



Gestionnaire
du Réseau de Transport d'Electricité

Technical Results French Electricity Supply Industry



2007

Provisional values

www.rte-france.com

2007 Technical results French electricity supply industry (excluding overseas territories)

Technical Results French Electricity Supply Industry 2007

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N.B. : This booklet presents provisional results, expressed in rounded values because of some estimated values.

Data come from measures made by RTE, completed by various actors of the power system and by estimations made by RTE.

Data from 2001 to 2005 were updated in order to take into account additional information given by different actors of the electrical energy sector.

For any additional information, you can contact RTE, at the French Power Network Information Centre (CIREF) :

By e-mail : rte-fcent-ciref-publications@rte-france.com

By fax : 33 - 1 41 02 14 63

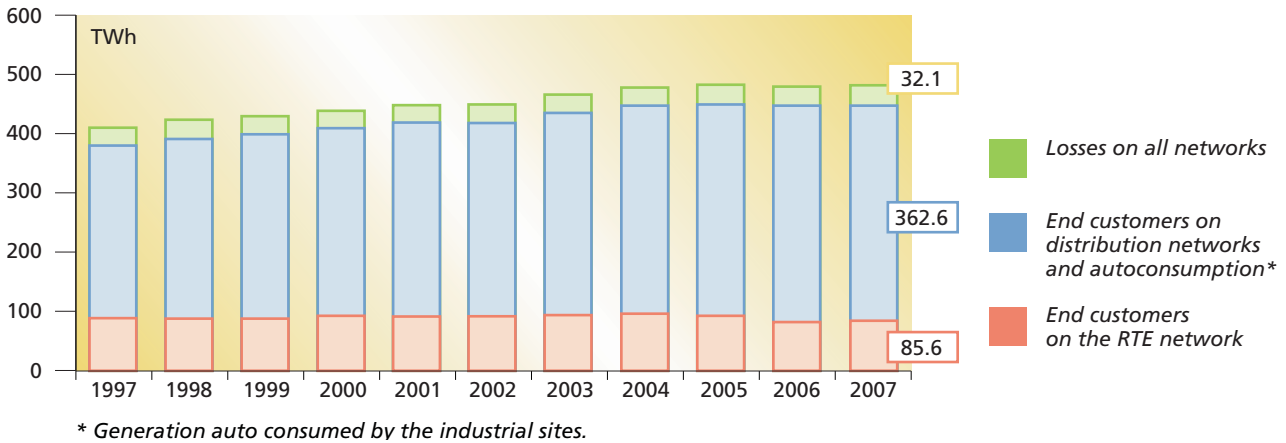
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General results in France

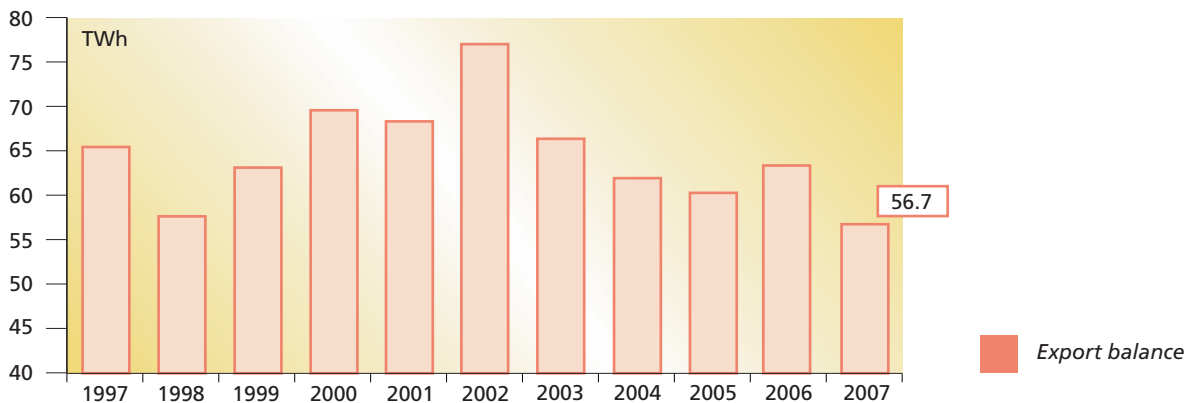
Provisional values

Technical Results French Electricity Supply Industry 2007

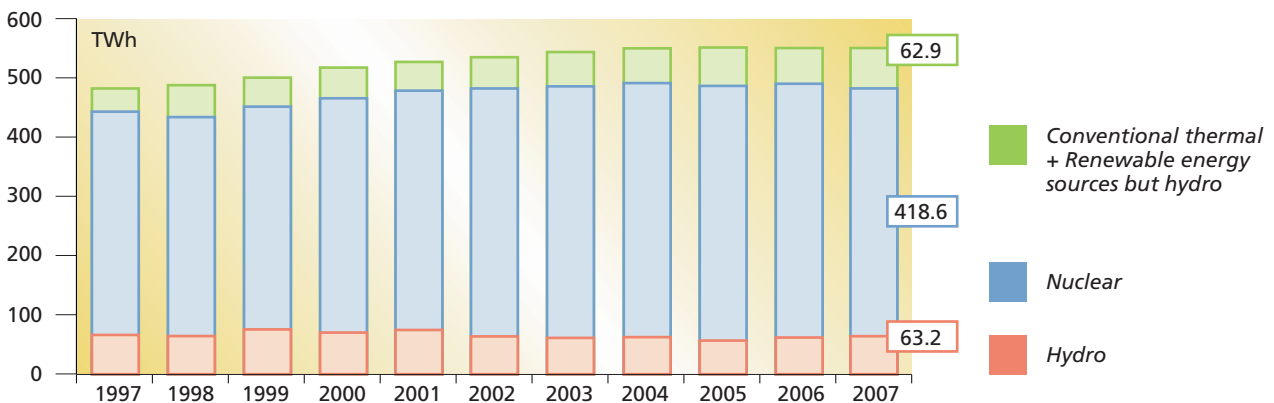
National consumption 480.3 TWh (+0.4 %)



Physical exchanges with foreign countries



Net generation 544.7 TWh (-0.8 %)



General results in France

Provisional values

Energy consumed

	2006 (TWh)	2007 (TWh)	Variation 2007/2006	Consumption share in 2007
National consumption	478.4	480.3	+0.4 %	
Net consumption (without losses)	447.0	448.2	+0.3 %	100.0 %
End customers on the RTE networks	83.5	85.6	+2.6 %	19.1 %
End customers on distribution networks	351.4	350.3	-0.3 %	78.2 %
Autoconsumption*	12.1	12.3	+1.5 %	2.7 %

* Generation auto consumed by the industrial sites.

The growth of the consumption of the end customers connected to the RTE network comes from the extractions of the energy sector's main customers whose increase in 2007 comes after the decrease recorded the previous year.

