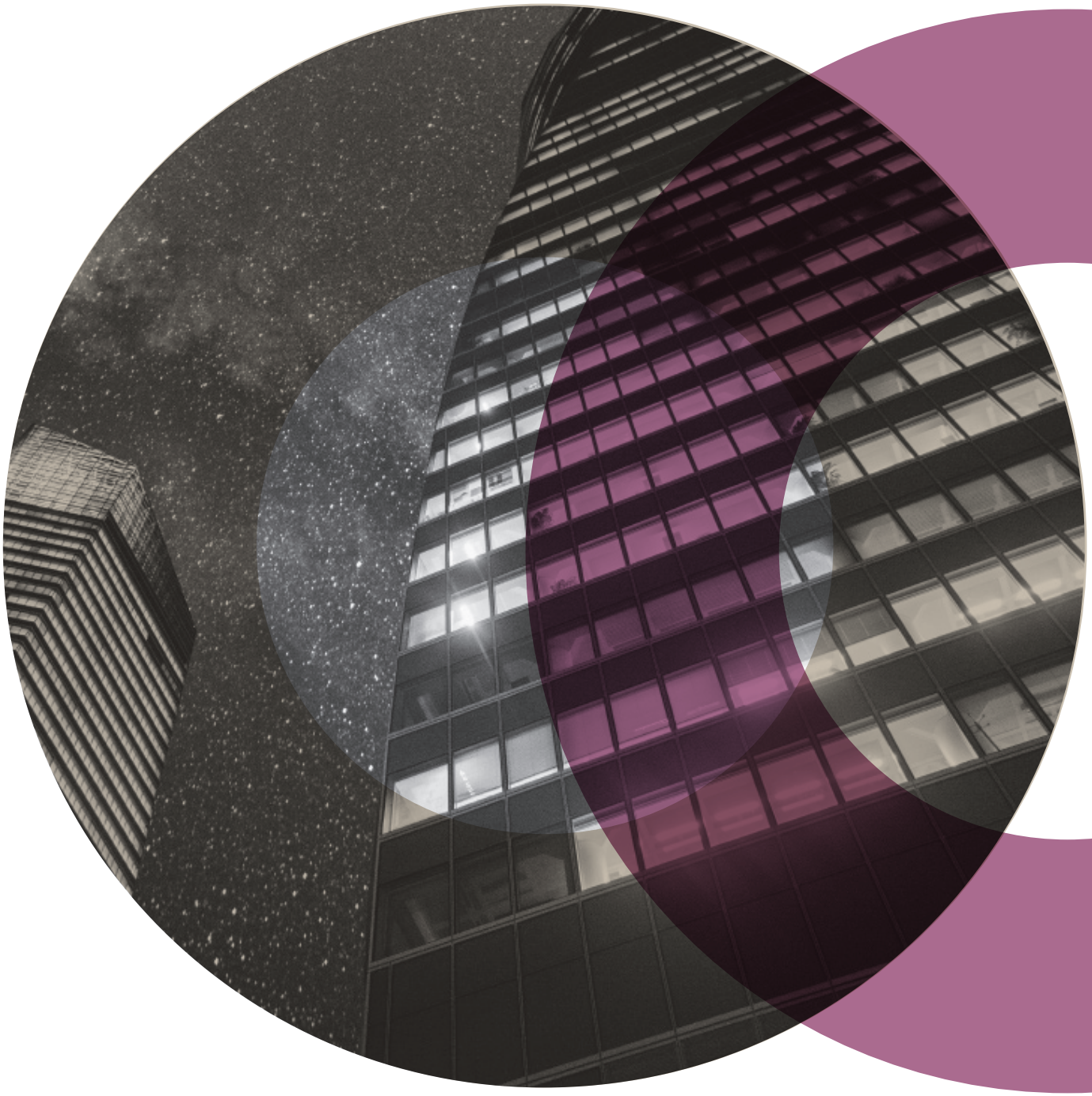
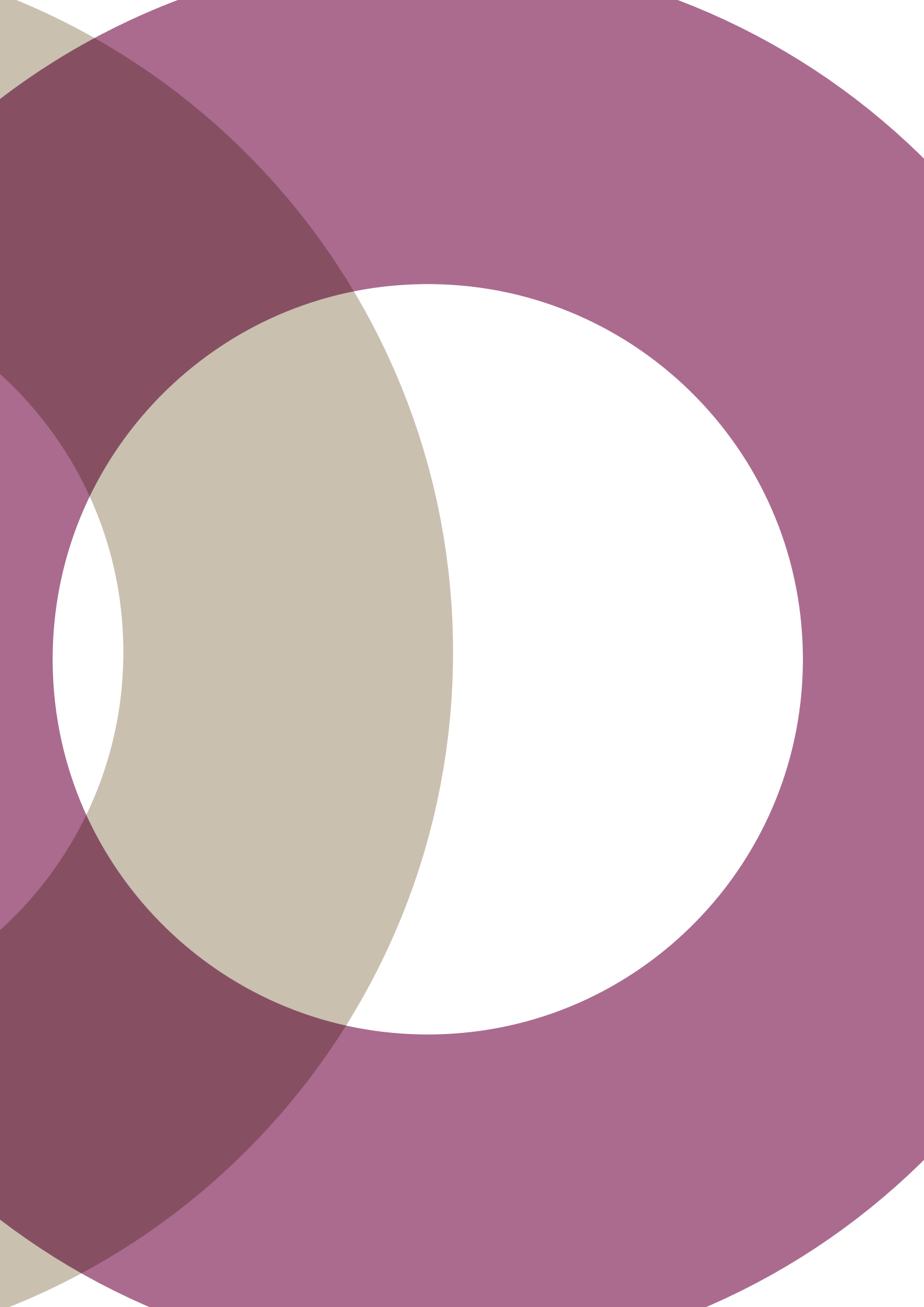
THE SPANISH ELECTRICITY SYSTEM

2017



RED ELÉCTRICA DE ESPAÑA



SUMMARY

PRESENTATION

Red Eléctrica de España (REE) as the sole Transmission Agent and Operator (TSO) of the Spanish electricity system, presents its latest edition of the Spanish Electricity System Report, which the Company has been publishing annually ever since it was established as TSO in 1985. This publication provides an overview of the main operational performance indicators and statistical ratios in 2017, as well as their evolution over recent years.

The report is supplemented by Excel files that provide a more comprehensive set of information and which allow data to be viewed on-line or downloaded. This information is available in the statistics section of the corporate website (www.ree.es/en), along with other publications and statistical series that Red Eléctrica periodically makes available to the public for their consultation and use.

As an extension of the information contained in this report, as of last year Red Eléctrica publishes "Renewable Energy in the Spanish Electricity System", a new report that delves into the generation and consumption of renewable energies, and this document is available on the corporate website as well.

As part of its continued effort to improve, Red Eléctrica's aim is to offer a quality service for all users. To this end the following e-mail address redelectrica@ree.es is made available to the public, as a channel through which suggestions and observations may be submitted.

EXECUTIVE SUMMARY

Demand for electricity in Spain has grown in 2017 for the third consecutive year and has exceeded the rate of increase registered in the previous year.

The growth trend, that began in 2015, regarding the **demand for electricity** in Spain has been maintained, although it is still below the maximum level of demand reached in 2008. Specifically, demand in Spain in 2017 grew by 1.1% year-on-year, exceeding the growth rate of 0.7% registered in 2016, although it was 4.6% lower than the demand level of 2008.

ELECTRICITY DEMAND IN SPAIN IN 2017

268,140

GWh

+1.1%

COMPARED TO 2016

In the peninsular system, which represents just over 94% of total Spanish demand, the annual electricity consumption was also 1.1% higher than in 2016. After having factored in the effects of seasonal and working patterns, the growth in the demand for electricity attributable mainly to economic activity increased by 1.6% compared to 2016.

By **large sectors of activity**, according to the Red Eléctrica Index (IRE) which collates demand data from large electricity consumers, Industryl electricity consumption, which represents about 30% of the demand, registered a growth of 2.0% (2.2% after having factored in the effects of seasonal and working patterns). With regard to the demand in the services sector, which represents about 13%, there was a slight increase of 0.4% (although, after having factored in the effects of seasonal and working patterns this figure stood at -0.2%). On the other hand, the aggregate of other sectors of activity, which represents 5% of demand, experienced a significant increase of 4.7% year-on-year (4.3% after having factored in the effects of seasonal and working patterns). As a result, the overall IRE growth was 1.9% (1.8% after having factored in the effects of seasonal and working patterns).

INDUSTRIAL SECTOR

DEMAND GROWTH

+2.0%

COMPARED TO 2016

SERVICES SECTOR

DEMAND GROWTH

+0.4%

COMPARED TO 2016

OTHER SECTORS

DEMAND GROWTH

+4.7%

COMPARED TO 2016

By **geographical area**, the electricity demand grew with respect to the previous year in most of the autonomous communities, noteworthy being increases above 3% in Cantabria, Murcia and the Balearic Islands.

In relation to the **maximum demand figures**, the peak of instantaneous power in the peninsular system was registered on 18 January at 7.50 pm with 41,381 MW, 2.2% higher than the maximum figure of the previous year registered on 6 September, but still far from the all-time high of 45,450 MW registered in December 2007.

Regarding the **demand coverage**, 96.4% of the peninsular demand was covered with domestic production and the remaining 3.6% with energy imported from other countries. It should be noted that this situation regarding the net import of electricity generation has occurred for the second consecutive year, following a long trend of more than ten years of net export balance.

Installed power capacity of the entire set of generating facilities in Spain decreased for the second consecutive year closing the year at 104,122 MW installed, 0.5% less than in 2016 (decrease due mainly to the definitive closure of the 455 MW Santa Maria de Garoña nuclear power station). Of all the installed power capacity nationally, 46.3% corresponds to renewable energy facilities and 53.7% to non-renewable technologies.

With regard to **electricity generation**, renewable energy, conditioned by a notable fall in hydroelectric production (a fall of 49.1% compared to the previous year), this has reduced its share in the overall generation on the peninsula to its lowest value in the last five years (33.7% compared to 40.3% in 2016). This fall in renewables has been replaced by a greater contribution of non-renewable energy (66.3% compared to 59.7% in 2016), coming mainly from combined cycle and coal-fired power stations.

By technology, electricity production on the peninsula in 2017 was primarily generated by nuclear with 22.4% (22.6% in 2016), followed by wind with 19.1% (19% in 2016). Regarding coal, this increased its share to 17.1% (14.2% in 2016) and combined cycle totalled 13.6% (10.3% in 2016), while hydro was reduced to 7.4% (14.5% in 2016). The remaining generation was shared between cogeneration (11.3%), solar technologies (5.4%) and other (3.7%).

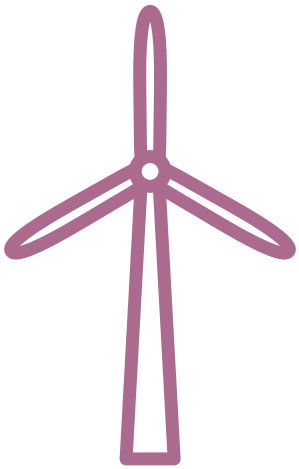
INSTALLED POWER CAPACITY IN SPAIN IN 2017

104,122

MW

46.3%

RENEWABLE ENERGY



ELECTRICITY GENERATION IN SPAIN IN 2017

19.1%

WIND ENERGY

SECOND

SOURCE OF ELECTRICITY GENERATION ON THE SPANISH PENINSULAR

MAXIMUM INSTANTANEOUS POWER IN THE PENINSULAR SYSTEM IN 2017

18 JANUARY 2017

41,381

MW

+2.2%

EXCEEDING THE PREVIOUS YEAR'S MAXIMUM FIGURE REGISTERED ON 6 SEPTEMBER 2016

CO_2 EMISSIONS RESULTING FROM ELECTRICITY GENERATION IN 2017

74.9

MILLION TONNES

+17.9%

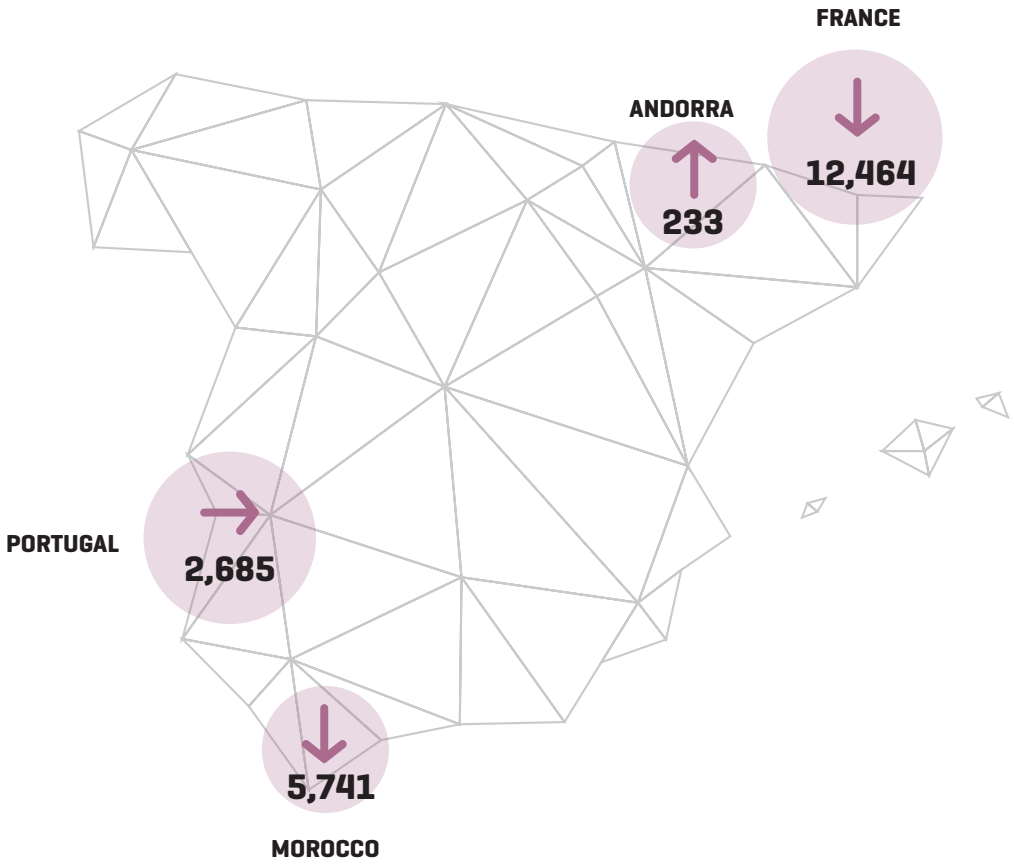
COMPARED TO 2016

The **CO_2 emissions** resulting from electricity generation in Spain increased to an estimated total of 74.9 million tonnes in 2017, 17.9% higher than the 2016 figure, due primarily to the lower share of renewable energy in the mix. However, it should be noted that despite this increase in emissions, the level this year is 33% lower than that registered a decade ago and that more than half of the electricity generated in 2017 came from sources that produce zero CO_2 emissions (nuclear and renewable).

The volume of Spain's **energy exchange programmes** with other countries registered an increase of 10.4% compared to the previous year. Although exports grew by 7.6% to reach 13,649 GWh, this growth was lower than that registered by imports, which amounted to 22,824 GWh, 12.2% higher than in 2016. As a result, the net balance was as an importer, the same as last year, with a value of 9,175 GWh, 19.8% higher than in 2016.

By interconnection, for yet another year Spain was a net importer of energy from France, and for a second year running from Portugal. The interconnection with France registered an import balance of 12,464 GWh (7,806 in 2016) and in the interconnection with Portugal the import balance was 2,685 GWh (5,084 GWh in 2016). With Andorra and Morocco, the balance was once again as an exporter with values of 233 GWh and 5,741 GWh respectively.

BALANCE OF SCHEDULED INTERNATIONAL ENERGY EXCHANGES 2017 (GWh)



The **electricity transmission grid** continued to be developed in 2017, a year in which 147 kilometres of new line and 108 new substation bays were commissioned, and transformer capacity was increased by 1,210 MVA. With this, at the end of the year the infrastructure of the Spanish transmission grid stood at 43,930 km of circuit, 5,719 substation bays and a transformer capacity of 86,654 MVA.

Among the projects currently being developed, noteworthy are the actions carried out in the interconnection with France due to their importance for the integration of the energy markets. In this regard, the commissioning of the Arkale phase shifter is important, which will contribute to favouring the exchange flows with southwestern Europe. Also of importance has been the progress made on the project of new interconnection with France across the Bay of Biscay, whose commissioning is planned for 2025.

The **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, being well inside the maximum limit value pre-established in the current regulations. Working with provisional data (pending auditing), the values corresponding to the Spanish peninsular system in 2017 for Energy Not Supplied (ENS) stood at 60 MWh (78 MWh in 2016) and Average Interruption Time (AIT) at 0.13 minutes (0.16 Minutes in 2016).

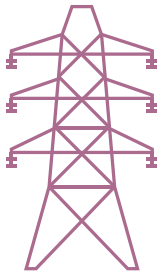
In the Balearic Islands system, these indicators were not as good compared to the previous year, with ENS registering 33 MWh (0.3 MWh in 2016) and an AIT of 2.88 minutes (0.03 minutes in 2016). On the other hand, in the Canary Islands electricity system, these figures improved notably by registering an ENS of 47 MWh (457 MWh in 2016) and an AIT of 2.75 minutes (27.45 minutes in 2016).

As for the Availability Rate, which measures the capacity or possibility of use by the system of the different elements of the transmission grid, the value recorded for the peninsular system was 98.29% and for the Balearic Islands and Canary Islands, 97.85% and 98.12% respectively.

The **average final price** of energy in the electricity market was 60.6 €/MWh, 25.1% higher than the price in 2016 and the second highest since the all-time high recorded in 2008. Similarly, the final energy contracted in the electricity market (reference supply companies plus free market contracting) was 1.1% higher than the previous year.

The combined price of the day-ahead and intraday markets accounted for 88.2% of the final price, the system ancillary services 3.9%, capacity payments 4.5 and the interruptibility service the remaining 3.4%.

If you compare the impact of the price on the final energy (unserved demand) with that of last year, there are increases of 31.5% in the day-ahead and intraday market and 6.7% in the interruptibility service, and decreases of 23.9% in the case of ancillary services and 1.4% in capacity payments.



THE SPANISH ELECTRICITY TRANSMISSION GRID

147

KILOMETRES OF CIRCUIT COMMISSIONED IN 2017

43,930

KILOMETRES OF TOTAL LINE AT THE END OF 2017

AVERAGE FINAL PRICE OF ELECTRICITY IN THE ELECTRICITY MARKET IN 2017

60.6

€/MWh

+25.1%

COMPARED TO 2016

01

ELECTRICITY DEMAND

Demand for electricity in Spain has maintained the positive trend shown in the last two years and has exceeded the rate of increase registered in 2016.

PENINSULAR ELECTRICITY DEMAND IN 2017

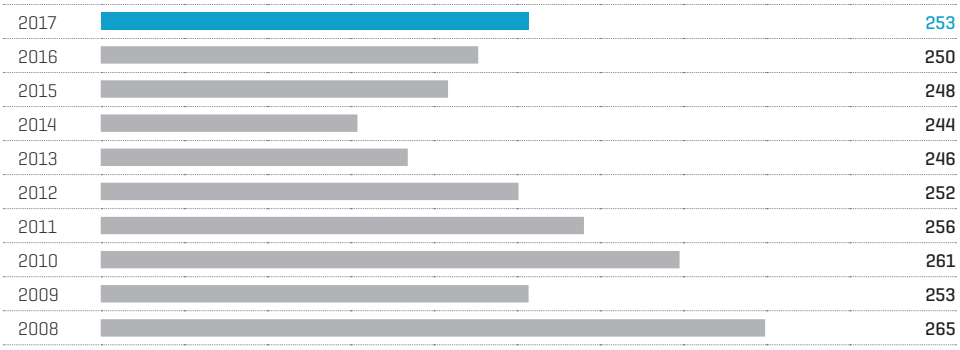
252,740
GWh

+1.1%
COMPARED TO 2016

The demand for electricity in whole of Spain continued its growth trend, which began in 2015, after the falls suffered during the years of the economic crisis. Specifically, in 2017 it reached 268,140 GWh, which represents a growth of 1.1% year-on- year, an increase of 0.7% compared to 2016.

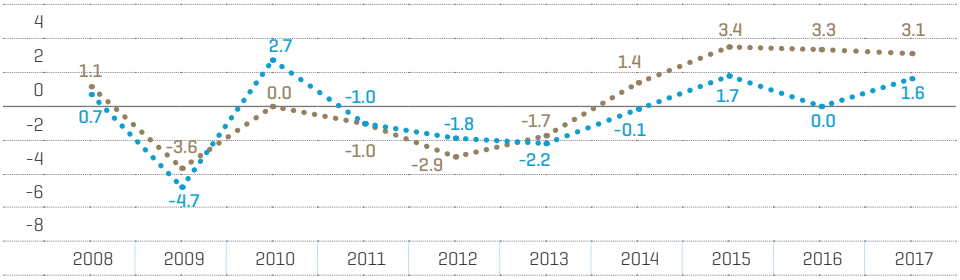
With regard to the evolution of the electricity demand in the peninsular electricity system, which represents just over 94% of the total Spanish demand, it also registered a growth of 1.1% compared to the previous year, totalling 252,740 GWh. In spite of this positive trend, the peninsular electricity demand is still 4.7% below the all-time high reached in 2008.

Evolution of peninsular demand at power station busbars in the last 10 years (TWh)



From an economic activity point of view, there has been a variation in the Gross Domestic Product (GDP) of 3.1% with respect to the previous year, this being the third consecutive year in which there has been a growth in the activity in excess of 3%.

Annual variation of peninsular electricity demand and Spanish GDP (%)



GDP[1] ADJUSTED DEMAND

(1) Source: INE

As has been happening since the beginning of the economic recovery, the good performance of the country's economic activity has not been reflected in a similar evolution of the electricity demand. The elasticity between the variation in the gross demand for electricity and GDP was 0.3, similar to the previous year, which stood at 0.2.

The demand for peninsular electricity, after having factored in seasonal and working patterns, registered a positive variation with respect to the previous year of 1.6%, which contrasts with last year's variation which was almost non-existent.

VARIATION OF ADJUSTED PENINSULAR DEMAND
COMPARED TO 2016

1.6%

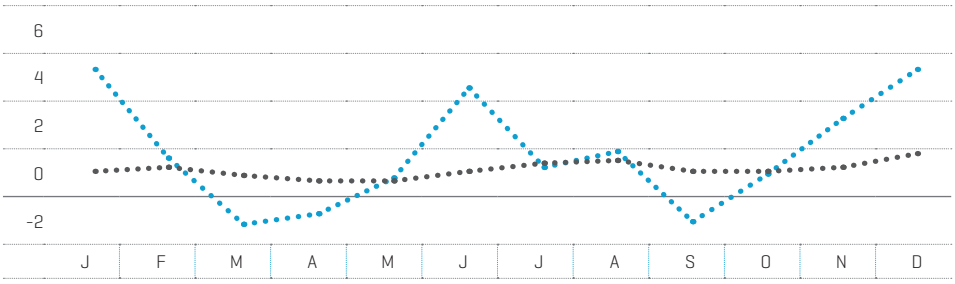
Components of the variation in the yearly peninsular electricity demand [%]

	Δ Demand at busbars	Working patterns	Temperature	Adjusted
2008	1.1	0.0	0.1	0.7
2009	-4.7	-0.2	1.1	-5.6
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	0.7	0.6	0.1	0.0
2017	**1.1**	**-0.3**	**-0.2**	**1.6**

The electricity demand in the peninsular electricity system continued its growth trend, which began in 2015, finishing 2017 with a growth of just over 1%.

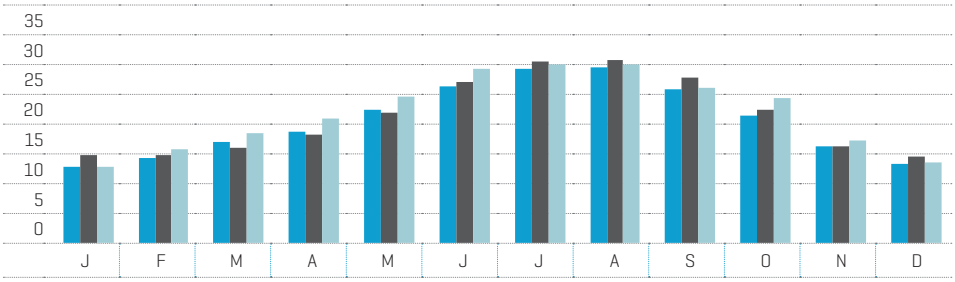
The adjusted monthly demand of the peninsular system has been characterised by high fluctuations in its variation, with increases of more than 4% in the months of January, June and December and decreases of more than 1% in the months of March, April and September.

Monthly variation in adjusted peninsular demand in 2017 (%)



% MONTH % ROLLING YEAR

Monthly evolution of maximum temperatures (°C)



HISTORICAL AVERAGE[1] 2016 2017

[1] Average monthly temperature for the period 1989-2013
Source: Prepared by REE using data from the Spanish State Meteorological Agency (AEMET) data.

INFLUENCE OF TEMPERATURE ON THE DEMAND

From the point of view of the influence of temperature on the demand, in line with what occurred in the previous three years, throughout 2017 there were warmer temperatures in summer and milder in winter than those corresponding to the historical average[1]. The cooling degree days[2] were 12.9% lower than the average values and the heating degree days were 44.0% higher than the average values of the period considered (1989-2013).

