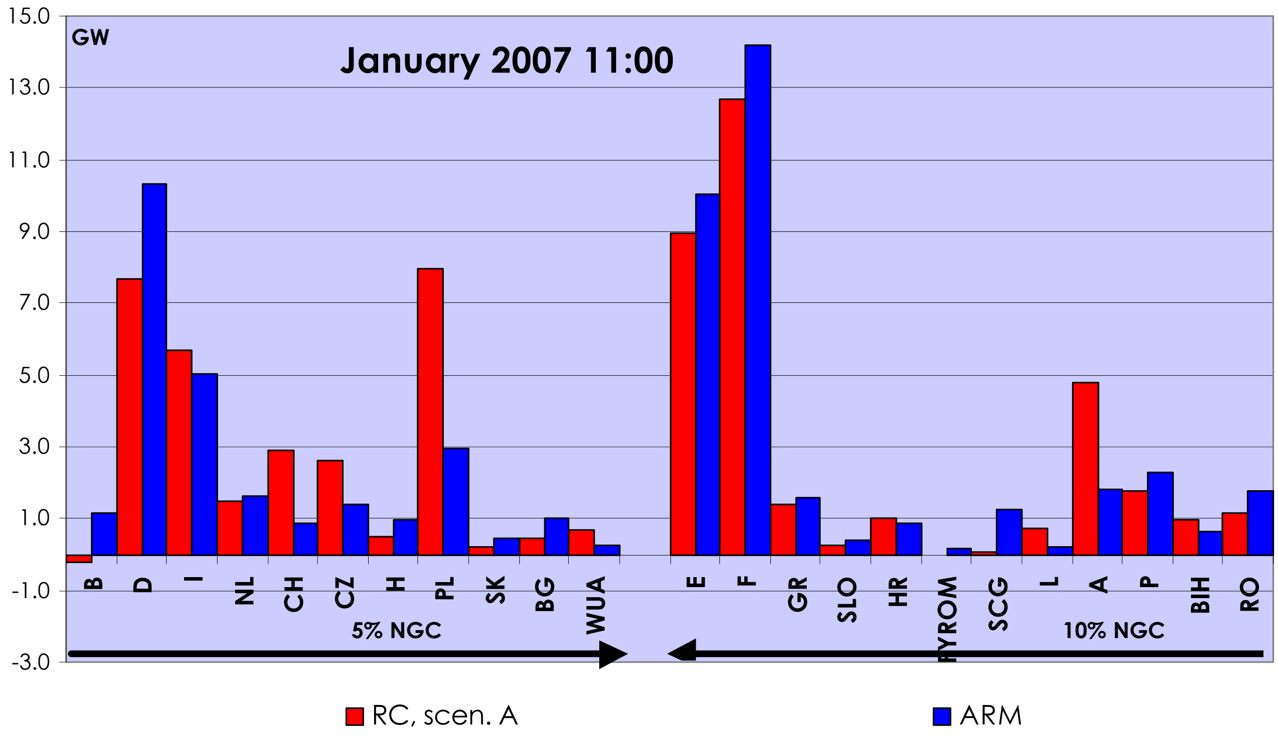


Figure 3-4 | **"margin against peak load" + 5%(or10%) of the generating capacity, July 2007 11:00 a.m.**

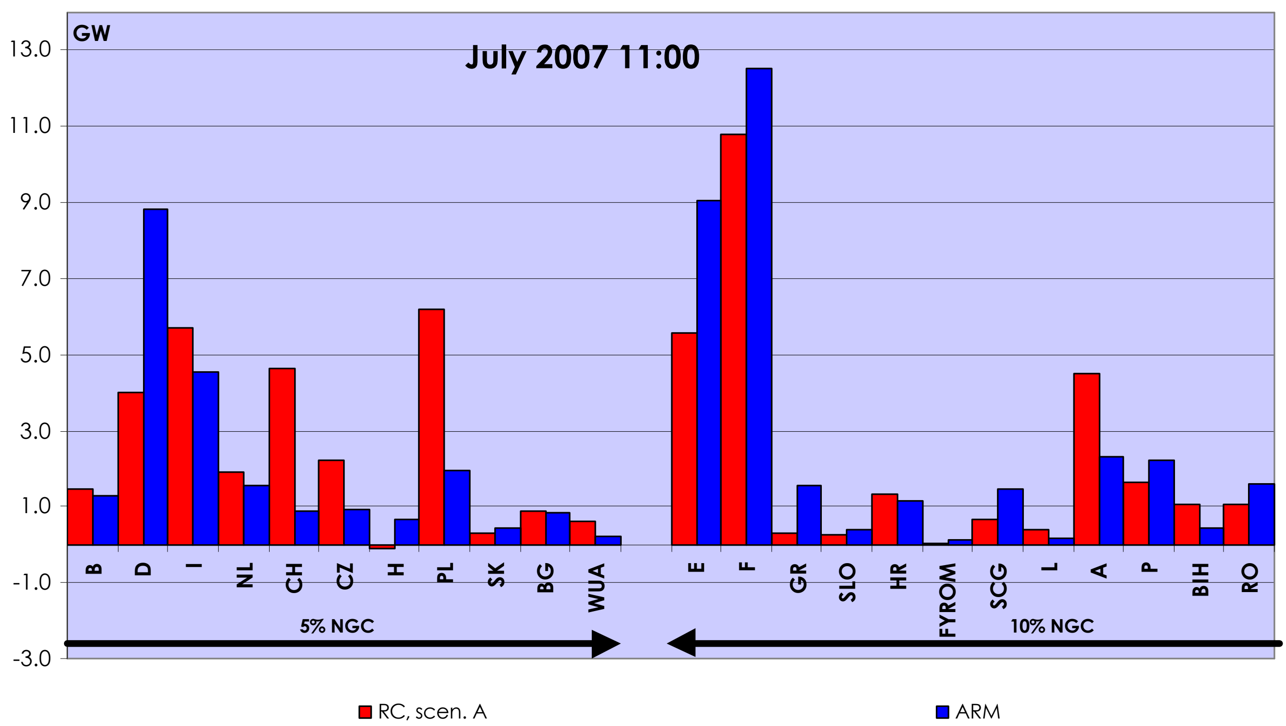


Figure 3-5 | **"margin against peak load" + 5%(or10%) of the generating capacity, January 2010 11:00 a.m.**

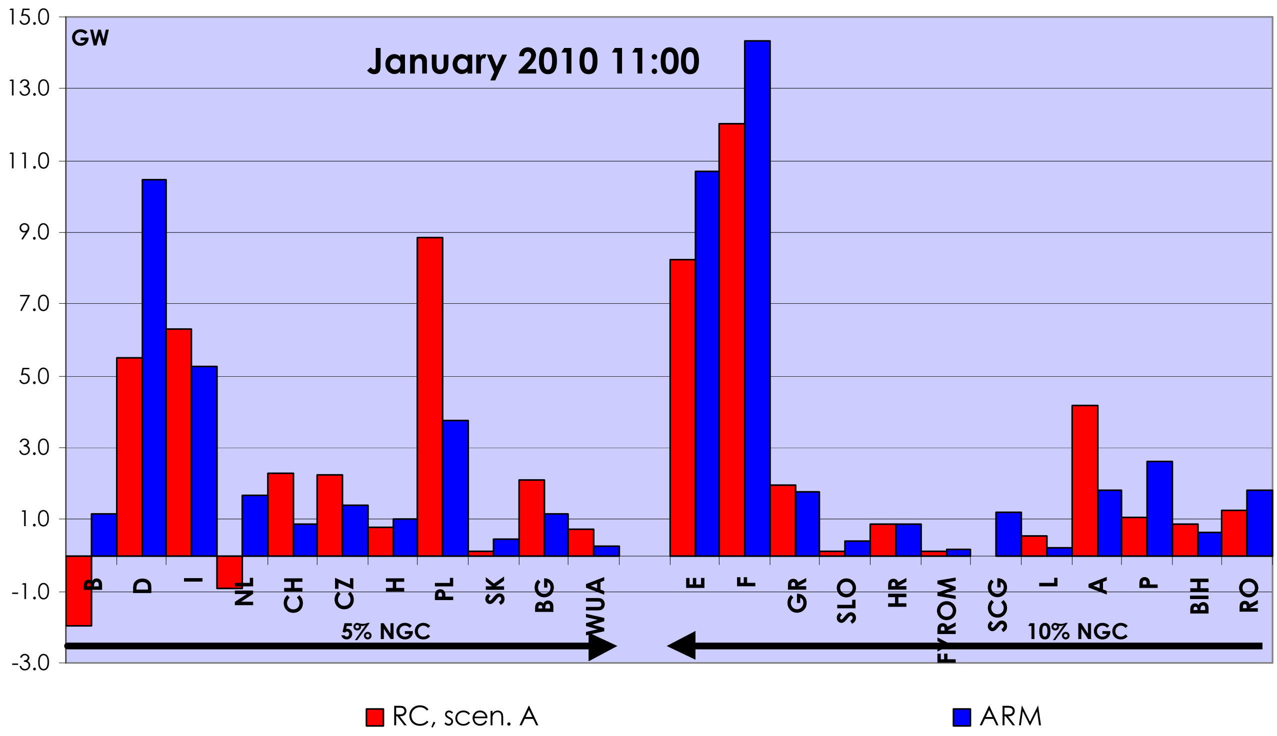


Figure 3-6 | **"margin against peak load" + 5%(or10%) of the generating capacity, July 2010 11:00 a.m.**

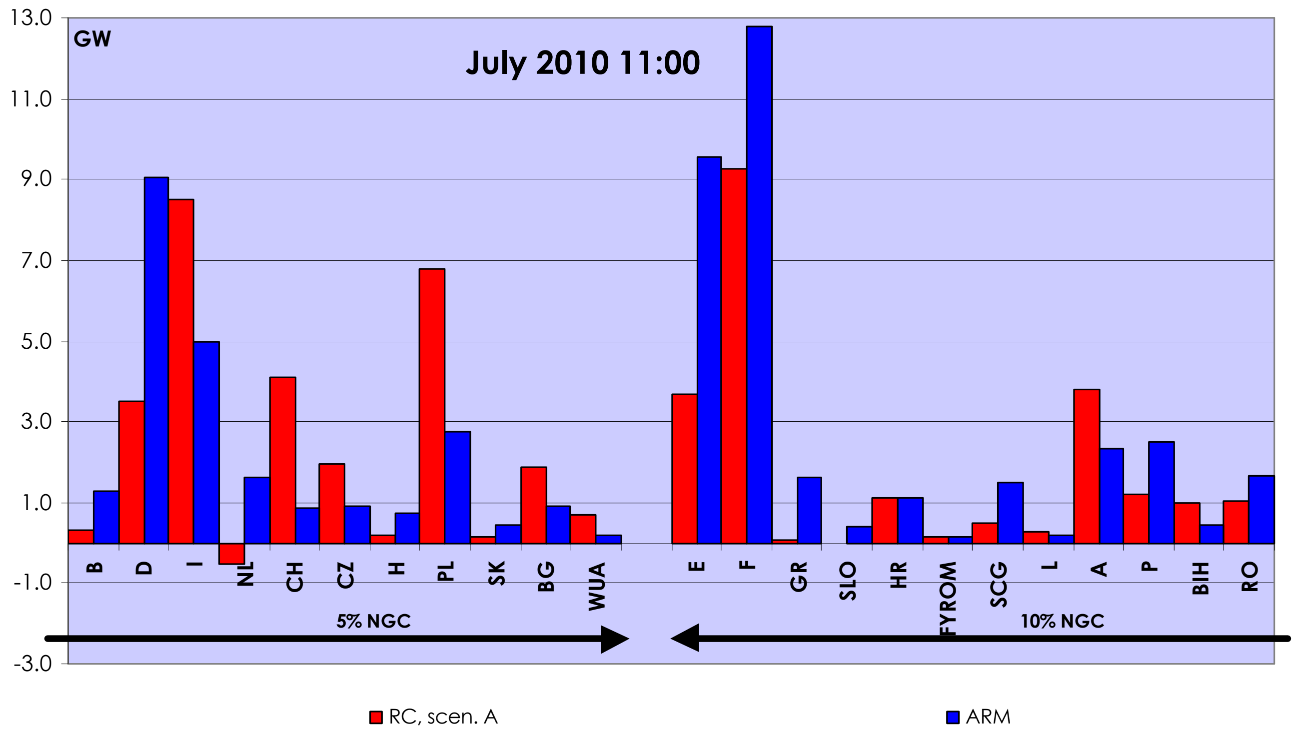


Figure 3-7 | **"margin against peak load" + 5%(or10%) of the generating capacity, January 2015 11:00 a.m.**

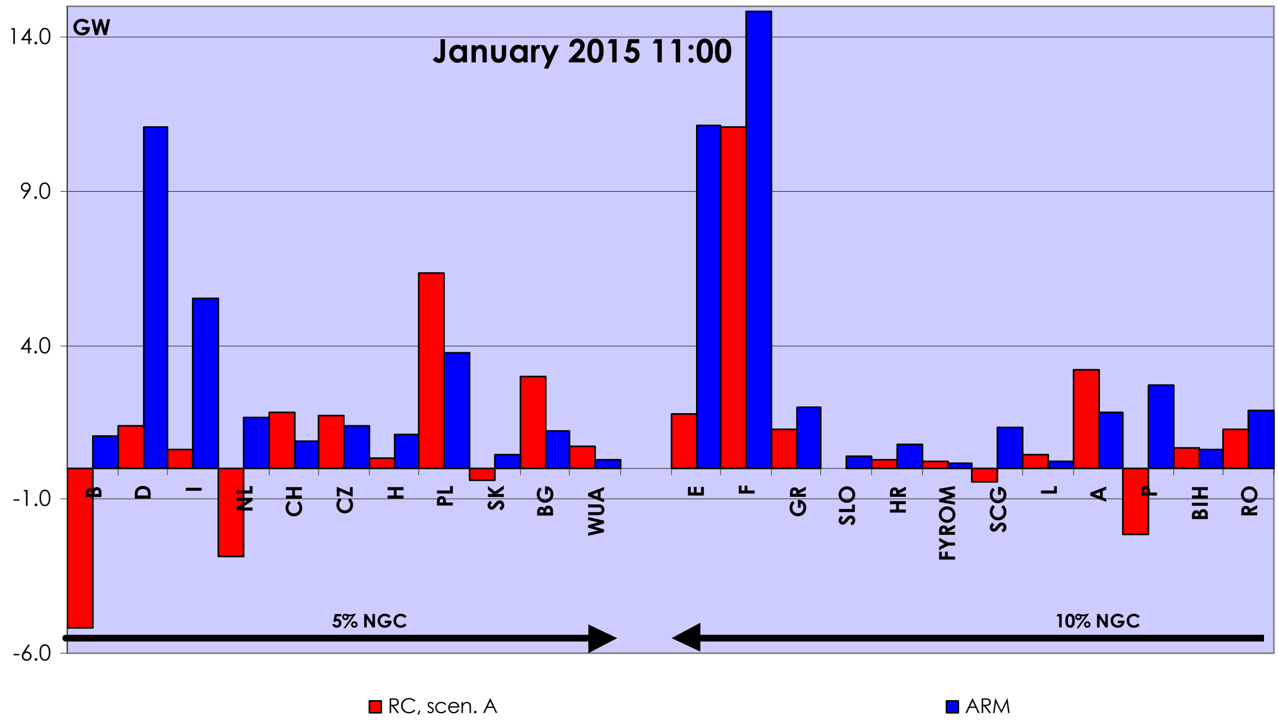
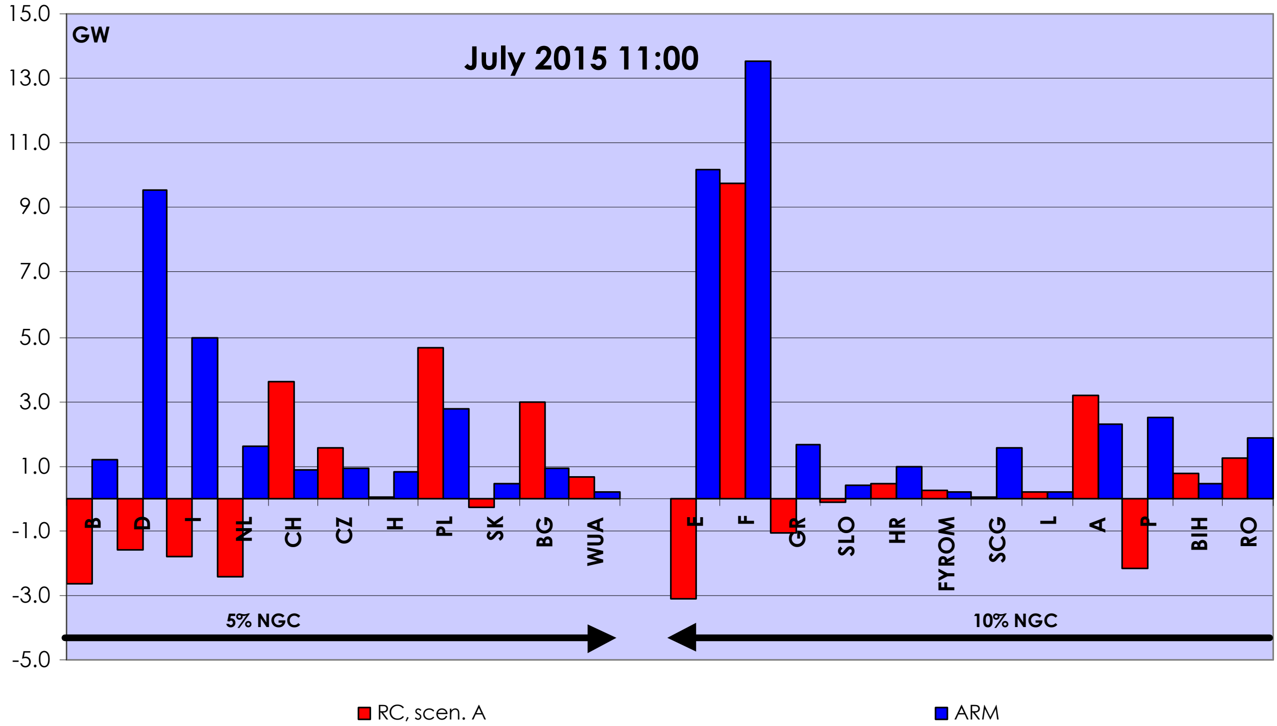


Figure 3-8 | **"margin against peak load" + 5%(or10%) of the generating capacity, July 2015 11:00 a.m.**



3.2.3 Analysis by geographical blocks

Considering the role that the interconnected transmission system plays for the reliability of some national systems, the situation of different geographical blocks is analysed (see representation in Figures 1A, 1B, 1C, 1D and 1E for 2005, 2006, 2007, 2010 and 2015, respectively).