The drop of the consumption of the end customers connected to the distribution networks, following the contrasted weather conditions between 2006 and 2007, compensates the increasing trend of their extractions.

The national consumption adjusted for climatic contingencies reached 480.8 TWh in 2007, 2.2 % higher than in 2006 ; excluding main end customers of the energy sector, it grew by 1.6 %.

Electrical energy balance in France

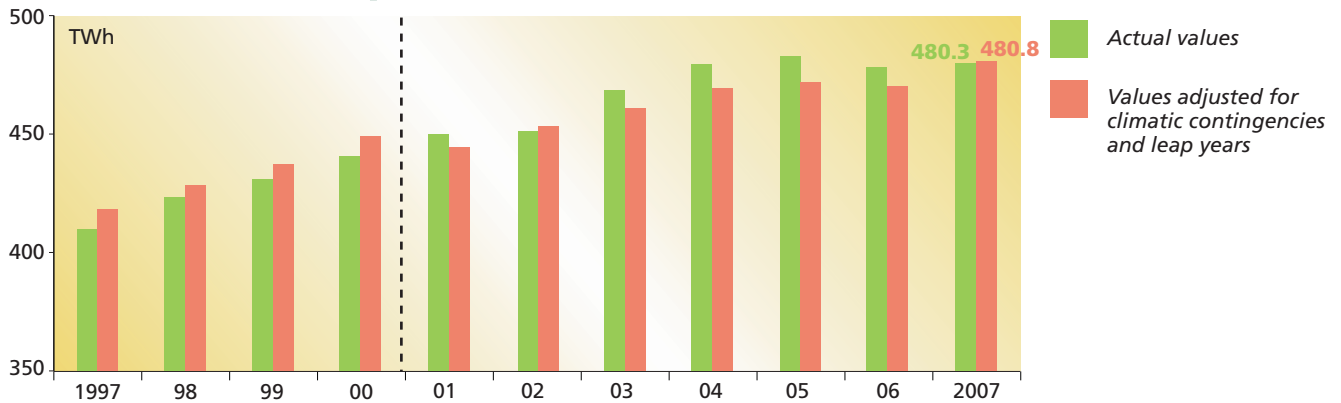
	2006 (TWh)	2007 (TWh)	Variation 2007/2006
National consumption	478.4	480.3	+0.4 %
Energy absorbed for pumping	7.5	7.7	+3.0 %
Balance of physical exchanges (export)	63.2	56.7	-10.3 %
Net generation	549.1	544.7	-0.8 %

Energy generated

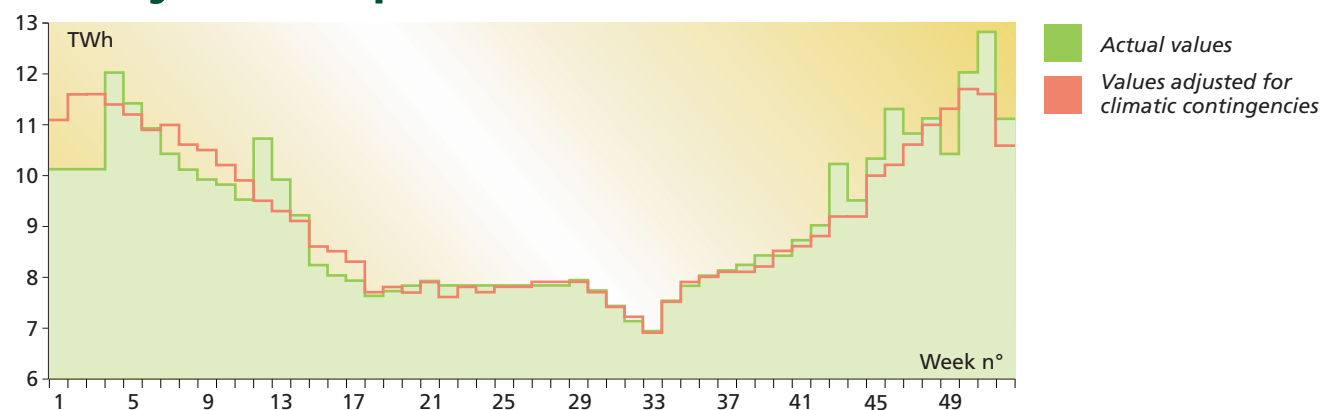
	2006 (TWh)	2007 (TWh)	Variation 2007/2006	Generation share in 2007
Net generation	549.1	544.7	-0.8 %	100.0 %
Nuclear	428.7	418.6	-2.3 %	76.9 %
Conventional thermal	53.8	55.0	+2.2 %	10.1 %
Hydro	61.0	63.2	+3.6 %	11.6 %
Wind	2.3	4.0	+79.4 %	0.7 %
Renewable energy sources but hydro but wind	3.3	3.9	+15.5 %	0.7 %

RTE has put a new reference of normal temperature* in place in 2003, which is applied retroactively to results after 1st January 2001 in its publication.