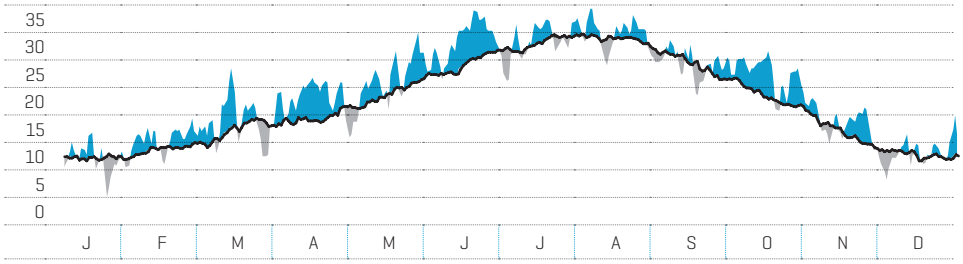
In this respect, throughout 2017 on 43.4% of the days, temperatures were recorded well above the historical average temperature[3]. These days were concentrated in the months of June, July and October. On the other hand, only 8.5% of the days of the year saw temperatures below the historical average. These days were mainly concentrated in the months of January, March and the beginning of December.

43.4%

of the days in 2017 registered temperatures which were much higher than the historical average

[1] Average maximum daily temperatures in the period 1989-2013.
[2] Cooling degree-days are defined as those days registering temperatures below 19°C, while heating degree-days are those above 23°C.
[3] Days with temperatures greater than the average, plus one times its dispersion, measured through standard deviation.

Evolution of temperatures compared to historical average (ºC)



HIGHER THAN AVERAGE LOWER THAN AVERAGE HISTORICAL AVERAGE[1]

(1) Average monthly temperature for the period 1989-2013.
Source: Prepared by REE using data from the Spanish State Meteorological Agency (AEMET) data.

INFLUENCE OF TEMPERATURE ON THE DEMAND

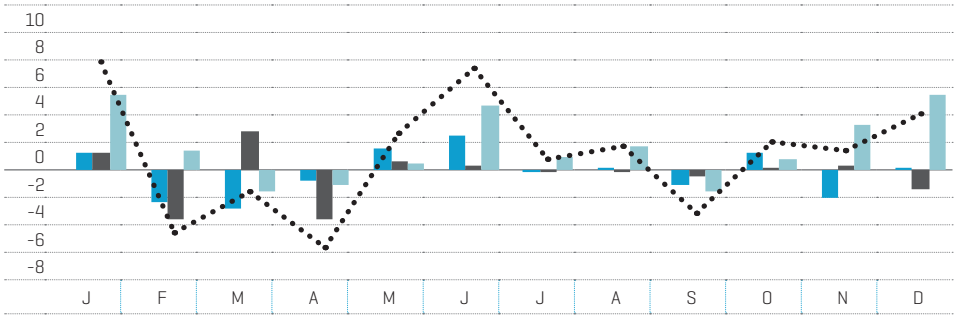
-0.2 P.P.

contribution of temperature to the growth in demand

Comparison with the previous year shows that 2017 has been warmer than 2016, with 11.8% more heating degree days and 4.3% less cooling degree days. The combined impact of these effects, with greater influence on the consumption recorded on the cooling degree days, results in a negative contribution of temperatures to the growth of demand of 0.2 percentage points (P.P.).

2017 has been warmer than 2016, with 11.8% more heating degree days and 4.3% less cooling degree days

COMPONENTS ASSOCIATED TO GROWTH IN MONTHLY DEMAND ON THE PENINSULA (%)



WORKING PATTERNS TEMPERATURE ADJUSTED DEMAND INCREASE IN DEMAND

Return to positive variations in the consumption of large consumers.

RED ELÉCTRICA INDEX IRE

106.4

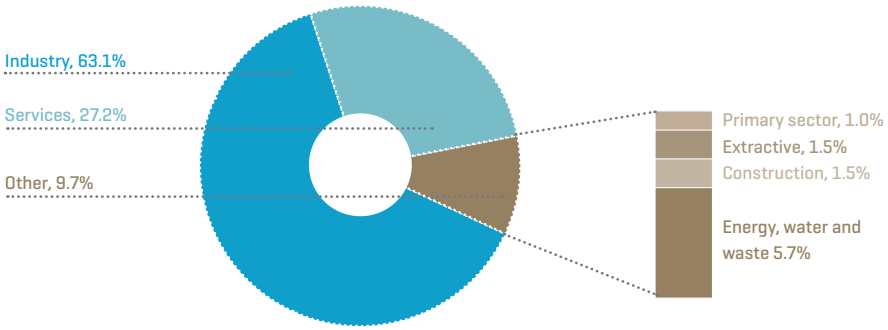
+6.4%
COMPARED TO 2010

+1.9%
COMPARED TO 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 broken down by activity sector (based on Standard Industryl Classification codes) and is available approximately 22 days after the end of the month in question.

In 2017, the overall IRE value was 1.9% higher than in the previous year, bringing the index to 106.4, a value 6.4% higher than the reference year (2010 = 100). After last year when growth was practically non-existent, there has been a return to growth rates close to 2% in 2017, although at a lower rate than the growth registered in 2014 and 2015.

Composition of the general IRE (%)



By large areas of business activity, all have shown a positive variation compared to the previous year, although spread across a wider range of activities:

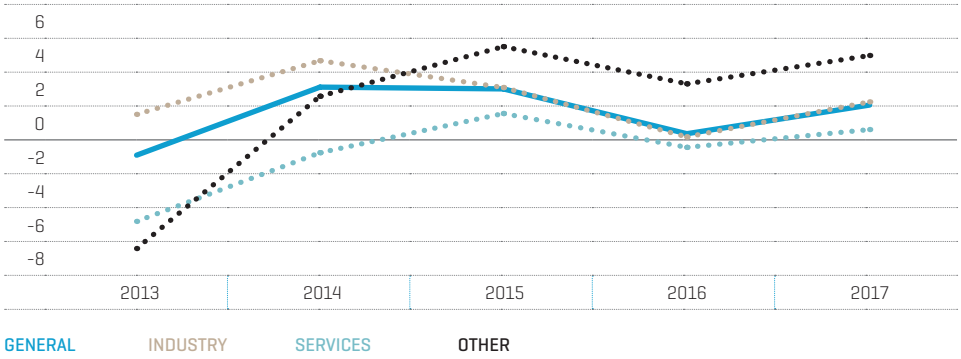
— **Industryl activities grew** 2.0% after the stagnation experienced the previous year.

— The **services sector experienced a slight positive variation (0.4%)** after the negative figure for 2016 (-0.6%), although it did not reach the high growth recorded in 2015 (1.4%).

— The **grouping of other areas of business activity** [4] has had a more dynamic evolution with **a growth of 4.7%** over the previous year (1.6 p.p. up on 2016).

[4] Primary sector. Extractive industry. Energy, water and waste; Construction.

Annual evolution of the IRE (% year-on-year)



In 2017, the composition of the calendar had a negative impact of 0.3 percentage points on the evolution of the IRE, mainly due to the fact that the previous year was a leap year. Temperatures, on the other hand, warmer than those of the previous year, contributed 0.4 p.p. to its evolution. After factoring in both of these effects, the general index grew 1.8% with respect to the previous year, which contrasts with the practically non-existent growth registered in 2016.

The effect of temperature on the evolution of consumption was uneven throughout the year. In the months where cold temperatures had an impact, the negative effects on the IRE were concentrated together, whereas in the months where heat had an influence, the positive impacts were more spread out and had a greater influence on the year as a whole.

IRE: variation breakdown in 2017 (%)

	IRE	Working patterns	Temperature	Adjusted
General	**1.9**	**-0.3**	**0.4**	**1.8**
Industry	2.0	-0.3	0.1	2.2
Services	0.4	-0.4	1.0	-0.2
Other	4.7	-0.2	0.6	4.3

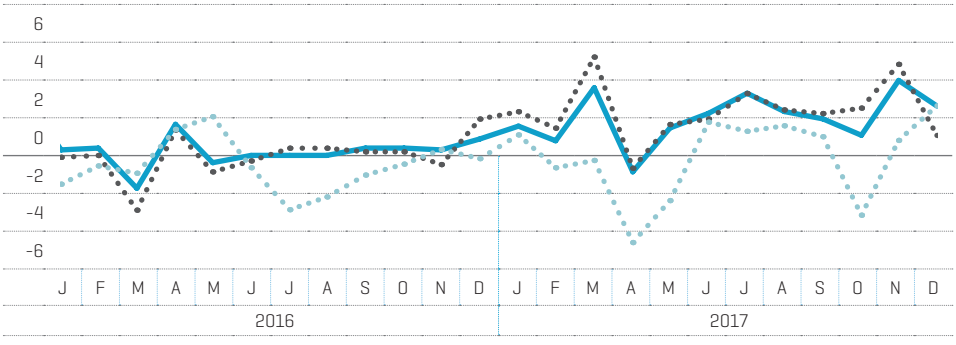
Temperature has had a slight positive impact of 0.4 p.p. on the evolution of consumption, although with a uneven behaviour throughout the year due to the fact that 2017 was warmer than 2016.

Both the industrial sector and services sector (the two largest groupings of business activities) have shown a significant variation spread in their evolution although both have shown a certain recovery in consumption levels, although with different intensities.

The Industrial sector, after the slight decrease of the previous year, has regained momentum to end the year with an adjusted growth of 2.2%, although with a monthly evolution which showed growth peaks of 5.0% and 4.6% in the months of March and November, and a decrease of 0.8% in April and in the month of December the evolution indicated the beginning of a possible slowdown in growth rates.

The Services sector continued its negative evolution although with an adjusted variation of less intensity than that registered the previous year (-0.2% in 2017 compared to -0.7% in 2016). The evolution of this sector grouping continues to show high volatility in its monthly variations, with sharp decreases in the months of April, May and October that have counteracted the positive evolution of the summer months and the last two months of the year.

Monthly evolution of the adjusted IRE (% year-on-year)



GENERAL INDUSTRY SERVICES

ADJUSTED GENERAL INDEX
INDUSTRY

+2.2%

ADJUSTED GENERAL INDEX
SERVICES

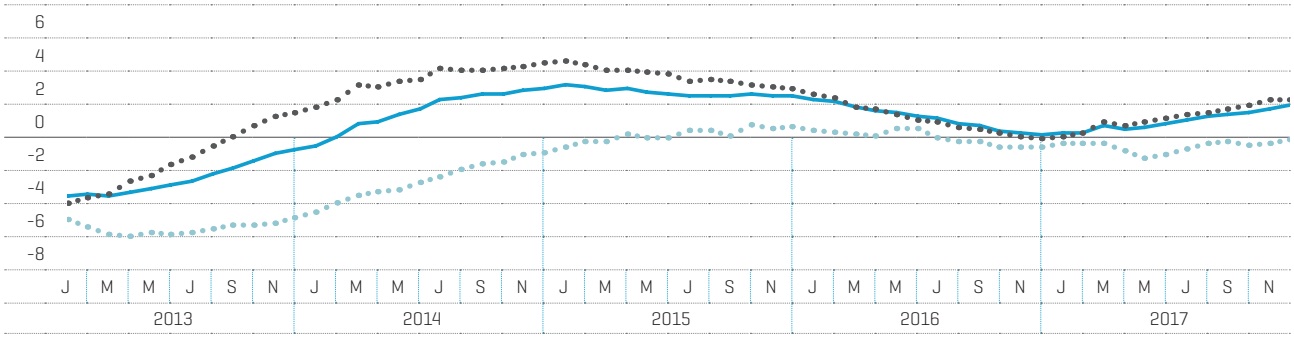
-0.2%

Regarding the trend, the slowdown shown by the evolution of the IRE during 2016 was turned around at the beginning of 2017, leading to a trend showing clear growth throughout this year.

Already in 2015, the Industrial sector had shown a decline in its growth rates that were confirmed during 2016. In 2017, on the other hand, there has been an upsurge in the consumption of this sector that has influenced the general evolution of the index.

The Services sector has continued a downward trend although with a changeable behaviour throughout 2017. The negative variation registered in late 2016 continued throughout the first few months of 2017 showing little or no change until the beginning of spring when it experienced a sharp fall that continued until the beginning of summer when consumption began a recovery trend; a trend that closed the year close to zero, although still with a negative variation rate.

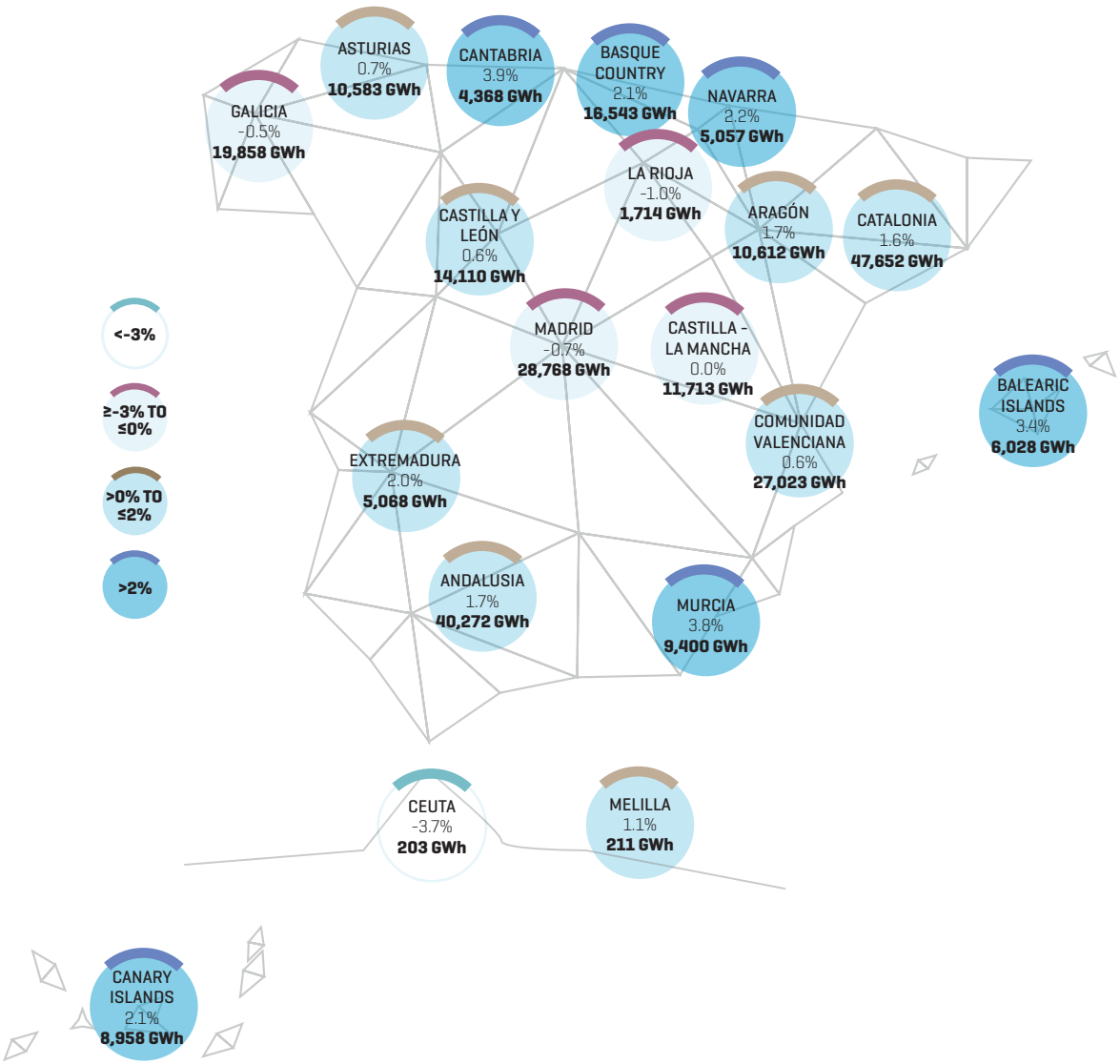
Monthly trend of the adjusted IRE (% rolling year)



Higher growth both in the north and east of the country.

The **evolution of the demand by geographical** zone oscillated between a maximum growth in Cantabria of 3.9% and a decrease of 3.7% in Ceuta. In addition, there were declines in demand in geographically dispersed communities such as Galicia, La Rioja and Madrid to which we can add Castilla-La Mancha which had zero variation compared to the previous year. The rest of the autonomous communities experienced a positive variation in demand, noteworthy being the highest growths in the north (Cantabria, the Basque Country and Navarra) and in the east (Balearic Islands and Murcia).

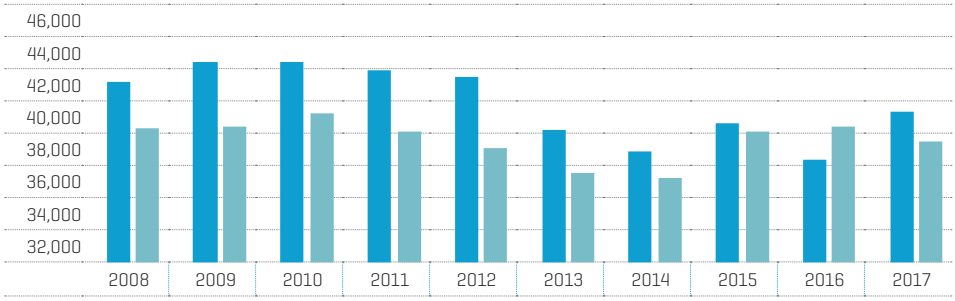
Demand per autonomous community and variation compared to the previous year (GWh and%)



The **annual maximum value of instantaneous demand** on the Spanish peninsula has returned to the usual situation, with this maximum being registered during the cold months, unlike that which happened in 2016 when this maximum was registered in the month of September. In 2017, the annual maximum of 41,381 MW was reached on 18 January at 7:50 pm, a value 2.2% higher than the previous year's maximum registered on 6 September 2016. Regarding the summer maximum value, this occurred on 13 July registering a value of 39,536 MW, a value 2.4% lower than the summer maximum of the previous year.

Nonetheless, the annual maximum value is far from the all-time high for demand registered in 2007, a value that is 4,069 MW higher than the value in 2017. The difference with respect to the all-time high value for the summer months is much smaller, with the summer maximum for 2017 being 1,782 MW lower than the summer all-time high.

Maximum annual values for instantaneous demand on the Spanish peninsula[1] (MW)



[1] All-time high 45,450 MW, 17 december 2007 (10:53 am).

MAXIMUM INSTANTANEOUS PENINSULAR DEMAND IN 2017

18 JANUARY 2017

41,381 MW

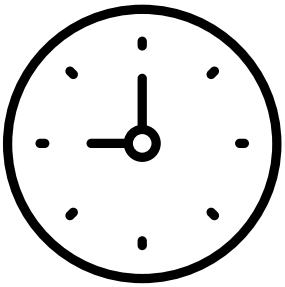
+2.2%

EXCEEDING THE PREVIOUS YEAR'S MAXIMUM VALUE REGISTERED ON 6 SEPTEMBER 2016

-9.0%

LOWER THAN THE PREVIOUS ALL-TIME HIGH VALUE REGISTERED ON 17 DECEMBER 2007

The **maximum hourly demand** for 2017 was also registered on 18 January, from 8:00 pm to 9:00 pm with a value of 41,015 MWh, 7.3% higher than the winter hourly maximum of the previous year. Regarding the summer hourly maximum, this took place on 13 July from 1:00 pm to 2:00 pm and stood at 39,286 MWh, 2.1% less than the summer maximum of 2016.



MAXIMUM HOURLY DEMAND
WINTER

41,015
MWh

+7.3%
COMPARED TO 2016

MAXIMUM HOURLY DEMAND
SUMMER

39,286
MWh

-2.1%
COMPARED TO 2016

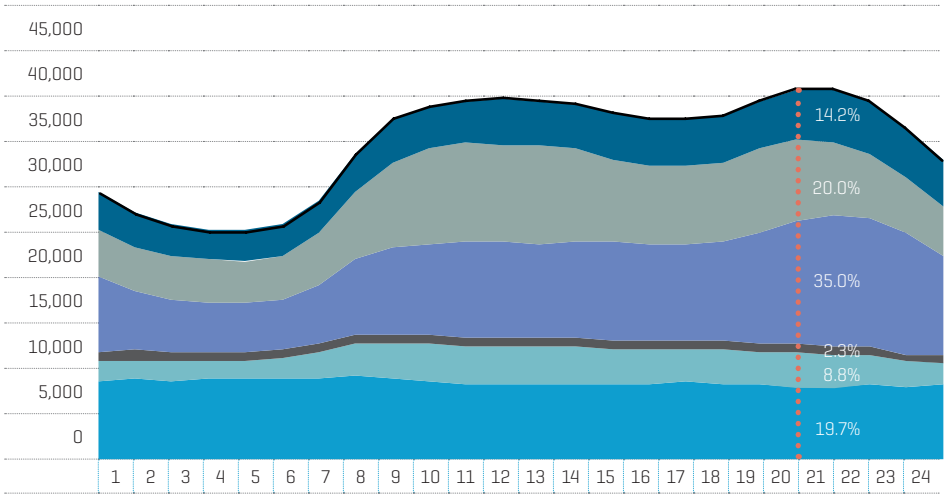
LARGEST CONSUMER IN THE HOUR OF MAXIMUM HOURLY DEMAND REGISTERED FOR THE YEAR
RESIDENTIAL SECTOR

35%

8:00 PM – 9:00 PM

In the hour of maximum hourly demand for the year, the residential sector[5] accounted for 35% of consumption, while the industrial consumption as per the IRE accounted for 19.7%, large services (IRE) 8.8% and small businesses and services 20%. During the day of peak consumption, the greatest share of the industrial sector occurred during the early morning, between 4:00 am and 5:00 am, when it reached a 34.8% share of the total demand (as measured at power station busbars), while for the large services, the time period with the greatest share took place between 10:00 am and 7:00 pm when its share, in terms of consumption, was between 9.6% and 10.5%.

Breakdown of the maximum hourly demand in 2017- January 18th (MWh)

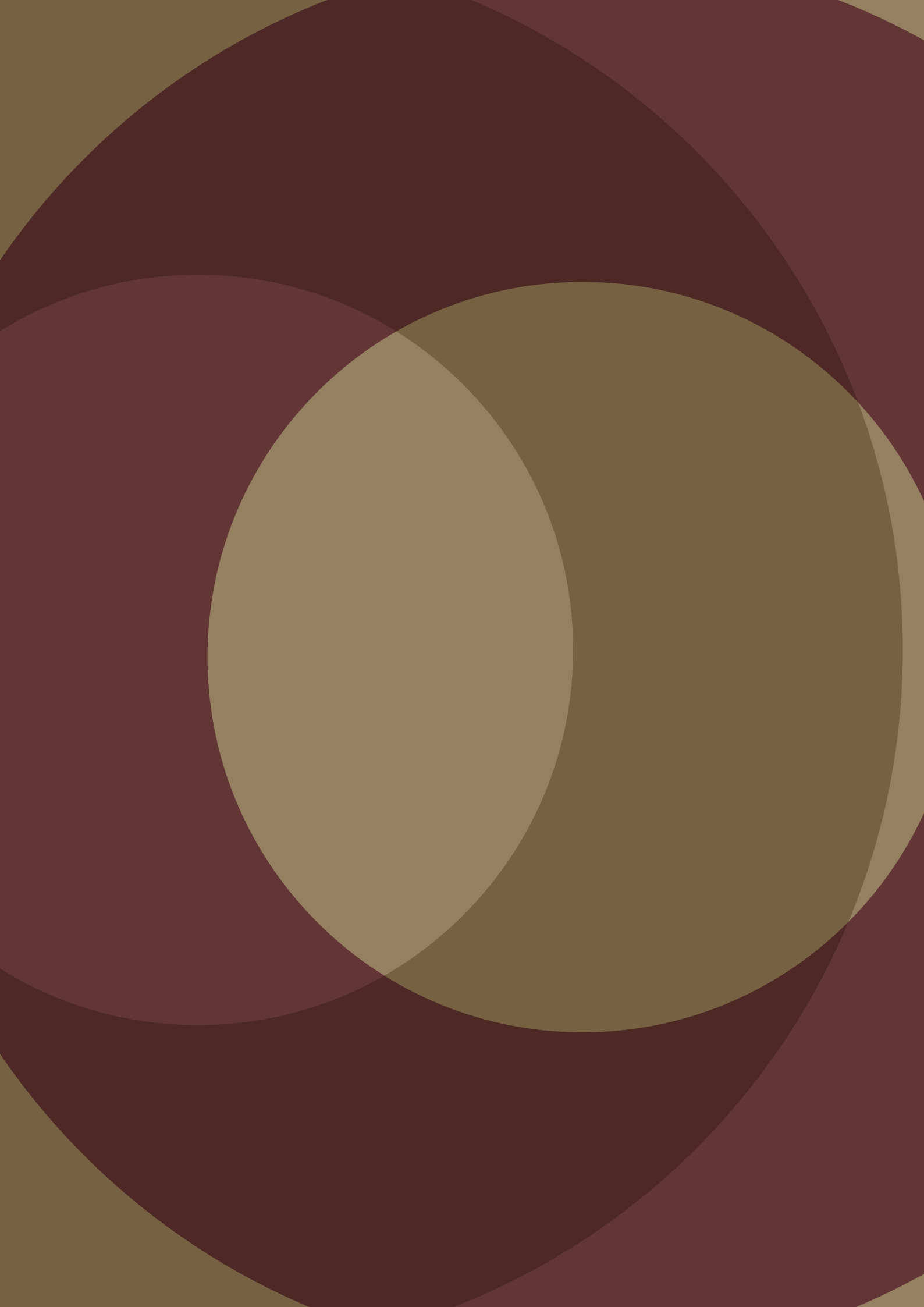


INDUSTRY IRE SERVICES IRE OTHERS IRE RESIDENTIAL SECTOR[1]
OTHER (SMALL BUSINESSES AND SERVICES) TOTAL ENERGY LOSSES TOTAL DEMAND AT BUSBARS

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

Regarding demand coverage, 96.4% of the demand of the peninsular electricity system was covered by domestic production, while the rest of the generation needed to cover the demand was imported from other countries, mainly from France. It should be noted that this import balance situation has occurred for the second consecutive year, while during the period 2003 to 2015 the net balance was as an exporter every year.

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



02

ELECTRICITY GENERATION

Production of renewable energy decreases significantly due to the limited contribution of hydroelectric energy, while generation coming from coal and combined cycle increases.

Explanatory note: the structure of the energy balance and of the installed power capacity balance has been modified. In this year's report, 'Pumped storage' has been included as a concept on its own and is no longer included in the 'Hydro' concept. Similarly, the 'Waste' concept has now been broken down into two concepts: 'Renewable waste' and 'Non-renewable waste'. To standardise the information, data from previous years has been recalculated.

ELECTRICITY GENERATION IN THE PENINSULAR SYSTEM

248,424
GWh

-49.1%
HYDROELECTRIC GENERATION

+31.8%
COMBINED CYCLE

+21.0%
COAL

Electricity generation in the peninsular system, which represents almost 95% of the total generation nationwide, has remained virtually unchanged in 2017 standing at 248,424 GWh. The most significant variations with respect to the previous year were recorded by hydroelectric generation, which fell by 49.1%, while combined cycle and coal-fired generation increased their production by 31.8% and 21.0%, respectively.

