the Spanish electricity system

preliminary report

2011

RED ELÉCTRICA DE ESPAÑA

Drafting date: 4 January 2012 (Provisional data).

the Spanish electricity system

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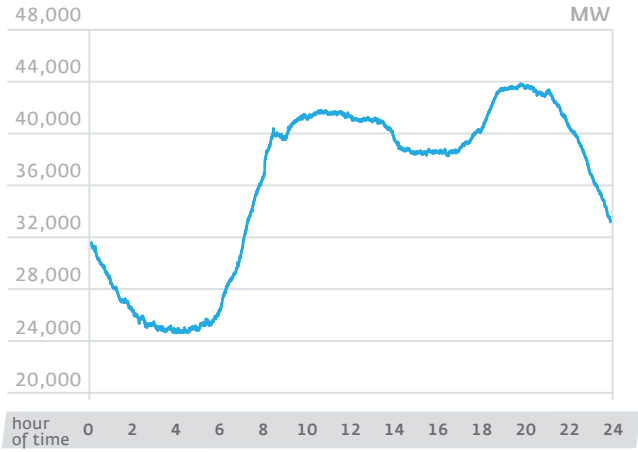
2011

Load curve of the maximum demand day january 24 th



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Introduction

Presented within this preliminary report is the provisional statistical data regarding the behaviour of the Spanish electricity system during 2011.

Peninsular system

Annual demand for electrical energy on the Spanish peninsula, after factoring in seasonal and working patterns, fell 1.2 % with respect to the previous year. The figure before factoring in these effects was 2.1 %. This drop in electricity consumption meant that the volume of demand at year end was 255,179 GWh, a value similar to that reached in 2006.

The **yearly maximums for hourly average power demand** and daily energy demand were reached on 24 and 25 January with 44,107 MW and 12 January with 884 GWh respectively. Both values were 1.7 % and 2.5 % lower when compared to the historical maximums recorded in 2007.

Installed power capacity grew by 1,879 MW, meaning that the total generation capacity at year end was 100,576 MW (1.9 % up on the previous year). The large majority of this increase in power (93 %) comes from the new renewable facilities, mainly wind power (997 MW) and solar (674 MW).

Producible hydroelectric energy reached 22,954 GWh, 18 % lower than the average historical value and 37 % less than that recorded in 2010 (a year which was noteworthy for increased hydraulicity). The hydroelectric reserves in the set of reservoirs as a whole finished the year at 54 % of their total capacity, compared to 66 % the previous year.

With regard to **the production mix**, the majority of the technologies have registered falls in production compared to last year, with significant drops in hydroelectric (28 %) and combined cycle (22 %). On the other hand, coal-fired power stations doubled their generation with respect to 2010 and photovoltaic and thermoelectric technologies increased by 26 % and 193 % respectively.

Regarding **demand coverage**, nuclear was at the forefront covering 21 % of the demand (22 % in 2010), followed by combined cycle providing 19 % (23 % in 2010). In third place was wind power with16 % maintaining the same percentage as the previous year, coal increased its contribution to 15 % (8 % in 2010) and hydroelectric fell to 11 % (16 % in 2010). The remaining technologies maintained a contribution similar to that of the previous year.

As a whole, **renewable energies** covered 33 % of the demand, 3 percentage points down on last year, due mainly to the reduced generation of hydroelectric energy.

During 2011, **the amount of wind recorded** (wind factor), or available wind, was notably lower than in 2010, within the relatively narrow margins of variability of this technology in terms of calculating the annual energy produced. This has meant that during 2011 the maximum production values did not reach those levels recorded the previous year. Nevertheless, on 6 November 2011 at 2:00 am, a new record was registered for demand coverage by wind power energy (59 % compared to the previous value of 54 %), with an important wind power production coinciding with a low demand and a significant export balance.

Introduction

The increase in generation from coal and the lower production by other energy sources (hydroelectric, wind power and nuclear) have given rise to an upturn in CO2 emissions from the electricity sector that has been estimated for 2011 at 73 million tonnes, 25 % more than last year.

The balance of **international exchanges** was as an exporter, with 6,105 GWh, 27 % less than in 2010. This decrease is due to increased imports through the interconnection with France that, after being classed as an exporter for the first time in 2010, have led the net exchange balance for this interconnection to return to that of an importer with a value of 1,189 GWh in 2011.

With respect to the **transmission infrastructures**, 1,705 km of circuit were commissioned during 2011, of which 1,446 km correspond to the peninsular system. This increase raises, at year end, the number of kilometres of circuit of the peninsular transmission grid to 37,395 km and the national grid to 40,233 km. Noteworthy amongst the infrastructures commissioned is the 488 km electricity link between the Spanish peninsula and the Balearic Islands. This link is the first submarine transmission interconnection using direct current that exists in Spain.

Extra-peninsular systems

The annual demand for electrical energy in the extra-peninsular systems maintained the same levels as the previous year, with a joint growth of just 0.1 % (Canary Islands grew 1 % and Melilla 0.5 %, while the Balearic Islands and Ceuta registered a fall of 1.1 % and 5.9 %, respectively).

1 Electricity balance, installed power capacity and transmission grid

Annual electric power balance

	Peninsular system		Extra-peninsular systems		National total	
	GWh	% 11/10	GWh	% 11/10	GWh	% 11/10
Hydro	27,650	-28.5	0	-	27,650	-28.5
Nuclear	57,670	-7.0	-	-	57,670	-7.0
Coal(1)	43,426	96.5	3,002	-11.2	46,427	82.2
Fuel / gas(2)	0	-	7,491	-3.1	7,491	-21.6
Combined cycle	50,619	-21.6	4,455	11.6	55,074	-19.7
Gross production	**179,364**	**-5.2**	**14,948**	**-1.0**	**194,311**	**-4.9**
Self-consumption	-7,186	7.7	-857	-4.7	-8,043	6.2
Special regime	**92,352**	**1.6**	**1,091**	**13.3**	**93,443**	**1.7**
Hydro	5,155	-24.3	1	-	5,156	-24.3
Wind	41,661	-3.9	399	18.8	42,060	-3.7
Solar photovoltaic	7,569	25.6	343	20.7	7,912	25.4
Solar thermoelectric	2,029	193.4	-	-	2,029	193.4
Renewable thermal	4,336	-13.0	304	-9.0	4,640	-12.7
Non-renewable thermal	31,603	8.8	43	418.6	31,646	9.0
Net production	**264,529**	**-3.2**	**15,182**	**0.1**	**279,711**	**-3.1**
Pumped storage consumption	-3,245	-27.2	-	-	-3,245	-27.2
International exchanges(3)	-6,105	-26.7	-	-	-6,105	-26.7
Demanda (b.c.)	**255,179**	**-2.1**	**15,182**	**0.1**	**270,361**	**-2.0**

