The Spanish Electricity System

Electricity System 2021

red eléctrica

Glossary of terms
https://www.ree.es/en/glossary

Information prepared with data
available as at 8 April 2022

Published by
RED ELÉCTRICA
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Coordination of publication
Corporate Image and
Brand Department

Technical management
Department of Access to Information
on the Electricity System

Graphic design and layout
EUROPUBLIC

Other details of the publication
Date of publication: June 2022

This English version is a translation of the original and authentic Spanish text found in the 'El sistema eléctrico español 2021' report, originally issued in Spanish. In the event of discrepancy, the original Spanish language version shall prevail.

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PRESENTATION

Red Eléctrica, as transmission agent and operator of the Spanish electricity system, presents the 2021 edition of the Spanish Electricity System Report, which the Company has been publishing annually ever since it was established as Transmission System Operator (TSO) in 1985. As in previous years, this publication provides an overview of the main operational performance indicators and statistical ratios regarding the Spanish electricity system, as well as the evolution of this data over recent years. All of the aforementioned in an energy environment which was impacted by the prolonged health crisis resulting from COVID-19 and by new conditioning factors at the end of the year which, directly or indirectly, were influenced by the evolution of the pandemic. This situation also had repercussions on the evolution of economic activity: disruptions in the supply chain of intermediate products and the rise in the price of raw materials and fuels.

The information contained in this report is intended to be used as a management and reference tool in the current energy transition context, in which the electricity system is paramount and where Red Eléctrica, as a key facilitator of this transition, is entrusted the mission of achieving the objectives set out in the European Green Deal and in Spain's National Energy and Climate Plan (NECP).

The success of this energy transition will be underpinned by the connection of renewable energy generation to the transmission grid at the required pace. An example of this has been the high level of connection of renewable energy capacity over recent years. In 2021, our power generation fleet incorporated almost 4,500 MW of installed renewable power capacity.

Once again, this year's report includes the 'European Landscape' chapter with information coming from the ENTSO-E Transparency Platform that includes data that complies with the criteria of Regulation (EU) No 543/2013.

The report is supplemented by Excel files that expand on the information and allow the data to be viewed online or downloaded. The digital version of the report along with the new 'Renewable Energy in the Spanish Electricity System' report that provides a greater depth of information on renewable energy generation and consumption can be found and viewed directly in the REData section of the corporate website: www.ree.es/en, allowing the user to access the data in a more interactive and flexible way. These reports can be found along with other publications and statistical data that Red Eléctrica periodically makes available to the general public for their consultation and use.

As part of its continued effort to improve, Red Eléctrica's aim is to offer a quality service for all users and for this reason a contact form is also made available in the REData section, as a channel through which suggestions and observations may be submitted.

EXECUTIVE SUMMARY

Executive Summary 2021

In 2021, the demand for electricity in Spain grew after two consecutive years of decline.

The demand for electrical energy in Spain during 2021 showed an increase of 2.6% compared to the previous year, reaching a total demand of 256,482 GWh, impacted by the prolonged COVID-19 crisis which meant that the values prior to the pandemic have not yet recovered.

Electricity demand in Spain

256,482 GWh

The **demand for electricity in Spain** in 2021 showed an increase of 2.6% compared to the previous year, reaching a total demand of 256,482 GWh. This is the first year of growth after two consecutive years of declining demand.

The evolution of the peninsular electricity system demand, which represents just over 94% of total demand nationwide, was 2.4% higher than the previous year, with a total of 242,492 GWh. This demand is at similar levels to those recorded 16 years ago in 2005, although similar values were also recorded in 2014 during the period of the strongest depression due to the crisis that began in 2009. After having factored in the effects of seasonal and working patterns, there is a positive variation of 2.4% compared to the previous year, which contrasts with the 5% decline recorded in 2020.

By **large sectors of activity**, according to the Red Eléctrica Index (IRE) that collects data on the electricity demand of large consumers, figures show that they have grown with respect to the previous year: the industry sector increased by 5.1%, the services sector registered a slightly bigger growth with an increase of 5.2%, and the grouping of other sectors of activity also increased by 0.9%.

The composition of the working calendar and the evolution of temperatures had a negative impact on the trend registered by the IRE, with the magnitude of temperature having twice the impact as that of the working calendar, subtracting 0.6 percentage points and 1.2 percentage points, respectively.

By **geographical areas**, the continuation of the effects of the pandemic during 2021 led to a positive variation in demand in most of the Spanish autonomous communities, although lower than the average growth nationwide, with the exception of Ceuta and Melilla, which showed a negative variation.

Installed power capacity in Spain

113,156 MW

Renewable energy facilities

56.7 %

The **maximum demand** was recorded on 8 January between 1:00 p.m. and 2:00 p.m. with a total of 41,483 MWh, an increase of 3.7% compared to the maximum value registered the previous year.

The **installed power capacity** of the power generation fleet in Spain increased by 2.1%, closing 2021 with 113,156 MW. Renewable installed power capacity in the national electricity system increased by 4.3 GW, which increased the installed power capacity of renewable generation sources to 56.7% of the total installed power capacity.

Maximum renewable generation on the Spanish peninsula

48.4%

of the generation mix

In terms of **electricity generation**, there was a new all-time high in peninsular renewable generation with a 48.4% share of the total electricity generation mix as a result of an increase in wind power and solar photovoltaic production, which were 10% and 37.4% higher than the previous year, respectively.

The **share of non-renewable generation** stood at 51.6% of the peninsular total, a decrease of 2.9 percentage points compared to the previous year when non-renewable generation represented 54.5%. This decrease in non-renewable generation on the Spanish mainland is mainly due to the lower production of nuclear and combined cycle power stations, which generated 3.1% and 2% less than in 2020, respectively.

> In 2021, the all-time minimum value of **CO_2 equivalent emissions** associated with national electricity generation was registered, 35.9 million tonnes of CO_2, 0.6% less than in 2020 and 67.7% below the level of emissions recorded in 2007.

The volume of **scheduled energy exchanges** between Spain and other countries registered a 55.7% fall with respect to the previous year. Exports grew by 22.8% to 16,581 GWh, and imports grew to 18,043 GWh a value 7.4% higher than in 2020. Therefore, for the sixth consecutive year, a net import balance was recorded regarding the scheduled energy exchanges, registering a value of 1,462 GWh, 55.7% lower than in 2020.