Electricity generation in non-peninsular systems (14,221 GWh) increased 3.2% with respect to the previous year, although it should be noted that there was an increase of 13.0% in coal-fired generation. Also noteworthy is the increase in the production from the hydro-wind power station located on the island of El Hierro, whose production was 12.7% higher than the previous year.

Regarding the balance of generation by type of energy, unlike in 2016, renewable energy reduced its share in the peninsular electricity generation mix to 33.7% (40.3% in 2016), as a result of the impact the abnormally low rainfall had on hydroelectric production which registered the lowest value since 2005. In contrast, non-renewable energy increased its share to 66.3% (59.7% in 2016).

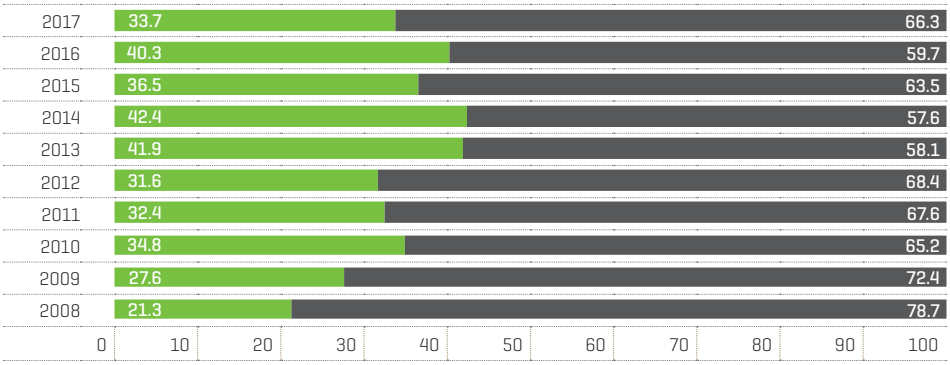
ELECTRICITY GENERATION IN NON-PENINSULAR SYSTEMS

14,221
GWh

+3.2%
COMPARED TO 2016

+13.0%
COAL

Evolution of renewable and non-renewable generation on the Spanish peninsula (%)



RENEWABLE: HYDRO, WIND, SOLAR PHOTOVOLTAIC, SOLAR THERMAL, RENEWABLE WASTE AND OTHER RENEWABLES.
NON-RENEWABLE: NUCLEAR, COAL, FUEL/GAS, COMBINED CYCLE, COGENERATION, PUMPED STORAGE AND NON-RENEWABLE WASTE

SHARE OF RENEWABLE ENERGY IN THE PENINSULAR GENERATION MIX

33.7%
(40.3% IN 2016)

AS A RESULT OF THE IMPACT THE ABNORMALLY LOW RAINFALL HAD ON HYDROELECTRIC PRODUCTION

National electrical energy balance [1]

	Peninsular system		Non-peninsular systems		National total	
	GWh	**%17/16**	**GWh**	**%17/16**	**GWh**	**%17/16**
Hydro	18,361	-49.1	3	-5.5	18,364	-49.0
Pumped storage [2]	2,249	-28.2	-	-	2,249	-28.2
Nuclear	55,609	-0.9	-	-	55,609	-0.9
Coal	42,593	21.0	2,603	13.0	45,196	20.6
Fuel/gas [3]	-	-	7,011	3.6	7,011	3.6
Combined cycle [4]	33,855	31.8	3,442	-3.7	37,296	27.5
Hydro-wind	-	-	20	12.7	20	12.7
Wind	47,498	0.4	399	0.1	47,897	0.4
Solar photovoltaic	7,988	5.4	397	-0.4	8,385	5.1
Solar thermal	5,348	5.5	-	-	5,348	5.5
Other renewables [5]	3,603	5.5	11	5.1	3,614	5.5
Cogeneration	28,134	8.7	36	4.2	28,170	8.7
Non-renewable waste	2,459	-0.5	149	9.7	2,608	0.0
Renewable waste	728	12.1	149	9.7	877	11.7
Generation	**248,424**	**0.0**	**14,221**	**3.2**	**262,645**	**0.1**
Pumped storage consumption	-3,675	-23.7	-	-	-3,675	-23.7
Peninsula-Balearic Islands' link [6]	-1,179	-5.7	1,179	-5.7	0	-
International exchange balance [7]	9,171	19.6	-	-	9,171	19.6
Demand (b.c.-at power station busbars)	**252,740**	**1.1**	**15,400**	**2.5**	**268,140**	**1.1**

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

Breakdown of installed power capacity as at 31.12.2017. National Electricity System

	Peninsular system		Non-peninsular systems		National total	
	MW	**%17/16**	**MW**	**%17/16**	**MW**	**%17/16**
Hydro	17,030	0.0	2	0.0	17,032	0.0
PUMPED STORAGE	3,329	0.0	-	-	3,329	0.0
Nuclear	7,117	-6.0	-	-	7,117	-6.0
Coal	9,536	0.0	468	0.0	10,004	0.0
Fuel/gas	0	-	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	22,922	0.1	211	35.2	23,132	0.3
Solar photovoltaic	4,439	0.0	247	0.2	4,687	0.0
Solar thermal	2,304	0.0	-	-	2,304	0.0
Other renewables [1]	852	0.1	6	0.0	858	0.1
Cogeneration	5,818	-2.8	10	0.0	5,828	-2.8
Non-renewable waste	459	0.0	38	0.0	497	0.0
Renewable waste	123	0.0	38	0.0	162	0.0
Total	**98,877**	**-0.6**	**5,245**	**1.1**	**104,122**	**-0.5**

(1) Includes biogas, biomass, marine energy and geothermal

The installed power capacity of the complete set of electricity generation facilities in Spain decreased in 2017 for the second consecutive year.

INSTALLED POWER CAPACITY IN THE PENINSULAR ELECTRICITY SYSTEM

98,877
MW

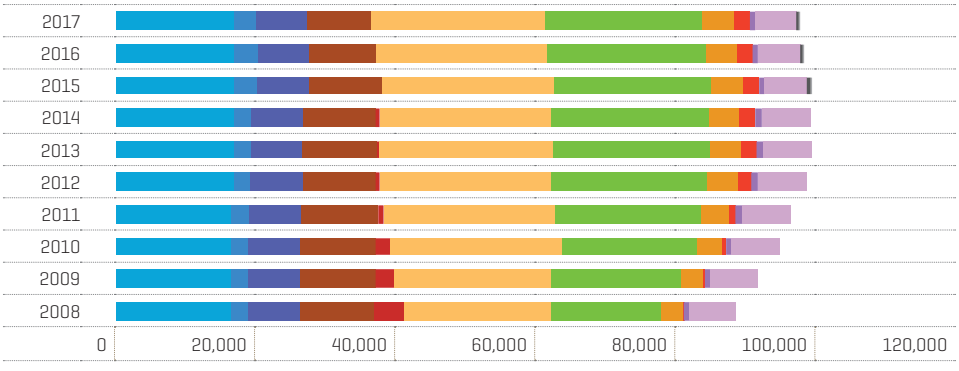
-0.6%
COMPARED TO 2016

As at 31 December 2017, the complete set of electricity generation facilities in the peninsular system had fallen slightly compared to the previous year, registering an installed power capacity of 98,877 MW, 0.6% less than at the end of 2016. This decrease was mainly due to the definitive shutdown of the 455 MW Santa Maria de Garoña nuclear power station, a facility that had been inactive since the end of 2012.

On the other hand, overall installed power capacity in non-peninsular systems increased by 1.1% by the end of 2017. This growth is mainly due to the substantial increase in 2017 of installed wind power capacity in the Canary Islands.

Installed power capacity in the complete set of generation facilities nationwide, encompassing the peninsular system and non-peninsular systems, decreased for the second consecutive year, ending 2017 at 104,122 MW, 0.5% less than in 2016. Of the total installed power capacity, 46.3% corresponds to renewable energy facilities and 53.7% to non-renewable technologies.

Evolution of installed power c apacity on the Spanish peninsula (MW)



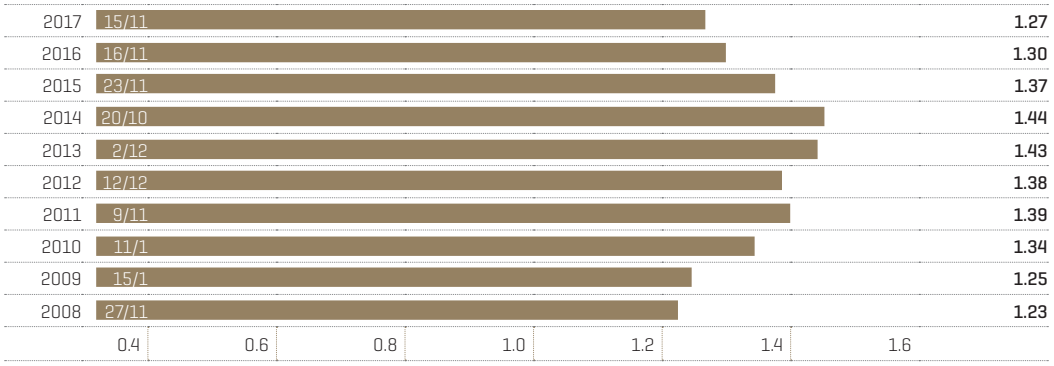
(1) Power included in Other renewables and Cogeneration until 31/12/2014
Source: National Commission for Markets and Competition (CNMC) on data regarding power from: non-Hydro Management Unit (UGH), wind, solar photovoltaic, solar thermoelectric, other renewables, cogeneration and waste.

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 1.27 in 2017, a value below those of the previous seven years.

MINIMUM COVERAGE INDEX FOR THE PENINSULA

1.27 THE LOWEST VALUE SINCE 2009

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.

Lower renewable generation in the peninsular system due to the low contribution of hydroelectric energy.

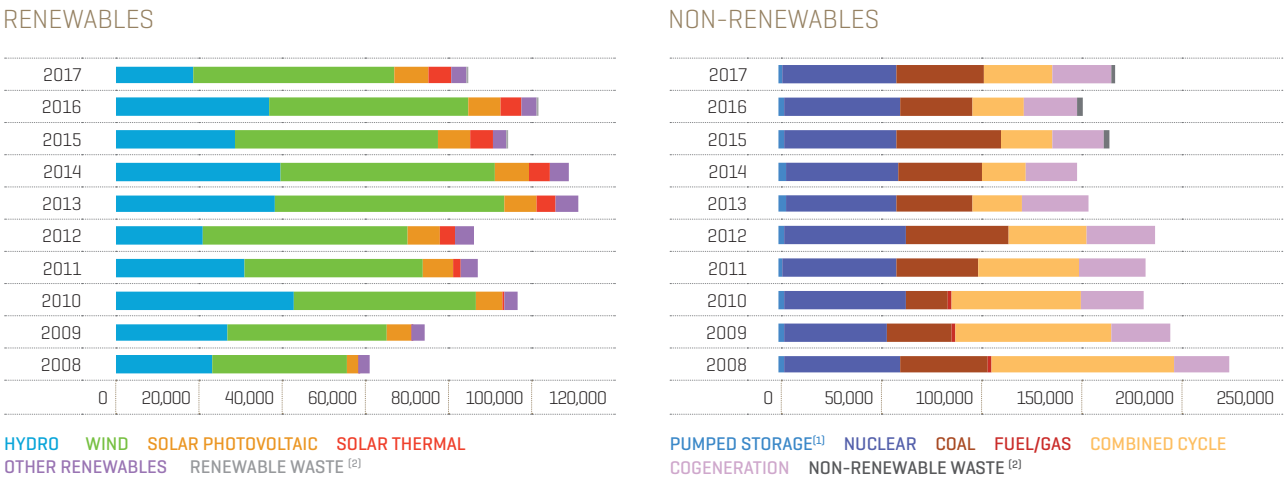
RENEWABLE ENERGY GENERATION IN THE PENINSULAR SYSTEM

33.7%

The contribution of renewable energy to peninsular electricity generation has registered the lowest figure in the last five years, reducing its share in the electricity generation mix to 33.7% in 2017, compared to 40.3% in 2016. This notable decrease is a consequence of the impact the abnormally low rainfall had on hydroelectric production that registered a fall of 49.1% with respect to the previous year.

The low production of hydroelectric energy has had a direct impact on the peninsular generation mix, leading to an increase in the need to use power stations that use fossil fuels as a primary source of energy. These non-renewable facilities have covered the decrease in the production of hydroelectric energy, mainly through the increase in production from combined cycle and coal-fired power stations.

Evolution of renewable and non-renewable electricity generation in the peninsular system (GWh)



(1) Pure pumped storage + estimate of mixed pumped storage.
(2) Generation included in Other renewables and Cogeneration until 31/12/2014.

Wind power continues to be the second source of electricity generation.

Renewable generation in the peninsular system in 2017 fell by 16.5% with respect to the previous year, standing at 83,526 GWh, a value similar to that registered five years ago.

In general, these variations in renewable generation can be explained by the variability that characterises this type of energy due to its dependence on weather conditions throughout the year. The lower renewable generation in 2017 is related, as indicated above, to the significant decrease in hydroelectric production that has been reduced to practically half of that registered the previous year due to the abnormally low rainfall registered throughout Spain.

Wind energy generation in the peninsular system in 2017 stood at 47,498 GWh, 0.4% higher than that registered the previous year. This increase occurred mainly in the last quarter of the year, when this technology generated 44.2% more than in the same quarter of 2016. In addition, wind power continues to be the most relevant renewable technology in the peninsular system, representing 56.9% of renewables in 2017, a much higher share than the 47.3% it had in 2016.

In line with previous years, noteworthy is the important contribution of wind energy production in the generation mix, which, with a share of 19.1% of the total production, ranks second behind nuclear power in the technologies of the complete set of generation facilities in the peninsular system.

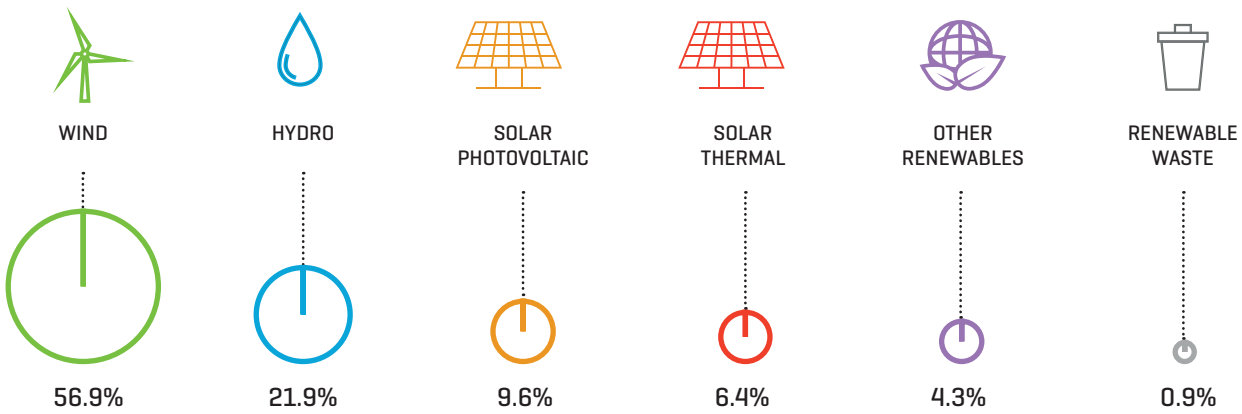
In addition, wind power was the technology that contributed the most to the peninsular production in the months of February (24.5%) and December (24.8%). It should also be noted that wind energy covered 60.7% of the demand at one specific point in time (28 February 3:45 am).

RENEWABLE GENERATION IN THE PENINSULAR SYSTEM

83,526
GWh

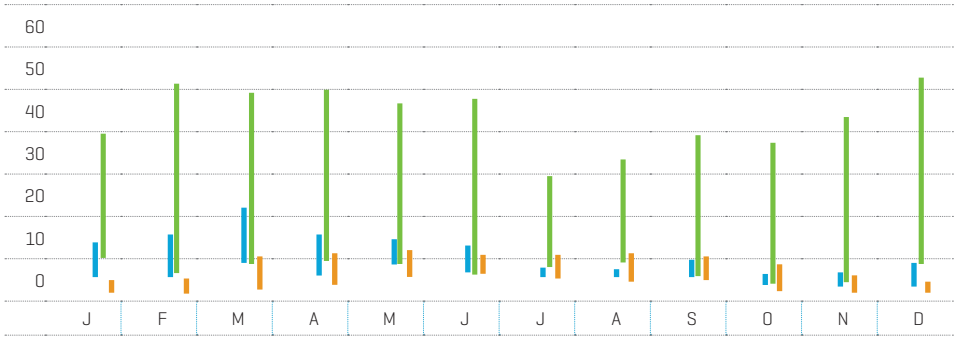
-16.5%
COMPARED TO 2016

Annual generation mix of renewable energy in the peninsular system in 2017 (%)



The great variability of generation from wind power can be seen in the graph below which shows the maximum and minimum daily coverage by hydro, wind and solar. During 2017, daily wind power generation had a share in the generation mix that ranged from a minimum of 3.3% on 10 October to a maximum of 44.7% on 27 December.

Maximum and minimum daily coverage on the peninsular in 2017 using hydro, wind and solar [%]



DAILY MAXIMUM AND MINIMUM DAILY VALUES OF WIND POWER IN THE GENERATION MIX

MAXIMUM

44.7%

27 DECEMBER

MINIMUM

3.3%

10 OCTOBER

Minimum values of hydroelectric generation were registered in the peninsular system.

Hydroelectric generation in the peninsular system in 2017 reached 18,361 GWh, representing a decrease of 49.1% compared to the previous year and registering a share in the peninsular generation mix of 7.4%, the lowest level since 2005 when its share was 7.2%. In 2017, the total electricity generated by hydroelectric power stations ranked this technology as the sixth source of generation, while the previous year it was ranked third with a 14.5% share in the peninsular total.

In the comparative chart of peninsular hydroelectric generation 2016-2017, it can be seen that during every month of 2017 hydroelectric production was lower than both the generation of 2016 and the historical average, calculated based on the production values of the last twenty years. In addition, in the months of February, April and May, hydroelectric generation on the Spanish peninsula fell to just over half of that registered in the same months of the previous year. Also, in the months of May, July, October and November the hydroelectric contribution in the electricity balance registered all-time lows for those months since monthly records began (January 1990), with shares of 10.1%, 5.6%, 4.1% and 3.9%, respectively. This situation contrasts with what happened in the previous year, when in April and May hydroelectric generation was the technology with the largest share in the generation mix with levels of 25.3% and 26.0%, respectively.

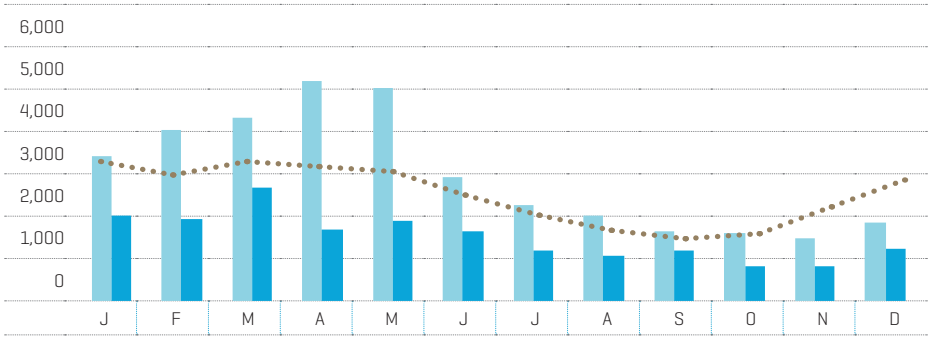
HYDROELECTRIC GENERATION IN THE PENINSULAR SYSTEM

18,361
GWh

-49.1%
COMPARED TO 2016

7.4%
SHARE IN THE PENINSULAR GENERATION MIX

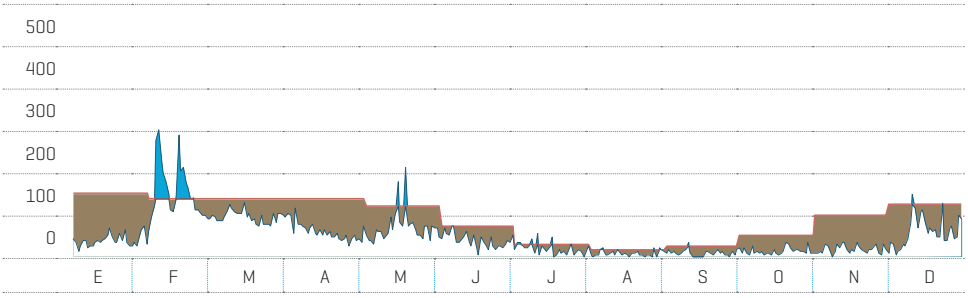
Peninsular hydroelectric generation 2016-2017 compared to average generation (GWh)



(1) Average monthly hydroelectric generation over the last 20 years.

The drop in hydroelectric generation is in line with the producible hydroelectric values (maximum amount of electricity that can be produced with the registered hydroelectric contributions) which reached 15,972 GWh in 2017, a value 53.9% lower than that registered in 2016, and 47.3% lower than the highest annual average value ever recorded. Therefore, we can consider that 2017, overall, has been a dry year as the producible hydroelectric index, defined as the quotient between the producible energy and the average producible energy, registered a value of 0.5.

Daily producible hydroelectric energy during 2017 compared to the historical average producible (GWh)



Hydroelectric reserves ended 2017 below the statistical minimum value.

Throughout 2017, there has been a shortage of rainfall nationwide in Spain that has caused a decrease in the volume of water stored in the reservoirs. As a result, the hydroelectric reserves of all peninsular reservoirs stood at 26.3% of their total capacity as at 31 December 2017, 12.9 points below the previous year and below the statistical minimum value (calculated as the average of the minimum values of the last twenty years). The level of reserves for 2017 is the lowest end-of-year level recorded since records began in 1990.

HYDROELECTRIC RESERVES IN THE COMPLETE SET OF RESERVOIRS

26.3%

OF THEIR TOTAL CAPACITY AS AT
31/12/2017

Solar photovoltaic facilities of the peninsular system produced 7,988 GWh, representing an increase of 5.4% compared to 2016 and a 3.2% share in the peninsular generation mix.

With regard to **solar thermal** in the peninsular system, in 2017, a total of 5,348 GWh was generated with this technology, which represents an increase of 5.5% over the previous year and a 2.2% share of the total peninsular production.

Both solar technologies have broken all-time records of annual production, exceeding the previous maximum values of 7,918 GWh and 5,085 GWh registered in 2013 and 2015, respectively.

Production from **other renewables** (biogas, biomass, marine hydro and geothermal) also grew by 5.5% in 2017 compared to the previous year and its share in the peninsular generation mix stood at 1.5%.

SOLAR PHOTOVOLTAIC FACILITIES

7,988
GWh

3.2%
SHARE IN THE PENINSULAR GENERATION MIX

Non-renewable generation increases due to higher production levels from coal and combined cycle.

Non-renewable energy in the peninsular system registered a total generation level of 164,898 GWh in 2017, which was 11.1% higher than in 2016. In contrast to the decrease of 8.1% experienced last year, this increase has resulted in a greater share of the total peninsular generation (6.6 percentage points), reaching a share of 66.3% in 2017 compared to 59.7% in 2016.

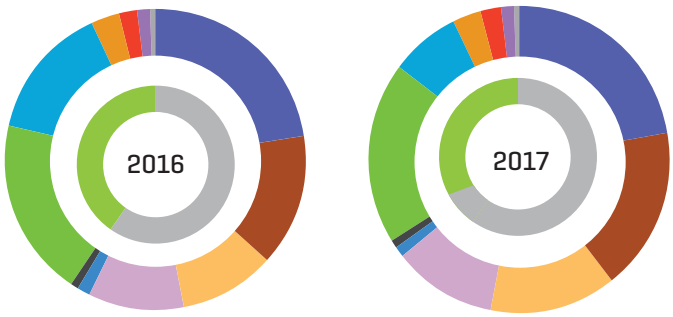
Within non-renewable energy, **nuclear** produced a total of 55,609 GWh in 2017, which was 0.9% less than the previous year. Despite this decline, for the seventh consecutive year, nuclear power stations have been the main source of peninsular generation (in 2013, it headed the list along with wind power). In 2017, nuclear reached a share of 22.4% of the total peninsular generation (22.6% in 2016).

In 2017, nuclear saw its installed power capacity reduced by 6.0%, due to the definitive shutdown in November of the 455 MW Santa Maria de Garoña power station located in the province of Burgos. In this regard, at the end of the year, nuclear power represented 7.2% of all installed power capacity on the Spanish peninsula, compared to 7.6% in 2016. The last time there was a decrease registered in installed nuclear power capacity was eleven years ago when the 142 MW José Cabrera nuclear power station in the province of Guadalajara was shutdown.

The utilisation rate of nuclear power stations was 98.5% (ratio between actual production and that which could have been produced if the power stations had operated at their rated power during the whole time they were available).

Annual generation structure of the peninsular electricity energy 2016 y 2017 [%]

	2016	2017
NUCLEAR	22.6	22.4
COAL	14.2	17.1
COMBINED CYCLE	10.3	13.6
COGENERATION	10.3	11.3
PUMPED STORAGE	1.3	0.9
NON-RENEWABLE WASTE	1.0	1.0
WIND	19.0	19.1
HYDRO	14.5	7.4
SOLAR PHOTOVOLTAIC	3.1	3.2
SOLAR THERMAL	2.0	2.2
OTHER RENEWABLES	1.4	1.5
RENEWABLE WASTE	0.3	0.3



	2016	2017
RENEWABLE	40.3	33.7
NON-RENEWABLE	59.7	66.3

COAL-FIRED GENERATION IN THE PENINSULAR SYSTEM

42,593
GWh

+21%
COMPARED TO 2016

17.1%
SHARE IN THE PENINSULAR GENERATION MIX

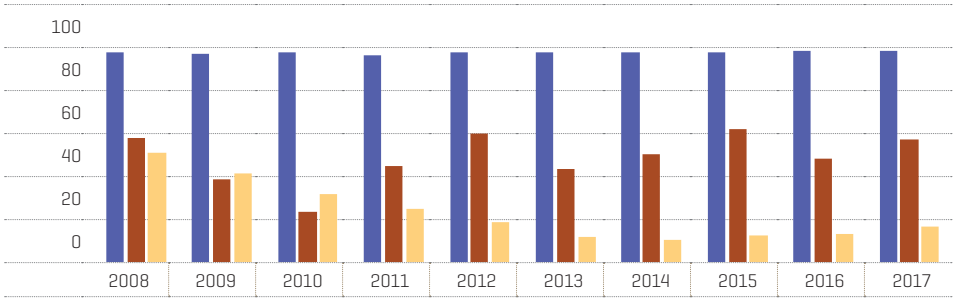
With regard to **coal-fired power stations** in the peninsular system, in 2017 these generated 42,593 GWh, representing 21.0% more than the previous year. This increase took place in the first half of the year, mainly in the months of April and May, coinciding with the lowest levels of hydroelectric generation. In the months of January, April and June coal-fired generation doubled and in the month of May it tripled, in all cases with respect to the same month of the previous year.

It is worth highlighting that in June and November coal was the technology with the largest share in the monthly generation mix, with 20.5% and 21.6% respectively. In the annual calculation, coal-fired power stations were the third source of electricity production in 2017, with an increase of 2.9 percentage points in their share in the peninsular generation mix, going from 14.2% in 2016 to 17.1% of 2017

The utilisation rate of coal-fired power stations during 2017 stood at 56.9%, compared to 48.5% the previous year.

