THE SPANISH ELECTRICITY SYSTEM 2016

RED ELÉCTRICA DE ESPAÑA

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2016

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PRESENTATION

Red Eléctrica de España (REE), as the sole transmission agent and operator (TSO) of the Spanish electricity system, presents a new edition of the Spanish Electricity System Report, which it has been publishing annually since it was created as TSO in 1985. This publication provides an overview of the main operational performance indicators and statistical ratios of the Spanish electricity system in 2016.

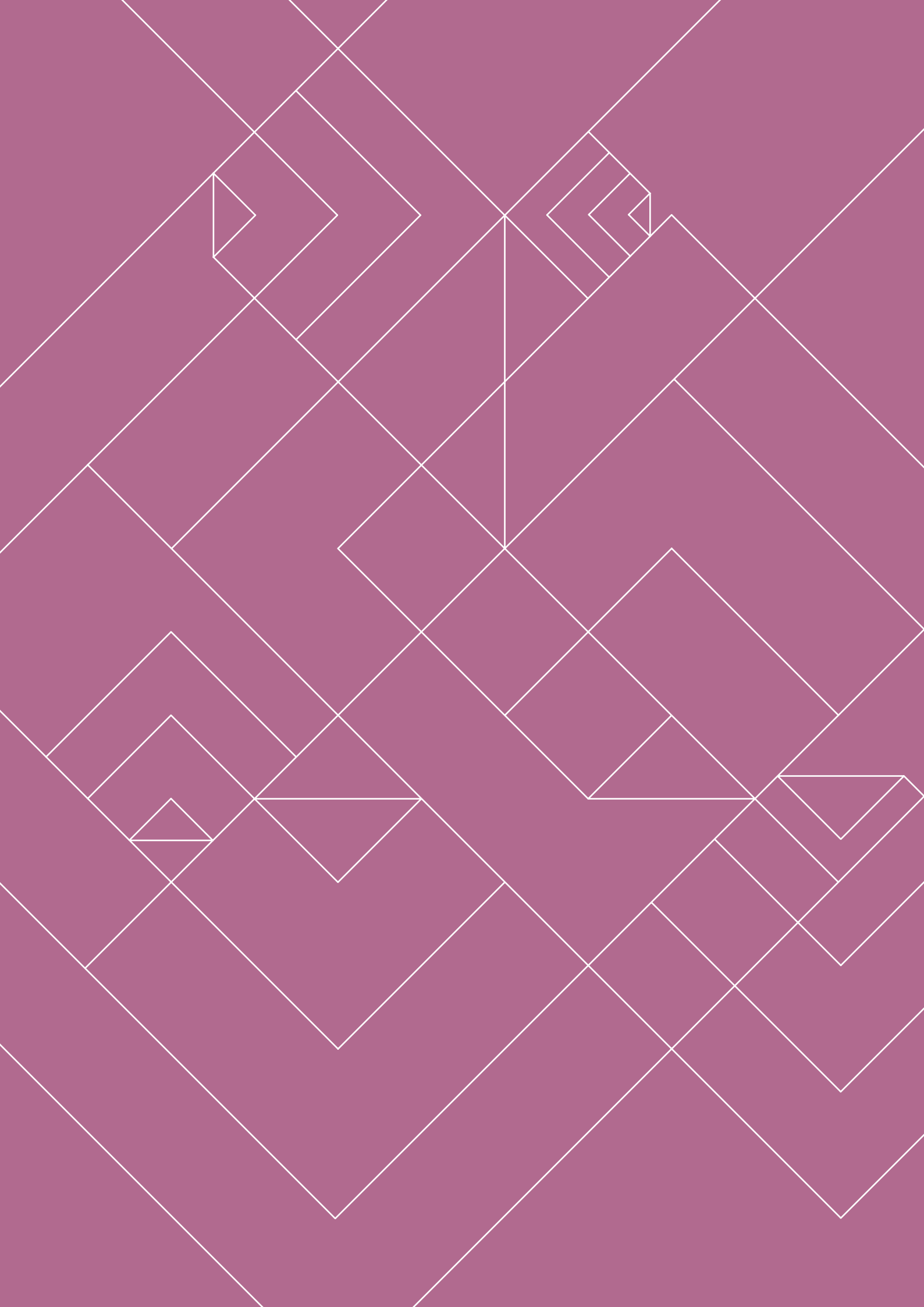
This year's report continues with the new format and changes in the report's approach, content and layout introduced in previous years reports so as to adapt it to current communication trends and media tools. This same approach has begun to be used for the drafting of the monthly bulletins.

The current annual report has been drafted bearing in mind the desire for it to become a tool for the dissemination of information about the system and to reach a greater number of users without losing the rigour and quality of the information.

The data tables have been removed from the printed version and greater emphasis has been placed on the descriptive part. Also noteworthy in the report is the greater analytical content, including indicators of electricity consumption by sector as well as broader information regarding the Spanish electricity system as a whole.

The report is supplemented by Excel files that provide a more comprehensive set of information and which allow data to be downloaded. These files and the digital version of this report can be accessed via the corporate website: **www.ree.es**

As part of its ongoing improvement process, Red Eléctrica seeks to provide a better quality of service for all users, therefore we are making the following email address **redelectrica@ree.es** available to you, through which you may send us your suggestions and comments.



EXECUTIVE SUMMARY

Demand for electricity in Spain has grown for the second consecutive year following the economic crisis, although at a rate lower than the previous year

Gross demand in Spain stood at 265,009 GWh, which represents a growth of 0.7% compared to the previous year, while in 2015 growth stood at 2.0%.

Electricity consumption on the peninsula was 0.6% higher than in 2015

The peninsular system, which represents more than 94% of the total demand in Spain, showed a growth in electricity consumption of 0.6% compared to 2015. After having factored in the effects of seasonal and working patterns for 2016 (a leap-year), the demand mainly attributable to economic activity dropped slightly by 0.1% compared to 2015.

By **large sectors of activity,** according to the Red Eléctrica Index (IRE) which collects demand data from large consumers of electricity, the industrial consumption, which represents about 30% of the electricity demand, registered a fall after three consecutive years showing growth. Specifically, it registered a negative variation of 0.8%, (-0.9% after factoring in the effects of seasonal and working patterns). The services sector, which represents about 13% of demand, fell by 0.9% (-1.1% after factoring in the effects of seasonal and working patterns). On the other hand, the aggregate of other sectors, which barely represents 5% of demand, experienced a slight increase of 0.3% (0.6% after factoring in the effects of seasonal and working patterns) compared to 2015. As a result, the IRE as a whole was 0.7% lower than the value registered in 2015 (-0.8 after factoring in the effects of seasonal and working patterns).

NATIONAL DEMAND COMPARED TO 2015

0.7% ↑

NATIONAL DEMAND 2016

265,009 GWh

ELECTRICITY CONSUMPTION LARGE CONSUMERS COMPARED TO 2015

INDUSTRIAL 0.8% ↓

SERVICES 0.9% ↓

Electricity demand shows widespread growth in the majority of autonomous communities

MAXIMUM INSTANTANEOUS POWER IN THE PENINSULAR SYSTEM

For the first time ever, the maximum peak was registered in

SUMMER

6 September at 1:32 pm

By **geographical area,** electricity demand compared to the previous year shows widespread growth in all autonomous communities, except in Catalonia, the Basque Country, Cantabria and Melilla.

In relation to the **maximum demand figures,** noteworthy is the fact that the maximum peak of instantaneous power in the Spanish peninsular system was registered for the first time ever in the summer period, specifically on 6 September at 1:32 pm with a total of 40,489 MW, only 0.6% below the previous maximum value recorded in February 2015, but still far from the all-time high of 45,450 MW registered in December 2007.

Regarding the **demand coverage,** 97% of the peninsular demand was covered with domestic production and the remaining 3% with energy imported from other countries. It should be noted that this situation regarding the net import of electricity generation had not occurred since 2003.

DEMAND COVERAGE

National Production

97%

Energy imported

3%

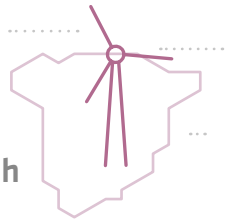
Installed power capacity of the entire set of generating facilities in Spain decreased in 2016 after a long path of continued growth. Specifically, it closed the year with an installed capacity of 105,279 MW, 0.8% less than in 2015. This decrease was mainly due to the decommissioning of five coal-fired facilities on the peninsula and their removal from the generation market; these five facilities totalled 932.2 MW.

As for **electricity generation,** renewable energy increased its share in the set of generating facilities on the peninsula, reaching 40.8% (36.9% in 2015), driven by the increase of 25.5% in hydroelectric generation. As a result, non-renewable energy decreased its share in the generation mix, reaching 59.2% (63.1% in 2015),

RENEWABLE ENERGY

40.8%

With regard to total generation on the Spanish peninsula



CO_2 emissions from electricity generation falls to the lowest level of the last ten years

with coal taking the entire hit, dropping its share in the mix by 30.9% compared to the previous year.

By technology, electricity production on the peninsula during 2016 was primarily generated by the following technologies: 22.9% from nuclear power stations (21.8% in 2015), followed by wind power with 19.3% (19.0% in 2015) and hydro with 14.6% (11.2% in 2015). Coal declined to 14.4% (20.3% in 2015), while the remaining 28.8% of the generation was distributed across combined cycle (10.5%), cogeneration (10.4%), solar (5.2%) and other (waste and other renewable 2.7%), values similar to those of the previous year.

CO_2 emissions resulting from electricity generation in Spain stood at their lowest level in the last ten years, mainly due to the significant reduction in coal-fired generation. Specifically, the level of emissions stood at 63.5 million tonnes, 18.3% below the 2015 level and 43.1% lower than in 2007.

Spain's energy exchange programmes with other countries recorded, for the first time since 2003, a net import balance. While exports grew by 8.2% over the previous year reaching 12,686 GWh, this growth was much lower than the imports registered, that amounted to 20,346 GWh, 75.7% higher than

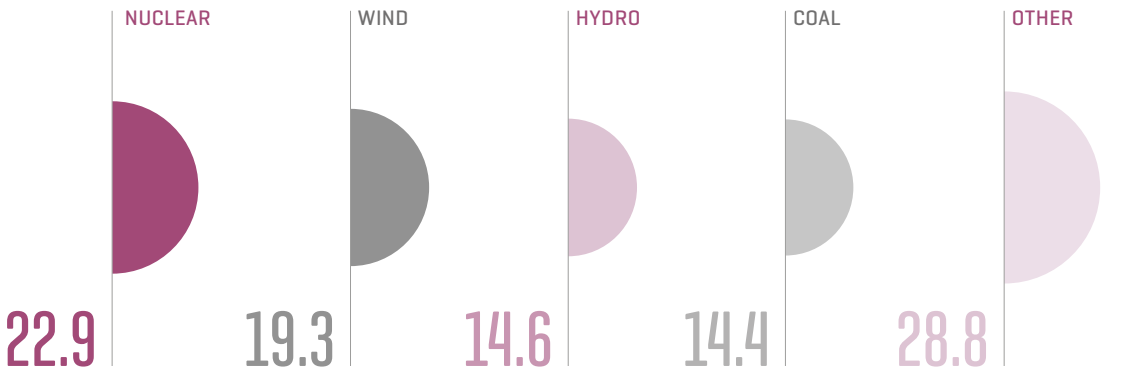
INTERNATIONAL ENERGY EXCHANGE BALANCE

7,660 GWh

First net import balance since 2003

ELECTRICITY GENERATION
SPANISH PENINSULAR SYSTEM 2016

%



The Mallorca - Ibiza link completed in 2016 consolidates the electrical integration process of the entire Balearic archipelago and its connection to the Spanish peninsula

NEW TRANSMISSION GRID LINES

674 km
OF CIRCUIT
commissioned in 2016

in 2015. As a consequence, the net balance resulted in an import figure of 7,660 GWh.

By interconnection, for yet another year Spain was a net importer with France and, for the first time ever, also with Portugal. The interconnection with France recorded an importer balance of 7,806 GWh, a value 6.6% higher than in 2015, and the interconnection with Portugal recorded an importer balance of 5,084 GWh (compared to the exporter balance of 2,267 GWh registered in 2015). Regarding the interconnections with Andorra and Morocco, for yet another year the balance was exporter, with values of 278 GWh and 4,952 GWh, respectively.

The electricity transmission grid experienced a further boost in 2016 with the commissioning of 674 km of circuit, 61 new substation bays and 600 MVA of transformer capacity. With this, at the end of the year, the infrastructure of the Spanish grid stood at 43,800 km of circuit, 5,609 substation bays and 85,144 MVA.

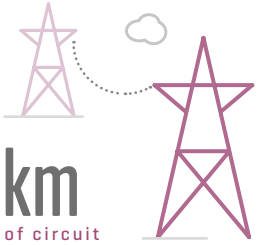
Among the projects completed in 2016, noteworthy was the installation of the second cable of the link connecting the islands of Majorca and Ibiza, of which 117 km is a submarine section and 8 km is an underground land section, which, together with the first cable commissioned in 2015, has enabled the connection of the

KEY FIGURES OF THE SPANISH TRANSMISSION GRID

5,609
SUBSTATION BAYS

85,144 MVA

43,800 km
of circuit



For yet another year, the electrical energy transmission grid has shown high levels of performance regarding service quality indicators

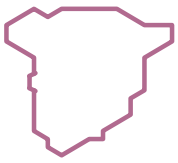
two electricity systems of the Balearic Islands, Mallorca-Menorca and Ibiza and Formentera, thus creating a single interconnected electricity system.

Service quality indicators have shown for yet another year the high level of security of supply and quality of the transmission grid in all systems, except in the Canary Islands; the values registered for all other systems (excluding the Canary Islands) were much more favourable than the reference values set out in the current regulation. Working with provisional data (pending auditing), the values corresponding to the Spanish peninsular system in 2016 for Energy Not Supplied (ENS) stood at 78 MWh (53 MWh in 2015) and Average Interruption Time (AIT) at 0.16 minutes (0.11 Minutes in 2015).

In the Balearic Islands system, these indicators improved significantly compared to the previous year, with ENS registering only 0.3 MWh (29 MWh in 2015) and an AIT of 0.03 minutes (2.66 minutes in 2015). On the contrary, the Canary Islands system suffered several incidents motivated mainly by the absence of a sufficiently meshed grid in Fuerteventura and as a consequence registered an ENS of 457 MWh and a AIT of 27.45 minutes.

ENERGY NOT SUPPLIED (ENS) AND AVERAGE INTERRUPTION TIME (AIT)

Spanish peninsular system



(ENS) 78 MWh

(AIT) 0.16 Min

(AI) 98.33%

Balearic Islands system

(ENS) 0.3 MWh

(AIT) 0.03 Min

(AI) 96.93%

Canary Islands system

(ENS) 457 MWh

(AIT) 27.45 Min

(AI) 98.07%

The final energy contracted in the electricity market was 0.8 % higher than in 2015

As for the Availability Index (AI), which measures the capacity or possibility of use by the system of the different elements of the transmission grid, the values recorded showed improvement in all systems. The value for the peninsular system was 98.33 % (97.94 % in 2015) and for the Balearic Islands and the Canary Islands, 96.93 % and 98.07 % respectively (96.88 % and 96.74 % in 2015).

The average final price for the acquisition of energy in the electricity market was 48.4 €/MWh, 23.0 % lower than the price in 2015 and the lowest since 2010. Similarly, the final energy contracted in the electricity market (reference supply companies plus free market contracting) was 0.8 % higher than the previous year.

During 2016, the combined price of the day-ahead and intraday markets accounted for 83.9 % of the final price, the system ancillary services 6.4 %, capacity payments 5.7 % and the interruptibility service the remaining 4.0 %.

AVERAGE FINAL PRICE FOR ENERGY

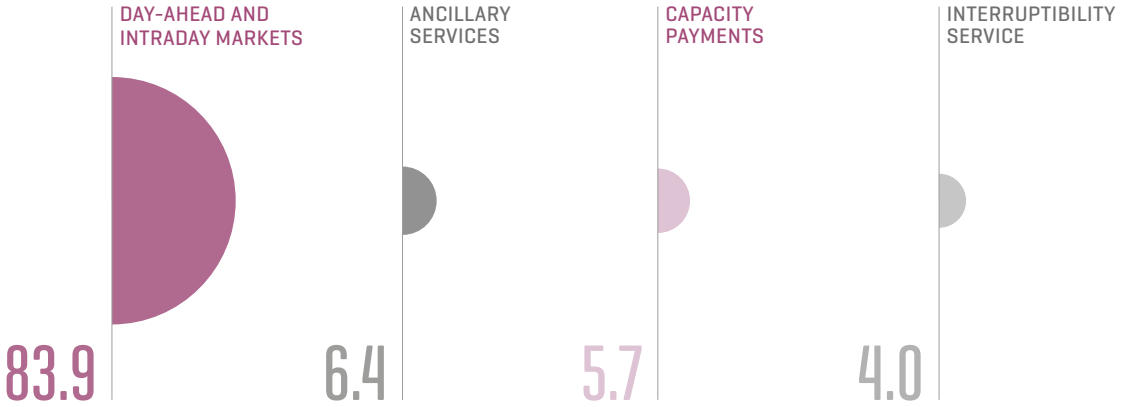
48.4 €/MWh

COMPARED TO 2015

23.0 %

COMPONENTS OF THE AVERAGE FINAL PRICE OF THE ELECTRICITY MARKET

%



ELECTRICITY DEMAND

For the second year in a row, the growth in gross electricity demand in Spain has been positive, although lower than in 2015

In 2016, the demand for electrical energy in Spain reached 265,009 GWh, an increase of 0.7 % over the previous year. This is the second consecutive year in which has shown growth, although the variation registered this year was less than that recorded in 2015, which stood at 2.0 %.

Gross demand in the Spanish peninsular electricity system, which represents just over 94% of the total demand in Spain, grew by 0.6% over the previous year, with total demand standing at 249,980 GWh; a figure that is somewhat higher than that recorded in 2015. As for the remaining electricity systems, gross demand grew in all of them except in Melilla where it fell by 2.4% compared to 2015.

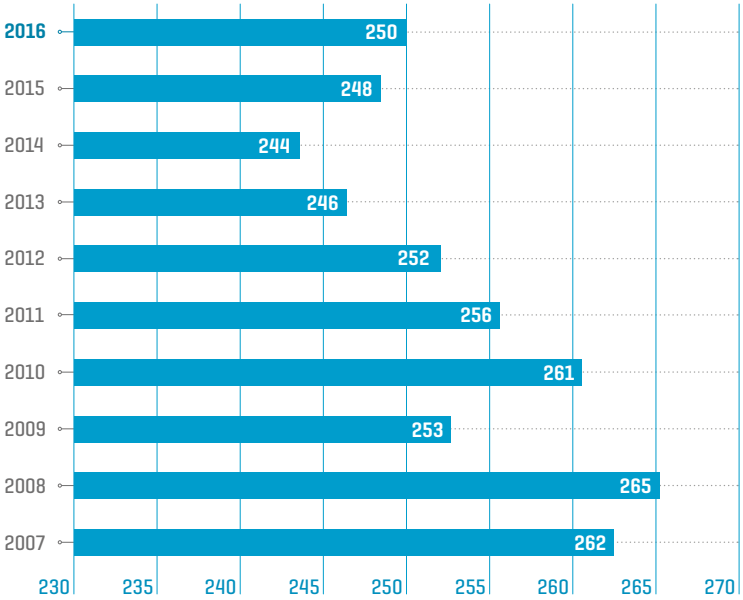
DEMAND IN THE PENINSULAR SYSTEM COMPARED TO 2015

0.6% ↑

Second consecutive year showing growth

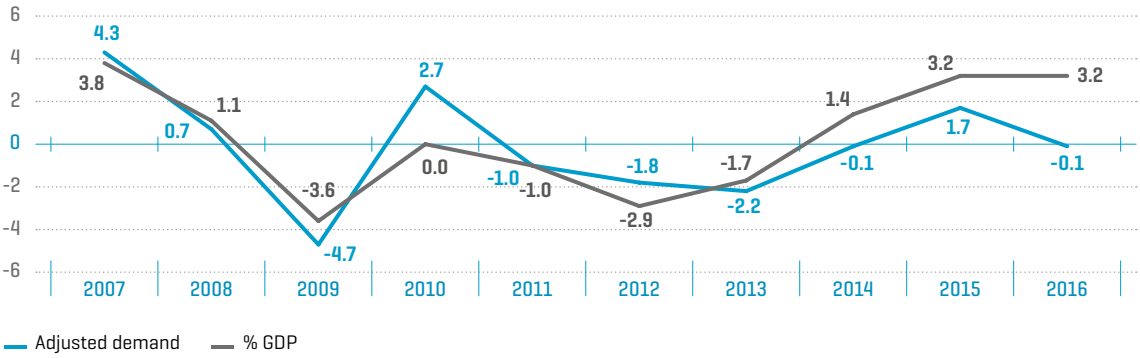
EVOLUTION OF PENINSULAR DEMAND AT POWER STATION BUSBARS IN THE LAST 10 YEARS

TWh



ANNUAL VARIATION OF PENINSULAR DEMAND AND SPANISH GDP

%



Gross electricity demand grew in all of Spain's electricity systems, except in Melilla

VARIATION OF ADJUSTED PENINSULAR DEMAND COMPARED TO THE PREVIOUS YEAR

-0.1%

From the point of view of economic activity, this year the growth rates registered in the previous year have continued their trend registering a positive variation of the Gross Domestic Product (GDP) of 3.2% with respect to 2015, thus maintaining an upward growth trend of the activity.

The elasticity between the variation in gross demand for electrical energy and GDP stood at 0.2, compared to the elasticity of 0.6 in the previous year.

The demand for peninsular electricity, after having factored in seasonal and working patterns for 2016 (which was a leap year), registered a slightly negative variation of 0.1% over the previous year. This decline contrasts with the positive variation of 1.7% registered in 2015 over 2014.

MILDER TEMPERATURES
had little impact on the variation of the demand

PENINSULAR DEMAND
VARIATION YEARLY BREAKDOWN
% compared to the previous year

%

		Effects		
	Demand at busbars	Working patterns	Temperature	Adjusted
2007	2.9	0.0	-1.3	4.3
2008	1.1	0.4	-0.1	0.7
2009	-4.7	-0.5	0.4	-4.7
2010	3.1	0.1	0.4	2.7
2011	-1.9	0.1	-1.0	-1.0
2012	-1.4	-0.3	0.7	-1.8
2013	-2.2	0.2	-0.3	-2.2
2014	-1.1	0.0	-1.0	-0.1
2015	2.0	-0.1	0.4	1.7
2016	**0.6**	**0.6**	**0.1**	**-0.1**

Adjusted monthly demand of the peninsular system continued its upward trend with a growth of around 1.3% during the first half of the year. As of July, until the end of the year, the trend started registering a downward trend, closing the year with the above mentioned indicated negative adjusted value of 0.1%.

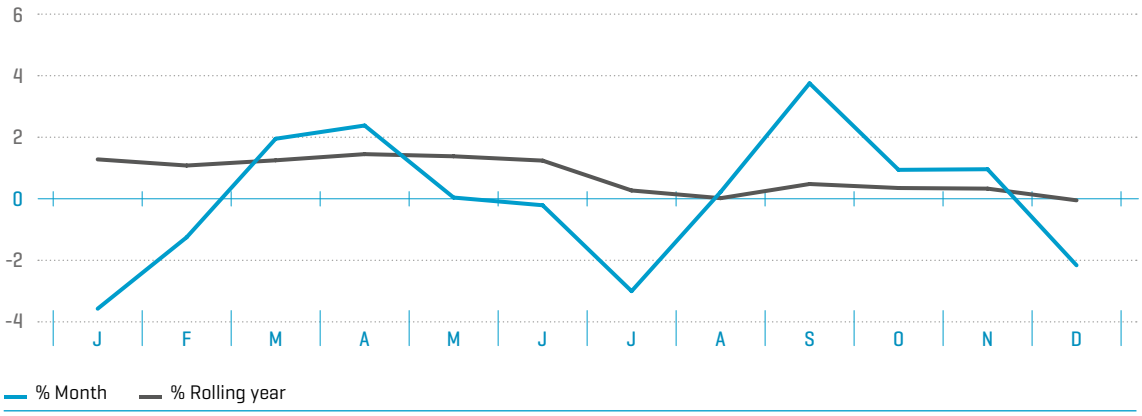
From the point of view of the influence of temperature on the demand, in line with what occurred in 2014 and 2015, temperatures in 2016 have been warmer in summer and milder in winter than those corresponding to the historical average [1]. The cooling degree-days [2] were 8.8% lower than the average values and heating degree-days were 28.8% higher than the average values of the period considered.

(1) Average maximum daily temperatures in the period 1989-2013.

(2) Cooling degree-days are defined as those days registering centigrade degrees below 19°C, while heating degree-days are those above 23°C.

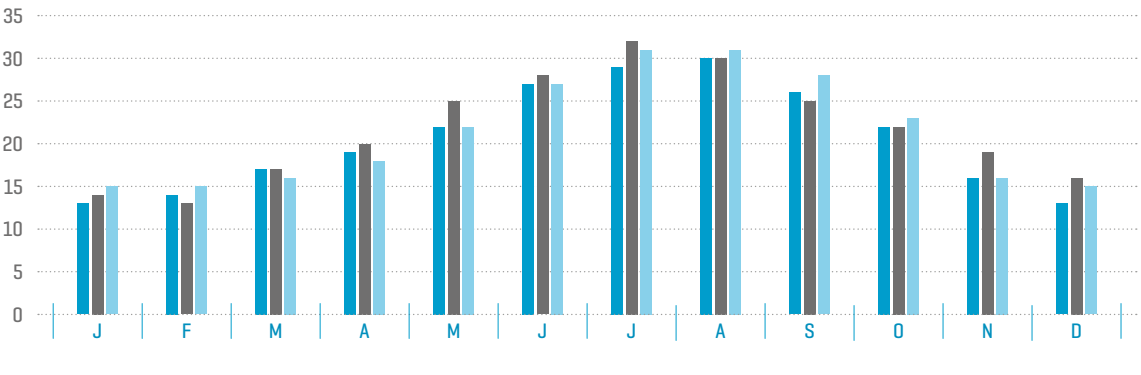
MONTHLY VARIATION IN ADJUSTED PENINSULAR DEMAND

%



MONTHLY EVOLUTION OF MAXIMUM TEMPERATURES

ºC



(1) Average monthly temperature for the period 1989-2013.

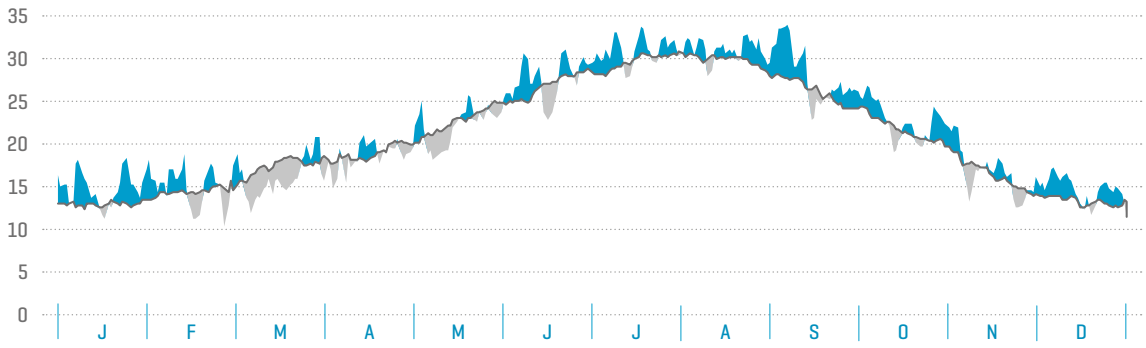
In this respect, throughout 2016 on 23.8% of the days, temperatures were recorded well above the historical average temperature [1]. These days were concentrated in the months of January, July and September. On the opposite side, only 10.1% of the days of the year saw temperatures below the historical average. These days were mainly concentrated in the months of March and, to a lesser extent in November.

Compared to the previous year, 2016 was slightly cooler than 2015, with 6.3% more cooling degree-days and 0.9% less heating degree-days. The combined impact of these effects, with the greater weight of cooling degree-days, results in a positive contribution of temperatures of a 0.1 percentage point to the growth in demand.

(1) Days with temperatures greater than the average, plus one times its dispersion, measured through the typical deviation.

EVOLUTION OF TEMPERATURES COMPARED TO HISTORICAL AVERAGE

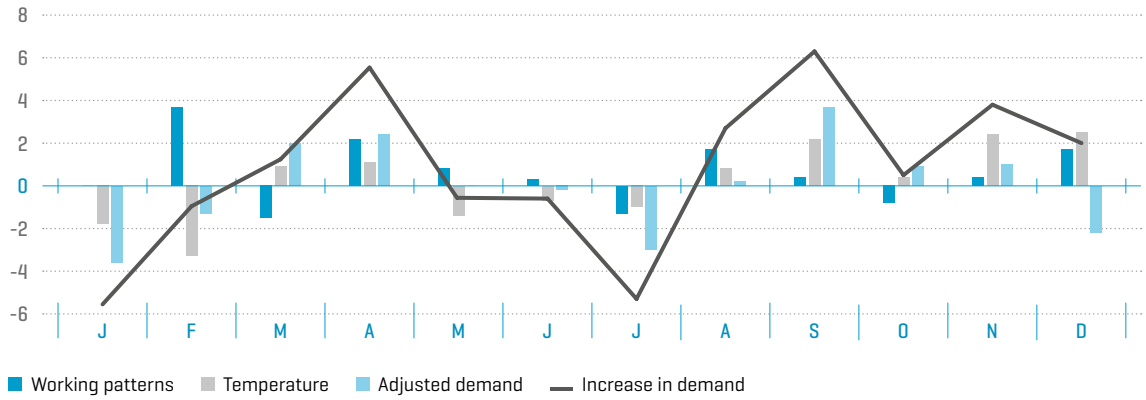
ºC



(1) Average monthly temperature for the period 1991-2014.

COMPONENTS ASSOCIATED TO GROWTH IN MONTHLY DEMAND ON THE PENINSULA

%



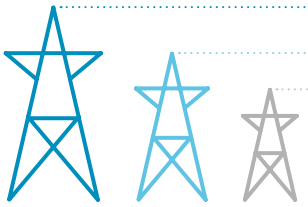
Demand from large consumers fell slightly throughout 2016

The Red Eléctrica Index (IRE) is a leading electricity indicator that shows the evolution of electricity consumption of companies whose volume of power consumption is medium/high (contracted power of over 450 kW). This index is published including data both at a general level and detailed by activity sector (CNAE - National Statistics Institute) and is available approximately 22 days after the end of the month.

In 2016, the overall IRE value was 0.7% lower than in the previous year, bringing the index to 99.5, slightly lower than the reference year (2010 = 100). The decline in this year's index means that, after two consecutive years with growth rates above 2% (2014 and 2015) in which consumption levels in 2010 had been exceeded, the value has returned to levels below those of 2010 (the reference year).