(1) As of 1 January 2011 includes GICC (Elcogás). According to Royal Decree 134/2010 this power station is obliged to participate, as a selling unit that uses coal mined locally as fuel, in the restriction resolution process to guarantee supply. **(2)** Generation with auxiliary generator units is included in the Balearic electricity system. **(3)** Positive value: importer balance; negative value: exporter balance.

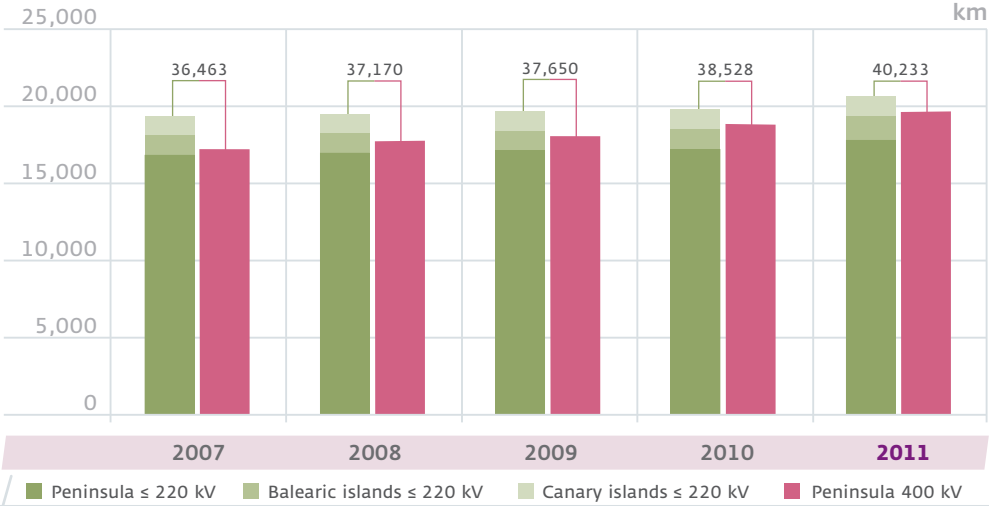
Installed capacity as at 31 December

	Peninsular system		Extra-peninsular systems		National total	
	MW	% 11/10	MW	% 11/10	MW	% 11/10
Hydro	17,537	0.0	1	0.0	17,538	0.0
Nuclear	7,777	0.0	-	-	7,777	0.0
Coal(1)	11,700	2.8	510	0.0	12,210	2.7
Fuel / gas	2,540	-11.2	2,885	0.8	5,425	-5.2
Combined cycle	25,269	0.1	1,854	-0.5	27,123	0.1
Ordinary regime	**64,824**	**0.1**	**5,250**	**0.2**	**70,074**	**0.1**
Hydro	2,036	0.1	0,5	0.0	2,036	0.1
Wind	20,733	5.1	148	0.0	20,881	5.0
Solar photovoltaic	3,903	7.1	196	7.9	4,099	7.1
Solar thermoelectric	949	78.3	-	-	949	78.3
Renewable thermal	1,062	7.6	80	-31.0	1,142	3.5
Non-renewable thermal	7,071	1.4	44	8.9	7,115	1.4
Special regime	**35,753**	**5.4**	**469**	**-3.7**	**36,221**	**5.3**
Total	**100,576**	**1.9**	**5,719**	**-0.1**	**106,295**	**1.8**

(1) GICC (Elcogás) included.

1 Electricity balance, installed power capacity and transmission grid

Evolution of the Spanish transmission grid



Spanish transmission grid facilities

	400 kV	≤ 220 kV			
	Peninsula	Peninsula	Balearic Isl.	Canary Isl.	Total
Total lines (km)	**19,622**	**17,773**	**1,539**	**1,299**	**40,233**
Overhead lines (km)	19,567	17,235	1,089	1,023	38,914
Submarine cable (km)	29	236	306	15	586
Underground cable (km)	26	302	145	261	733
Transformer capacity (MVA)	71,509	63	2,248	1,375	75,195

Data relating to km of circuit and transformer capacity as at 31 December 2011.

Peninsular system
2.1 Demand

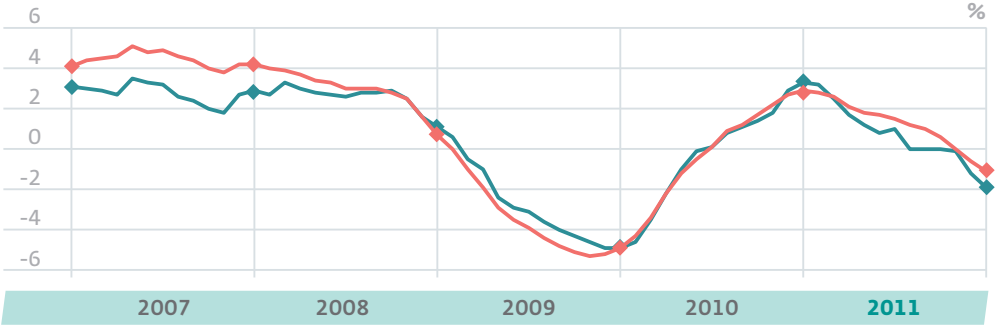
2

Demand evolution

Year	GWh	Δ Annual (%)	Δ Adjusted annual(*) (%)
2007	262,436	2.9	4.2
2008	265,206	1.1	0.7
2009	252,201	-4.9	-4.9
2010	260,608	3.3	2.9
2011	**255,179**	**-2.1**	**-1.2**

(*) Adjusted as a result of factoring in the effects of seasonal and working patterns.