By **interconnection**, Spain was, for yet another year, a net importer with France and for the third consecutive year as a net exporter with Portugal. The cross-border connection with France recorded an import balance of 6,054 GWh (15.4% higher with respect to 2020) and the cross-border connection with Portugal recorded an export balance of 4,548 GWh, compared to 1,455 GWh in 2020. With Andorra, the balance was once again as an exporter, with 225 GWh, and with Morocco, it went back to being an importer, with a value of 182 GWh, compared to the 298 GWh exported last year.

The **electricity transmission grid** continued to be bolstered in 2021 with the commissioning of 206 kilometres of new line circuit and 134 new substation bays, bringing the total length of line circuit in the national grid to 44,769 kilometres and there were 6,224 substation bays by the end of the year. In turn, transformer capacity increased by 850 MVA, bringing the total installed transformer capacity nationwide to 93,871 MVA.

In 2021, noteworthy was the commissioning of 16 new substation bays for the expansion of renewable power, including the Almaraz, Brovales and Carmonita substations with a power capacity ranging between 0.7 and 1 GW. For the connection of railway axes, eight new substation bays were commissioned.

The **service quality indicators** for 2021 remain below the maximum thresholds established in Royal Decree 1955/2000.

The Energy Not Supplied (ENS) in 2021 corresponding to the mainland system was 188 MWh (95 MWh in 2020) and the Average Interruption Time (AIT) stood at 0.41 minutes (0.21 minutes in 2020).

In the electricity system of the Balearic Islands, these indicators showed a clear fall over the previous year, with ENS closing the year at 1 MWh (4 MWh in 2020) and an AIT of 0.07 minutes (0.47 minutes in 2020). Something similar happened in the Canary Islands' electricity system, with an ENS standing at 33 MWh (corresponding to 4 electricity supply interruptions) and an AIT of 2.33 minutes.

Regarding the **grid availability index** (which measures the capacity or possibility of use of the different elements of the transmission grid by the system) corresponding to the peninsular system was 98.5%, slightly below the 98.57% recorded in 2020, and in the Balearic Islands and Canary Islands electricity systems, these indicators stood at 98.61% (98.66% in 2020) and 99.2% (99.07% in 2020), respectively.

The **average final price of energy in the electricity market** stood at 118.65 €/MWh, almost three times higher than last year and the highest value ever.

The **combined price of the day-ahead and intraday market** increased, reaching 95.3%, which is the highest percentage ever, surpassing the 94.8% registered in 2008. The impact of ancillary services on the combined price represents 3.6%, very similar to the value in 2018 and capacity payments represent just 1.1%, a value much lower than in previous years.

Comparing the impact of the price on the demand served by the system with that of last year, it can be seen that the overall price corresponding to the day-ahead and intraday market has almost tripled, that of ancillary services increased by 68.5% and capacity payments saw a reduction of almost 51%.

At **European level** and in a context still impacted by the pandemic, in 2021 electricity demand in all the European countries belonging to ENTSO-E increased by 3.9% and the electricity generation from renewable sources continued to be promoted.

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Electricity
System Report

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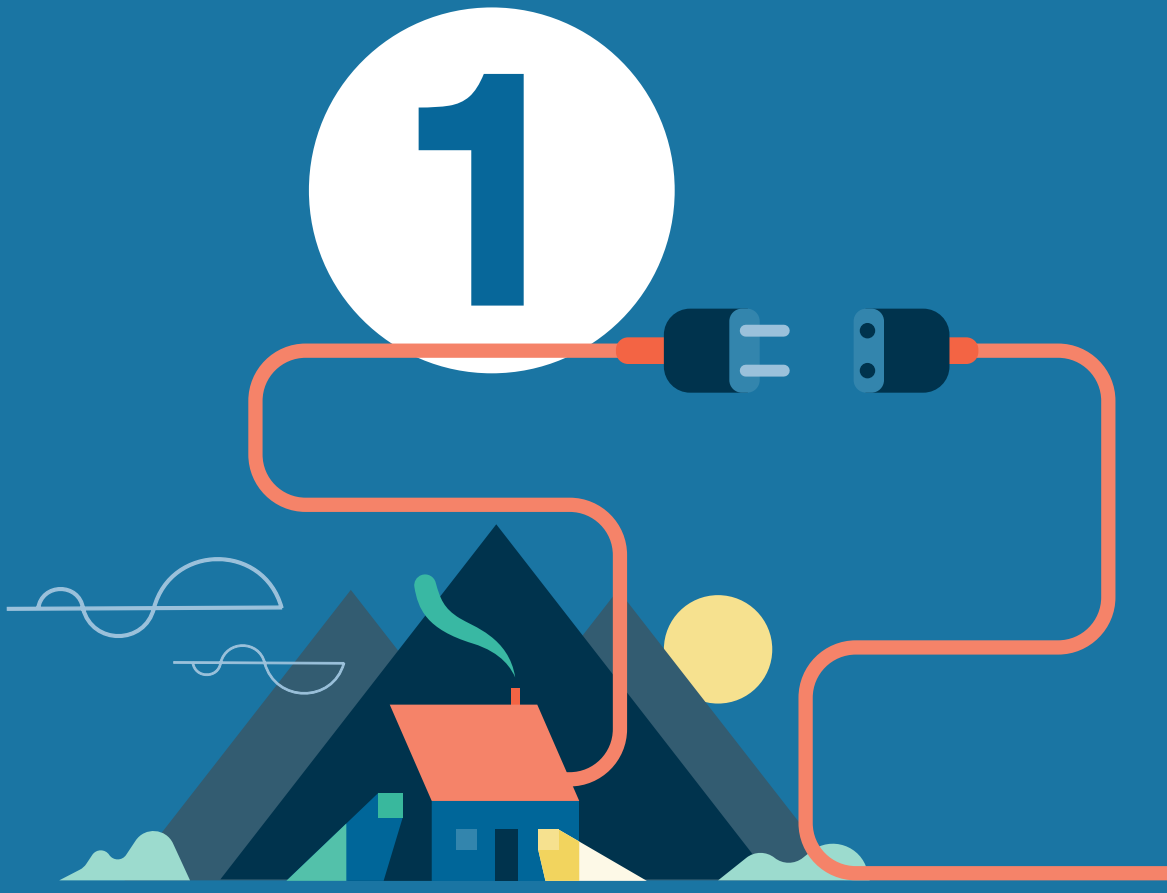
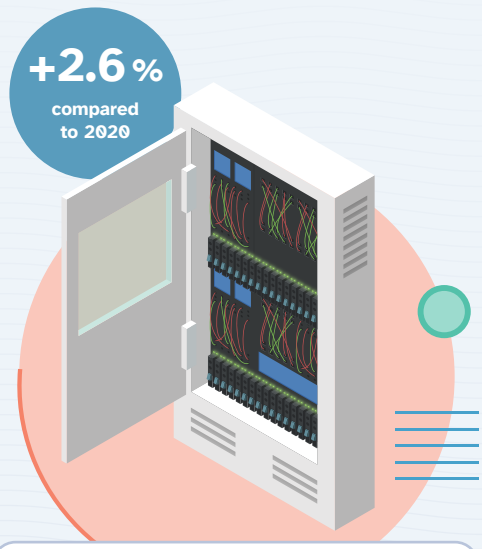