RED ELÉCTRICA INDEX (IRE)

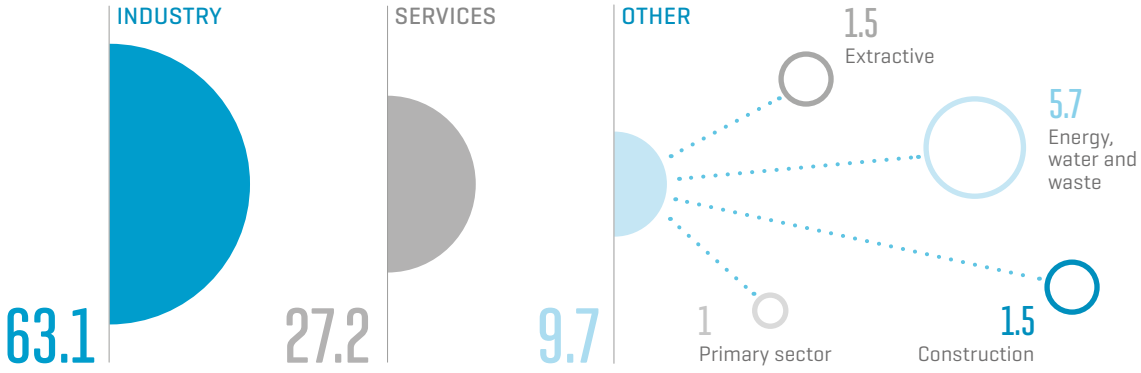
COMPANIES CONSUMPTION LEVEL



Contracted power

+450 kW

COMPOSITION OF THE GENERAL IRE %



By major sectors, all of them have shown a lower variation rate compared with the previous year (2015):

> After three consecutive years of growth, industrial activities fell by 0.8%, mainly due to the negative evolution of power consumption associated to the production of intermediate goods.

> Following the small (but positive) variation of 0.1% experienced by the services sector in 2015, consumption of this aggregate has returned to negative rates of variation, standing at 0.9% in 2016.

> The grouping of other sectors of activity has grown again with respect to the previous year, albeit at a much more modest rate of 0.3%, a figure which contrasts with the high growth of 3.0% experienced in 2015 compared to 2014.

INDUSTRIAL IRE COMPARED TO 2015

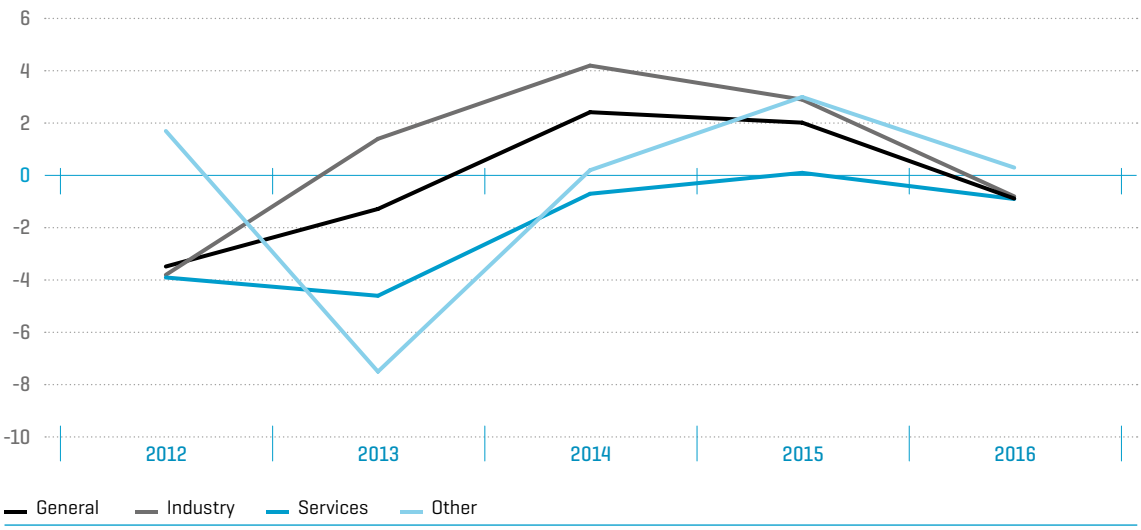
0.8% ↓

2016 IRE

With regard to the reference value YEAR 2010 = 100

99.5

ANNUAL EVOLUTION OF THE IRE



In 2016, the composition of the calendar had a positive impact of 0.2 percentage points (pp) on the evolution of the IRE, mainly due to 2016 being a leap year. Temperatures, on the other hand, slightly milder than those of the previous year decreased the evolution by 0.1 p.p. After factoring in both effects, the general index fell by 0.8% with respect to the previous year, representing (as in the gross value) the first negative variation of the index since 2013.

ADJUSTED GENERAL INDEX COMPARED TO 2015

0.8% ↓

First negative variation of the index since 2013

IRE: VARIATION BREAKDOWN IN 2016

%

	IRE	Effects		
		Working patterns	Temperature	Adjusted
General	-0.7	0.2	-0.1	-0.8
Industry	-0.8	0.2	-0.1	-0.9
Services	-0.9	0.2	0.0	-1.1
Other [1]	0.3	0.1	-0.5	0.6

[1] Extractive; energy, water and waste; construction; and primary sector.

The monthly evolution of the two large sectoral groupings (industry and services) has been uneven, despite the adjusted consumption of both closing the year with a negative variation of around 1.0% with respect to the previous year, their behaviour throughout the year was noticeably different.

The main components of the index registered falls:

INDUSTRY AND SERVICES

After growth rates of between 2% and 3% in the last four months of 2015, the industry sector started 2016 with negative variations, a situation that remained practically unchanged during all the months of the year. December saw a spike in consumption that could indicate a possible change in its evolution in the medium term.

The services sector continued its negative evolution, as well as showing high volatility in the monthly variations registering negative growth in all months of the year, except for the positive 'peak' that occurred in April and May.

The symptoms of depletion of the adjusted consumption trend seen during 2015, when there was a gradual slowdown in the growth rates, were even more evident throughout 2016 with a clearly decreasing consumption trend, closing the year with the above mentioned adjusted negative variation of 0.8%.

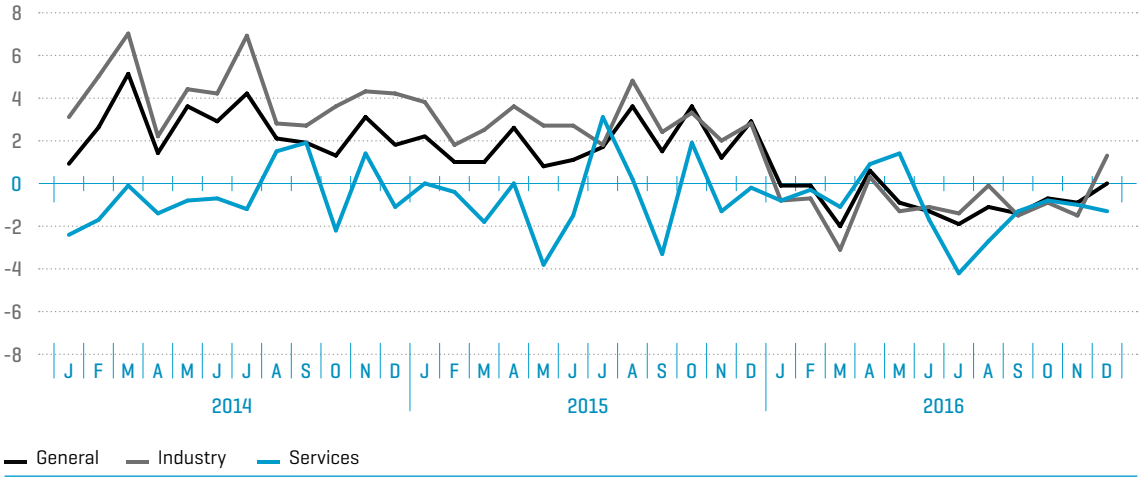
In 2015, the industrial sectors had already begun to show a slowdown in their rates of growth, although in a moderate way. In 2016, however, this moderate slowdown in consumption was interrupted by an abrupt drop which, at the end of the year, caused

a fall of 0.9% compared to the growth of 2.8% of the previous year's consumption. This decrease is mainly due to the negative evolution of consumption associated with the production of intermediate goods.

Meanwhile, the variation in consumption of the services sector (rolling year) has continued its steady decline, except in the specific situations in May and June. This decline even showed a certain level of acceleration towards the end of the year bringing with it a decline of 1.1% with respect to the previous year, a fall of 0.5 p.p. greater than in 2015.

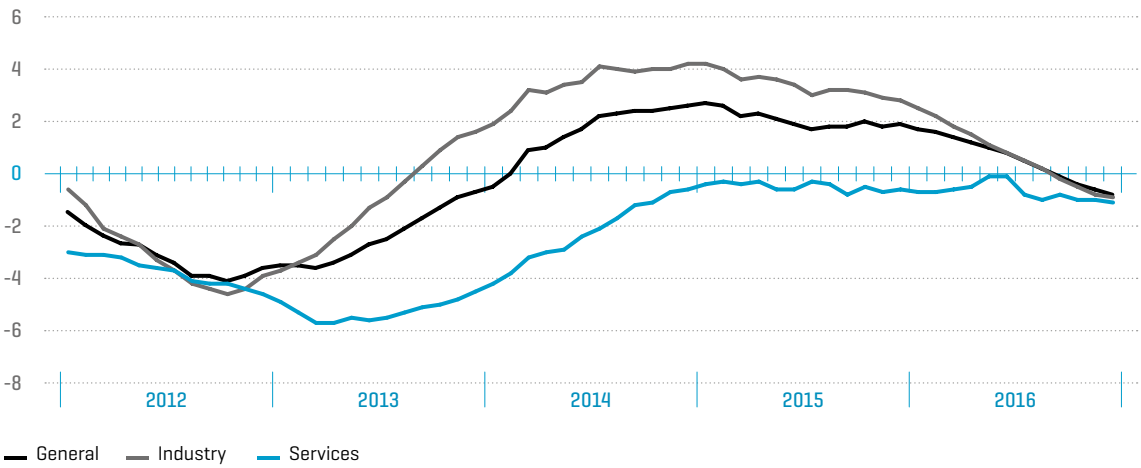
MONTHLY EVOLUTION OF THE ADJUSTED IRE

%

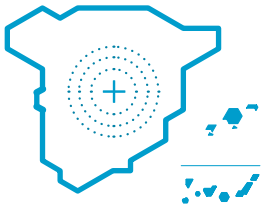


MONTHLY TREND OF THE ADJUSTED IRE

%



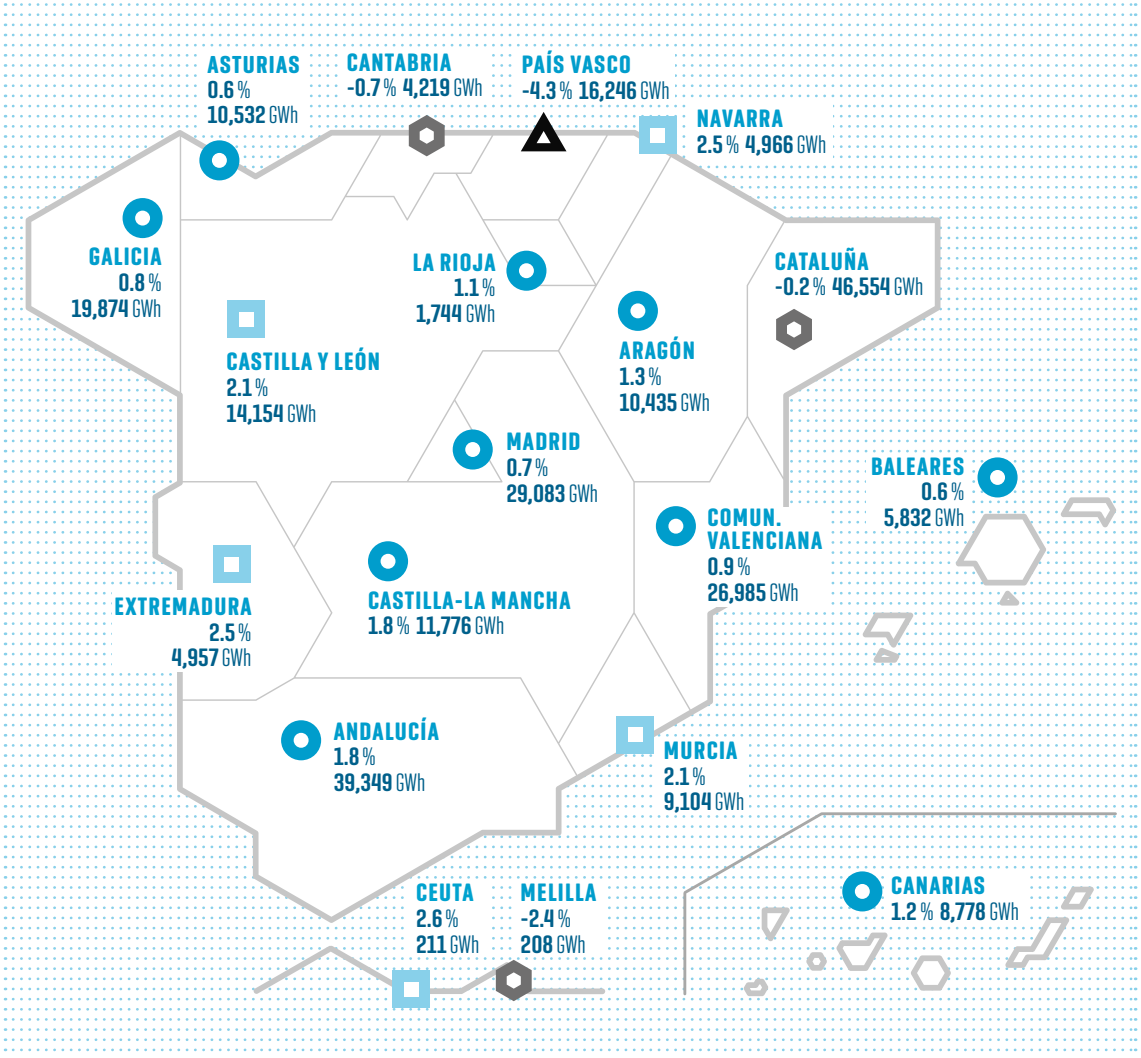
GREATER GROWTH
in the non-coastal communities



The evolution of the demand by geographical area in 2016, compared to the previous year, ranged between a maximum growth in Ceuta of 2.6% (in the autonomous communities in the mainland the maximum growth was recorded in Extremadura and Navarra with 2.5%) and a decrease of 4.3% in the Basque Country. Most of the autonomous communities showed positive variations in demand, except in Catalonia, Melilla, Cantabria, and the aforementioned Basque Country.

These variations in demand have not occurred in any particular area, although it may be noted that the non-coastal autonomous communities of the mainland (except Madrid) have presented positive variations above 1%.

DEMAND PER AUTONOMOUS COMMUNITY AND VARIATION COMPARED TO THE PREVIOUS YEAR



For the first time ever, the maximum instantaneous demand of the peninsular system occurs in the summer period

The maximum values of instantaneous demand on the Spanish Peninsula corresponding to the cold and hot seasons in 2016 showed a behaviour that was somewhat divergent, while the winter maximum was 5.6% lower than the value recorded in 2015, the summer maximum was 0.7% higher than the previous year, with the particularity that, for the first time, the maximum summer value of 40,489 MW, registered on 6 September at 1:32 pm, ended up being the absolute maximum demand of the year.

MAXIMUM INSTANTANEOUS DEMAND ON THE PENINSULA

6 SEPTEMBER/13:32 pm

40,489 MW

comparison with all-time high

-10.9%

45,450 MW

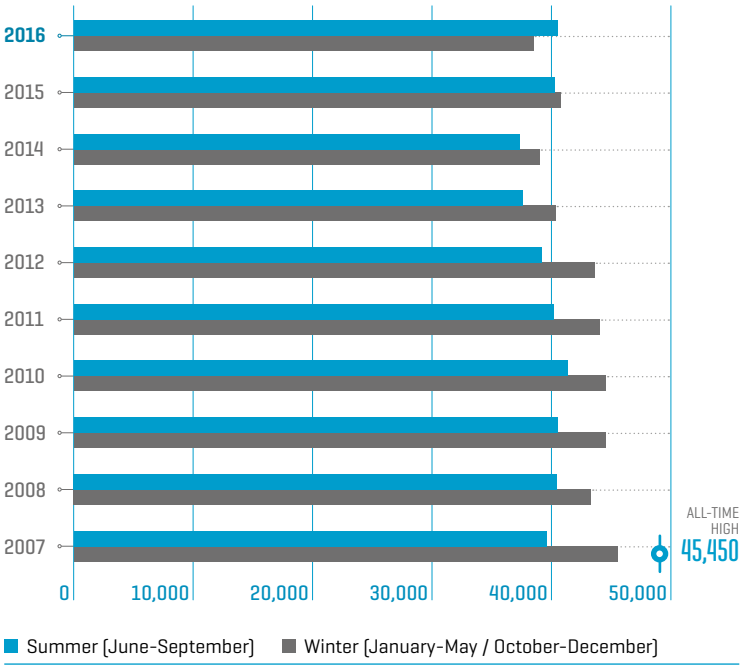
2007
all-time high registered in 2007

40,489 MW

2016

MAXIMUM ANNUAL VALUES FOR INSTANTANEOUS DEMAND ON THE SPANISH PENINSULA

MW



The maximum hourly demand in the summer months was also higher than in winter

MAXIMUM HOURLY DEMAND COMPARED TO 2015

0.5 % ↑

Regsitering a value of 40,144 MWh

This maximum, however, is still well below the all-time high (45,450 MW) for demand recorded in December 2007. But if we compare it with the all-time summer high (41,318 MW) recorded in 2010, the value is just short by 829 MW.

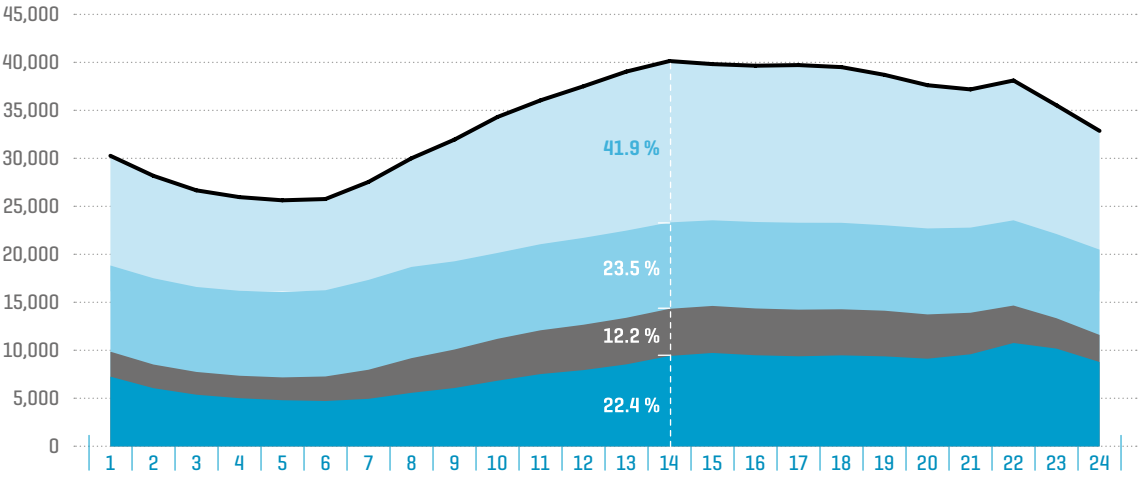
Similarly, the maximum hourly demand corresponding to the cold months was lower than the value registered in 2015, while the maximum hourly demand of the summer months was slightly higher than the previous year and, in line with what happened with instantaneous demand, the maximum value for the summer was higher than the winter maximum.

In 2016, the maximum hourly demand (38,239 MWh) for the winter months was registered in February, a value 5.2 % lower than the previous year's maximum. The maximum hourly demand (40,144 MWh) for the summer months was registered in September, a value 0.5 % higher than the maximum for 2015.

BREAKDOWN OF THE MAXIMUM HOURLY DEMAND IN 2016

September the 6th

MWh



Industry IRE | Services IRE | Residential sector [1] | Other consumption+losses | Total demand at busbars

[1] Hourly profiles applied to the general low voltage electricity tariff with a contracted power equal or less than 10 kW.

For the first time since 2003, part of the peninsular demand was covered with an import balance of international exchanges

PEAK TIME OF THE DAY OF MAXIMUM DEMAND

23.5%

Consumption of the residential sector

At the peak time of the day of maximum hourly demand [4] of the year, the residential sector [5] accounted for 23.5% of consumption, while industrial consumption in the IRE accounted for 22.4% and large consumers in the services sector in the IRE represented 12.2%. During the day of peak consumption, the greatest share of the industrial sector occurred during the morning, between 4:00 am and 6:00 am, when it reached around a 35% share of the total demand (as measured at power station busbars), while for large consumers in the services sector, the time period of greatest share took place between 10:00 am and 8:00 pm, when it reached a share of the demand of values between 12% and 13%.

The 249,980 GWh demanded in the peninsular electricity system were covered 97% with domestic generation, while the remaining generation needed to supply the demand was imported from other countries, mainly France and Portugal. It is worth noting that a situation of import balance such as this has not occurred in the Spanish peninsular system since 2003.

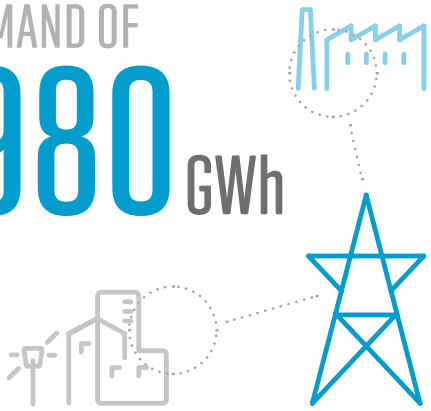
PENINSULAR DEMAND 2016

OF THE TOTAL DEMAND OF

249,980 GWh

was covered with domestic generation

97%



(4) Includes losses.

(5) Hourly profiles applied to the general tariff for low voltage with contracted power less than or equal to 10 kW.

ELECTRICITY GENERATION

Renewable energies increased their key role by having more than a 40% share in the total electricity generation mix of the peninsular system

Electricity generation in the peninsular system, which represents almost 95% of the total generation nationwide, was 248,383 GWh in 2016, 2.4% lower than in 2015. The most significant decrease occurred in coal-fired generation that registered a reduction of 30.9% with respect to the previous year.

In contrast, electricity generation in non-peninsular systems (13,778 GWh) increased by 1.7% over the previous year, highlighting in this case the 23.5% increase in coal-fired generation. Also noteworthy is the significant increase in the production of the hydro-wind power station located on the island of El Hierro which, although in absolute values is small, in terms of percentage was 111.6% higher than that of the previous year.

ELECTRICITY GENERATION PENINSULAR SYSTEM

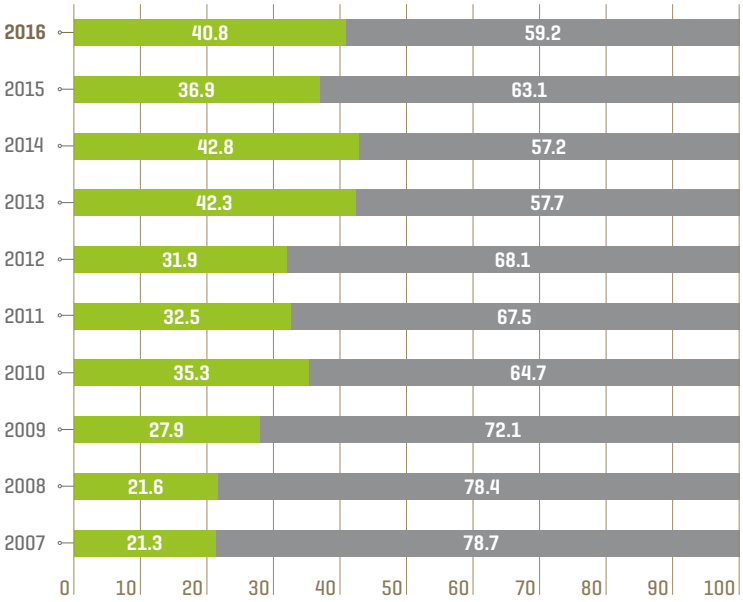
2.4% ↓

Compared to 2015

Regarding the balance of the generation mix by type of energy, unlike 2015, renewable energies increased their share in the mix of the peninsular electricity generation to 40.8% (36.9% in 2015), favoured by the hydrological characteristics of the year, which led to a remarkable increase of 25.5% in hydroelectric generation compared to the previous year. In contrast, non-renewable energies reduced their share to 59.2% (63.1% in 2015).

EVOLUTION OF RENEWABLE AND NON-RENEWABLE GENERATION ON THE SPANISH PENINSULA

%



Renewable: hydro, wind, solar photovoltaic, solar thermal and other renewables. Does not include pumped storage generation.

Non-renewable: nuclear, coal, fuel/gas, combined cycle and cogeneration and waste.

ELECTRICITY GENERATION NON-PENINSULAR SYSTEMS

A 1.7% INCREASE

Compared to 2015

13,778 GWh

COAL-FIRED GENERATION INCREASED SIGNIFICANTLY

23.5%

NATIONAL ELECTRICAL ENERGY BALANCE [1]

	Peninsular system		Non-peninsular systems		National total	
	GWh	%16/15	GWh	%16/15	GWh	%16/15
Hydro	39,168	25.5	3	-3.2	39,171	25.5
Nuclear	56,099	2.5	-	-	56,099	2.5
Coal	35,188	-30.9	2,304	23.5	37,491	-29.0
Fuel/gas [2]	-	-	6,765	4.1	6,765	4.1
Combined cycle [3]	25,686	1.7	3,574	-11.1	29,260	-0.1
Hydro-wind	-	-	18	111.6	18	111.6
Wind	47,296	-0.9	399	-0.6	47,695	-0.9
Solar photovoltaic	7,567	-3.5	398	-0.1	7,965	-3.4
Solar thermoelectric	5,060	-0.5	-	-	5,060	-0.5
Other renewables [4]	3,416	7.6	11	6.2	3,426	7.6
Cogeneration	25,782	1.4	35	10.1	25,817	1.4
Waste	3,121	4.5	271	-12.7	3,392	2.9
Generation	**248,383**	**-2.4**	**13,778**	**1.7**	**262,161**	**-2.2**
Pumped storage consumption	-4,819	6.6	-	-	-4,819	6.6
Peninsula-Balearic Islands' link [5]	-1,251	-6.4	1,251	-6.4	0	-
International exchange balance [6]	7,667	-	-	-	7,667	-
Demand (b.c.-at power station busbars)	**249,980**	**0.6**	**15,029**	**1.0**	**265,009**	**0.7**

(1) Allocation of generation units based on primary fuel. (2) Generation from auxiliary generation units is included in the Balearic Islands' electricity system. (3) Includes operation in open-cycle mode. The Canary Islands' electricity system uses gas-oil as primary fuel. (4) Includes biogas, biomass, marine energy and geothermal. (5) Positive value: incoming energy; negative value: outgoing energy. (6) Positive value: importer balance; negative value: exporter balance. Increment values are not calculated when exchange balances have different signs.

BREAKDOWN OF INSTALLED POWER CAPACITY NATIONAL ELECTRICITY SYSTEM AS AT 31.12.2015

	Peninsular system		Non-peninsular systems		National total	
	MW	%16/15	MW	%16/15	MW	%16/15
Hydro	20,352	0.0	1	0.0	20,353	0.0
Nuclear	7,573	0.0	-	-	7,573	0.0
Coal	9,536	-8.9	468	0.0	10,004	-8.5
Fuel/gas	-	-	2,490	0.0	2,490	0.0
Combined cycle	24,948	0.0	1,722	0.0	26,670	0.0
Hydro-wind	-	-	11	0.0	11	0.0
Wind	22,900	0.1	156	0.0	23,057	0.1
Solar photovoltaic	4,430	0.3	244	0.3	4,674	0.3
Solar thermoelectric	2,299	0.0	-	-	2,299	0.0
Other renewables [1]	743	0.1	5	0.0	749	0.1
Cogeneration	6,600	-0.1	44	0.0	6,645	-0.1
Waste	677	0.0	77	0.0	754	0.0
Total	**100,059**	**-0.9**	**5,220**	**0.0**	**105,279**	**-0.8**

(1) Includes biogas, biomass, marine energy and geothermal. // Source: National Commission for Markets and Competition (CNMC) on data regarding power from: non-Hydro Management Unit (UGH), wind, solar photovoltaic, solar thermoelectric, other renewables, cogeneration and waste.

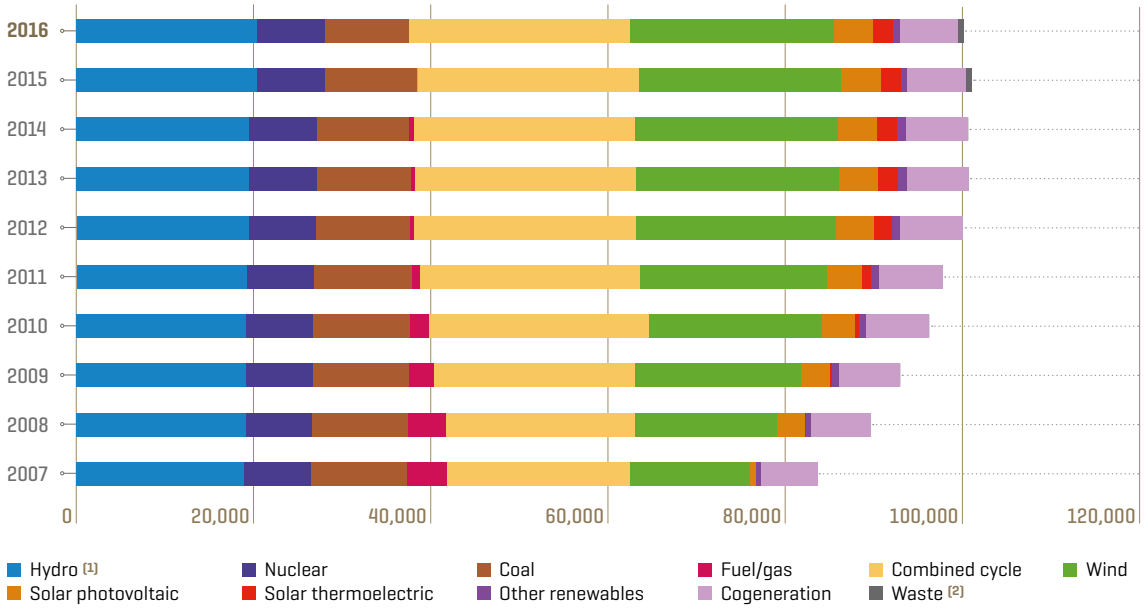
After a long trend of continuous growth, with the only exception being the slight fall experienced in 2014, installed power capacity of the complete set of electricity generating facilities in Spain fell in 2016

INSTALLED COAL-FIRED POWER CAPACITY ON THE SPANISH PENINSULA

FALLS BY ↓ 8.9 % Due to the decommissioning of five coal-fired facilities, which jointly total 932 MW

EVOLUTION OF INSTALLED POWER CAPACITY ON THE SPANISH PENINSULA

MW



(1) Includes power from pure pumped storage. (2) Power included in Other renewables and Cogeneration until 31 Dec, 2014. // Source: National Commission for Markets and Competition (CNMC) on data regarding power from: non-Hydro Management Unit (UGH), wind, solar photovoltaic, solar thermoelectric, other renewables, cogeneration and waste.

Spain's electricity generation capacity fell slightly compared to the previous year, registering an installed capacity of 105,279 MW as at 31 December 2016, a value that is 0.8% less than at the end of 2015. This decrease corresponds almost entirely to the decommissioning of five coal-fired facilities on the peninsula and the removal of their power capacity (totalling 932.2 MW) from the electricity generation market, which represents a decrease of 8.9% in installed coal-fired power capacity compared to the previous year. The remaining technologies have not undergone any changes, apart from small variations in wind, solar photovoltaic and cogeneration.