Annual demand growth (rolling year)



Monthly demand growth (%)

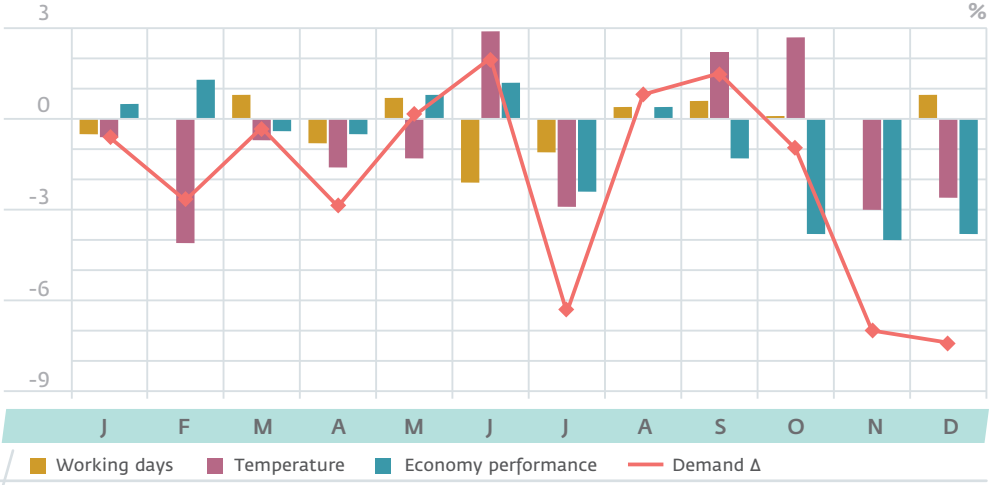
	J	F	M	A	M	J	J	A	S	O	N	D
Monthly	-0.6	-2.7	-0.3	-2.9	0.1	2.0	-6.4	0.8	1.5	-1.0	-7.0	-7.4
Cummulative	-0.6	-1.6	-1.2	-1.6	-1.2	-0.7	-1.6	-1.3	-1.0	-1.0	-1.6	-2.1

Variation as compared to same month of previous year

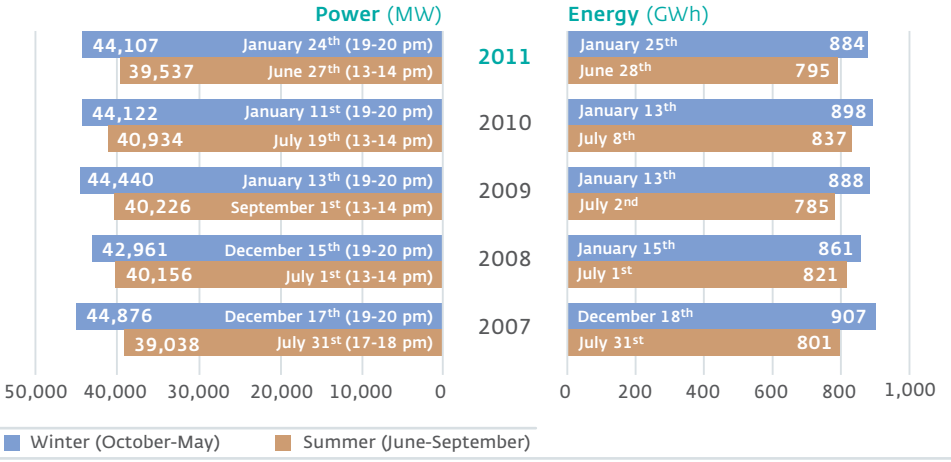
2 Peninsular system

2.1 Demand

Demand growth components



Maximum peak load and maximum daily demand



Peninsular system
2.1 Demand

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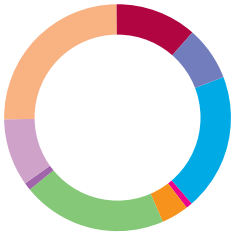
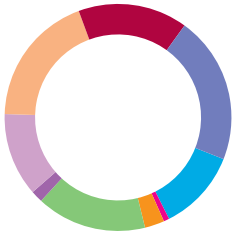
Installed capacity as at 31 December (100,576 MW)



- Combined cycle 25 %
- Coal 12 %
- Nuclear 8 %
- Hydro(1) 19 %
- Solar thermoelectric 1 %
- Solar photovoltaic 4 %
- Wind 21 %
- Renewable thermal 1 %
- Cogeneration and the rest of the technologies(2) 9 %

(1) Includes pure pumped storage (2,747 MW). **(2)** Includes non-renewable thermal and fuel / gas.

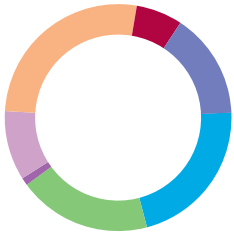
Demand coverage(1)



- Combined cycle 19 %
- Coal 15 %
- Nuclear 21 %
- Hydro(1) 11 %
- Solar thermoelectric 1 %
- Solar photovoltaic 3 %
- Wind 16 %
- Renewable thermal 2 %
- Cogeneration and the rest of the technologies(2) 12 %

(1) Pumped storage not included. **(2)** Includes non-renewable thermal and fuel / gas.

Maximum peak load coverage(1)
44,107 MW January 24 2011 (19-20pm)



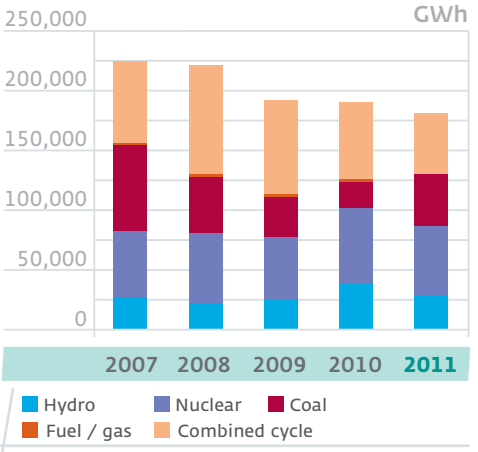
- Combined cycle 27 %
- Coal 7 %
- Nuclear 15 %
- Hydro(1) 21 %
- Wind 19 %
- Renewable thermal 1 %
- Cogeneration and the rest of the technologies(2) 10 %

(1) Pumped storage not included. **(2)** Includes non-renewable thermal and fuel / gas.