Coal-fired power stations were the third source of electricity production in 2017, with an increase of 2.9 percentage points in their share in the peninsular generation mix

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.

COMBINED CYCLE GENERATION IN THE PENINSULAR SYSTEM

33,855
GWh

+31.8%
COMPARED TO 2016

13.6%
SHARE IN THE PENINSULAR GENERATION MIX

Combined cycle production in the peninsular system grew for the third consecutive year, reaching 33,855 GWh, which has meant an increase of 31.8%, making it the technology with the highest growth registered in the peninsular system in 2017. In January and in the months from June to September 2017, combined cycle power stations generated over 50% more electricity than in the same months of the previous year.

The increase in the level of generation coming from combined cycle on the Spanish peninsula has meant a growth of of 3.3 percentage points in the overall generation mix, reaching a share of 13.6% in 2017 (10.3% in 2016). However, this share is still far from the generation levels for this technology registered in 2008, 2009 and 2010, when it led the annual generation balance with percentages of 31.8%, 28.9% and 23.0% respectively. The utilisation rate of this technology in 2017 reached 16.7% (13% in 2016).

In January, and in the months of June to September 2017, combined cycle power stations generated over 50% more electricity than in the same months of the previous year.

Electricity generation in non-peninsular systems increases for the third consecutive year.

The annual production of electricity in all non-peninsular systems in 2017 reached 14,221 GWh, 3.2% higher than the previous year. This growth has occurred for the third consecutive year and is the highest increase since records began for non-peninsular data. By system, the Balearic Islands, Canary Islands and Melilla grew 5.8%, 2.1% and 1.1% respectively, while in Ceuta it fell by 3.7%.

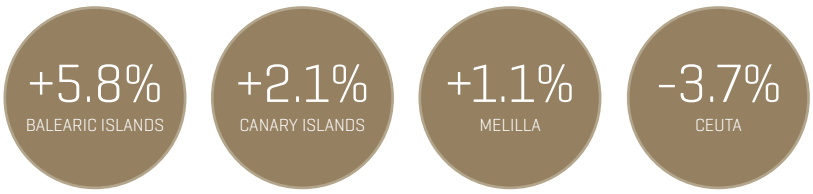
The electricity produced in the Balearic Islands system has also been growing for the last three years, reaching a total of 4,849 GWh in 2017, 5.8% more than the previous year. The coal-fired power stations, which have increased their production by 13.0%, represent the technology with the highest share in the generation mix of this system. In 2017, these power stations produced more than half of the generation in the Balearic Islands, 53.7% of the total (50.3% in 2016).

In contrast, combined cycle power stations in the Balearic Islands reduced their production for the second year in a row, with decreases of 33.0% in 2016 and 21.4% in 2017. These power stations, despite being the technology with the highest amount of installed power capacity, 37.5% of the total, ranked fourth in the generation mix with a share of 8.8% in 2017.

ANNUAL ELECTRICITY PRODUCTION IN THE NON-PENINSULAR SYSTEMS

14,221
GWh

+3.2%
COMPARED TO 2016



The energy transferred from the Peninsula continues to play an important role in the coverage of the demand on the Balearic Islands.

With regard to the Spanish Peninsula-Balearic Islands link, during 2017 the amount of electrical energy coming from the Peninsula was reduced by 5.7%. This decrease in incoming energy occurred mainly during the first half of the year.

Nevertheless, the energy transferred from the Peninsula continues to play a significant role in the coverage of demand on the Balearic Islands, as it had a 19.6% share in 2017, reaching peaks that exceeded 35% of hourly consumption. This has meant a saving of 29% in the cost of coverage of the Balearic Islands system and has avoided the emission of around 350,000 tonnes of CO_2 into the atmosphere in the Balearic Islands

ENERGY EXCHANGE BETWEEN THE SPANISH PENINSULA AND THE BALEARIC ISLANDS

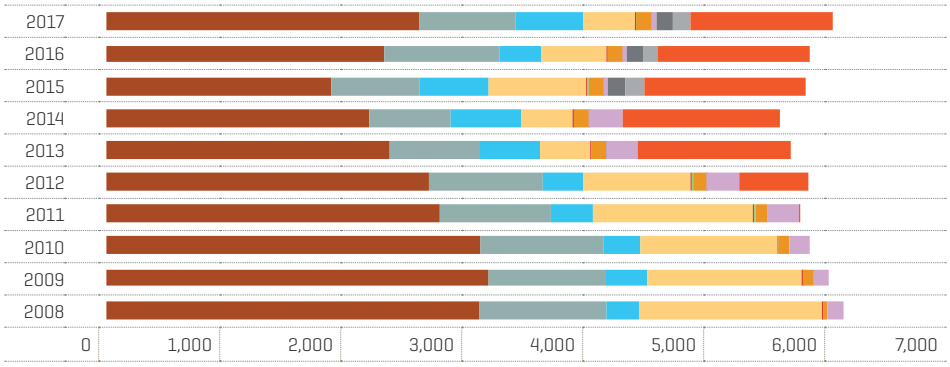
-5.7%

COMPARED TO 2016

19.6%

OF THE DEMAND ON THE BALEARIC ISLANDS COVERED USING ENERGY TRANSFERRED FROM THE PENINSULA

Evolution of demand coverage in the Balearic Islands (GWh)



COAL DIESEL ENGINES GAS TURBINE COMBINED CYCLE[1] AUXILIARY GENERATION[2] WIND
SOLAR PHOTOVOLTAIC OTHER RENEWABLES COGENERATION NON-RENEWABLE WASTE [3]
RENEWABLE WASTE [3] PENINSULA-BALEARIC ISLANDS' LINK[4]

(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.

Installed wind power capacity in the Canary Islands in 2017 increased by 36.1%.

ENERGY PRODUCTION IN THE CANARY ISLANDS ELECTRICITY SYSTEM

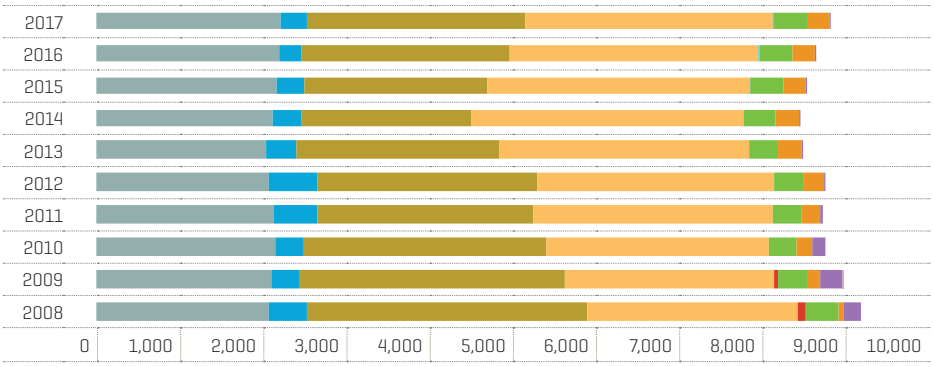
8,958
GWh

+2.1%
COMPARED TO 2016

Electricity production in the Canary Islands electricity system has continued the growth trend of the previous three years, reaching 8,958 GWh in 2017, 2.1% more than the previous year. The increase in generation in 2017 was mainly concentrated in gas and steam turbines, whose generation grew 13.6% and 5.5%, respectively, compared to the previous year.

Combined cycle is the technology with the most installed power capacity in the Canary Islands electricity system, 31.0% of the total at the end of 2017. Similarly, for seven consecutive years it has been the main source in the generation mix of the Canary Islands with a 33.7% share in 2017. This is followed by generation with steam turbine and diesel engines whose share of the generation in 2017 of these islands was 29.9% and 25.1%, respectively.

Evolution of demand coverage in the Canary Islands (GWh)



(1) 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.

New all-time high regarding the integration of renewable energy on the island of El Hierro.

In the Canary Islands electricity system, generation from renewable sources represented 7.8% of the total generation in 2017, at certain times registering levels of 34% in Gran Canaria and 35% in La Palma, which are particularly challenging values in small isolated electricity systems.

Red Eléctrica has continued to work in conjunction with the Gorona del Viento facility in order to increase the use of renewables in the coverage of the electricity demand on the island of El Hierro by applying a process of continuous improvement .In addition to guaranteeing the security of the system, the progress made has allowed the hydro-wind power station to operate regularly throughout 2017, producing 12.7% more than the previous year, and also reach new records regarding the integration of renewable energy. As a result, the monthly renewable integration in this island system in July accounted for almost 80% and reached an overall share of 46.5% for the year as a whole. Similarly, it should be noted that demand coverage on this island was 100% renewable for eight consecutive days in June and for almost 900 hours throughout the year.

MAXIMUM INSTANTANEOUS RENEWABLE ELECTRICITY GENERATION IN THE CANARY ISLANDS 2017

34%
GRAN CANARIA

35%
LA PALMA

ISLAND OF 'EL HIERRO' GORONA DEL VIENTO HYDRO-WIND POWER STATION

+12.7%
PRODUCTION COMPARED TO 2016

The demand for electricity on the island of El Hierro was co vered with 100% renewable energy for eight consecutive days.

The Soria-Chira pumped-storage hydroelectric power station will allow greater development and use of renewable energy in the island of Gran Canaria.

Red Eléctrica Infraestructuras en Canarias (REINCAN), a subsidiary created in 2015 by Red Eléctrica, maintains the objective of promoting energy storage projects in the Canary Islands. These projects will serve as tools for the system operator to guarantee supply, improve system security and optimise the integration of renewable energy in the islands.

In this regard, the construction of the pumped-storage hydroelectric power station between the reservoirs of Soria and Chira, which has an investment of 320 million euros, is an essential tool to progress towards the sustainability of the new energy model in the Canary Islands and will enable the further development of renewable energy technologies on the island of Gran Canaria, allowing full advantage to be taken of this type of energy.

Moreover, when faced with demand peaks or certain situations of lack of generation, this facility will be a key element in order to reduce the vulnerability of small electrically isolated systems, such as that of the island of Gran Canaria.

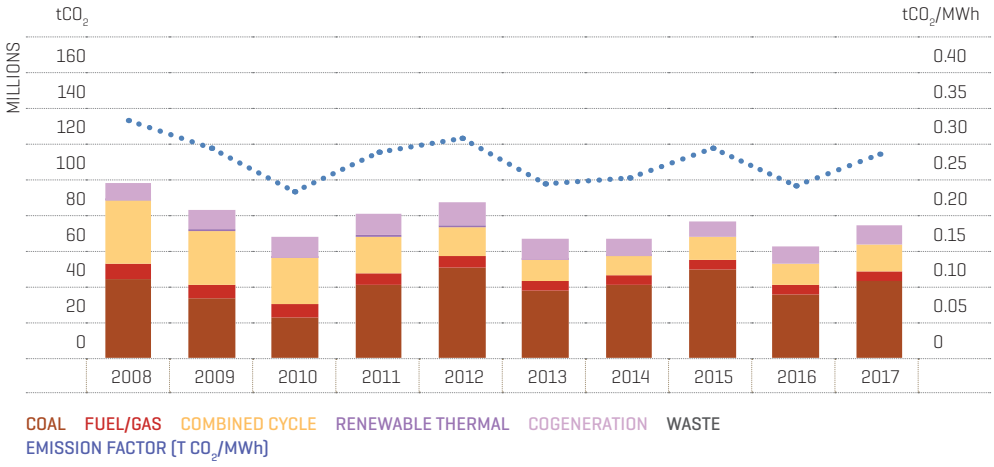
The first steps taken regarding this project commenced in 2016 with the administrative permitting process and the public information period after the Governing Council of the Canary Islands had declared the construction of this pumped-storage hydroelectric power station in Gran Canaria a project of strategic interest.

In 2017, the permitting process was requested in order to begin the exploratory drilling and excavation works. These works, that will be conducted at different depths, are being carried out in order to have an in-depth knowledge of the geological and geotechnical characteristics of the terrain where the facility is to be constructed; and specific tests will also be carried out to optimise the design of the caverns where the power station and the substation are to be housed. In addition, in relation to the desalination plant associated to the project, a seawater pumping test will be carried out to study the permeability of the land.

The CO_2 emissions resulting from electricity generation nationwide increased due to the lower share of renewable energy in the generation mix.

The make-up of the generation mix determines the variations in CO_2 emissions associated with the generation of electricity. Thus, the lower renewable generation in 2017 has been offset by higher production using combined cycle and coal-fired power stations, which has resulted in an increase in CO_2 emissions of 17.9% over the previous year. Therefore, the CO_2 emissions of the Spanish electricity system in 2017 reached 74.9 million tonnes, of which 57.3% is associated with coal-fired production and 20.1% related to combined cycle.

CO_2 emissions and emission factor associated to national electricity generation [1]



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

Castilla y León continues to be the autonomous community with the greatest share of renewable energy generated nationwide.

By autonomous community, in 2017 the most relevant aspects of electricity generation are the following:

GREATEST SHARE OF ELECTRICITY GENERATED NATIONWIDE

17.1%

CATALONIA

— Catalonia is the community that generated the most energy during 2017, a total of 44,852 GWh, a value that represents 17.1% of national production. Most of this generation is of non-renewable origin, 83.6% (54.0% nuclear facilities and 17.6% combined cycle).

GREATEST INCREASE IN GENERATION

+64.3%

MURCIA

— Murcia is the autonomous community with the greatest increase in generation in 2017, 64.3% higher than in 2016. This growth was due to an increase of 209.2% in generation coming from combined cycle power stations, which represents the greatest share in Murcia's generation mix, 52.9% of the total.

— On the other hand, the largest fall in production took place in Castilla y León, with a fall of 20.7% compared to the previous year. This decrease is mainly explained as a result of the reduction of 63.1% of its hydroelectric production, which represents 16.3% of the generation of this autonomous community.

— Despite the decline in generation, Castilla y León continues to record the highest production of hydroelectric and wind energy, which again places it, for yet another year, as the autonomous community with the greatest volume of renewable generation, 19.3% of the total renewable energy nationwide. Similarly, it is the autonomous community with the greatest share of renewables in its generation mix, 64.1% in 2017.

GREATEST SHARE OF RENEWABLE ENERGY GENERATED NATIONWIDE

19.3%

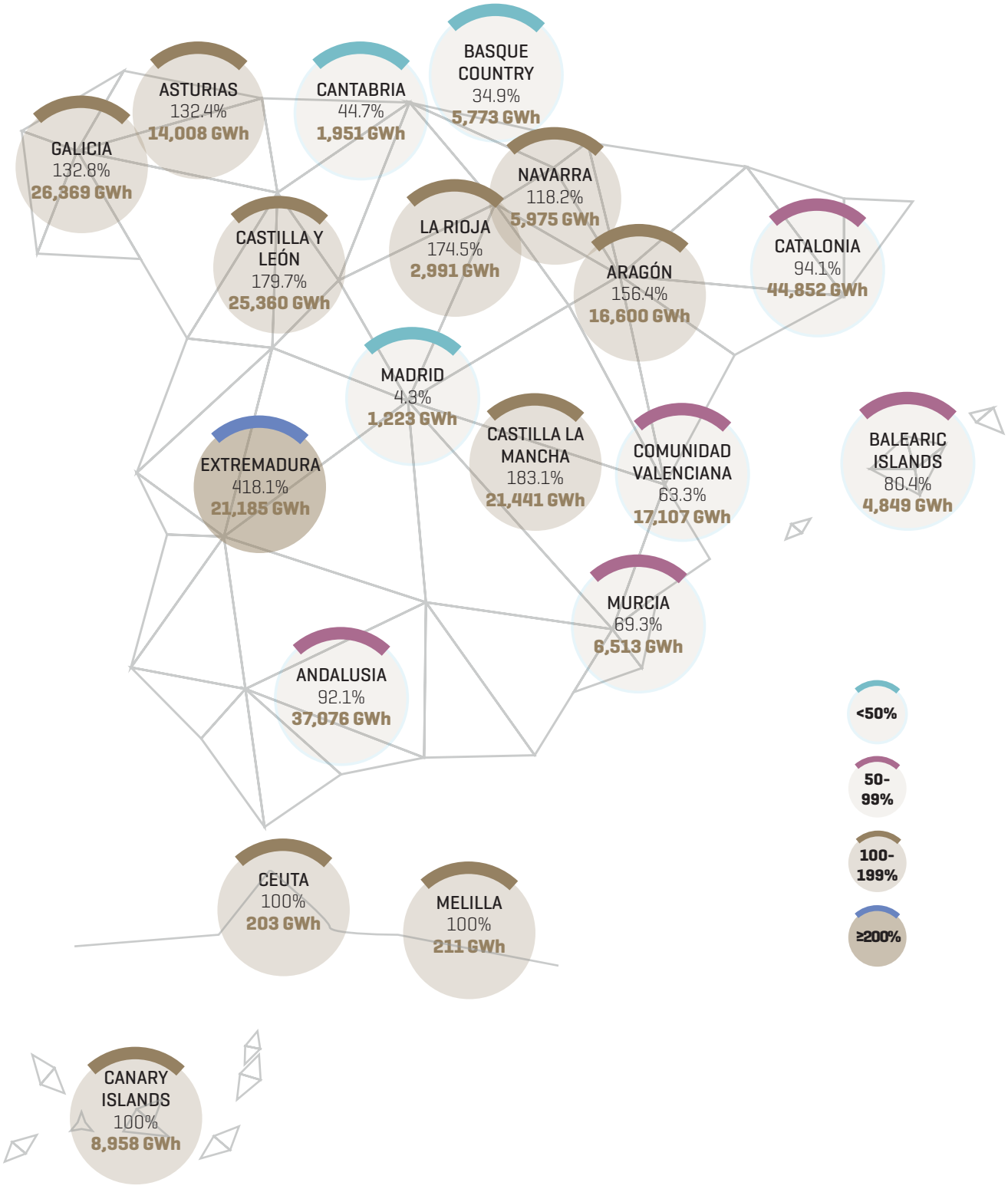
CASTILLA
Y LEÓN

— During 2017, eight autonomous communities have generated more electricity than they have consumed, among which noteworthy is Extremadura, where the energy generated has been four times higher than its demand. This is followed by Castilla-La Mancha, Castilla y León and La Rioja, which produce almost twice the amount they need to satisfy their demand.

— Among the communities with greater energy dependence, the Community of Madrid ranks first, generating only 4.3% of its demand. The Basque Country and Cantabria are the least dependent, generating 34.9% and 44.7% of their demand respectively.

— In relation to installed power capacity, the most significant changes in 2017 were in Castilla y León with a 3.3% reduction due to the definitive shutdown of the 455 MW Santa María de Garoña power station, and in Canary Islands where there has been an increase of 2.0% due to the increase of 55 MW of wind power.

Generation/Demand ratio (%) and generation (GWh) in 2017 by autonomous community



03

INTERNATIONAL EXCHANGES

For the second consecutive year, Spain's electricity exchange programmes with other countries closed 2017 with an import balance.

INTERNATIONAL ELECTRICITY EXCHANGES IN 2017 IMPORT BALANCE

9,175
GWh

+19.8%
COMPARED TO 2016

22,824
GWh IN IMPORT PROGRAMMES

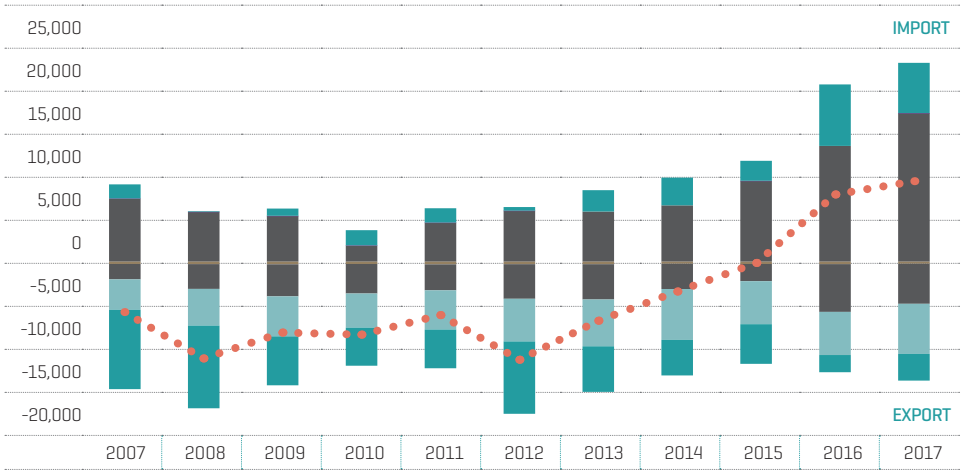
+12.2%
COMPARED TO 2016

13,649
GWh IN EXPORT PROGRAMMES

+7.6%
COMPARED TO 2016

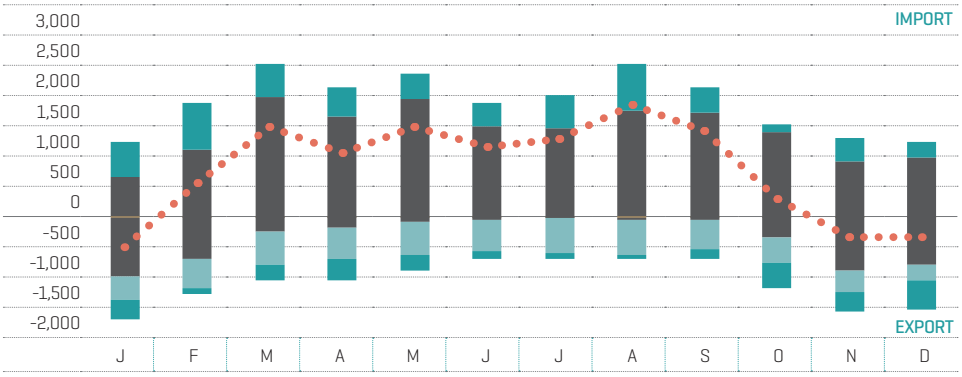
The volume of energy scheduled through interconnections totalled 36,473 GWh, 10.4% higher than in 2016. A total of 13,649 GWh were scheduled for export (7.6% more than the previous year) and 22,824 GWh were imported (12.2% higher than 2016). As in the previous year, the net balance is again as an importer with a value of 9,175 GWh, 19.8% higher than in 2016.

Annual evolution of scheduled international energy exchanges (GWh)

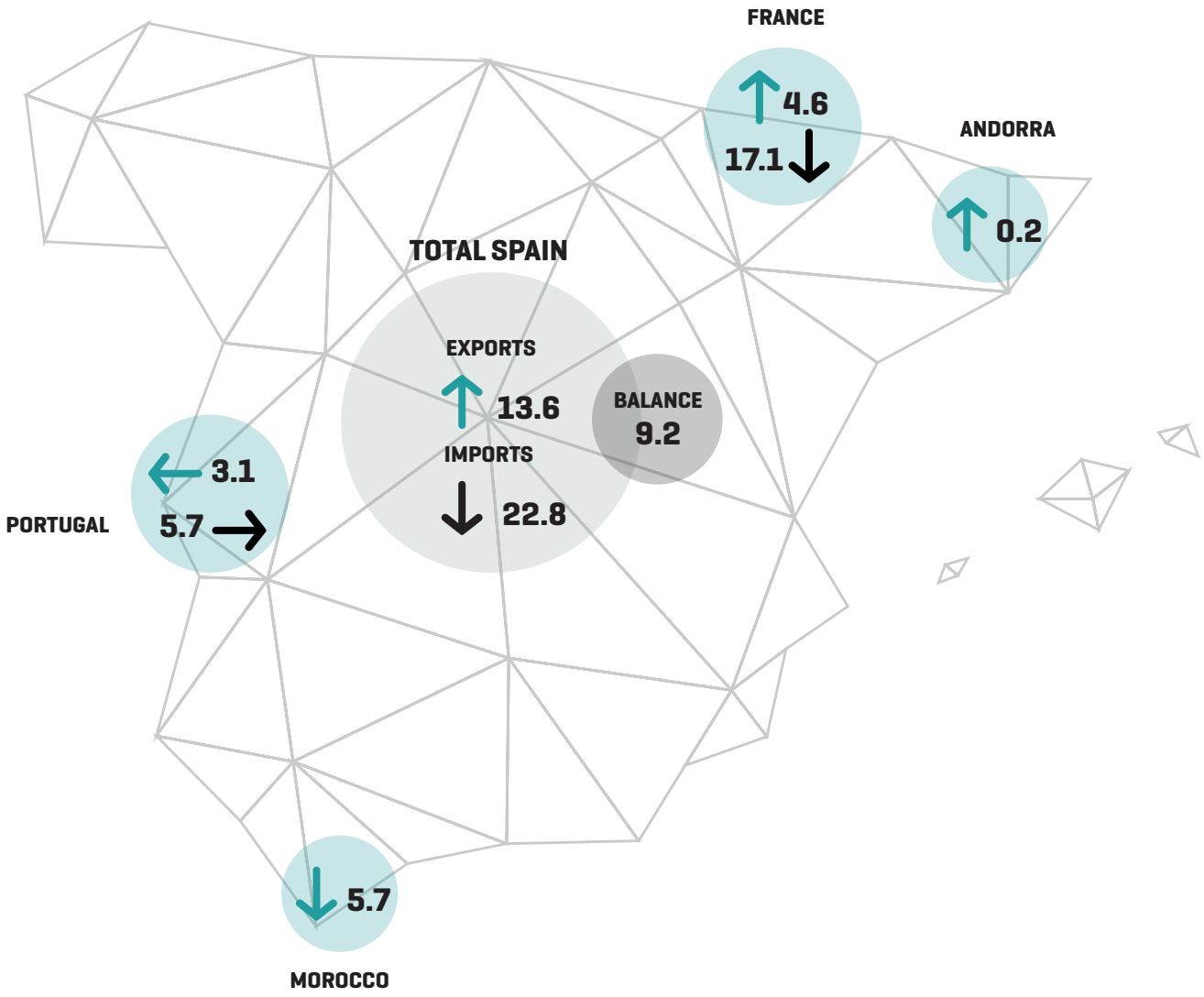


In 2017, the net monthly balance of energy exchanges scheduled in the Spanish interconnections was as an importer, except for the months of January, November and December. The maximum net importer balance occurred in the month of August (1,826 GWh).

Monthly evolution of scheduled international energy exchanges 2017 (GWh)



Scheduled energy exchanges by interconnection 2017 (TWh)



FRANCE

ENERGY EXCHANGES WITH FRANCE IMPORT BALANCE

12,465
GWh

+59.7%
COMPARED TO 2016

17,066
GWh IN IMPORT PROGRAMMES

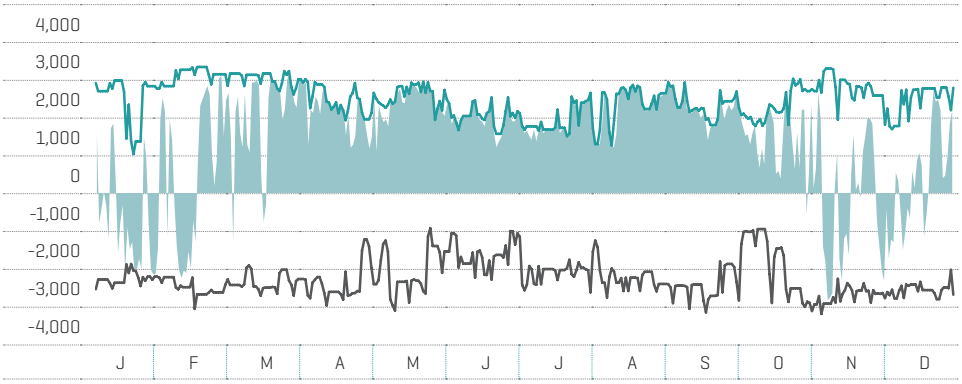
+28.4%
COMPARED TO 2016

4,601
GWh IN EXPORT PROGRAMMES

-16.1%
COMPARED TO 2016

The annual balance of electricity exchanges through the interconnection with France was as an importer with a total of 12,465 GWh, 59.7% higher than in 2016. Import programmes totalled 17,066 GWh, 28.4% higher than the previous year, while exports decreased to 4,601 GWh, a decrease of 16.1% on last year's value. Except for January and November, all monthly net balances were registered with importer values.