Electricity Demand

The demand for electricity in Spain during 2021 showed an increase of 2.6% compared to the previous year, reaching a total demand of 256,482 GWh.

The demand in the peninsular electricity system represented slightly more than 94% of total Spanish demand, which was 2.4% higher than the previous year, with a total of 242,492 GWh.



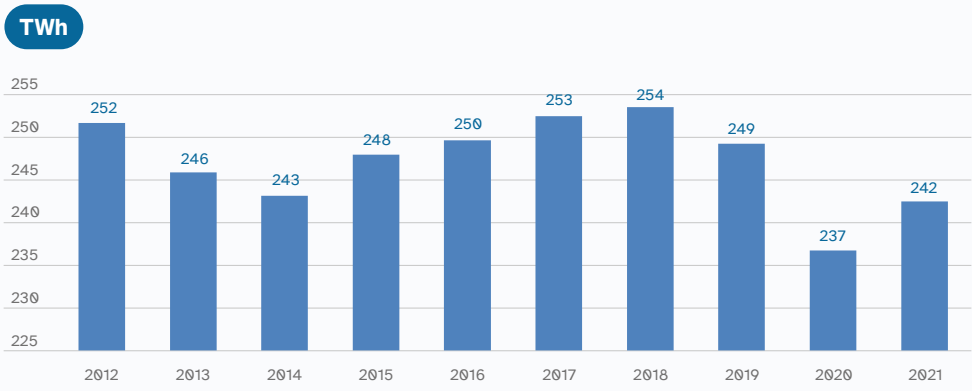
Electricity demanded in Spain was

256,482 GWh

The demand for electricity in Spain during 2021 showed an increase of 2.6% compared to the previous year, reaching a total demand of 256,482 GWh impacted by the prolonged effects of the COVID-19 crisis in 2021, which meant that the pre-pandemic values have not yet been recovered. In this regard, it would be necessary to add two new conditioning factors that, directly or indirectly influenced by the evolution of the pandemic, could have also affected the evolution of the activity, such as the disruptions in the supply chain of intermediate products and the rise in the price of raw materials.

The evolution of the peninsular electricity system, which represents slightly more than 94% of total Spanish demand, was 2.4% higher than the previous year, with a total demand of 242,492 GWh. This demand is at similar levels to those recorded 16 years ago in 2005, although similar values were also recorded in 2014 during the period of the strongest depression due to the crisis that began in 2009.

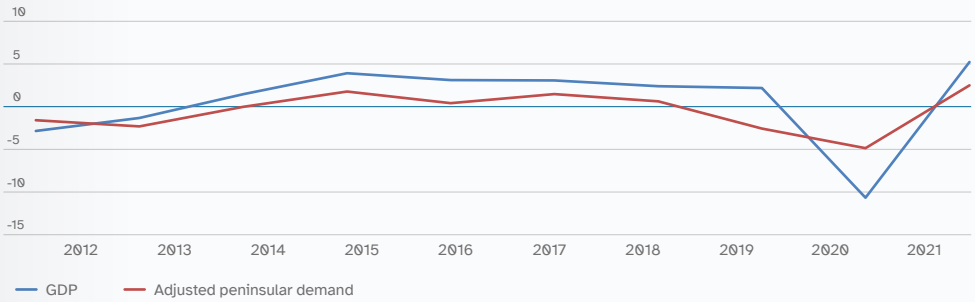
Evolution of the peninsular electricity demand over the last 10 years



Compared to the evolution of economic activity, both the electricity demand and GDP showed a positive variation, although the variation of GDP was stronger than that of electricity demand. In 2020, the opposite was the case, with GDP falling more sharply than demand. This joint variation gave rise to an elasticity between both magnitudes of 0.5. That is, activity measured through GDP was growing twice as much as electricity demand, this being the second consecutive year in which this situation occurred, showing that, both in the fall of 2020 and in the subsequent rebound, both magnitudes maintained an even behaviour.

Annual variation of the peninsular electricity demand and Spanish GDP

% year-on-year



In any case, the evolution of the elasticity relationship between electricity demand and GDP maintains a low rate, as it has shown in recent years: elasticity of 0.1 in the period 2017-2021. In other words, in recent years the relationship between these variables has been practically negligible, as has become evident following the economic recovery that occurred after the 2009 crisis.

After having factored in the influence of seasonal and working patterns, although practically nil regarding temperature, the result is a positive variation of 2.4% with respect to the previous year, which contrasts with the 5% decrease recorded the previous year, showing a certain recovery in 2021, although without reaching the levels seen prior to the start of the pandemic.