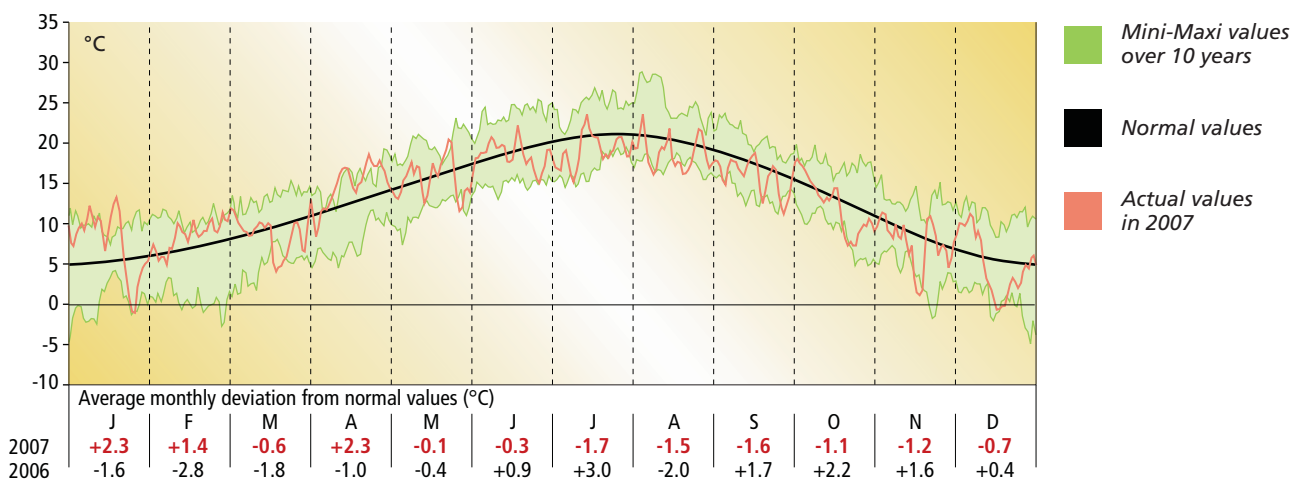
Annual consumption



Weekly consumption in 2007



Temperature*



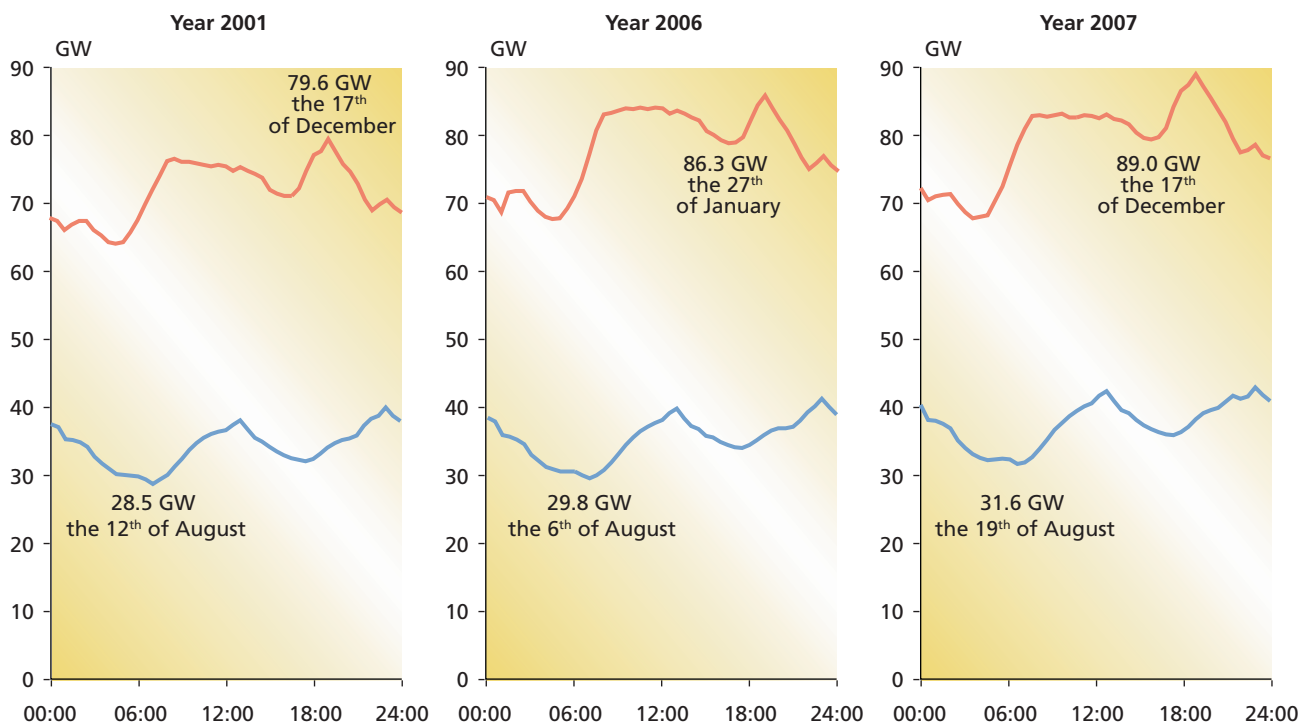
* Internal references drawn up on the basis of METEO-FRANCE data.

Daily consumption

These values reflect all of the electricity flows in Metropolitan France excluding Corsica.

	2001		2006		2007		Winter 2006/2007	
Daily noteworthy data								
Energy (GWh)								
Maximum	1 733	On Dec., the 18 th	1 885	On Jan., the 27 th	1 932	On Dec., the 19 th	1 864	On Jan., the 26 th
Minimum	817	On Aug., the 12 th	856	On Aug., the 6 th	899	On Aug., the 19 th		
Demand (GW)								
Maximum	79,6	On Dec., the 17 th	86,3	On Jan., the 27 th	89,0	On Dec., the 17 th	86,3	On Jan., the 25 th
Minimum	28,5	On Aug., the 12 th	29,8	On Aug., the 6 th	31,6	On Aug., the 19 th		

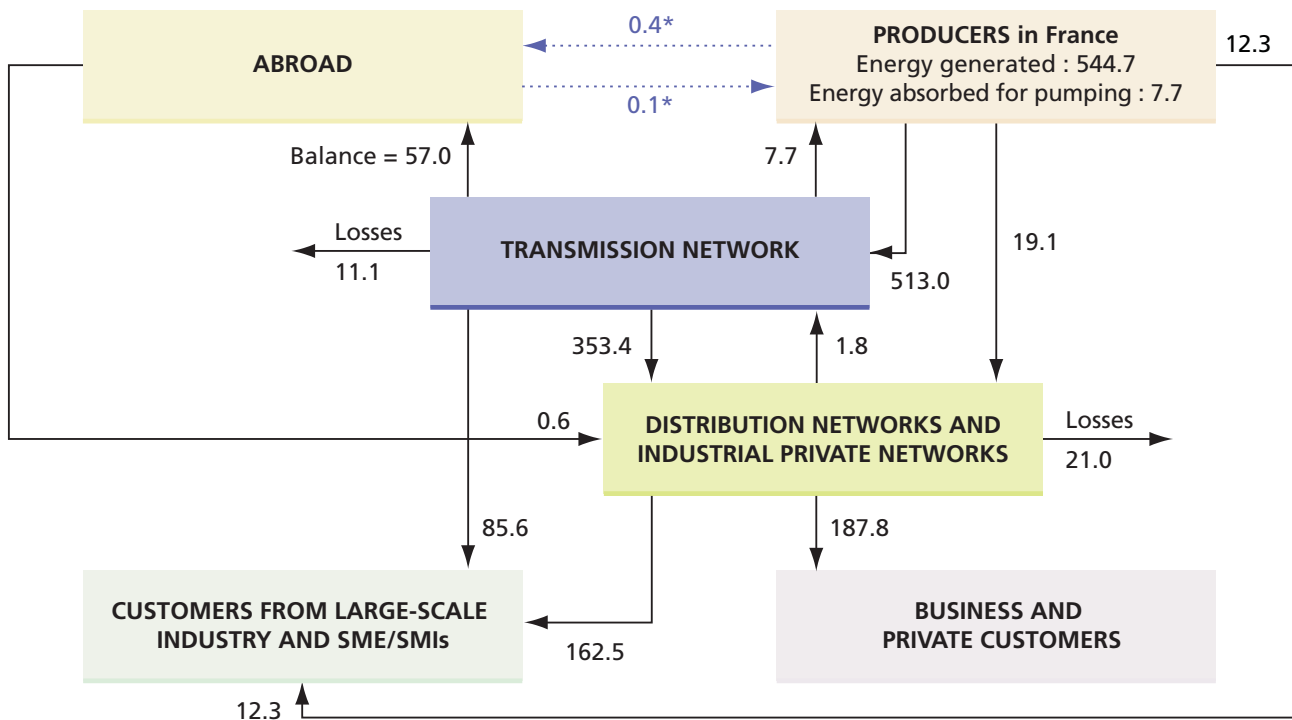
Daily load curve for the peak and off-peak day in capacity terms of the years 2001, 2006 and 2007.