Exchange capacity and net balance of scheduled exchanges at the interconnection with France 2017 (MW/MWh)



2017 registered a high level of utilisation of this interconnection with it being congested most of the time in the direction from France to Spain (53% of the hours).

Regarding the use of exchange capacity in the interconnection with France, from March to September, the interconnection was congested mainly in an import direction, occurring on 67% of the days with an exchange capacity utilisation rate in excess of 95%. In January, the utilisation rate was mainly in an export direction, primarily due to the more complex situation in the French electricity system regarding coverage which, among other causes, was brought about by various situations in which France's nuclear power was not available.

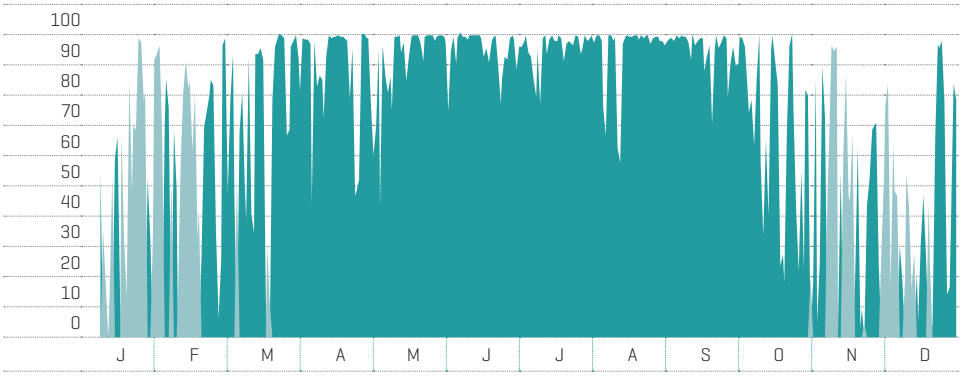
It can also be observed that from November to mid-December, the balance of the interconnection was that of an exporter (54%).

CONGESTION IN THE INTERCONEXTION WITH FRANCE WAS IN THE IMPORT DIRECTION FOR A TOTAL OF SEVEN MONTHS

67%
OF THE DAYS WITH A UTILISATION RATE IN EXCESS OF

95%

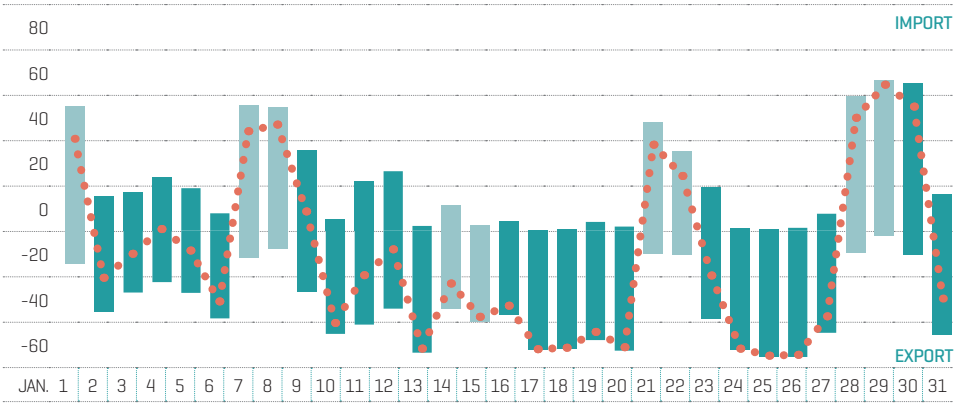
Utilization rate of exchange capacity at the interconnection with France 2017 (%)



IMPORT EXPORT

In January the high non-availability of French nuclear power caused the exchange balances in the interconnection with France to be that of an exporter almost every day, except on weekends.

Effects of french nuclear non-availability In exchanges at the interconnection with France January 2017 (GWh)

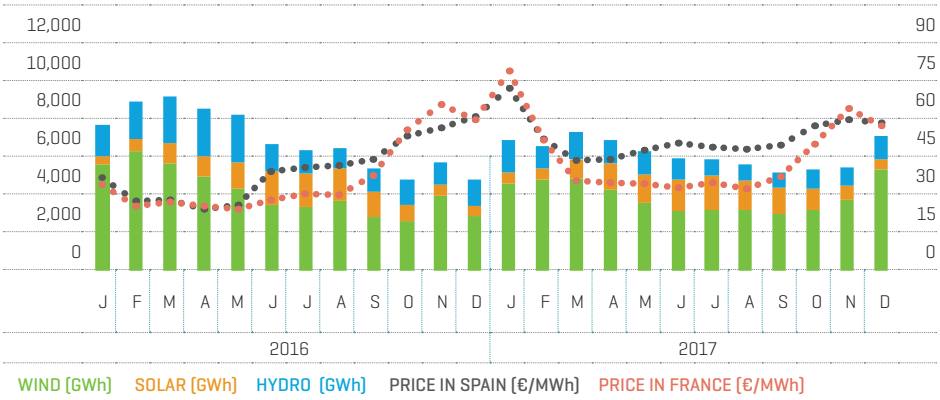


WORKING DAYS WEEKENDS AND PUBLIC HOLIDAYS BALANCE

If we compare the evolution of the day-ahead market prices in France and Spain with the behaviour of renewable generation in Spain over the last two years, it can be seen that when renewable generation in Spain is high, the price differentials with France are lower.

On the other hand, in the final months of 2016 and in January 2017, the French electricity system registered high day-ahead market prices due to situations arising from the non-availability French nuclear power stations, which led to an increase in the energy export programmes from the Spanish system and a higher rate of utilisation of non-renewable generation in Spain.

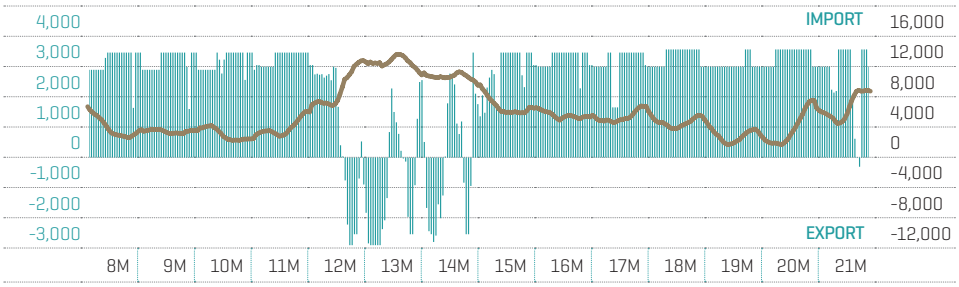
Renewable generation in Spain and day-ahead market prices (GWh/€MWh)



In 2017, the low level of hydroelectric production and lower wind energy led to a reduced share of renewable energy in the generation mix of the day-ahead market and, as a result, higher price differentials were recorded between the electricity systems of France and Spain.

Wind energy production influences prices and determines the exchange direction. Thus, in the month of March, when there were low levels of wind energy production in Spain, the balance of exchange programmes with France was as an importer, while the balance becomes mainly as an exporter when there are high levels of wind energy production.

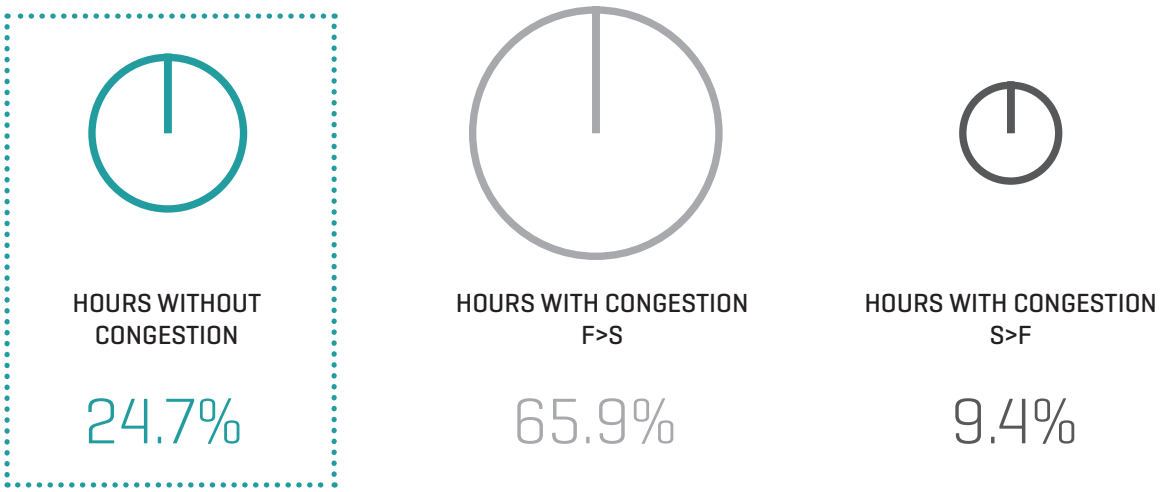
Net balance of scheduled exchanges in the interconnection and wind power generation in Spain (8 march - 21 march 2017) (MWh)



Regarding the level of utilisation of exchange capacity in the daily horizon, a high rate of utilisation of this interconnection was registered. Thus, in two out of every three hours (65.9%) it was congested in the direction France to Spain, with an average price difference of 13.3 €/MWh; in 9.4% of the hours it was congested in the direction Spain to France, with an average price difference of 15.8 €/MWh, and in the remaining 24.7% of hours there was no congestion in this interconnection.

The 12th and 20th of February and 9th of December are the only days of the year in which the interconnection with France was not congested at all. 76% of the days of the year have registered congestion for more than 12 hours.

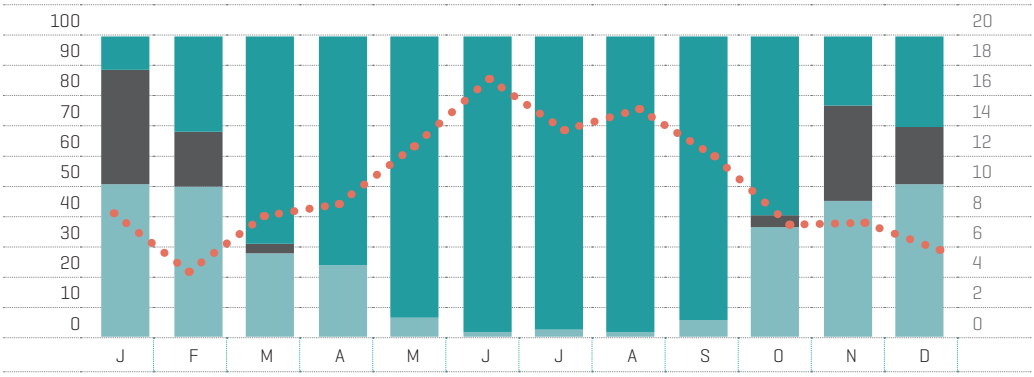
Hours with congestion and without congestion in the interconnection with France in 2017 (%)



The levels of congestion for the utilisation of exchange capacity in the daily horizon were greater every month in the direction France to Spain, except in January and November, months in which the prices in Spain were lower than those in France.

The average price differential in absolute terms was equal to 10.2 €/MWh in 2017.

Hours with and without congestion at the interconnection with france and the difference in prices of the day-ahead market 2017 [% y €/MWh]



HOURS WITHOUT CONGESTION HOURS WITH CONGESTION S>F HOURS WITH CONGESTION F>S
PRICE IN SPAIN - PRICE FRANCE (€/MWh)

CONGESTION REVENUES FOR THE INTERCONNECTION SPAIN – FRANCE

220
MILLION EUROS

182
MILLION EUROS IN AN IMPORT DIRECTION

38
MILLION EUROS IN AN EXPORT DIRECTION

Congestion revenues (or congestion rents) generated in 2017 in this interconnection totalled 220 million euros (182 million as an importer and 38 million as an exporter), 50% of this total corresponds to the Spanish electricity system. This value exceeds the congestion revenues generated in 2016 by 6.5%. Congestion revenues are earmarked to help reduce electricity system costs.

Regarding the prices resulting from the exchange capacity auctions, the marginal price of the annual capacity auction for 2017 in the direction Spain>France was equal to 2.46 €/MW, 211% higher than the price of capacity in the annual auction for 2016 (0.79 €/MW). In the direction France>Spain, the resulting marginal price was equal to 8.10 €/MW, which represents a decrease of almost 37% with respect to that registered in that direction of flow in the annual auction for 2016 (12.78 €/MW).

The maximum price of allocated capacity in monthly auctions was registered in July, in the direction France>Spain with a value of 16.92 €/MW. In the Spain>France direction, the maximum price was reached in December with 5.66 €/MW.

Cross-border balancing services, managed via the BALIT platform, have enabled 38 GWh of balancing energy to be scheduled for import and 302 GWh for export at this border.

This year, compared to 2016, it was even more necessary for the electricity system operators in Spain and France to apply coordinated counter-trading actions (exchange programmes, in a counter direction, in order to guarantee already established commercial programmes when faced with reductions in capacity), for a total value of 406 GWh, much higher than the 28 GWh scheduled for the previous year.

PORTUGAL

The annual balance of the electricity exchanges scheduled in the interconnection with Portugal was again as an importer, with a value of 2,685 GWh, compared to 5,084 GWh in 2016. The import programmes have reached a figure of 5,756 GWh, with a reduction of 18.4% compared to the previous year, while exports reached 3,071 GWh, 55.7% higher than last year.

ENERGY EXCHANGES WITH PORTUGAL
IMPORT BALANCE

2,685
GWh

-47.2%
COMPARED TO 2016

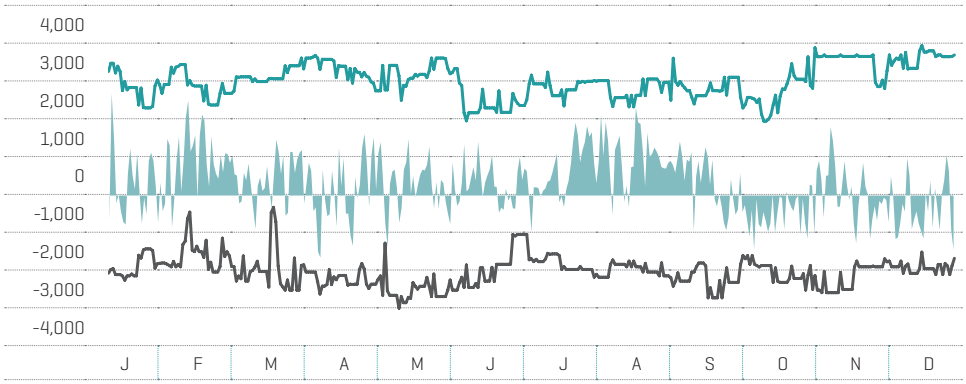
5,756
GWh IN IMPORT PROGRAMMES

-18.4%
COMPARED TO 2016

3,071
GWh IN EXPORT PROGRAMMES

+55.7%
COMPARED TO 2016

Exchange capacity and net balance of scheduled exchanges at the interconnection with Portugal 2017 (MW/MWh)

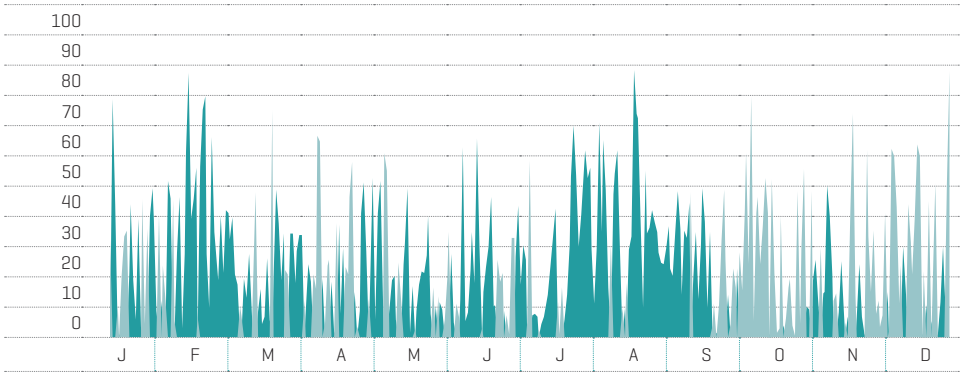


IMPORT CAPACITY (MW) EXPORT CAP (MW) BALANCE PORTUGAL (MWh)

The net balance of programmes has been as an importer every month, except in October and December. In the year as a whole, 3,653 hours registered an export balance, with October being the month with the highest number of hours with an export balance (551 hours). Portugal has reduced the energy export capacity from Spain (Spain>Portugal) by a significant number of hours in order to integrate the maximum amount of wind energy generated in Portugal into its system.

Regarding the final daily utilisation rate of the exchange capacity, in this interconnection there were no days when there was congestion throughout the whole 24-hour period. The maximum utilisation rate of the exchange capacity, in both the import and export direction, was 87%.

Utilization rate of exchange capacity at the interconnection with Portugal 2017 (%)

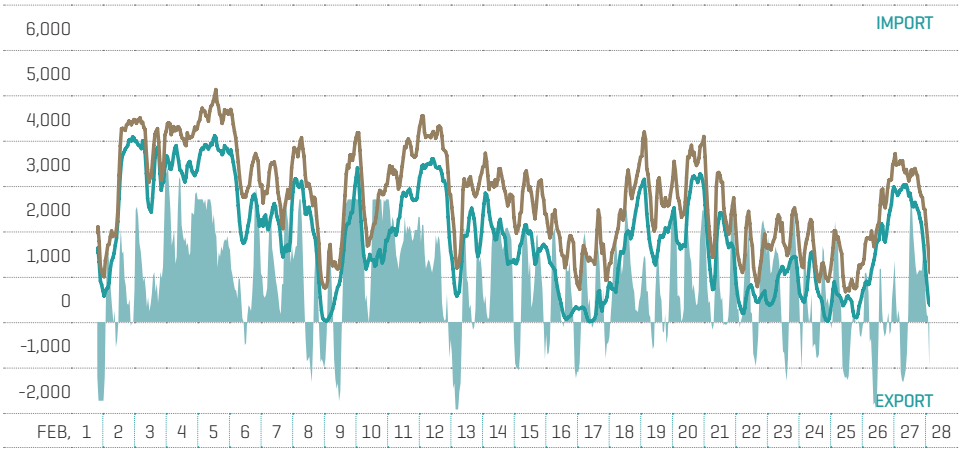


IMPORT EXPORT

The import balances are largely due to the high wind energy generation in Portugal, which ended the year with a producible wind power index of 0.97 (1). February and August, months in which the highest import balances were registered, are also the months in which the highest producible hydroelectric indexes were observed in the Portuguese system (1.07 and 0.99, respectively). However, the annual producible hydroelectric value corresponds to a dry year (0.47), registering minimum values in October and November.

Both hydroelectric and wind energy production significantly influence the results of the balances of scheduled exchanges in the interconnection with Portugal. For example, it can be seen that in a month with a high wind and hydroelectric production in the Portuguese system, the balance is as an importer, while in months with low production it is as an exporter, or with a low importer balance.

Balance of scheduled exchanges at the interconnection with Portugal and wind power generation in Portugal. February 2017 (MWh)

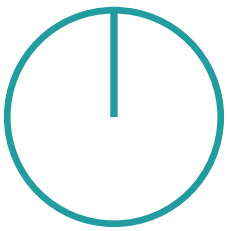


PERCENTAGE OF HOURS WITH CONGESTION

LESS THAN 10%

In the daily horizon, the coupling rates registered in the interconnection with Portugal in 2017 were high, resulting in a percentage of hours with congestion of less than 10% in the day-ahead market. Consequently, the prices in both systems were very similar, with the hourly price differential in absolute terms being less than 0.4 €/MWh.

Hours with congestion and without congestion in the interconnection with Portugal in 2017 (%)



HOURS WITHOUT CONGESTION
93.3%

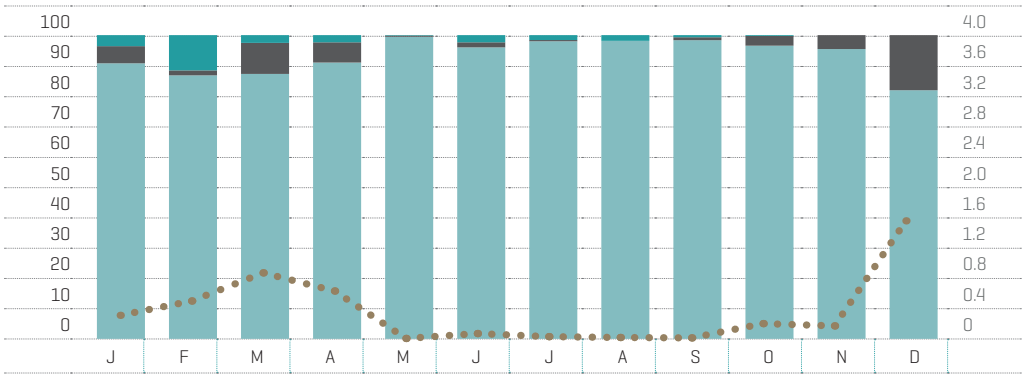
HOURS WITH CONGESTION P>S
2.2%

HOURS WITH CONGESTION S>P
4.5%

(1) Source: REN (http://www,centrodeinformacao,ren,pt/PT/InformacaoExploracao/Paginas/EstatisticaMensal,aspx)

In the graph below, showing the monthly evolution, it can be seen how May was the month with the highest coupling rate, while December registered the highest percentage of hours with congestion, almost 18% of the total number of hours of the month.

Monthly congestion levels at the Spain – Portugal interconnection 2017 [% and €/MWh]



Congestion revenues reached five million euros, with 97% coming from the day-ahead market and the remaining 3% from the intraday market. 50% of this amount corresponds to the Spanish electricity system.

The management of the cross-border balancing services have enabled 39 GWh of balancing energy to be scheduled for import and 156 GWh for export at this interconnection.

In 2017 it was necessary to apply coordinated counter-trading actions for a total value of 2,139 MWh, which were scheduled only in the import direction.

CONGESTION REVENUES IN THE INTERCONNECTION SPAIN - PORTUGAL

5
MILLION EUROS

97%
DAY-AHEAD MARKET

Hydroelectric and wind energy production have a very important influence on the balances scheduled in the interconnection with Portugal.

MOROCCO

ENERGY EXCHANGES WITH MOROCCO EXPORT BALANCE

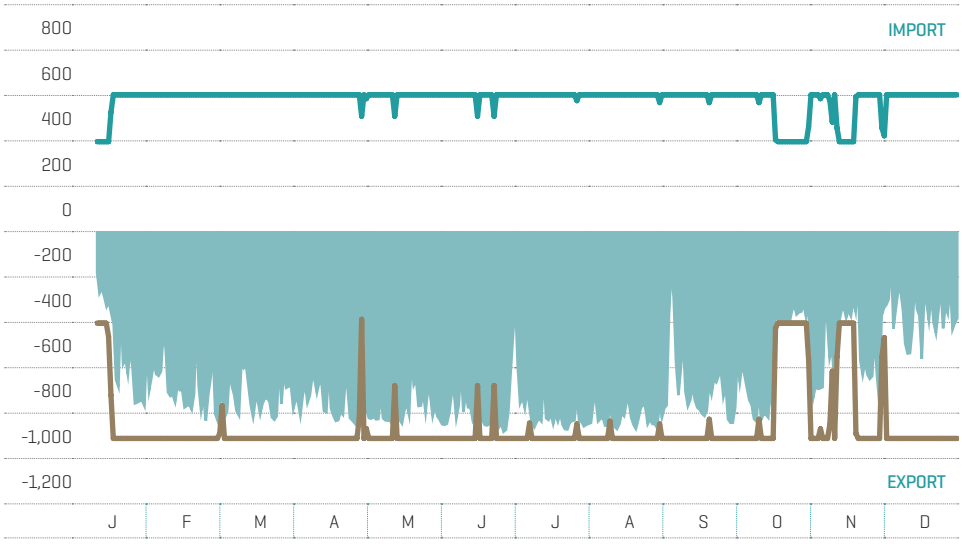
5,741
GWh

+15.9%
COMPARED TO 2016

The annual balance of the electricity exchanges scheduled in the interconnection with Morocco was as an exporter, with a value of 5,741 GWh, representing an increase of 15.9% compared to 2016. The average utilisation rate of the exchange capacity of this interconnection in the export direction was 77%, a value that exceeds the utilisation rate of the previous year by 3 percentage points.

The reductions in the exchange capacity at this interconnection were due to the non-availability of one of the two links of this interconnection.

Exchange capacity and net balance of scheduled exchanges at the interconnection with Morocco 2017 (MW/MWh)



IMPORT CAPACITY (MW) EXPORT CAPACITY (MW) BALANCE MOROCCO (MWh)

ANDORRA

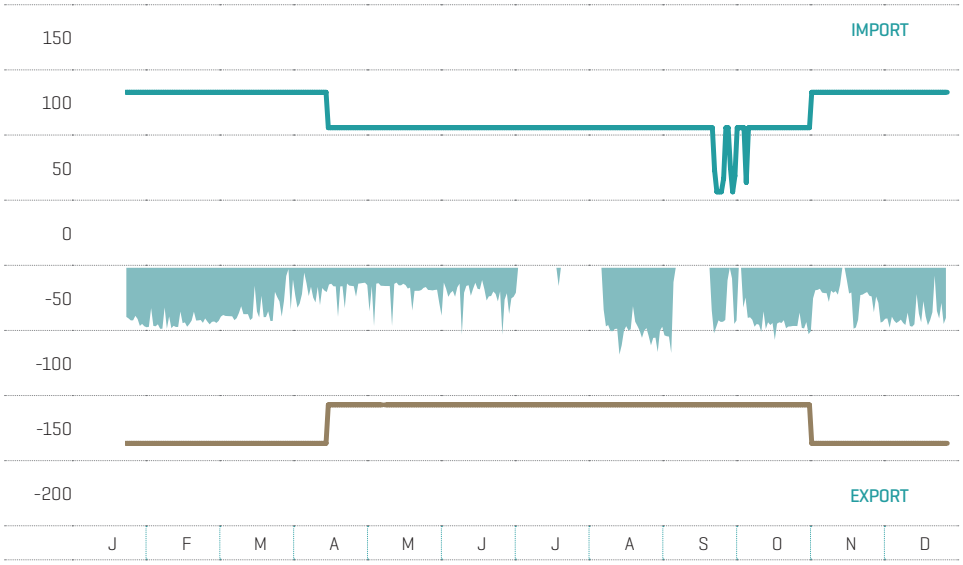
The annual balance of the electricity exchanges scheduled in the interconnection with Andorra was as an exporter, with a value of 233 GWh, representing a reduction of 16.4% with respect to 2016. The average utilisation rate of the exchange capacity of this interconnection in the export direction was 22%.