Main UCTE Block

2005-2007

From January 2005 to 2007, generating capacity increases by 6 GW (among which 5 GW from renewable energy sources), mainly thanks to commissioning in Germany (+3.7 GW). It contributes to an increase of only 2.3 GW of reliably available capacity. The annual average growth for load is 1.3% in winter and 1.4% in summer over that period. As a consequence, RC is decreasing from 35.5 GW in 2005 to 32.4 GW in 2007.
Still **ARM is met by approx. 8 GW in 2007 for this block.**
Considering national ARM, it can be noticed that Belgium is not expected to meet the margin in winter over this period, Germany, the Netherlands and Slovenia in winter and summer. Croatia does not meet ARM in 2006, and France in 2006 and 2007. When compared to SAF 2003 for 2005, it appears that RC is higher by 3 GW in January, and 1.7 GW in July. It is noticeable that RC is higher than last year's forecasts for Austria, France[6] and Switzerland in summer. It is significantly lower for Netherlands.

2010

The increase in generating capacity is 7 GW over the period 2007 to 2010 same order as the load increase. Decommissioning in nuclear and fossil fuel power plants result in a decrease of reliably available capacity. RC is only 23.8 GW in winter **2010** (loss of 9 GW when compared to 2007).
RC meets ARM in summer, but not completely in winter (at 11:00). Without any additional investment, tight situations could be expected in cold weather conditions.
Croatia, Luxembourg, Austria, Switzerland and Bosnia Herzegovina are the countries who meet individually the ARM.
When scenario B is taken into account, it appears that extra commissioning foreseen by TSOs would allow to meet the ARM in 2010. Forecasts for 2010 made last year showed a generating capacity 7 GW lower than this year's forecasts for 2010. Reliably Available Capacity is approx. 3 GW higher in winter (1.5 GW in summer) in this year's forecasts and load 2.5 GW higher . Consequently, Remaining Capacity expected for 2010 has improved by 0.7 GW in winter, and not in summer 2010. Expected commissioning are almost only from renewable energy sources, and remaining capacity drops drastically from 2010 to 2015: it is only 11.7 GW in winter, and 12 GW in summer.
To meet the ARM in 2015, an additional 12 to 15 GW commissioning of reliably available capacity would be necessary in the main UCTE block.
Luxembourg, Austria, Switzerland and Bosnia Herzegovina are the countries who meet individually the ARM. Tight situations may occur on interconnection when improving the balance in some countries will be necessary, thanks to neighbouring generation. The extra generation expected in scenario B is almost sufficient to cover ARM in 2015 for this block (lack of approx. 3 GW in winter).

[6] For France, amount of reserve for system services for forecasts has been modified this year: only necessary reserve seen from one hour before peak load is taken into account (and no more necessary reserve seen from the day before).

Specific remarks:

Belgium: the generation capacity, as far as known today, together with the import capacity, could be unable to cover the demand in 2010 taking into account the load on the third Wednesday at 11:00 If the situation remains as today, adequacy problems can be expected from 2007 and on, at peak load.

In **Germany**, during the individual months until the year 2007, the domestic remaining capacity varies between 7% and 3% of the national generating capacity. These values are considered adequate for power plant operation reserve. After 2007, the remaining capacity will decrease significantly due to the planned shutdown of nuclear power plants. This capacity is expected to be compensated by fossil fuel power plants, but according to the philosophy of scenario A only projects have been taken into account which can be considered as sure. Regarding primary energies, environmental aspects and cost structures must also be taken into consideration under current frame conditions.

In France: ARM has been increased till 10% of NGC following the new probabilistic approach; it mainly results from the load sensitivity of the load to the temperature. This ARM level is a little more pessimistic than the criteria used in the French generation adequacy assessment; generation adequacy can be considered as ensured in 2007 in scenario A ; new firm investment decisions are still needed in 2010.

In the Netherlands, until now all contingencies have been handled with the available amount. So it appears that sufficient resources exist in and externally to maintain programmatic balance by market parties themselves and also sufficient resources left to maintain system balance in an adequate way. There are no indications that there will be a need for less or more national reserve in future.

Spain + Portugal

2005-2007

Expected commissioning in the block contribute to an increase of generating capacity of 8 GW over the period. Renewable energy sources contribute to half of this increase. The increase in Reliably Available Capacity covers the load increase. As a consequence, the ratio Remaining Capacity / Generating Capacity is maintained in 2007. But the RC doesn't meet the new **ARM (related to 10% of generating capacity that reflects the sensitivity of this block to hydro and wind conditions) neither in winter nor in summer.** Generation and Remaining Capacity forecasts are approx. 1 GW higher than in SAF 2004-2010.

2010

From 2007 to 2010, the increase in generating capacity (+7 GW) only relies on the development of renewable energy sources, with a poor contribution to the increase in Reliably Available Capacity (+2.7 GW). Remaining Capacity is dropping. **ARM is not met neither in winter, nor in summer.** As compared to last year's forecasts, Remaining Capacity improves however by 1 to 2 GW. Scenario B shows that a 2.5 GW increase of the generating capacity can be reasonably expected. Thanks to these additional commissioning ARM could be met over the period.

2015

In 2015, new commissioning do not compensate expected shut down, and Reliably Available Capacity remains at its 2010 level. As a consequence, when load increase is annually 3.1% (winter peak load, 3.3% in summer), **Remaining Capacity drops to negative values in 2015**. If Scenario B is considered, new commissioning not yet decided but somehow predictable would allow to meet ARM. As compared to last year's forecasts, Remaining Capacity improves by 1 to 2 GW. Specific remarks :

In Portugal, according to the System Adequacy methodology, a very conservative scenario for the new thermal power plants is considered, aggravated by the decommissioning of the fuel-oil plants between 2010 and 2015. Consequently, as a significant increase of the consumption is expected, the remaining capacity is very low particularly in 2015. This situation will be certainly improved by several investments currently under study. Anyway these results must be viewed in the scope of the future Iberian market.

In Spain, the internal demand is attended by the spot market; there are a few bilateral contracts for international exchanges. The needed reserve will be in the future higher than now, mainly due to wind development, that will make necessary to have a Wind Power Prediction Model as accurate as possible to help the system operation to be more secure and less expensive.

Italy

2005-2007

Generating capacity in Italy should increase by 6.5% (+5 GW) by 2007, mainly thanks to commissioning in fossil fuel power plants, with a high contribution to Reliably Available Capacity. This will contribute to improve Remaining Capacity over the period (+3.4 GW). Under those circumstances, **ARM is met from 2005 to 2007**. This year's forecasts show an increase by 3.5 GW in generation; the contribution to the increase in Remaining Capacity is approx. 2 GW in winter 2005.

2010

The trend expected from 2005 to 2007 should be maintained until 2010, with an increase of 6 GW for Reliably Available Capacity, owing to commissioning in fossil fuel power plants. The increase in load is covered, and Remaining Capacity is slightly increasing from 2007 to 2010. **ARM is met in 2010, with an extra 3 GW margin in summer.** In SAF 2004-2010, Remaining Capacity was expected at a 6.7 GW level in winter 2010, and 5.8 GW in summer. This year, RC improves by 3 GW in summer, and is comparable in winter.

2015
Commissioning are still taken into account in forecasts for 2015, with 3 GW from fossil fuel sources, and 1 GW from renewable energy sources. Nevertheless, it is not sufficient to cover load increase (+10 GW), and Remaining Capacity is drastically decreasing. **ARM is not met in 2015, an extra Reliably Available Capacity of 5 to 7 GW is needed.** This capacity could be brought by, if scenario B is considered.

South Eastern UCTE (Greece + FYROM + SCG)

2005-2007
In conservative scenario, no significant increase in generating capacity is expected from 2005 to 2007. Remaining Capacity remains at very low levels. **ARM is not met from 2005 to 2007**. The situation of the block is representative of each national case, and shows no improvement when compared to last year's forecasts.

2010
Generating Capacity developments help to follow load increase, but do not improve the match to ARM. If investments after 2007 are not realised, the situation of the area will be weak. **ARM is not met in summer 2010.** Remaining Capacity in summer is 1 GW lower than in last year's forecast for 2010.

2015
ARM is not met in 2015, an extra Reliably Available Capacity of 1 to 3 GW is needed.
RC in summer are negative.

CENTREL block

2005-2007
No change in the generating capacity is expected in that block from 2005 to 2007, while load should increase by 3% over the period. Remaining Capacity remains stable until 2007. **ARM is met from 2005 to 2007**. Poland is the country that brings this comfortable margin ; other countries meet as well the ARM, except Hungary that is slightly below the ARM. Remaining Capacity is improving (+1-2 GW) when compared to expectations in SAF 2004-2010.

2010
From 2007 to 2010 the commissioning of new fossil fuel power stations contributes in an increase of 2 GW for Reliably Available Capacity ; given the lesser increase of load, Remaining Capacity improves again, **ARM is met in 2010 with a residual margin of approx. 5 GW.** Additional commissioning have been taken into account since last year, resulting in an increase of the expected Remaining Capacity (approx. 3-4 GW).

2015
2015 should not bring any additional capacity for the block, but the Remaining Capacity is such, that**the ARM is still met by approx. 2 GW in 2015.** This is the case for Poland and Czech Republic; Slovakia and Hungary meet just the ARM.

Romania & Bulgaria

2005-2007
Generating capacity is stable over the period. Owing to the load increase, Remaining Capacity is decreasing, and is just enough to meet the **ARM over the period.** This is the case for both Romania and Bulgaria. The expected Remaining Capacity has been reduced by approx. 2 GW (when compared to last year's forecasts), because of an increase of load forecasts, and a slightly lesser generating capacity.

2010
From 2007 to 2010 generating capacity is expected to increase by 2.5 GW (fossil fuel power plants commissioning), and Remaining Capacity improves by 1.7 to 2 GW. **ARM is met in 2010 by 1 GW.** The situation improves particularly for Bulgaria, and is more comfortable than last year's forecast.

2015
Commissioning of a nuclear power plants in Bulgaria results in an increase of Reliably Available Capacity, and as a consequence another improvement of Remaining Capacity. **The ARM is still met, by approx. 2 GW in 2015.**

4.Transmission System Adequacy

The tables in Appendix C show the details on grid developments in the UCTE countries. The following table shows the clearly identified main developments on international interconnections over the period from 2005 to 2015 :

Line or equipment	Voltage level	Date of commissioning	Cross-border
Avelgem - Avelin - Mastaing (second circuit)	400 kV	2005	B - F
Chooz - Jamiolle - Monceau	225 / 150 kV	2006	B - F
PST Zandvliet + Kinrooi		2006	B - NL
Upgrade of line Audorf - Kasso - + 500 MVA		2008	D - DK
Upgrade of 400 KV line Isar - St.Peter + 1800 KV		> 2010	A - D
Double AC line Thaur - Gressanone through Brenner Basis Tunnel	400 kV	2015	A - I
Single line Nauders - Curon/Glorenza		> 2010	A - I
PST Hagenwerder - Mikulowa		> 2010	D - PL
Second line Slavetice - Durnrohr	400 kV	2006	CZ - A
Lienz - Cordigniano line	400 kV	2008	A - I
Double AC tie-line Robbia - San Fiorano	400 kV	2005	CH - I
2x400 kV Okroglo - Udine	400 kV	2011	SLO - I
Cirkovce - Pince Line	400 kV	2010	SLO - H
OHL Nahab - Bekescsaba	400 kV	2007	RO - H
Single line	400 kV	2010	SCG - H
Single line Podgorica - Tirana	400 kV	2007	SCG - AL
Single line Nis - Skopje	400 kV	2007	SCG - FYROM
Single line Mitrovica - Ugljevic	400 kV	2007	SCG - BiH
Stip - Cervena Mogila	400 kV	2005	FYROM - BG
Bitola - Lerin	400 kV	2006	FYROM - GR
Line Meliti - Bitola	400 kV	2006	FYROM -GR
Bitola - Zernjak	400 kV	2015	FYROM - AL
Vrutok - Bureli	220 kV	2006	FYROM - AL
Line Philippi - Turkey	400 kV	2006	GR - TR
OHL Suceava - Balti	400 kV	2009	RO - MD
France - Spai: eastern reinforcement	400 kV	2007	F - E
Balboa - Alqueva line	400 kV	2004 - 2005	E - P
Nadab - Bekescsaba	400 kV	2007	H - HR
Line Ernestinovo - Pecs	400 kV	2007 - 2008	HR - H
Line Valdigem - Douro Intal - Aldeadavilla	400 kV	2010	EP
Estrecho - Fardioua /second circuit) Interconnection	400 kV	2005	E - MA

As far as regional blocks are concerned, noticeable increase of exchange capacities are expected according to developments on interconnections:

- between **main UCTE** and **Spain+Portugal** (+1200 MW in 2007)
- between **main UCTE** and **Italy** (+800 MW in 2007, +1600 MW in 2010)
- between **Spain + Portugal** and **Morocco** (+ 400 MW in 2007)
- between **JIEL +Greece** and **Turkey** (+500 MW in 2010)
- between **Romania & Bulgaria** and **IPS/UPS** (+1100 MW in 2009)

Because the UCTE system adequacy forecasts are established without taking exchanges into account, the remaining capacity is a useful indicator of the "exportable" capacity of each country or, conversely, of its need for imports. In order to evaluate the reliability of electricity systems, it is useful to compare remaining capacity to the "transportable capacity" provided by systems at the borders of the countries or groups of countries concerned.

Net Transfer Capacity values published by the ETSO are used as a reference. However, as the transfer capacity is not available for all countries, some values are simply estimations. Figures 4-1, 4-2, 4-3, and 4-4 show a comparison between the remaining capacity in various countries in January and July 2005, 2010 and 2015, and the transportable capacity (exportable and importable).

The minimum value among the remaining capacity and the exportable capacity may be interpreted as the capacity that the country concerned is able to make available to the interconnected network in order to ensure the security of the interconnected system. On the other hand, countries with a low remaining capacity have potential need for power imports. For some countries, the calculation of importable or exportable capacities is not relevant due to the usual situation of the generation balance. It concerns France and Western Ukraine for imports, Greece and Italy for exports, Austria and Macedonia whose exchange capacity cannot be calculated at the country level due to their strong interconnection with the neighbouring countries.

Figure 4-1 | **Net Transfer capacity, January 2005 11:00 a.m.**

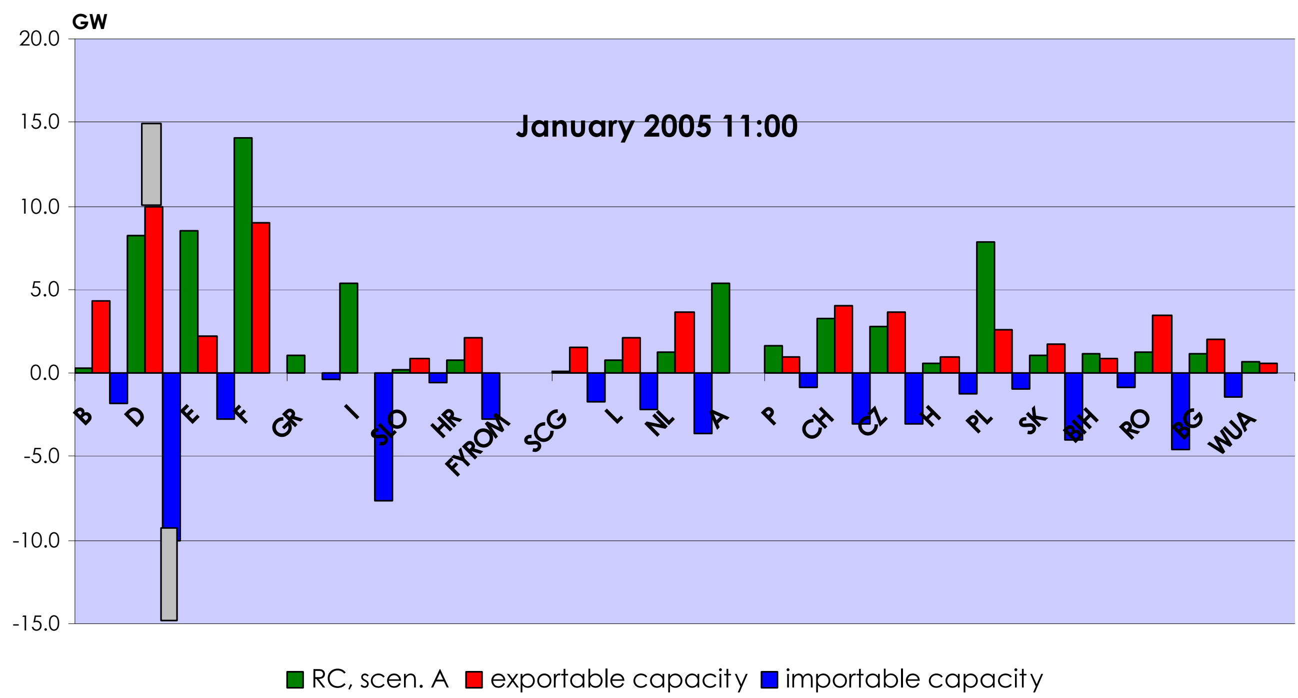


Figure 4-2	Net Transfer capacity, July 2005 11:00 a.m.