End consumption by type of customer

	2007 (TWh)	Variation 2007/2006	Share in consumption
■ Large-scale Industry and SME/SMIs	260.4	+0.9 %	58.1 %
■ Business and private customers	187.8	-0.6 %	41.9 %
■ TOTAL	448.2	+0.3 %	100.0 %

Physical flows of electrical energy (expressed in TWh)

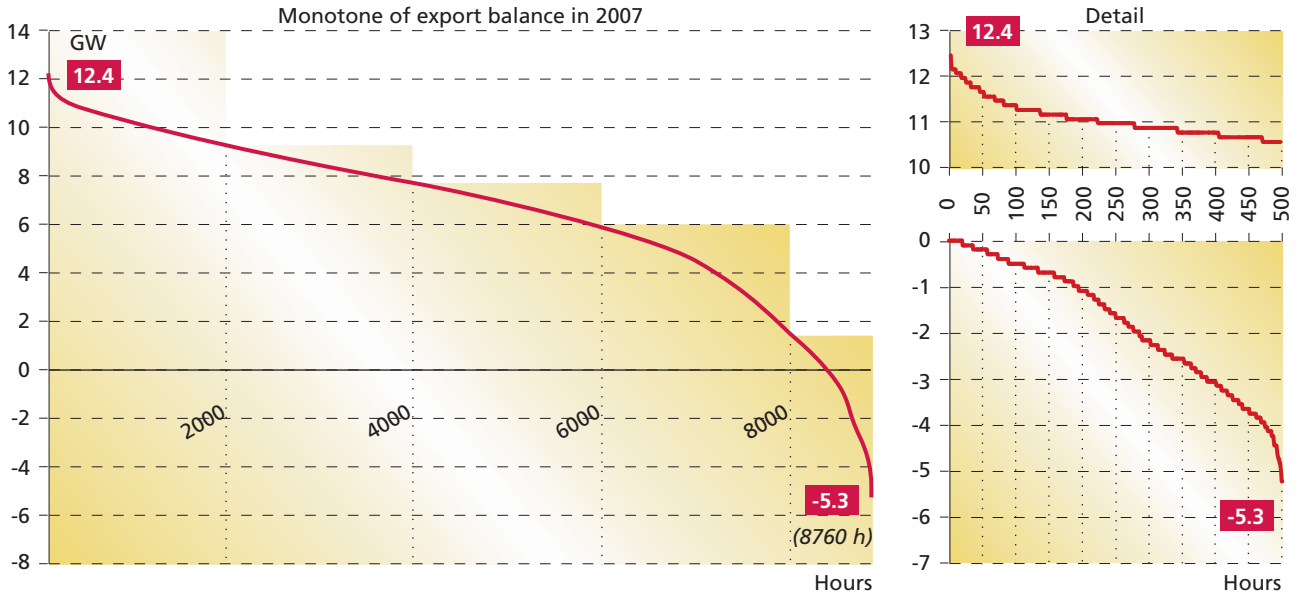
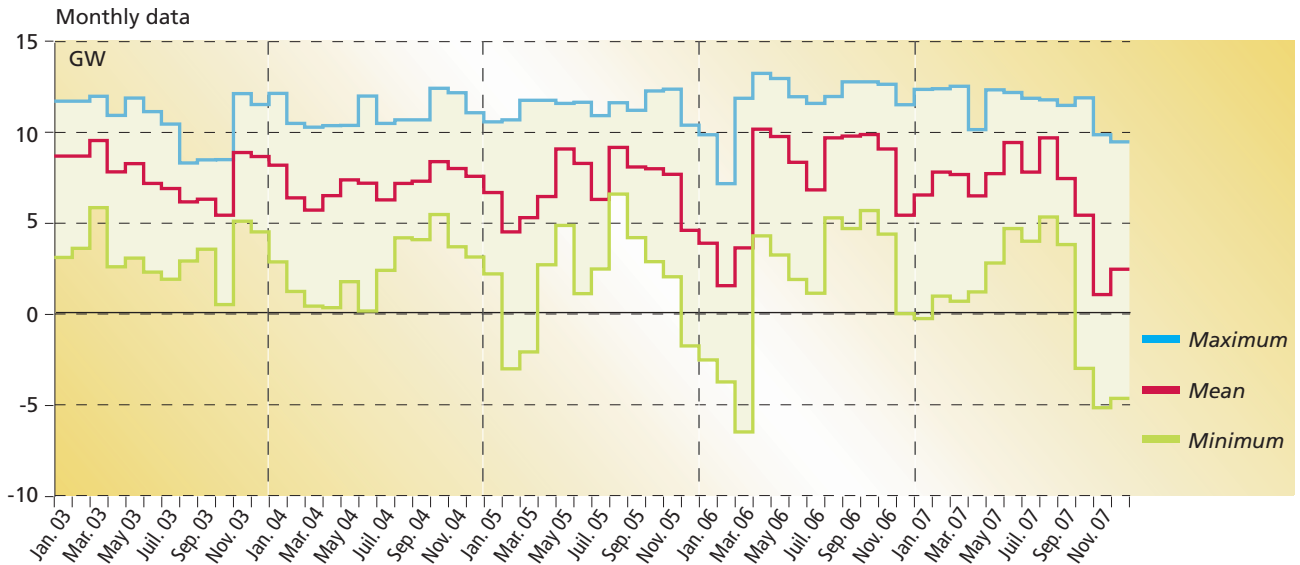


* : water rights (see "Terminology")

The data on this page reflect all of the electricity flows in Metropolitan France excluding Corsica.