MINIMUM COVERAGE INDEX PENINSULAR SYSTEM

1.3 ↓

a lower value than in the previous six years

The minimum coverage index for the peninsula, defined as the minimum value of the ratio between the power available in the system and the peak power demanded from the system, stood at 1.30 in 2016, a lower value than in the previous six years.

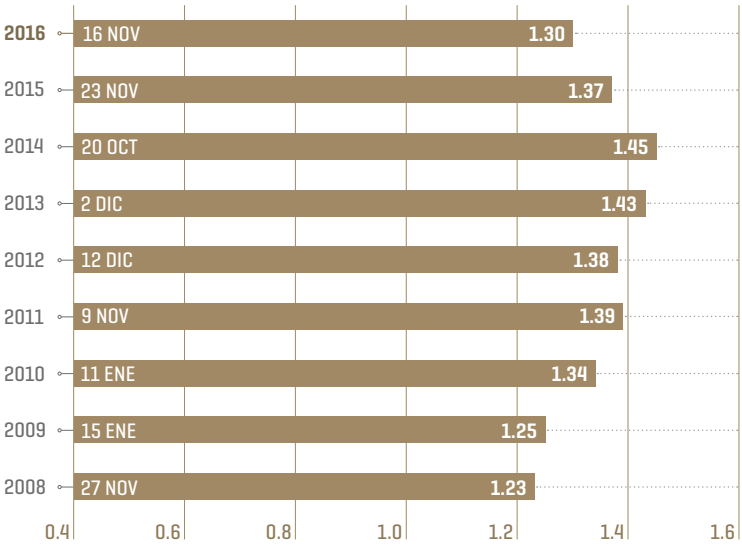
COMPLETE SET OF ELECTRICITY GENERATING FACILITIES IN SPAIN

INSTALLED POWER CAPACITY

2015
2016
-0.8%

105,279 MW

EVOLUTION OF THE MINIMUM COVERAGE INDEX (ICMIN) FOR THE SPANISH PENINSULA



ICmin = Min [Pd/Ps]
ICmin: Minimum coverage index. Pd: Power available in the system.
Ps: Peak power demanded to the system.

Renewable energy recovers thanks to the good performance of hydroelectric generation

RENEWABLE ENERGY GENERATION PENINSULAR SYSTEM

40.8% ↑

ALMOST 4 POINTS HIGHER

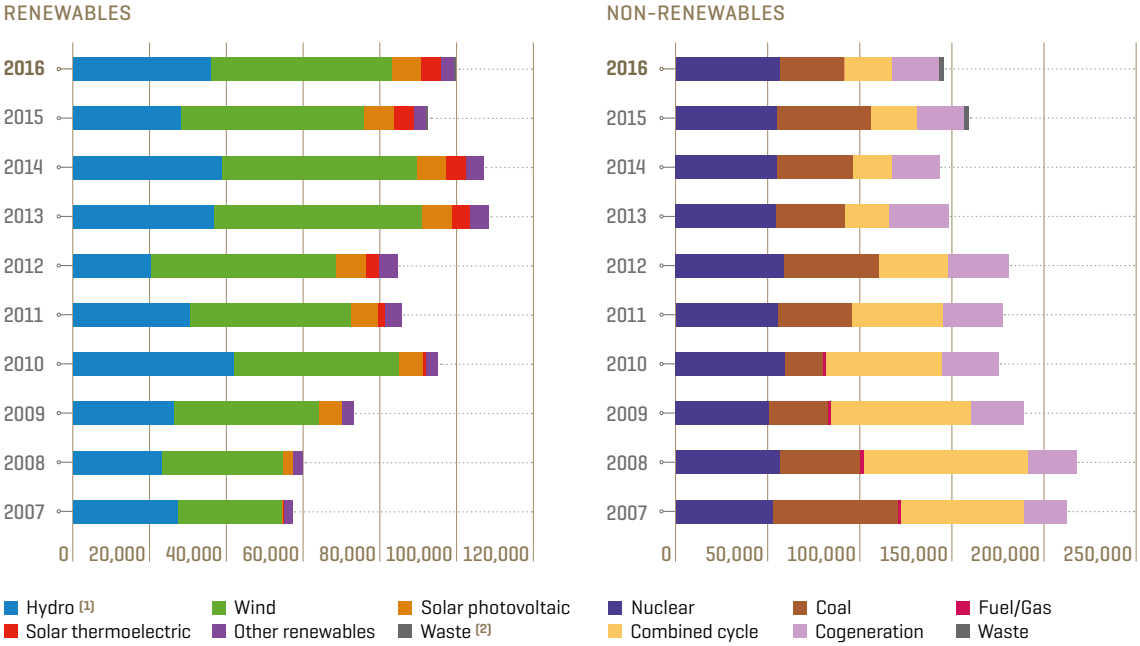
Compared to 2015

Thanks to the good performance of hydroelectric generation, during 2016 there was a recovery in renewable energy generation compared to the previous year, which presented the challenge of integrating this type of energy into the system under secure conditions. To this end, the efficient work of the Control Centre of Renewable Energies (CECRE) was once again key, enabling 40.8% of the energy integrated into the peninsular system in 2016 to come from renewable sources, almost four points higher than in 2015.

Contrary to the behaviour of renewable energy, generating power stations that use fossil fuels as their primary energy source reduced their production compared to the previous year, with coal-fired power stations on the peninsula absorbing practically the entire impact of the decline.

EVOLUTION OF RENEWABLE AND NON-RENEWABLE ELECTRICITY GENERATION ON THE PENINSULAR SYSTEM

GWh



(1) Does not include pumped storage generation. (2) Generation included in Other renewables and Cogeneration until 31-Dec, 2014. 50% of the generation produced by urban solid waste is deemed to be renewable.

In the whole of 2016, renewable generation on the peninsula amounted to 99,783 GWh, representing an increase of 7.8% in terms of annual variation. This growth in renewable generation contrasts with falls in the previous two years, 13.4% in 2015 and 1.3% in 2014.

This disparity in the behaviour of renewable generation is explained by the variability that characterises this type of energy due to its dependence on climate conditions. Thus, the increase in renewable generation in 2016 was strongly influenced, as indicated before, by the considerable growth of hydroelectric generation. Similarly, in 2015, hydroelectric generation was also the determining factor, but in this case for the decrease in renewables.

Peninsular wind power generation in 2016 stood at 47,296 GWh, down 0.9% from the previous year. This decrease is mainly due to the fall in generation observed in the last quarter of the year, when this technology produced 19.6% less than in the same quarter of 2015. However, it remains the most relevant renewable technology in the peninsular system, representing 47.4% of the renewable mix in 2016.

Regarding total generation, it should be noted that wind power was once again the second main source of peninsular generation in 2016, representing 19.3% of the total, as was the case in 2014. In addition, it was the technology that contributed the most to the total generation in the months of January (26.7%), February (30.1%) and March (25.1%).

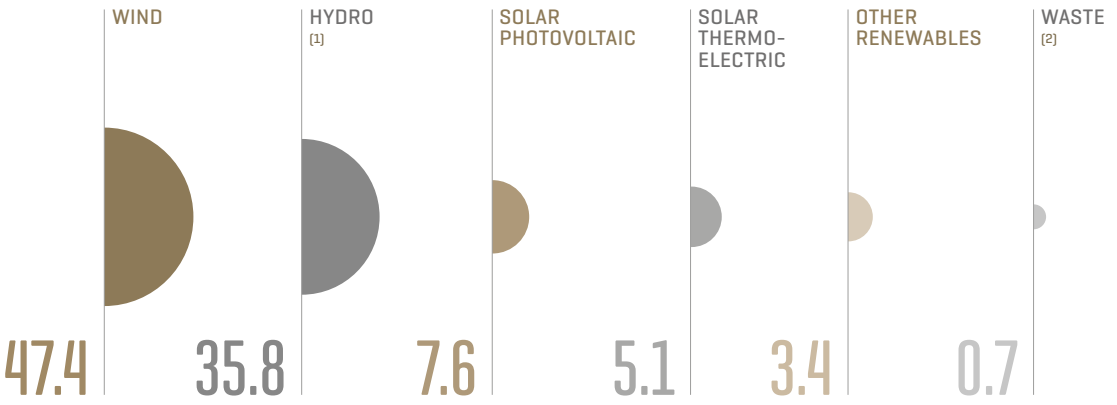
RENEWABLE GENERATION ON THE PENINSULA

7.8% ↑

Compared to 2015

ANNUAL GENERATION MIX STRUCTURE OF RENEWABLE ENERGY 2016

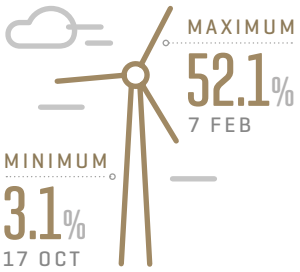
%



(1) Does not include pumped storage generation. (2) 50% of generation obtained using urban solid waste is considered as renewable.

During the course of 2016, new all-time highs were set for hourly and daily wind-power generation

DAILY WIND ENERGY GENERATION 2016



With respect to the complete set of generating facilities

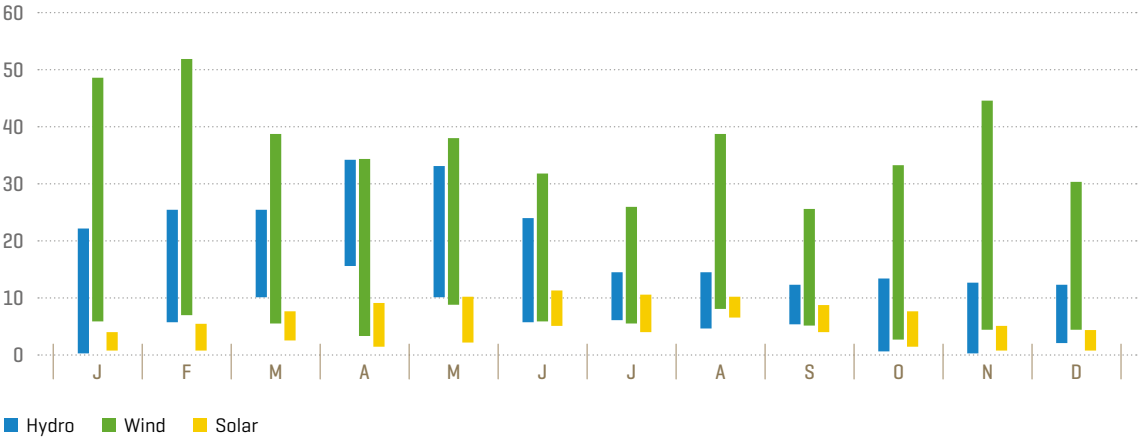
In addition, in 2016 new all-time highs for hourly and daily peninsular wind power generation were registered. On 11 January, an all-time high of hourly energy was registered at 17,390 MWh between 1:00 pm and 2:00 pm, an increase of 1% over the previous record of 17,213 MWh set on 29 January 2015.

In addition, on Friday 12 February 2016, the daily energy generation reached an all-time high in the peninsular electricity system with a value 3.6% higher than that registered in January 2015.

The great variability of wind power generation can be seen in the graph showing the maximum and minimum daily coverage of renewable technologies: hydro, wind and solar. During 2016, daily wind power generation had a share in the generation mix that ranged from a low of 3.1% on 17 October to a high of 52.1% on 7 February.

MAXIMUM AND MINIMUM COVERAGE ON THE PENINSULAR IN 2016 USING HYDRO, WIND AND SOLAR

%



Producible hydroelectric registered a value above the historical average value

Hydroelectric generation on the peninsula in 2016 reached 39,168 GWh, an increase of 25.5% over the previous year and a contribution to the peninsular generation mix of 14.6%. The comparative graph of monthly generation 2015-2016 shows how, during the first eight months of 2016, hydroelectric generation was superior both to the generation of 2015 and to the historical average, calculated with generation from the period 1991-2014. In April 2016, hydroelectric generation was almost double that registered in the same month of the previous year. In addition, in April and May it was the technology with the largest share in the generation mix on the Spanish Peninsula, with hydro accounting for 25.9% and 26.4%, respectively. As of September, this situation changed, as hydroelectric generation fell by 3.3% in the fourth quarter of 2016.

PENINSULAR HYDROELECTRIC GENERATION

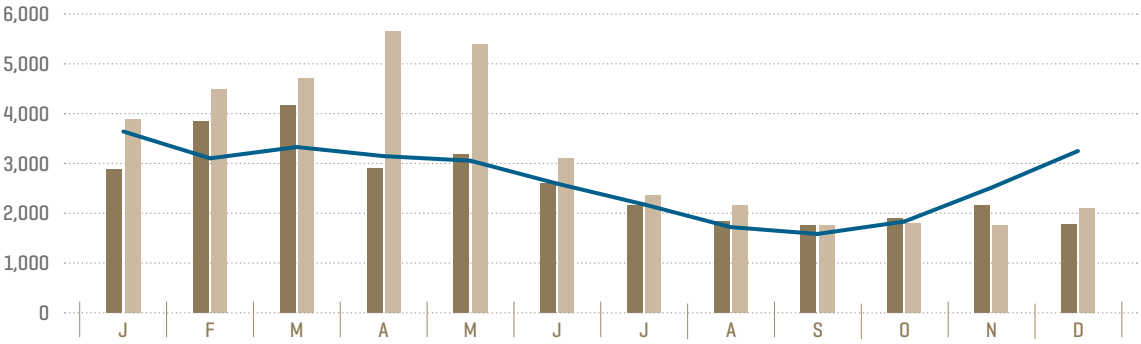
+25.5%
Compared to the previous year

39,168 GWh

Hydroelectric generation in April almost doubles that of April 2015

PENINSULAR HYDROELECTRIC GENERATION
2015-2016 COMPARED TO AVERAGE GENERATION

GWh

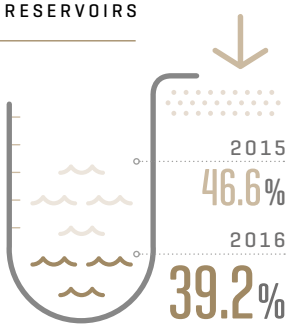


Hydroelectric generation in 2015 Hydroelectric generation in 2016 Average historical hydroelectric generation (1)

(1) Average monthly hydroelectric generation in the period 1991-2014.

Hydroelectric reserves ended 2016 below the average statistical value

HYDROELECTRIC RESERVES OF PENINSULAR RESERVOIRS



The lowest level of the last three years

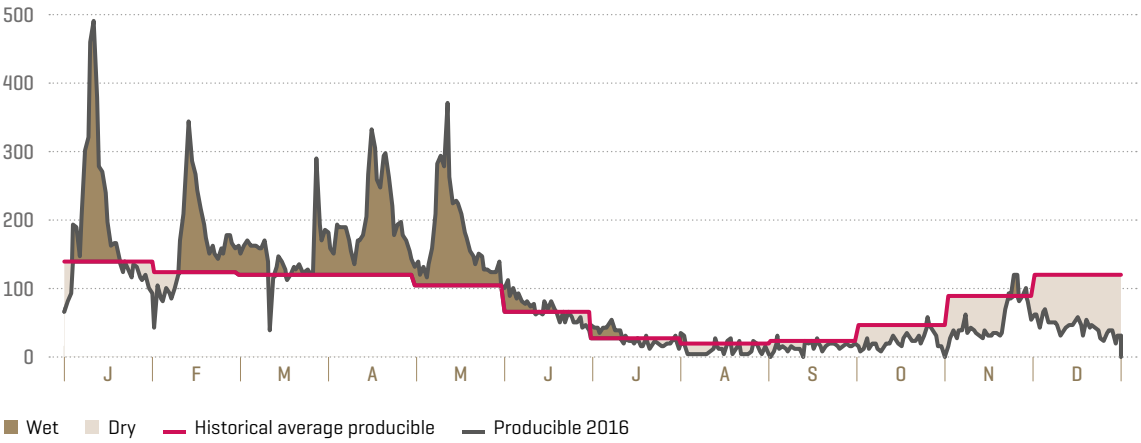
This good performance of hydroelectric generation is in line with the producible hydroelectric values (maximum amount of electricity that could be produced in 2016 with the registered hydroelectric contributions), which reached 34,422 GWh, 38.4% higher than in 2015 and 12.0% higher than the average annual historical value. Therefore, we can consider that 2016, as a whole, was a wet year due to the fact that the producible hydroelectric index, defined as the quotient between the producible energy and the average producible energy, reached a value of 1.1.

Hydroelectric reserves, for the complete set of reservoirs on the Spanish peninsula, closed the year at 39.2% of their total capacity, 7.4 points below the previous year and below the average statistical value. The level of reserves in 2016 is the lowest in the last three years.

Solar photovoltaic facilities of the peninsular system produced 7,567 GWh, representing a decrease of 3.5% compared to 2015 and a 3.1% contribution to the generation mix on the Spanish Peninsula, a value that has remained constant since 2013.

DAILY PRODUCIBLE HYDROELECTRIC ENERGY DURING 2016 COMPARED TO THE HISTORICAL AVERAGE PRODUCIBLE

GWh



With regard to **solar thermal** on the peninsula, in 2016, 5,060 GWh were generated with this technology, representing 2.1% of the total peninsular generation in the year.

Regarding generation from **other renewables** (biogas, biomass, marine hydro and geothermal), worth noting is the 7.6% growth experienced in 2016 compared to the previous year, although its weight in the peninsular generation mix barely reaches 1.4%.

NON-RENEWABLE ENERGY GENERATION

Decreased due to a substantial fall in generation from

COAL

Non-renewable energies of the peninsular system registered a generation of 145,226 GWh in 2016, 8.5% lower than in 2015. This decrease contrasts with the increase of 11% experienced last year and reduces its contribution to the total peninsular generation to 59.2%, compared to 63.1% in 2015.

Within the non-renewable energies, for another year **nuclear** continues to be the main source of peninsular generation, reaching a production in 2016 of 56,099 GWh, 2.5% more than the previous year. This growth means that the contribution of this technology in the generation mix stood at 22.9%, a value higher than the 21.8% registered in 2015. The utilisation rate (ratio between actual production and the production that could have been produced if power stations had operated at their rated power for the whole time they were available) was 98.1%.

NUCLEAR POWER GENERATION

2.5% More than the previous year

56,099 GWh

ANNUAL GENERATION STRUCTURE OF THE PENINSULAR ELECTRICITY ENERGY

%

	2015	2016
Nuclear	21.8	22.9
Coal	20.3	14.4
Combined cycle	10.1	10.5
Cogeneration	10.0	10.4
Waste [2]	1.2	1.3
Wind	19.0	19.3
Hydro [1]	11.2	14.6
Solar photovoltaic	3.1	3.1
Solar thermoelectric	2.0	2.1
Other renewables	1.3	1.4
Renewable	36.9	40.8
Non-renewable	63.1	59.2

2015

2016

(1) Does not include pumped storage generation. (2) 50% of generation obtained using urban solid waste is considered as renewable.

As for **coal-fired power stations,** during 2016 they underwent significant changes in terms of installed power and generation. Specifically, there were five coal-fired production units decommissioned, which together total 932.2 MW. As a result, coal accounted for 9.5% of the installed power on the peninsula at the end of the year, compared to 10.4% in 2015.

Regarding electricity generation, coal-fired power on the peninsula is the technology which registered the greatest fall in 2016, 30.9% compared to 2015. This reduction caused a drop of 5.9 points in its share in the annual generation mix structure of the peninsula, going from 20.3% in 2015 to just 14.4% in 2016. Coal-fired generation fell every month in 2016, except December, registering reductions of 69.4% and 63,4 % in April and May respectively, coinciding with the months of greater hydroelectric generation. However, it should be noted that in November and December coal was the technology with the greatest share in the monthly generation mix, with 21.8% and 24.5% respectively. The utilisation rate of coal-fired stations was 48.5%.

COAL

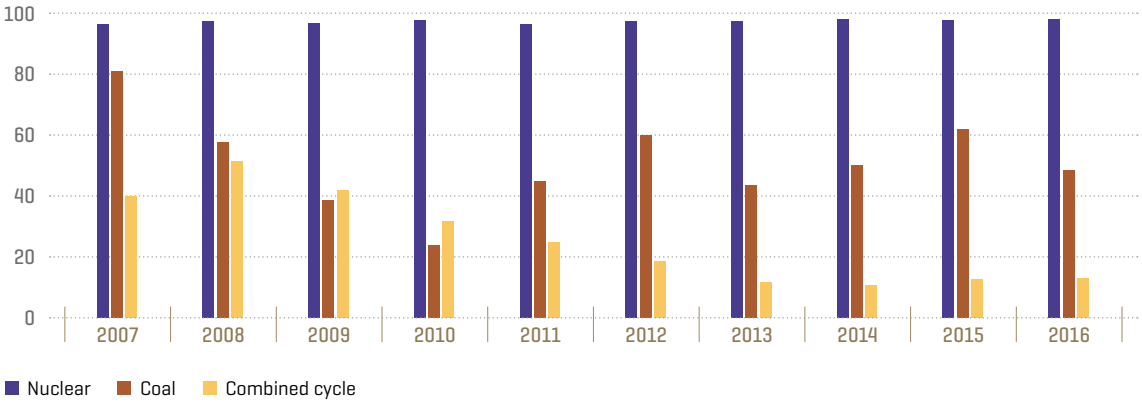
9.5%

of installed power on the peninsula

Compared to 10.4% in 2015

Peninsular generation from **combined cycle power stations** grew for the second consecutive year, after the fall suffered in the previous six years. Specifically, it reached 25,686 GWh, 1.7% more than the previous year, although this growth is well below the value of 18.4% registered in 2015. In terms of the structure of the generation mix, combined cycle covered 10.5% of peninsular generation in 2016 (10.1% in 2015) and the utilisation rate barely reached 13%.

UTILISATION COEFFICIENT OF PENINSULAR THERMAL POWER STATIONS [1]



(1) The utilisation coefficient is the quotient between actual production and the available production or maximum production that the power station could.

The recovery of electricity generation of non-peninsular systems continues

ELECTRICITY GENERATION. BALEARIC ISLANDS ELECTRICITY SYSTEM

2.7% ↑

Compared to 2015

Annual electricity generation in the complete set of non-peninsular systems in 2016 reached 13,778 GWh, 1.7% higher than that of the previous year. This growth occurred for the second consecutive year, after six consecutive years of declines in production. Per system, the Balearic Islands, the Canary Islands and Ceuta grew 2.7%, 1.2% and 2.6% respectively, while Melilla fell by 2.4%.

In 2016, the electricity produced in the Balearic Islands electricity system grew for the second consecutive year reaching 4,582 GWh, a 2.7% increase over the previous year. Coal-fired power stations, which account for 20.4% of installed capacity in this system, were the technology with the largest increase in production in 2016, 23.5% compared to the 14.7% decrease they registered in 2015.

BALEARIC ISLANDS ELECTRICITY SYSTEM

COMBINED CYCLE

37.6%

of total installed power capacity

Combined cycle power stations in the Balearic Islands electricity system are the technology with the greatest amount of installed capacity, accounting for 37.6% of the total. These power stations had the opposite behaviour to those of coal-fired, as they actually reduced their production by 33% in 2016.

ELECTRICITY GENERATION. NON-PENINSULAR SYSTEMS

13,778 GWh | **+1.7%**

Compared to 2015

- +2.7% Balearic Islands
- +1.2% Canary Islands
- +2.6% Ceuta
- -2.4% Melilla

Energy transferred from the Peninsula continues to play a significant role in the demand coverage of the Balearic Islands

ENERGY COMING FROM THE PENINSULA

6.4% ↓

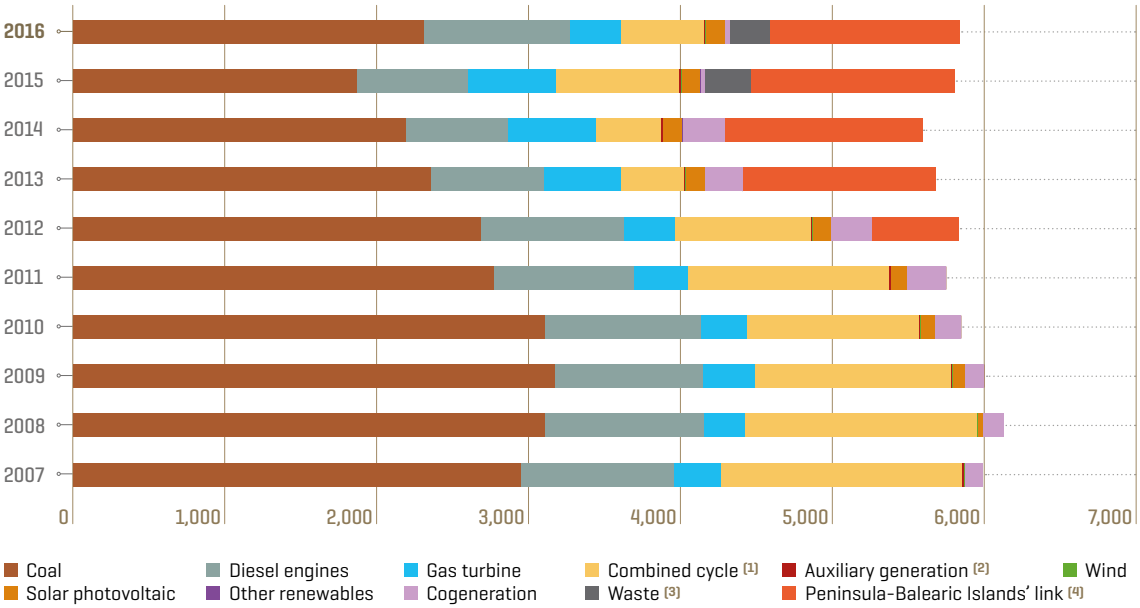
The decrease occurred in every month of the year except in March, May and June

As for the Spanish Peninsula-Balearic Islands link, during 2016 the amount of energy coming from the Peninsula was reduced by 6.4%. This decrease in energy input occurred in every month of the year, except in March, May and June.

However, the energy transferred from the Peninsula continues to play a significant role in the demand coverage of the Balearic Islands, as it represented 21.4% of the demand in 2016, reaching peaks that exceeded 30% of hourly consumption. This has resulted in savings of 18% in the costs of coverage of the Balearic Islands system and has avoided the emission of approximately 350,000 tonnes of CO_2 into the atmosphere in the Balearic Islands.

EVOLUTION OF DEMAND COVERAGE IN THE BALEARIC ISLANDS

GWh



(1) Includes operation in open cycle mode. (2) Emergency generators installed temporarily in specific zones to cover a deficit in generation. (3) Generation included in Other renewables and Cogeneration until 31/12/2014. (4) Peninsula-Balearic Islands' link working at minimum technical level until 31/08/2012.

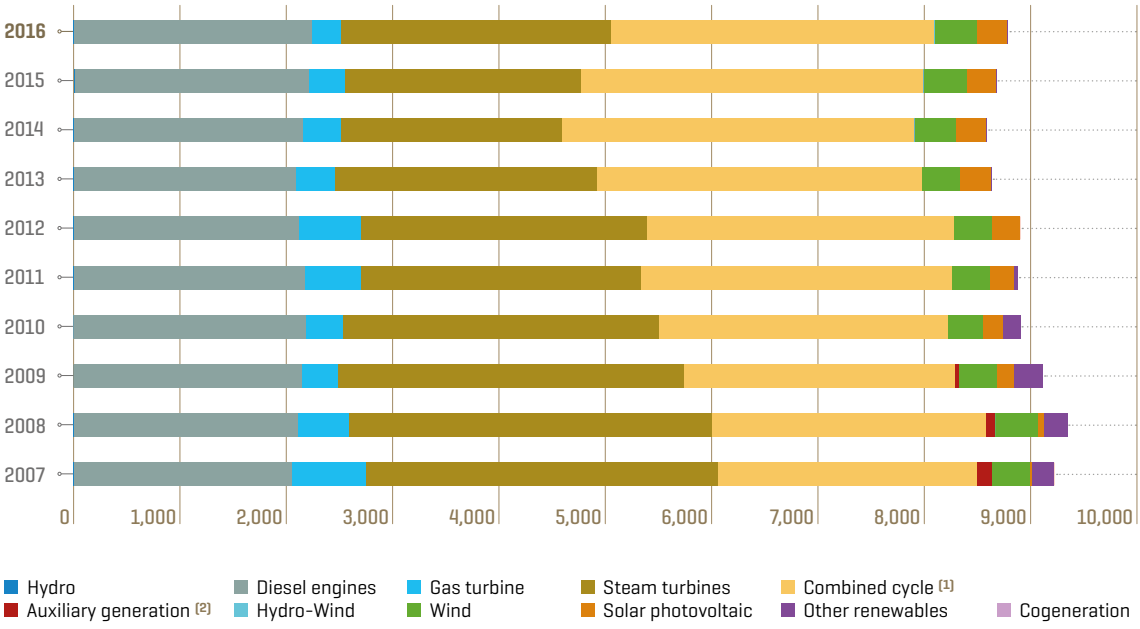
Renewable production from the new hydro-wind power station on the Canary Islands continues to increase

Energy production in the Canary Islands electricity system grew by 1.0% in 2015 and by 1.2% in 2016, after two consecutive years of annual reductions. The increase in generation in 2016 was mainly obtained from diesel engines and steam turbines, which grew by 0.9% and 14%, respectively, compared to the previous year. The higher production of these technologies helped offset the lower generation of gas turbines, 15.6%, and combined cycle stations, which experienced a negative variation of 5.6% compared to 2015.

Combined cycle is the technology with the highest installed power capacity in the Canary Islands, 31.4% at the end of 2016. Similarly, since 2011 it is the technology which contributes the most to the generation mix of the Canary Islands, with a 34.5% share in 2016.

EVOLUTION OF DEMAND COVERAGE IN THE CANARY ISLANDS

GWh



Includes operation in open cycle mode. Uses gas-oil as primary fuel. (2) Emergency generators installed temporarily in specific zones to cover a deficit in generation.

The construction of the Soria-Chira pumped-storage hydroelectric power station will allow a greater use of renewable energy in Gran Canaria

THE GORONA DEL VIENTO HYDRO-WIND POWER STATION

Has supplied the electricity system of El Hierro

500 h

WITH 100% RENEWABLE ENERGY

In the Canary Islands electricity system, generation from renewable sources represented 8% of the total generation in 2016, reaching 29% in Gran Canaria and 35% in Palma throughout the year, values which are especially significant in isolated electricity systems.

Similarly, the Gorona del Viento hydro-wind power station has been operating regularly throughout 2016, increasing the integration of renewable energy in the electricity system of El Hierro. During 2016, this power station generated more than double the energy produced the previous year, with especially significant increases in the first half of the year. Thus, 41% of the total annual generation of El Hierro came from renewable energy sources. More importantly, is that this electricity system supplied itself of 100% renewable energy for a total of more than 500 hours.

In order to reduce the vulnerability of small and isolated electricity systems such as those of the Canary Islands, when faced with peaks of demand or should certain situations of a lack of generation occur, it is crucial to introduce energy storage systems such as pumped-storage hydroelectric power stations, which serve as operational tools to improve the guarantee of supply, security of the system and the integration of non-manageable renewable energy.