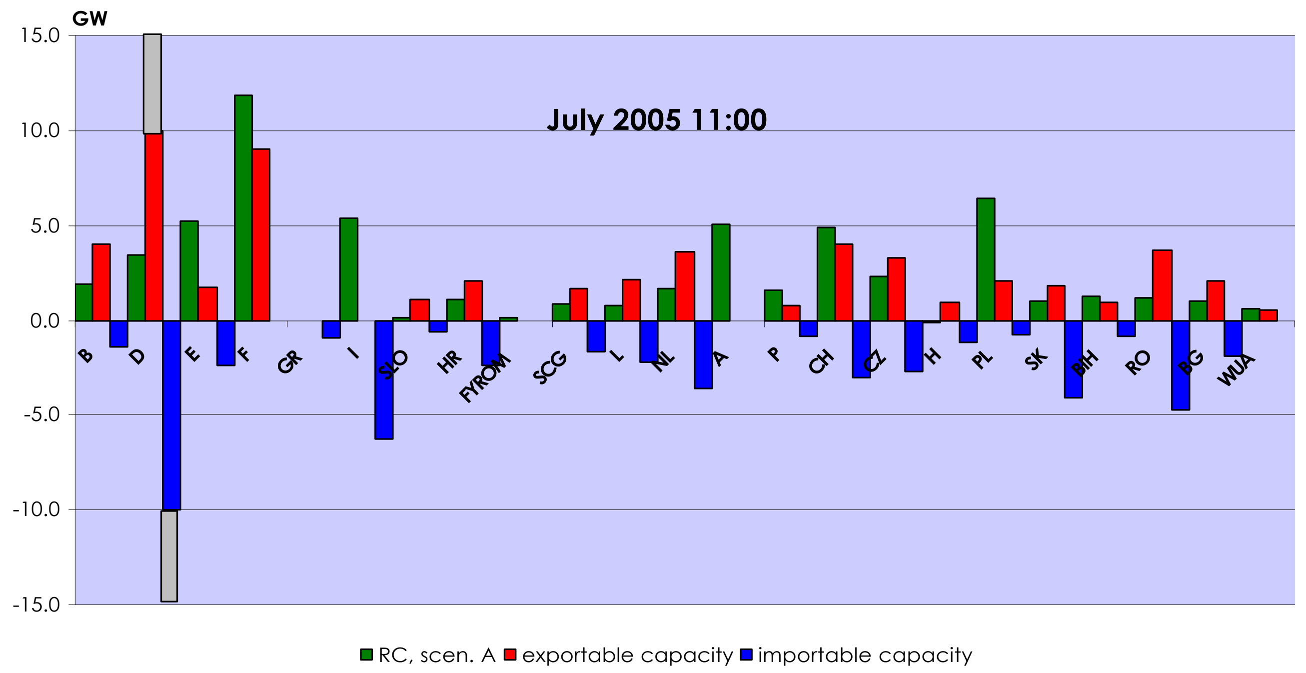
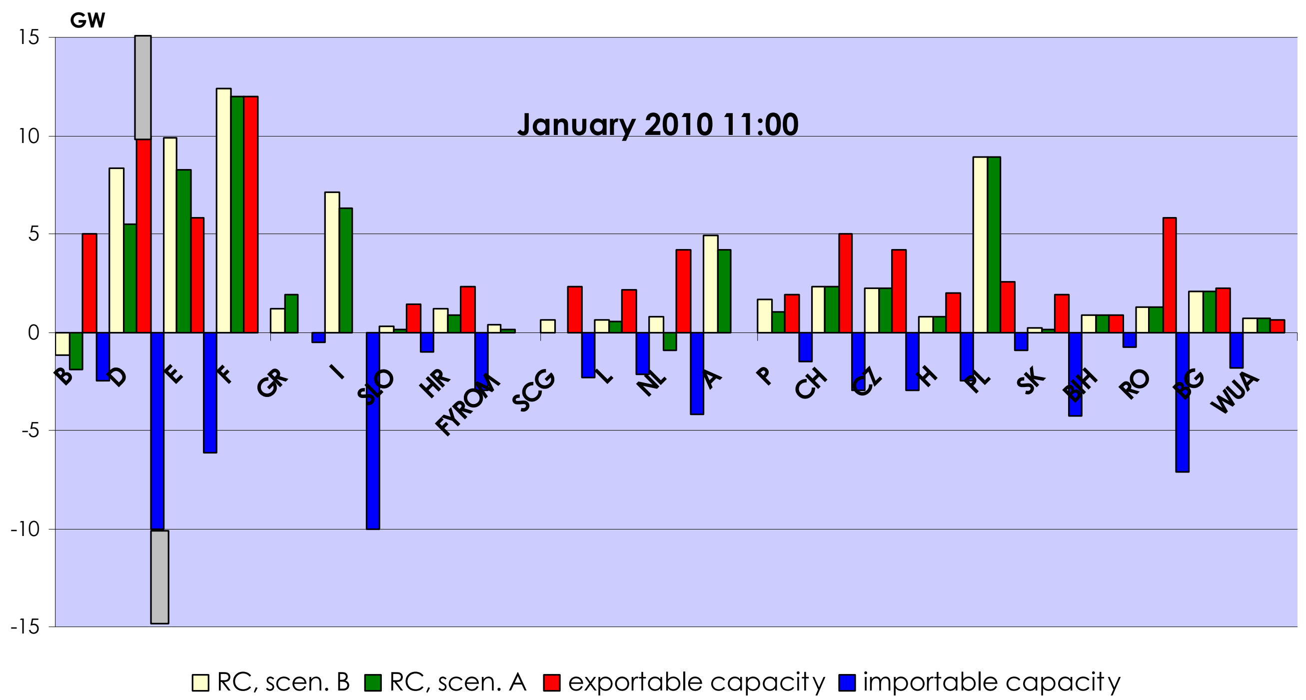


Figure 4-3	Net Transfer capacity, January 2005 11:00 a.m.

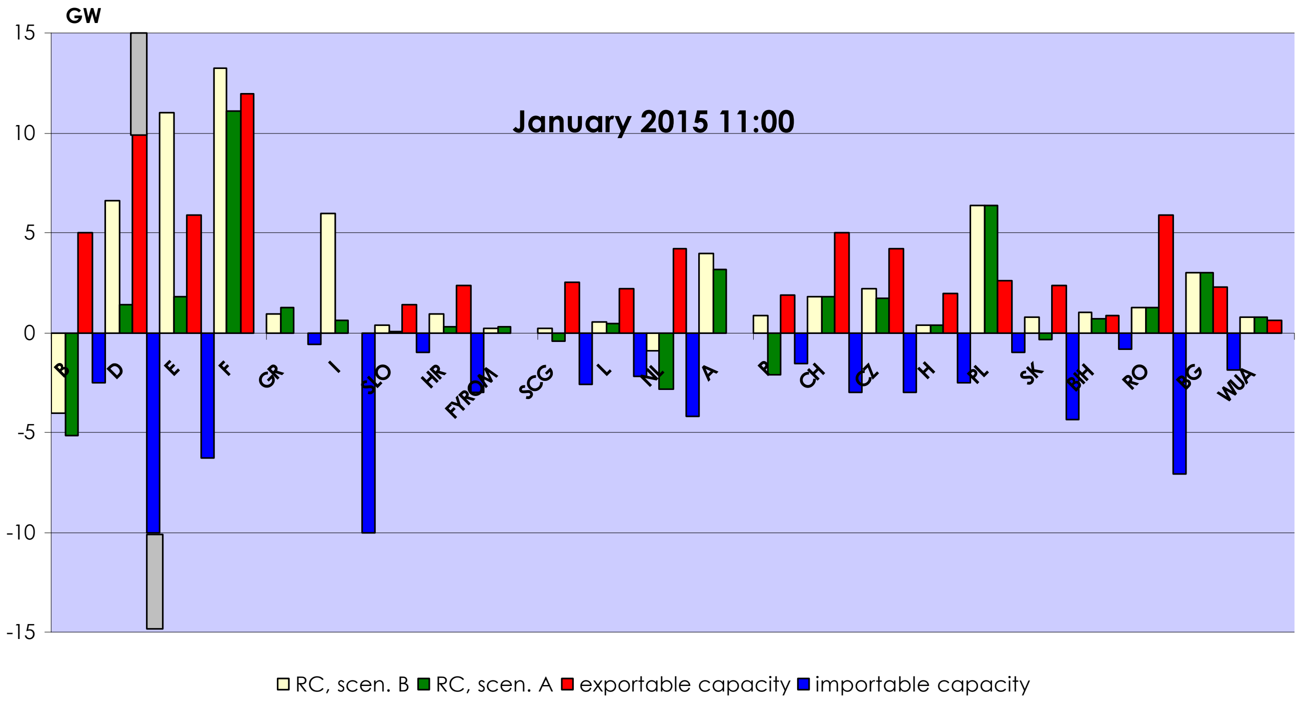


Overall, it emerges that transfer capacities do not seem to be an obstacle to system security. However it can not be excluded that, due to market phenomena (striving for the most economic use of power system resources), some congestion points could appear in the interconnected network, where transmission bottlenecks make it impossible to use available more economical electricity sources abroad. The rapidly increasing share of renewable energy sources (representing 10% of UCTE generating capacity in 2010), mainly wind power, in the generation mix, will contribute to these situations.

Some specific situations can nevertheless be observed:

- the relatively low exchange capacities of Spain and Portugal in 2005 ; the situation improves in 2010 when exchange capacities are of the same order of magnitude as the remaining capacity;
- remaining capacity in France is higher than the exportable capacity in 2005; this value is however subject to large variations but the potential for exports can be limited at some periods; the exportable capacity seems to be more adequate in 2010 after the reinforcement towards Belgium and Spain are commissioned.
- exportable capacity seems not in accordance with the export capabilities in Poland.
- In 2005 the ratio between the remaining capacity and the transmission capacity is balanced in Germany. On interconnections with the Netherlands, there currently exists congestion with regard to exports, and with regard to imports from North to East. Correspondingly, network reinforcement or network extension may already be necessary, taking account of other frame conditions, such as the legal situation.

Figure 4-4 | **Net Transfer capacity, July 2015 11:00 a.m.**



D: the estimated importable and exportable capacity for Germany varies between 10 and 15 GW

CH : Importable and exportable capacity fall within a range of +3 GW to +6 GW; these are indicative values

A : no real limits for import capacity exist

F : import capacity is not relevant

I : export capacity is not relevant

Figures 1A, 1B, 1C and 1D summarise the results of the power balance forecasts in different regions of the UCTE synchronous area for the 3rd Wednesdays in January at 11:00, 2005, 2007, 2010 and 2015 respectively.

FIGURE 1A
Data for January 2005

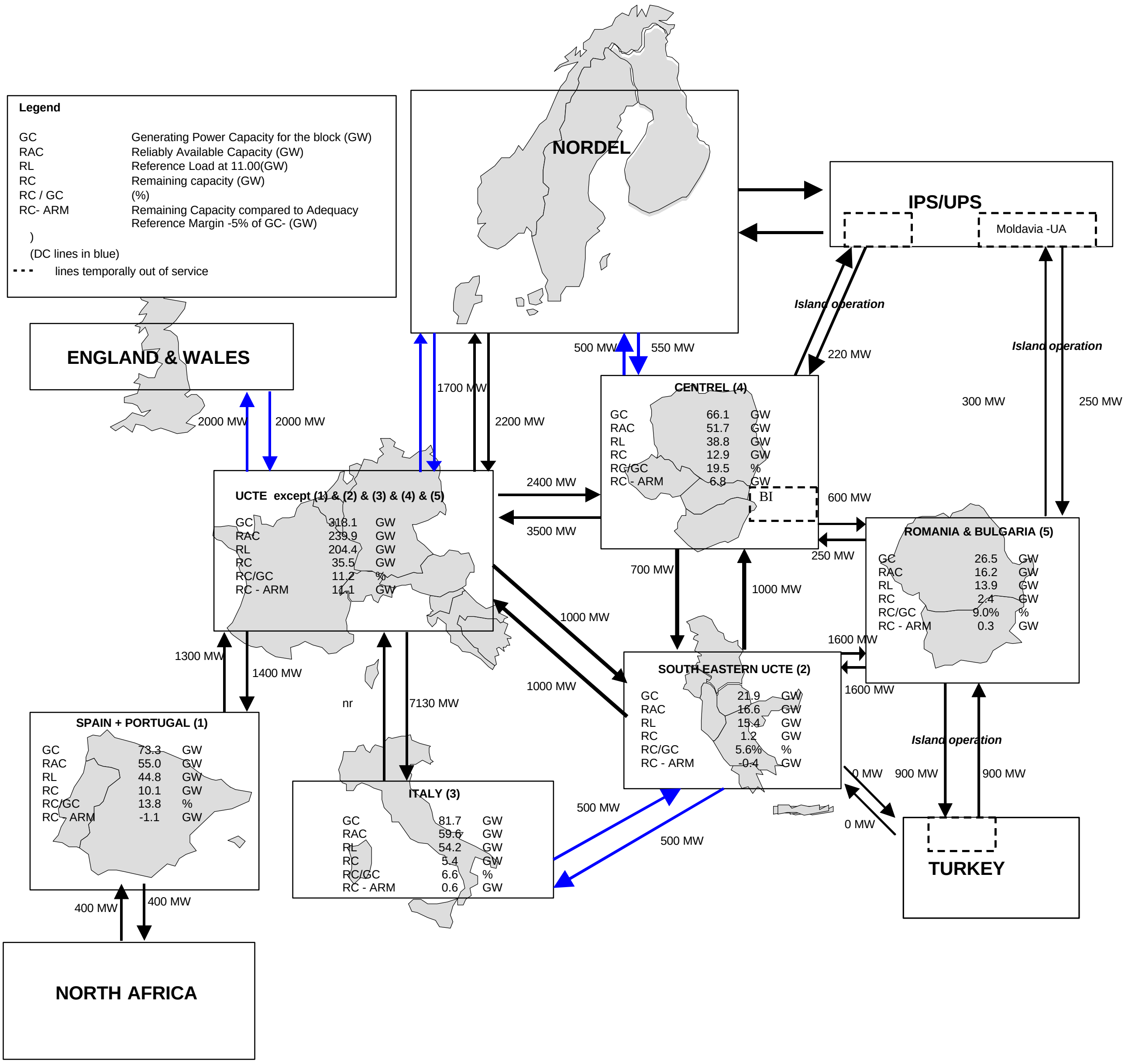


FIGURE 1B
Data for January 2007
Only changes in transportable capacity through interconnections are incidated

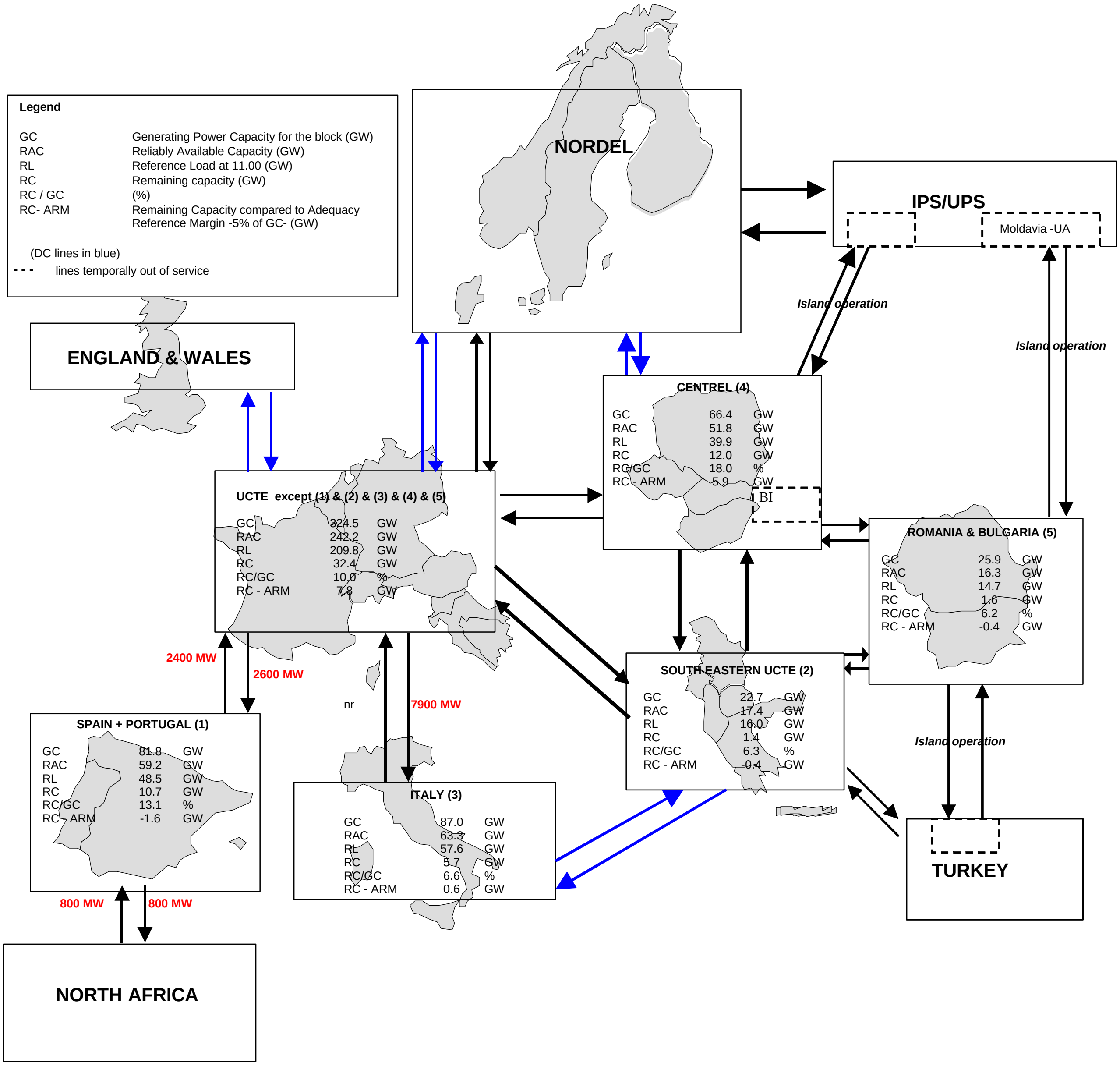


FIGURE 1C
Data for January 2010
Only changes in transportable capacity through interconnections are incidated