Physical exchanges with foreign countries

Export balance in term of demand



Daily data

EXPORT BALANCE IN 2007

	ENERGY (GWh)		DEMAND (GW)	
Minimum	-87	On November, the 14 th	-5.3	On November, the 14 th at 7:30
Mean	157		6.5	
Maximum	277	On June, the 16 th	12.4	On March, the 13 th at 18:00

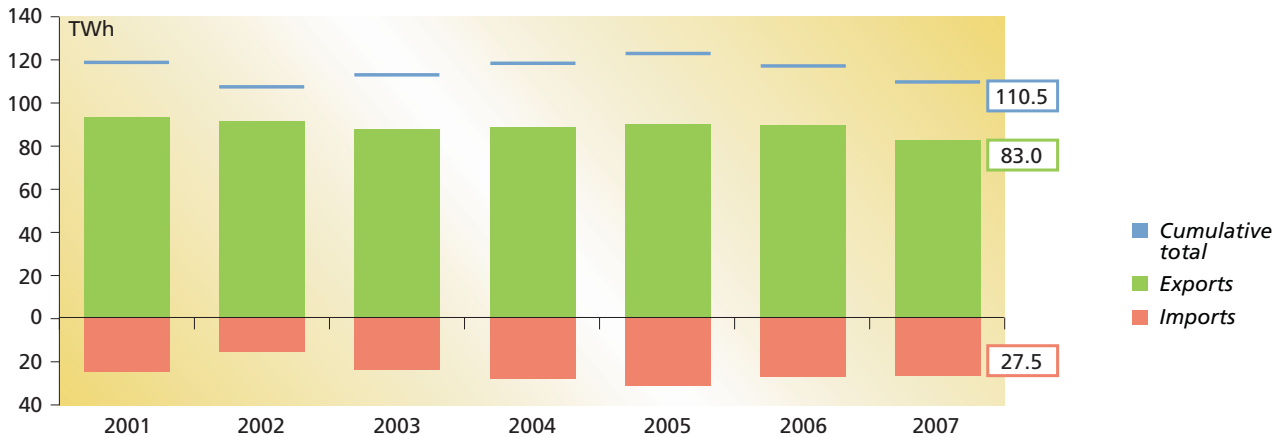
4 Trend of the electricity market

Provisional values

Technical Results French Electricity Supply Industry 2007

Crossborders contractual exchanges

Annual trend



Access to international connections

Number of participation agreements to the Rules for access to the French Public Transmission Network (RPT)
 Number of import transactions
 Number of export transactions

Number as of 31 st December 2007	Variation 2007/2006
108	+42 %
556	+41 %
526	+12 %

Evolution by country

Contractual exchanges	Imports		Exports		Cumulative total		Export balance	
	Energy (TWh)	Variation 2007/2006	Energy (TWh)	Variation 2007/2006	Energy (TWh)	Variation 2007/2006	Energy (TWh)	Variation 2007/2006
Belgium	1.6	↘ -7 %	11.8	↘ -31 %	13.4	↘ -29 %	10.2	↘ -34 %
Germany	16.2	↗ +8 %	8.0	↘ -16 %	24.2	↘ -1 %	-8.2	↗ +49 %
Switzerland	4.4	↘ -28 %	26.1	↘ -1 %	30.5	↘ -6 %	21.7	↗ +7 %
Italy	0.3	↘ -74 %	20.7	↗ +10 %	21.0	↗ +5 %	20.4	↗ +17 %
Spain	1.9	↘ -15 %	7.3	↗ +11 %	9.2	↗ +4 %	5.4	↗ +25 %
Great-Britain	3.1	↗ +98 %	9.1	↘ -21 %	12.2	↘ -6 %	6.0	↘ -39 %
Total	27.5	↘ -2 %	83.0	↘ -8 %	110.5	↘ -6 %	55.5	↘ -10 %

Daily maxima observed in 2007

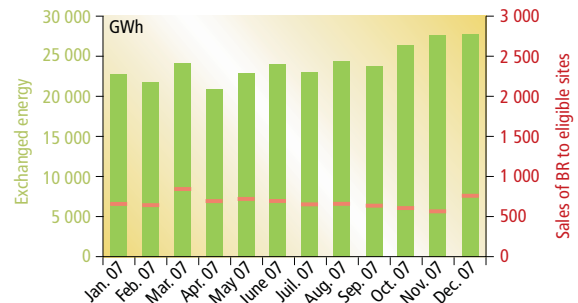
	ENERGY (GWh)		DEMAND (GW)	
Exports	290	On January, the 20 th	14,0	On January, the 16 th at 18:00
Imports	241	On November, the 14 th	11,9	On Nov., the 14 th at 14:00
Cumulative total	392	On November, the 14 th	19,0	On Dec., the 13 th at 13:00

4 Trend of the electricity market

Provisional values

Balance Responsible Entities (BR)

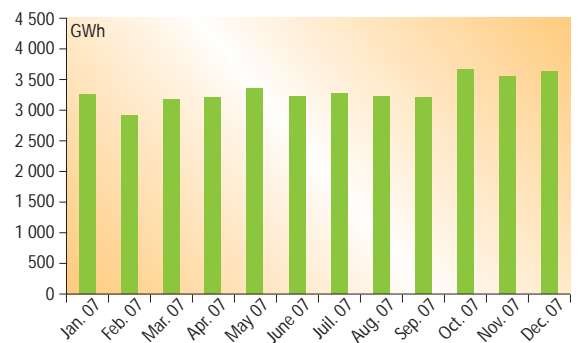
	As of 31 st December 2007	Variation 2007/2006
Number of contracts	122	+24
Number of active Block Exchange Notifications (NEB)	1 936	+31 %
Energy amount exchanged between Balance Responsible Entities through the Block Exchange Notifications (excluding eligible sites)	290 TWh	+7 %
Sales of Balance Responsible Entities to eligible sites	8.1 TWh	+7 %



■ Energy amount exchanged between BR through the NEB (excluding eligible sites)
— Sales of Balance Responsible Entities to eligible sites

Sales of generation capacity auction

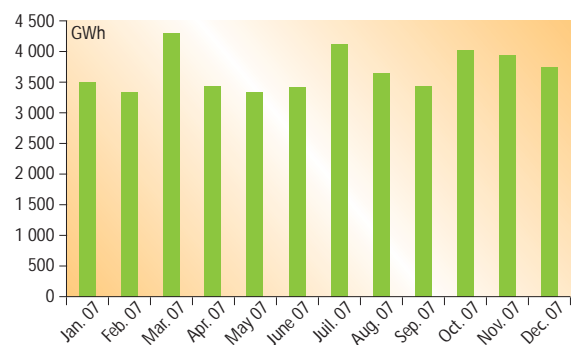
	Energy (TWh)	Variation 2007/2006
Generation capacity auctioned by EDF (Virtual Power Plants)	40	-2 %



Energy sales on Powernext Day-Ahead™ *

	Energy (TWh)	Variation 2007/2006
Day-Ahead™ market	44	+47 %

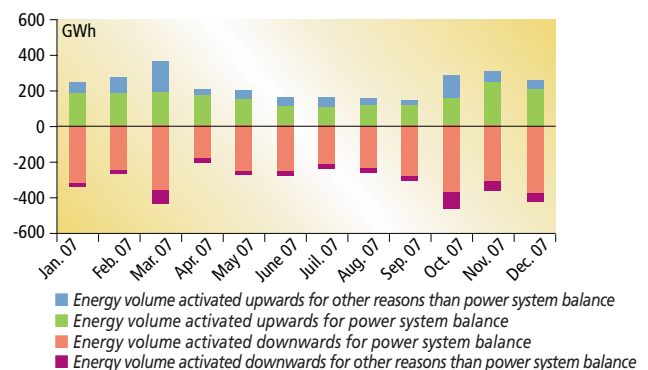
* Source : Powernext



Balancing mechanism

	As of 31 st December 2007	Variation 2007/2006
Number of actors	35	+3
Global amount of energy activated upwards Of which energy volume activated upwards for power system balance*	2.8 TWh 2.0 TWh	-28 % -35 %
Global amount of energy activated downwards Of which energy volume activated downwards for power system balance*	3.8 TWh 3.4 TWh	-3 % -6 %

* The other reasons than power system balance are congestion, reconstitution of margin and system services.