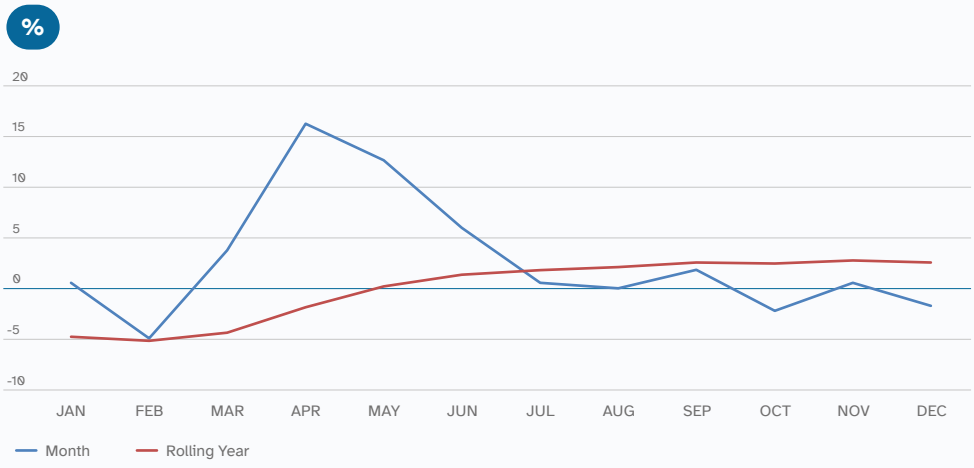
Components of the annual variation in peninsular electricity demand

%

	Demand at substation busbars	Working Patterns	Temperature	Adjusted value
2012	**-1.3**	**-0.3**	**0.7**	**-1.7**
2013	-2.3	0.4	-0.3	-2.4
2014	-1.1	0.0	-1.0	-0.1
2015	2.0	-0.1	0.4	1.7
2016	0.7	0.3	0.1	0.3
2017	1.1	-0.1	-0.2	1.4
2018	0.4	-0.3	0.2	0.5
2019	-1.7	0.7	0.2	-2.7
2020	-5.0	-0.1	0.1	-5.0
2021	**2.4**	**0.1**	**0.0**	**2.4**

As for the trend, this was conditioned by the impact that the successive waves of the COVID-19 pandemic had on society and the economy. Thus, between the months of March and June, there were strong rebounds in demand, compared to the same months of 2020, due to the fact that this was when the most restrictive measures were taken to try to contain the pandemic. In the following months, the different waves of the pandemic prevented activity from returning to normality, so that positive monthly variations alternate with negative ones, in comparison with the previous year, ending the year with the impact due to the sixth wave of the omicron variant that has even continued into the first few months of 2022. It should be noted that the campaign carried out that vaccinated a high percentage of the Spanish population favoured a certain recovery in activity, although other factors such as the increase in the price of raw materials or the disruptions in the supply chain of certain components had a negative impact on the recovery began after the initial effects of the pandemic.

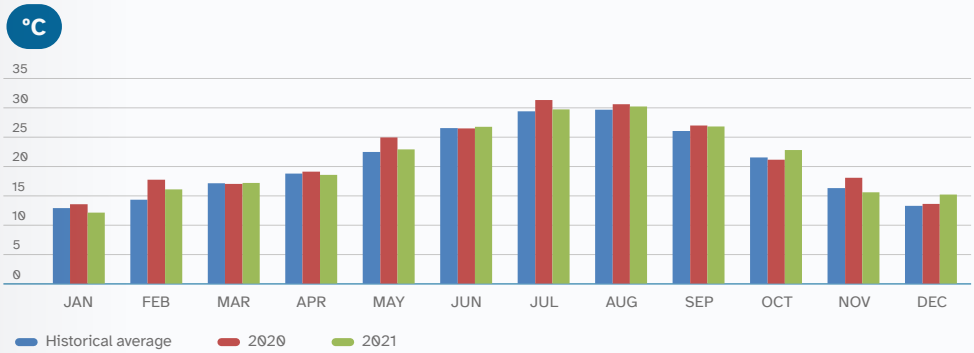
Monthly variation in the adjusted electricity demand on the Spanish peninsula in 2021



> Compared to the evolution of economic activity, both the electricity demand and GDP showed a positive variation, although the variation of GDP was stronger than that of electricity demand, which has given way to an elasticity between both magnitudes of 0.5.

INCREASED NUMBER OF DAYS WITH WARMER TEMPERATURES

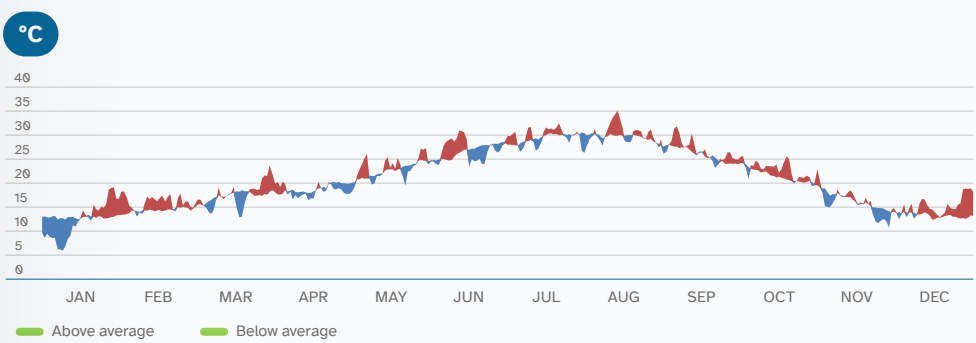
Monthly evolution of maximum temperatures



From the point of view of the influence of temperatures on demand, the whole of 2021 compared to the historical average, showed warmer temperatures in summer and milder temperatures in winter. The daytime temperatures with a cooling effect (Cooling Degree Days) were 6.2% lower than the average values and the daytime temperatures with a heating effect (Heating Degree Days) were 14.8% higher than the average values for the period considered. In other words, over the year as a whole, the number of days with warmer than average temperatures was higher.

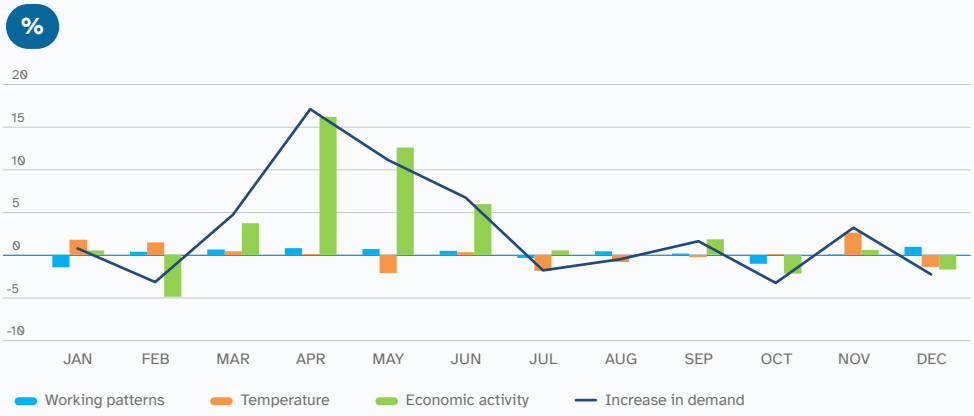
Thus, in 2021, temperatures were much higher than the historical average temperature on 21% of the days, which were more concentrated in August for the summer months, and in December for the winter months. On the other hand, on days with temperatures below the historical average, this situation only occurred on 11.7% of the days in the year and these days were mainly in January and November.