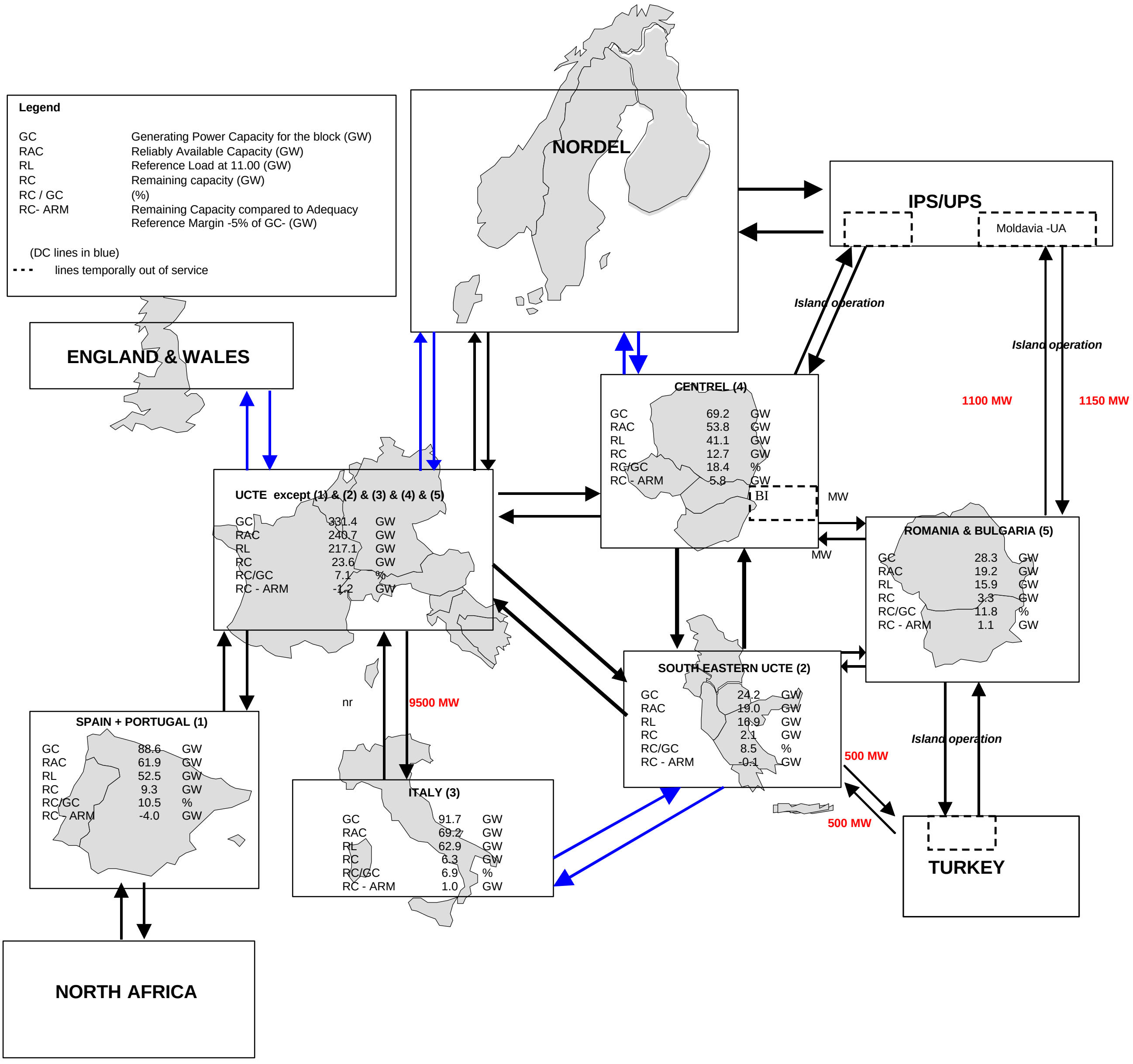
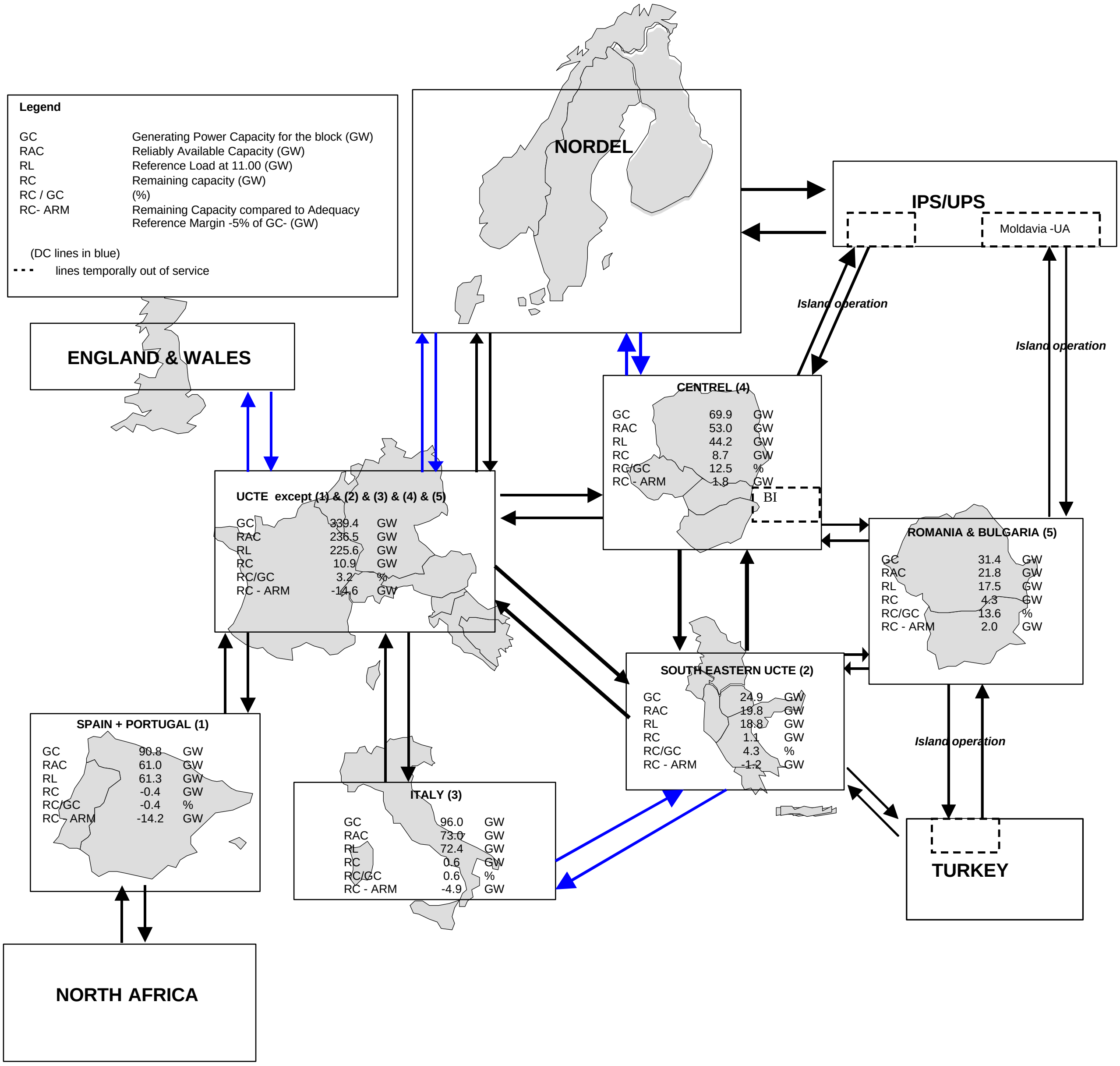


FIGURE 1D
Data for January 2015
Only changes in transportable capacity through interconnections are incidated



5. Conclusion

According to information available for TSOs, the reliability of the UCTE system should not be at risk in the three following years, even if the margin between Remaining Capacity and security standards is decreasing over the period.

On the longer term, the period 2007-2010 shows an acceleration of the decrease of margins in generating capacities. At that time, renewable energy sources (mainly wind power) should represent 10% of the UCTE generating capacity.

At the beginning of the period 2010-2015, if no investment decisions are taken (still possible at that time horizon) further than those already considered as sure by TSOs, reliability of the UCTE system as a whole can be considered at risk.

When looking at System Adequacy Forecast Report from last year (SAF 2004-2010), it can be considered that this risk, expected in 2010, has been postponed to the period 2010-2011.

CENTREL (as stated in last year's report) is the only block that seems to have a long term exportorientated position, provided that it is not affected by the effects of the future environmental legislation.

The UCTE main block, globally exporter today, is expected to have a decrease in its potential for export, and could show a need for import as soon as 2010, confirming last year's expectations. Inside this block many countries do not fulfil the Adequacy Reference Margin as soon as 2007, and will have to rely on interconnection to ensure the adequate level of security.

The position of Italy is expected to improve or at least stabilise over the coming years, but will have to rely strongly on its ability to import after 2010, if further investments are not decided for this period.

The Romania & Bulgaria block (thanks to new commissioning not foreseen last year) should improve its margin in the long term. The Spain & Portugal block shows a slightly lower generation margin expectation for 2005 and 2010, when compared to last year's forecasts. Due to ARM referring to 10% for both country, ARM is not met from 2005 to 2015 (lack of about 1 GW from 2005 to 2007).

The position concerning generation adequacy of the JIEL+Greece block has not improved since last year's report; this block, that will be in a weak position if expected investments are not realised after 2010, will be willing to take advantage of the future trade on the newly reconnection of the second UCTE synchronous zone in October.

No significant interconnection devices have emerged since last year's report; the existing development projects should nevertheless help countries whose generation adequacy is at risk.

APPENDIX A : Detailed analysis of the power balance elements

National Generating Capacity

Changes in national generating capacities of UCTE countries are shown in Table A/1 for scenario A (conservative) and in Table A/2 for scenario B (Best Estimate, difference B-A). These values represent the maximum net available capacity from electric utility companies and auto-producers in the countries concerned by the study. The details of national capacity (hydro, nuclear, fossil fuel, renewable, energy sources which cannot be reliably identified) are available from members of the Working Group.

Table A-1 | **National generating capacity on the 3rd Wednesday [9]** | **Results in GW**

	2005		**2006**		**2007**		**2010**		**2015**		**Variation** 2005-2007 %	**Variation** 2007-2010 %	**Variation** 2010-2015 %
Country	Jan.	July	Jan.	July	Jan.	July	Jan.	July	Jan.	July	January	January	January
B	15.8	15.8	15.7	15.7	15.7	15.7	14.6	14.6	12.0	12.0	-0.6	-7.0	-17.7
D	114.9	115.2	116.4	117.1	118.6	118.7	123.1	124.9	127.3	128.6	3.2	3.8	3.4
E	61.7	63.6	65.5	66.8	68.3	69.4	73.2	73.8	76.6	77.6	10.6	7.2	4.6
F	117.5	117.6	117.9	118.2	118.6	118.7	120.9	121.2	127.2	127.2	1.0	1.9	5.2
GR	10.7	10.7	10.8	11.1	11.5	11.7	12.7	12.7	13.2	13.2	7.0	10.5	4.1
I	81.7	82.4	84.6	85.5	87.0	88.8	91.7	96.0	96.0	96.0	6.5	5.4	4.7
SLO	2.8	2.8	2.9	2.9	3.1	3.1	3.1	3.1	3.1	3.1	9.9	0.6	0.0
HR	3.7	3.7	3.8	3.8	4.1	4.1	4.1	4.1	4.0	4.0	9.5	1.0	-3.9
BiH	3.8	3.8	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	1.0	0.0	0.0
FYROM	1.4	1.4	1.4	1.4	1.4	1.4	1.7	1.7	1.9	1.9	2.6	15.9	14.6
SCG	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	0.1	0.0	0.0
L	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	0.7	0.0	0.0
NL	22.0	22.0	22.2	22.2	23.2	23.2	24.4	24.4	24.7	24.7	5.3	5.0	1.3
A	18.5	18.5	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	-1.5	0.0	0.0
P	11.6	12.1	12.4	13.2	13.6	13.9	15.4	15.9	14.3	14.3	16.6	13.5	-7.5
CH	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	0.0	0.0	0.0
CZ	16.1	16.1	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	0.6	0.0	0.0
H	7.5	7.6	7.8	7.9	8.0	8.1	8.8	8.8	9.0	9.0	6.7	9.5	2.4
PL	32.3	32.3	32.5	32.5	32.8	33.3	34.8	35.4	35.3	35.8	1.5	6.1	1.5
SK	7.7	7.7	7.7	7.7	6.9	6.9	6.9	6.9	6.9	6.9	-10.8	1.1	-0.7
RO	14.4	14.4	14.6	14.6	14.7	14.7	15.3	15.3	17.2	17.2	1.7	4.4	12.4
BG	12.1	12.1	12.1	12.1	11.3	11.5	13.0	13.0	14.2	14.2	-6.6	15.3	9.1
West UA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.0	0.0	0.0
UCTE	**587.7**	**591.3**	**597.9**	**602.3**	**608.4**	**612.8**	**633.4**	**641.6**	**652.5**	**655.3**	**3.5**	**4.1**	**3.0**

[9] Note: as specificied in the 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)

Over the period from January 2005 to January 2007, renewable energy power plants increase by 11.2 GW, while capacity for fossil fuel power plants increase by 9.6 GW.
From 2007 to 2010, the increase in capacity from renewable energy sources (+17.6 GW), promoted by regulatory mechanisms in many countries, becomes higher than the sum of all the other categories (+7.4 GW); in 2015, UCTE's power generation is 19.1 GW higher than in 2010. Decommissioning of nuclear and fossil fuel power stations contribute to a drop of 4.5 GW in nuclear capacity, and 1.5 GW in fossil fuel capacity.

Table A-2 | **Additional national generating capacity, Scenario B** | **Results in GW**

	2005		**2006**		**2007**		**2010**		**2015**	
	January	July	January	July	January	July	January	July	January	July
Country	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
B					0.2	0.2	0.7	0.7	1.1	1.1
D							2.8	2.8	5.2	5.2
E							1.6	2.2	9.2	10.2
F							1.5	1.6	7.0	7.0
GR									0.4	0.8
I				0.4	0.5	1.3	1.3	1.3	5.5	8.1
SLO							0.2	0.2	0.3	0.3
HR							0.3	0.3	0.8	0.8
BiH									0.8	0.8
FYROM									0.2	0.2
SCG							1.0	1.0	1.1	1.1
L										
NL										
A			0.1	0.1	0.4	0.4	0.7	0.7	0.7	0.7
P						0.4	0.7	0.7	3.9	4.6
CH										
CZ									0.5	0.5
H										
PL										
SK							0.1	0.1	1.2	1.2
RO										
BG										
West UA										
UCTE			**0.1**	**0.5**	**1.2**	**2.4**	**10.9**	**11.6**	**38.0**	**42.7**

When considering TSO's estimation of national developments in generation, an extra capacity of 11 GW in 2010 and 38 GW in 2015 could be brought by. It would result from investments that can not be foreseen with certainty at this time horizon. More precisely, the following developments can be noticed in several countries **for scenarios A and B**:

For scenario B, an additional capacity of 200 MW is taken into account in 2010 and 300 MW in 2015.

- **A** for scenario B, approx. 800 MW will be commissioned before the end of 2007, mostly renewable energy sources. 300 MW will be decommissioned in 2005 (fossil fuel power plants). An additional 400 MW capacity is expected in 2010 (wind power farms mainly). Generation capacity in scenario A "Conservative" is 700 MW lower in 2010 and 2015.

- **B** 450 MW will be commissioned in the period 2005-2007, half of which will be wind farm power stations. In the mean time, 900 MW of fossil fuel power stations capacity will be decommissioned. Between 2010 and 2015, decommissioning of all the nuclear units will result in a drop of generating capacity amounting 1.7 GW, as long as 1.2 MW (fossil fuel power stations). For scenario B, commissioning of fossil fuel power stations could be higher by 0.5 GW in 2010, and 0.9 GW in 2015.

- **D** changes in the generation capacity will be marked by shut down of nuclear power stations with approx. -0.4 GW in 2005, -1.2 GW in 2007, -1.5 GW in 2010 and –6 GW in 2015. "Scenario B" includes additional generation capacity of fossil fuel power stations on the basis of assumptions and estimations, for approx. 2.8 GW more in 2010, and 5.2 GW in 2015. The TSOs recommend operators of large power stations to optimise the commissioning and shut down of power stations with due respect to the load development, remaining capacity and import/export capacities. In-depth studies are currently carried out with regard to the wind energy development. The increase in generating capacity from this renewable energy source and their availability has a growing influence on the compilation of data on the power balance forecast.

- **NL** an additional capacity of 1200 MW is expected over the period from 2005 to 2007 (500 MW in renewable energy sources), as long as the commissioning of 700 MW in new thermalpower plants. Later on, the increase in generating capacity is 1.2 GW from 2007 to 2010, renewable energy sources accounting for nearby 1 GW.

- **F** for scenario A, the expected increase in generating capacity, when considering firm decisions, results in the commissioning of 1 GW in 2005 (return from mothballed capacities, while approx. 200 MW will be shutdown) and 600 MW in 2010, for combined cycle power plants. Commissioning of a nuclear demonstration power station will bring an additional 1.6 GW capacity in 2015. Concerning renewable energy power plants, forecasts include the com missioning of 1.2 GW before 2007, 1.8 GW in 2010 (1.6 GW for wind) and 4.7 GW in 2015 (4.2 GW for wind). Scenario B would bring an additional capacity of 400 MW in 2015.

- **SLO** approx. 300 MW (100 MW from wind sources) are to be connected to the Slovenian grid between 2005 and 2007, and 50 MW will be decommissioned; Further on, generation capacity from wind power plants should increase by 50 MW in 2010 and 100 MW in 2015. An additional 400 MW is expected in scenario B in 2010.

- **HR** commissioning for scenario A brings out an additional 395 MW capacity from 2005 to 2010. Scenario B suggests an increase in the longer term, by 0.3 GW in 2010 and 0.8 GW in 2015.

- **I** conservative scenario A assesses that fossil fuel energy sources capacity is to increase by 2 GW in 2005 to 2006 (1 GW for renewable energy sources), 1.8 GW in 2007 (0.5 GW for renewable), 2.7 GW in 2010 (1.6 GW for renewable), and still 3.1 GW in 2015 (1.1 GW for renewable). According to Italian TSO's estimation in scenario B, an additional increase of approx. 1.3 GW in fossil fuel generating capacity is expected in 2010, and approx. 4 GW in 2015. The newly commissioned renewable energy sources (essentially wind power) will contribute to an additional generating capacity of 1.3 GW for 2015.

- **E** generating capacity due to fossil fuel energy sources will increase by 2.2 GW from 2005 to 2006, and 1.6 GW from 2006 to 2007. Decommissioning will contribute to a decrease of approx. 3 GW in 2015, when compared to 2007. Renewable energy sources will generate an additional capacity of 1.5 GW in 2006, 1.3 GW in 2007, 4.3 GW in 2010 and 6.4 GW in 2015. Considering Scenario B, commissioning of fossil fuel power stations would contribute to an increase of 3.0 GW in 2005, 2.0 GW in 2006 and 1.5 GW in 2007, while shutdowns would result in the loss of a 2.3 GW capacity over the same period. Renewable energy sources capacity would increase by 1.5 GW per year between 2005 and 2007. On the long term, 2010 should bring another 7.8 GW (more than half of which will be from wind power stations) to compensate the loss of 5.3 GW of fossil fuel power stations. In 2015, almost 15.5 GW of new capacities are expected.

- **P** approx. 2300 MW of new power plants will be commissioned from 2005 to 2007 (among which approx. 1900 MW of wind power plants). Over the period 2007-2010, 400 MW of new fossil fuel power plants will be connected to the grid, and an additional 1.3 GW of wind power plants. Over the period 2010-2015, the expected increase of the national generation should reach 2.6 GW, with 1.5 GW of new hydro power plants, 1.7 GW of fossil fuel power plants, and 1.3 GW of renewable energy sources. By 2015 approx. 1.7 GW of fossil fuel power plants will be decommissioned (but replaced by approximately the same level), while an additional 900 MW of wind power plants will be connected to the grid. TSO considers that, in scenario B, almost 4 GW could be commissioned in 2010 (mostly thermal power plants), among which 0.7 would be connected in 2010.

- **PL** approx. 1.4 GW will be commissioned in Poland between 2005 and 2007, half of this generation is from fossil fuel sources. Development of wind power generation is increasing in 2007, and should bring an additional 800 MW capacity in 2010 and 1.8 GW in 2015. Commissioning of 1.4 GW fossil fuel energy capacities in 2010 will compensate the shut downs in 2010 (0.3 GW) and 2015 (1.7 GW).