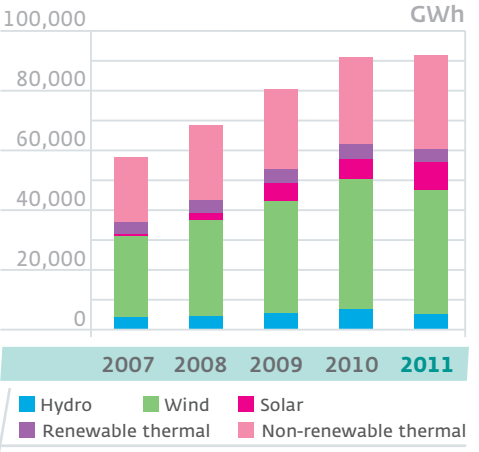
2 Peninsular system

2.1 Demand

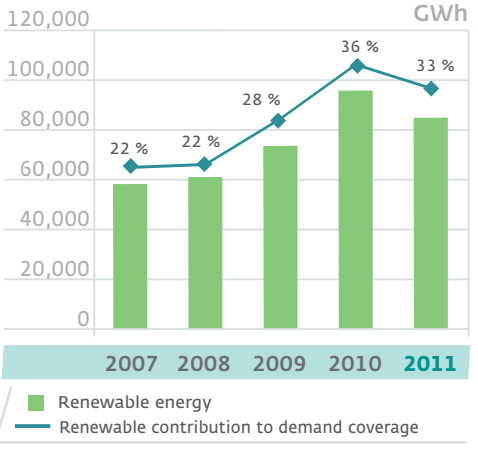
Evolution of gross production from ordinary regime



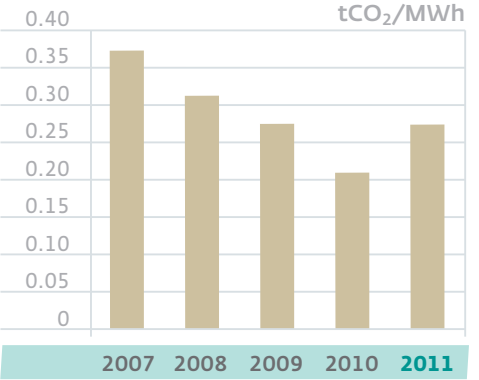
Evolution of special regime production



Evolucion of renewable energies



Evolution of the emission factor associated to electricity generation

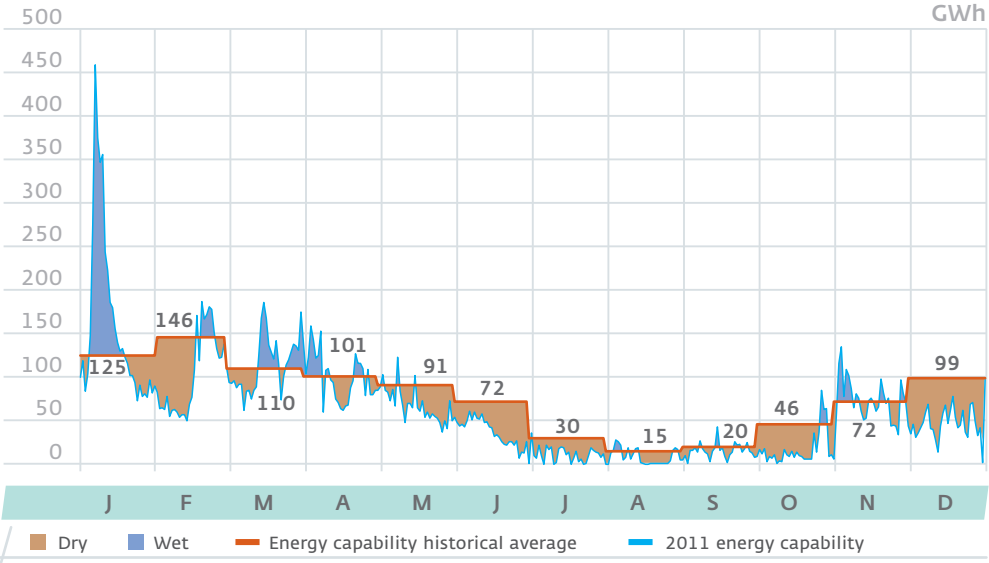


Peninsular system

2.2 Hydroelectric energy

2

Daily energy capability compared to the energy capability average



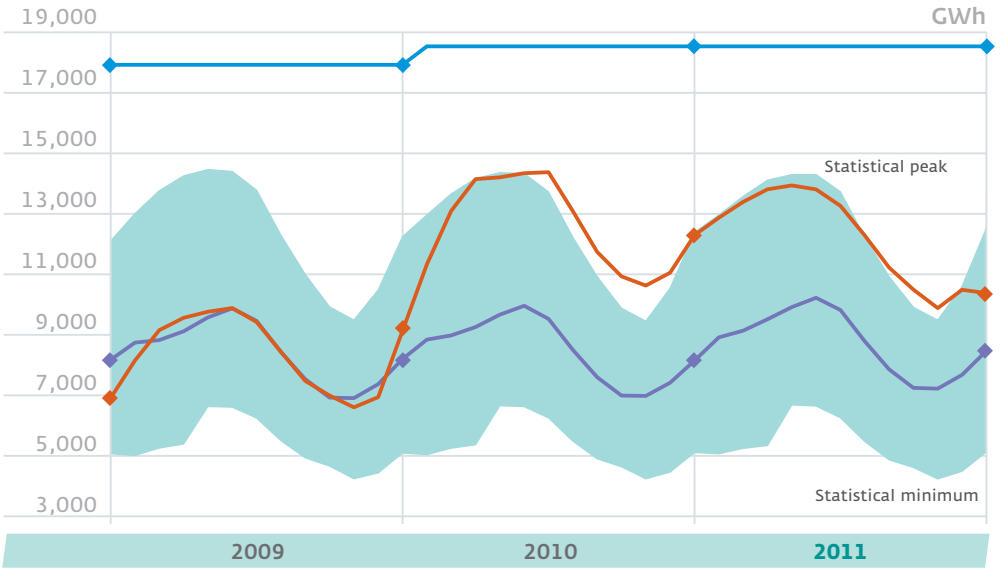
Annual energy capability

Year	GWh	Index	Probability of being exceeded (%)
2007	18,416	0.65	92
2008	18,945	0.67	90
2009	22,262	0.79	76
2010	36,174	1.29	16
2011	**22,954**	**0.82**	**73**