ENERGY EXCHANGES WITH ANDORRA EXPORT BALANCE

233
GWh

-16.4%
COMPARED TO 2016

Exchange capacity and net balance of scheduled exchanges at the interconnection with Andorra 2017 (MW/MWh)



IMPORT CAPACITY (MW) EXPORT CAPACITY (MW) BALANCE ANDORRA (MWh)

04

ELECTRICITY TRANSMISSION

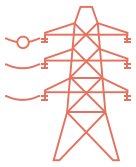
The electricity transmission grid maintains its sustainable growth trend to guarantee the quality of service and the security of electricity supply.

The electricity transmission grid in Spain has continued to develop with the commissioning of facilities that strengthen grid reliability, promote the evacuation of renewable energy and support interconnections between electricity systems, with the core objective of guaranteeing security of supply. During 2017, 147 kilometres of circuit and 108 substation bays were commissioned, which means the total length of the national grid at the end of the year was 43,930 kilometres of circuit and there were 5,719 substation bays. In addition, the transformer capacity increased by 1,210 MVA, bringing the total installed national transformer capacity to 86,654 MVA.

TRANSMISSION GRID
NEW CIRCUIT COMMISSIONED IN 2017

147
KILOMETRES OF CIRCUIT

TRANSMISSION GRID
TOTAL LENGTH OF THE NATIONAL GRID



43,930
KILOMETRES OF CIRCUIT

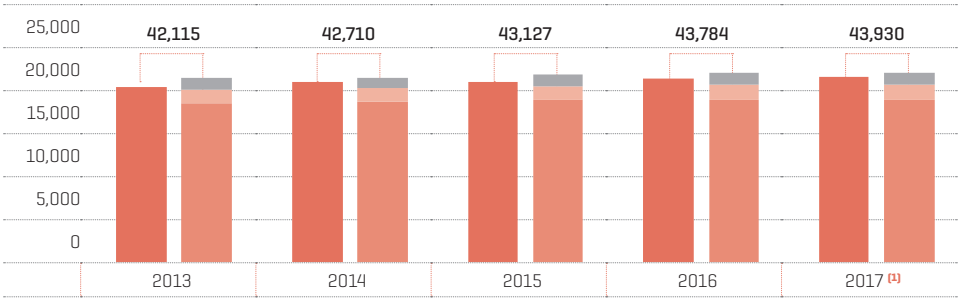
5,719
SUBSTATION BAYS

Facilities in the electricity transmission grid in Spain

	400 kV	≤220 kV			Total
	Peninsula	Peninsula	Balearic Islands	Canary Islands	
Total lines (km)	**21,728**	**19,039**	**1,808**	**1,355**	**43,930**
Overhead lines (km)	21,611	18,264	1,089	1,080	42,045
Submarine cable (km)	29	236	540	30	835
Underground cable (km)	88	539	179	245	1,051
Transformer capacity (MVA)	**80,208**	**613**	**3,273**	**2,560**	**86,654**

Provisional data pending audit (currently underway).
Accumulated data for kilometres of circuit and on transformer capacity as at 31 December, 2017.

Evolution of the electricity transmission grid in Spain (km of circuit)



PENINSULA 400kV PENINSULA ≤ 220kV BALEARIC ISLANDS ≤ 220kV CANARY ISLANDS ≤ 220kV

(1) Provisional data pending audit (currently underway).

Among the projects carried out in 2017, the following are noteworthy based on their geographical area:

Andalusia: work continued to increase the capacity of a sizeable part of this region's 220 kV grid, seeking to reduce the overloads that have been occurring, and therefore the consequent re-despatching of generation that is necessary to eliminate them. The lines affected were: the 220 kV Don Rodrigo-Quintos line, the 220 kV Rocío-Torrearenillas line and the 220 kV Alcores-Gazules line.

Aragón: the 220 kV Mequinenza-Ribarroja line was commissioned after its power capacity had been increased. The objective of this development is to improve the possibilities of evacuating generation from renewable sources while increasing the quality, reliability and security of supply. On the other hand, the 400 kV to 220 kV grid in Escatrón was strengthened with the commissioning of a 400/220 kV step-down transformer unit. Lastly, in order to improve the control of voltage levels, a 400-kV reactor has been commissioned in Magallón.

Balearic Islands: work continued on the meshing of the transmission grid in order to improve the security and quality of the electricity supply. In 2017, the enlargement of the Llucmajor 66-kV substation was commissioned, which included the installation of a coupling switch, with the aim of adapting the substation to the operating procedures.

Canary Islands: work continued regarding the infrastructure improvement plan on the Canary Islands, in order to increase the reliability of existing facilities. Similarly, the 132/66 kV La Oliva, 132/66 kV Puerto del Rosario and 132 kV Matas Blancas gas-insulated substations were commissioned, key actions for improving security of supply on the island of Fuerteventura.

Castilla y León: Construction work continued on the 400 kV Tordesillas-Galapagar-San Sebastian de los Reyes (SUMA) axis to improve grid meshing between Castilla y León and Madrid, in the section corresponding to the Community of Madrid. The 400 kV Tábara substation was commissioned to provide power for the Olmedo-Zamora-Lubián-Orense high-speed train and the 400 kV Buniel substation to provide power for the Burgos-Vitoria high-speed train.

Catalonia: strengthening of the transmission grid in the Barcelona metropolitan area continued, with the increasing of the power capacity of the 220-kV double circuit line between Can Jardí and Rubí and its subsequent commissioning. On the other hand, also to strengthen the grid, the transformer capacity in Sentmenat was increased by replacing a 500 MVA unit for that of a 600 MVA unit. To improve the dynamic behaviour of the transmission grid between Ascó and Vandellós, a reactor was commissioned in the Ascó 400 kV substation.

Castilla La Mancha: the meshing of the Campanario 400 kV substation was completed by commissioning the first circuit of the 400 kV Ayora-Campanario line. With this facility, the connection between the centre of the peninsula and the Levante area has been bolstered.

Extremadura: work has continued on the 220 kV J.M. Oriol-Los Arenales-Trujillo axis, and the administrative permitting procedures have continued for two new substations: Cañaveral and Carmonita to provide power for the high-speed train and the evacuation of renewable generation.

TRANSMISSION GRID IMPROVEMENTS IN THE AREA OF LEVANTE

220 kV

COMMISSIONING OF THE AQUA SWITCHYARD

132 kV

VALLE DEL CARCER–VALLDIGNA-GANDÍA AXIS

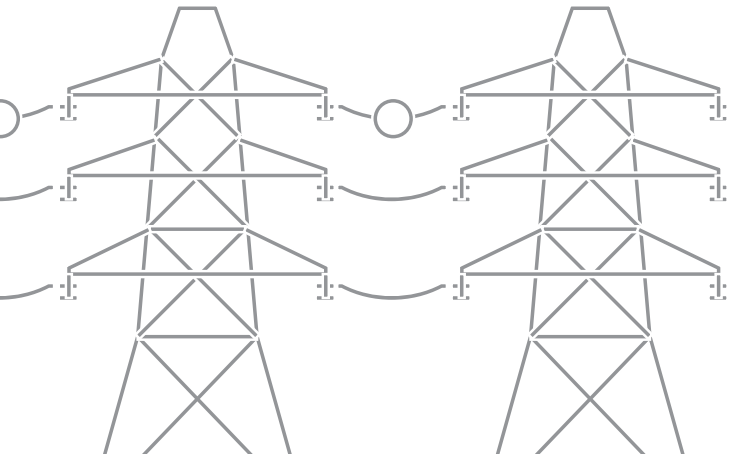
220 kV

Levante: in the area of Valencia, the commissioning of the 220 kV Godelleta switchyard, connected to the 220 kV Torrente-Catadau line via an incoming/and out-going line, and the commissioning of the 220 kV Aqua switchyard, connected through an incoming /and out-going line to the 220 kV Parque Central-Fuente San Luis circuit. Both will improve the security of supply in the city of Valencia. Similarly, the development of the transmission grid continues with the voltage change from 132 to 220 kV in the Valle del Carcer-Valldigna-Gandía axis in order to improve the area's electricity supply. Finally, to improve the control of the voltage levels, three reactors have been commissioned: in the 400-kV Catadau, Benejama and Rocamora substations.

On the other hand, noteworthy is the commissioning of the 220-kV double circuit El Palmar-Murcia line to improve the security of supply in the city of Murcia.

Central area: the ambitious plan for the installation of new reactors continued with the commissioning of a unit in the 400 kV La Cereal substation to facilitate the control of the electrical voltage. Similarly, permitting processes were started for those actions (support for distribution, dual-nodes, bypass) that will help increase system reliability in the area, by providing support for demand coverage in addition to controlling short circuit power.

Northern area: the Arkale phase-shifting transformer has been commissioned in the Basque Country, which will help increase the utilisation of the exchange capacity between Spain and France. In Navarra, the works were completed for increasing the power capacity of the 220 kV La Serna-Olite-Tafalla axis. On the other hand, the grid actions planned in the area of Navarra and the Basque Country continue, which include a new 400 kV axis that, passing through Ichaso, will connect the west of the Basque Country (Abanto-Güeñes axis) with the 400-kV grid of Navarra (Muruarte-Castejón axis). This strengthening will enable the capacity of energy evacuation to be increased and allow a greater integration of renewable energy.



The commissioning of the Arkale phase-shifting transformer will help increase the utilisation of the exchange capacity between Spain and France.

INTERNATIONAL INTERCONNECTIONS

Work has continued on interconnection projects with Europe, due to their great influence on improving the quality and security of supply of the Spanish electricity system and the integration of renewable energy. These projects are aimed at ensuring that in the year 2030 the Spanish electricity system has a 15% interconnection capacity with respect to its installed power capacity, a priority milestone on the European stage, as it is an essential aspect for the integration of the European single energy market.

During 2017, there was significant progress in the interconnections with France following the agreement, between the regulators of both countries, on the cost sharing of the new interconnection across the Bay of Biscay and the commencement of its administrative permitting process, after the launch of the public participation process of the project. The 578 million-euro grant awarded by the European Commission, the highest granted so far by the Connecting Europe Facility (EU funding instrument), also highlights the commitment of the European Union to this project.

EUROPEAN UNION'S COMMITMENT
GRANTS

578
MILLION EUROS

Similarly, this year a 550 MVA phase shifting transformer was commissioned in the 220 kV Arkale-Argia interconnection line. This is an element that acts as a power flow control unit that enables a better distribution of energy and, in turn, an increased utilisation of the interconnection. This project has been key to help increase not only the exchange capacity with Europe but also security of supply.

Lastly, with the publication of the third list of Projects of Common Interest, where the two trans-Pyrenean projects have their own denomination: Navarra-Landes and Aragón-Atlantic Pyrenees, the necessary steps are being taken to comply with the provisions of the Madrid Declaration.

15% FOR THE YEAR 2030
INTERCONNECTION CAPACITY

The projects are aimed at ensuring that by the year 2030 the Spanish electricity system has a 15% interconnection capacity, an essential aspect for the integration of the European single energy market.

SERVICE QUALITY

The quality of service indicators showed once again the high degree of quality and security of supply of the transmission grid, as they are much more favourable than the reference values established under current regulations. The key indicators of global quality according to Royal Decree 1955/2000 are the Energy Not Supplied (ENS), the Average Interruption Time (AIT) and the Availability Rate of the transmission grid (AR).

PENINSULAR ELECTRICITY SYSTEM SUPPLY

13.3%

DECREASE IN INTERRUPTIONS OF POWER SUPPLY

0.13

AIT VALUE IN 2017 (0.16 IN 2016)

In the peninsular electricity system there were thirteen interruptions of power supply in 2017, 13.3% less than in 2016. This decrease has been reflected in the ENS that improved compared to the previous year (60 MWh in 2017 compared to 78 MWh in 2016). The main incident occurred in the 400 kV Mesón-Dumbría line with an ENS of 23 MWh. In terms of AIT, this registered a value of 0.13 minutes (0.16 minutes in 2016), which was well inside the 15-minute reference value established in article 26.2 of Royal Decree 1955/2000.

Energy not supplied (ENS) and average interruption time (AIT) of the transmission grid

	ENS (MWh)			AIT (minutes)		
	Peninsula	**Balearic Islands**	**Canary Islands**	**Peninsula**	**Balearic Islands**	**Canary Islands**
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	78	0.3	457	0.16	0.03	27.45
2017[1]	**60**	**33**	**47**	**0.13**	**2.88**	**2.75**

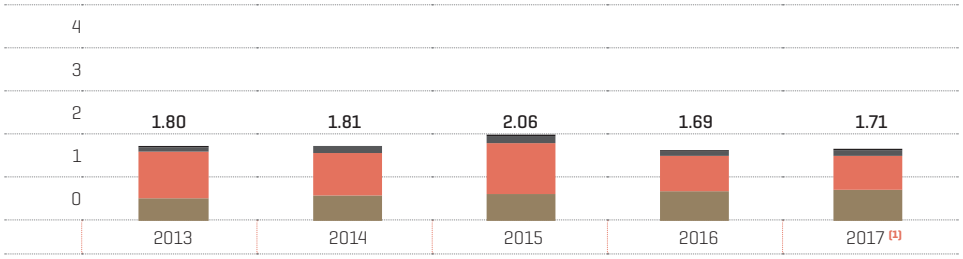
Average interruption time (AIT) = Energy not supplied (ENS) / Average power of the system.
The continuity of supply indicators submitted include the assessment of the impact of several incidents subject to an administrative proceeding currently underway.
(1) Provisional data pending audit (currently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

In the Balearic Islands electricity system, the continuity of supply indicators for 2017 were not as good compared to the previous year. There were five supply interruptions with ENS registering 33 MWh (0.3 MWh in 2016) and an AIT of 2.88 minutes (0.03 minutes in 2016). However, in the Canary Islands electricity system, quality indicators were registered that were much more favourable than those of the previous year. Thus, with twelve interruptions of supply, the ENS stood at 47 MWh (457 MWh in 2016) and the AIT was 2.75 minutes (27.45 minutes in 2016), which shows that the investment made in the Canary Islands is improving the indicators of previous years. The investment programme must continue in order to resolve the weaknesses of the grid in this electricity system.

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

The annual evolution of this indicator in the last five years is shown in the non-availability rate graphs below. The availability rate of the peninsular transmission grid in 2017 reached a value of 98.29% (slightly lower than 98.31% in 2016). In the Balearic Islands and the Canary Islands, the availability rate of the grid was 97.85% (96.94% in 2016) and 98.12% (98.06% in 2016) respectively. The fundamental reason for the improvement in the availability rate in non-peninsular systems has is as a consequence of the on-going investment made in the areas of construction, renovation and improvement of grid assets.

Annual evolution of the non-availability rate of the peninsular transmission grid (%)

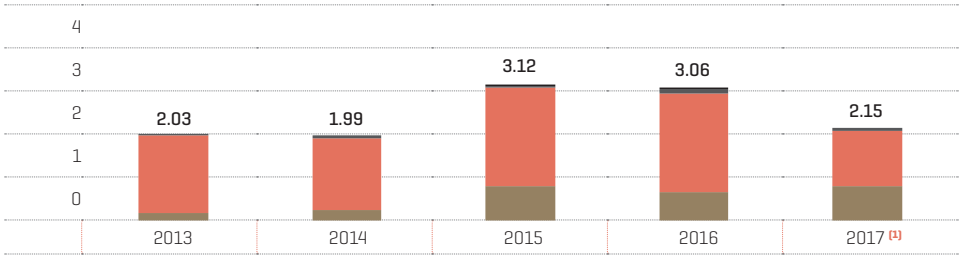


TRANSMISSION GRID AVAILABILITY RATE IN 2017

98.29%

PENINSULAR SYSTEM

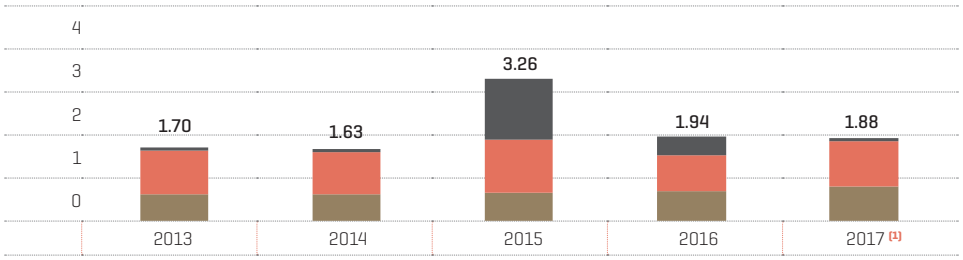
Annual evolution of the non-availability rate of the transmission grid of the Balearic Islands (%)



97.85%

BALEARIC ISLANDS

Annual evolution of the non-availability rate of the transmission grid of the Canary Islands (%)



98.12%

CANARY ISLANDS

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).

INNOVATION IN THE TRANSMISSION GRID

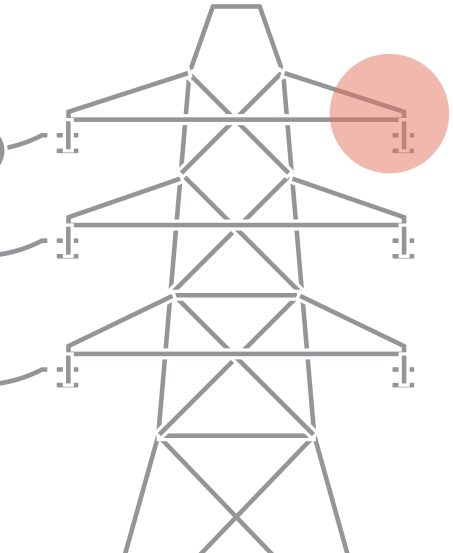
In 2017, work continued to allocate resources to various innovation projects regarding the transmission grid. Among the completed projects, the following are noteworthy:

Research on VHTSC materials (Very High Critical Temperature Super Conductors): a basic research project by the Chemistry Faculty of the Complutense University of Madrid regarding very high critical temperature superconductor materials has been financed. The objective is to ensure the continuity of the research team and its work, whose objective is to find materials that reach the condition of superconductivity at temperatures closer to that of the environment in which they are located, which would be extremely useful for use in the transmission of electricity.

Useful-life estimation model for metallic structures: a model has been developed that analyses and evaluates the ideal moment to apply anticorrosive treatments to electricity towers according to the environmental conditions in the area they are located. In particular, those towers exposed to higher rates of corrosion have been targeted, in order to better plan and schedule the use of resources necessary for this type of work.

Evaluation of the useful life of insulated electricity cables: laboratory tests have been carried out to evaluate the useful life of insulated power cables, as well as that of terminals, joints, etc., in response to different types of stresses due to daily operation, in other dielectric conditions, or with different degrees of humidity, etc. The results allow the assessment of the criteria currently used in operation and planning for the calculation of transmission line capacity.

Inspection of electricity lines using multicopter drones: a methodology has been developed and tested in the Central area to use Remotely Piloted Aircraft Systems (RPAS) for inspecting electricity lines and substations.



We have developed a model that analyses and evaluates the ideal moment to apply anticorrosive treatments on electricity towers according to the environmental conditions in the area they are located.

Vegeta: a methodology has been developed and tested in Galicia to optimise the overall management of the works for the control of the vegetation present in the vicinity of high-voltage electricity infrastructure, with the aim of ensuring it is managed in an efficient and socially responsible manner.

A second phase is currently underway to design a complementary financial optimisation algorithm, as well as to test this methodology in Extremadura; a region that has different vegetation and climatic conditions. In this second phase, access roads to the towers have also been included as part of the technical needs for the operation of this methodology.

Climate control with geothermal energy in maintenance buildings: a pilot installation for climate control in maintenance buildings using low enthalpy geothermal energy is underway in the San Sebastian de los Reyes substation.

Geothermal ventilation for gas-insulated facilities and cable galleries: a geothermal ventilation experiment has been conducted in the Fuencarral substation, which consists of harnessing geothermal energy from the ground to provide climate control, exchanging heat through a process of forced convection.

The 'Vegeta' methodology seeks to optimise the overall management of the works for the control of the vegetation present in the vicinity of high-voltage electricity infrastructure.

05

ELECTRICITY MARKETS

In 2017, the average price of energy in the electricity market increased 25.1% compared to the previous year and is the second highest value since the all-time high reached in 2008.

During 2017, the final energy managed in the electricity market (reference supply plus free contracting) grew by 1.1% compared to the previous year.

TOTAL ENERGY MANAGED IN THE ELECTRICITY MARKET

+1.1%

COMPARED TO 2016

The final average price of energy in the electricity market stood at 60.6 €/MWh in 2017, 25.1% higher than the price of 2016 and the second highest since 2008, the year in which the all-time maximum price was registered. Comparing month to month it can be seen how all the final prices have been higher than in 2016, except in December (2% lower than the price in December 2016). From January to June, the average monthly variation with respect to the previous year was 50% higher, while from July to November the average monthly increase was 10%. The maximum price during the year was registered in January, coinciding with low hydroelectric and wind energy production, high non-availability of French nuclear power, low temperatures and a high demand for gas. It should be remembered that in the first few months of 2016, there was a large share of hydroelectric and wind energy used to cover the demand, which resulted in a significant price reduction in that period.

FINAL AVERAGE PRICE OF ENERGY IN THE ELECTRICITY MARKET

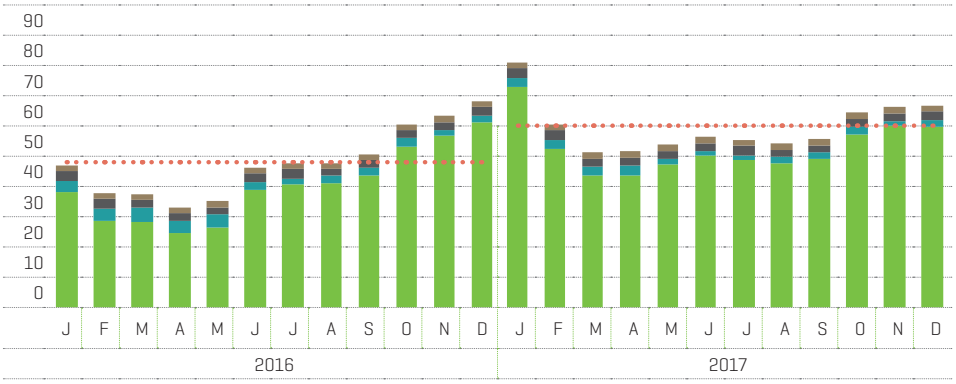
60.6

€/MWh

25.1%

COMPARED TO 2016

Components of the average final price of energy (€/MWh)



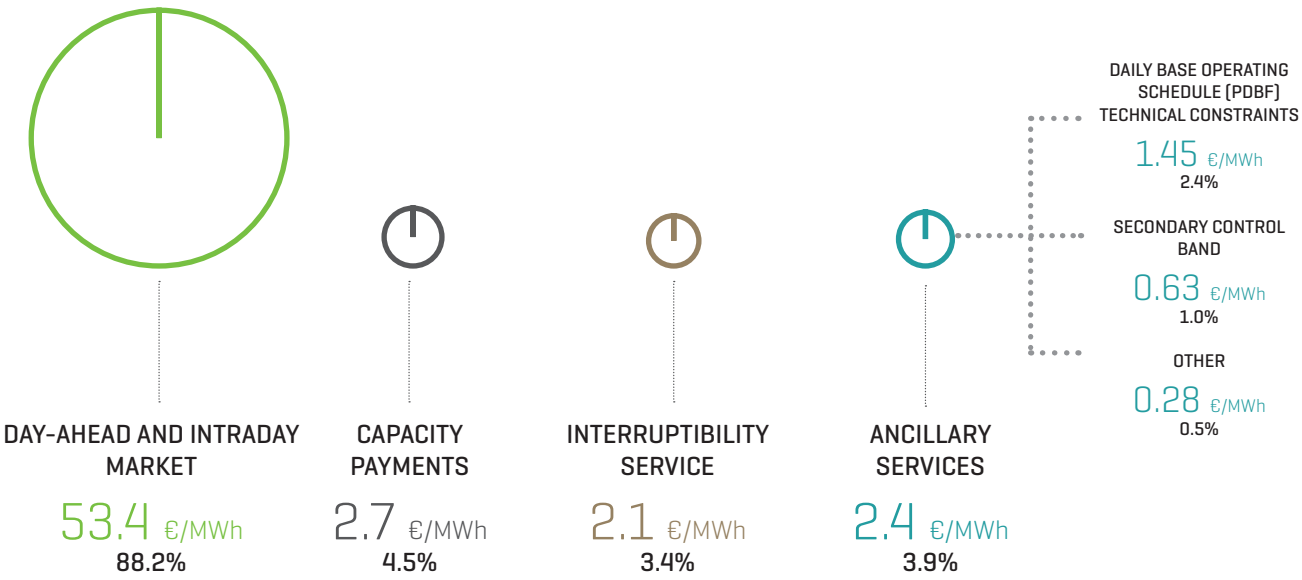
DAY-AHEAD AND INTRADAY MARKET
ANCILLARY SERVICES
CAPACITY PAYMENTS
INTERRUPTIBILITY SERVICE
AVERAGE FINAL PRICE

The maximum price during the year was registered in January, coinciding with low renewable production, the high non-availability of French nuclear power, gas shortages and the increased demand due to low temperatures.

During 2017, the components that made up the price of energy were the following: day-ahead and intraday markets 88.2%, ancillary services 3.9%, capacity payments 4.5% and the remaining 3.4% was for the interruptibility service.

If you compare the impact of the price on the unserved demand with that of last year, there are increases of 31.5% in the day-ahead and intraday market and 6.7% in the interruptibility service and decreases of 23.9 % in the ancillary services and 1.4% in the capacity payments.

Components of the final average price of the electricity market in 2017



During 2017, the day-ahead and intraday market price component represented 88.2%, compared to 83.9% last year.

DAY-AHEAD MARKET

ENERGY IN THE DAY-AHEAD MARKET

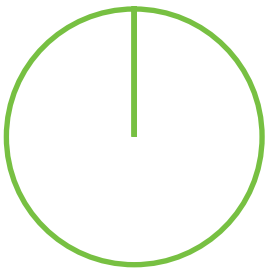
253
TWh

1.1%
COMPARED TO 2016

Energy in the day-ahead market stood at 253 TWh in 2017 (192 TWh in the spot market without bilateral contracts), which represents an increase of 1.1% compared to 2016. A total of 76.0% of the energy was traded on the spot market (73.6% in 2016) and the remaining 24.0% through bilateral contracts, compared to 26.4% the previous year. These percentages have remained very similar since 2010, with an average value of 73.0% for the spot market and 27.0% for bilateral contracts, although in the last two years there has been a reduction in the percentage of bilateral contracts.

The energy supplied by market traders, who are not classified as reference traders, continued to increase reaching a market share of 88.2% in 2017, compared to 87.3% in 2016.