- **SK** in both scenarios the capacity of 2x410 MW of nuclear sources will be decommissioned until the year 2010. Also decrease of 417 MW of fossil fuel power plants is expected until 2007. On the other hand the commissioning of 515 MW of fossil fuel power plants is foreseen in 2010 and in the best estimate scenario the commissioning of 2x410 MW of nuclear sources and 188 MW of a fossil fuel power plant are considered in the year 2015.

- **CZ** expected developments concern wind power generation: + 100 MW from 2005 to 2007, and an additional 200 MW in 2010. Another 500 MW could be brought by in 2015 for scenario B.

- **H** commissioning (approx. 800 MW) will balance the expected shutdowns by the end of 2007. In 2010, commissioning will reach 1.4 GW (0.9 GW in 2015), while 0.6 GW of capacity will be decommissioned (0.6 GW in 2015).

- **FY ROM** 300 MW are expected to be commissioned in 2010, and an extra 200 MW in 2015. In scenario B, commissioning until end of 2007 will result in an increase of 100 MW of the generating capacity. Between 2007 and 2015, an additional 200 MW is expected.

- **SCG** commissioning are only expected in 2010 with 1 GW (850 MW from fossil fuel sources).

- **GR** from 2005 to 2007, the overall increase in generating capacity will be approx. 800 MW. 1200 MW of new power plants will be commissioned (among which approx. 900 MW of fossil fuel power plants and 100 MW of renewable), while approx. 100 MW are to be decommissioned. An additional commissioning of 1000 MW in 2010 (and 450 MW in 2015) is expected; the trend in renewable development should bring an additional 150 MW of renewable from 2007 to 2015. Scenario B brings out an additional capacity of 400 MW in 2015 (fossil fuel power plants).

- **RO** in agreement with « Road Map for Energy Field » in Romania, expected commissioning will reach 2 GW before the end of 2007. Further on, 1.8 GW should be commissioned in 2010, and 1.8 GW in 2015.

In terms of generation mix, significant changes can be noticed in many countries, mainly owing to:

- **In Portugal**, the development implicit in this forecast for the renewable energies allows for the compliance with the EU directives in 2010. With the commissioning of 2 combined cycle units this year the natural gas generating capacity will equal the coal's. The future development of the Portuguese system will be conditioned by the implementation of the Iberian Market (MIBEL).
- **in Belgium**: on the long term (2015-2025), all the nuclear units will be decommissioned (law) . The nuclear generating capacity represents 40% of the total generating capacity with a 90% production rate. This implies that a large amount of new generation units have to be built within that period.
- **In Spain** the generation mix is changing: all the new thermal plants are combined cycles and the wind power generating capacity is increasing quickly.
- **In Germany**, the generation mix is going to be influenced by the expected shutdown of nuclear power stations and the expected increase of renewable.
- **In Italy**, a major shift from oil fired power plants towards gas fired combine cycle, some of them of CHP type, is in progress; the output of coal fired power plant is forecasted to keep the present share of electricity generation. Renewable generation, boosted by generous supporting schemes, is expected close to meet Italy's renewable targets at 2010; wind power represents the most of new additions.

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..

Table A-3 | **Non-useable capacity on the 3rd Wednesday** | **Results in GW**

Country	2005 January GW	2005 July GW	2006 January GW	2006 July GW	2007 January GW	2007 July GW
B	0.9	1.3	0.9	1.3	0.9	1.3
D	20.2	22.4	21.6	23.8	23.0	25.1
E	11.3	14.9	12.3	15.9	13.5	16.5
F	18.8	29.9	19.4	29.9	19.4	29.8
GR	1.5	1.3	1.5	1.3	1.5	1.1
I	11.3	11.7	11.9	12.5	12.4	13.9
SLO	0.4	0.3	0.4	0.3	0.4	0.3
HR	0.2	0.2	0.2	0.2	0.2	0.2
BiH	0.7	0.7	0.7	0.7	0.7	0.7
FYROM	0.0	0.0	0.0	0.0	0.0	0.0
SCG	1.2	2.0	1.2	2.0	1.2	2.0
L	0.0	0.0	0.0	0.0	0.0	0.0
NL	2.4	3.0	2.6	3.2	2.7	3.3
A	2.9	2.0	2.9	2.0	2.9	2.0
P	1.3	2.6	1.9	3.2	2.5	3.8
CH	3.7	2.1	3.7	2.1	3.7	2.1
CZ	1.8	1.8	1.8	1.8	1.8	1.8
H	0.7	0.8	0.7	0.9	0.8	1.0
PL	2.8	1.3	2.6	4.1	2.7	5.0
SK	1.8	1.9	1.7	1.9	1.6	1.8
RO	3.0	3.2	2.8	3.0	2.7	2.9
BG	2.9	3.1	2.6	2.8	2.5	2.5
West UA	0.3	0.3	0.3	0.3	0.3	0.3
UCTE	**90.0**	**109.8**	**93.6**	**113.2**	**97.4**	**117.6**

In UCTE, the non-usable capacity accounts for approximately 15.3 % (2005) to 16% (2007) of generating capacity in winter and 18.6% to 19.2 % of generating capacity in summer. It is on average 1% higher than in last year's forecasts for the same year. There are wide variations from country to country, with the non-usable capacity ranging from a few percent up to 24-25 % of the generating capacity. The highest values (in percent of NGC) in winter concern Germany, Switzerland, Romania, Spain, Slovak Republic, and Bulgaria. In some of these countries, hydro is a relevant part of generating capacity. In summer, Spain, France, Romania, Serbia and Montenegro, Portugal and Slovak Republic (because of limitations in combined heat/power plants and hydroelectric constraints in summer) assume the highest non usable capacity ratio. Non-usable capacity for the whole UCTE shows an increase over the period from 2005 to 2007 (+7.4 GW in winter and +7.8 GW in summer). The major contribution to this growth (2005-2007) comes from countries in which the new commissioning of renewable energy, particularly wind power, and co-generation is most significant. Non usable capacity is not distinguished from expected overhauls and outages in 2010 and 2015, but aggregated figures show that the sensible share of wind power commissioning in the increase of generating capacity tends to drastically increase the non availability ratio by 2015.
The following table shows the share of wind power generation that cannot be considered as usable, for each country :

Non-usable wind power capacity at peak load in %:

B	**D**	**E**	**F**	**GR**	**I**	**SLO**	**HR**	**SCG**	**FYROM**	**BiH**	**L**	**NL**	**A**	**P**	**CH**	**CZ**	**H**	**PL**	**SK**	**RO**	**BG**
100	85-90	90	75	90	77	60	75	-	n.a.	n.a.	76	75	70	82	n.a.	75	90	75	75	-	-

NL Since the beginning of 2003 started the implementation of MEP (Electricity Generation Environmental Quality), agovernment guided subsidising program, to realise a vigorous and costeffective promotion of environmentally safely generated electricity in the Netherlands. As this program started in 2003 it is not predictable at which scale will change the generation mix in the long term, but nevertheless can be foreseen that there will be a progressive growth of wind energy up from 2008, specially in offshore wind parks.

SK Significant part of non-usable capacity consists in hydro power stations due to hydrological conditions. Heating plants have also impact - discontinuance of heating in summer.

F From now through end of 2015, about 3 500 MW of existing coal fired plants will be brought out of service (mainly according to the 'Large Combustion Plants' Directive). For convenience, these plants have not been considered as decommissioned, but as 'mothballed' (provisional date of closure may be postponed – or they may be brought back into service - in case of shortfall). Conversely, based on the agenda of generators, three currently mothballed fuel-oil fired plants are deemed to be back into service between 2006 and 2008.
Non usable capacity is composed of:
- mothballed fossil fuel thermal plants
- power limitations due to fuel management and decreasing thermal efficiency in summer for nuclear plants difference between rated power and maximum available generation in average inflows conditions for hydraulic plants
- difference between rated power and actual generation (last years measures) of embedded thermal generation
- 75% in winter – 85 % in summer – of wind generation

E The historical contribution of the renewable (wind is more important every year) and the historical data related to the hydro conditions and the hydro power availability are used for the prediction. In the new power plants using gas turbines, the temperature is more important as the power decrease with the increase of the temperature. In hot summers it is important as it happens at the same time of peak demand.

P

Wind energy:	a constant limitation of production due the lack of wind in all seasons based on historical values is considered
Hydroelectric energy (public system):	power limitation due to reduction on maximum head height (in January and July) and also maintenance in July is considered
Hydroelectric energy (small independent producers)	In January limitation of power due to reduction of head height and water availability is considered, in July this power is considered totally non usable
Fossil fuel, renewable and co-generators (small independent producers):	historical values are taken into account, (reduction of 50% of the generating capacity)

GR non-usable capacity mainly results from:
- Capacity not used in wind power plants
- Capacity of hydro power plants reduced due to limited reservoir capacity.

Fossil fuel and nuclear power plants overhauls and outages

The overhauls remain stable over the considered period. Overhauls account for 2.4 % of generating capacity in winter and for approximately 12 % of generating capacity in summer. It is slightly higher in summer than in last year's report. Outages are of the order of 4 %. With regard to expected outages, the data are essentially based on estimations from past statistical values. They show a slight increase too as compared to last year. Special remarks from countries follow:

I Since load demand is continuously increasing in summer time, due to air conditioning, plant operators tend to shift the scheduled overhauls in intermediate seasons, while they used to do it in summer. The scheduled overhauls is established every year by power plant operators and this amount in the report are obtained from the retrospective statistic analysis. The value of outages capacities is statistically obtained and comes from the amount of capacity of the power stations generating capacity.

SK Maintenance of sources is scheduled from March till November. In January, February and December all sources are available. Outages forecasts are based on the long-term statistics.

D Owing to the shorter duration of overhauls and longer overhaul intervals, the value of capacity not available due to overhauls will tend to decline in future. The value of expected outages constitutes rather an update of past statistical values since outages and partial outages are no longer reported to the TSOs by the power plant operators.

Reserve for system 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.

Table A-4 | **Reserve for system services on the 3rd Wednesday** | **Results in GW**

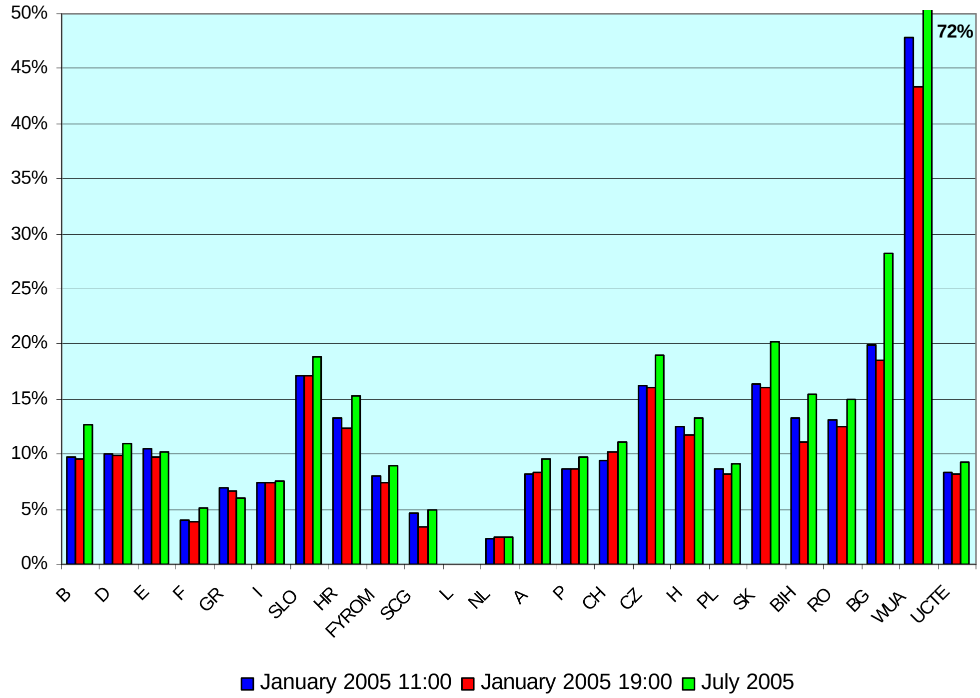
	2005			2006			2007			2010			2015		
	January		July	January		July	January		July	January		July	January		July
Country	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00
B	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
D	7.5	7.4	7.4	7.5	7.5	7.3	7.5	7.6	7.3	7.6	7.6	7.3	7.8	7.8	7.4
E	3.9	3.9	3.9	4.1	4.1	4.1	4.3	4.3	4.3	4.9	4.9	4.9	5.8	5.8	5.8
F	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
GR	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
I	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.2	4.3	4.6	4.6	4.7	5.1	5.1	5.2
SLO	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
HR	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
BiH	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
FYROM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
SCG	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.4	0.3	0.2	0.4	0.3	0.3
L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
A	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
P	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.7
CH	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
CZ	1.5	1.5	1.3	1.5	1.5	1.3	1.5	1.5	1.3	1.5	1.5	1.3	1.5	1.5	1.3
H	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
PL	1.7	1.7	1.4	1.7	1.7	1.5	1.7	1.7	1.5	1.7	1.7	1.5	1.7	1.7	1.5
SK	0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.8	0.7
RO	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
BG	1.2	1.2	1.1	1.2	1.2	1.1	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.2
West UA	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
UCTE	**31.2**	**31.0**	**30.4**	**31.5**	**31.5**	**30.7**	**31.9**	**31.9**	**31.0**	**33.0**	**32.8**	**32.3**	**34.5**	**34.5**	**34.0**

The reserve capacity for system services is stable from 2005 to 2007 (approximately 31-32 GW in winter, and 31 GW in summer), and reaches 33 GW in January 2010, and 34.5 GW in 2015 (respectively 32.3 GW and 34 GW in summer). This accounts for approximately 8 % and 9 % of the UCTE load, in winter and in summer respectively. Reserve for service systems are respectively 3.0 GW and 2.0 GW lower (respectively in winter and summer) than in last year’s forecasts. Changes in values taken into account in France explain about 2 GW of this difference10. There are substantial variations, ranging from less than 5 % to more than 30 %. The highest values are indicated for Slovenia, Bosnia and Herzegovina, and the Czech Republic, Slovak Republic: in these countries, where the peak load is less than 10 GW, the reserve capacity is determined by the rating of the largest generating units, which can be even greater than 1 GW. In larger systems, the reserve capacity for system services represents between 8 % and 12 % of the load.

Figure A/1 System Services Reserve versus Load

The amount of system reserves is computed according to requirements defined in documents like the Grid Code and, in general, according to the UCTE recommendations.

Figure A-1 | **System Services Reserve versus Load**



- In **Germany,** the provision of reserves for system services of TSOs is regulated on the basis of privatelaw contracts. Since 2001, a tendering procedure has existed in Germany for control power and imbalance energy. TSOs are not prohibited from holding available their own generating capacity for control energy. However, this is currently not being practised. From the TSOs' point of view, power station operators would have to secure at least the output of the largest unit as hours reserve within the respective control area, as the TSO makes the reserve available only for a maximum of one hour (dimensioning of system services). However, almost all power station operators try to reduce this power through pooling with other power station operators. As a result, this reserve is likely to become even smaller in the future.

- In **The Netherlands**, the seconds reserve is fixed on basis of the UCTE-obligations, which are included in the System Code. 65 % of minutes reserve requirements are contracted by the TSO and must be direct available. The remaining 35 % are obtained by voluntary bids within a bidding system, which is managed by the TSO. Besides the generating companies maintain an unknown amount of reserves for their own purposes. In case of congestion the same bidding system is used to extract power from the market to manage these congestion.

- In **Switzerland**, every TSO has its own rules regarding the division of capacity from different reserves. They are not published. In general, the rules fixed by the UCTE are respected. In Switzerland (where no legal unbundling is under way), TSO is allowed to own and actually owns power plants (pumped storage power plants), used for system reliability.

- Concerning **Portugal,** reserves are contracted with producers through the Power Purchase Agreements. TSO is not legally allowed to own any power plant, but these reserves are under TSO's responsibility, as it guarantees, for now, almost all the consumption (corresponding to the clients of the Public Electricity System), through the PPA's (Power Purchase Agreements) with the producers.

- As far as other reserves are concerned, **Slovak Republic, Hungary and Poland** do keep cold reserves (for Slovak Republic, to be provided in case of outage of the greatest power unit). For Poland Other Reserves did not appear in the Report of System Adequacy Retrospect 2002.

- **Luxembourg's** TSO is not in charge of the frequency control of the public network (assumed by RWE Net).

- In **Greece**, the TSO keeps as a reserve all the available generating capacity to use it for voltage control and congestion management according to the economic offers submitted by the generators. An extra reserve for the area of Athens has been settled. Under the current Legislation , TSO is not allowed to own power plants as system reserve. The new Electricity Law, however, states that the old units of PPC that are under decommissioning will be allotted to the TSO for reserve.

- In **Romania**, TSO signs yearly with qualified producers contracts for all classes of reserves: secondary, running, tertiary rapid and tertiary slow, voltage control. Reserves are scheduled for each class (which units will provide, which amount for which hourly interval) daily in the same time with dayahead energy market. Conditions which entitles the provider to conclude contracts for reserves are prescribed through the Qualification Procedure issued by the TSO. Merit ordering is not used. Reserves are activated according to amount and ramp needed, energy schedule and reservoir level of hydro plant and geographical location. Price is regulated and may be changed by the Regulatory Authority, together with System Service fee.