2 Peninsular system

2.2 Hydroelectric energy

Hydroelectric reserves evolution(1)



(1) Maximum, minimum and average reserve statistics calculated for recent years

Hydroelectric reserves as at 31 December

		2010		2011	
	Capacity	GWh	% of maximum capacity	GWh	% of maximum capacity
Annual regime	8,967	5,556	62.0	4,159	46.4
Hyper-annual regime	9,571	6,741	70.4	5,779	60.4
Global	**18,538**	**12,298**	**66.3**	**9,938**	**53.6**

Peninsular system
2.3 Facilities. Generation and transmission

New generation facilities under ordinary operating conditions

	Commissioned		Decommissioned	
	Type	MW	Type	MW
Algeciras 3	Combined cycle	10		
Málaga 1			Combined cycle	20
Puerto de Barcelona 1	Combined cycle	35		
Puerto de Barcelona 2	Combined cycle	10		
TOTAL		**55**		**20**

New 400/220 kV substations

	Voltage kV
Carril	400
Mezquita	400
Palo	400
Silleda	400
Tabernas	400
Amoeiro	220
Baró de Viver	220
Calamocha	220

	Voltage kV
La Solana	220
Los Leones	220
Mezquita	220
Novelda	220
Nudo Viario	220
Santiz	220
Tabernas	220

New 400 kV transmission lines

	No. of circuits	km of circuit
E/S Belinchón L/Morata-Olmedilla	2	6.90
E/S Carril L/Asomada-Litoral	2	2.83
E/S Carril L/El Palmar-Litoral	2	2.90
E/S Palo L/Pesoz-Grado	2	0.30
E/S Silleda L/Cartelle-Puentes G.ª Rodríguez	2	1.71
E/S Tabernas L/Huéneja-Litoral	1	1.31
E/S Udalla L/Abanto-Aguayo	1	1.94
L/Aparecida-Tordesillas	2	353.20
L/Fuendetodos-Mezquita	2	159.68
L/Pesoz-Salas	2	102.14
L/Pesoz-Sanzo	2	2.30
L/Soto-Penagos	1	182.84
L/Vic-Bescanó (3 phase)	1	39.93
TOTAL		**857.98**

New 220 kV transmission lines

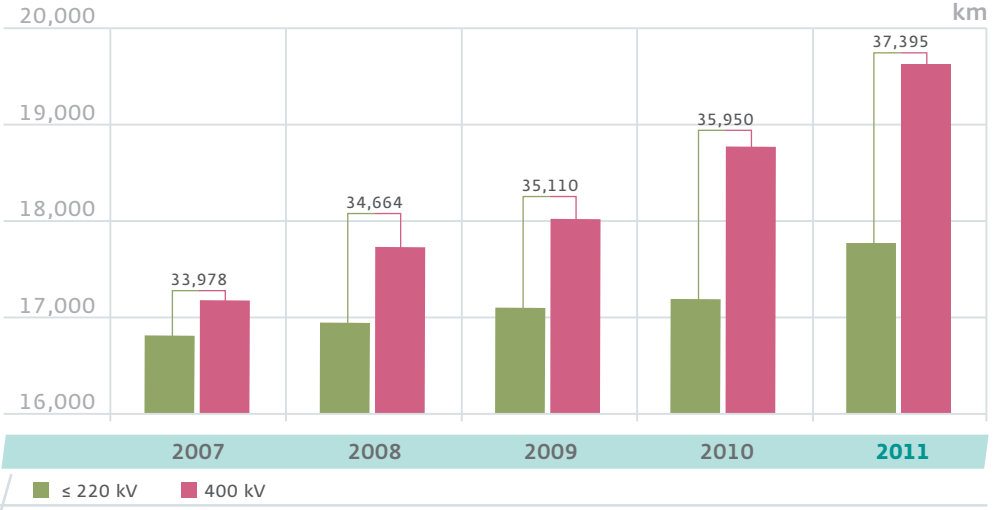
	No. of circuits	km of circuit
E/S Amoeiro L/Chantada-Castrelo	2	0.15
E/S Arenas San Juan L/La Paloma-Madridejos	2	1.36
E/S Beniferri L/Feria de Muestras-Torrente (underground)	2	3.07
E/S Bescanó L/Vic-Juiá	2	2.19
E/S Buenavista L/Moraleja-Retamar (underground)	2	0.12
E/S Cartama L/Alhaurín-Tajo	1	1.64
E/S Cartama L/Ramos-Casares	2	2.58
E/S Cartama L/Alhaurín-Montes	2	19.39
E/S Haro L/Miranda-Laguardia	2	18.11
E/S Illora L/Caparacena-Tajo	2	2.30
E/S Illora L/Atarfe-Tajo	2	2.22
E/S La Solana L/Picón-Puertollano 1	1	0.12
E/S La Solana L/Picón-Puertollano 1 (underground)	1	0.10
E/S La Solana L/Picón-Puertollano 2	2	0.11
E/S La Solana L/Picón-Puertollano 2 (underground)	1	0.07
E/S Montebello L/El Cantalar-Jijona	2	65.68
E/S Montebello L/El Cantalar-Jijona (underground)	2	4.17
E/S Nudo Viario L/Hospitalet-Viladecans	2	1.00
E/S Nudo Viario L/Hospitalet-Viladecans (underground)	2	0.31
E/S Nueva Casares L/Algeciras-Los Ramos	2	12.38
E/S Palencia L/Corcos-Villalbilla	2	7.77
E/S Palencia L/Mudarra-Vallejera	2	12.86
E/S Santiz L/Villalcampo-Villamayor	2	1.32
L/Alvarado-Vaguadas	1	18.15
L/Alvarado-Vaguadas (underground)	1	0.09
L/Arkale-Irún	1	1.03
L/Baró de Viver-Trinitat (underground)	1	0.94
L/Benicull-Bernat (Alcira)	2	14.29
L/Benicull-Bernat (Alcira) (underground)	2	0.45
L/Beniferri-Fuente de San Luis	1	12.96
L/Fuencarral-El Pilar (underground)	2	17.68
L/Jalón-Los Vientos	2	60.77
L/La Solana-Costanilla (underground)	1	0.10
L/Mérida-Vaguadas	1	57.26
L/Mérida-Vaguadas (underground)	1	0.09
L/Morvedre-Santa Ponsa (Morvedre to km 122) (submarine) ±250 kV	2	236.00(*)
L/Morvedre-Santa Ponsa (Morvedre to km 122) (underground) ±250 kV	2	8.00(*)
Fausita: connection between substations (underground)	1	0.28
Fuencarral: connection AT3 to GIS 220	1	0.27
Galapagar: connection between substations (underground)	1	0.17
Torrente: connection between substations (underground)	1	0.26
TOTAL		**587.81**