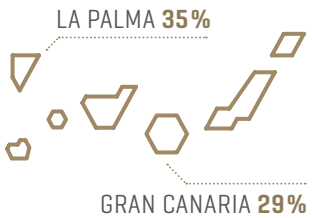
CANARY ISLANDS ELECTRICITY SYSTEM

RENEWABLE GENERATION

Especially significant are the specific records of La Palma and Gran Canaria

8 % of the total generation in 2016

SPECIFIC RECORDS



In this regard, the construction of the pumped-storage hydroelectric power station between the Soria and Chira reservoirs, whose administrative permitting process began in 2016, represents an essential tool to progress towards the sustainability of the new energy model in the Canary Islands, as it will allow greater development and use of renewable energies in the island of Gran Canaria.

The hydroelectric station's power capacity represents about 36% of the current demand peak on the island, which makes it an efficient operational tool for the electricity system to improve the guarantee of supply, the security of the system and the integration of renewable energies on the island of Gran Canaria. This facility will contribute to reducing the costs of the Canary Islands electricity system by reducing the import of fossil fuels, therefore representing higher energy efficiency and a reduction in emissions.

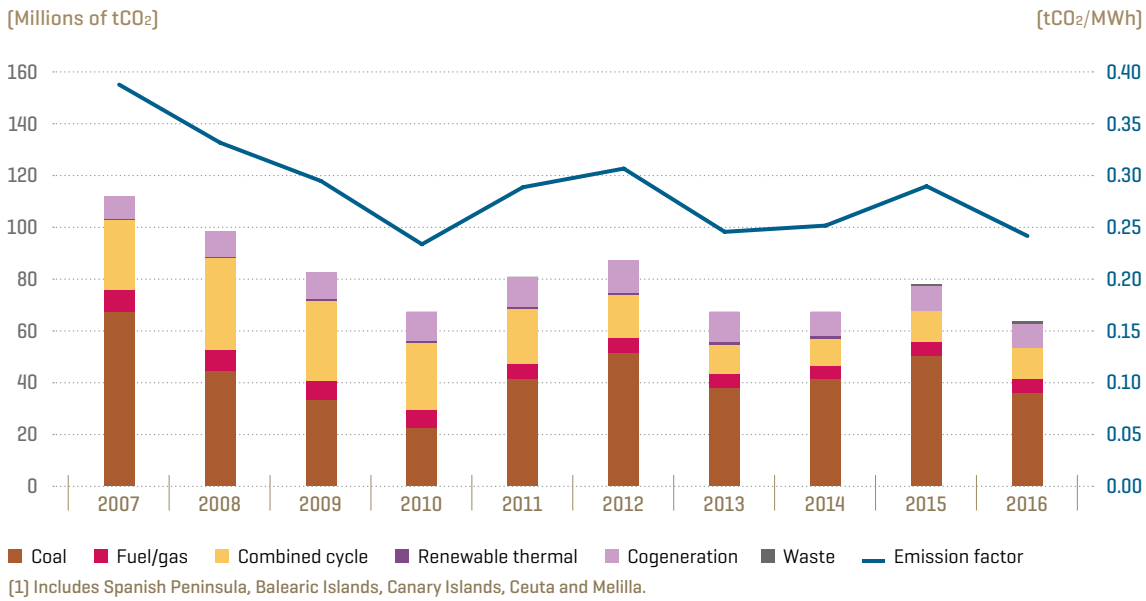
CO_2 EMISSIONS ASSOCIATED WITH ELECTRICITY GENERATION

LOWEST LEVELS in the last 10 YEARS

The composition of the generation mix has an impact on the variations of **the CO_2 emissions associated with the generation of electricity.** Thus, the significant decline in coal-fired generation in the peninsular system contributed to bringing the level of national emissions for 2016 to its lowest in the last ten years, 63.5 million tonnes, 18.3% lower than that registered in 2015 and 43.1% lower than in 2007.

CO_2 EMISSIONS AND EMISSION FACTOR ASSOCIATED TO NATIONAL ELECTRICITY GENERATION [1]

Mill. tCO_2 | tCO_2/MWh



(1) Includes Spanish Peninsula, Balearic Islands, Canary Islands, Ceuta and Melilla.

Castilla y León is the autonomous community with the highest renewable energy generation

During 2016, the set of generating facilities in each of the **autonomous communities** that make up the country behaved differently. Among the most relevant aspects, the following are noteworthy:

RELEVANT ASPECTS

CATALONIA
43,215 GWh
Highest national generation

LA RIOJA
25.0%
Increase in generation compared to 2015

CASTILLA Y LEÓN
22.8%
Of renewable generation nationwide

- In absolute terms, Catalonia is the autonomous community where most energy was generated during 2016, a total of 43,215 GWh, which represents 16.5% of national production. Much of this generation is of non-renewable origin, 82.7%, as the majority comes from nuclear and combined cycle facilities which, in relation to the total generation obtained from each of these technologies at a national level, in 2016 represented 42.3% and 23.9%, respectively.

- La Rioja is the autonomous community that had the greatest increase in generation in 2016, 25% higher than in 2015. This growth was due to the increase of 72.1% in generation coming from combined cycle facilities, which are the power stations with the biggest share in the generation mix of this autonomous community, 43.6% of the total.

- On the other hand, the biggest decrease in generation took place in Asturias, with a drop of 27.9% over the previous year. This decrease is mainly explained by the 39.3% reduction in the generation coming from coal-fired facilities, which represent 63.1% of this autonomous community's generation capacity.

- Castilla y León registered the highest production of hydroelectric and wind energy, which means that for yet another year it is the autonomous community with the highest generation of renewable energy, 22.8% of the total renewable energy nationwide. Similarly, it is the community with the highest share of renewables in its generation mix, 73.2 % in 2016.

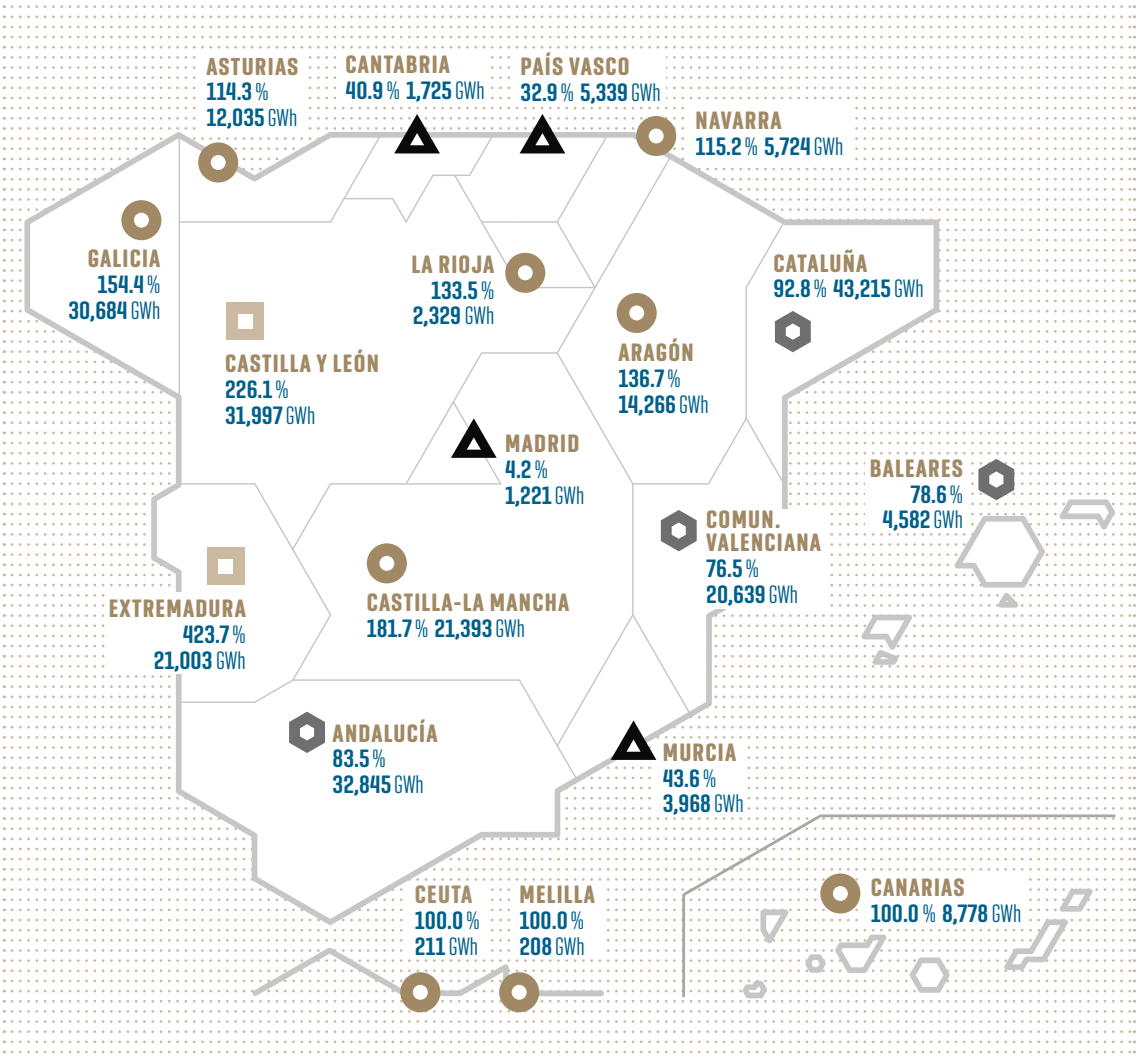
- During 2016, eight autonomous communities generated more electricity than they consumed, among which Extremadura is noteworthy, a community in which the energy generated was four times higher than its demand. The next in line in this ranking is Castilla y León and Castilla-La Mancha with generation values around twice the amount they need to meet their demand.

› The autonomous communities closest to a demand-generation balance were Asturias and Catalonia, producing 114.3% and 92.8% of their demand, respectively.

› In relation to installed power capacity, the most significant changes in 2016 occurred in: Asturias, with a reduction of 6.1% due to the decommissioning of the Narcea 1 (52 MW) and the Soto de La Ribera 2 (239 MW) coal-fired power stations and the consequent removal of their capacity from the electricity markets, and in Castilla-La Mancha, where the decrease was 5.8% due to the decommissioning of two coal-fired power stations, GICC-PL ELCOGAS (296 MW) and Puertollano (206 MW). Lastly, in Castilla y León installed capacity was reduced by 0.8% due to the decommissioning of the Compostilla 2 coal-fired power station (138 MW).

GENERATION RATIO/DEMAND (%) AND GENERATION (GW) IN 2016 BY AUTONOMOUS COMMUNITY

% | GWh



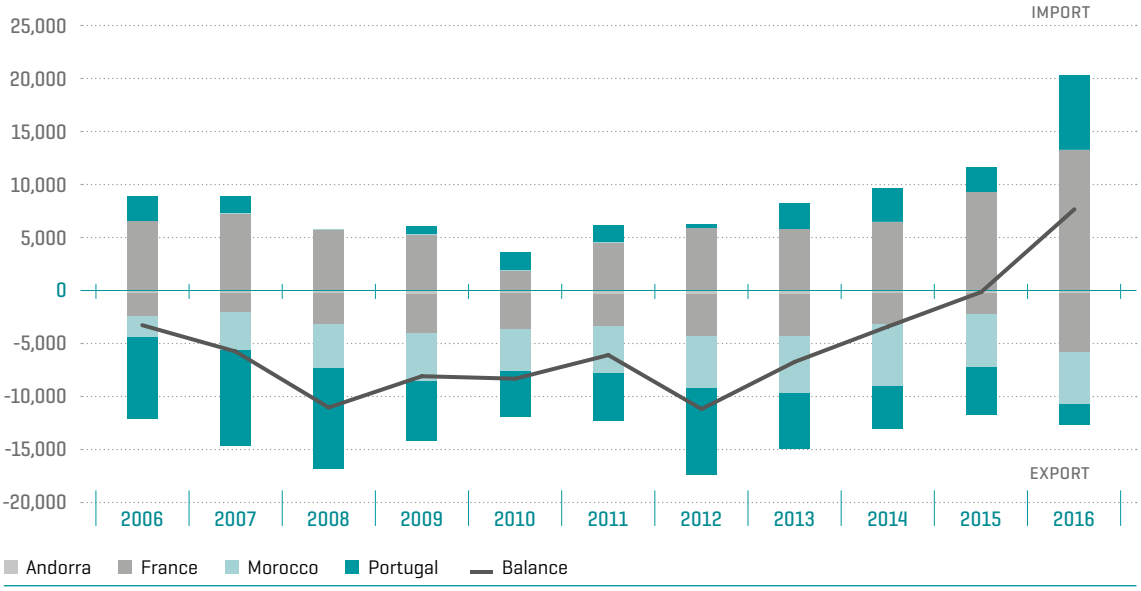
SCHEDULED INTERNATIONAL ENERGY EXCHANGES

In 2016, Spain's electricity exchange programmes with other countries closed the year with an import balance after twelve consecutive years of export balance

The volume of energy traded through exchange programmes with other countries stood at 33,032 GWh, 41.7% higher than in 2015. A total of 12,686 GWh was exported, 8.2% more than the previous year, and 20,346 GWh was imported, 75.5% more than in 2015. The resulting net exchange balance was 7,660 GWh as an importer, representing the first importer balance since 2003.

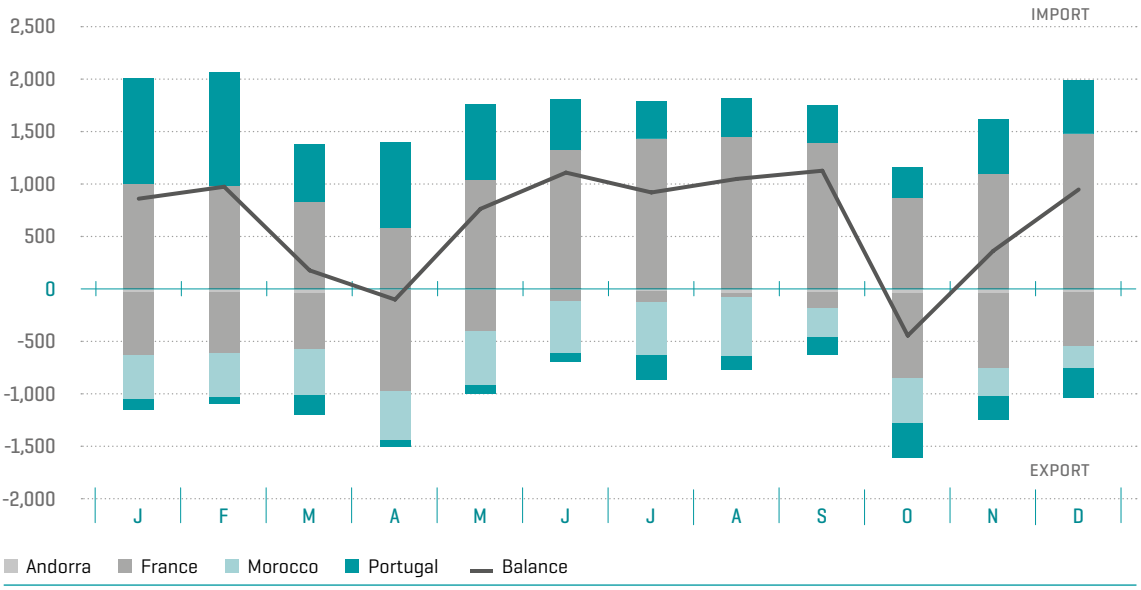
ANNUAL EVOLUTION OF SCHEDULED INTERNATIONAL ENERGY EXCHANGES

GWh



MONTHLY EVOLUTION OF SCHEDULED INTERNATIONAL ENERGY EXCHANGES

GWh



The volume of energy traded with other countries through exchange programmes was 41.7 % higher than 2015, reaching 33,032 GWh

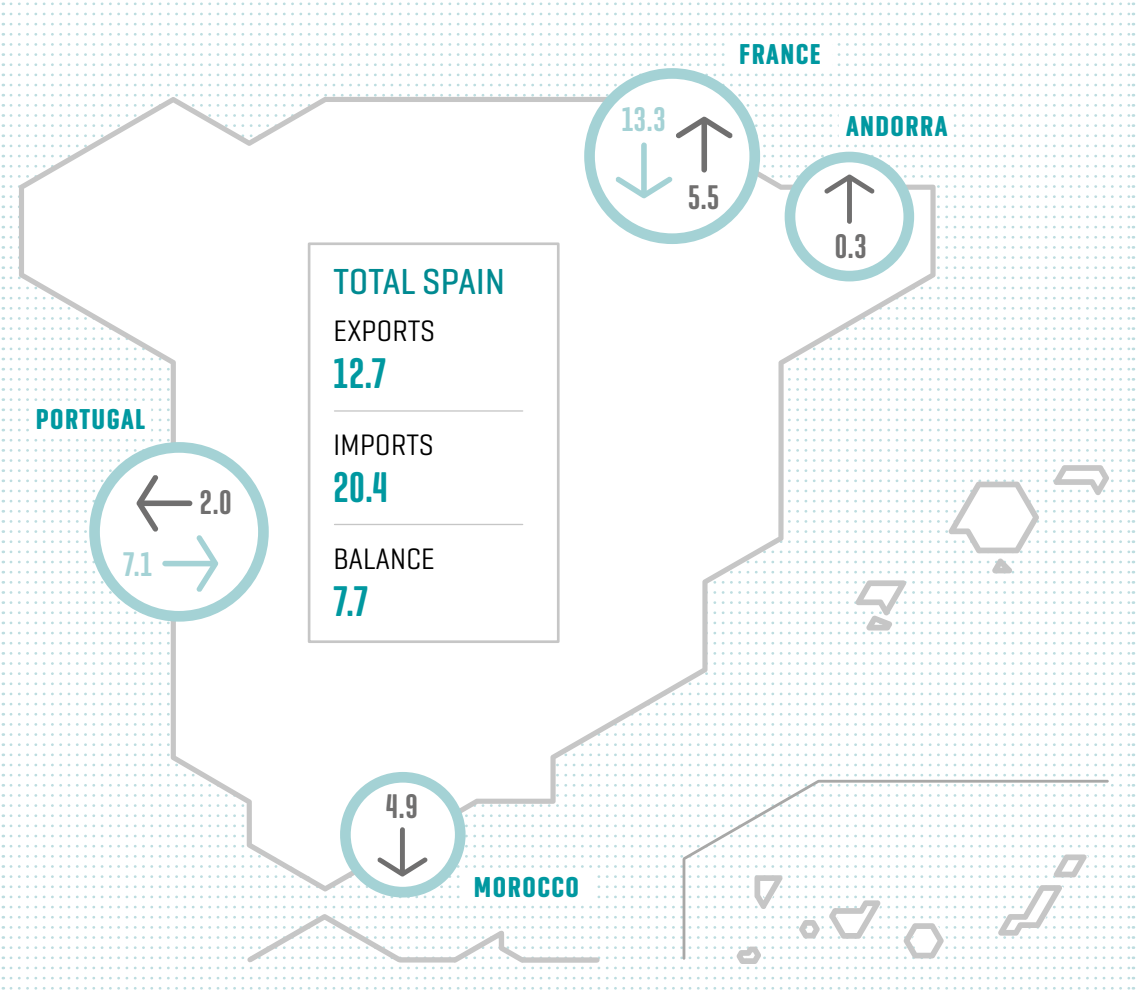
EXCHANGE PROGRAMMES NET IMPORTER BALANCE IN 2016

7,660 GWh

In 2016, the net monthly balance of energy exchanges at the Spanish interconnections was as an importer in every month of the year, except April and October. The maximum importer value was registered in September (1,115 GWh).

SCHEDULED ENERGY EXCHANGES BY INTERCONNECTION

TWh



The interconnection with France resulted in an import balance of 7,806 GWh

France

The balance of electricity exchanges through the interconnection with France was as an importer with a total of 7,860 GWh, 6.6% higher than in 2015. Imports totalled 13,290 GWh, 43.0% higher than the previous year, while exports increased to 5,483 GWh, an increase of 178.1% on last year's value. Except for April, all monthly balances were registered with importer values.

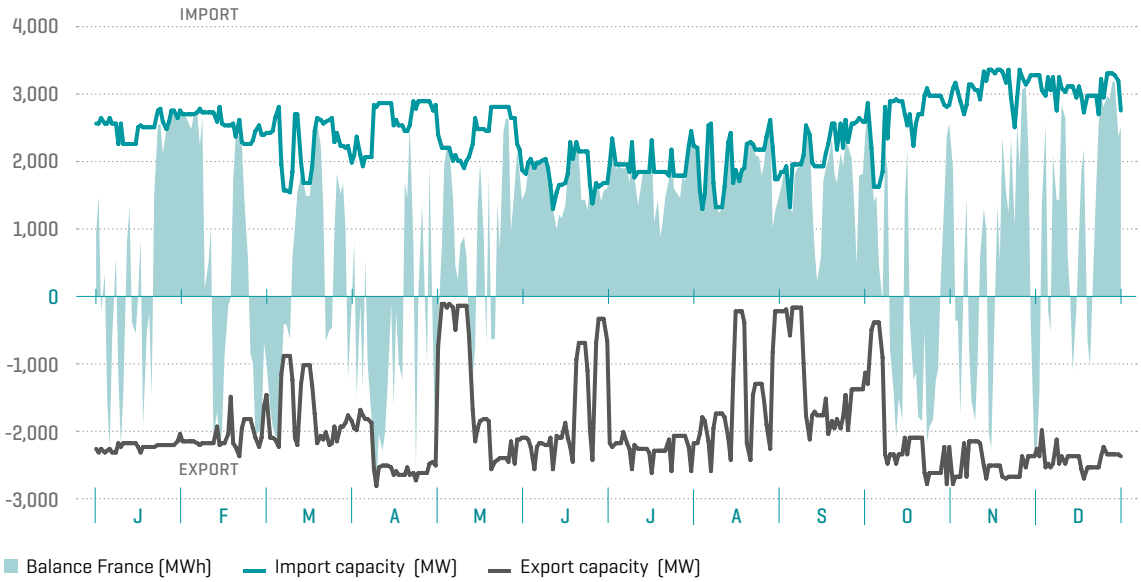
ELECTRICITY EXCHANGES WITH FRANCE

IMPORTS
13,290 GWh
↑ 43.0% higher than 2015

EXPORTS
5,483 GWh
↑ 178.1% higher than 2015

EXCHANGE CAPACITY AND NET BALANCE OF SCHEDULED EXCHANGES AT THE INTERCONNECTION WITH FRANCE

MWh | MW



France's prices were lower than those of Spain in almost every month of 2016, with the interconnection being congested in the importer direction

CONGESTION OF THE INTERCONNECTION WITH FRANCE WAS IN THE IMPORTER DIRECTION

Between June and September

58%

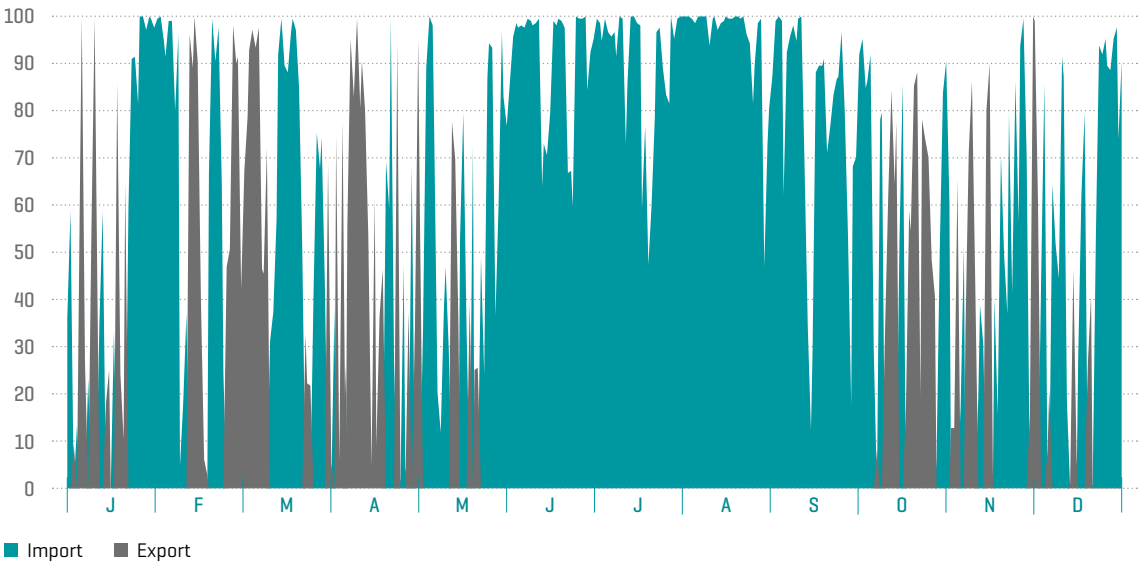
Of the days with a use of exchange capacity above

95%

A great use of the import capacity with France is observed, the interconnection being congested most of the time in the direction France to Spain. This is because the prices in France were, in general, lower than those in Spain in almost every month of 2016.

In the graph 'Utilisation rate of exchange capacity at the interconnection with France', it can be observed that from June to September, months with little renewable generation, the interconnection was mostly congested in the importer direction, with 58% of the days showing a utilisation rate of exchange capacity above 95%. In the last few months of the year, it was congested more hours in the exporter direction, due to the various situations in which France's nuclear power was not available.

UTILIZATION RATE OF EXCHANGE CAPACITY AT THE INTERCONNECTION WITH FRANCE[1]

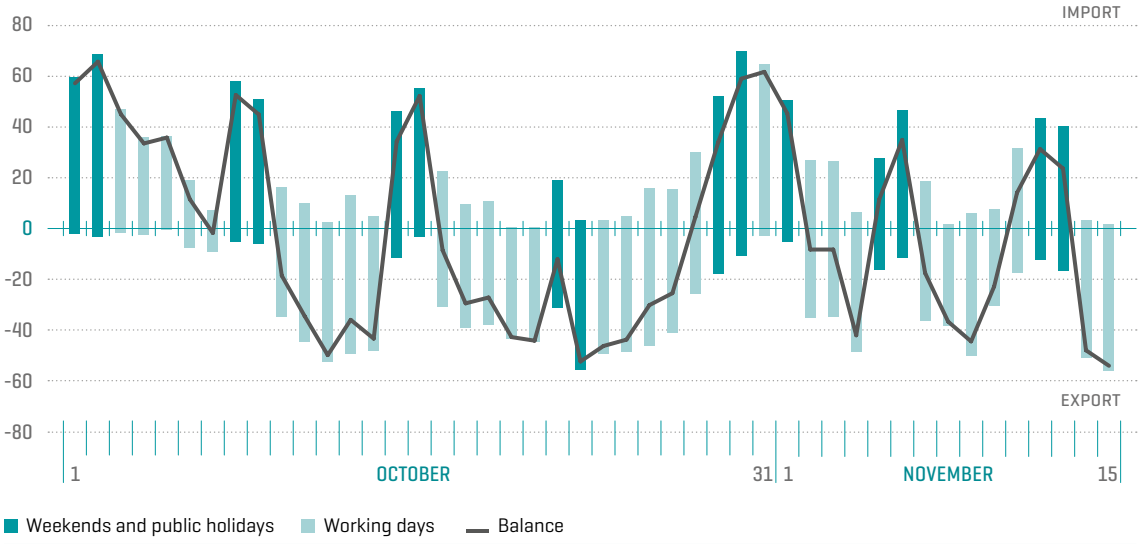


(1) Data at the close of the programme.

In the graph 'Effects of French nuclear non-availability in exchanges at the interconnection with France (1 October to 15 November)', it can be seen how since 10 October, the date on which the non-availability many nuclear power stations in France began, the exchange balance at this interconnection was that of an exporter, except on weekends. In the utilisation rate graph, one can see how as of mid-November the balance with France was more often as an importer (74%) than as an exporter.

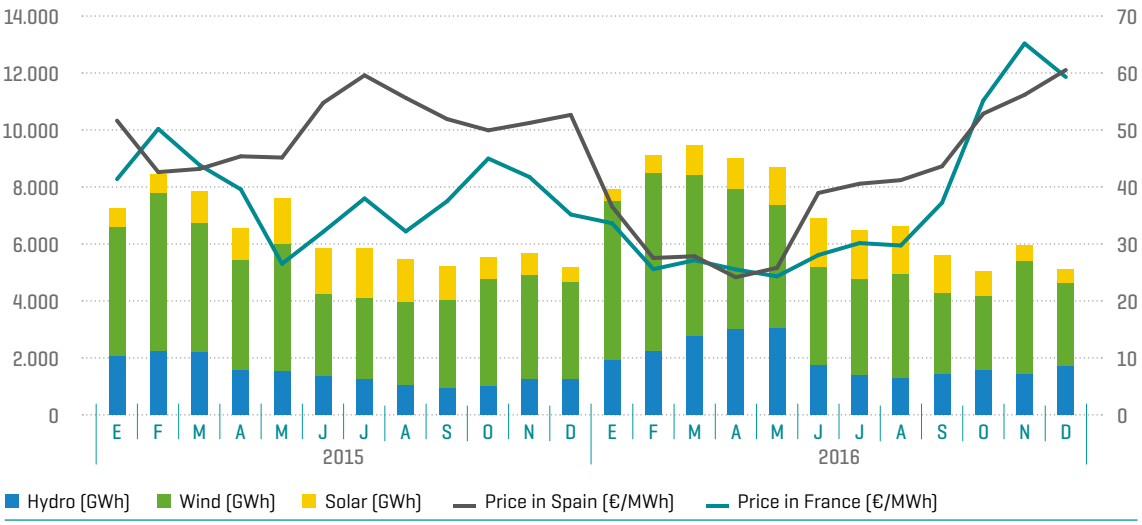
EFFECTS OF FRENCH NUCLEAR NON-AVAILABILITY IN EXCHANGES AT THE INTERCONNECTION WITH FRANCE

GWh



RENEWABLE GENERATION IN SPAIN AND ARITHMETIC DAY-AHEAD MARKET PRICES

GWh | €/MWh



With a high production of renewables, the price in Spain is similar to or lower than that of France

INFLUENCE OF WIND POWER IN EXCHANGES WITH FRANCE

More production
EXPORTER BALANCE

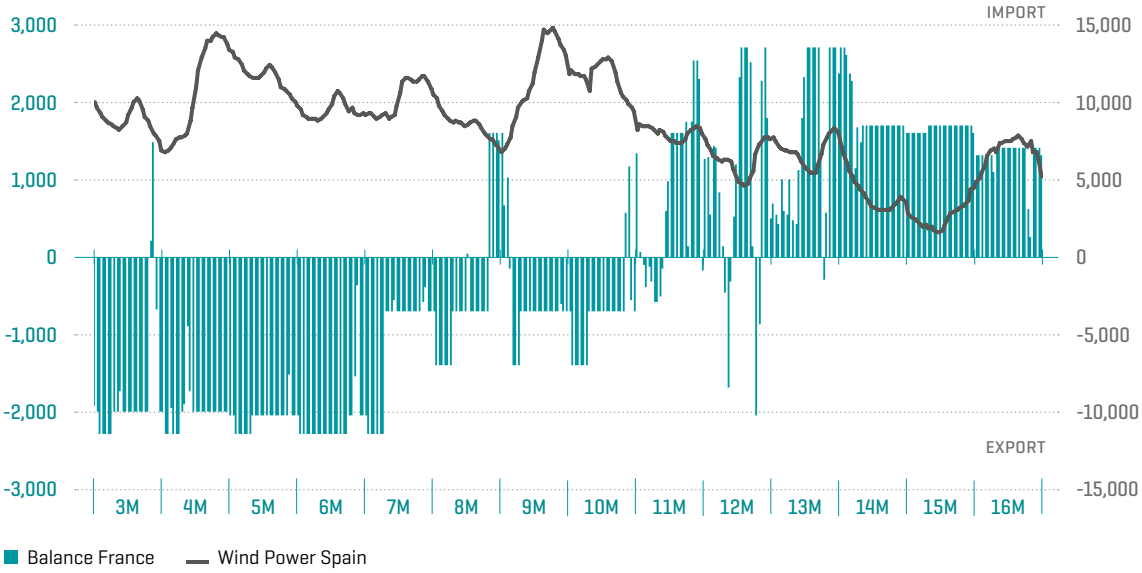
Less production
IMPORTER BALANCE

In the graph 'Renewable generation in Spain and day-ahead market prices' one can see the difference in the daily average prices between France and Spain and the effect that renewables have had on this over the last two years. One can also appreciate that when production from renewables (mostly hydro and wind) is high, the price in Spain is similar to or lower than that of France.