---

[10] For France in this year's forecasts, only reserve needed one hour before peak has been taken into account

Reliably Available Capacity

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

Table A-5 | **Reliable available capacity, Scenario A on the 3rd Wednesday** **Results in GW**

	2005			2006			2007			2010			2015		
	January		July	January		July	January		July	January		July	January		July
Country	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00	11:00	19:00	11:00
B	12.7	12.7	11.4	12.6	12.6	11.3	12.6	12.6	11.3	11.6	11.6	10.7	9.2	9.2	8.4
D	82.7	82.7	70.6	82.6	82.6	72.0	83.3	83.2	71.9	82.3	82.3	72.4	78.7	78.7	68.2
E	45.5	45.5	43.3	47.6	47.6	44.6	49.0	49.0	46.4	51.3	51.3	47.9	51.8	51.8	48.8
F	90.2	90.2	70.1	91.1	90.1	70.6	90.8	90.8	71.0	92.5	92.5	72.1	94.6	94.6	73.2
GR	8.1	8.1	8.6	8.1	8.1	8.9	8.8	8.8	9.7	10.0	10.0	10.5	10.4	10.4	11.0
I	59.6	59.6	59.7	61.6	61.6	61.7	63.3	63.3	63.4	69.2	69.2	71.6	73.0	73.0	71.0
SLO	2.1	2.1	1.9	2.2	2.2	2.0	2.4	2.4	2.2	2.4	2.4	2.2	2.4	2.4	2.1
HR	3.2	3.2	3.2	3.2	3.2	3.2	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.5
BiH	2.6	2.6	2.5	2.7	2.7	2.6	2.7	2.7	2.6	2.7	2.7	2.6	2.7	2.7	2.6
FYROM	1.3	1.3	1.1	1.3	1.3	1.1	1.3	1.3	1.1	1.6	1.6	1.3	1.8	1.8	1.5
SCG	7.3	7.3	5.1	7.3	7.3	5.1	7.3	7.3	5.1	7.4	7.6	5.2	7.6	7.6	5.2
L	1.6	1.6	1.6	1.7	1.7	1.3	1.7	1.7	1.3	1.6	1.6	1.3	1.6	1.6	1.2
NL	18.0	18.0	17.4	18.0	18.0	17.4	18.9	18.9	18.3	17.6	17.6	17.0	17.5	17.5	16.9
A	13.9	13.9	12.4	13.6	13.6	12.1	13.6	13.6	12.1	13.6	13.6	12.1	13.6	13.6	12.1
P	9.5	9.5	8.2	9.7	9.7	8.8	10.2	10.2	8.9	10.6	10.6	9.4	9.2	9.2	7.5
CH	12.8	12.8	13.0	12.8	12.8	13.0	12.8	12.8	13.0	12.8	12.8	13.0	12.8	12.8	13.0
CZ	12.2	12.2	9.2	12.2	12.2	9.2	12.3	12.3	9.2	12.3	12.3	9-2	12.3	12.3	9.2
H	5.8	5.8	4.8	5.9	5.9	4.9	5.9	5.9	5.0	6.5	6.5	5.5	6.6	6.6	5.5
PL	27.1	27.1	22.0	27.5	27.5	22.5	27.7	27.7	22.3	28.9	28.9	23.2	28.0	28.0	22.4
SK	5.1	5.1	4.1	5.2	5.2	4.2	4.4	4.4	3.5	4.4	4.4	3.4	4.3	4.3	3.3
RO	9.0	9.0	8.0	9.4	9.3	8.2	9.7	9.6	8.5	10.6	10.6	9.5	12.0	11.9	10.9
BG	7.2	7.2	4.7	7.4	7.4	4.8	6.7	6.7	4.7	8.6	8.6	5.9	9.8	9.8	7.2
West UA	1.6	1.6	1.2	1.6	1.6	1.2	1.6	1.6	1.2	1.7	1.7	1.3	1.8	1.8	1.4
UCTE	**439.1**	**439.2**	**384.2**	**444.2**	**444.2**	**390.7**	**450.3**	**450.3**	**396.2**	**463.8**	**463.9**	**410.7**	**465.0**	**465.0**	**406.0**

The reliably available capacity within the UCTE shows an increase of 11.2 GW from January 2005 to January 2007, 13.5 GW from January 2007 to January 2010, and only 1.2 GW from January 2010 to January 2015. In addition to the customary reductions associated with overhauls and outages, it appears that a proportion of this additional generating capacity cannot be classified as completely usable for electricity producers.
When looking at forecasts carried out last year, it appears that Reliably Available Capacity has increased by 10.7 GW for winter 2005 (4.6 GW in summer), and 7.9 GW in winter 2010 (4.0 GW in summer), following the reviewed forecast for generation capacity.

Table A/6 shows the increase in reliably available capacity brought by hypothesis of Scenario B.

Table A-6 | **Additional reliable available capacity, scenario B on the 3rd Wednesday** **Results in GW**

Country	**2005** January 11:00	**2005** January 19:00	**2005** July 11:00	**2006** January 11:00	**2006** January 19:00	**2006** July 11:00	**2007** January 11:00	**2007** January 19:00	**2007** July 11:00	**2010** January 11:00	**2010** January 19:00	**2010** July 11:00	**2015** January 11:00	**2015** January 19:00	**2015** July 11:00
B							0.2	0.2	0.2	0.7	0.7	0.7	1.1	1.1	1.1
D										2.8	2.8	2.8	5.2	5.2	5.2
E										1.6	1.6	2.2	9.2	9.2	10.2
F							0.1	0.1		0.4	0.4	0.2	2.2	2.2	2.6
GR													0.4	0.4	0.8
I						0.4	0.4	0.4	1.0	0.8	0.8	1.0	5.5	5.4	7.5
SLO										0.2	0.2	0.2	0.3	0.3	0.3
HR										0.3	0.3	0.3	0.6	0.6	0.6
BiH													0.4	0.4	0.4
FYROM							0.1	0.1	0.1	0.3	0.3	0.2	0.3	0.3	0.2
SCG										0.6	0.5	0.7	0.7	0.7	0.8
L															
NL							-0.1	-0.1	-0.1	1.7	1.7	1.7	1.9	1.9	1.9
A				0.1	0.1	0.1	0.4	0.4	0.4	0.7	0.7	0.7	0.7	0.7	0.7
P									0.4	0.6	0.6	0.6	3.0	3.0	3.4
CH															
CZ													0.5	0.5	0.5
H															
PL															
SK										0.1	0.1	0.1	1.1	1.1	1.1
RO															
BG															
West UA															
UCTE				**0.1**	**0.1**	**0.5**	**1.2**	**1.1**	**2.1**	**10.9**	**10.7**	**11.5**	**33.0**	**33.1**	**37.4**

The additional reliably available capacity brought by scenario B is comparable in 2010 (and only 5 GW lower in 2015) to the additional generating capacity. Indeed, new capacity that would be commissioned in scenario B is mostly new power plants from fossil fuel energy sources.

Load

The load values shown in the table correspond to normal climatic conditions:

Table A-7 | **Load on the 3rd Wednesday** | **Results in GW**

Country	2005 January 11:00	2005 January 19:00	2005 July 11:00	2006 January 11:00	2006 January 19:00	2006 July 11:00	2007 January 11:00	2007 January 19:00	2007 July 11:00	2010 January 11:00	2010 January 19:00	2010 July 11:00	2015 January 11:00	2015 January 19:00	2015 July 11:00
B	12.4	12.66	9.5	12.6	12.8	9.6	12.8	13.0	9.8	13.5	13.8	10.4	14.4	14.7	11.0
D	74.5	74.4	67.2	75.1	74.5	67.3	75.6	75.2	67.9	76.8	76.6	68.9	77.3	77.0	69.8
E	37.0	39.9	38.1	38.0	41.3	39.5	40.0	42.7	40.8	43.0	46.4	44.2	50.0	53.3	51.9
F*	76.1	78.5	58.2	77.0	79.4	59.1	78.1	80.4	60.3	80.5	82.7	62.8	82.5	85.6	63.5
GR	7.0	7.3	8.7	7.2	7.6	9.0	7.4	7.8	9.4	8.1	8.66	10.4	9.2	9.8	12.1
I	54.2	54.3	54.3	55.9	56.1	56.1	57.6	57.8	57.7	62.9	63.2	63.1	72.4	72.4	72.8
SLO	2.0	2.0	1.8	2.0	2.0	1.9	2.1	2.1	1.9	2.3	2.3	2.1	2.4	2.4	2.2
HR	2.4	2.6	2.1	2.5	2.7	2.2	2.6	2.8	2.3	2.8	3.0	2.5	3.2	3.4	3.0
BiH	1.5	1.8	1.3	1.6	1.9	1.4	1.7	1.9	1.5	1.8	2.0	1.6	2.0	2.2	1.8
FYROM	1.3	1.4	1.0	1.3	1.4	1.0	1.4	1.5	1.1	1.5	1.5	1.2	1.6	1.7	1.3
SCG	7.2	7.4	4.2	7.2	7.4	4.4	7.2	7.5	4.4	7.4	7.7	4.7	8.1	8.3	5.1
L	0.9	0.7	0.8	0.9	0.8	0.9	0.9	0.8	0.9	1.1	0.9	1.0	1.2	0.9	1.1
NL	16.8	16.6	15.8	17.1	16.9	16.1	17.4	17.2	16.4	18.5	18.3	17.5	20.3	20.1	19.3
A	8.5	8.4	7.3	8.7	8.6	7.5	8.8	8.7	7.6	9.4	9.3	8.3	10.4	10.3	8.9
P	7.8	7.8	6.7	8.2	8.2	7.0	8.5	8.5	7.3	9.5	9.5	8.2	11.3	11.3	9.7
CH	9.5	8.9	8.1	9.7	9.1	8.3	9.9	9.3	8.4	10.5	9.9	8.9	11.0	10.4	9.4
CZ	9.4	9.5	6.8	9.5	9.6	6.9	9.6	9.8	7.0	10.0	10.1	7.3	10.5	10.7	7.7
H	5.2	5.6	4.9	5.3	5.7	5.0	5.4	5.8	5.1	5.8	6.1	5.4	6.3	6.6	5.5
PL	19.2	20.2	15.6	19.4	20.4	15.9	19.7	20.8	16.1	20.1	21.0	16.4	21.6	22.6	17.7
SK	4.1	4.2	3.1	4.1	4.2	3.1	4.2	4.3	3.2	4.3	4.4	3.3	4.7	4.8	3.6
RO	7.8	8.1	6.8	8.2	8.5	7.2	8.5	8.8	7.5	9.4	9.7	8.4	10.7	10.9	9.6
BG	6.1	6.5	3.7	6.1	6.6	3.7	6.2	6.6	3.8	6.5	7.0	4.0	6.8	7.3	4.2
West UA	0.9	1.0	0.6	0.9	1.0	0.6	0.9	1.0	0.6	1.0	1.1	0.7	1.1	1.1	0.7
UCTE	**371.5**	**379.7**	**326.5**	**378.4**	**386.6**	**333.8**	**386.5**	**394.0**	**340.9**	**403.5**	**414.9**	**361.1**	**439.8**	**447.8**	**391.9**

* since 1st November, 2003, the load perimeter corresponds to 100% of the national consumption (against approx.97% earlier)

The load in the UCTE countries shows an increase of 15.0 GW between January 2005 and January 2007, as well as an increase of 14.4 GW between July 2005 and July 2007. This represents, in **winter**, a growth of **2.0%** per year from 2005 to 2007. In **summer**, the increase is approximately **2.2 %** per year from July 2005 to July 2007.

On the long term, the trend in load increase is approx. 1.7% and 1.6% per year in winter, and slightly higher in summer (1.9% from 2007 to 2010, then 1.6%). It is to be noticed that for 2005, this year's forecasts are approx. 5 GW higher than last year's forecasts for the same year. Change in French perimeter accounts for almost all this difference. Apart from this difference in the perimeter, this year's forecasts for 2010 are 2.4 GW lower in January (0.1 GW in July) than forecasts carried out last year.

Table A-8 here below shows average annual increase over the periods 2005-2007, 2007-2010 and 2010-2015.

Table A-8 | **Load - Average annual growth on the 3rd Wednesday** | **Results in %**

Country	**2005 - 2007** January 11:00	January 19:00	July 11:00	**2007 - 2010** January 11:00	January 19:00	July 11:00	**2010 - 2015** January 11:00	January 19:00	July 11:00
B	1.7	1.7	1.7	1.9	1.9	1.9	1.2	1.2	1.2
D	0.7	0.5	0.5	0.5	0.6	0.5	0.1	0.11	0.3
E	4.0	3.4	3.5	2.4	2.8	2.7	3.1	2.8	3.3
F	1.3	1.2	1.8	1.0	0.9	1.4	0.7	0.7	0.2
GR	3.1	3.3	3.9	2.8	3.1	3.5	2.6	2.8	3.1
I	3.1	3.2	3.1	3.0	3.0	3.0	2.9	2.8	2.9
SLO	3.5	3.5	3.3	2.9	3.1	3.4	0.7	0.6	0.9
HR	3.1	2.8	4.0	2.7	2.9	3.3	3.0	2.5	3.7
BiH	6.5	2.7	7.4	1.9	1.7	2.2	2.1	1.9	2.4
FYROM	4.7	3.3	3.1	1.9	1.1	3.2	1.3	2.0	2.2
SCG	0.1	0.1	2.1	1.0	1.0	2.1	1.7	1.6	1.8
L	2.9	3.0	2.9	5.9	2.6	2.6	1.9	1.9	1.9
NL	1.9	1.9	2.0	2.1	2.1	2.2	1.9	1.9	2.0
A	1.7	1.8	2.0	2.2	2.2	3.0	2.0	2.1	1.4
P	3.9	3.9	4.6	4.1	4.1	4.0	3.5	3.5	3.5
CH	2.1	2.2	1.8	2.0	2.1	1.9	0.9	1.0	1.1
CZ	1.4	1.4	1.4	1.2	1.2	1.2	1.1	1.1	1.1
H	1.9	1.8	2.0	2.1	2.0	1.6	1.7	1.4	0.6
PL	1.3	1.3	1.7	0.6	0.4	0.6	1.5	1.5	1.5
SK	1.3	1.3	1.5	1.1	1.1	1.1	1.8	1.8	1.8
RO	4.5	4.2	4.6	3.2	3.1	4.0	2.7	2.4	2.7
BG	1.2	0.8	1.1	1.6	2.0	1.7	0.9	0.8	1.0
West UA	1.7	1.5	2.6	1.4	1.3	2.1	1.6	1.5	2.3
UCTE	**2.0**	**1.9**	**2.2**	**1.7**	**1.7**	**1.9**	**1.6**	**1.5**	**1.6**

Countries like Spain, Portugal, Italy, Slovenia, Greece and Romania for instance, show an increase higher than the average growth for UCTE, while Germany, France, Poland, Bulgaria or Czech Republic have a more moderate growth in consumption. This year's forecasts include the January 19:00 point, that is approx. 8 GW higher than the January 11:00 point for the whole UCTE. It should be noticed that, in specific countries, the 11.00 point does not correspond to the daily peak load. There are significant discrepancies in relation to this daily peak in some countries: in January for instance, the margin against the peak load (for 11.00. forecast) represents approximately 4.5 GW in Germany and 3 GW Spain, approximately 2-3 GW in Poland and France (for a total of approx. 17.4 GWfor UCTE). With the forecasts at 19:00, the margin against peak load is reduced to approx. 8.5 GW. In that case only Germany has a margin exceeding 1 GW. This factor must be taken into account when analysing the results for the capacity available in each country.

APPENDIX B: Generation adequacy criteria

The table here below shows which kind of criteria are used to assess the generation adequacy in the different countries. That point is interesting from the power system reliability point of view.

Country	Deterministic or probabilistic	Mandatory standards on generation adequacy
B	Probabilistic, (LOLE, 16 hours/year)	No mandatory standards
D	Deterministic for primary cotrol power; Probalistic approach used by the TSO's	"Transmission Code" requirements
E	Deterministic	"Operation procedures" requirement
F	Probabilistic, (100% of probability of loss of load within one year, fairly consistent with o LOLE of 4/year	No mandatory standards but with the Ministry in charge of Energy
GR	deterministic for the short term, probabilistic for the medium and long term	Operation code, Power Exchange Code and the "Authorisations Regulation for Generation ans Supply" requirements
I	Both	-
SLO	Deterministic	"System Operation Instructions fot The Electricity Transmission Network" requirements
HR	Deterministic	"Annual Energy Balancing Plan" and internal documents on system operations
BiH	-	"ZEKC Book of Rules and obligations" requirements
SCG	Deterministic	-
JIEL	-	-
L	-	-
NL	None left to the market on the basis of "price produces supply"	"National system code" requirements
A	-	No mandatory standards
P	Probabilistic: - LOLE - less than 2.5% of the months - Loss of energy probability (in dry hydro conditions) - below 0.4% of total consumption	No mandatory standards, but the criteria used has the approval of the Economy Ministry
CH	Deterministic	No mandatory standards - shared responsibility between the Federal Ministry of Energy, the cantonal ministries and the Power Utilities
CZ	Deterministic - for the TSO's short term operational planning	No mandatory standards
H	Propabilistic, LOLE	Middle & Long Term Forecast Plan
PL	Deterministic	"Polsh Grid Code" requirements
SK	Deterministic	Requirements resulting from operation
RO	Deterministic for short term ("largest unit"), probabilistic for medium and long term (LOLE and LOLP)	"Grid Technical Code" requirements
BG	**-**	**-**
West UA	-	-

APPENDIX C: Transmission grid development

Main UCTE

Belgium				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
2nd Avelgem - Avelin	400 kV	2005	2nd circuit	All these investments will increase the ca-pacity of transactions between B and F. 2005: +700MVA - 2006: +700MVA Conservative option: Only the value for 2005 has been taken into account in the Power data table because it is the only reasonably sure project.
Chooz - Monceau	225 kV	2006	Increasing capacity 290 => 400 MVA	
Zandvliet	400 kV	2006	PST in the coupling Zandvliet => NL	
Kinrooi	400 kV	2006	PST in the coupling on the lines B => Maasbracht	

France				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Avelgem - Avelin - Mastaing	400 kV	2005	Second circuit	This project will increase the NTC between France and Belgium
New line in the French grid: Vigy - Marlenheim	400 kV	2007	AC line, double circuit (one of them operated at 225 kV), 3x570 mm^2 , 115 km	
Boutre - Broc Carros	400 kV	2007	AC line	
Lyon - Chambery	400 kV	2007	AC line, double circuit, 75 km	
France - Spain: eastern reinforcement	400 kV	2007		This project will increase the NTC between France and Spain of 1200 MW.

Germany				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Connection Windpark Putlitz	380 kV	2004	Single circuit	
Connection Windpark Bertokow	220 kV	2004	Double circuit	
Kriftel - Marxheim	380 kV	2004	Four circuit	
Conneforde substation	380 kV	2005	Gross additional capacity = 660 MVA (Net additional capacity depends on system conditions)	
Weisweiler-Oberzier	380 kV / 110 kV	2007	Four circuits	
Audorf (D) - Kassø (DK)		2008	Upgrade of the line from 1600 A to 2000 A (gross additional capacity 500 MVA)	
Flensburg (D)- Kassø (DK)		2008	Conversion from 220 kV to 400 kV	
Third 400 kV AC connection D - PL		2008	New 400 kV line	
Hagenwerder (D) - Mikulowa (PL)		> 2010	Installation of phase shifting transformers	
Neuenhagen- Vierraden - Krajnik (PL)		> 2010	Voltage level switch over from 220 kV to 400 kV	

Management of the congestion:
The German transmission system operators (TSOs) have already made appropriate preparations before the EC regulation 1228/2003 on network access conditions for cross-border exchange in electricity became on 1st July 2004. These preparations included in particular:

- the commitment to apply market-oriented solutions in the event of network congestion pursuant to Article 6, section 1 of the EC regulation,
- the obligation to use the proceeds from congestion for one or several of the three objectives mentioned in Article 6 , section 6 of the EC regulation,
- different publication and information duties,
- information of the Federal Ministry od Economics and Labour and of the regulatory authority on telecommunication and postal services about application of the regulation and support with a view to ensuring transparency in the application and functioning of the EC regulation.