(*) Of the 488 km of circuit which this link has, half is included in the figures for the Spanish Peninsula and the other half in those of the Balearic Islands.

Peninsular system
2.3 Facilities. Generation and transmission

2

Evolution of the transmission grid



Evolution of the power transmission system

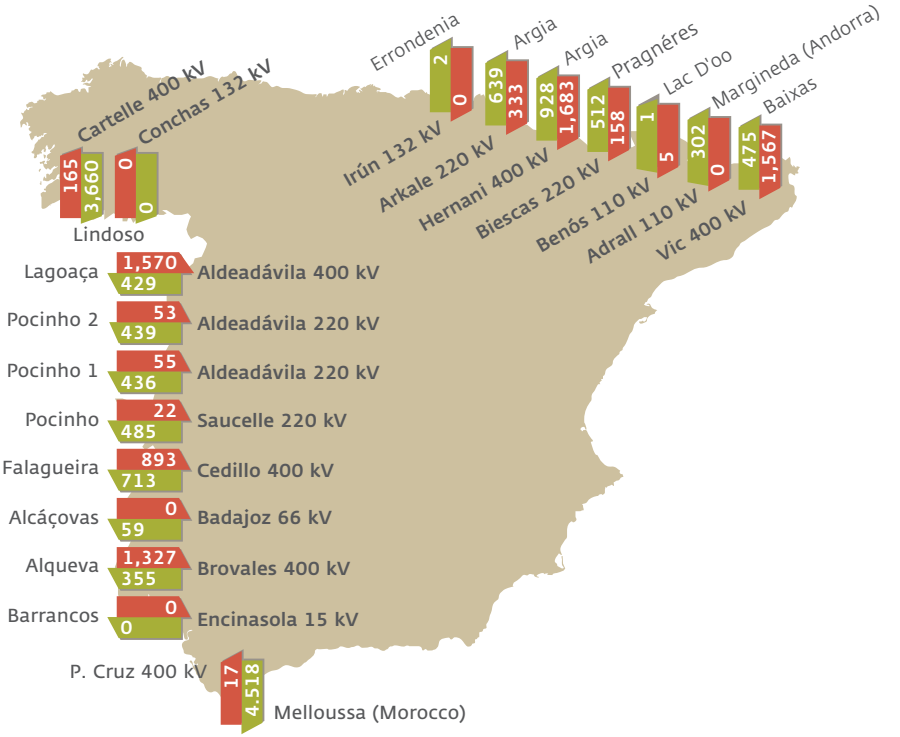
	2007	2008	2009	2010	2011
Circuit 400 kV (km)	17,172	17,724	18,015	18,765	19,622
Circuit ≤ 220 kV (km)	16,807	16,940	17,095	17,185	17,773
Transformer capacity 400/AT (MVA)	59,259	63,659	67,059	69,059	71,509(1)

(1) The data for 2011 reflects three transformers inventoried during this fiscal year.

2 Peninsular system

2.4 International exchanges

Physical electricity exchanges (GWh)

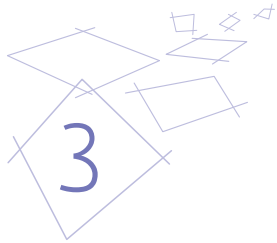


Exchange balances (GWh)

	France	Portugal	Andorra	Morocco	Total
2007	5,487	-7,497	-261	-3,479	-5,750
2008	2,889	-9,439	-278	-4,212	-11,040
2009	1,590	-4,789	-299	-4,588	-8,086
2010	-1,531	-2,634	-264	-3,903	-8,333
2011	**1,189**	**-2,492**	**-302**	**-4,500**	**-6,105**

Positive value: import balance; negative value: export balance.

Extra-peninsular systems
3.1 Demand



Electricity balance from extra-peninsular systems

	Balearic Islands		Canary Islands		Ceuta		Melilla	
	GWh	% 11/10	GWh	% 11/10	GWh	% 11/10	GWh	% 11/10
Hydro	-	-	0	-	-	-	-	-
Coal	3,002	-11.2	-	-	-	-	-	-
Fuel / gas	1,315	-3.6	5,722	-3.0	223	-6.3	222	1.4
Internal combustion engines(1)	958	-9.6	2,303	-0.1	223	-5.2	221	1.4
Gas turbines	358	17.3	542	53.3	0.3	-89.7	1	-3.4
Steam turbines	-	-	2,876	-11.3	-	-	-	-
Combined cycle	1,400	17.0	3,055	9.3	0	-	0	
Auxiliary generation(2)	9	30.6	0	-	-	-	-	-
Ordinary regime	**5,726**	**-3.7**	**8,777**	**0.9**	**223**	**-6.3**	**222**	**1.4**
Self-consumption	-358	-5.0	-466	-4.4	-19	-10.3	-14	3.6
Special regime	**410**	**52.3**	**674**	**-1.7**	**-**	**-**	**7**	**-16.2**
Hydro	-	-	1	-	-	-	-	-
Wind	5	-10.6	394	19.3	-	-	-	-
Solar photovoltaic	97	9.1	246	26.0	-	-	0	-
Renewable thermal	288	74.0	9	-94.3	-	-	7	-15.7
Non-renewable thermal	19	125.4	25	-	-	-	-	-
Demand (b.c.)	**5,777**	**-1.1**	**8,986**	**1,0**	**205**	**-5.9**	**214**	**0.5**

(1) Includes generators whose main fuel is fuel oil, gasoil and/or natural gas. **(2)** Emergency generator units which are installed temporarily in specific areas to cover deficits in generation.