Evolution of the daily maximum temperatures compared to the historical average



Compared to the previous year, 2021 was colder in winter and not as hot in summer compared to 2020, registering 19.2% more 'cold days' and 13.3% fewer 'hot days'. The combined impact of these temperatures resulted in a slightly negative impact of -0.04 percentage points on demand growth.

Elements associated with the variation in monthly demand on the Spanish peninsula 2021



> 2021 was colder in winter and not as hot in summer compared to 2020, resulting in temperatures having a slightly negative impact of -0.04 percentage points on demand growth.

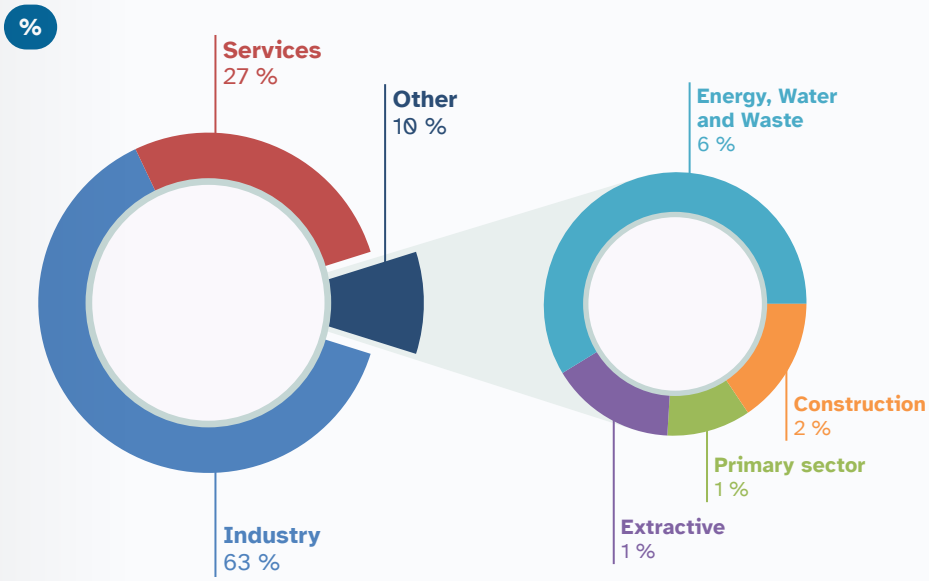
Influence of temperature on the demand

21%

of the days registered temperatures that were much higher than average

INCREASED CONSUMPTION IN THE INDUSTRIAL AND SERVICES SECTORS

Breakdown of the General IRE



The evolution of the IRE during 2021 recovered its growth trend but it too was not immune to the effects of the pandemic situation that was experienced as of March 2020 in which periods of restrictions on mobility and the limitation placed on certain activities had an impact on the IRE, especially with the arrival of the fourth, fifth and sixth waves.

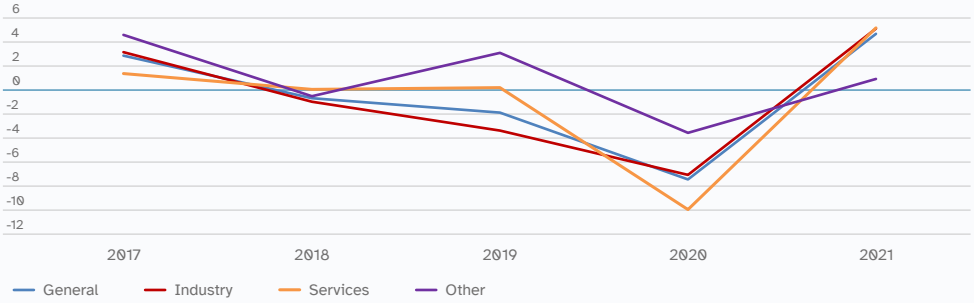
In 2021, the overall IRE was 4.7% higher than in the previous year, an increase that does not offset the decline experienced in 2020, which was -7.4%. The index closed the year at 120.6, compared with a value of 124.4 in 2019.

All the main sectors of activity that make up the IRE (industry, services sector and the grouping of other activities), experienced a positive variation compared to the previous year, although with different intensities depending on the particular sector of activity:

- Industrial activities grew 5.1%, showing accelerated growth in consumption after the substantial fall registered the previous year.
- The services sector had a slightly greater impact, with an increase of 5.2%.
- The grouping of 'Other' sectors of activity also increased with a variation of 0.9% over the previous year, although to a lesser extent than the main sectors.

Annual variation of the IRE

% year-on-year



In 2020, both the composition of the working calendar and the evolution of temperatures had a negative impact on the evolution of the Red Eléctrica Index, with the magnitude of temperature having twice the impact than that of the working calendar.

Temperatures had a negative impact of 1.2 percentage points on the evolution of the IRE, noteworthy were May and July, when temperature had a negative impact of 4.9 and 4.8, respectively. By main sectors, the most significant impact was in industry, where temperature had an influence of -1.7 percentage points on the IRE, followed by the services sector, where temperatures had a negative effect of just over 0.1, and that of the 'Other' sectors that had an impact of slightly less than 0.1%.

> Temperatures had a negative impact of 1.2 percentage points on the evolution of the IRE, by main sectors, the most significant impact was in industry where temperature had an influence of -1.7 percentage points.