The TSOs have assured that a market-based procedure (explicit auction) will be applied at interconnectors susceptible to congestion (i.e. at international interconnecting lines towards Denmark, The Netherlands, Czech Republic and Poland).
At the bordes with France, Switzerland and Austria there are no relevant market procedures installed at the present time as the available interconnection capacity on the German side is currently sufficient (with a few exceptions); for this reason, there has no congestion been defined and published to date.
Owing to the presently observed market development, discussions are however going on about possibilities of co-ordination auctioning for these borders, too.
In Germany, a restriction of international transactions under energency conditions has occurred extremly seldom to date when network security as at risk. For those cases, clear-cut procedures have been agreed and laid down e.g. in the Transmission Code 2003, chapter3.3 (first of all topological measures, subsequently re-dispatching, counter-trading, programme curtailment).
The provision of the maximum capacity of interconnection lines (determinned on the basis of the TSOs' sequently standards) to market participants, and the return to the market of capacities that have possibly not been utilized ("use it or lose it") are ensured by explicit auctions applied in Germany.

Spain				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Guillena - Palos	400 kV	2005	Double circuit	
Balboa - Alqueva	400 kV	2005		
Penagos- Soto de Ribera	400 kV	2005		
Pierola - Santa Coloma	400 kV	2005		
Begues - Pierola	400 kV	2005		
Castejon - Muruarte	400 kV	2005	Double circuit	
Abanto - Zierbena	400 kV	2005		
Tarifa - Fardioua	400 kV	2005		
Eliana - Plana	400 kV	2005		
Nueva Escombreras - Palmar	400 kV	2005	Double circuit	
Abanto - Zierbena	400 kV	2005		
Fausita - Nueva Escombreras	400 kV	2005		
Puerto de la Cruz - Tarifa	400 kV	2005		
Antinano - Tineo	400 kV	2006		
Magallon - Serna	400 kV	2006	Double circuit	
Palo - Antinano	400 kV	2006		
Mezquita - Morella	400 kV	2006	Double circuit	
Mezquita - Fuendetodos	400 kV	2006	Double circuit	
Bescano - Vic	400 kV	2006		
Bescano - Sentmenat	400 kV	2006		
Segovia - Tordesillas	400 kV	2006		
Arcos Sur - Roda	400 kV	2006		
Arcos Sur - Cabrta	400 kV	2006		
Antinano - Soto de Ribera	400 kV	2006		
Palo - Pesoz	400 kV	2006		
Pesoz - Tineo	400 kV	2006		
Abanto - Guenes	400 kV	2006		
Bescano - Massanet	400 kV	2006	Double circuit	
Antinano - Tabiella	400 kV	2006		
Cabra - Roda	400 kV	2006		
Meson D.V. - Puentes G.R.	400 kV	2006	Double circuit	
Yora - Pinilla	400 kV	2006		
Moraleja - Segovia	400 kV	2006		
Boimente - Pesoz	400 kV	2007	Double circuit	
S.S. Reyes - Cereal	400 kV	2007		
Tordesillas - Creal	400 kV	2007		
Bescano - Baixas	400 kV	2007		
Santa Llogaia - Bescano	400 kV	2007		
Aparecida - Tordesillas	400 kV	2007		
Aparecida - Trives	400 kV	2007		
Muruarte - Vitoria	400 kV	2007		
Cabra - Guadame	400 kV	2007		
Plana - Morella	400 kV	2007		
Cabra - Guadame	400 kV	2007		
Guenes - Ichaso	400 kV	2008		
Abanto - Ichaso	400 kv	2008		

Slovenia				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Bericevo - Krsko 2x400 kV	400 kV	2008	Double	All lines will have an impact on the inter-connections and will be solve same con-gestions especially on the Slovenian - Italian border, the NTC values could increase.
Circovce - Pince (SLO - H)	400 kV 2x400 kV	2010	Double	
Okrogle - Udine 2x400 kV	400 kv	2011	Double	

Further needs of the system: Internal line 220 kV line Bericevo - Podlog should be substituted with 400 kV line in the future.

Congestion management (Long term): Prorata on Slovenian - Italian and Slovenian - Austrian border and Daily Implicit Auctions

Greece				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
EHT Lagada	400 kV	2007	3bars 400 kV	
EHT N.Santa	400 kV	2007	3bars 400 kV	
EHT Korinthos	400 kV	2008	3bars 400 kV	
EHT Lamia	400 kV	2010	3bars 400 kV	
Line Meliti - Bitola	400 kV	2006	Upgrade to 400 kV	
Line Philippi - Turkey	400 kV	2006	double circuit AC line, 208 km	
Line Amydaio - Philippi	400 kV	2007	Double circuit AC line, 101 km	
Line Koumoundourou-Korinthos	400 kV	2008	double circuit AC line, 72 km	
Line Trikala - Ag.Dimitrios	400 kV	2011	double circuit AC line, 127 km	

Further needs of the system: some of these new commissioning or upgrading are part of the scheduled extensionof the 400 kV grid to the southern part of the country (Peloponnese) and to the Eastern Macedonia and Thrace and the reinforcment of the 150 kV grid there.

The line between Greece and Turkey and the upgrade of the 150 kV-line Meliti - Bitola to 400 kV will increase the total NTC value.

Croatia

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Mraclin - Jajce (BiH)	220 kV	2005	Single circuit line (reconstruction)	Tie line Mraclin - Jajce will increase NTC value between Croatia and Bosnia and Herzegovina. Tie line Ernestinovo - Pecs will increase NTC value betweeen Croatia and Hungary. Both lines together with inter-nal lines Zagvozd - Plat and Vodnjan - Plomin will make Croatian transmission system stronger by reducing constraints and avoi-ding or mitigating potentional congestions.
Ernestinovo - Pecs (H)	400 kV	2007/2008	Double circuit line	
Zagvozd - Plat	220 kV (400 kV)	2007	Double circuit line	
Vodnjan - Plomin	220 kV	2007	Double circuit line	

Luxembourg

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Centrale TGV-SOTEL	220 kV	2006	220 kV cable	No impact on interconnections.
Schifflange - CFL Berchem	220 kV	2006	2x220 kV	

Further needs of the system:

The Netherlands

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Static VAR equipment at different locations	380 kV	2004/2005		The static VAR equipment will be better the performance on the entire 380 kV network under varying import/export conditions.
Upgrading of 150 kV line Diemen - Velsen	380 kV	2005/2006	2x1645 MVA	
Construction of substations Oostzaan and Velsen	380 kV	2005/2006	3x500 MVA and 1x500 MVA	

Further needs of the system: some regional reinforcments.

Congestion management: TenneT has agreed with the neighboring TSOs to exchange more online information. This will enable all TSOs to have a clear overview of the relevant parts of each TSO-network and thus be of benefit for congestion and security management purposes.

Italy

Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Trino - Lacchiarella	380 kV	M / L	Single circuit line	The installations of the PST in the north-east frontier (Slovenia border) will increase the import of enrgy with security, with limiting the actual constraints. The completion of the line Matera - S.Sofia, in the south of the country, will remove the constraints that actually reducing the import from the Greece actually set at 300 MW. A further addition in term of NTC, in the short-medium term, will come from a new 132 kV line Prati di Vizze - Steinach with Austria. This line will be managed by means of PST installed in the Austrian border.
Turbigo - Rho	380 kV	2006	Single circuit line	
Voghera - La Casella	380 kV	S / M	Single circuit line	
Udine - Redipuglia	380 kV	2006	Single circuit line	
Cordignano - Lienz	380 kV	M / L	Single circuit line	
Venezia Nord - Cordig.	380 kV	M / L	Single circuit line	
Udine - Okroglo	380 kV	M/ L	Double circuit line	
Redipuglia Padriciano	380 / 220 kV	S / M	PST	
Tavernuze - Castellina	380 kV	2005	Single circuit line	
Candela - Foggia	380 kV	2005	Single circuit line	
Sorgente - Rizziconi	380 kV	2006	Second AC link	
Sardegna - Continente	380 kV	2008	AC plus DC link	
S.Fiorano - Robbia	380 kV	2005	Double circuit line	
Matera - S.Sofia	380 kV	M / L	Single circuit	
Piossasco - Grand'lle	380 kV	M / L	Single circuit	
La Casella - S.Rocco	380 kV	M / L	Single circuit	
Substations	380 - 220 kV	S / L	New substations	
Lines	380 - 220 kV	S / L	1430 km of total length	
Transformers	380 - 220 kV	S / L	13 GVA of total power	

Austria				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Südburgenland - Kainachtal (A - A)	380 kV	2007	AC, 3000 MVA	The building of this transmission line will lead to an increase of NTC towards CZ, H and SLO and to a decrease of congestion costs.

Interconnections:
- 380 kV interconnection line from Lienz (A) to Cordigano (I) (AC-Double)
- Wien Südost - Györ (Construction of an additional 380 kV line)
- 380 kV interconnction through the Brenner Basis tunnel A (Thaur) - I (Bressanone) (AC-Double)
- Nauders (A) - Curon/Glorenza (I) (Construction of a new single circuit connection cable)

Comment: A further addition in term of NTC, inthe short-term, will come from the new 132 kV line Parti di Vizze - Steinach with Austria. This line will be managed by means of PST installed at the Austrian border.

Within Austria:
- Ernsthofen substation (Upgrade from 220 kV to 380 kV)
- St Peter substation (Upgrade from 220 kV to 380 kV)
- Zell/Ziller - Westtirol (Upgrade from 220 kV to 380 kV)
- Bisamberg substation (Upgrade from 220 kV to 380 kV)
- Lienz - Obersiedel (Construction of a new double circuit connection, 380 kV)
- St.Peter (A) - Salzach (A) (Upgrade from 220 kV to 380 kV)
- Salzach (A) - Tauern (A) (Upgrade from 220 kV to 380 kV)

Because of bottlenecks from north to south in inner Austria it is necessery to redispatch in Austria. This Situation causes limited NTCs.

FYROM				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Stip - Vervena Mogila	400 kV	2005	400 kV line between FYROM and BG, 80 km	
Bitola - Lerin	400 kV	2006	400 kV line between FYROM and GR, 18 km	
Skopje 5 - Nis	400 kV	2010-2015	400 kV line between FYROM and SCG, 36 km	
Bitola - Zemjak	400 kV	2015	400 kV line between FYROM and AL, 80 km	
Vrutok - Bureli	220 kV	2006	220 kV line between FYROM and AL, 45 km	

Serbia and Montenegro

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
SS 400/220 kV S.Mitrovica	400 kV	End of 2004	1x400 MVA (extension SS S.Mitrovica2)	The reconnection of the two UCTE synchro-nous zones, excepted in Autumn 2004 will be enable the use of the import/export capa-cities at the northern and western SCG bor-ders and in the same time increase the transfer capabilities to RO and BG. Construction of new substation and lines is expected to increase the transfer capabili-ties in all directions.
Subotica 3 - Sombor 3	400 kV	2005/2006	Single circuit AC line, 40 km	
SS 400/110 kV Jagodina 4	400 kV	2005/2006	2x300 MVA	
SS 400/110 kV Sombor 3	400 kV	2005/2006	2x300 MVA	
SS 400/110 kV Beograd 20	400 kV	2005/2006	2x300 MVA	
Podgorica (SCG) - Tirana (AL)-Elbasan (AL)	400 kV	End of 2007	Single circuit AC line, 198 km	
Nis (SCG) - Skopje (FYROM)	400 kV	End of 2007	Single circuit AC line, 195 km	
S.Mitrovica (SCG) - Ugljevik (BA)	400 kV	End of 2007	Single circuit AC line, 70 km	
SS 400/110 kV Leskovac	400 kV	End of 2007	1x300 mVA	
SS 400/110 kV Vranje	400 kV	End of 2010	1x300 MVA	
Sombor (SCG) - Pecs (H)	400 kV	End of 2010	Single circuit AC line, 70 km	
Further needs of the system:	Rehabilitation or upgrading 220 kV network			

Switzerland

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Robbia-San Fiorano	400 kV	2005	Double AC tie-line with Italy	Will increase significantly the NTC with Italy
Congestion management:	A new concept for congestion management in Switzerland was approved between ETRANS and the Swiss Uitillities and will be implemented until end of 2004.			

Portugal

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Reinforcement of capacity in existing lines	220/ 150kv	2004/2005/ 2006	Increase in transmission ca-pacities of existing lines	All the new elements mentioned above will be have a positive influence in the intercon-nection capacities. There are a lot of other reinforcments in the network, but their impact than those.
Line Alqueva - Balboa (E)	400 kV	2004/2005	Single circuit, 120 km	
Line Pego-Batalha	400 kV	2005	Single circuit, 81 km	
Paraimo substation 400/220 kV	400/ 220 kV	2006	400/220 kV substation	
Line Valdigem-Bodisa-Paraimo	400 kV (220)	2005/2006	Single circuit, 36 km Portugal, 40 km Spain	
Douro Internacional substation	(400) 220 kV	2008	400/220 kV substation, initialy only with 220 kV	
Line Valdigem - Recarei	400 kV	2009	Double circuit , 70 km	
Line Valdigem -D.internacional-Aldeadavila	400 kV	2010	Single circuit, 95 km	
Line Pedralva - Riba de Ave	400 kV +150 kV	2011	400+150 kV double circuit, 30km	
Further needs of the system :	For the interconnection capacity purpose, eventually a new interconnection in the extreme south part of the country would be positive.			

Czech-Republic

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
2nd line Slavetice - Durnrohr	400 kV	2006	on the common towers with the existing line V437	
Further needs of the system :	- There is still the need of completing of the last section 400 kV north-south link in Bohemia (to construct the 400 kV line between the substations Cechy Stred and Bezdecin), supposed commis-sioning about 2008.			
Management of congestion:	Coordinated auction between PSE, CEPS and VE-T is under negotiation.			

Hungary

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Nadab (RO) - Bekescsaba (H)	400 kV	2007	Double circuit, AC line, 30 km	
Ernestinovo (HR) - Pecs (H)	400 kV	2007/2008	Double circuit	
Paks - Pécs	400 kV	2004	Double circuit, AC line	
Györ - Szombathely	400 kV	2007	Double, AC line	

Poland

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Line Olstyn - Matki	220 kV	2005 (planned)	Single, AC	
Line Tarnow - Krosno	400 kV	2006 (planned)	Single, AC	
Line Ostrow - Plewiska	400 kV	2006 (planned)	Single, AC	
Line Ostrow - Rogowiec Line Ostrow - Trebaczew	400 kV	2008 (planned)	Double, AC	

Slovak Republic

Line or Equipment name	Voltage Level	Commis-sioning Date	Main Characteristics (single or double circuit line, length, AC lines or DC lines,...)	Comments, Impact on the intercon-nections and on congestions (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
Lemesany (SK) - Moldava (SK)	400 kV	2011	Double circuit line	tie line on Slovak territory
R.Sobota or Moldava (SK) - Sajoivanka (H)	400 kV	after 2011	Double circuit line	cross-border tie line
Varin (SK) - Byczyna (PL)	400 kV	2015	Double circuit line	cross-border tie line
2x400/110 kV transformers in substation Krizovany (SK)	400/ 110 kV	2006 and 2008	Transformers	
Sucany-Medzibrod-Lipt.Mara (SK) line	400 kV	2011	Line	tie line on Slovak territory
Further needs: replace old lines				

Romania				
Line or Equipment name	**Voltage Level**	**Commis-sioning Date**	**Main Characteristics** (single or double circuit line, length, AC lines or DC lines,...)	**Comments, Impact on the intercon-nections and on congestions** (increasing the NTC, by reducing or increasing constraints, by decreasing congestion costs, ...)
OHL Gutinas - Bacau upgrading of line operation from 220 kV to 400 kV	400 kV	2007	AC line, single circuit, 55 km	The new lines will eliminate the actually internal congestion in the north and east part of Romania and will increase the com-pany turnover.
Bacau - Roman upgrading of line operation from 220 KV to 400 kV	400 kV	2007	AC line, single circuit, 59 km	
Roman - Suceava upgrading of the line from 220 kV to 400 kV	400 kV	2007	AC line, single circuit, 99 km	
OHL Portile de Fier II - Cetate	220 kV	2007	AC line, double circuit, 30 km	
OHL Oradea - Nadab	400 kV	2007	AC line, single circuit, 85 km	
OHL Nadab (RO) - Bekescsaba (H)	400 kV	2007	AC line, double circuit, 30 km	
OHL Nadab - Arad	400 kV	2007	AC line, single circuit, 30 km	
OHL Suceava (RO) - Balti (MD)	400 kV	2009	AC line, single circuit, 150 km	
OHL Suceava - Gadalin	400 kV	2010	AC line, single circuit, 260 km	
OHL Portile de Fier I - Resita	400 kV	2010	AC line, single circuit, 117 km	
OHL Resita - Timisoara (actualy operation al 220 kV, double circuit)	400 kV	2010	AC line, single circuit, 73 km	
OHL Timisoara - Arad (actualy operation al 220 kV, double circuit)	400 kV	2010	AC line, single circuit, 54 km	

APPENDIX D: Exceptional trends, deregulation of the market and impact on forecasts

Exceptional trends

In several countries (Germany, Italy, France, Slovenia, Poland …) there is a governmental support to renewable sources, consistent with European environmental goals. Consequently, renewable sources and combined heat/power plants form a considerable part of new generating capacity in the UCTE.
Some significant information should be retained :

A The surplus of electricity in the north and the deficit in the south of Austria, combined with insufficient north-south-transmission capacity cause congestion due to the highly loaded lines in the transmission grid of Verbund-APG. Verbund-APG has to apply counter measures in order to reduce these bottlenecks. At present this is done by re-dispatching (including restrictions for pumping) and changes of the network configuration. Due to the decommissioning of thermal power plants in the south the above mentioned bottlenecks will become even more critical. To eliminate the congestion in the grid of Verbund-APG, new 380 kV lines (Südburgenland - Kainachtal, St. Peter – Tauern) are planned to be put into operation. If the commissioning of these lines is delayed, additional congestion management measures will have to be taken. Such a measure would have an essential impact on the overall Austrian electricity system and in particular on the Austrian electricity market.

PL After its accession to EU on 1 May 2004, has become a full member participant in the Internal Electricity Market. In May 2003 a new amended secondary legislation to the Polish Energy Law concerning the obligation to purchase electricity and heat from renewable energy sources and electricity generated in combined heat and power units, was introduced. In 2004 this RES purchase obligation amounts to 2.85% in total annual sale of electricity of the specific energy company. Then the share is growing every year up to 7.5% in 2010. Electricity trading companies are also obliged to purchase electricity from CHPs. The share of electricity produced from CHPs is growing from 12.4% in 2004 up to 16% in 2010. The Government adopted “the Climate Policy for Poland, the greenhouse gas emissions reduction strategy until 2020” in November 2003. It determines policies and measures to achieve the goal of 40% greenhouse gas emissions reduction until 2020 compared to 1988 (the base year for Kyoto Protocol commitments). The Energy Law Act was changed in April 2004 with amendments adapting it to the Directive 2001/77/EC. According to that amendments the President of the Energy Regulatory Authority will issue guarantee of origin of electricity produced from RES. Draft law on the long-term contracts is under legislation process in Poland and is expected to have final approval by the European Commission soon.