Installed capacity as at 31 December

	Balearic Islands		Canary Islands		Ceuta		Melilla	
	MW	% 11/10	MW	% 11/10	MW	% 11/10	MW	% 11/10
Hydro	-	-	1	0.0	-	-	-	-
Carbón	510	0.0	-	-	-	-	-	-
Fuel / gas	802	-2.0	1,900	2.1	99	0.0	85	0.0
Internal combustion engines(1)	199	-7.7	546	0.0	83	0.0	70	0.0
Gas turbines	603	0.0	641	6.3	16	0.0	15	0.0
Steam turbines	-	-	713	0.0	-	-	-	-
Combined cycle	934	0.0	920	-1.0	-	-	-	-
Auxiliary generation(2)	0	-	0	-	-	-	-	-
Ordinary regime	**2,246**	**-0.7**	**2,821**	**1.0**	**99**	**0.0**	**85**	**0.0**
Hydro	-	-	0,5	0.0	-	-	-	-
Wind	4	-0.4	144	0.0	-	-	-	-
Solar photovoltaic	65	16.8	130	4.0	-	-	0.1	0.0
Renewable thermal	77	2.8	1	-96.8	-	-	2	0.0
Non-renewable thermal	11	49.9	33	0.0	-	-	-	-
Special regime	**157**	**10.7**	**310**	**-9.7**	**-**	**-**	**2**	**0.0**
Total	**2,403**	**-0.1**	**3,130**	**-0.1**	**99**	**0.0**	**87**	**0.0**

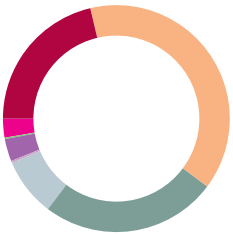
(1) Includes generators whose main fuel is fuel oil, gasoil and/or natural gas. **(2)** Emergency generator units which are installed temporarily in specific areas to cover deficits in generation.

3 Extra-peninsular systems

3.1 Demand

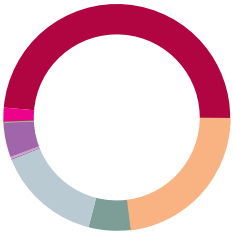
Balearic Islands

Installed capacity as at 31 December 2011 (2,403 MW)



- Coal 21 %
- Combined cycle 39 %
- Gas turbines 25 %
- Internal combustion engines 8 %
- Cogeneration and the rest of the technologies 1 %
- Renewable thermal 3 %
- Wind 0.2 %
- Solar photovoltaic 3 %

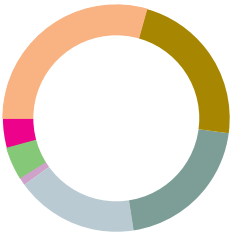
Demand coverage



- Coal 49 %
- Combined cycle 23 %
- Gas turbines 6 %
- Internal combustion engines 15 %
- Auxiliary generation 0.1 %
- Cogeneration and the rest of the technologies 0.3 %
- Renewable thermal 5 %
- Wind 0.1 %
- Solar photovoltaic 2 %

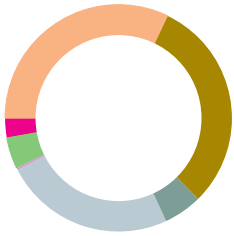
Canary Islands

Installed capacity as at 31 December 2011 (3,130 MW)



- Combined cycle 29 %
- Steam turbines 23 %
- Gas turbines 21 %
- Internal combustion engines 17 %
- Cogeneration and the rest of the technologies 1 %
- Wind 5 %
- Solar photovoltaic 4 %

Demand coverage



- Combined cycle 32 %
- Steam turbines 30 %
- Gas turbines 6 %
- Internal combustion engines 24 %
- Cogeneration and the rest of the technologies 0.3 %
- Wind 5 %
- Solar photovoltaic 3 %

Extra-peninsular systems
3.1 Demand

3

Variations to the ordinary regime generation equipment (%)

	J	F	M	A	M	J	J	A	S	O	N	D
Balearic Islands	-1.9	-4.8	-3.2	-4.0	5.6	7.2	-4.9	2.6	7.3	-0.3	-7.8	-10.5
Canary Islands	-1.4	-0.7	-1.2	-1.6	0.0	2.8	3.2	0.7	-0.2	1.9	1.4	7.2
Ceuta	-11.3	-12.8	-5.8	-8.6	-7.5	-2.3	-3.8	-8.7	-11.8	-3.9	-1.9	8.8
Melilla	1.5	3.0	-0.5	-1.2	2.1	3.1	-1.1	-2.3	-0.3	2.6	-1.8	2.5

Variation as compared to same month of previous year.