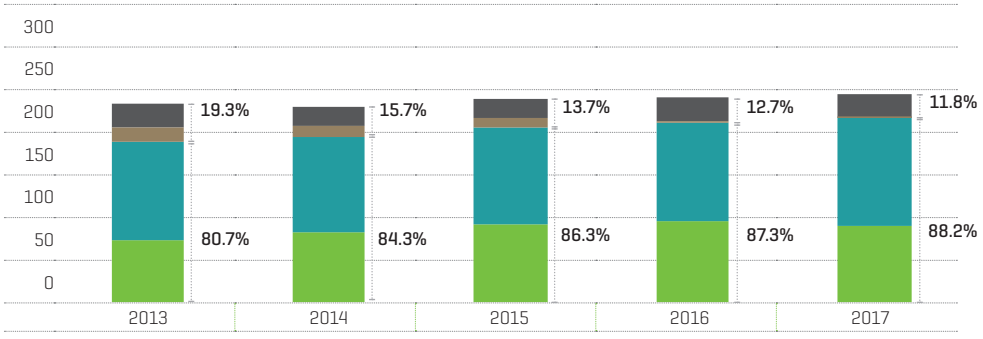
PERCENTAGE OF ENERGY PURCHASED IN THE DAY-AHEAD MARKET AND THROUGH BILATERAL CONTRACTS



SPOT MARKET
76%

BILATERAL CONTRACTS
24%

Evolution of purchases in PDBF from Reference Suppliers (RS) and other suppliers (TWh)



PDBF = DAILY BASE OPERATING SCHEDULE

The arithmetic average price of the day-ahead market in Spain stood at 52.24 €/MWh, 31.7% higher than the previous year and slightly lower than that of Portugal (52.48 €/MWh).

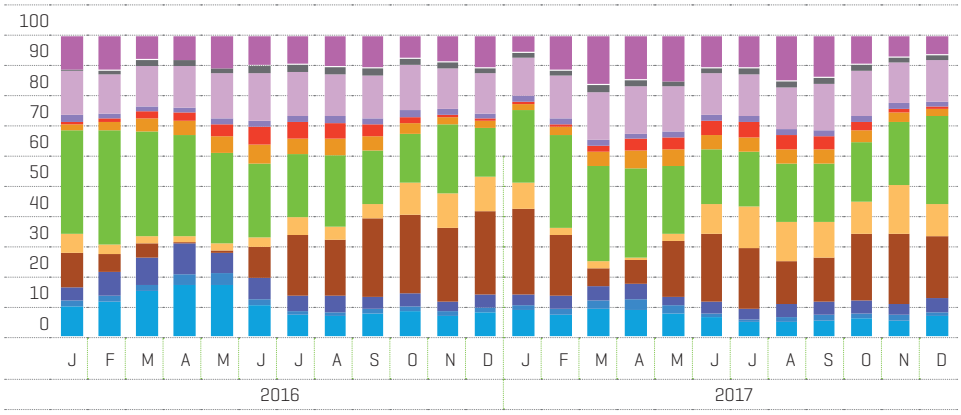
If we take into account the structure of the generation mix, in the day-ahead market, which represents an important factor in the price formation, we can see how January and November were months in which coal and the combined cycle technology had a higher percentage of energy sales in the day-ahead market, whereas in the entire year hydro and wind reduced their share with respect to 2016. In annual terms, coal increased its share by almost four percentage points and combined cycle by three percentage points, whereas hydro reduced its share by almost four percentage points and wind by just under three percentage points. International imports increased by just over one percentage point, due to the interconnection with France, as prices in France were lower than those in Spain.

RENEWABLE ENERGY IN THE DAY-AHEAD MARKET

-11%

COMPARED TO 2016

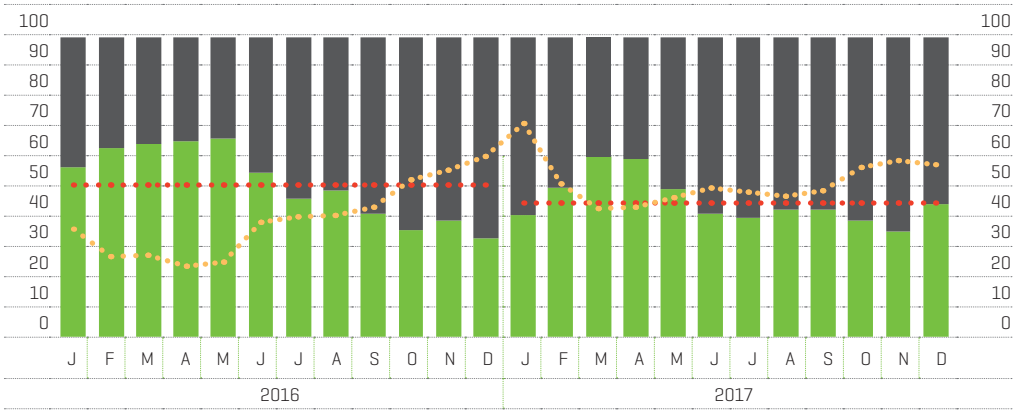
Percentage of energy sales by technology in the spot market



The renewable energy traded in the day-ahead market during 2017 was 11% lower on average than the previous year.

In general, it can be seen how there is an inverse correlation between the price of the day-ahead market and the participation of renewable energy, so that a lower share of renewables shows an increase in the day-ahead market price.

Generation in Spain and prices [% and €/MWh]



MINIMUM PRICE IN THE DAY-AHEAD MARKET

70%
RENEWABLE GENERATION

MAXIMUM PRICE IN THE DAY-AHEAD MARKET

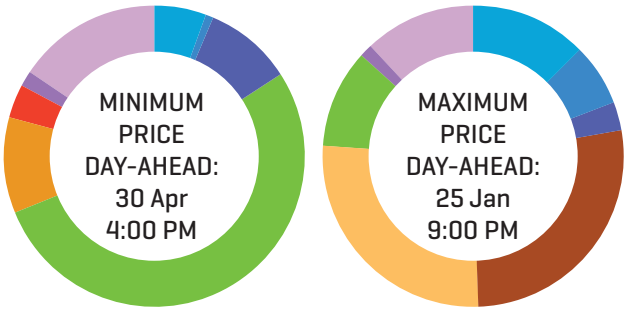
70%
NON-RENEWABLE GENERATION

If the matching process of the generation structures is represented in a graph showing the times of the day when the day-ahead price sets the annual minimum and maximum values, we can see how these are very different. At the time at which the minimum price was registered, we can see how wind was the one technology that has an impact on the marginal price, with renewable energy matched in that hour being above 70%. If you look at the structure at the time when the maximum price was reached, you can see how combined cycle was the one technology that determined the marginal price. Non-renewable energy matched at that time was over 70%, although it is observed that hydro also participated with more than 10%. The low rainfall registered in 2017, a year in which only February was classified as a wet month, and the low availability of hydro reserves meant that hydroelectric generation was a limited resource, having a direct impact on the marginal price of the day-ahead market.

In 2017, the months with the highest hydroelectric and wind energy production were those in which the prices registered were below 6 €/MWh. 2017 was again a year during which there was no hours registered with a zero price.

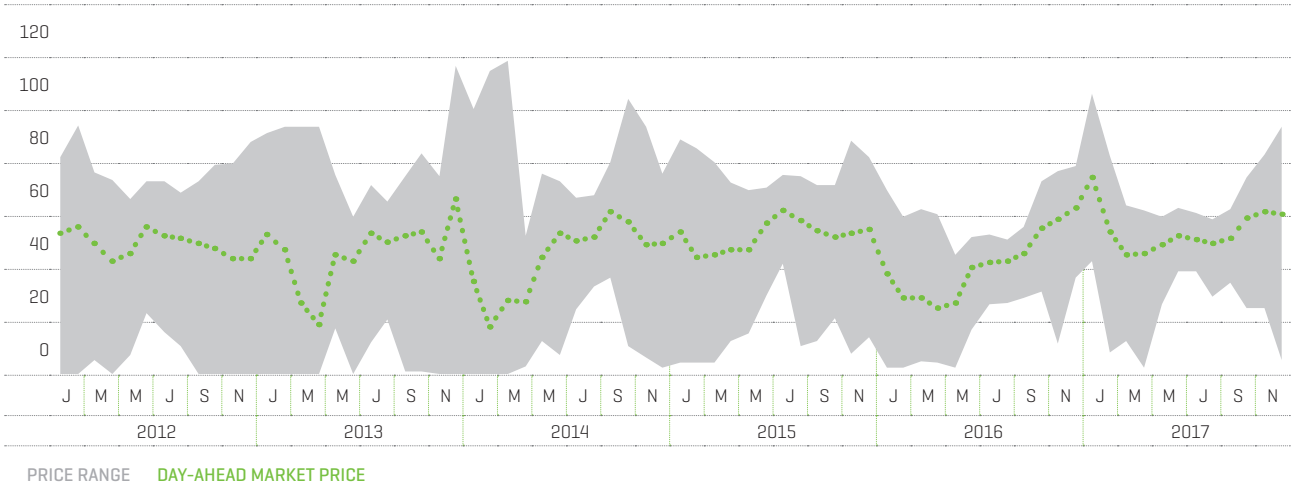
Minimum and maximum price structure of the day-ahead market 2017 [%]

	MINIMUM PRICE DAY-AHEAD	MAXIMUM PRICE DAY-AHEAD
	30 APR	**25 JAN**
HYDRO	5.8%	12.6%
PUMPED STORAGE	0.8%	6.7%
NUCLEAR	9.4%	2.9%
COAL	0%	27.2%
COMBINED CYCLE	0%	26.9% **(1)**
WIND	52.9% **(1)**	10.4%
SOLAR PHOTOVOLTAIC	10.4%	0%
SOLAR THERMAL	3.6%	0%
OTHER RENEWABLES	1.7%	1.4%
COGENERATION AND OTHER	15.4%	11.9%



(1) Technology that sets the marginal price.

Maximum, minimum and average price of the day-ahead market [€/MWh]



In 2017, the months with the highest hydroelectric and wind energy production were the only ones that registered prices below 6 €/MWh.

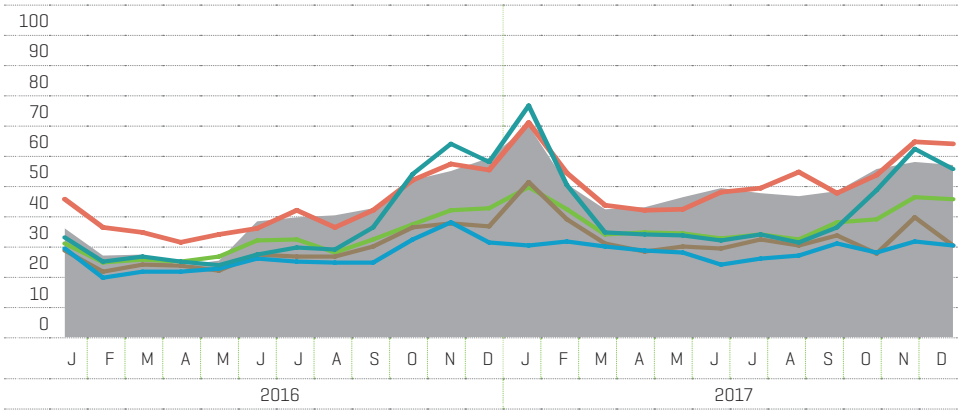
The higher the hydroelectric and wind energy production, the lower the prices in Spain and the closer the prices are to the lowest in Europe.

If we compare the prices of the Spanish day-ahead market with the prices of the European markets, we see how the prices of Spain are among the highest, although they were exceeded in seven months by those of Italy (National Single Price) and in two months by those of France (January and November).

Looking at the evolution of the last two years, it can be seen that in the first few months of 2016, when there was higher hydroelectric and wind power generation, prices in Spain were lower and closer to the lowest prices in Europe.

The weak interconnection of the Iberian system, and therefore Spain, with the Central European electricity system, is evident in the high levels of congestion and in the lower convergence with the prices of the most interconnected countries.

Prices of European markets (€/MWh)



INTRADAY MARKET

Energy sales in the intraday market stood at 31.6 TWh, 14.2% higher than in 2016, with 36.7% of sales corresponding to a net increase in demand and/or pumped-storage consumption.

The arithmetic average price of the intraday market in 2017 stood at 53.12 €/MWh, higher than the 52.24 €/MWh of the day-ahead market.

ANCILLARY SERVICES

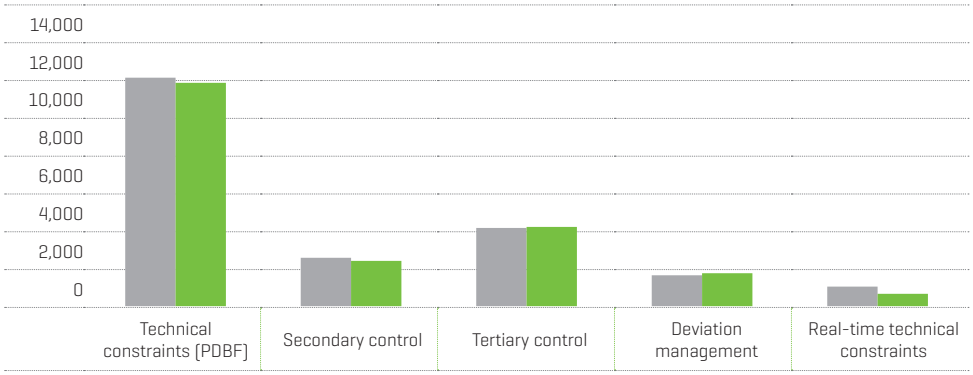
The volume of energy managed through the ancillary services[1] of the system in 2017 was 20,751 GWh, 2.8% lower than the previous year, as a result of a decrease in the volume of energy scheduled for resolving technical constraints through the Daily Base Operating Schedule (PDBF), in real time and using secondary control energy. In contrast, tertiary control energy and that of deviation management saw their volumes increase slightly. The energy for resolving technical constraints of the Daily Base Operating Schedule fell by 2%, representing almost 57% of the total volume of energy in this market.

ENERGY MANAGED IN THE ANCILLARY SERVICES

20,751
GWh

-2.8%
COMPARED TO 2016

Energy managed in the system ancillary services (GWh)



Cost of ancillary services (M€)

	2016	2017
Daily base operating schedule (PDBF) technical constraints	516	366
Real-time technical constraints	30	23
Technical constraints	546	388
Secondary control band	177	159
Additional upward power reserve	37	28
Deviations	47	60
Deviations surplus	-20	-25
Power control factor	-15	-15
Total Ancillary services	**773**	**595**
% 2017/2016		-23.0

(*) Includes non-fulfilment of balancing energy, deviation balancing and deviations between systems.

COST OF THE ANCILLARY SERVICES

595
MILLION EUROS

-23%
COMPARED TO 2016

(1) Does not include additional upward power reserve, secondary control band, nor energy associated to the cross-border balancing services.

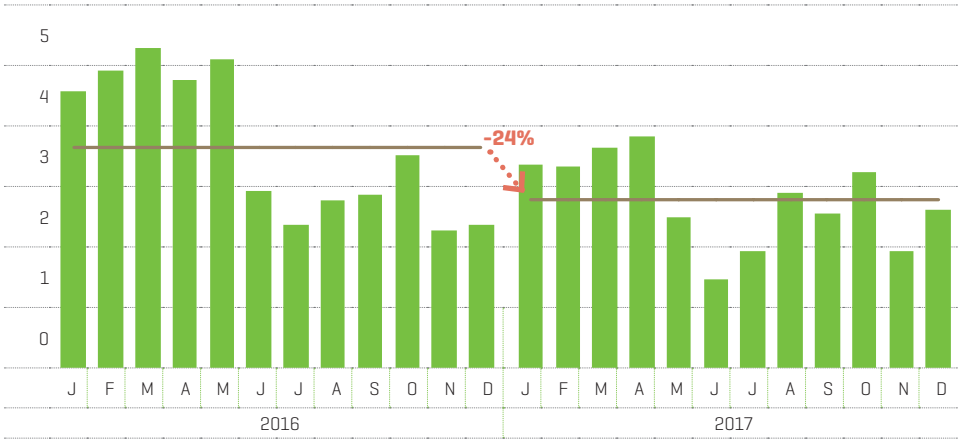
IMPACT OF ANCILLARY SERVICES ON THE AVERAGE PRICE OF ENERGY

2.4
€/MWh

-24%
COMPARED TO 2016

The ancillary services in 2017 represented only 3.9% of the final average price of energy in the electricity market, having an impact on this price of 2.4 €/MWh, a value 24% lower than in 2016 and the lowest since 2007. If compared month by month, the cost of the ancillary services was lower than last year in every month with the exception of August and December.

Impact of ancillary services in the final price (€/MWh)

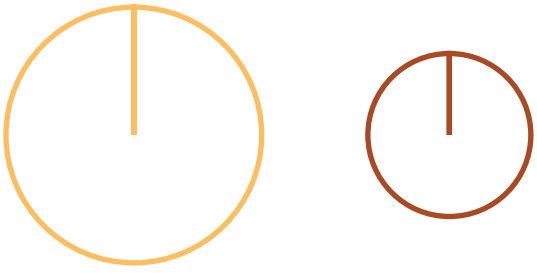


ANCILLARY SERVICES AVERAGE PRICE AS

Constraints of the Daily Base Operating Schedule

The energy scheduled for resolving technical constraints of the Daily Base Operating Schedule (PDBF) stood as follows: 11,035 GWh of upward energy (7% lower than the previous year) and 739 GWh of downward energy (four times the value of the previous year). The average value of the price of upward energy was 81.5 €/MWh, 3.3% higher than last year, and the downward energy price was 48.2 €/MWh, 37.0% higher than in 2016. The impact on the final average price of energy was 1.45 €/MWh compared to 2.07 €/MWh in the previous year.

Upward energy in phase I



COMBINED CYCLE
68.4%

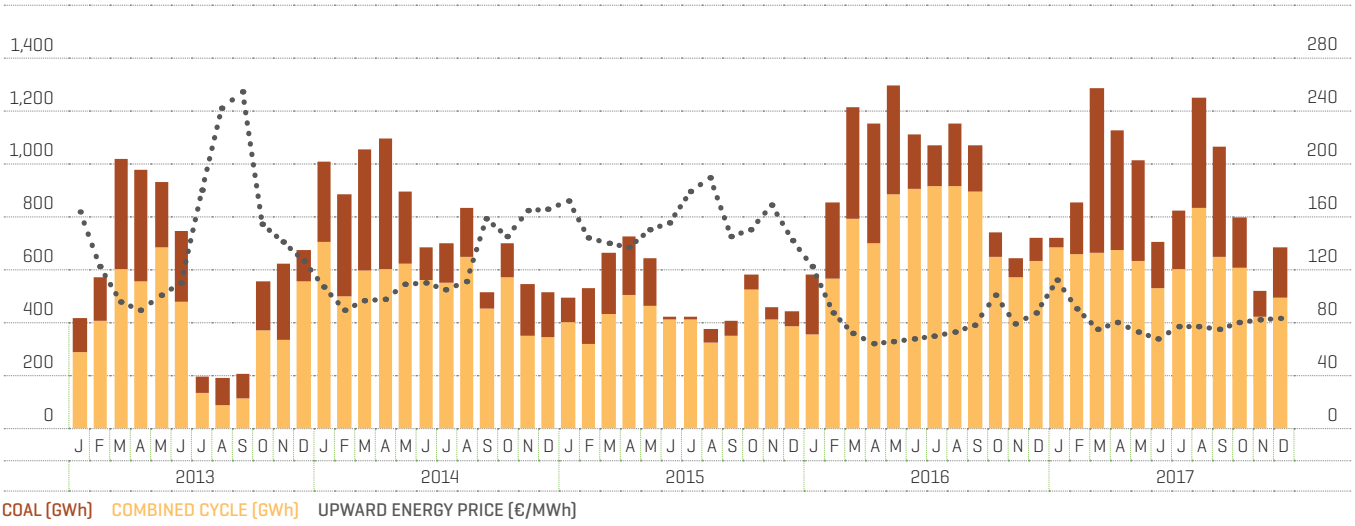
COAL
31.2%

HYDRO	0.1%
PUMPED-STORAGE CONSUMPTION	0.2%
NUCLEAR	0.1%

The energy scheduled in phase I for resolving technical constraints of the Daily Base Operating Schedule corresponded mainly to combined cycle and coal technologies. The downward energy in phase I was all but negligible.

In the bar chart below we can see the evolution of these technologies, over the last five years, of the upward energy scheduled in phase I for resolving technical constraints of the Daily Base Operating Schedule.

Upward energy scheduled in phase i – coal and combined cycle – and upward energy price (GWh and €/MWh)



Other Ancillary Services

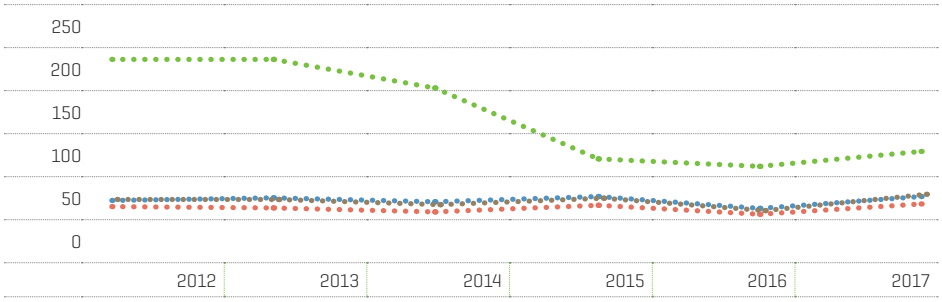
In the markets for secondary control, tertiary control, deviation management and the resolution of technical constraints in real time, 2,415 GWh, 4,155 GWh, 1,766 GWh and 642 GWh were managed, respectively. Of this total, 53.1% corresponded to upward energy managed and the remaining 46.9% to downward energy managed.

Regarding power reserves, the volume of additional upward power reserve that needed to be allocated was 1,559 GW, 22% lower than that allocated the previous year; with an impact of 0.11 €/MWh on the average final price of energy (unserved demand).

The average hourly secondary control band allocated was 1,195 MW, with an impact of 0.63 €/MWh on the average final price of energy (unserved demand), 11.3% lower than the previous year.

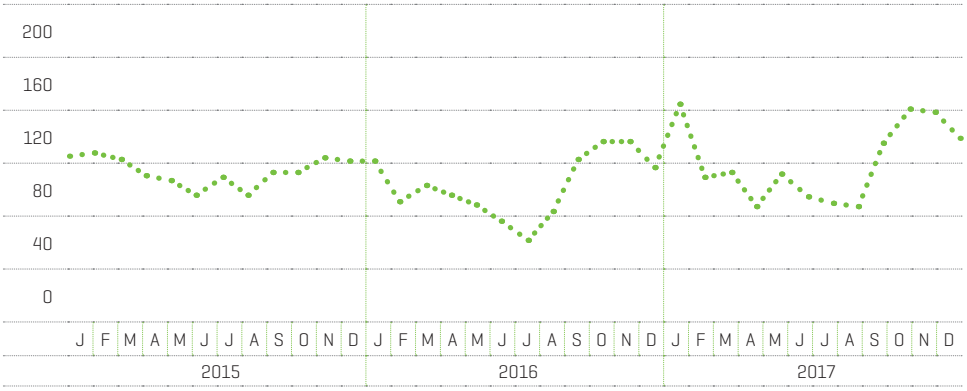
The weighted price of upward energy of secondary and tertiary control has remained fairly constant, while the upward energy prices for real-time re-dispatches due to security of supply measures registered high values in 2012 and 2013, which fell until 2015 and have remained fairly constant over the last two years.

Annual evolution of price of upward energy for resolution of real-time constraints [€/MWh]



In the graph below, we can see the monthly evolution of the average weighted prices of upward energy scheduled for the resolution of technical constraints in real time, by volume of energy re-dispatched.

Annual evolution of the average weighted price of upward energy for resolution of real-time constraints [€/MWh]

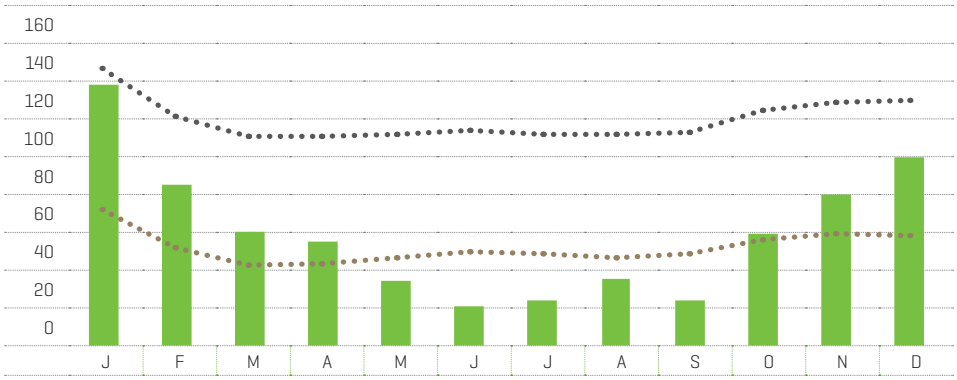


Voluntary price for the small consumer (VPSC)

The voluntary price for the small consumer exceeded that of the previous year by 15.9%. In the first five months of the year, the price was well above that of 2016 (increases above 20%), from June to November the increases did not exceed 13%, while in December the price was slightly lower.

It is worth noting that the VPSC is linked to the day-ahead market price, as shown in the following graph. For this reason, the highest price of the VPSC was registered in January with 147.4 €/MWh, while the lowest price was in March, with a value of 111.2 €/MWh.

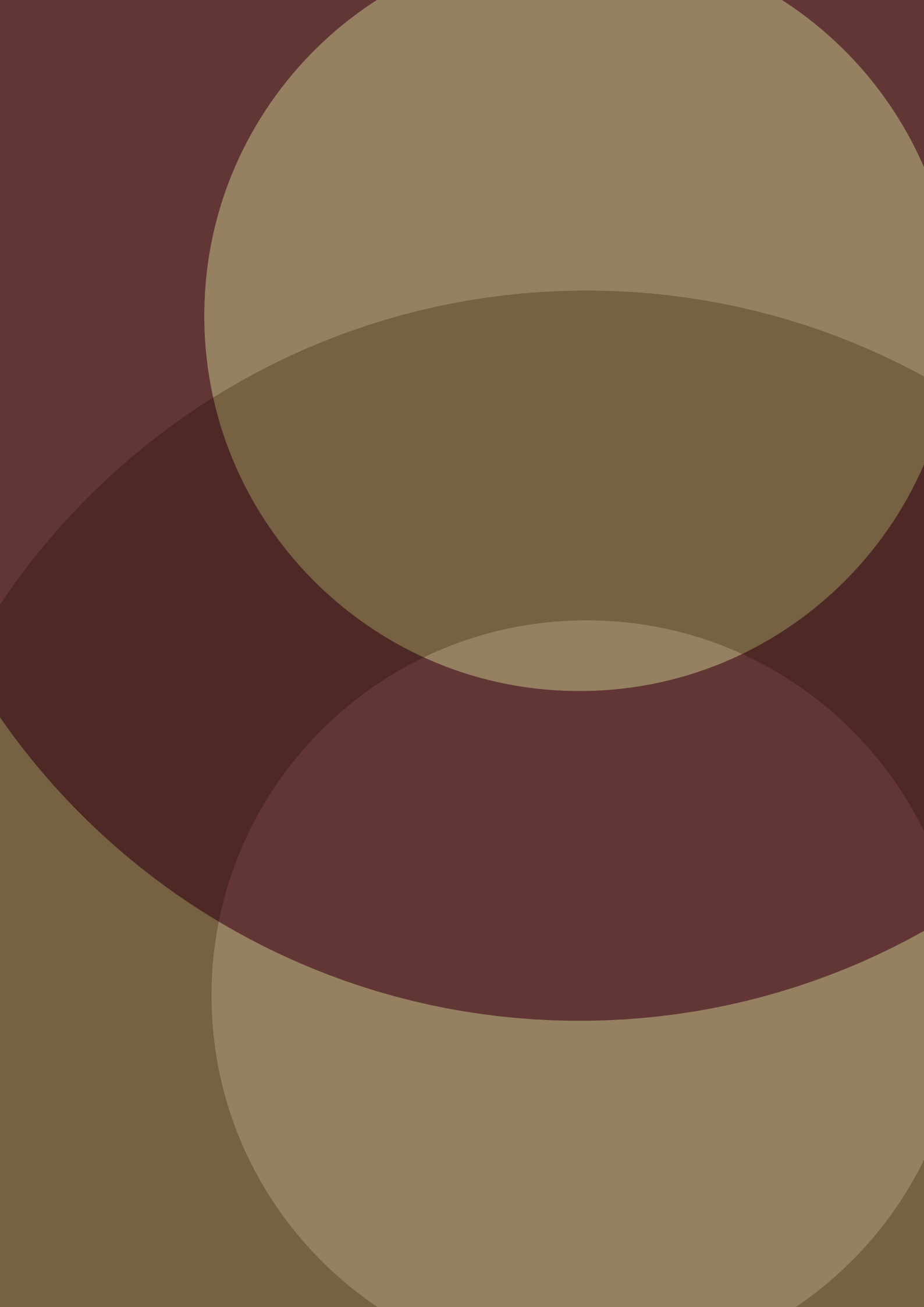
Evolution of the VPSC (general tariff 2.0 A) compared to the day-ahead market price (€/MWh)



JANUARY
147.4 VPSC €/MWh
HIGHEST PRICE

MARCH
111.2 VPSC €/MWh
LOWEST PRICE

The voluntary price for the small consumer exceeded that of the previous year by 15.9%.