IRE: Breakdown of the variation in 2021

%

	Gross	Working patterns	Temperature	Adjusted value
General	**4.7**	**-0.6**	**-1.2**	**6.6**
Industry	5.1	-0.5	-1.7	7.4
Services	5.2	-1.0	-0.1	6.3
Other	0.9	-0.8	-0.1	1.8

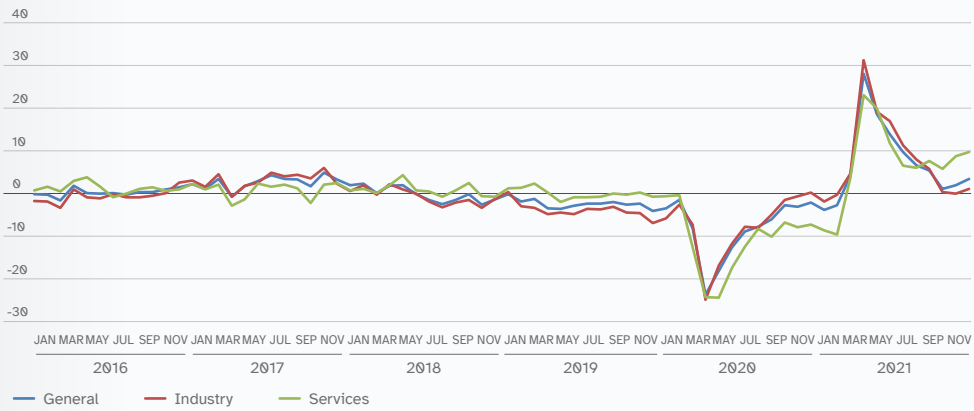
The monthly evolution of the adjusted index was impacted by the recovery after the pandemic and its subsequent evolution. It is noteworthy, in any case, that the adjusted IRE had been achieving positive rates since the first months of the year, reaching double-digit variations that had not been seen since the IRE indicator began, as a consequence of the large falls registered in 2020. Thus, in the month of March, still immersed in the second state of emergency at a national level and with negative rates until February, the adjusted IRE increased by 4.1% with respect to the previous year, but it was in the month of April when it reached a maximum increase of 27.9%, taking into account that in April 2020 there was a 'hibernation of the economy', linked to a general lockdown and the suspension of non-essential activities. In the month of May, the index reflected an increase of 18.5% with respect to May of the previous year, when there was still a state of emergency and restrictions on mobility. From that month onwards, the index began to register positive rates, although moderate, that continued right up until the end of the year.

With respect to the monthly evolution of the adjusted index corresponding to the two main sectors (industry and services), it should be noted that although all sectors began to recover at the beginning of the year, the progressive recovery of the index did not take place with equal intensity, as while the industry sector registered a positive trend from the outset, the services sector was slower to recover and subsequently rallied later on in the year, helping the IRE to register positive rates in the last months of 2021.

> The monthly evolution of the adjusted index registered positive rates as of the beginning of the year, reaching double-digit variations that had not been seen since the IRE indicator began.

Monthly evolution of the adjusted IRE

% year-on-year

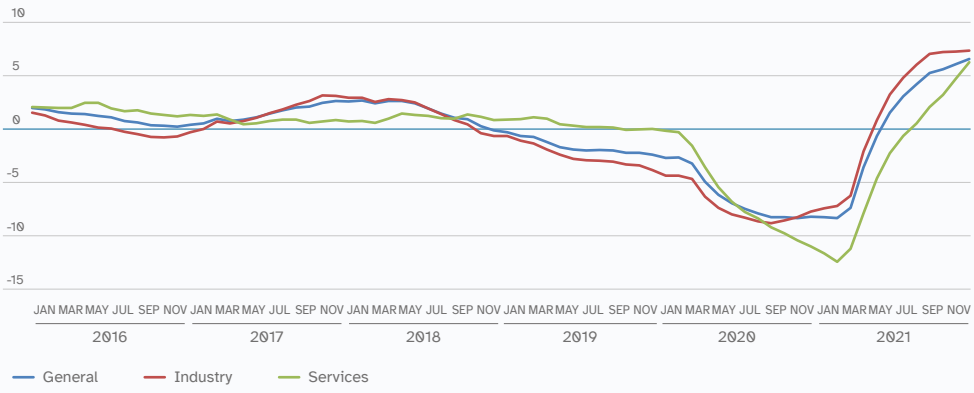


Regarding the trend, it should be noted that in 2020 the IRE was showing a downward trend with negative records being set throughout the year, conditioned by the evolution of all sectors, especially the services sector. This situation continued during the first two months of 2021 until, from March onwards, the trend of the index reached a turning point when it started to show positive values in the first months of summer. From that moment on, with the more positive evolution of industry, the trend took an upward turn, although maintaining negative variation rates in its comparison with 2019.

Since 2020, the services sector had been showing a more negative trend compared to the industry sector. The expectations and the relaxation of measures as of the second quarter of the year meant that since March the index of this sector show a clear upward trend that continued throughout the year without showing signs of weakening, which was motivated because this sector includes activities that were more influenced by the relaxation of the pandemic containment measures.

Monthly evolution of the change in trend of the adjusted IRE

% year-on-year



Annual adjusted index for the industry sector

+7.4%

Annual adjusted index for the services sector

+6.3%

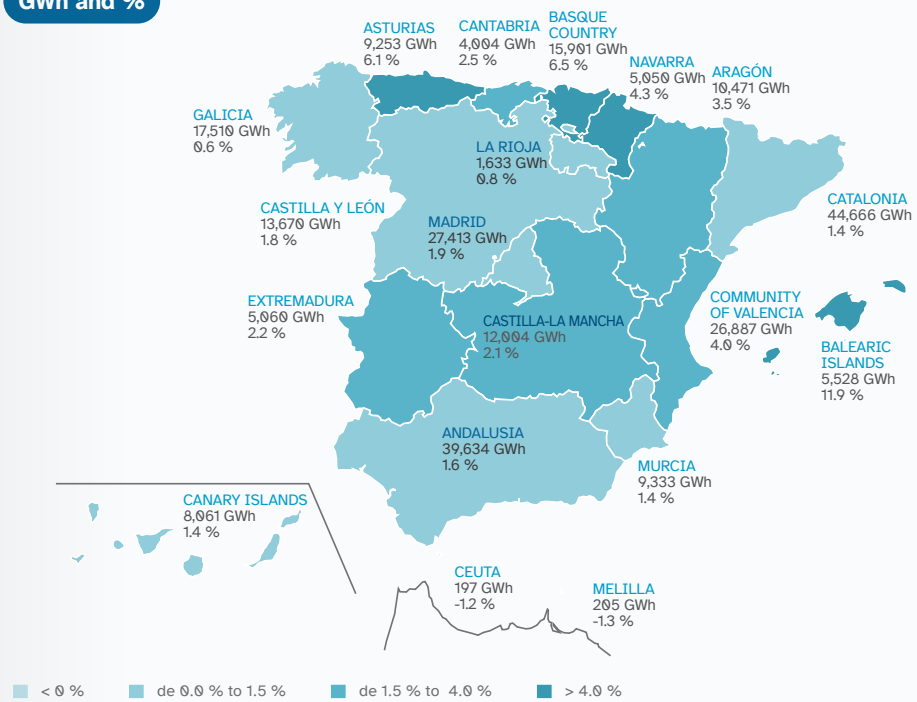
ALL AUTONOMOUS COMMUNITIES, EXCEPT CEUTA AND MELILLA, SHOWED AN OVERALL INCREASE IN DEMAND