5 Generation in France

Provisional values

Technical Results French Electricity Supply Industry 2007

Installed capacity and generation by type of facility

Type of facility	France				RTE network		
	Maximum capacity	Generation	Share in generation of the technology	Share in total French generation	Maximum capacity	Energy injected on the RTE network	Share of injected energy in total French generation

THERMAL

	GW	TWh			GW	TWh	
Nuclear							
Total	63.3	418.6	88.4 %	76.9 %	63.3	418.6	76.9 %
Conventional thermal							
Coal	7.9	23.2	4.9 %	4.3 %	7.9	23.0	4.2 %
Fuel oil (≥ 250 MW)	6.4	2.4	0.5 %	0.4 %	6.4	2.4	0.4 %
Others	9.8	29.4	6.2 %	5.4 %	6.4	10.6	2.0 %
Total	24.1	55.0	11.6 %	10.1 %	20.7	36.0	6.6 %
Total	87.4	473.6	100.0 %	87.0 %	84.0	454.6	83.5 %

HYDRO

	GW	TWh			GW	TWh	
Run-of-river	7.6	33.3	52.7 %	6.1 %	6.3	28.4	5.2 %
Pondage	4.3	10.7	16.9 %	2.0 %	4.2	10.4	1.9 %
Reservoir installation	9.3	12.6	19.9 %	2.3 %	9.2	12.2	2.3 %
Pumped storage	4.2	6.6	10.5 %	1.2 %	4.2	6.6	1.2 %
Total	25.4	63.2	100.0 %	11.6 %	23.9	57.6	10.6 %

Renewable energy sources but hydro

	GW	TWh			GW	TWh	
Wind	2.2	4.0	50.6 %	0.7 %			
Others sources	0.9	3.9	49.4 %	0.7 %			
Total	3.1	7.9	100.0 %	1.4 %	0.4	0.8	0.1 %

Equipment in operation as of 31st December

		France		RTE	
		2007	Variation 2007/2006	2007	Variation 2007/2006
TRANSMISSION NETWORK					
HVA/HVB Transmission lines					
Circuit length	400 kV	21 130 km	+0.4 %	21 090 km	+0.4 %
	225 kV	26 510 km	-0.3 %	26 320 km	-0.3 %
	150, 90, 63 and 45 kV	58 290 km	-0.1 %	52 490 km	-0.1 %
Network transformers					
Nominal capacity	400 kV	128 540 MVA	+2.4 %	123 690 MVA	+2.5 %
	225 kV	123 210 MVA	+0.1 %	83 560 MVA	+0.2 %
DISTRIBUTION NETWORK					
Lines					
Circuit length	HVA	634 700 km	+0.6 %		
	LV	706 000 km	+0.7 %		

(1) Part of buried lines

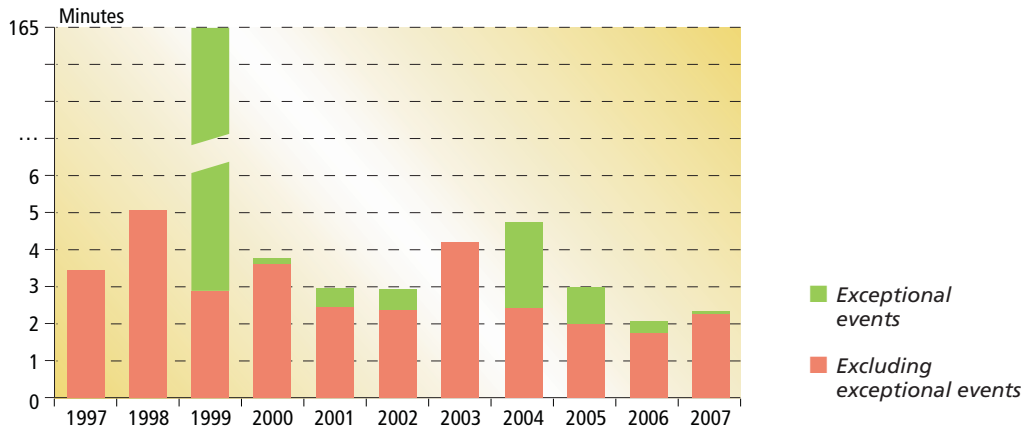
MAIN TRANSMISSION FACILITIES COMMISSIONED IN 2007

- 13 new substations connected to the RTE network, including 1 at 400 kV (Montagny-les-Lanches), 6 at 225 kV (Lagafière, Richier, Savigny, Suisse, Terres-Noires, Trith-Saint-Léger), and 6 at 63 kV.
- At 400 kV, 203 km of new or refurbished circuits (combined with 93 km of removed installations and various modifications) including:
 - As part of the work to strengthen the electrical connection between Lyon and Chambéry, the overhead lines at 400 kV Le Chaffard – Grande Ile 1 and 2 ;
 - The 400 kV line St Avold – Vigy, first section of the new double circuit line between Marlenheim (near to Strasbourg) and Vigy (near to Metz).
- At 225 kV, 90 km of new or refurbished circuits (combined with 83 km of removed installations and various modifications) including:
 - The overhead interconnection line Chooz-Monceau in replacement of the ancient line Chooz – Jamiolle, after the commissioning of a phase-shifting transformer in Belgium at the substation of Monceau in order to facilitate the exchange of electrical energy between France and Belgium ;
 - The overhead lines Mambelin – Pusy, in the Doubs and Haute-Saône departments, and Compiègne – Latena in the Oise department, after the replacement of the conductors ;
 - The underground line Croix-rouse - Charpenay in the Rhône department, after reconstruction.