In 2016, this situation occurred in the first few months of the year, while in the last few months the price of France rose due to the non-availability of many nuclear power stations in that country, which caused Spain to export a lot of energy on weekdays, forcing a lot of non-renewable energy to be scheduled. Wind production also influenced the direction of exchange.

The following graph 'Net balance scheduled at the interconnection and wind generation in Spain' shows in detail data from a fourteen-day period at the beginning of March. One can see how with low wind power production, the exchange balance with France is as an importer, while with high production the balance is that of an exporter.

NET BALANCE OF SCHEDULED EXCHANGES IN THE INTERCONNECTION AND WIND POWER GENERATION IN SPAIN (3 MARCH-16 MARCH) MWh



Regarding the utilisation rate of the exchange capacity, congestion was recorded in 52% of the hours in the import direction as a result of higher prices in Spain compared to France. Congestion did not occur in 30% of the hours.

27 April was the only day in which the interconnection with France was not congested. A further four days, in the first five months of the year, were only congested for one hour.

The levels of congestion of the exchange capacity are greater in the direction France to Spain in every month of the year except April and October, months in which the day-ahead prices in Spain were lower than those of France.

GREATER CONGESTION IN THE IMPORT DIRECTION DURING 2016

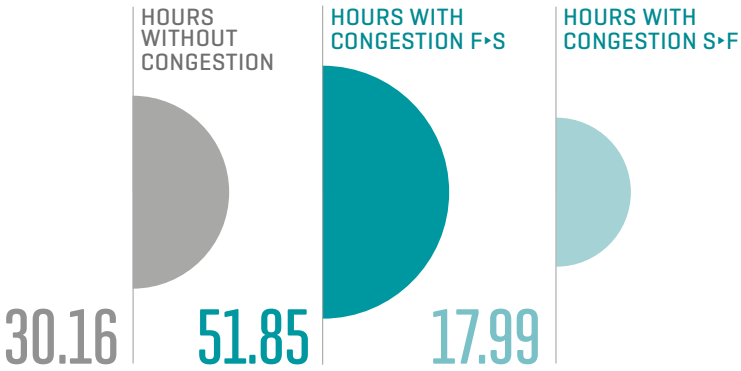
52%

of the hours

as a result of higher prices in Spain compared to France in almost every month of the year

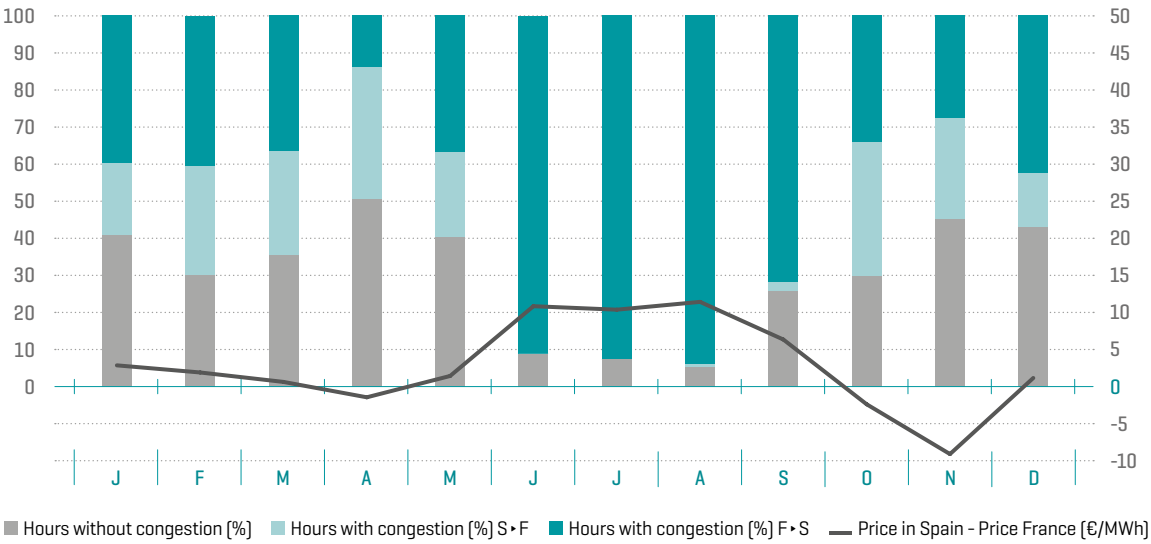
HOURS WITH CONGESTION AND WITHOUT CONGESTION AT THE INTERCONNECTION WITH FRANCE

%



HOURS WITH AND WITHOUT CONGESTION AT THE INTERCONNECTION WITH FRANCE AND THE DIFFERENCE IN PRICES OF THE DAY-AHEAD MARKET

% | €/MWh



Congestion rents generated in 2016 were 44% higher than those generated in 2015

CONGESTION RENTS AT THE SPAIN-FRANCE INTERCONNECTION

207 M. €

Importer direction

163 M.

Exporter direction

44 M.

Congestion rents generated in 2016 totalled 207 million euros (163 million as an importer and 44 million as an exporter), 50% of this total corresponding to the Spanish electricity system. This value represents a 44% increase over rents generated in 2015.

As for the prices resulting from the exchange capacity auctions, the marginal price of the annual capacity auction for 2016 in the direction Spain to France registered a value of 0.79 €/MW, a 79% drop in the price registered in the annual auction for 2015 (3.82 €/MW). In the direction France to Spain, the resulting marginal price was 12.78 €/MW, a value 58% higher than in the same direction in the annual auction for 2015 (8.09 €/MW).

The maximum price of allocated capacity in monthly auctions was registered in July, in the direction France to Spain with a value of 15.40 €/MW. In the direction Spain to France, the maximum price was reached in December with 19.07 €/MW.

21 GWh were imported at this border and 219 GWh were exported via the cross-border balance service. In 2016, it was necessary for the electricity system operators in Spain and France to apply coordinated counter-trading actions (establishment of exchange schedules, in a counter direction, when faced with reductions in capacity in order to guarantee already established commercial schedules) for a total value of 27,728 MWh, a value that is substantially higher than the 10,898 MWh registered the previous year.

MARGINAL PRICE OF THE ANNUAL CAPACITY AUCTION 2016

DIRECTION S ▸ F **0.79** €/MW

DIRECTION F ▸ S **12.78** €/MW

Portugal

The annual electricity exchange balance with Portugal was as an importer with a total of 5,084 GWh compared to the exporter balance of 2,267 GWh registered in 2015. It is the first year of the historical series of this interconnection with an import balance.

Imports totalled 7,056 GWh, three times the import value of the previous year, while exports reached 1,972 GWh, a value that is 56.6% lower compared to the previous year.

The balance for every month of the year was as an exporter, except in October. In the full year, there were 2,877 hours with an exporter balance, with October being the month with more hours as an exporter (403 hours). On the other hand, October 2015 was the month with more hours as an importer (492 hours). Portugal has reduced the export capacity by many hours (Spain-Portugal) to integrate the maximum amount of wind power in its system.

ELECTRICITY EXCHANGES WITH PORTUGAL

Import balance

5,084 GWh

First year of the historical series with an import balance

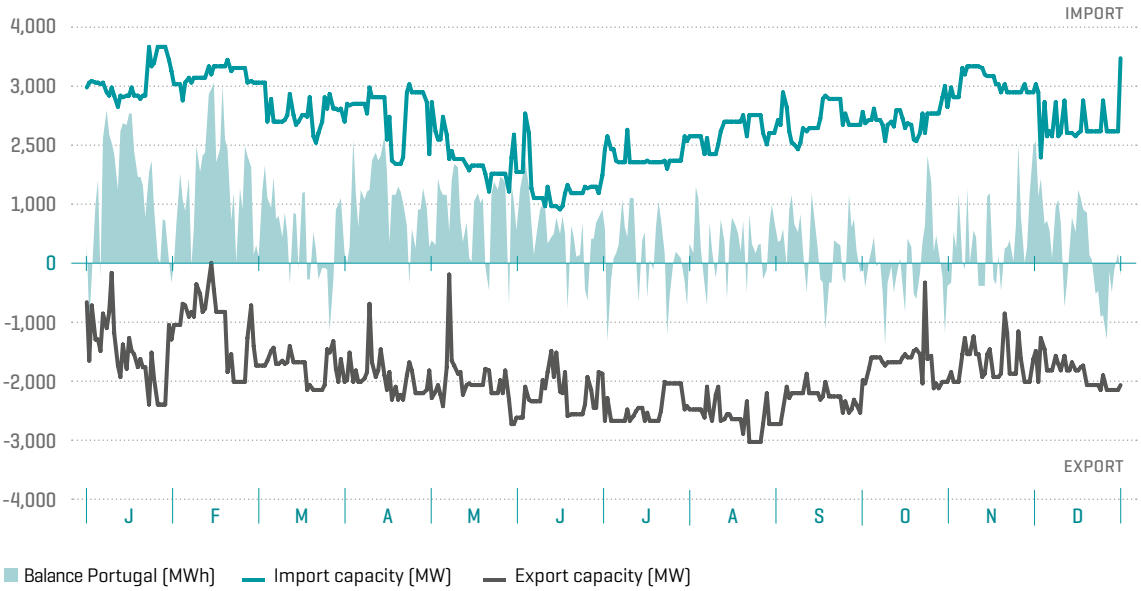
TOTAL HOURS REGISTERED IN 2016 WITH AN EXPORT BALANCE

2,877 h

403 h OCTOBER the month with more hours as an exporter

EXCHANGE CAPACITY AND NET BALANCE OF SCHEDULED EXCHANGES AT THE INTERCONNECTION WITH PORTUGAL

MWh | MW

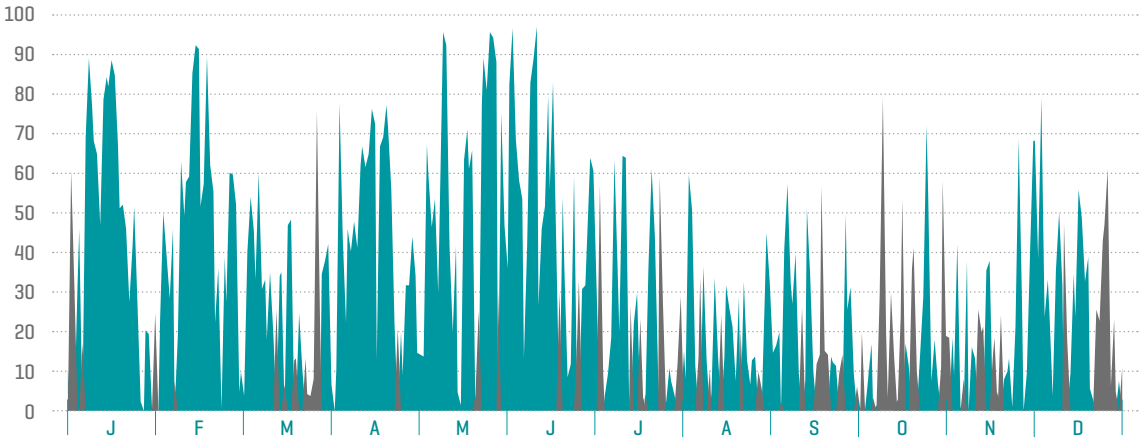


Regarding the utilisation rate of the exchange capacity, there were no hours of congestion recorded at this border. The maximum utilisation of capacity in the import direction was 97%, while in the export direction a value of just 79% was reached.

Day-ahead market prices in Spain were slightly higher than those in Portugal, except for the months of September and November, however the exchange balance in the day-ahead market in these months was also as an importer.

UTILIZATION RATE OF EXCHANGE CAPACITY AT THE INTERCONNECTION WITH PORTUGAL [1]

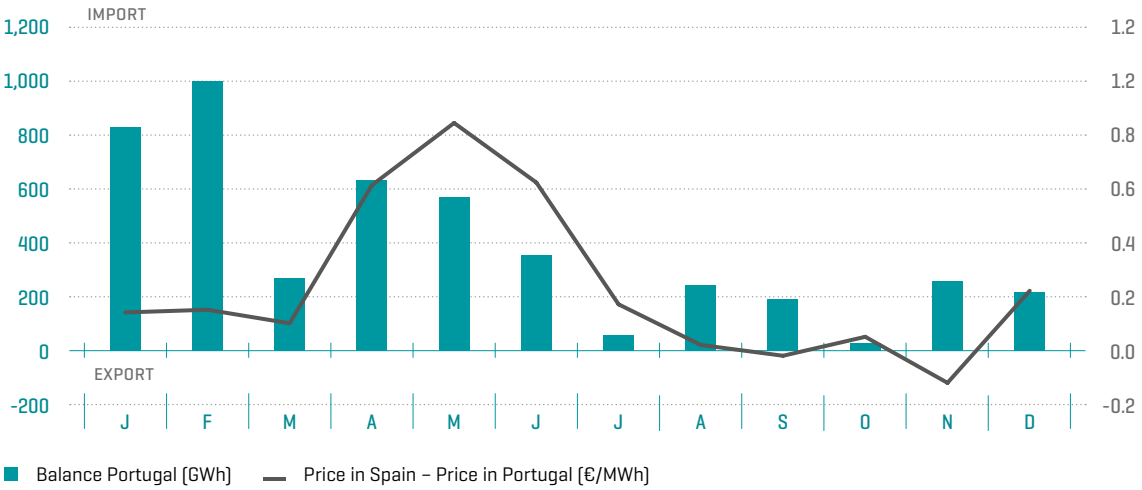
%



(1) Data at the close of the programme.

NET BALANCE OF SCHEDULED EXCHANGES AND PRICE DIFFERENCES IN THE DAY-AHEAD MARKETS AT THE INTERCONNECTION WITH PORTUGAL

GWh | €/MWh



Hydroelectric and wind power production affects the import and export balances at the interconnection with Portugal

The import balances were due to the high hydroelectric and wind power production in Portugal. The producible hydroelectric was high (1.33), while that of wind stood at a value of 1 (average year).

Both hydroelectric and wind power production significantly influence the results of the balances of scheduled exchanges at the interconnection with Portugal. For example, one can see how in a month with high hydroelectric and wind power generation in the Portuguese system, the balance is as an importer, while months with low production are as an exporter or as a low importer balance.

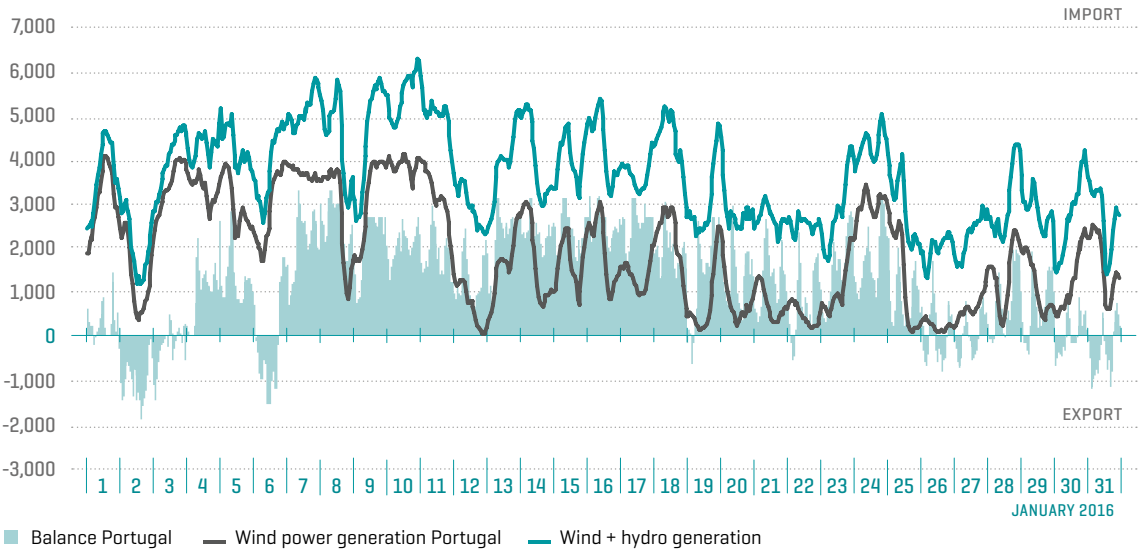
PORTUGUESE SYSTEM

High
PRODUCIBLE HYDROELECTRIC
1.33

High
WIND PRODUCTION
1

BALANCE OF SCHEDULED EXCHANGES AT THE INTERCONNECTION WITH PORTUGAL AND WIND POWER GENERATION IN PORTUGAL

MWh



The interconnection in the day-ahead market was congested a greater number of hours than in 2015 (8.2% of the hours markets were uncoupled, resulting in different prices in Spain and Portugal), importer being the direction with greatest congestion.

By months it can be seen how August was the month in which the market was coupled for the most number of hours, while June was the month in which the market was uncoupled for the most number of hours, almost 21% of the hours of the month.

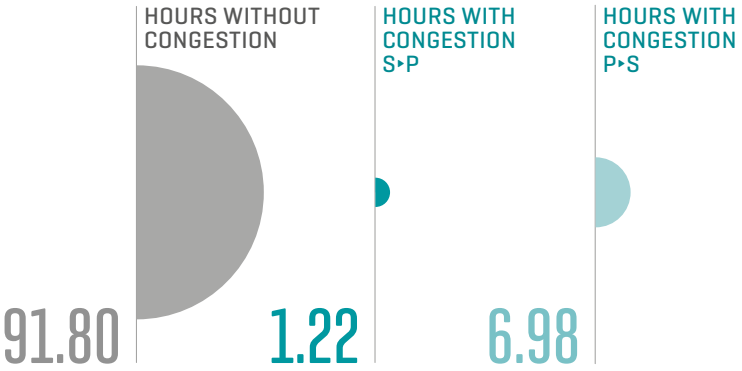
CONGESTION RENTS AT THE SPAIN-PORTUGAL INTERCONNECTION

5.2 M. €

Half corresponds to the Spanish electricity system

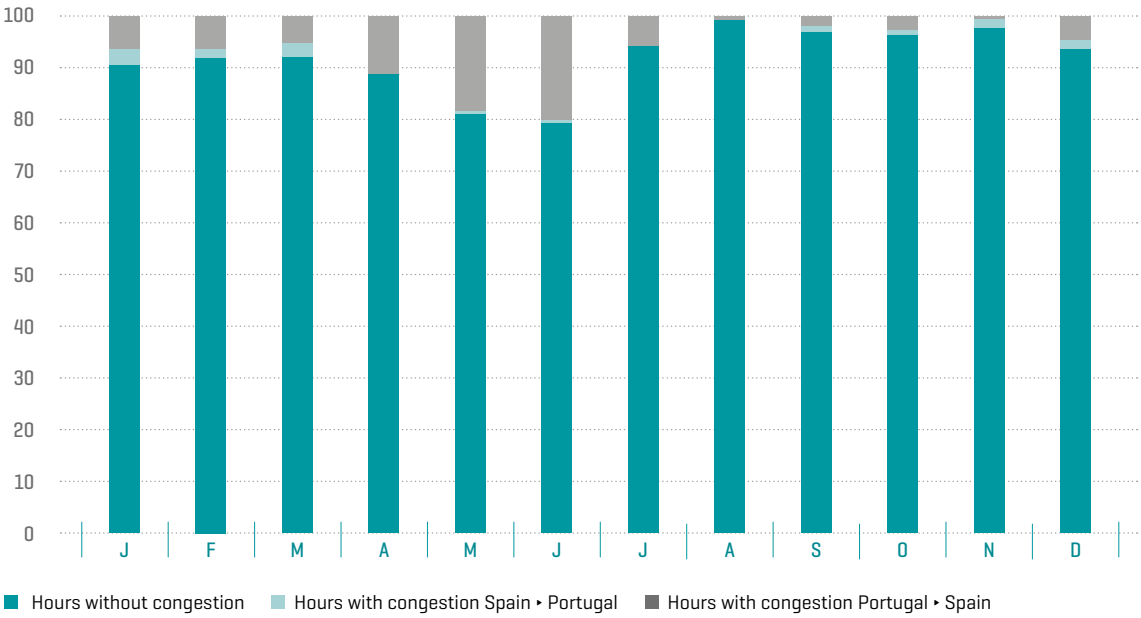
HOURS WITHOUT CONGESTION AND WITH CONGESTION AT THE INTERCONNECTION WITH PORTUGAL

%



MONTHLY CONGESTION LEVELS AT THE SPAIN – PORTUGAL INTERCONNECTION

%



Congestion rents were 5.2 million euros, with 95% coming from the day-ahead market and the remaining 5% from the intraday markets. Half of this amount corresponds to the Spanish electricity system.

37 GWh were imported at this border and 177 GWh were exported via the cross-border balance service. In 2016, it was necessary for the electricity system operators in Spain and Portugal to apply counter-trading actions for a total of 400 MWh of scheduled exchanges solely in the exporter direction.

EXPORTER BALANCE WITH MOROCCO COMPARED TO 2015

0.3 % ↑

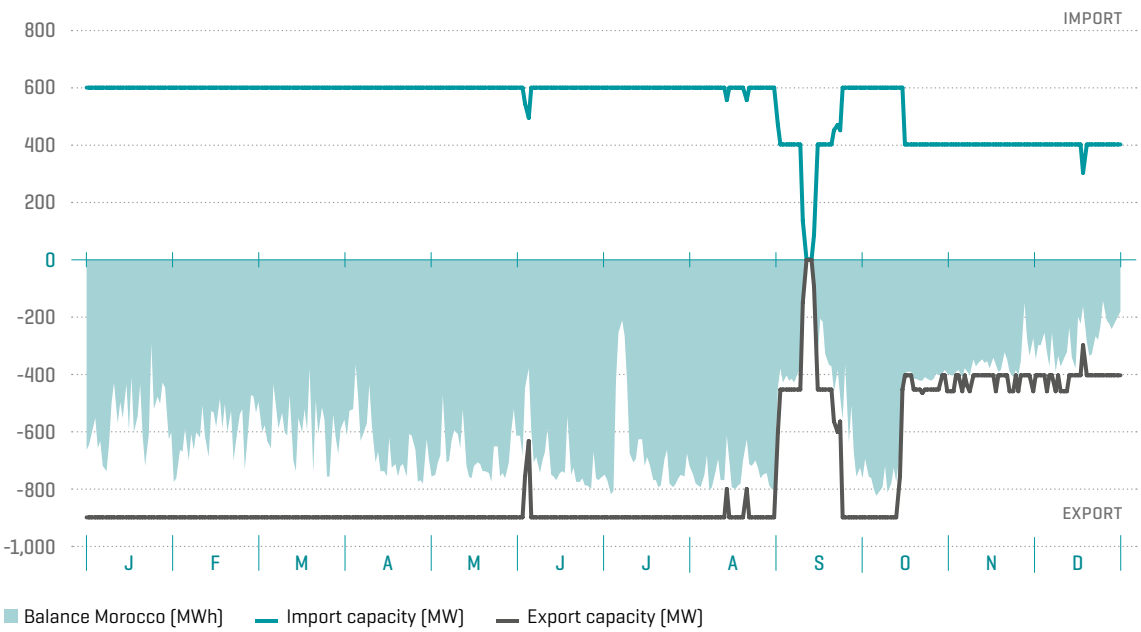
Morocco

The balance of scheduled exchanges with Morocco was as an exporter, with a value of 4,952 GWh, 0.3% higher than last year. The average utilisation rate of the export capacity of this interconnection was 74%, a value higher than the 63% of the previous year.

The reduction in capacity in September was due to the non-availability of the interconnection lines, which were simultaneously offline in both directions between the 10th and the 14th. The reductions since mid-October coincide with the fault of the ESMA 2.

EXCHANGE CAPACITY AND NET BALANCE OF SCHEDULED EXCHANGES AT THE INTERCONNECTION WITH MOROCCO

MWh | MW



In 2016, the export balance increased in the electricity exchanges with Morocco and Andorra with respect to 2015

EXPORTER BALANCE WITH ANDORRA COMPARED TO 2015

5.5% ↑

Andorra

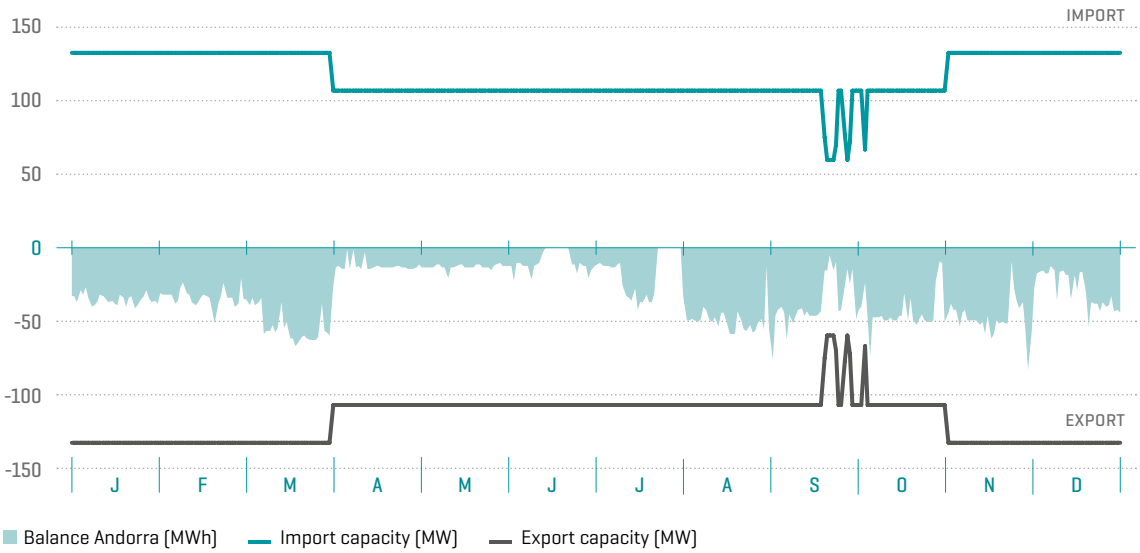
The balance of scheduled exchanges for the interconnection with Andorra was as an exporter with a value of 278 GWh, 5.5% higher than that of 2015. The average utilisation rate of the capacity in the export direction was 27%.

SPAIN-ANDORRA INTERCONNECTION

average utilisation rate of the capacity as an EXPORTER **27%**

EXCHANGE CAPACITY AND NET BALANCE OF SCHEDULED EXCHANGES AT THE INTERCONNECTION WITH ANDORRA

MWh | MW



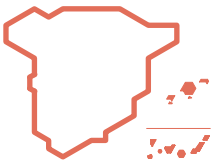
ELECTRICITY TRANSMISSION

The Spanish electricity transmission grid received a new boost in 2016 with the commissioning of 674 kilometres of circuit

TRANSMISSION GRID

674 km

of circuit commissioned in 2016



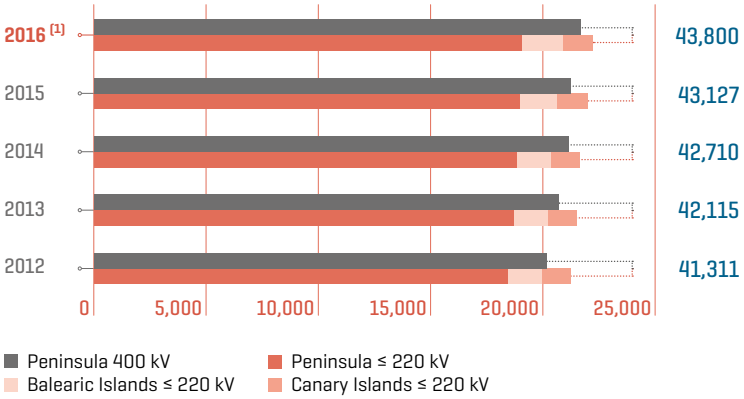
In 2016, work continued to strengthen the Spanish electricity transmission grid with the commissioning of facilities that provide it with a greater level of reliability, a higher degree of grid meshing and that enable a greater amount of renewable energy to be incorporated. During the year, 674 kilometres of circuit and 61 substation bays were commissioned, which means that at the end of 2016 the national grid was composed of a total of 43,800 kilometres of circuit and 5,609 substation bays. Transformer capacity in 2016 increased by 600 MVA, bringing the national total of installed transformer capacity to 85,144 MVA.

Among the projects undertaken in 2016, the following are noteworthy according to the geographical area in which the work or construction is carried out:

Andalusia: work continued to increase the capacity of a large part of the 220 kV grid in Andalusia, which will help reduce the overloads that have been occurring and the consequent

EVOLUTION OF THE **ELECTRICITY TRANSMISSION GRID IN SPAIN**

km of circuit



(1) Provisional data pending audit (currently underway). Cumulative data for kilometres of circuit at the end of each year.

FACILITIES IN THE ELECTRICITY TRANSMISSION GRID IN SPAIN

	400 kV	≤ 220 kV			
	Peninsula	Peninsula	Balearic Islands	Canary Islands	Total
Total lines (km)	**21,620**	**19,026**	**1,800**	**1,354**	**43,800**
Overhead lines (km)	21,503	18,259	1,089	1,080	41,931
Submarine cable (km)	29	236	540	30	835
Underground cable (km)	88	531	171	244	1,034
Transformer capacity (MVA)	**79,808**	**63**	**3,273**	**2,000**	**85,144**

Provisional data pending audit (currently underway).
Accumulated data for kilometres of circuit and on transformer capacity as at 31 December, 2016.

The 243.5 km Mezquita-Morella line improves grid meshing between the communities of Aragón and Valencia

redispatching of the generation necessary to eliminate them. The lines affected were: T Casares-Los Ramos, Algeciras-Puerto Real, Carmona-Villanueva del Rey-Almodóvar, Almodóvar-Casillas, Casillas-Lancha and Carmona-Guillena-Santiponce.

TRANSFORMER CAPACITY

Increased by

600 MVA

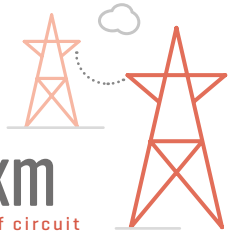
Aragón: a double incoming/outgoing line was commissioned in the 400 kV Mudéjar substation connected to the 400 kV Aragón-Teruel double circuit line. In order to increase the meshing of the 400 kV transmission grid between the communities of Aragón and Valencia, the 400 kV Mezquita-Morella double circuit, which is 243.5 km in length, was also commissioned. The objective of these developments is to increase the possibilities of evacuating generation from renewable sources while increasing the quality, reliability and security of supply. On the other hand, support for the electricity distribution grid is strengthened by the replacement of a 220/110 kV transformer unit in Cinca, while support between the 400 kV grid and the 220 kV grid in Mequinenza is strengthened by the replacement of a 400/220 kV unit. A reactor was also commissioned at the Mezquita 400 kV substation. The installation of this new reactor will allow, on the one hand, the voltage profile in the transmission grid of the area to be kept within the values established in the Operating Procedures, without having to resort to the opening of lines with the consequent loss of quality, reliability and security of supply.