The ongoing effects of the pandemic during 2021 led to an increase in demand in the majority of the autonomous communities, although lower than the average growth in Spain as a whole, with the exception of Ceuta and Melilla, which showed a negative variation.

On the mainland, the exceptions that caused the growth in demand to be somewhat higher were registered in the Basque Country 6.5%; Asturias 6.1%; Navarra 4.3% and the Community of Valencia 4%, autonomous communities that in 2020 had higher than average falls. In the non-peninsular systems, noteworthy was growth in the Balearic Islands which reached 11.9%, although it must be taken into account that the initial impact of the pandemic during 2020 in these islands was much higher, with a decrease of 19.2% in that year.

Electricity demand by autonomous communities and variation year-on-year

GWh and %



> After 4 years, the maximum annual demand during the winter months grew compared to previous years, registering the highest value since 2012.

In 2021, the maximum hourly demand in the winter months (which was actually the highest value registered throughout the year), was 3.7% higher than that recorded the previous year, reaching a demand of 41,483 MWh on 8 January between 1:00 p.m. and 2:00 p.m. This maximum value coincides with the cold wave that swept the peninsula at the beginning of January, with the particularity that it broke a run of four consecutive years of a downward trend in winter maximums and this maximum was the highest hourly value registered since 2012 when the maximum value for the winter period was set at 43,411 MWh.

The summer peak occurred on 22 July between 1:00 p.m. and 2:00 p.m. with 36,923 MWh, a decrease of 4% compared to the 2020 peak value.

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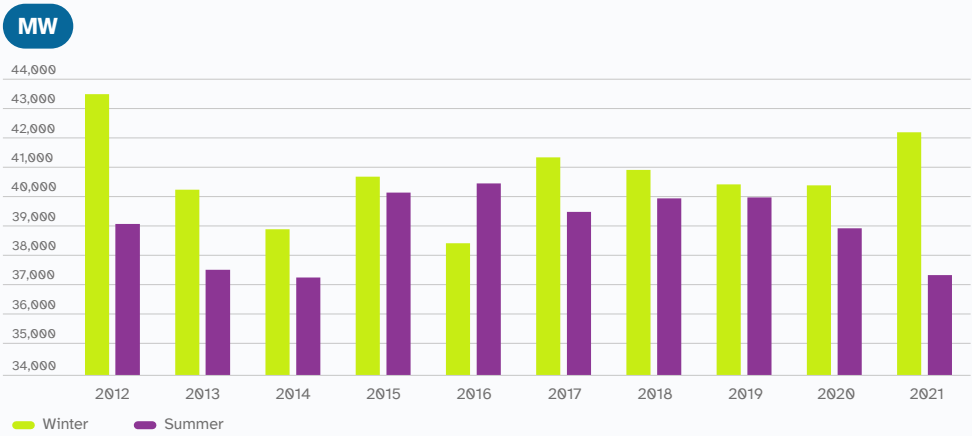
+3.7 %
compared to 2020

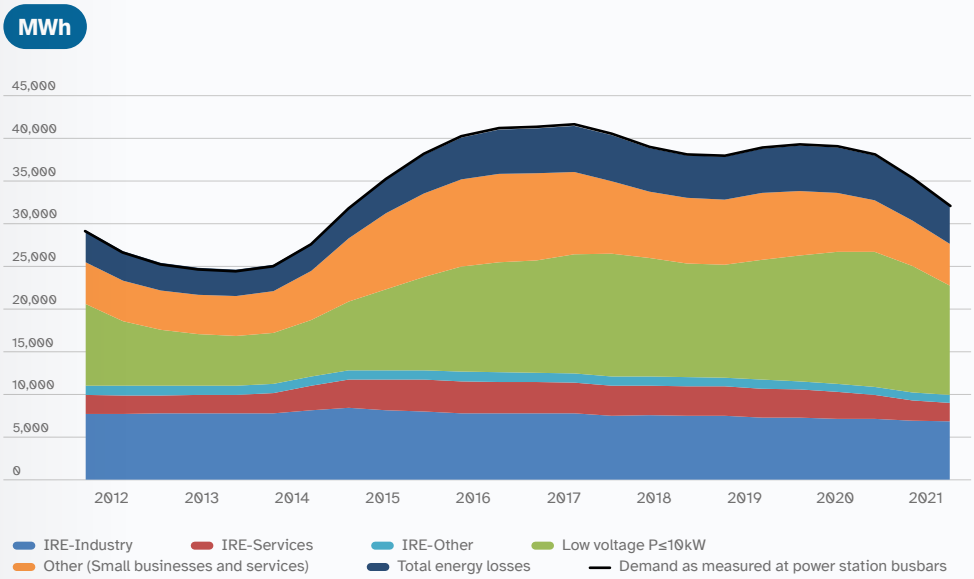
Annual maximum
41,483 MWh
8 January
between 1:00 p.m. and 2:00 p.m.