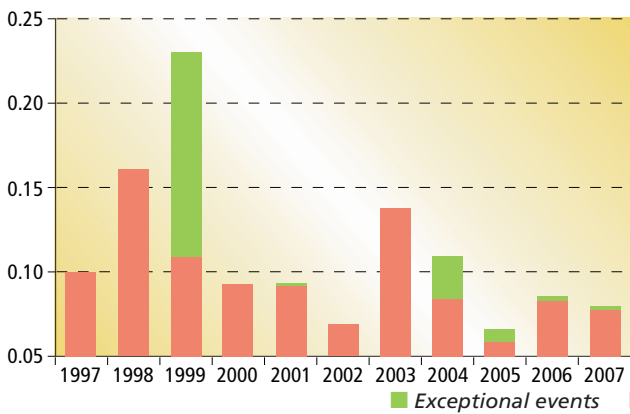
Network owned by RTE : new or refurbished circuits in 2007

Circuit length	km
400 kV	203
225 kV	90
150, 90, 63 and 45 kV	185

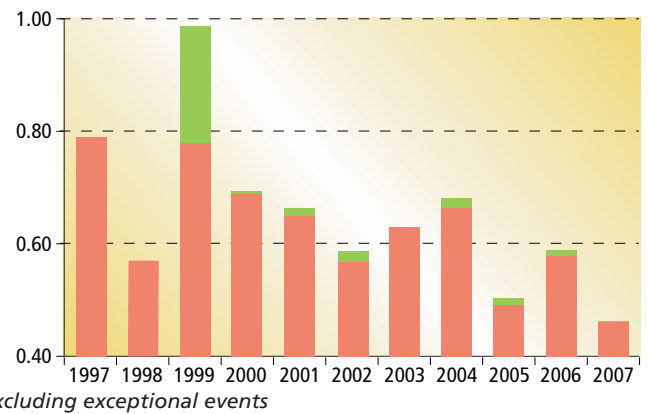
Equivalent time of interruption*



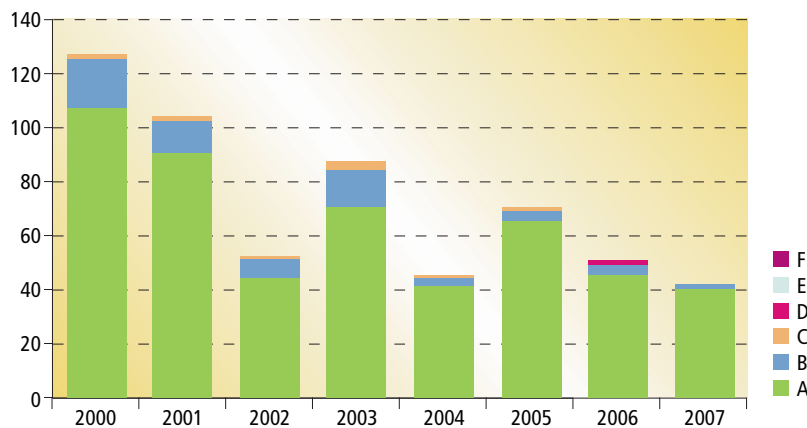
Long outage frequency



Short outage frequency



Number of annual Significant System Events (SSE) by severity



* To be noted, by agreement, the consequences of load shedding are not taken into account in this indicator's calculation.

Network 400 kV



Facilities in France at year-end

Year	Maximum capacity					Transmission		Daily Results	
	Nuclear MW	Conventional thermal ⁽¹⁾ MW	Renewable energy sources but hydro but wind		Hydro MW	225 kV 400 kV km of circuits	Maximum demand GW	Maximum energy GWh	
			Wind MW	Hydro MW					
1992	57 675	22 477			25 097	25 740	20 205	64.0	1 428
1993	59 020	23 460			25 165	25 851	20 295	70.0	1 522
1994	58 515	23 483			25 231	26 021	20 338	66.9	1 452
1995	58 515	23 869			25 227	26 063	20 554	66.8	1 461
1996	59 970	26 109			25 314	26 075	20 782	69.6	1 500
1997	62 875	26 203			25 329	26 206	20 866	68.9	1 518
1998	61 733	25 857			25 335	26 378	20 892	69.0	1 502
1999	63 183	26 213			25 355	26 320	20 892	71.9	1 568
2000	63 183	26 799			25 356	26 325	20 888	72.4	1 559
2001	63 183	26 763	441	94	25 366	26 299	20 917	79.6	1 733
2002	63 273	26 783	503	131	25 475	26 476	20 904	79.7	1 719
2003	63 363	26 354	667	219	25 372	26 440	21 004	83.5	1 833
2004	63 363	26 901	772	393	25 421	26 441	21 043	81.4	1 764
2005	63 260	25 354	927	752	25 451	26 506	21 051	86.0	1 874
2006	63 260	24 578	1 051	1 496	25 544	26 581	21 056	86.3	1 885
2007*	63 300	24 100	900	2 200	25 400	26 510	21 130	89.0	1 932

Annual results in France

Year	Net generation					Balance of physical exchanges (export)	Energy absorbed for pumping	National consumption	Variation over prior year	End consumption		
	Nuclear GWh	Conventional thermal (1) GWh	Renewable energy sources but hydro but wind		Hydro GWh					Large-scale Industry and SME/SMIs GWh	Business and private customers GWh	Total GWh
			Wind GWh	Hydro GWh								
1992	321 780	48 149			72 218	53 796	5 005	383 346	+2.1 %	213 462	142 412	355 874
1993	350 046	32 916			67 621	61 430	4 187	384 966	+0.4 %	211 048	145 140	356 188
1994	341 616	32 254			80 606	63 168	3 102	388 206	+0.8 %	219 233	140 570	359 803
1995	358 779	36 802			75 790	69 841	4 230	397 300	+2.3 %	222 360	145 527	367 887
1996	378 225	41 681			69 933	68 811	5 836	415 192	+4.5 %	230 906	153 275	384 181
1997	375 935	37 781			67 227	65 396	5 237	410 310	-1.2 %	234 131	147 487	381 618
1998	368 500	52 660			65 795	57 562	5 556	423 837	+3.3 %	238 475	154 832	393 307
1999	374 914	48 698			76 694	63 143	6 298	430 865	+1.7 %	243 815	157 222	401 037
2000	395 200	49 879			71 593	69 479	6 604	440 589	+2.3 %	250 920	159 747	410 667
2001	399 585	44 790	2 214	130	77 310	68 390	5 735	449 904	+2.1 %	253 525	166 354	419 879
2002	415 515	51 581	2 722	268	65 453	77 034	7 388	451 117	+0.3 %	255 426	165 007	420 433
2003	419 814	54 865	2 726	390	64 327	66 414	7 322	468 386	+3.8 %	261 863	175 144	437 007
2004	426 883	53 594	3 269	605	64 371	61 864	7 290	479 568	+2.4 %	266 381	182 269	448 650
2005	429 978	59 650	3 337	985	56 179	60 329	6 590	483 210	+0.8 %	265 835	185 667	451 502
2006	428 665	53 848	3 345	2 257	60 987	63 258	7 461	478 383	-1.0 %	258 093	188 916	447 009
2007*	418 600	55 000	3 900	4 000	63 200	56 700	7 700	480 300	+0.4 %	260 400	187 800	448 200

(1) By agreement, includes the renewable energy sources but hydro until 2000.