Balearic Islands: work continued on the meshing of the transmission grid in order to improve the security and quality of supply. The enlargement of the 66 kV San Juan substation

SPANISH TRANSMISSION GRID FACILITIES

5,609 SUBSTATION BAYS

43,800 km of circuit



to support demand was commissioned, as well as the new 132 kV Cala Blava substation. The second 132 kV cable between the Santa Ponsa and Torrent substations, which, together with the first cable commissioned in 2015, is of particular importance with regard to reliability and security of supply as it has enabled two electricity systems of the Balearic archipelago, Majorca-Menorca and Ibiza-Formentera to be connected.

Canary Islands: work continued on the improvement plan of the Canary Islands' infrastructure in order to increase the reliability of existing facilities. Also in 2016, the 220/66 kV Sabinal and the 66 kV Muelle Grande substations were commissioned, key actions to improve the security of supply in the system of Gran Canaria.

Castilla y León: work continued on the construction of the Tordesillas-Galapagar-San Sebastián de los Reyes (SUMA) 400 kV axis for the meshing between Castilla y León and Madrid, in the section corresponding to the Community of Madrid.

TRANSMISSION GRID 2016

COMMISSIONED

Coll Blanc-Facultats-Trinitat underground line

220 kV

Catalonia: work has continued on strengthening the transmission grid in the metropolitan area of Barcelona, with the commissioning of the 220 kV Coll Blanc-Facultats-Trinitat underground line. Similarly, the meshing of the 220 kV Gavarrot substation was increased through cable connections to the 220 kV Begues and Sant Boi substations. Support for the electricity distribution grid in the Vic area was strengthened by the replacement of a 220/25 kV transformer unit.

Castilla-La Mancha: progress was made regarding the ambitious plan for the installation of new reactors, to facilitate electricity voltage control, such as that carried out with the bringing into service of the reactor located in the 400 kV Brazatortas substation.

Extremadura: the Plasencia-Almaraz line was re-energised after changing its voltage, increasing it from 132 kV to 220 kV. Work continued on the 220 kV J.M. Oriol-Los Arenales (Cáceres)-Trujillo axis and the administrative permitting process continues for two new substations: Cañaveral and Carmonita to feed the high-speed train.

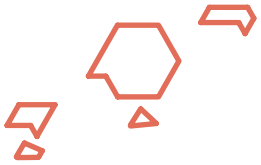
RELIABILITY AND SECURITY OF SUPPLY

Commissioning of the

SECOND 132 kV CABLE

The Balearic archipelago is now consolidated as a single electricity system

Between the Santa Ponsa and Torrent substations



The commissioning of the Torremendo substation will improve the security of supply between Alicante and Murcia and the Godelleta substation that of Valencia

Improvements in security of supply

NEW SUBSTATIONS

In the coastal axis of Levante

Levante: noteworthy is the commissioning of the 400/220 kV Torremendo substation that will help improve the security of supply in the 220 kV coastal axis between Alicante and Murcia, connected by means of an incoming/outgoing line with the Nueva Escombreras-Rocamora 400 kV line and through a 220 kV double circuit with San Miguel de Salinas. Also worth noting was the commissioning of the 400/220 kV Godelleta substation to improve security of supply in Valencia capital, connected to the 400 kV Catadau-Requena circuit by an incoming/outgoing line and to the Cofrentes-Eliana 400 kV line again by an incoming/outgoing line. The development of the transmission grid continues with the change of voltage from 132 kV to 220 kV between the Bernat and Valldigna substations so as to improve the electricity supply in the area.

Central zone: in Madrid, support for the electricity distribution grid was strengthened with the installation of distribution transformers in the 220 kV Algete and Antonio Leyva substations.

Northern zone: in order to increase the capacity to evacuate energy, to allow the integration of renewable energies and to strengthen the transmission grid in the area, work continued on planned grid

COMMISSIONED IN 2016

BOIMENTE-PESOZ LINE

163.5 km of circuit

International interconnections allow the development of the Internal Electricity Market (IEM)

actions in the area of Navarra and the Basque Country, which includes a new 400 kV axis, which will connect the west of the Basque Country (Abanto-Güeñes axis) with the 400 kV grid of Navarra (Muruarte-Castejón axis) through Ichaso. Progress has been made in the construction of other sections of the Northern axis, in particular, the commissioning of the 400 kV Boimente-Pesoz double-circuit line which is 163.5 kilometres in length.

Interconnections continue to play a fundamental role as hardware in the integration of the electricity markets. They are the instrument that will help make Europe's Internal Electricity Market (IEM) a reality by efficiently integrating the currently existing markets.

During 2016, the projects of the three new interconnections with a post-2020 horizon have continued to be managed: a submarine interconnection through the Bay of Biscay and two trans-Pyrenean interconnections through Navarra and Aragón. The execution of these projects, with an expected exchange capacity of 8 GW, is aimed at the challenge of achieving a 15% interconnection capacity in 2030 with respect to Spain's installed power capacity. Also, a phase shifting transformer in the 220 kV Arkale-Argia line (planned for 2017) has been included in the 2015-2020 horizon in order to improve the Spain-France interconnection.

NEW INTERCONNECTIONS TARGET FOR 2030

Expected exchange capacity
8 GW

15%
of interconnection capacity with respect to the installed power in Spain

The transmission grid maintains a high degree of security and quality, being well below the predetermined reference value set out in the current regulations

PENINSULAR ELECTRICITY SYSTEM

Fall in service disruptions compared to 2015

16.7% ↓

Commitment to service quality

For yet another year, the **quality of service indicators** showed a high degree of security and quality of the transmission grid, being well below the maximum reference value pre-established in the current regulations, except in the Canary Islands. The essential performance indicators of overall quality of continuity of supply according to Royal Decree 1955/2000 are Average Interruption Time (AIT), Energy Not Supplied (ENS) and the Availability Index (AI).

In the peninsular electricity system, 15 supply disruptions were reported in 2016, 16.7% less than in 2015. However, this decrease was not reflected in the ENS, which increased compared to the previous year (78 MWh in 2016 compared to 53 MWh in 2015). For its part, the AIT, with a value of 0.16 minutes (0.11 minutes in 2015), is well below the 15-minute reference value established in Article 26.2 of Royal Decree 1955/2000. The main incident occurred in the 220 kV Fuenlabrada line with a ENS of 22 MWh.

ENERGY NOT SUPPLIED (ENS) AND AVERAGE INTERRUPTION TIME (TIM) OF THE TRANSMISSION GRID

	ENS (MWh)			AIT (minutes)		
	Peninsula	Balearic Islands	Canary Islands	Peninsula	Balearic Islands	Canary Islands
2012	133	7	224	0.28	0.68	13.25
2013	1,156	81	72	2.47	7.50	4.38
2014	204	13	148	0.44	1.21	9.04
2015	53	29	150	0.11	2.66	9.08
2016[1]	78	0.3	457	0.16	0.03	27.45

Average interruption time (AIT) = Energy not supplied (ENS) / Average power of the system.
The continuity of supply indicators submitted include the assessment of the impact of several incidents subject to an administrative proceeding currently underway. (1) Provisional data pending audit (currently underway).

A significant improvement in the quality of supply indicators was registered in the Balearic Islands system in 2016

AVERAGE INTERRUPTION TIME

Balearic Islands

0.03 MIN

Significant improvement compared to 2015

Canary Islands

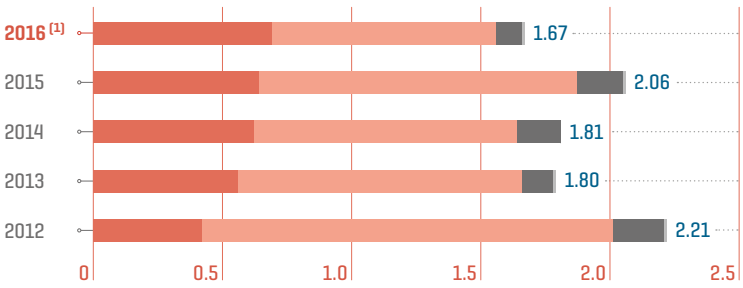
27.45 MIN

In the Balearic Islands electricity system, the continuity of supply indicators for 2016 showed a significant improvement with respect to the previous year. There was only one supply disruption with an ENS of 0.3 MWh (29 MWh in 2015) and AIT of 0.03 minutes (2.66 minutes in 2015). However, these indicators in the Canary Islands electricity system were at 457 MWh (corresponding to 14 supply interruptions) and 27.45 minutes, both much higher than in the previous year, mainly due to the various incidents in the 66 kV Las Salinas-Gran Tarajal-Matas Blancas line, as a result of the lack of sufficient meshing in the Fuerteventura grid.

The quality of the transmission grid is also evaluated based on the availability of the facilities it is composed of. The availability indicator measures the capacity or ability of the system to use the various elements of the transmission grid; these being electricity line circuits, transformers and active or reactive (reactors and capacitors) power control elements. The availability rate is calculated as the difference between 100 and the non-availability rate of the trans mission grid.

ANNUAL EVOLUTION OF THE NON-AVAILABILITY RATE OF THE TRANSMISSION GRID

%



- Programmed for predictive and preventative maintenance
- Programmed for causes not due to maintenance
- Non-programmed due to corrective maintenance
- Non-programmed due to fortuitous circumstances

Note: Classification according to RD 1955/2000. // The total non-availability rate of the transmission grid does not include non-availabilities due to force-majeure or third party actions. (1) Provisional data pending audit (currently underway).

The graphs of the non-availability rate show the evolution of this indicator over the last five years. The availability rate of the peninsular transmission grid in 2016 reached a value of 98.33%, which is higher than the 97.94% in 2015. In the Balearic Islands and Canary Islands systems, grid availability stood respectively at 96.93% (96.88% in 2015) and 98.07% (96.74% in 2015). The fundamental cause of the slight improvement in the availability rate in the Balearic Islands system is the continued investment made in the fields of construction, renovation and improvement grid assets.

TRANSMISSION GRID AVAILABILITY RATE

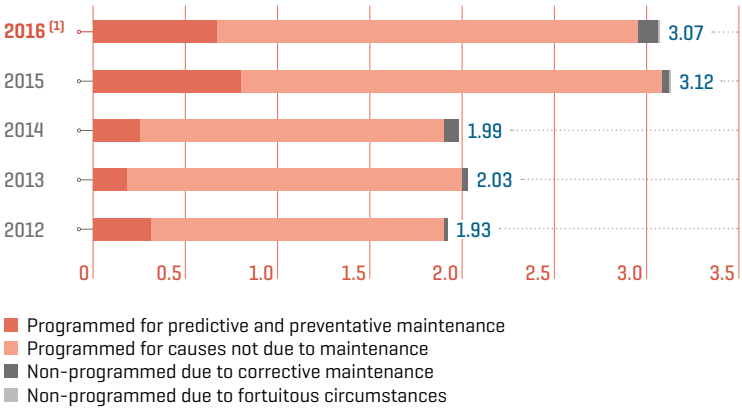
Peninsular
98.33%

Balearic Islands
96.93%

Canary Islands
98.07%

ANNUAL EVOLUTION OF THE NON-AVAILABILITY RATE OF THE TRANSMISSION GRID OF THE BALEARIC ISLANDS

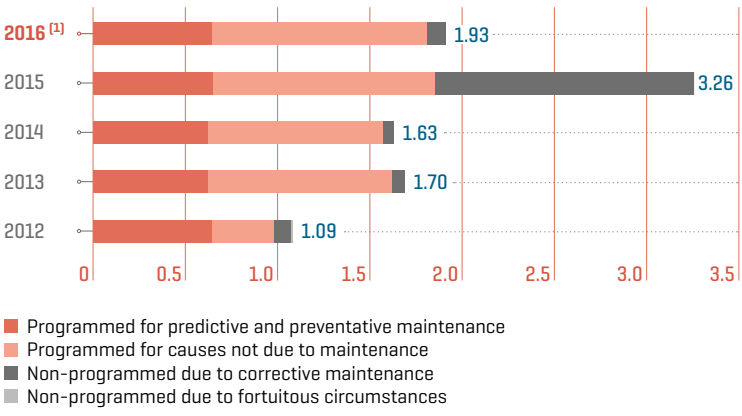
%



Note: Classification according to RD 1955/2000. // The total non-availability rate of the transmission grid does not include non-availabilities due to force-majeure or third party actions. (1) Provisional data pending audit (currently underway).

ANNUAL EVOLUTION OF THE NON-AVAILABILITY RATE OF THE TRANSMISSION GRID OF THE CANARY ISLANDS

%



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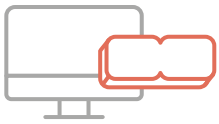
R&D+i for the achievement of a secure, efficient and sustainable grid

Among the projects completed in 2016 with direct application in the transmission grid are the following:

Moviman: development of a mobility solution that facilitates tasks related to the field deployment of maintenance technicians such as the geographic location of facilities, preparation of work orders, recording anomalies, management of occupational health and safety risk prevention or access to the necessary documentation to carry out the work.



VIRTUAL REALITY

Applied to training

with the aim of optimising resources and minimising risks

Virtual reality applied to training: the fundamental objective of the project has been to initiate the use of virtual reality technology for training, optimising resources and minimising risks for people and facilities by providing a simulation environment. Virtual reality transfers the student to the place where they want to be, providing a real idea of the dimensions of objects and creating a sense of space, light and sound. In addition, it allows spaces to be visualised and also phenomena that cannot be seen in reality, acting as a valuable training supplement, as it allows a better understanding of the phenomena that are the cause of possible accidents. In particular, this project has simulated the sequence of manoeuvres in electricity facilities for the execution of non-live works, as well as the execution of the necessary maintenance measures.

Study of surges due to ferroresonance in high voltage grids: the phenomenon of ferroresonance, in series or in parallel, that can be take place in transformers has been simulated and different options have been validated in laboratory conditions to avoid them.

DEVELOPMENT OF DTS METHODOLOGY

For the calculation of temperatures in underground cables

Will allow higher values of transmission capacity to be used

Temperature sensing in underground cables: the methodology for calculating the thermal inertia of insulated cables has been developed and validated by monitoring its external temperature with DTS (Distributed Temperature Sensors). This will give the possibility of achieving greater flexibility in the criteria associated with operation, planning and engineering and will enable the optimisation of the available resources, assuming higher values of transmission capacity with the assurance of not exceeding the maximum temperature allowed and facilitating maintenance work. Test have been conducted on 220, 132 and 66 kV cables.

Simulation platform for dynamic generation models: a working platform has been implemented that extends knowledge of the behaviour of the dynamic models usually used in Red Eléctrica to carry out dynamic studies of facilities connected to the transmission grid and other new developments.

The automated updating of architectural plans will make digital records available for modifications performed in works

Maximising the use of the RTTR (Real Time Thermal Rating) system: the temperature data of the 220 kV Maria-Fuendetodos line has been studied to evaluate the usefulness of this information and to promote the best use of available capacity while maintaining the level of security required. In addition, a model for calculating actual transmission capacity and two, four and six-hour predictions has been developed.

DEPLA (Drawing up of plans): the tasks of updating the final plans of a substation 'according to work' have been automated, which reduces the time needed to access them and represents a cost savings in drafting of plans, as well as a continual improvement in engineering by having digital records of the modifications made to works regarding the project design.

Development of inspection methodology for

OVERHEAD LINES

Using image comparison

Methodology for collecting data regarding the state of conservation of the foundations of towers for overhead lines: a 'non-destructive' data collection methodology has been developed to determine the state of conservation of the foundations of the towers for high-voltage overhead electricity lines. Additionally, a software tool has been developed to facilitate the decision-making process regarding preventive actions and to plan their costs according to the available budget.

SAIR Phase III: a system and methodology for the systematic inspection of overhead lines (safety corridors, conductors and towers) has been developed, based on the comparison of images obtained with devices fitted to an aeroplane and reproduced by photogrammetric methods.

'In situ' emptying of oil pits: a methodology has been put in place that allows the emptying of power transformers oil pits without having to transport all the liquid material to an authorised waste manager, thus reducing the time required for emptying the tanks and improving the management of the lorries used for its transportation. For this purpose, a catalyst has been developed which allows oils and greases to be separated from the water.

ELECTRICITY MARKETS

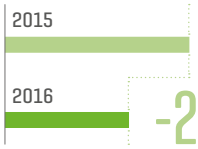
The average price of energy in the electricity market fell by 23 % compared to 2015, reaching its lowest level since 2010

During 2015, the final energy managed in the electricity market (reference supply plus free contracting) was higher than the previous year by 0.8%.

The final average price of electricity in the electricity market stood at 48.4 €/MWh in 2016, down 23.0% from the previous year and at its lowest level since 2010. By month, the final price was lower in the first nine months of the year in which the monthly variation was 30% lower than in the previous period, while in the last quarter it rose to an average monthly increase of over 4%. Noteworthy was the fact that in the first few months of 2016 there was a large share of hydro and wind in the demand coverage, which led to a fall in prices.

PRICE OF ENERGY IN THE ELECTRICITY MARKET

AVERAGE FINAL PRICE

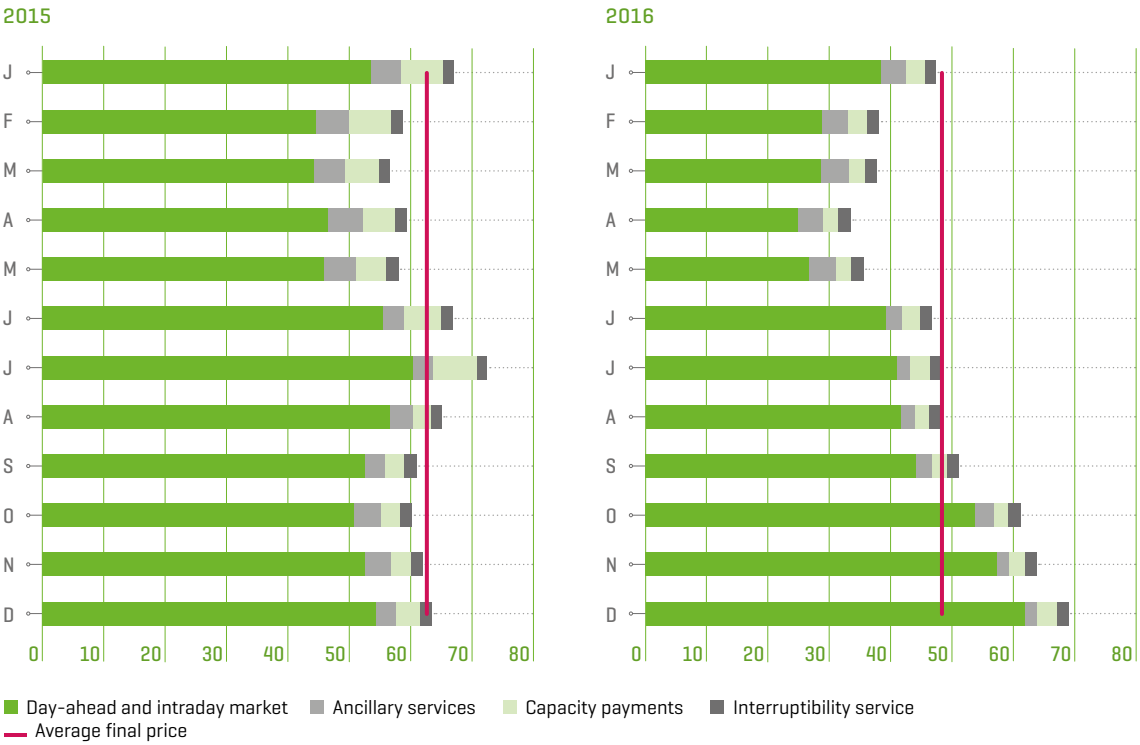


-23.0%

48.4 €/MWh

COMPONENTS OF THE AVERAGE FINAL PRICE OF ENERGY

€/MWh



The large share of hydro and wind in demand coverage in the first few months of 2016 helped to bring down prices

During 2016, the components that made up the price of energy were the following: day-ahead and intraday markets 83 %, ancillary services 6.4%, capacity payments 5.7% and the remaining 4% was for interruptibility service. Compared to last year, there were decreases of 21% in the price component of the day-ahead and intraday market, 27% in ancillary services and 45% in capacity payments, while the component for the interruptibility service rose slightly by 2%. The decrease in the capacity payments component was due to the reduction of the costs associated with these payments as established in Order IET / 2735/2015.

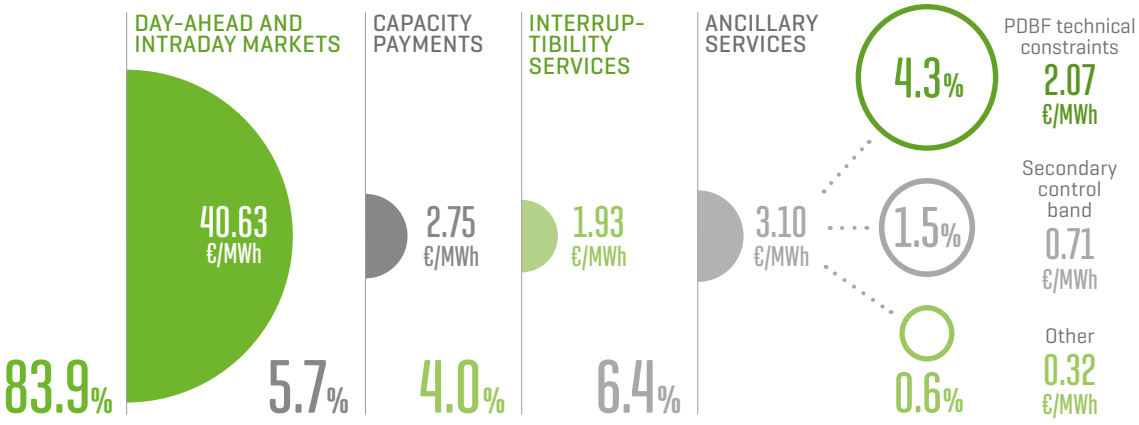
FINAL ENERGY IN THE ELECTRICITY MARKET

REFERENCE SUPPLY PLUS FREE CONTRACTING

↑ 0.8%

higher than 2015

COMPONENTS OF THE FINAL PRICE 2015



Day-ahead market

The energy on the day-ahead market stood at 250 TWh in 2016 (184 TWh on the spot market without bilateral contracts), representing an increase of 1.2% compared to 2015. 73.6% of the energy was traded on the spot market (71.2% in 2015), and the remaining 26.4% through bilateral contracts (28.8% in 2015). These percentages have remained very similar since 2010, with an average value of 72.5% for the spot market and 27.5% for bilateral.

Energy supplied by traders/agents different to the reference traders/agents continued to increase, reaching a market share of 87.3% in 2016, compared with 86.3% the previous year.

ENERGY ON THE DAY-AHEAD MARKET IN 2016

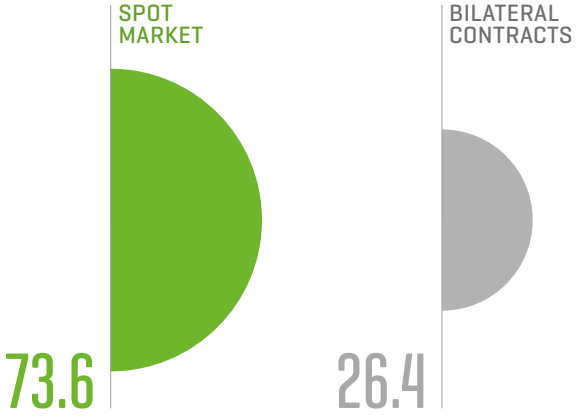
250 TWh

1.2% ↑

Compared to 2015

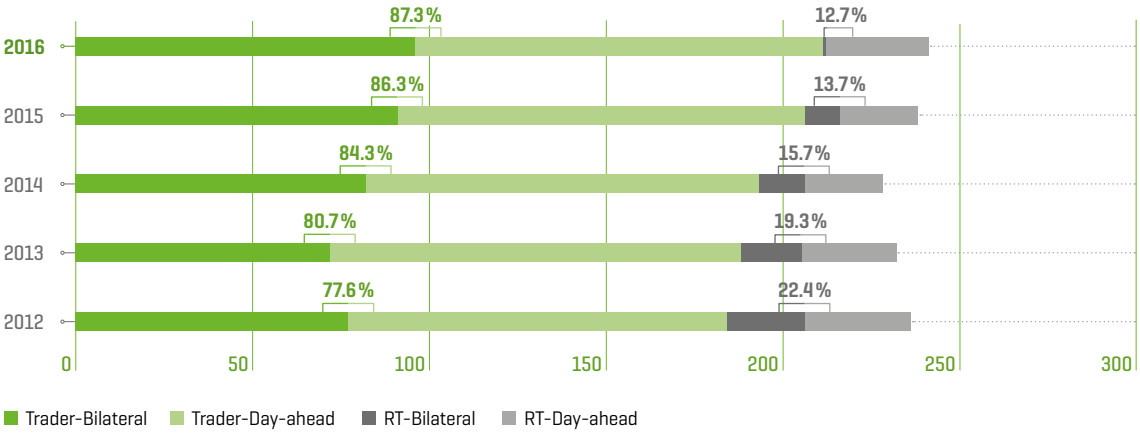
ENERGY PURCHASED
ON THE DAY-AHEAD MARKET

%



EVOLUTION OF PURCHASES IN PDBF
FROM REFERENCE TRADERS (RT)
AND REMAINING TRADERS

TWh



AVERAGE PRICE IN THE DAY-AHEAD MARKET IN SPAIN

21.2% ↓

Lower than 2015

and slightly higher than that of Portugal

The arithmetic average of the day-ahead market price in Spain stood at 39.67 €/MWh, a value 21.2% lower than the previous year and slightly higher than that of Portugal, (39.44 €/MWh).

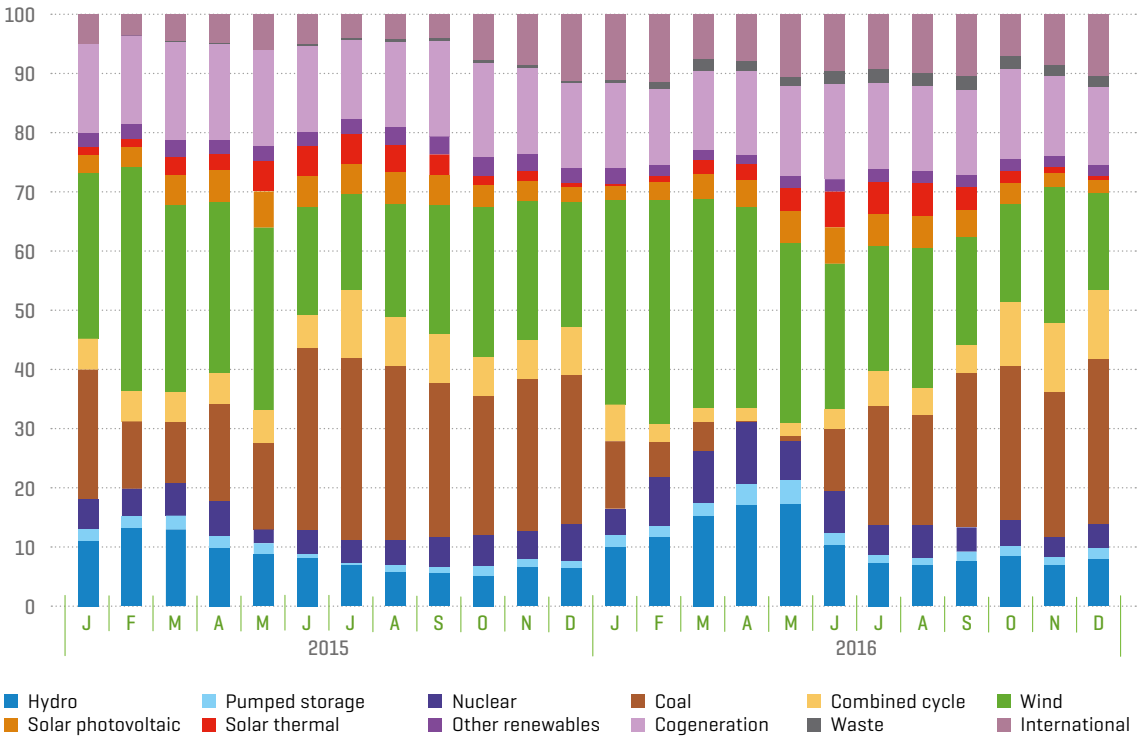
If we take into account the structure of the generation mix in the day-ahead market, which represents an important factor in the price formation, we can see how in the first few months of 2016 hydro and wind production increased their share, whereas in the last few months of the year this was true of coal and combined cycle, technologies, which from a logical perspective, are more expensive. In annual terms, coal has reduced its share by more than seven percentage points and combined cycle by one point, while hydro increased its share by two percentage points and wind by one percentage point. International imports have also increased by almost four points, due to the energy imported via the Portuguese border, as Portugal's prices are lower than those of Spain.

GENERATION MIX IN THE DAY-AHEAD MARKET

EVOLUTION of the share compared to the previous year

PERCENTAGE OF ENERGY SALES BY TECHNOLOGY IN THE SPOT MARKET

%



A lower share of renewable energy means a higher day-ahead market price

RENEWABLE ENERGY MATCHED IN THE DAY-AHEAD MARKET COMPARED TO 2015

14% ↑

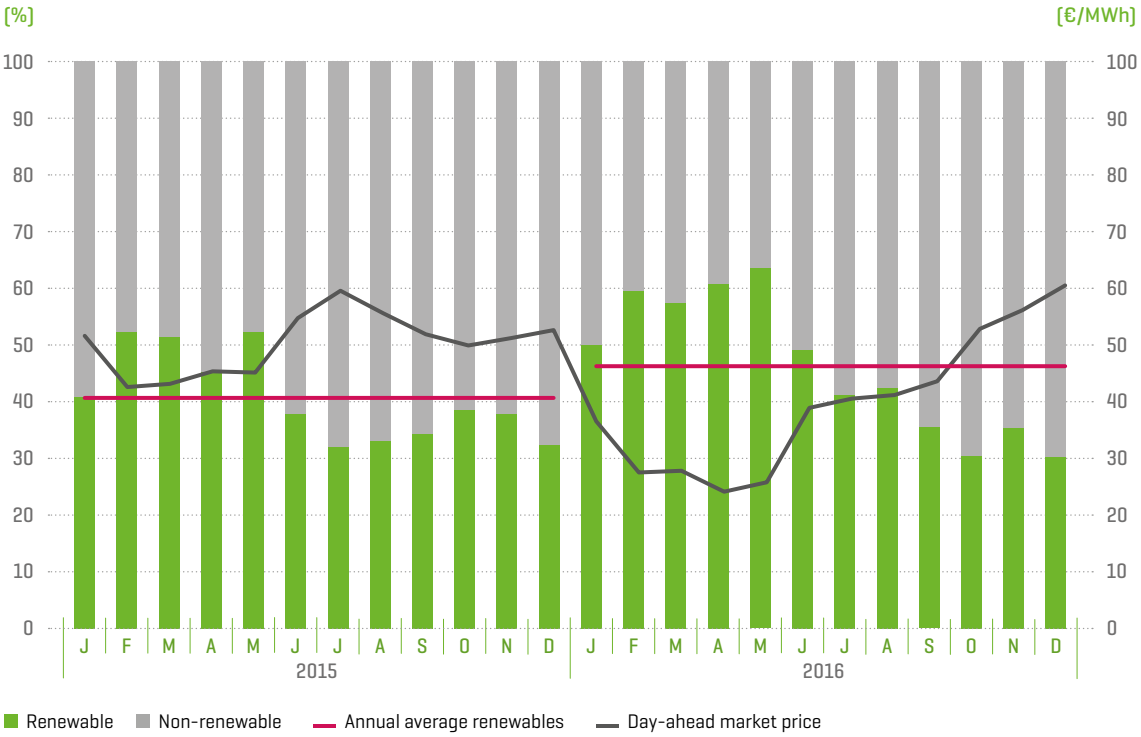
It can be seen how the renewable energy matched in the day-ahead market during 2016 was higher on average that the previous year by 14%. In general terms, it can be said that the greater presence of renewables, mainly hydro and wind, in the matching process brings with it a decrease in the average price of the day-ahead market.