Maximum peak load and maximum daily demand

	Power (MW)		Energy (MWh)	
Balearic Islands	1,026	25th January (20-21pm)	24th January	18,703
	1,159	22th August (21-22pm)	23th August	22,822
Canary Islands	1,428	4th October (20-21pm)	3th March	25,839
	1,430	23th June (13-14pm)	22th June	28,266
Ceuta	36	2nd February (21-22pm)	20th December	658
	36	30th June (12-13pm)	28th July	655
Melilla	37	1st February (20-21pm)	1st February	663
	39	8th August (12-13pm)	16th August	752

Winter (October-May) Summer (June-September)

Demand evolution

	Balearic Islands		Canary Islands		Ceuta		Melilla	
	GWh	Annual Δ (%)	GWh	Annual Δ (%)	GWh	Annual Δ (%)	GWh	Annual Δ (%)
2007	5,977	2.6	9,214	4.5	203	0.5	193	13.5
2008	6,122	2.4	9,357	1.6	210	3.5	205	6.2
2009	5,991	-2.1	9,103	-2.7	212	0.9	206	0.7
2010	5,840	-2.5	8,894	-2.3	218	2.8	213	3.4
2011	**5,777**	**-1.1**	**8,986**	**1.0**	**205**	**-5.9**	**214**	**0.5**

3 Extra-peninsular systems

3.2 Facilities. Generation and transmission

Variations to the ordinary regime generation equipment

	Commissioned		Decommissioned	
	Type	MW	Type	MW
Balearic Islands				
Ibiza BW2			Fuel / gas	8
Ibiza BW3			Fuel / gas	8
Formentera AUX	Electrogen generator	8	Electrogen generator	8
Total		**8**		**24**
Canary Islands				
Cotesa(1)	Gas turbine	38		
Granadilla 10-Gas 5 CCC			Combined cycle	5
Granadilla 11-Gas 6 CCC			Combined cycle	5
Total		**38**		**10**

(1) According to the resolution of 9 June 2011 of the General Management for Energy Policy and Mines, the facility is removed from special regime and it is included in the ordinary regime of the Administration of Registry of Facilities of Electrical Energy Production.

New transmission lines

	Voltage kV	No. of circuits	km of circuit
Balearic Islands			
L/Morvedre-Sta. Ponsa (Sta. Ponsa a km 122) (submarine) ±250 kV	220	2	238.00(*)
L/Morvedre-Sta. Ponsa (Sta. Ponsa a km 122) (underground) ±250 kV	220	2	6.00(*)
L/Valdurgent-Santa Ponsa 1 (underground)	220	1	0.41
L/Valdurgent-Santa Ponsa 2 (underground)	220	1	0.39
L/Santa Ponsa-Santa Ponsa EC 1 (underground)	220	1	0.31
L/Santa Ponsa-Santa Ponsa EC 2 (underground)	220	1	0.36
Capdepera-Arta	110	2	14.20
Capdepera-Arta (underground)	110	2	0.20
L/Santa Ponsa-Calviá 1 66 kV (underground)	66	1	0.12
L/Palmanova-Santa Ponsa 66 kV (underground)	66	1	0.12
Total			**260.11**

(*) Of the 488 km of circuit which this link has, half is included in the figures for the Spanish Peninsula and the other half in those of the Balearic Islands.

Extra-peninsular systems
3.2 Facilities. Generation and transmission

3

New substations

	Voltage kV	Transformer capacity kV	Transformer capacity MVA
Balearic Islands			
Santa Ponsa	220	66	250
Santa Ponsa	66	-	-
Capdepera	66	-	-

Evolution of the power transmission system

		2007	2008	2009	2010	2011
220 kV (km)	Balearic Islands	177	177	185	185	430
	Canary Islands	163	163	163	163	163
	Total	**340**	**340**	**348**	**348**	**594**
132 kV (km)	Balearic Islands	199	199	199	206	206
	Canary Islands	-	-	-	-	-
	Total	**199**	**199**	**199**	**206**	**206**
< 132 kV (km)	Balearic Islands	854	875	884	889	903
	Canary Islands	1,091	1,091	1,108	1,136	1,136
	Total	**1,946**	**1,967**	**1,992**	**2,024**	**2,039**
Transformer Capacity (MVA)	Balearic Islands	1,998	1,998	1,998	1,998	2,248
	Canary Islands	1,250	1,250	1,375	1,375	1,375
	Total	**3,248**	**3,248**	**3,373**	**3,373**	**3,623**

Terminology index

Combined cycle. Technology for the generation of electrical energy in which two thermodynamic cycles coexist within one system: one involves the use of steam, and the other one involves the use of gas. In a power station, the gas cycle generates electrical energy by means of a gas turbine and the steam cycle involves the use of one or more steam turbines. The heat generated by combustion in the gas turbine is passed to a conventional boiler or to a heat-recovery element which is then used to move one or more steam turbines, increasing the yield of the process. Electricity generators are coupled to both the gas and steam turbines.

Closed-cycle pumped storage. Production of electrical energy carried out by the hydroelectric power stations whose higher elevation reservoir does not receive any type of natural contributions of water, but uses water solely from the lower elevation reservoir.

Generation consumption. Energy used by the auxiliary elements of power stations, necessary for the everyday functioning of the production facilities.

Hydroelectric reserves. The hydroelectric reserve of a reservoir is the quantity of electrical energy that could be produced in its own power plant and in all the power plants situated downstream, with the total drainage of its current useable water reserves and providing that drainage occurs without natural contributions. The annual regime reservoirs are those in which complete drainage would take place in less than one year. Hyper-annual regime reservoirs are those in which the total drainage time takes more than one year.

Ordinary regime. The production of electrical energy from all those facilities which are not included under the special regime.

Physical electricity exchanges (Intl.) The movements of energy which have taken place across lines of international interconnection during a certain period of time. It includes the loop flow of energy as a consequence of the grid design.

Producible energy. Maximum quantity of electrical energy that theoretically could be produced considering the water supplies registered during a specific period of time and once the supplies used for irrigation or uses other than the production of electrical energy have been deducted.

Producible hydroelectric index. This is the quotient between the producible energy and the average producible energy, both related to the same period and to the same hydroelectric equipment.

Special regime. Production of electrical energy which falls under a unique economic regime, originating from facilities with installed power not exceeding 50 MW whose production originates from cogeneration or other forms of electricity generation associated with non-electrical activities, if and when, they entail a high energy yield: Generation units that use renewable non-consumable energies, biomass or any type of biofuel as a primary energy source: Groups which use non-renewable or agricultural waste, livestock and service sector waste as primary energy sources, with an installed power lower than or equal to 25 MW, when they entail a high energy yield.

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