* Provisional values

Energy data of UCTE countries in 2006

	National consumption TWh	Net generation TWh	Physical exchanges balance ⁽¹⁾ TWh	
Germany (DE)	559.1	587.8	19.8	E
Austria (AT)	66.5	63.0	6.8	I
Belgium (BE)	89.9	81.4	10.2	I
Bosnia-Herzegovina (BA)	11.1	13.3	2.2	E
Bulgaria (BG)	35.7	43.9	7.8	E
Croatia (HR)	16.8	11.4	5.6	I
Spain (ES)	259.7	268.2	3.3	E
France (FR)	478.4	549.1	63.3	E
Greece (GR)	54.0	50.4	4.2	I
Hungary (HU)	40.6	33.4	7.2	I
Italy (IT)	337.8	301.5	44.9	I
Luxembourg (LU)	6.6	4.2	3.5	I
Macedonia / FYROM (MK)	8.4	6.6	1.8	I
The Netherlands (NL)	116.2	94.7	21.5	I
Poland (PL)	136.5	148.9	11.0	E
Portugal (PT)	50.7	46.0	5.4	I
Slovak Republic (SK)	27.2	29.0	1.6	E
Czech Republic (CZ)	64.3	77.9	12.6	E
Romania (RO)	53.0	57.4	4.3	E
Serbia and Montenegro (CS)	42.3	41.2	1.8	I
Slovenia (SI)	13.3	13.1	0.2	I
Switzerland (CH)	63.2	62.1	3.8	I

Source : UCTE "Statistical Yearbook 2006" – Values as of 15th August 2007 but France (FR) definitive values.

The above data refer to the national values (representativity = 100%)

(1) E = Export balance ; I = Import balance

Terminology

Technical Results French Electricity Supply Industry 2007

■ National consumption

"National consumption" is the total of all the electrical energy supplied for consumption in France (thermal, hydro, wind and other renewable energy sources generation + imports - exports - pumping) and which has been consumed by the end-users as well as by losses in the transmission and distribution networks (*including Corsica, but not the French Overseas Departments*).

■ Exchanges

Physical exchanges with foreign countries cover:

- the total of instantaneous exchange balances measured by the metering equipment on each interconnection line,
- compensation trade corresponding to hydro generation sharing from hydro power plants located along a border waterway or river, also called "Compensation trade of water rights" (*the output of these power plants must be registered, regardless of the location of the generating facilities, for the shares apportioned to each country, in the generation statistics of the countries concerned ; the national electrical energy balance is reached through compensation trade.*)

The exchanges with foreign countries, as viewed by RTE, take into account only physical exchanges measured at the frontiers, without allowance for water rights.

Crossborder contractual exchanges comprise all contracts managed by RTE.

■ Generation

The "net generation" is calculated at the power plant outlet terminals and consequently implies deduction of energy consumed by auxiliary services and losses in the main transformers of these power plants. This factor is more commonly known as "Generation".

■ Hydro power facilities

There are four categories of hydroelectric heads: run-of-river, pondage, reservoir installations and pumped storage, depending on the way in which each power plant is operated and according to the filling period of the reservoir which directly supplies each head. The filling time, D , is the quotient of the useful water capacity of the reservoir divided by the average flow rate of the waterway(s) which feed it. Where: run-of-river: $D \leq 2$ h, pondage : $2 \text{ h} < D < 400$ h, reservoir: $D \geq 400$ h.

■ Significant System Event (SSE)

The non-conformity of a facility or of a parameter to the operating conditions results in the declaration of a significant system event as soon as it has an effect, or might have had an effect, on the operating safety of the power system. Significant system events are ranked according to a severity level ranging from 0 (not very serious), then from A to F, by ascending level of seriousness.

■ Outage frequency

The outage frequency is calculated, for a given period, as the ratio between the number of long or short outages recorded at the points where RTE delivers energy to its customers, industrial customers or distributors, and the number of sites supplied.

■ Circuit length

The "length of an electrical energy transmission circuit" is the actual length of one of any constituent conductors, or the average length of these conductors if they are notably of different lengths. Only circuits in operation, that is to say energized, are taken into account.

■ Balancing mechanism

Through a bidding system (offering either higher or lower prices) the players of the balancing mechanism communicate the technical and financial

conditions on the basis of which RTE can modify their generation, consumption or exchange programmes. RTE ensures a balance between electricity consumption and generation in real time by selecting offers, after having ranked them according to a merit order criterion and by taking into account the technical constraints expressed by the partners.

■ Generating facilities: characteristics

Maximum capacity (thermal):

This is the sum of the "net maximum capacity" which could be generated by each power plant in continuous operation over an extended period of service, assuming that all main and auxiliary facilities of the plant are in working order and assuming optimum fuel and feedwater supply conditions.

Maximum capacity (hydro):

The "maximum electrical capacity of a hydroelectric head" is the maximum continuous electrical capacity of the head over an extended period (*usually at least 4 hours*), which allows normal operation for the exclusive generation of active power, assuming that all facilities are fully in working order and that optimum flow and net head conditions have been reached.

Renewable energy sources but hydro

The designation **Renewable energy sources but hydro** includes all installations that generate electricity from renewable energy sources - Wind, Household Waste Incineration Plants, paper industry waste, etc - in the sense of Directive 2001/77/CE of the European Parliament, dated 27th September 2001, with the exception of hydro-electric generation installations which are dealt separately.

■ Balance Responsible Entity (BR)

Legal entity committed to RTE, through a Balance Responsible contract, to settling the costs of the imbalances observed a posteriori, on behalf of one or more network users attached to its scope. These imbalances result from the difference between all of the supplies and the consumption for which they are responsible. Through Base Load Block Exchange Notifications (NEB), a Balance Responsible Entity can exchange base load energy blocks with another Balance Responsible Entity or supply part of the eligible sites belonging to a scope other than its own.

■ French Public Transmission Network (RPT)

Power transmission and transforming network between generation sites and consumption sites. It is made up of the main and interconnection network (*400 kV and 225 kV*) and the regional distribution networks (*225 kV, 90 kV and 63 kV*).

■ Equivalent time of interruption (TCE)

The equivalent time of interruption is equal to non-distributed energy due to customer supply outages compared with the average annual power that RTE delivers to its customers. By agreement, this indicator takes into account supply outages ascribable to RTE, except consequences of load shedding during non-normal load conditions.

■ Virtual Power Plants (VPP)

The Virtual Power Plants are generation capacities in France, which are auctioned by EDF and which represent rights to nominate electricity output for delivery on the following day on the high voltage grid at a pre-defined price.

Units

kV = kilovolt (*voltage*)

kW = kilowatt (*capacity*)

kWh = kilowatt-hour (*energy*)

MWh = Thousand of kWh

GWh = Million de kWh

TWh = Billion of kWh

LV : voltage ≤ 1 kV

HVA : $1 \text{ kV} < \text{voltage} \leq 50 \text{ kV}$

HVB : $50 \text{ kV} < \text{voltage} \leq 500 \text{ kV}$

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CENTRE D'INFORMATION DU RÉSEAU
ÉLECTRIQUE FRANÇAIS

1, terrasse Bellini
TSA 41000
92919 La Défense Cedex

www.rte-france.com