In this regard, the following graph 'Generation in Spain and prices' shows that generally when the share of renewable energy is lower, the day-ahead market price is higher.

If the matching process of the generation structures is represented in a graph showing the times of the day when the day-ahead market price sets the annual minimum and maximum, we see how they are very different. At the time at which any of the minimum prices are registered, it can be observed that wind energy is the renewable technology that impacts the marginal price, meaning that 70%

GENERATION AND PRICES

% | €/MWh



of energy matched in that hourly period comes from renewables. If the structure is analysed in the hours of the day that set the maximum price, we can see how pumped-storage is the renewable energy technology that sets the marginal price. Similarly, the graph also shows that the maximum price is registered when there is a large amount of energy matched to generation coming from coal-fired, combined cycle and hydroelectric stations.

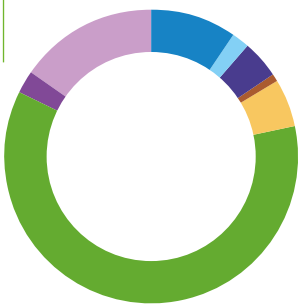
Another factor to be taken into account when observing the evolution of market prices is the absence of hours with zero price, as was the case in the previous year, as well as the reduction in the difference between the maximum and the minimum prices.

MINIMUM AND MAXIMUM PRICE STRUCTURE OF DAY-AHEAD MARKET

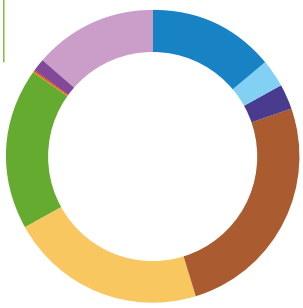
%

	MINIMUM PRICE DAY-AHEAD	MAXIMUM PRICE DAY-AHEAD
Hydro	9.7	14.1
Pumped storage	1.7	3.1 [1]
Nuclear	4.3	2.8
Coal	0.9	25.6
Combined cycle	5.3	21.5
Wind	60.4 [1]	17.9
Solar photovoltaic	0	0.1
Solar thermal	-	0.1
Other renewables	2.5	1.5
Cogeneration and other	15.2	13.4

MINIMUM PRICE DAY-AHEAD: 10 JAN. 6:00 AM



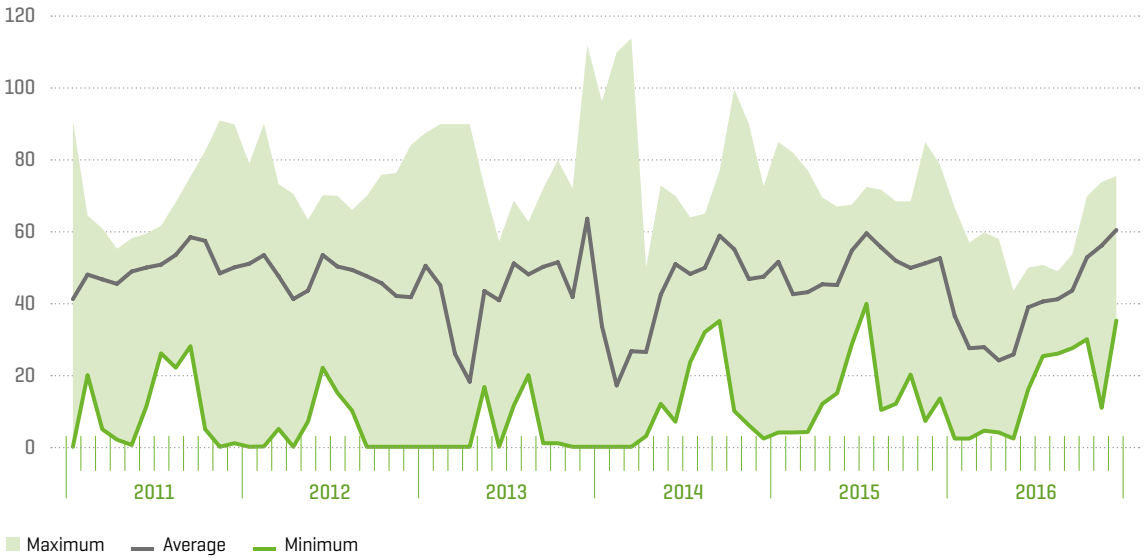
MAXIMUM PRICE DAY-AHEAD: 16 DIC. 19:00 PM



(1) Technology that sets the marginal price.

MAXIMUM, MINIMUM AND AVERAGE PRICE OF THE DAY-AHEAD MARKET

€/MWh



If you compare the price of the Spanish day-ahead market with the prices of European markets, you can see how it is among the highest in Europe. Until May 2016, the day-ahead market price in Spain was far from the maximum price registered by Italy, but since June prices have increased considerably, being closer to the high prices of Europe rather than to the low prices.

ENERGY SALES IN THE INTRADAY MARKET

0.7% ↓

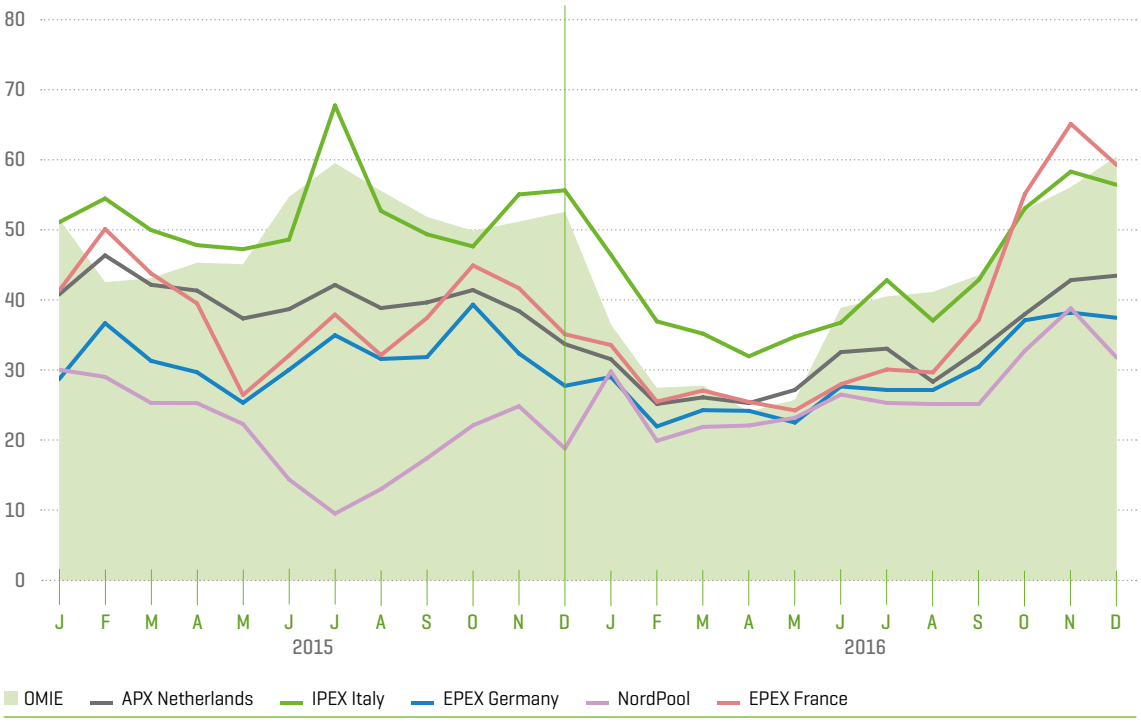
Below that of 2015

Intraday market

Energy sales in the intraday market stood at 27.6 TWh, 0.7% lower than in 2015, with 42.4% of sales corresponding to a net increase in demand and/or pumped storage consumption.

The arithmetic average of the intraday market price in 2016 stood at 40.6 €/MWh, higher than the day-ahead market price of 39.7 €/MWh.

PRICES OF EUROPEAN MARKETS €/MWh



ARITHMETIC AVERAGE OF THE INTRADAY MARKET PRICE IN 2016

40.6 €/MWh

Higher than the day-ahead market price

39.7 €/MWh

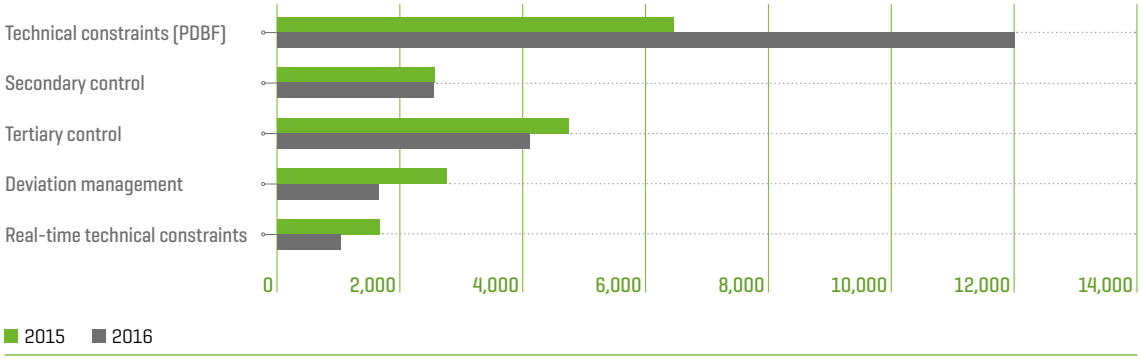
The cost of ancillary services in 2016 was 27.5% lower than in 2015

Ancillary services

The volume of energy managed through ancillary services in 2016 was 21,351 GWh, 17.3% higher than in the previous year, as a result of an increase of 86% in the volume of energy scheduled for resolving technical constraints of the Daily Base Operating Schedule (PDBF), with the volume of energy managed in this market representing 56.3% of the total. Energy from other ancillary services registered a decrease.

During 2016, the cost of ancillary services reached 750 million euros, 27.5% lower than the previous year.

ENERGY MANAGED IN THE SYSTEM
ANCILLARY SERVICES — GWh



ENERGY MANAGED THROUGH ANCILLARY SERVICES

17.3% ↑

Higher than 2015

COST OF ANCILLARY SERVICES — M€

	2015	2016
PDBF constraints	691	515
Real-time technical constraints	45	31
Technical constraints	736	546
Secondary control band	225	178
Additional upward energy reserve	49	39
Deviations	35	-18
Deviations surplus	4	19
Power control factor	-15	-14
Total Ancillary services	**1,034**	**750**
Δ 2016/2015		-27.5%

The impact of ancillary services on the final average price reached the lowest value since 2009

IMPACT OF ANCILLARY SERVICES IN THE FINAL PRICE

27% ↓

Lower than in 2015

The impact of ancillary services on the final average price for 2016 was 3.1 €/MWh, 27% lower than in 2015 and the lowest value since 2009. The impact was higher in the first five months of the year due to the fact that during this period a lot of hydroelectric and wind power generation was matched, reducing thermal, hence combined cycle was not matched in the day-ahead market. This resulted in more thermal energy being scheduled for resolving technical constraints in order to ensure system security, increasing the impact of the ancillary services.

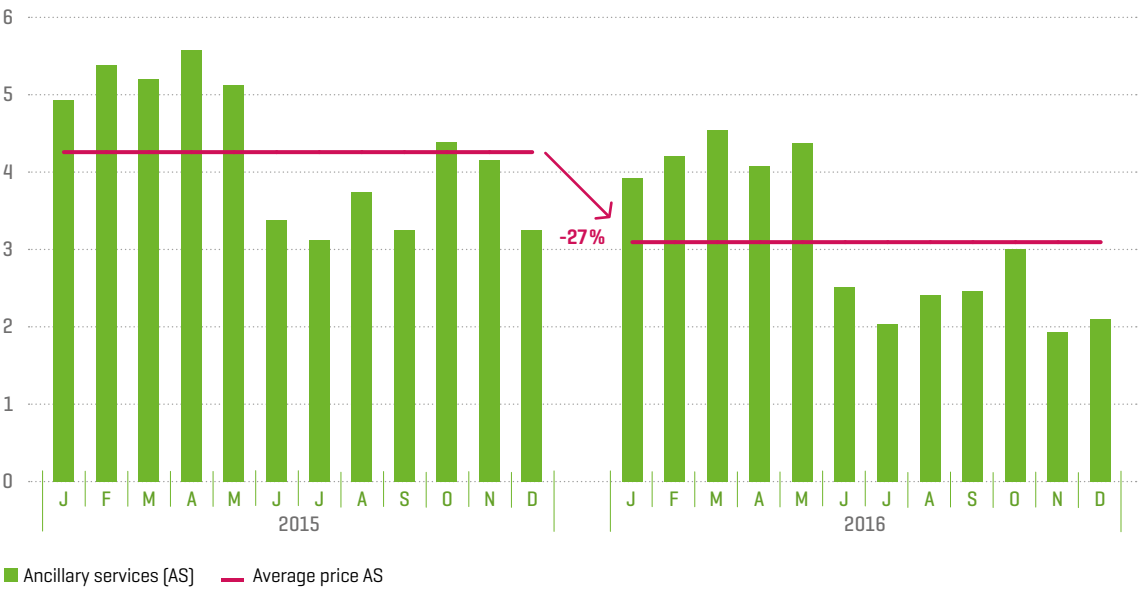
Constraints to the Daily Base Operating Schedule (PDBF)

Energy scheduled for the resolution of technical constraints of the Daily Base Operating Schedule (PDBF) totalled 11,834 GWh upward (88.3% higher than the previous year) and 181 GWh downward (1.5% higher than in 2015). The average value of the upward price was 78.9€/MWh, 49.4% lower than last year, and the downward price stood at 35.2€/MWh, 21.6% lower than in 2015.

The impact on the final average price was 2.07 €/MWh compared to 2.79 €/MWh in the previous year.

IMPACT OF ANCILLARY SERVICES IN THE FINAL PRICE

€/MWh



ENERGY SCHEDULED FOR RESOLUTION OF TECHNICAL CONSTRAINTS

UPWARD ↑ 88%

1% DOWNWARD ↑

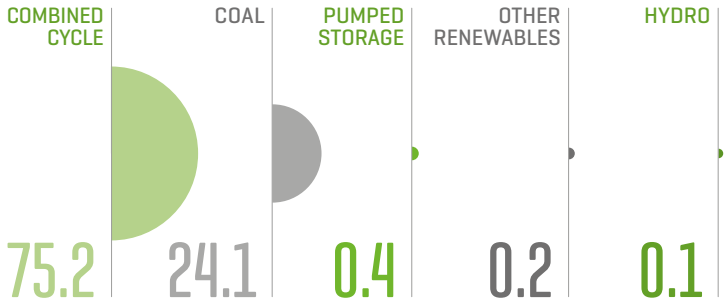
Compared to 2015

The energy scheduled in phase I for resolution of technical constraints of the PDBF mainly corresponds to combined cycle and coal. The downward energy in phase I is practically negligible.

The following chart shows the evolution of the last five years of upward energy of these technologies in Phase I of resolution of technical constraints of the PDBF.

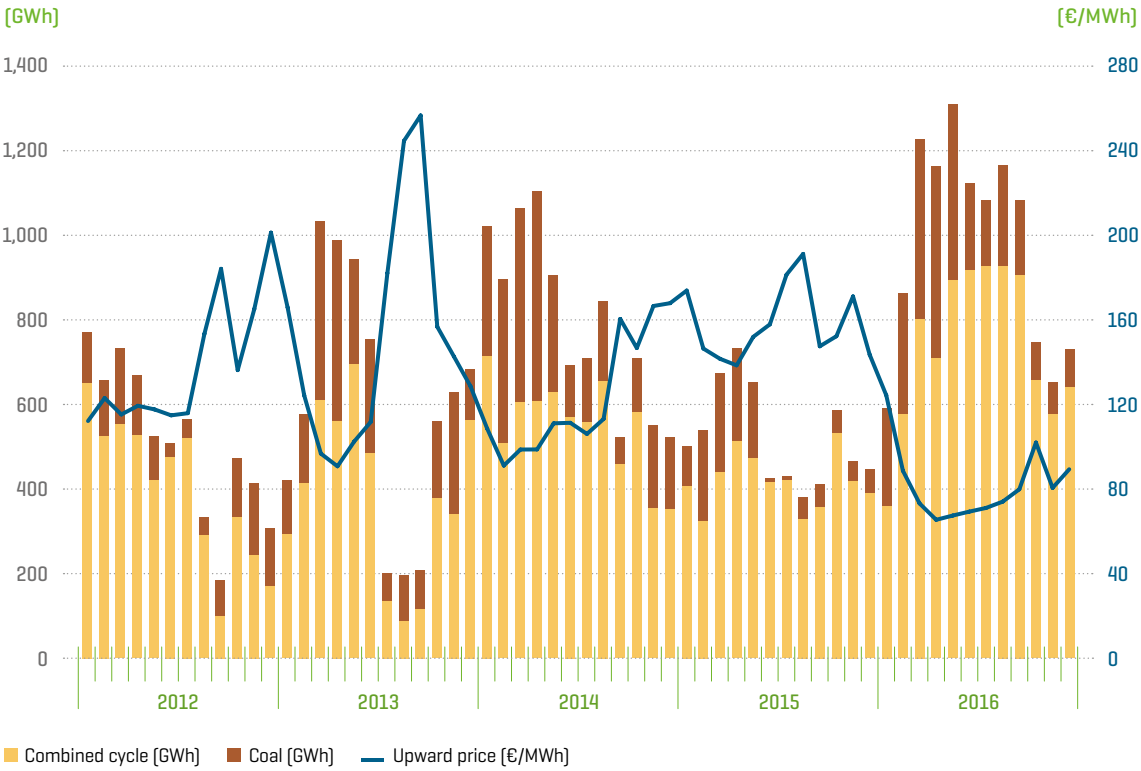
The Daily Base Operating Schedule of technical constraints in Phase I matches mainly with coal and combined cycle generation. Downward energy in Phase I is practically negligible.

UPWARD ENERGY IN PHASE I %



UPWARD ENERGY SCHEDULED IN PHASE I – COAL AND COMBINED CYCLE – AND UPWARD PRICE

GWh | €/MWh



IMPACT OF THE AVERAGE HOURLY SECONDARY CONTROL BAND ON THE FINAL PRICE

0.71
€/MWh

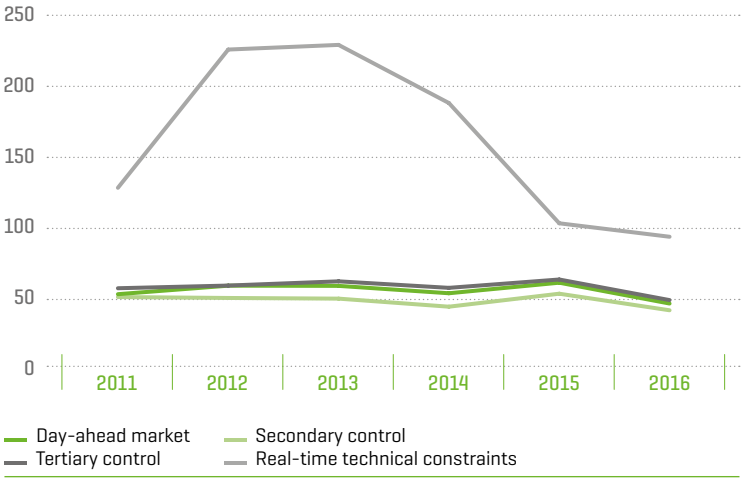
22% Lower than in 2015

Other Ancillary Services

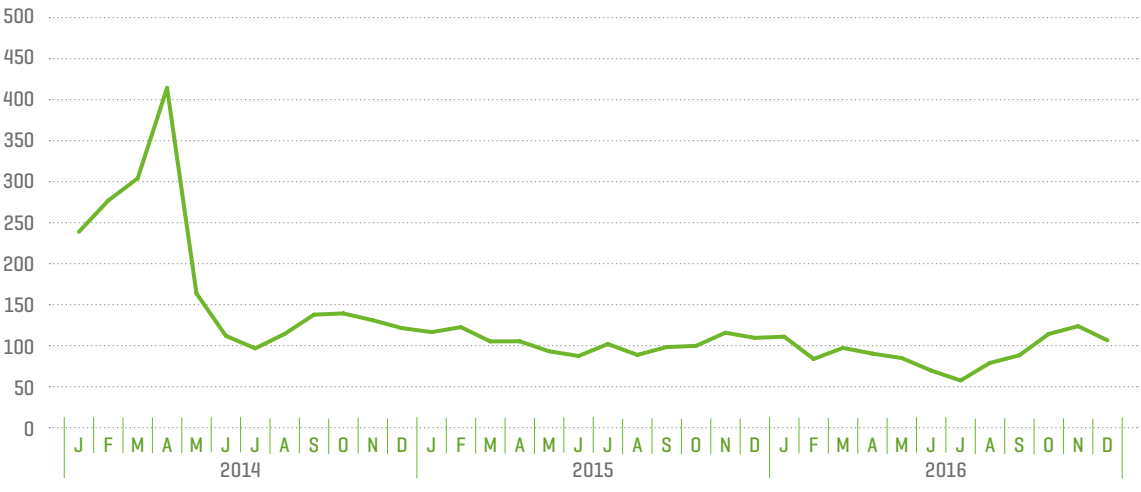
In the markets for secondary and tertiary control, deviation management and resolution of technical constraints in real time, a total of 2,542 GWh, 4,110 GWh, 1,648 GWh and 1,036 GWh, were managed respectively. Of this total, 60.6% corresponds to upward energy managed and the remaining 39.4% corresponds to downward energy.

Regarding power reserves, the volume of additional upward power reserve that needed to be allocated was 1,996 GW, 5% lower than that allocated the previous year; with an impact of 0.15 €/MWh on the average final price of energy.

ANNUAL EVOLUTION OF PRICE OF UPWARD ENERGY FOR RESOLUTION OF REAL-TIME CONSTRAINTS — €/MWh



ANNUAL EVOLUTION OF THE AVERAGE WEIGHTED PRICE OF UPWARD ENERGY FOR RESOLUTION OF REAL-TIME CONSTRAINTS — €/MWh



The average hourly secondary control band allocated was 1,191 MW, with an impact on the final average price of 0.71 €/MWh, 22.0 % lower than the previous year.

The weighted upward secondary and tertiary prices have remained fairly constant, while upward prices of real-time re-dispatches rose sharply in 2012, remaining in line with those values in 2013 and progressively decreasing over the past three years. As previously mentioned last year, this circumstance is a result of implementation of the modification implemented by the Resolution of 8 May 2014 of Operating Procedure 14.4 'Collection rights and payment obligations' (P.O. 14.4 'Derechos de cobro y obligaciones de pago') for ancillary services, in which the methodology for settlements of real-time technical constraints is amended.

In the graph of the annual evolution of the average weighted upward price for resolution of technical constraints in real-time shows in detail the evolution of the weighted upward prices for resolution of technical constraints in real-time on a monthly basis.

VOLUNTARY PRICE FOR THE SMALL CONSUMER

HIGHEST VPSC
130.23 €/MWh
In December

LOWEST VPSC
86.84 €/MWh
In April

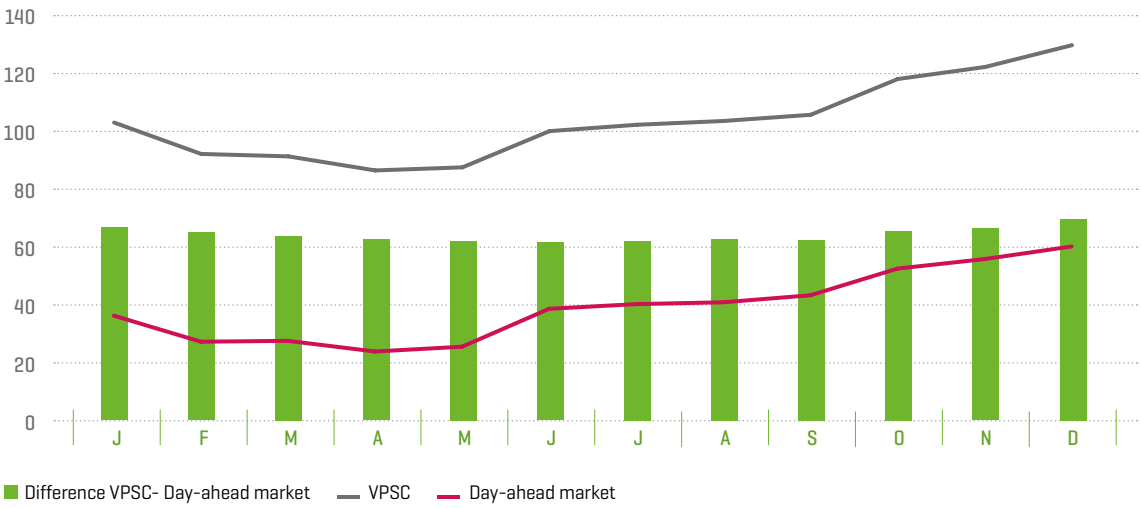
Voluntary Price for the Small Consumer (VPSC)

The voluntary price for the small consumer was 15 % lower than the previous year. Prices in the first few months of the year were below those of 2015, while in the last three months they were higher, but the price never reached the maximum value registered in July 2015.

It should not be forgotten that the VPSC is conditioned by the day-ahead market price, as can be seen in the following chart. For this reason, the highest VPSC price in the year was registered in December (130.23 €/MWh), while the lowest price was registered in April at (86.84 €/MWh).

EVOLUTION OF THE PVPC COMPARED TO THE DAY-AHEAD MARKET PRICE (GENERAL TARIFF 2.0 A)

€/MWh



EUROPEAN SCOPE

Demand for electricity in Europe continues its recovery as it grows for second consecutive year

DEMAND GROWTH IN ENTSO-E MEMBER TSOs' COUNTRIES

1.3 % ↑

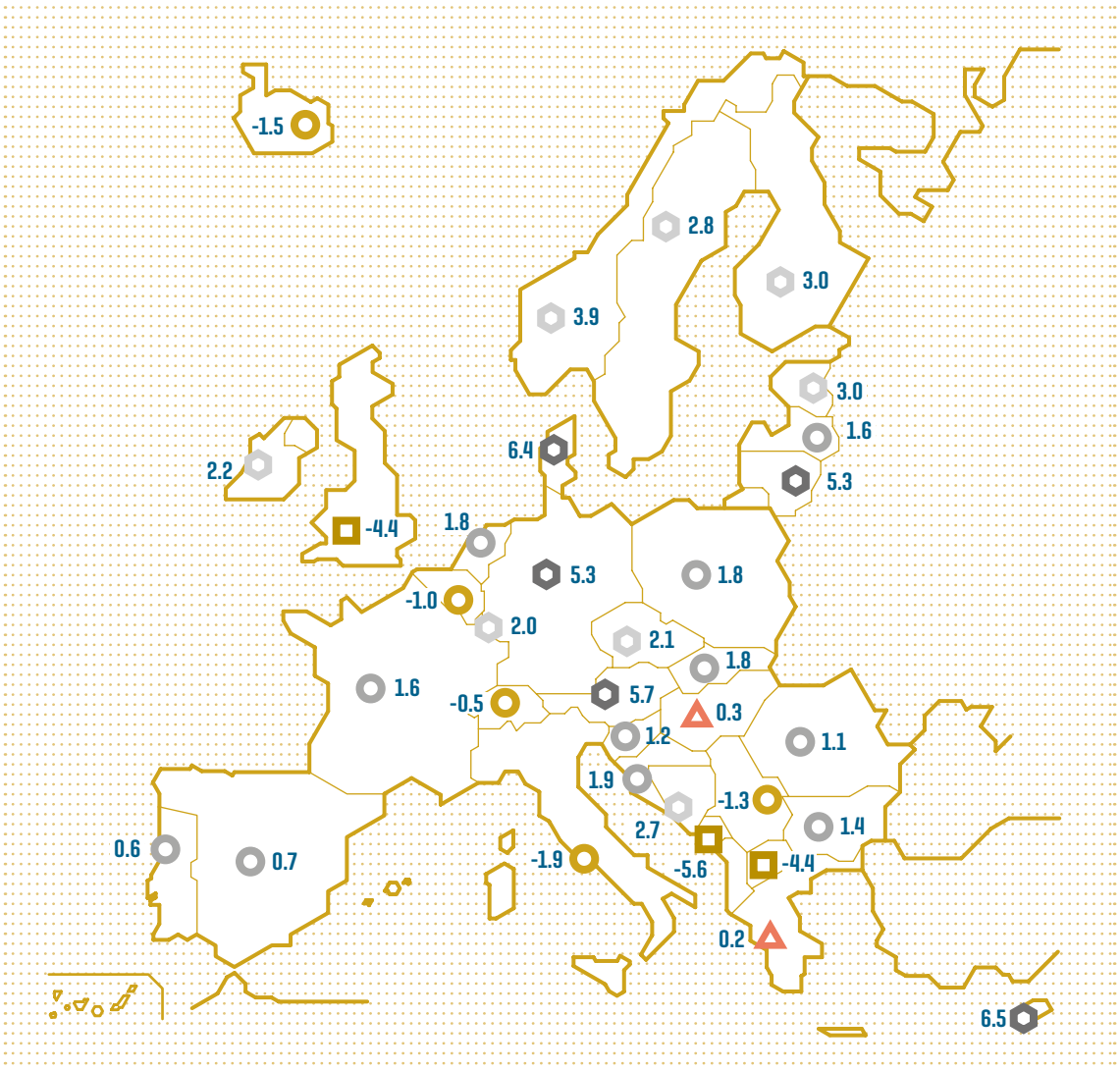
Compared to 2015

In the set countries that belong to ENTSO-E, electricity demand continued in 2016 along the growth path started in 2015 after breaking the downward trend registered in the previous four years. Specifically, 2016 showed a growth of 1.3% compared to 2015.

The following map shows the evolution of the electricity demand in each country compared to 2015. Due to its importance in the overall contribution to demand, noteworthy were the increases registered in Germany, France and Spain, with variations of 5.3%, 1.6% and 0.7% respectively, while on the other hand, in Great Britain and Italy, the variations were -4.4% and -1.9%, respectively.

VARIATION IN ELECTRICITY DEMAND
IN ENTSO-E MEMBER TSOs' COUNTRIES IN 2016

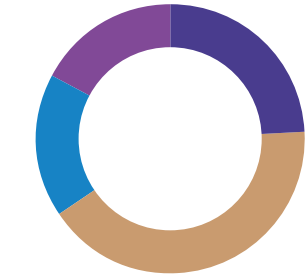
%



≥ 4% 3.9% a 2% 1.9% a 0.5% Estable -0.5% a -1.9% -2% a -3.9% ≤ -4%

Source: ENTSO-E. Data Portal May 24, 2017. Great Britain includes data belonging to Northern Ireland. Spain REE.