06

EUROPEAN SCOPE

Demand for electricity in Europe continues its recovery as it grows for the third consecutive year, although it registers a growth rate lower than that of the previous year.

VARIATION IN THE ELECTRICITY DEMAND IN ENTSO-E MEMBER COUNTRIES

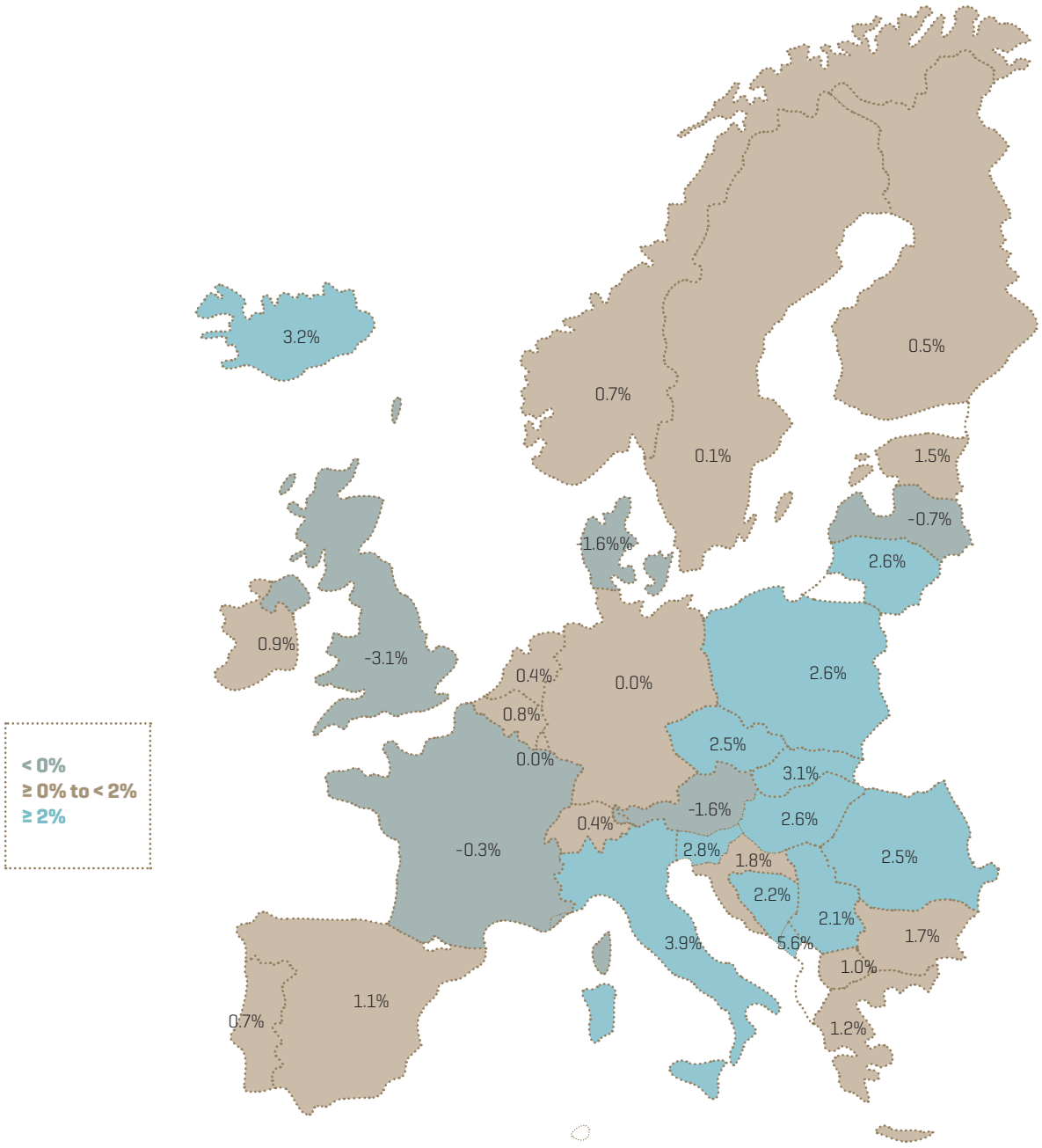
+0.8 %

COMPARED TO 2016

In the group of countries belonging to ENTSO-E, the demand for electricity continued the growth trend which began in 2015 but with an increase rate lower than that of the previous year. Specifically, the ENTSO-E member countries registered a growth of 0.8% compared to 2016, an increase lower than the 1.3% registered the previous year.

The following map shows the evolution of electricity demand in each country compared to 2016. Due to its importance in the overall contribution to demand, noteworthy on the one hand, were the increases registered in Italy and Spain with variations of 3.9% and 1.1%, respectively, while on the other hand, in Great Britain and France, there were decreases of -3.1% and -0.3% respectively.

Variation in electricity demand in ENTSO-E member countries in 2017/2016 (%)



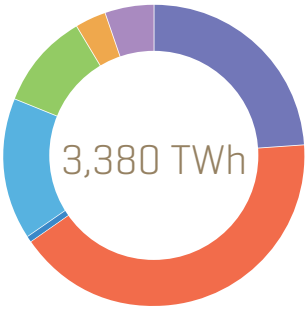
Source: ENTSO-E Data Portal 19/4/2018. Spain REE.

RENEWABLE ENERGY CONTINUES ITS GROWTH TREND

The generation of electricity from renewable sources (excluding hydroelectric pumped-storage generation), has represented 33.7% of the energy produced by the ENTSO-E member countries, representing a variation of 2.4% with respect to last year. In 2017, Spain was ranked sixteenth in the share of renewable generation in terms of total electricity production. However, in terms of wind and solar, both calculated in terms of total electricity production, it is ranked fifth and fourth respectively.

Net generation 2017 (%)

NUCLEAR	23.9%
CLASSIC THERMAL	41.5%
PUMPED STORAGE	0.8%
HYDRO	14.9%
WIND	10.4%
SOLAR	3.3%
OTHER RENEWABLES	5.1%



Source: ENTSO-E Data Portal 19/4/2018. Spain REE.

Electricity generation coming from renewable sources

33.7%

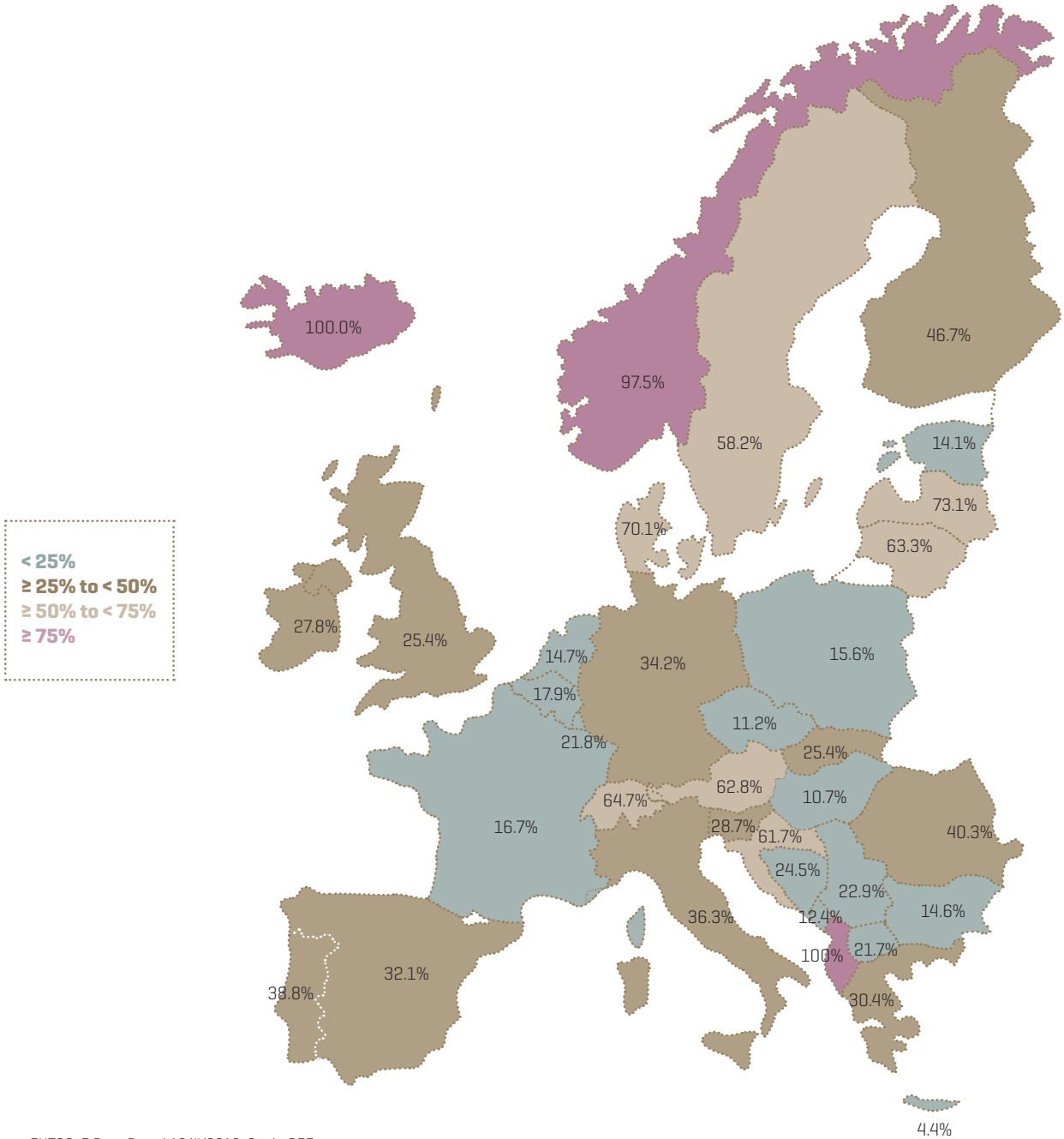
in the set of ENTSO-E member countries

+2.4%

COMPARED TO 2016

Regarding the contribution of renewables to total electricity production in each of the countries. Spain is in the middle in terms of covering demand with renewables, with 32.1% of the total generation in 2017, a percentage slightly lower than the European average which stood at 38.3% this year.

Renewable energy over total generation of ENTSO-E member countries in 2017 (%)

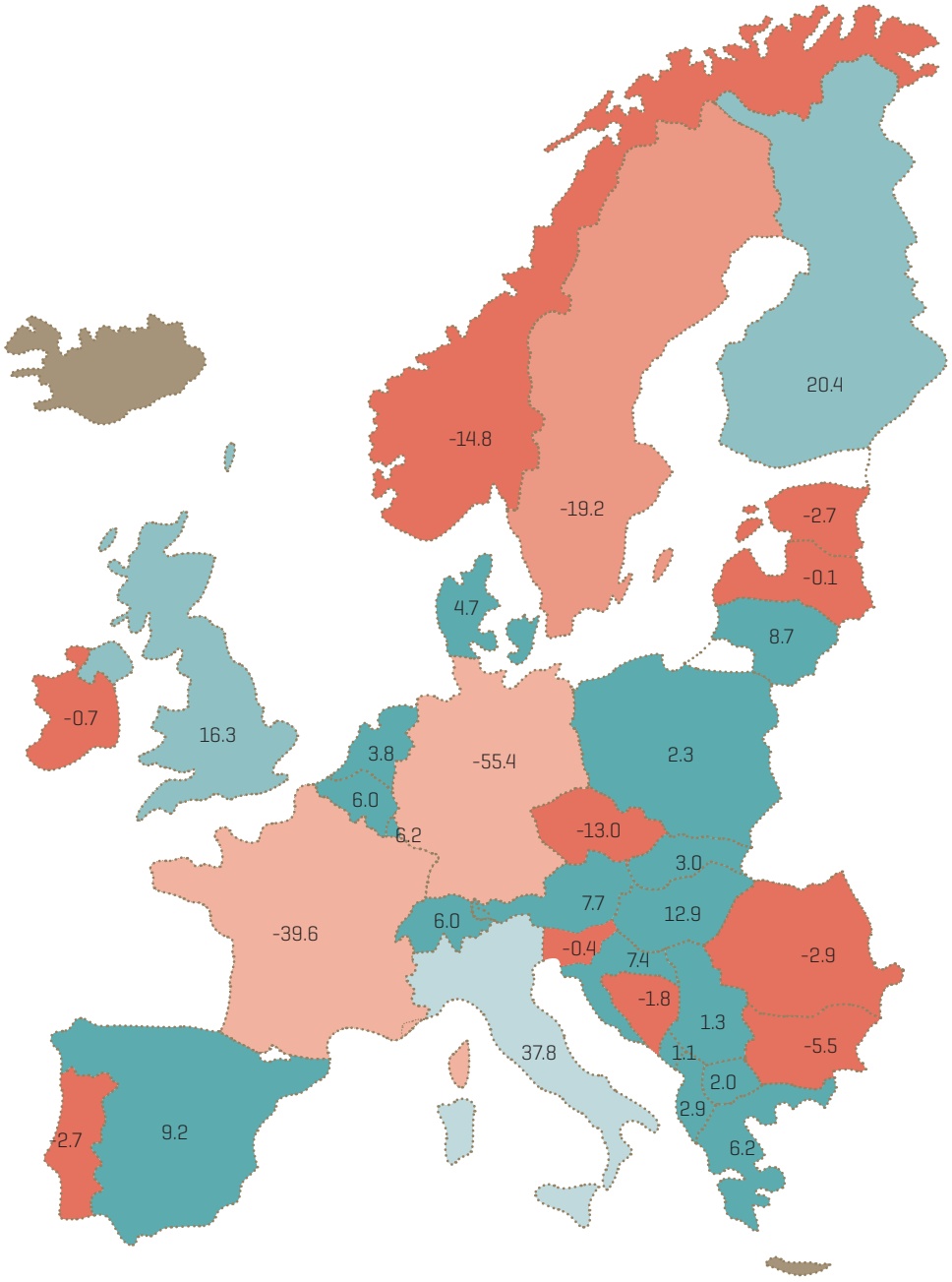


Source: ENTSO-E Data Portal 19/4/2018. Spain REE.

ENERGY EXCHANGES

The net balance of electricity exchanges between ENTSO-E member countries and their neighbouring countries has been as an importer with a value of 7.2 TWh. Among the biggest importer countries are Italy, Finland and Great Britain with importer balances in 2017 of 38 TWh, 20 TWh and 16TWh, while Germany, France, Sweden and Norway, have the highest export balances of 55 TWh, 40 TWh, 19 TWh and 15 TWh respectively.

Balance of physical electrical energy exchanges in ENTSO-E member countries and neighbouring countries in 2017 (TWh)



Source: ENTSO-E Data Portal 19/4/2018. Spain REE.

07

REGULATORY FRAMEWORK

In 2017, developments continued in the electricity regulation, both nationally and in the EU, in line with the objectives of the European Union's energy policy.

The usual activities linked to energy regulation were resumed in 2017, following a period in 2016 which brought with it a legislative halt as a result of the failure to reach an agreement to form a new government after the general elections held in December 2015, and which prevented the new Government from being in place until the end of 2016. Under the new stable scenario existing in 2017, National Electricity regulation continued to develop Spanish Electricity Industry Law 24/2013, noteworthy developments related to this Law are the new provisions published related to the requirement to call two auctions annually for the allocation of the specific remuneration scheme associated with new electricity generating facilities that use renewable energy sources in the peninsular electricity system. A total of 8,000 MW of new renewable generation capacity was allocated by means of these auctions, the focus of which are to fulfil the European Union targets regarding the share of these energies in the generation mix in order to cover demand, for both 2020 and the 2030 horizon.

SOURCES OF RENEWABLE ENERGY AUCTIONS

8,000
MW

OVERALL RENEWABLE GENERATION CAPACITY ALLOCATED IN 2017 WITH A FOCUS ON THE FULFILLMENT OF EUROPEAN UNION TARGETS, BOTH FOR 2020 AND FOR THE 2030 HORIZON.

Four years after the coming into force of the new Spanish Electricity Industry Law 24/2013, which initiates the new regulatory framework for the sector established following the electricity sector reform process initiated in 2012, the surplus regulated revenue registered during the period, as well as the forecast of balance between income and costs of the sector for the next four or five years, are a good indicator that progress is being made in the right direction to achieve the main objective of the reform: the economic and financial sustainability of the electricity system in the medium and long term.

Although its fundamental objective is well channelled, the reform of the electricity sector cannot be understood as concluded, as, in addition to numerous regulatory developments still pending, various aspects on how the operational and economic issues regarding the generation capacity using conventional technologies in the current context marked by a strong penetration of renewable technologies have not yet been addressed. Among other issues are the review of the capacity settlement mechanisms and the establishment of a procedure for the temporary or permanent closure of power stations.

Regarding the legislative activity in the European Union, in 2017 there were 3 new European network codes approved: Regulation establishing the directive on the management of the electricity transmission grid (System Operation), Regulation on Emergency and Restoration of the power service, and the Regulation that approves the guideline on Electricity Balancing. These new codes together with the already exiting codes, completes the first block of 8 European network codes agreed by the European Commission, the European Network of Transmission System Operators (ENTSO-E) and the Agency for the Cooperation of Energy Regulators (ACER). Once this first package has been approved, and with a view to the coming years, the European Commission has proposed prioritising its correct implementation, which would represent a key advance towards achieving the internal electricity market in the European Union, instead of developing new network codes.

Surplus revenue recorded in the last four years are a good indicator that progress is being made towards achieving the objective of the economic and financial sustainability of the electricity system.

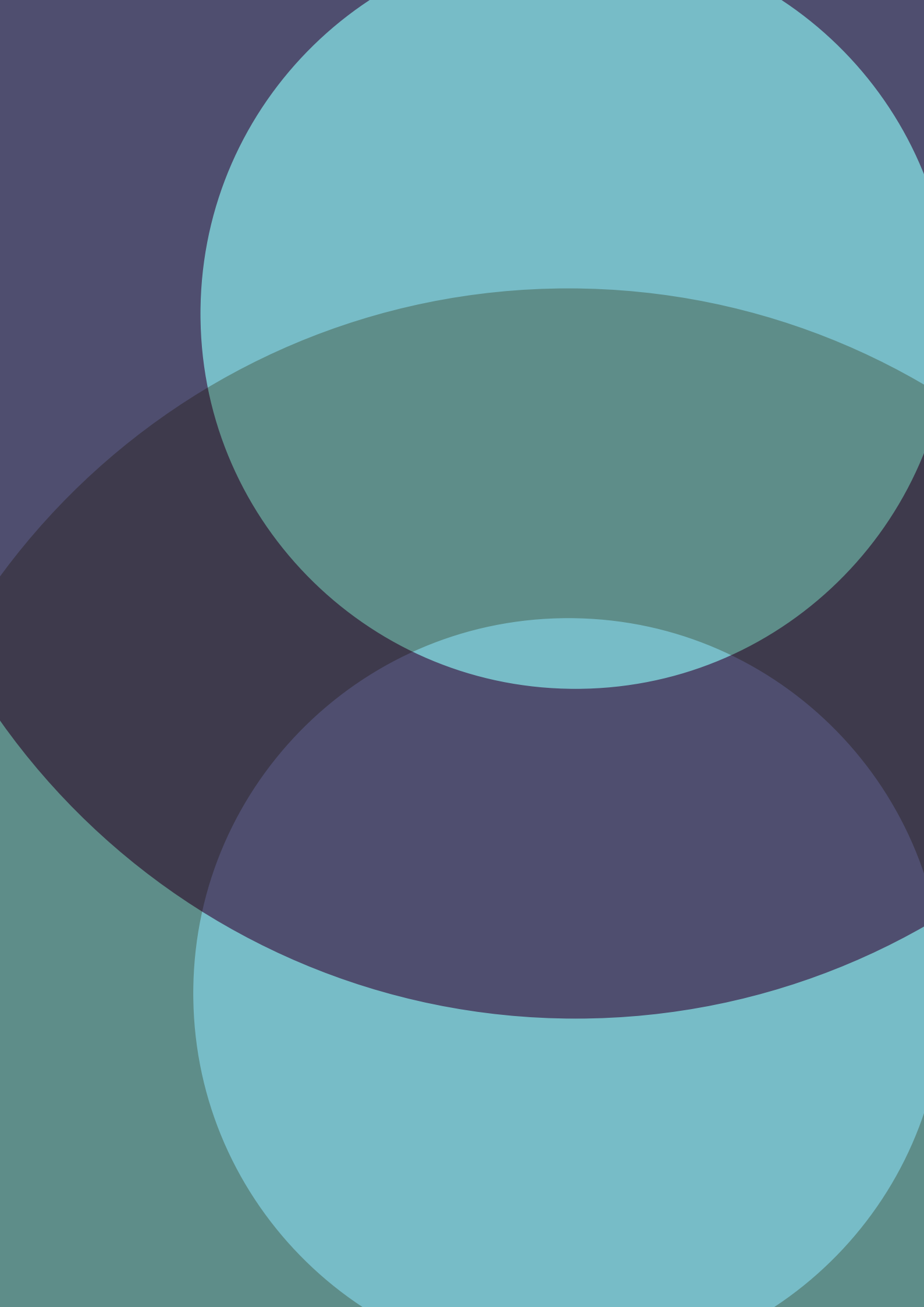
The latest revision of the list of Projects of Common Interest (PCIs) includes all the proposals from Spain for new interconnections, including the new submarine interconnection known as the 'Bay of Biscay'.

Also, at European Union level, during 2017 the debate and processing of the draft legislative package published by the European Commission at the end of 2016 under the generic title of "Clean energy for all Europeans", informally referred to as 'Winter Package', continued. The package consists of various legislative proposals relating to energy efficiency, renewable energy, the design of the electricity market, security of the electricity supply and the governance standards of the Energy Union. It is expected that during 2018 the usual legislative procedure will be developed among the three Community institutions; the European Council, Parliament and Commission, which should lead to consensus and then the approval of the definitive texts of the new regulations.

In 2017, the European Union institutions have continued to move towards achieving the specific targets of the European energy policy by the year 2030, within the framework of the strategic package called 'The Energy Union', launched by the European Commission at the end of 2015. The last of the detailed monitoring reports on the progress of the energy transition process of this strategic package stresses the existence of bottlenecks in electricity interconnections, highlighting that Spain will be one of the four countries in the EU that it will not meet the 10% interconnection target in 2020, and it sets out specific actions to be taken to fully integrate the Iberian Peninsula into the internal electricity market.

To this effect, in 2017, Addendum VII, which sets out the list of Projects of Common Interest (PCIs), of EU Regulation No. 347/2013 has been revised. The updated Addendum contains the list of the EU's Projects of Common Interest (PCIs) and which includes all the proposals from Spain, among them the new submarine interconnection with France known as 'Bay of Biscay' and the new interconnection with the north of Portugal, as well as two other interconnection projects with France across the Central Pyrenees, which in the previous list were only referred to in a generic manner.

The latest report on the state of the 'Energy Union' also assesses other elements of the EU's energy transition strategy, including the requirement to draw up national energy and climate plans. In this regard, the creation in Spain of a Group of Experts in these matters was reported in July 2017. Said group has been given the task of defining alternative scenarios for the energy transition which are coherent with the strategy of the 'Energy Union', as well as with the Government's objective for approving a Law on Climate Change and Energy Transition during the current legislative term.



08

GLOSSARY

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.

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.

ELECTRICITY SUPPLIERS
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.

ENERGY NOT SUPPLIED (ENS)
Energy not delivered to the system due to service interruptions that may occur in the transmission network.

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.

HYDRO-WIND

Production of electricity through the integration of a wind farm, a pumping unit and a hydroelectric power station. The operation allows the wind farm to supply electricity directly to the grid and, simultaneously, to feed a pump that moves water from a catchment area to a reservoir upstream, as an energy storage system. The hydroelectric power station harnesses the stored potential energy, guaranteeing the electricity supply and the stability of the grid.

INSTALLED POWER CAPACITY

Electrical energy capacity that a power station can generate and deliver under ideal conditions.

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.

MARGINAL PRICE
Price of the last bid that has been activated to cover the energy demand in a competitive bidding process of the energy market. This price is the price charged by all generators and the price paid by all consumers who participate in said bidding process.

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.

MIXED PUMPED STORAGE
Production of electricity generated by power stations capable of generating electrical energy with or without prior pumping from its lower reservoir or catchment area. When there is a water surplus, the power station will function as a conventional power station, also having the possibility of storing energy by pumping water from the lower to the upper reservoir.

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 pumped storage, nuclear, fuel/gas, combined cycle, cogeneration and renewable 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.

PURE PUMPED STORAGE
Production of electricity by hydroelectric power stations whose associated reservoir does not receive any natural water inflows. The water comes from it being pumped up from a lower reservoir or catchment area.

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 SUPPLIER
They replace the Last Resort Suppliers and are those designated to offer the Voluntary Price to the Small Consumer (VPSC).

RENEWABLE ENERGY
Includes hydro, hydro-wind, wind, solar photovoltaic, solar thermal, biogas, biomass, marine-hydro, geothermal and renewable waste.

RENEWABLE WASTE
Non-fossil organic material of biological origin resulting from municipal solid waste and some commercial and non- hazardous industrial waste. 50% of municipal solid waste, also known as Municipal Solid Waste (MSW) is considered renewable.

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.

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.

VOLUNTARY PRICE FOR THE SMALL CONSUMER (VPSC)
A system (known in Spain as 'Precio Voluntario al Pequeño Consumidor' or PVPC), implemented by the Public Administration, by means of which the price of electrical energy is set and which is applied to the electricity bill of those consumers with a contracted power of no more than 10 kW. The VPSC replaces the former Last Resort Tariff (LRT).

WASTE
Combustible materials resulting from a product or by-product of waste which, when processed, produces energy for purposes such as heating and electricity generation.

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