D The law concerning the primacy of renewable energies and the Co-generation Act, decided three years ago, entail an increased development of wind power and secure the operation of existing co-generation plants. The consensus achieved about the remaining life of nuclear power stations has led to additional effects with the scheduled shutdown of nuclear plants over the period covered by this year’s forecast.

NL The joint TSO-auction of the cross-border transmission capacity serves well to manage eventual cross-border congestion by forehand The Dutch Government imposed a stimulation program for renewable by subsidising and certification of so called green energy. This program has until a certain degree impact on the origin of imports.

RO The main objective of environmental policy is the implementation of an efficient environment management system, which targets the reduction of transmission network negative effects on the environment according to the European standards. Since April 2004 is in force the GD. Nr. 443/2003 regarding the renewable energy sources development.

Deregulation of the market and impact on forecasts

The status of electricity market deregulation is not homogeneous over the UCTE countries. Some significant information should be retained:

D As a result of unbundling (required by law) between generation, transmission and distribution, the flow of information concerning power balance data has been interrupted to a large extent between TSOs and power station operators. Individual items of the power balance have been based on model calculations and estimations of TSOs for their respective control area. The German power balance values are obtained as aggregate value by adding up the individual values of TSOs concerned. In order to obtain a realistic representation of renewable energies, the German data on the UCTE power balance forecast 2005-2015 comprise estimated and forecast values of TSOs for plants < 1 MW, which were largely not included in the German power balance data dating back more than 3 years. This means that the large coherence of data about the generating capacity and peak load with official statistics does not longer exist, as plants < 1 MW were not (or only insufficiently) taken into consideration by these statistics. This should be noted when making comparisons with former power balances. A regulatory body will be institutionalised in Spring 2005 to replace the system of the Associations' Agreement on network access. To date, the missions of this regulatory authority have not been determined yet in detail. So we assume that the electricity market in Germany will continue to function on the basis of the Associations' Agreement, all the more since the German model of negotiated network access has been explicitly provided for in the amended EU Internal Electricity Market Directive. Besides, the instrument of the electricity industry's self-regulation represented by the Associations' Agreement has proven to be successful as it enabled the swift and complete opening-up of the German electricity market. Therefore, the refinement of the current Associations' Agreement II plus is being pursued.

GR The scheduled extensions and reinforcements of the Greek Transmission System to the Southern part of the country and in Macedonia and Thrace, the new tie-line between Greece and Turkey and the new electricity Law and Codes that impose new requirements and set new regulations regarding the System Adequacy and the Electricity Market will smooth out the path of the newcomers who are really interested in investing in the electrical energy sector. The deregulation of the Electricity Market has been taken into account in this forecast. The new generating capacity includes power plants scheduled for commissioning either by PPC or by independent generators. The power plants scheduled for commissioning at 2005-2007 are under construction while those scheduled for commissioning after 2007 may participate in a tendering procedure for new generating capacity. All these power plants have been taken into account in long-term plan for transmission system development.

CH A draft of a new law for the opening of the Swiss electricity market is available and the discussion between the concerned parties will start in autumn 2004.

CZ The electricity market will be opened for **all consumers other than householders** from 1st January 2005. The market will be opened **completely** for all consumers from 1st January 2006.

PL According to the Polish Energy Law, at the day of Poland's accession to the EU, the opening of the electricity market was extended to electricity generated in the EU Member States. The process of gradual opening continued according to the Ordinance of the Ministry of Economy. With the aim of the full implementation of the new IEM Directive, the new amendments to the Polish Energy Law, adopting the Act and its secondary legislation to the requirements of the Directive 2003/54/EC will be introduced. The main legal changes will include: introduction of supplier of last resort and universal service, increase in the regulator's tasks, unbundling provisions for the system operators. The aim of these amendments is to make further convergence and harmonization of the Polish market rules with the EU model. On 1 July 2004 a company PSE-Operator SA commenced its activities as a Polish Transmission System Operator on the basis of its transmission licence and by taking over the obligations in this respect from the Polskie Sieci Elektroenergetyczne SA. PSE-Operator SA has been established within the structures of the PSE holding as a legally unbundled company, according to requirements of the Directive 2003/54/EC.

RO **TRANSELECTRICA S.A -** The National Power Grid Company is acting as the country's Transmission System Operator (**TSO**) and is responsible for the transmission and system operation, including electric market and interconnection management functions with the neighbouring power systems as well. Transelectrica owns transmission assets, ensuring a non-discriminatory and regulated network access. According to its operation license, Transelectrica does not have the right to trade electricity, the only allowed transactions being electricity acquisition to cover its own technological consumption. Through its dispatching system, Transelectrica provides the control of all dispatchable units within the Romanian Power System (342 units at present, including as dispatchable hydro units groups of small hydro power plants). The main responsibilities, in compliance with the existing requirements of licenses are:

- Provides the real time control of the power system, by using the ancillary system services
- Ensures interconnected operation with other power systems.
- Ensures the wholesale market administration through its fully owned subsidiary, OPCOM.
- Ensures the non-discriminatory access and grid connection to all grid customers in a transparent manner
- Operates, maintains, modernises, plans and develops the transmission grid assets
- Ensures the metering service for the wholesale electric market

Transelectrica has an functional organisation corresponding to its key market-focussed operations:

-**OPCOM** is the power market operator. Although legally a 100% owned subsidiary, Transelectrica has no voting power on its Board and the effective control lies with the Ministry of Industry and Resources, which appoints the members of OPCOM's Board of Directors.

-**SMART,** a 100% subsidiary that provides grid maintenance services to Transelectrica.

-**TELETRANS,** a 100% subsidiary, providing the in-house telecommunication services and IT to manage the transmission networks.

-**FORMENERG,** a 100% subsidiary for vocational training services for all power industry.

ELECTRICA S.A. is a state-owned distribution and supply company, operating the distribution network (110 kV and below) and providing the electricity supply services for more than 8 millioncustomers. **In the fields of power generation 47 power producers** are licentiate by the Romanian Electricity and Heat Regulatory Authority (ANRE). The main producers, 100 % state-owned, under the authority of the Ministry of Economy and Commerce are:

- Three new energy complex type commercial companies (**Rovinari, Turceni, Craiova)** started operating in April 2004, GD 103/29.01.2004, including power plants and lignite mines;
- **Electrocentrale Bucuresti**;
- **Electrocentrale Deva**;
- **Termoelectrica;**
- **HIDROELECTRICA**: a generating state-owned company, has as a main objective of activity electricity generation, supply ancillary services for power system operation and water system management services by using the hydropower resources of the country. It operates almost all Romanian hydropower plants and has 12 regional subsidiaries. Hidroelectrica has in administration 343 hydropower plants (including 4 water pumping stations and 219 micro hydropower stations), summing up a generating capacity of 6266 MW (from which 71 MW in water pumping stations) with a power generation in 2002 of 15902 GWh (29% from total country generation). The generation for an average hydrological year is about 17293 GWh.
- **NUCLEARELECTRICA** Since July 27, 1998 "**Nuclearelectrica" S.A**. was set up as a 100% state owned generating company, under of the authority of Ministry of Industry and Resources, its main mission being to produce nuclear-generated electricity, heat and nuclear fuel. The company has also an active participation in the nuclear power development program in Romania.

FY ROM Regarding provisions of the Athens memorandum, Macedonia is doing very serious efforts to create independent institutions for policy, regulation and system operation. The Energy Regulatory Commission was established in July 2003, and the New Electricity Law, was adopted by the Government. The new law for unbundling of the Electric Power Company of Macedonia is prepared. ESM will be divided in 3 parts: Generation, Transmission and Distribution. So, the energy sector of Macedonia is doing very serious efforts for accession to the Regional Electricity Market in South East Europe and its integration into the European Union's Internal Electricity Market.

Country	Date of beginning of deregulation process	1st threshold	2nd threshold	other threshold
B	Royal decree, May 5th, 2000	January 1st,2003 Brussels: consumers > 10 GWh Wallonia: consumers >10 GWh Flanders: customers with a distribution system connection capacity of 56 kVA or over. Federal level: consumers > 10 GWh or other specific conditions	July 1st,2003 Brussels: consumers > 10 GWh Wallonia: consumers >10GWh Flanders: All residential clients Federal level: consumers > 10 GWh or other specific conditions	Third threshold: January 1st, 2005 Brussels: all high voltage clients Wallonia: all high voltage clients Flanders: all residential clients Federal level: consumers > 10 GWh or other specific conditions Fourth threshold: January 1st, 2007 Brussels: all residential clients Wallonia: all high voltage clients Flanders: all residential clients Federal level: consumer > 10 GWh or other specific conditions
D	Law, dated April 25th, 1998	100%	100%	100%
E	Electricity Act November 27st 1997	January 1st, 1998, consumers > 15 GWh/year (i.e. market opening of 27%)	January 1st, 1999, consumers > 5 GWh/year (i.e. market opening of 33%)	April 1st, 1999, consumers > 3 GWh/year (i.e. market opening of 37%) July 1st 1999, consumers > 2 GWh/year (i.e. market opening of 39%) October 1st 1999, consumers > 1 GWh/year (i.e. market opening of 42%) July 1st 2000, consumers connected to > 1kV networks (i.e. market opening of 54%) January 1st 2003, all consumers (100%)
F [11]	Law 2000-108 February 10th 2000	by February 2000: 16 GWh/year/site (i.e. market opening of about 30%)	by February 2003 at the latest: 7 GWh/year/site (i.e. market opening of about 35%)	July 1st 2004: all costumers excepted residential

[11] The status of eligible customer is reviewed every two years.

Country	Date of beginning of deregulation process	1st threshold	2nd threshold	other threshold
GR	LAW 2773/99 February 2001	by February 2001, HV/MV consumers (market opening of about 34%)	July 1st 2004: all consumers connected to the mainland interconnected system other than householders	July 1st 2007: all consumers connected to the mainland interconnected system
I	Law 1999-79 March 16th 1999	by January 1st, 2000: 20 GWh/year/site (i.e. market opening of about 25%)	by January 1st, 2002 9 GWh/year/site (i.e. market opening of about 38%)	by January 1st, 2003: 0.1 GWh/year/site
SLO	Date of the beginning of deregulation is October 1999 with the Energy Law. On January 2003 the electricity market will be opened up to 60%.			
L	Law July 24th, 2000	by February 19th, 1999: consumers > 100 GWh and distributers > 800 GWh by January 1st, 2001: consumers > 20 GWh and distributers > 800 GWh	by January 1st, 2003: consumers > 9 GWh and distributers > 90 GWh	by July 1st, 2004: all nonhousehold consumers by July 1st, 2007 all the consumers
NL	Electricity Law, July 1998	by January 1999: big consumers > 2 MW (i.e. market opening of about 30%)	by January 2002: 35 kW < middle consumers > 2 MW (i.e. market opening of about 35%)	by July 2001: all consumers of certified green energy (renewable sources; relative small groups) by January 2004: all other consumers and households (i.e. market opening of about 35%)
A	Electricity Act (EIWOG) 1998	particial opening of the market	October 1st 2001: 100% of the electricity market is liberalised (Amendment to the Electricity Act)	
P	Law 213/98, September 15th, 1998	by January 1st, 1999: consumers > 30 GWh (i.e. market opening of 27%)	by January 1st, 2000: consumers > 20 GWh (i.e. market opening of 29%)	by January 1st, 2001: consumers > 9 GWh (i.e. market opening of 33%) by January 1st, 2002: all consumers connected to > 1 kV network (i.e. market opening of 44%)
CH	not applicable	not applicable	not applicable	not applicable

Country	Date of beginning of deregulation process	1st threshold	2nd threshold	other threshold
CZ	Law 458/2000 January 1st, 2002	since January 2002: consumers > 40 GWh/year/site	since January 2003: consumers > 9 GWh/year/site	from January 1st 2004: for all consumers with continuous measurement (one-hour meter readings) of the electricity consumption (other than householders) from January 1st 2005: for all consumers (other than householders) from January 1st 2006: for all consumers
H	January 1st , 2003 Act of CX/2001 (Electricity Act)	from January 1st , 2003: consumers > 6.5 GWh (33-35% of total consumption)	will be decided according to the accession to EU and experience gained	
PL	Energy Law, April 10th, 1997	till August 6tht, 1998: final consumers > 500 GWh/year (i.e. market opening of about 16%)	from January 1st, 1999: final consumers > 100 GWh/year (i.e. market opening of about 28%)	from January 1st, 2000 : final consumers > 40 GWh/year (i.e. market opening of about 33%) from January 1st, 2002 : final consumers > 10 GWh/year (i.e. market opening of about 40%) from January 1st, 2004 : final consumers > 1 GWh/year (i.e. market opening of about 46%) from December 5th, 2005: all consumers (i.e. market opening of 100%)
SK	January 1st, 2002, Edict Mo. 562/2001 to the Energy Law No.70/1998, this was replaced by Edict No.548/2002 and 549/2002	since January 2002: consumers > 100 GWh/year	from January 2003 on: consumers > 40 GWh/year	from January 2004 on: consumers > 20 GWh/year from January 2005 on: consumers > 0 GWh/year; all consumers except household
RO	Government Emergency Ordinance no.68/1998; in July 2003 the Romanian Parliament adopted a comprehensive Energy Law (no. 318/2003) including all former changes	Government decision (GD) no.122/2000: competitive market up to 10%	GD no.982/2000: compentitive market up to 15% GD no.1272/2001: compentitive market up 25% GD no.48/31.01.2002: compen-	The market will open at 40% by the end of 2003, at 80% by 2005 and 100% by 2007.

Other Remarks

The Netherlands Some years ago the Netherlands changed from a situation of central dispatched generation to decentralised generation schemes. Since then Tennet only observes market-transactions and it is problematic to get adequate information from the market players about the actual and future power plant availability. To overcome this lack of information a cooperation with the government has been settled on a plant-availability monitoring system.

Romania **The domestic primary legislation for the Romanian electricity industry is made up of law No. 318/2003, ("Energy Law").** The European Union legislation is a relevant part of the Romanian legislative framework. The secondary legislation consists of regulations issued by **the Romanian Electricity and Heat Regulatory Authority (ANRE)** and include:

1. Licenses and authorizations
2. Technical Transmission Grid Code
3. Technical Distribution Grid Code
4. Wholesale Electricity Market Commercial Code
5. Tariffs and tariff methodology
6. Framework contracts for trading arrangements

All regulations were drafted on the basis of laws with a view to setting out correct, transparent and market-driven relationships among market participants. As per Government Decision no. 48/31.01.2002**, the competitive market is up to 33% of the total wholesale electricity traded. Eligible customers may choose their own power supplier and conclude bilateral negotiated contracts, in compliance with the relevant regulations.** The current licensing criteria for eligible consumers are:

1. annual consumption over 40 GWh/year
2. creditworthiness
3. no outstanding debts to the existing power suppliers.

Transelectrica is **the administrator of the electric market, through its legal subsidiary – the market operator OPCOM.** OPCOM plays the role of electric market administrator, as stated in the primary and secondary legislation in force, providing an organised, viable and efficient framework for the commercial transactions traded within the wholesale power market, under the conditions of consistency, fairness, objectivity, independence, equidistance, transparency and non-discrimination. As an early recognition of its efforts, OPCOM has been accepted as full member of the International Power Exchanges Association – APEX starting the October 1st, 2001. The Romanian wholesale electric market, which started on August 1st, 2000, is aimed for electricity and ancillary services trade among market participants and is made up by two components:

- the regulated market;
- the competitive market.

1. The regulated market is meant for electricity and ancillary services trade on regulated contract basis (with regulated prices and regulated and usually firm quantities). The contracts concluded on the regulated market are:
   - portfolio contracts (firm quantities and regulated prices);
   - contracts for electricity in cogeneration (quantities and regulated prices)
   - PPA contracts (long term contracts with regulated prices) - the "must run-must take" contract for SN Nuclearelectrica SA concluded for the whole output of the power plant;
   - ancillary services contracts (firm quantities, established by the System Operator, and regulated prices);
   - transmission contracts (regulated tariffs).
2. The competitive market is meant for electricity trade through bilateral contracts (firm quantities and negotiated prices) and by auction on the spot market (bulk transactions based on bids from producers). The following contracts are concluded on the competitive market:
   - bilateral contracts between internal producers/suppliers with eligible consumers or with other suppliers for the eligible consumers' consumption;
   - import contracts of the producers (for the unbalances that arise in portfolio contracts) and the suppliers import contracts;
   - export contracts;
   - negotiated contracts concluded by independent producers and self-producers, others than the owners of portfolio contracts;
   - transactions on spot market at the System Marginal Price.

OPCOM aims at becoming an attractive and efficient trading environment for all the agents interested to be actively involved in the domestic and regional energy market as well, by developing the market instruments required by every stage of the Romanian wholesale power market progress and at permanently contributing to the improvement of the legislative framework governing the electricity trade. Transelectrica is in charge of substantiating the portfolio selling/purchasing contracts established between some generation companies and supply companies. This is carried out by means of a computer simulation model, approved by the ANRE, and consists in determining the hourly electricity generation of each company according to the merit order of its units and in shaping the regulated prices for each base settlement period of electricity load curve. The tariffs for the regulated market, corresponding to the captive consumers, are established by the regulator. Eligible consumers, power suppliers and even Electrica have the opportunity to trade electricity on the competitive market, where prices are directly negotiated according to bilateral contracts or settled on the spot market. Both the existing and the new participants on the electric market are equally treated on a transparent and non-discriminatory basis, which also includes the regulated access to the transmission and distribution networks. In this respect, connection to the grids is a compulsory public service.

Participants to the market

producers: **Main producers (7):**	Termoelectrica, Hidroelectrica, Nuclearelectrica, Deva, Rovinari, Turceni, Craiova, Bucuresti, as well as other independent producers (28) and self producers (8).
Buyers:	
Suppliers and/or generators(51)**:**	Main Suppliers: Electrica and its 8 subsidiary companies, Termoelectrica, Hidroelectrica, Nuclearelectrica, Romenergo, Romelectro, UNICOM, ALRO , GRIVCO.

Eligible Consumers (19)

The *Transmission System Operator*(for transmission and ancillary services at regulated tariffs).

Executive editor: UCTE-Secretariat
15, Boulevard Saint-Michel, 1040 Brussels

Responsible for content: UCTE

Production editor: Vattenfall Europe Information Services

Contact: www.ucte.org
info@ucte.org

UCTE

Contact

Boulevard Saint-Michel, 15
B-1040 Brussels – Belgium
Tel +32 2 741 69 40 – Fax +32 2 741 69 49

info@ucte.org
www.ucte.org