NET GENERATION % 2016



Nuclear	24.3
Fossil fuels	41.4
Hydro	17.3
Other renewables	17.0

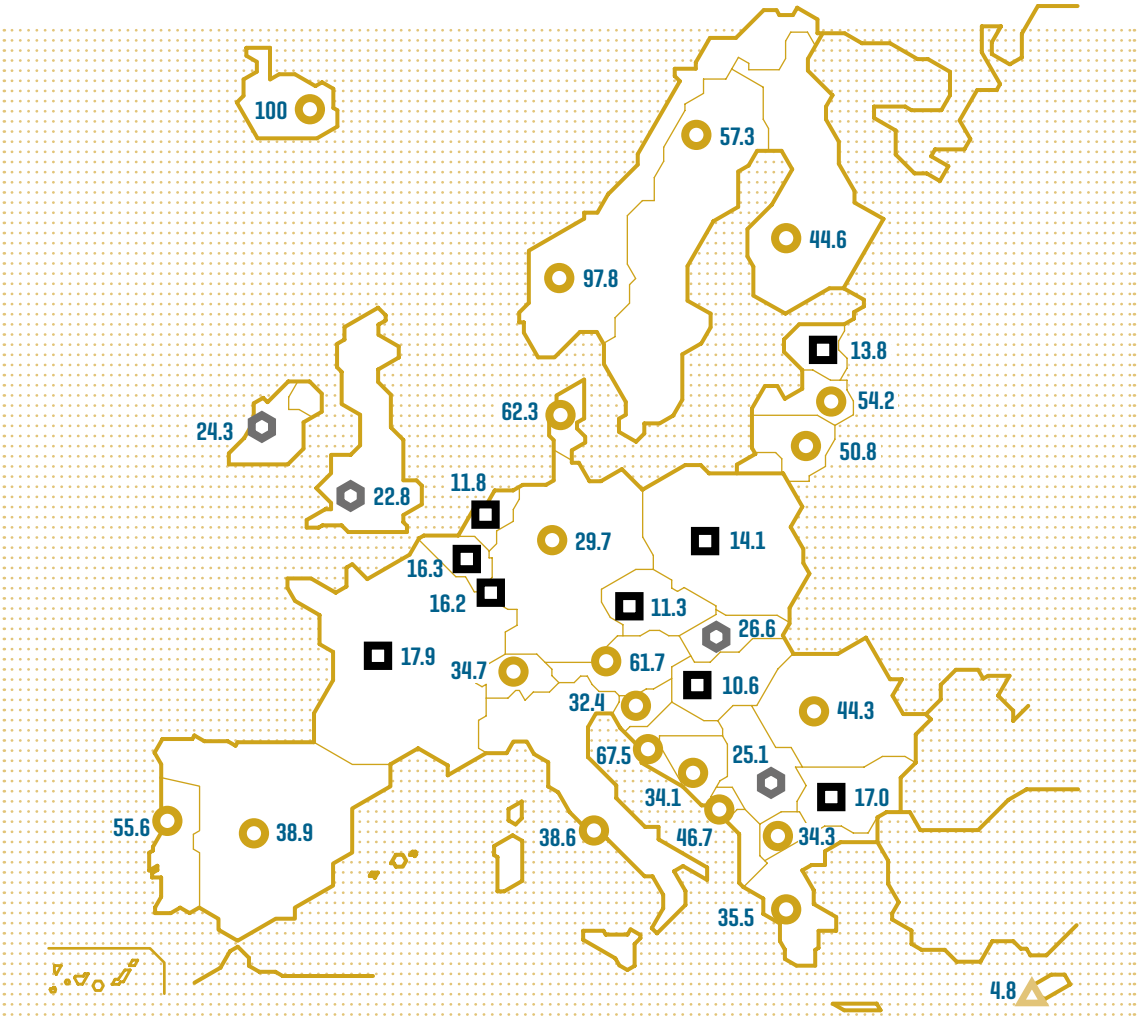
Source: ENTSO-E. Data Portal May 24, 2017. Great Britain includes data belonging to Northern Ireland.

Growth in renewable energies

Regarding generation, energy from renewable sources (excluding hydroelectric pumped-storage generation), represented 33% of the energy produced in the set of countries that are members of ENTSO-E. This represented a variation of 7.4% with respect to the previous year. Spain ranks thirteenth in renewable energy coverage in 2016, being the fifth country regarding coverage using wind energy and the fourth in terms of solar energy, both calculated on total electricity production.

The following map shows the contribution of renewable energy towards the total coverage in each of the countries. It should be noted that Spain is in the group of countries with the highest rate of coverage with renewables, with 38.9% of total generation.

RENEWABLE ENERGY OVER TOTAL GENERATION OF ENTSO-E MEMBER TSOs' COUNTRIES IN 2016 %



≥ 30% 29% a 20% 19% a 10% < 10%

Source: ENTSO-E. Data portal May 24, 2017. Great Britain includes data belonging to Northern Ireland.

ENERGY EXCHANGE BETWEEN ENTSO-E MEMBER TSOs' COUNTRIES AND WITH NEIGHBOURING COUNTRIES

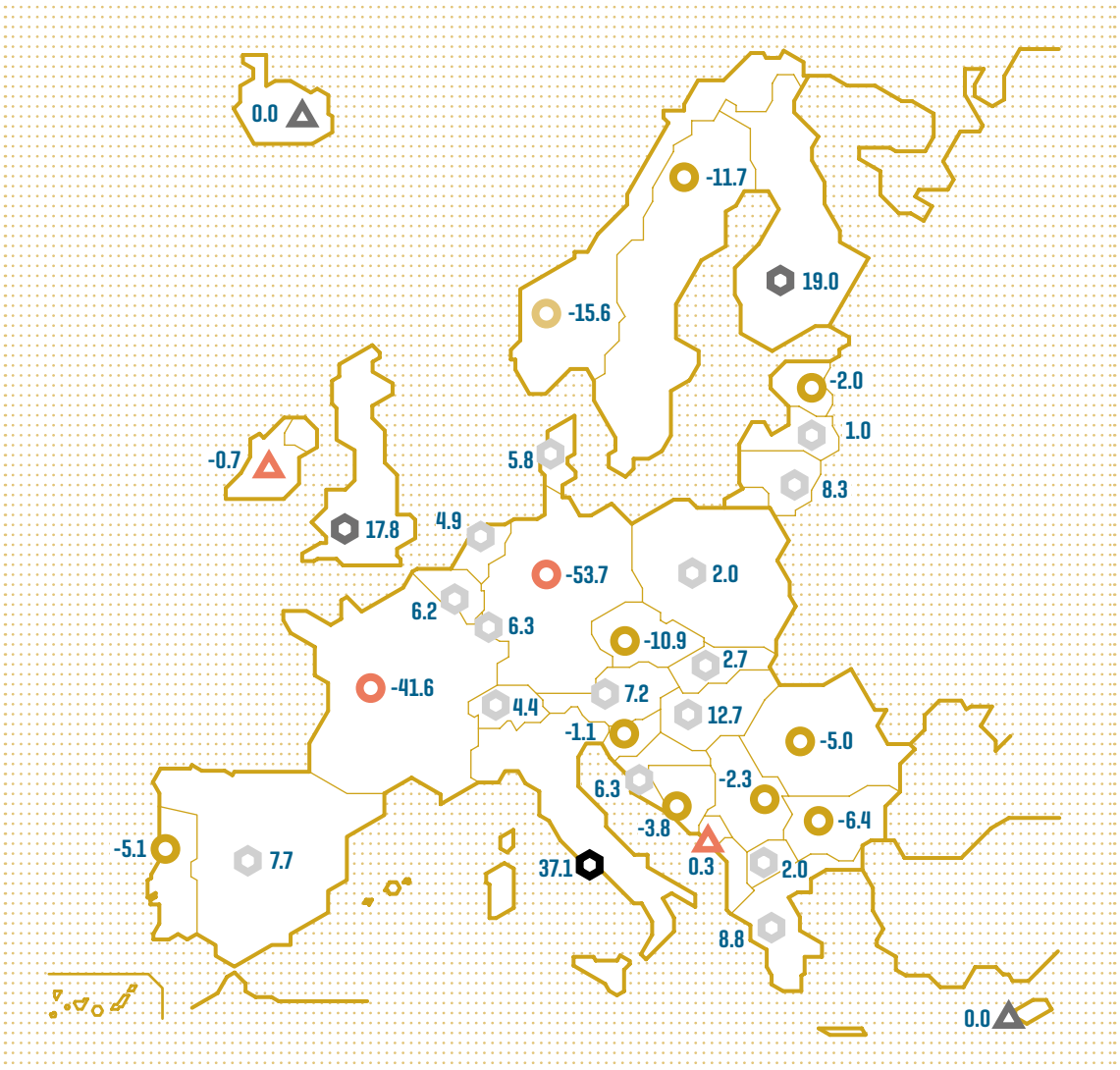
0.4 TWh
AS AN EXPORTER

Energy exchanges

Energy exchanges between ENTSO-E countries and with neighbouring countries have been as an exporter with 0.4 TWh. During 2016, there was essentially an export flow from north-central Europe to other countries on the continent. In 2016, twelve countries belonging to ENTSO-E exported more than 10% of their generation to neighbouring countries. The countries with the greatest exports of energy include Germany, France, Norway and Sweden with export balances of 54 TWh, 42 TWh, 16 TWh and 12 TWh respectively.

BALANCE OF PHYSICAL ELECTRICAL ENERGY EXCHANGES IN ENTSO-E MEMBER TSOs' COUNTRIES AND NEIGHBOURING COUNTRIES IN 2016

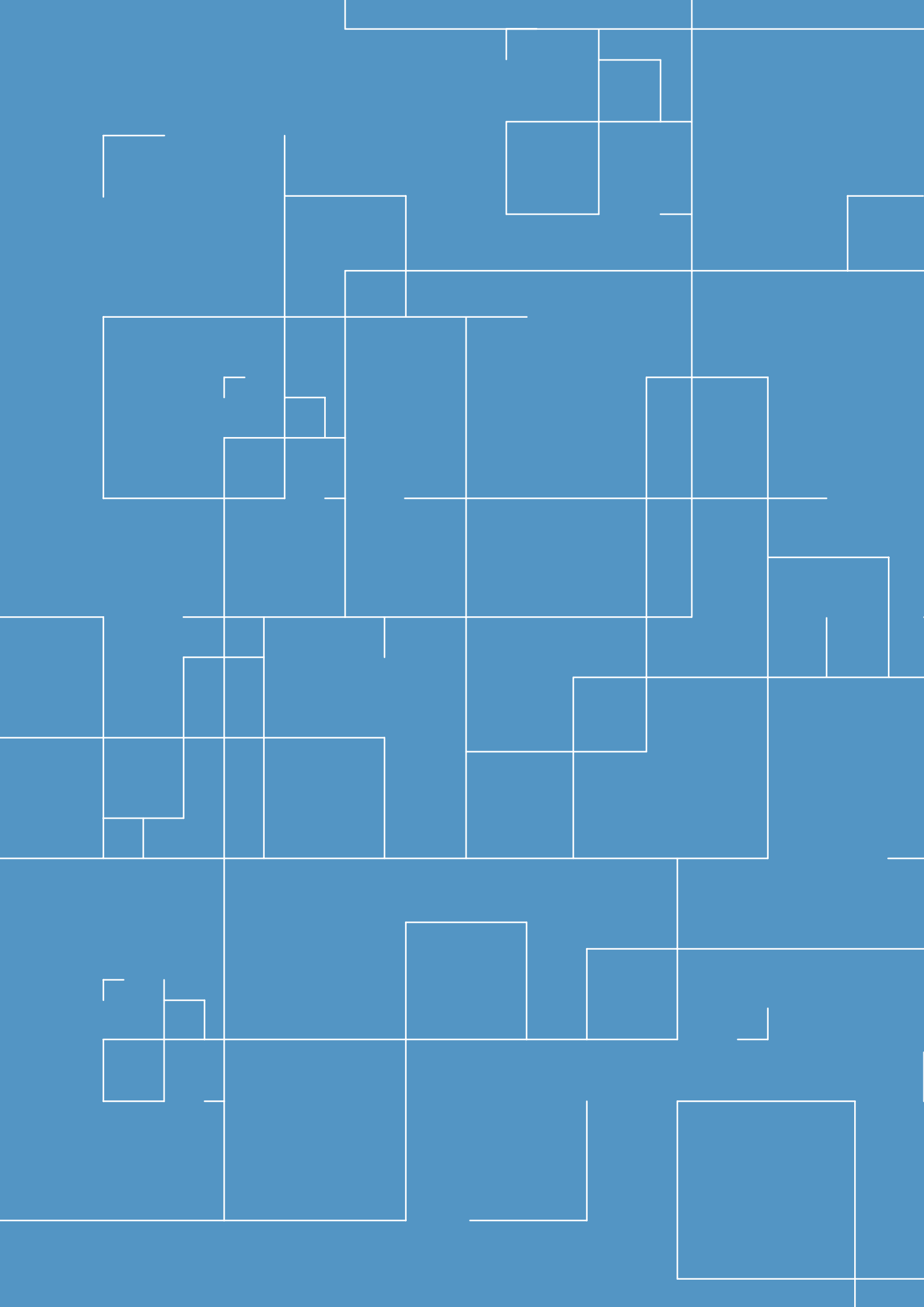
TWh



IMPORT ≥ 30 TWh | 29 TWh a 15 TWh | 14 TWh a 1 TWh | Balanced
EXPORT -1 TWh a -14 TWh | -15 TWh a -29 TWh | ≤ -30 TWh | Isolated

Source: ENTSO-E. Data portal May 24, 2017. Great Britain includes data belonging to Northern Ireland.

Of the twelve countries belonging to ENTSO-E which exported more than 10 % of their generation to neighbouring countries in 2016, noteworthy were Germany, France, Norway and Sweden



REGULATORY FRAMEWORK

2016 is the first year in which the new regulatory framework of the electricity sector is fully implemented following the reform of the regulation initiated in 2013

Regulatory news 2016

In the regulatory arena, 2016 was marked by the political stalemate stemming from the failure to reach an agreement to form a new government after the general elections held in December 2015 and which did not allow a new government to be in place until November 2016, therefore limiting new legislative developments.

Within the context of an interim Government, a number of necessary resolutions were approved during the first half of 2016 in order to complete the remuneration models for electricity transmission and distribution activities. Also approved were the corresponding provisions that set the cost recognised for these activities for the year 2016 and that were calculated for the first time by applying their respective new remuneration models.

With this in mind, 2016 can be considered as the first year in which the new regulatory framework of the electricity sector has been fully implemented following the reform of the regulation initiated in 2013 with the approval of Royal Decree-Law 9/2013, of 12 July which adopted urgent measures to guarantee the financial stability of the electricity system. The new regulatory framework was consolidated following the publication of Law 24/2013, of 26 December, of the Electricity Sector, which repeals Law 54/1997, with the exception of some of its additional provisions, and through the regulatory developments in this Law that have been approved over the last three years.

APPROVAL OF ROYAL DECREE-LAW 7/2016

New financing regime for the SOCIAL ELECTRICITY TARIFF

Discount on the electricity bill for certain consumers considered as vulnerable

Following the inauguration of the new Government in November, among the new relevant regulations passed during the year of note was the approval in December of Royal Decree-Law 7/2016, which establishes several amendments to Law 24/2013, of the Electricity Sector. The purpose of these changes is, on the one hand, to establish a new regime for the financing of a social electricity tariff *(Bono social)* - a discount on the electricity bill for certain consumers considered as vulnerable - the cost of which is to be borne by electricity providers and, on the other hand, introduce general provisions into Law 24/2013 considered necessary to provide coverage for the regulatory development of new measures aimed at protecting the most vulnerable electricity consumers.

Regarding the regulation of the European Union, at the end of November 2016 the European Commission published, under the generic title "Clean Energy for All Europeans", a new proposal for legislative development, which has been colloquially referred to as the 'Winter Package'. With regard to the electricity sector, this proposal includes a new EU Directive on electricity, which will replace the current Directive 2009/72/EC in force, as well as its corresponding regulatory developments.

The Winter Package is part of the European Union's goal for leading the transition towards clean energy

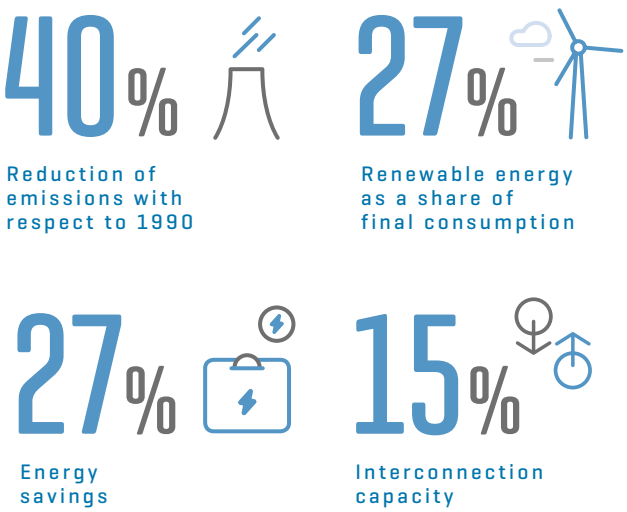
The Winter Package is part of the European Union's goal for leading the transition towards clean energy. In February 2015, the first step taken was the publication of the non-legislative package of the "Energy Union", which defined a new strategic framework for achieving EU energy policy targets in the 2030 horizon (40% reduction of emissions with respect to 1990, 27% renewable energy as a share of final energy consumption, 27% energy savings with regard to consumption forecasts and 15% interconnection capacity between member countries).

In this way, once the Winter Package is approved, after an administrative process that could take up to two years, it will become the normative support required to achieve a transition towards clean energy in accordance with the principles of the EU energy policy. To this effect, also included are legislative proposals concerning energy efficiency, renewable energies, design of the electricity market, the security of electricity supply and the governance regulations of the Energy Union.

2030 EU TARGETS

New legislative proposal
Winter Package

CLEAN ENERGY FOR ALL EUROPEANS



GLOSSARY OF TERMS

ADDITIONAL UPWARD RESERVE POWER
Is the upward power reserve value that may be required with respect to that available in the Provisional Daily Viable Schedule (PDVP) in order to guarantee the security of the electricity system on the Spanish peninsula. The contracting and management of the additional upward power reserve is performed by the system operator, if and when the system conditions require it, through a specific market mechanism.

AIT (AVERAGE INTERRUPTION TIME)
Time, in minutes, which results from dividing the ENS (energy not supplied to the system due to interruptions of the service occurred in the transmission grid), by the average power of the peninsular system.

ANCILLARY SERVICES
Services managed by the System Operator that are required to ensure the electricity supply under the necessary conditions of quality, reliability and security. Ancillary services can be of an obligatory or optional nature. Resolution of technical constraints of the system, supplemental balancing services (additional upward power reserve, primary control, secondary control, tertiary control and voltage control of the transmission grid) and deviation management are all considered ancillary services.

BALANCE MARKETS

Are those system adjustment services markets which allow the generation and demand to be balanced (deviation management services and tertiary and secondary control energy).

BILATERAL CONTRACTS

The generators, traders, consumers or representatives of any of the aforementioned, as participants in the production market may formalise bilateral contracts regarding physical electricity delivery.

CAPACITY AUCTION

Process used to allocate interconnection capacity with France based on market mechanisms, through explicit auctions on different time horizons.

CAPACITY PAYMENT

Regulated payment to finance the medium and long-term power capacity service, offered by the generation facilities to the electricity system.

CLOSED - CYCLE PUMPED STORAGE GENERATION

Production of electricity 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.

CLOSING OF ENERGY IN THE MARKET

Balance arising from the difference between the measured losses in transmission and distribution and the losses acquired by consumers on the peninsula who contract the energy with a trader/ agent or directly on the market.

COGENERATION

The process through which electricity and useful thermal and/or mechanical energy is obtained simultaneously.

COMBINED CYCLE

Technology for the generation of electricity 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 to produce steam 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.

COMMERCIAL EXCHANGE CAPACITY

Technical maximum import and export capacity of the Spanish electricity system with that of a neighbouring country's system and that is both compatible and which complies with the security criteria established for each system.

CONGESTION RENTS

Revenues derived from the management of the interconnection capacity between electricity systems.

CONGESTION

A situation in which the link which interconnects two neighbouring electricity systems is not able to accept all the resulting physical flows of the international due to an insufficient interconnection capacity of the interconnection elements and/or of the national transmission grids involved.

CONSUMERS

Natural or legal persons who buy energy for their own use. Those consumers who acquire energy directly from the production market are known as Direct Market Consumers.

CONTROL DEVIATIONS

Deviations which occur between two electricity systems and are measured as the difference between the scheduled international exchanges and the international physical energy exchanges.

COUNTER-TRADING

Schedule for exchanging energy between two electricity systems. It is established in real time and is carried out in a coordinated way between both system operators. This is super-imposed on the pre-existing final exchange schedules, whilst maintaining these, in order to solve a congestion situation identified in real time in the interconnection.

CROSS-BORDER BALANCING SERVICES

Hourly scheduled energy for balancing between two interconnected electricity systems through the coordinated action of the operators of the electricity systems involved, using the unused capacity after the intraday exchange market.

DAILY BASE OPERATING SCHEDULE (PDBF)

Is the daily energy schedule, broken-down in scheduled periods for the different energy generation selling and purchasing agents/units within the Spanish peninsular electricity system. This schedule is established by the System Operator based on the schedule resulting from matching the day-ahead market and the data regarding the execution of bilateral contracts with physical dispatch of energy.

DAY-AHEAD MARKET

This is the market in which the purchasing and sales transactions of electricty for the following day are carried out.

DEMAND (MEASURED AT POWER STATION BUSBARS)

Energy injected into the transmission grid from the power stations and imports, after deducting the consumption of pumps and exports. In order to transport this energy to the consumption points it would be necessary to subtract the losses originated in the transmission and distribution grid.

DEMAND IN REFERENCE SUPPLY MARKET

Electricity demand of the consumers on the Spanish peninsula (measured at power station busbars after subtracting standard losses) who contract energy from a last resort trader/reseller.

DEVIATION MANAGEMENT

The mechanism of deviation management is an optional service managed and remunerated by market mechanisms. The objective is to resolve the deviations between generation and demand superior to 300 MWh which could appear in the period between the end of one intraday market and the beginning of the next intraday market horizon.

DISTRIBUTION NETWORK TECHNICAL CONSTRAINTS

Are those technical constraints, corresponding to requests sent by the distribution network managers to the System Operator, to guarantee the security of the distribution network under its management.

DISTRIBUTORS

Those mercantile companies (or co-operative societies of consumers and users) have the function of distributing electricity, as well as to construct, maintain and operate the distribution facilities required to transfer and distribute the energy to the consumption points.

GENERATION MARKET

This is comprised of the set of commercial purchase transactions and the sale of energy and other services related to the supply of electricity. It is structured on credit markets, day-ahead market, intraday market, non-organised markets and system adjustment services, understanding as such the resolution of technical restrictions of the system, ancillary services and deviation management.

HYDROELECTRIC RESERVES

The hydroelectric reserve of a reservoir, at any given time, is the quantity of electricity that could be produced in the reservoir's own power station and in all the power stations situated downstream, with the total drainage of its current useable water reserves at

that time and providing that drainage occurs without natural contributions. The annual regime reservoirs are those in which the fill and drainage cycle occurs over a one year period. Hyper-annual regime reservoirs are those which allow the variations in rainfall to be offset in cycles in periods of more than one year.

HYDRO MANAGEMENT UNIT (HMU)

Each set of hydropower stations belonging to the same hydroelectric basin and the same individual agent.

INSTANTANEOUS POWER

Instantaneous power is the energy absorbed by the demand at any given moment of time.

INTERNATIONAL PHYSICAL EXCHANGE

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.

INTERNATIONAL SCHEDULED EXCHANGES

These are the schedules that are established between two electricity systems as a consequence of a set of scheduled individual transactions in the market by Market Participants, or by means of bilateral contracts.

INTERRUPTIBILITY

This is a demand-side management tool used to provide rapid and efficient response to the needs of the electricity system according to technical (system security) and economic criteria (least cost for the system), that consist on the reduction of the demanded active power in response to an order issued by Red Eléctrica as System Operator. According to the regulation on the competitive allocation mechanism for the demand-side interruptibility service (Order IET/2013/2013 and subsequent amendments) the interruptible resource is allocated through an auction procedure; it is the System Operator who is responsible for organizing and managing said auction system.

INTRADAY MARKET

The objective is to manage the adjustments occurring in the generation and demand of energy which may be produced after having fixed the day-ahead market.

MARKET COUPLING

Mechanism for managing the exchange capacity which allows the prices and net positions of the coupled day-ahead markets to be obtained simultaneously and allowing the resulting energy flows to be determined implicitly while respecting the available exchange capacity.

MARKET OPERATOR

A mercantile company which assumes the management of the bid system for the purchase and sale of electricity in the day-ahead and intraday market under the established regulations.

MEASURED DEVIATIONS

Difference between the energy measured at the power station busbars and the energy scheduled in the market.

MEASURED DOWNWARD DEVIATIONS

Measured downward deviations are those which result when the production measured at the power station busbars is less than that scheduled in the market, or when the consumption measured at the busbars is higher than that scheduled in the market. Therefore, the system must manage that difference in real time by increasing production or reducing pumped storage consumption through the ancillary markets.

MEASURED UPWARD DEVIATIONS

Measured upward deviations are those which result when the production measured at the power station busbars is greater than that scheduled in the market, or when the consumption measured at the busbars is lower than that scheduled in the market. Therefore, the system must manage that difference in real time by reducing production or increasing pumped storage consumption through the ancillary markets.

NATIONAL DEMAND IN THE FREE MARKET

Electricity demand of the consumers on the Spanish peninsula (measured at power station busbars) who directly contract energy from a trader or in the market.

NON-FULFILMENT OF ENERGY BALANCING

Unfulfilled energy of net allocated tertiary reserves and deviation management.

NON-RENEWABLE ENERGIES

Includes nuclear, fuel/gas, combined cycle, cogeneration and waste.

POWER FACTOR CONTROL

Article 7, paragraph e), of Royal Decree 413/ 2014, of June 6, by which the electricity production activity from renewable energy sources, cogeneration and waste is regulated, establishes measures to control the power factor applicable for facilities within the scope of this Royal Decree.

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. A producible hydroelectric index of less than 1 indicates that the period is dry, while if greater than 1 it is a wet period.

PRODUCIBLE HYDROELECTRIC ENERGY

Maximum quantity of electricity 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 generation of electricity have been subtracted.

PROGRAMMING UNIT

Minimum element with capacity to bid in a market.

PUMPED STORAGE CONSUMPTION

Electrical energy used by pumped storage hydroelectric power stations for elevating water from the lower to the upper reservoir for the generation of electricity.

RED ELÉCTRICA INDEX (IRE)

A preliminary electricity indicator that shows the evolution of electricity consumption of companies that have medium/high power consumption (with a contracted power capacity greater than 450 kW). This index is published both at a general level and at a detailed level by sector of activity (CNAE) and is available around 22 days after the end of the month.

REFERENCE SUPPLY

Electricity supply scheme established for low-voltage consumers connected to the system, and whose contracted power is not greater than 10 kW.

RENEWABLE ENERGIES

Includes hydro, hydro-wind, wind, solar photovoltaic, solar thermal, biogás, biomass, marine-hydro, geothermal and 50% of urban solid waste.

RESOLUTION OF REAL-TIME TECHNICAL CONSTRAINTS

The process carried out by the System Operator consisting of the resolution of the technical constraints identified during real-time operation of the system by means of the limitation, or if deemed necessary, the modification of the schedules of the Programming Units.

SECONDARY CAPACITY MARKET

A mechanism which allows the transfer and resale, on behalf of a participant, of acquired physical capacity rights in the annual and monthly auctions, or by means of transfers.

SECONDARY CONTROL BAND AND SECONDARY CONTROL

Secondary control is an optional ancillary service with the objective of maintaining the generation-demand balance, correcting deviations with respect to the anticipated power exchange schedules, and frequency deviations. Its temporary action horizon ranges from 20 seconds to 15 minutes. This service is remunerated by means of market mechanisms via two concepts: availability (control band) and usage (energy).

SOLAR PHOTOVOLTAIC

Sunlight converted into electricity through the use of solar cells, generally made of semiconductor material that, when exposed to sunlight, generates electricity.

SOLAR THERMAL

Heat produced by solar radiation that can be taken advantage of for the production of mechanical energy and, subsequently, electricity.

SURPLUS/DEFICIT OF DEVIATIONS

Difference between the number of settlements of the deviations and the energy used to maintain the generation-demand balance.

SYSTEM OPERATOR

A mercantile company whose main function is to guarantee the continuity and security of the electricity supply, as well as the correct coordination of the generation and transmission system. It carries out its functions in coordination with the operators and participants of the Iberian Electricity Market under the principles of transparency, objectivity, independence and economic efficiency. The system operator shall be the manager of the transmission grid.

TECHNICAL CONSTRAINTS PDBF SOLUTION

A mechanism managed by the System Operator for the resolution of the technical constraints identified in the Daily Base Operating Schedule by means of the limitation, or if deemed necessary, the modification of the schedules of the Programming Units and the subsequent process of re-balancing generation-demand.

TERTIARY CONTROL

An optional ancillary service that, if subscribed to, is accompanied by the obligation to bid (for active units) and is managed and compensated by market mechanisms. Its objective is to resolve the deviations between generation and consumption and the restitution of the secondary control reserve used. This is done by means of the adaptation of the operating schedules of the programming units corresponding to generation stations and pumped storage consumption facilities. The tertiary reserve is defined as the maximum variation of power generation that a generation unit can carry out within a maximum of 15 minutes, and which can be maintained for at least 2 hours.

THERMAL LINE RATING

The maximum energy which can be transported by an electricity line without breaking the established safety distances. This value depends on the characteristics of the line and on the environmental characteristics (temperature, wind and solar heating).

TRADERS/RETAILERS

Those mercantile companies or co-operative societies of consumers and users that, accessing the transmission grid or distribution network, acquire energy to sell to consumers, to other system participants or to carry out international exchange transactions under the terms established in Law 24/2013, of 26 December.

TRANSMISSION GRID

The complete set of lines, facilities, transformers and other electrical elements with voltages greater than or equal to 220 kV, and those other facilities, regardless of their power, which fulfil transmission functions, international interconnections and the interconnections with the Spanish insular and non-peninsular electricity systems.

TRANSMISSION GRID AVAILABILITY RATE

Indicates the percentage of total time in which each element of the transmission grid (line, transformer, control element of active and reactive power) has been available for service. It is calculated based on the nominal power of each facility after having factored in the downtime due to preventive and corrective maintenance, unforeseen unavailability, or other causes (such as the construction of new facilities, renovations and improvements).

TRANSMISSION GRID TECHNICAL CONSTRAINTS

Are those technical constraints identified within the global system (generation-transmission grid), that require a modification to the schedules in order to comply with the operation and security criteria for operating the system.

UNAVAILABILITY OF THE PRODUCTION UNITS

A production unit is completely available if it can participate in production without any limitation in generation capacity or, when applicable, pumped storage consumption. Otherwise, it is considered unavailable, such unavailability being of a partial or total nature.

VOLTAGE CONTROL

This is an ancillary system service whose aim is to guarantee the suitable voltage control in the nodes of the transmission grid, so that the operation of the system meets the established security and reliability requirements, to ensure that the energy supplied to the final consumers is in compliance with the required quality and that the generators can work in the established conditions for its normal operation.

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