Annual maximum for instantaneous power on the Spanish peninsula



Breakdown of the maximum hourly electricity demand

8 January 2021



Hourly profiles applied to the general low-voltage tariff with contracted power of 10 kW or less

At the time of the day when the maximum hourly demand for 2021 was registered, the residential sector accounted for 36% of consumption, while the industry sector of the IRE accounted for 24% of consumption, the large services sector in the IRE stood at 10% and small businesses and services stood at 24%. Throughout the peak day, the greatest impact of the industry sector occurred in the early hours of the morning, between 3:00 a.m. and 5:00 a.m. reaching a total share of 31.5% of the demand (as measured at the power station busbars), while for the large services sector, the hourly period with the greatest impact was between 6:00 a.m. and 8:00 p.m. with a share in the demand of around 10.3%.

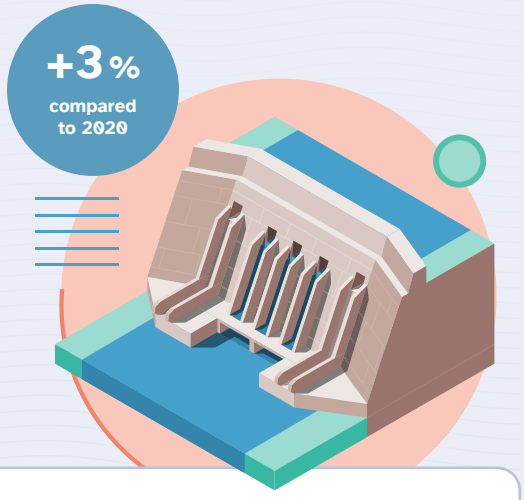
“At the time of the day when the maximum hourly demand for 2021 was registered, the residential sector accounted for 36% of consumption, while the industry sector of the IRE accounted for 24% of consumption, the large services sector in the IRE stood at 10% and small businesses and services stood at 24%.

2

Electricity Generation

In the overall electrical energy balance, broken down by the type of energy used, renewables increased their share in the peninsular electricity generation mix reaching a new all-time high with a total share of 48.4% compared to 45.5% in 2020, mainly due to significant increases in wind power and solar photovoltaic energy generation.

Non-renewable energy reduced its share to 51.6% (54.5% in 2020).



Total generation on the Spanish peninsular reached

246,805 GWh

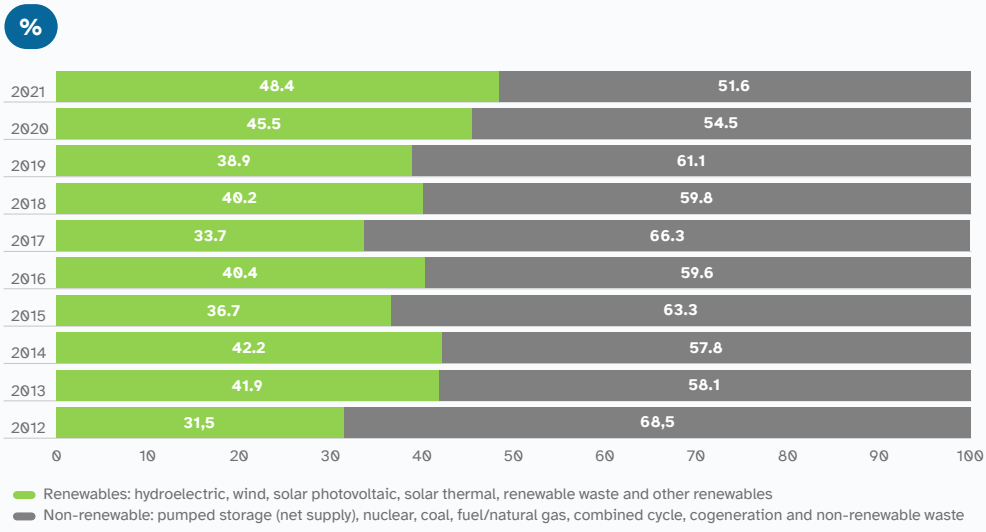
In 2021, renewable energy reached new all-time highs of electricity generation.

The energy landscape in Spain in 2021 continued to make progress in its recovery after the impact of the COVID-19 pandemic. In this context, electricity generation in the peninsular system, which represents around 95% of total generation nationwide, increased by 3% in 2021, reaching 246,805 GWh. The most significant variations with respect to the previous year were recorded by solar photovoltaic generation, which increased by 37.4%, while nuclear and combined cycle decreased their production by 3.1% and 2%, respectively.

The generation of electricity in the non-peninsular systems (13,100 GWh) grew by 10.4% with respect to the previous year, with a notable increase of 22% for combined cycle. On the other hand, noteworthy is the fall in coal-fired generation which was 79.9% lower compared to the previous year.

With regard to the overall generation balance, broken down by the type of energy used, renewable energy increased its share in the peninsular electricity generation mix by 9.6%, reaching a new all-time high with a total share of 48.4% compared to 45.5% in 2020, mainly due to significant increases in wind power and solar photovoltaic energy generation. On the other hand, non-renewable energy reduced its share to 51.6% (54.5% in 2020).

Evolution of renewable and non-renewable generation on the Spanish peninsula



National electrical energy balance (1)

	Peninsular system		Non-peninsular system		National Total	
	GWh	%21/20	GWh	%21/20	GWh	%21/20
Hydro	29,592	-3.4	3	-12.6	29,595	-3.4
Hydro-wind	-	-	23	18.2	23	18.2
Wind	59,184	10.0	1,312	18.9	60,496	10.2
Solar photovoltaic	20,504	37.4	451	19.4	20,954	36.9
Solar thermal	4,706	3.7	-	-	4,706	3.7
Other renewables (2)	4,709	5.3	10	-1.9	4,719	5.3
Renewable waste	751	23.9	127	6.3	878	21.0
Renewable generation	**119,445**	**9.6**	**1,926**	**17.9**	**121,371**	**9.7**
Pumped storage (net supply) (3)	2,649	-3.7	-	-	2,649	-3.7
Nuclear	54,041	-3.1	-	-	54,041	-3.1
Coal	4,941	3.0	45	-79.9	4,986	-0.7
Fuel/Natural gas (4)	0	-	4,049	-3.4	4,049	-3.4
Combined cycle (5)	37,581	-2.0	6,912	22.0	44,493	1.1
Cogeneration	26,036	-3.6	41	22.2	26,078	-3.5
Non-renewable waste	2,110	11.3	127	6.3	2,238	11.0
Non-renewable generation	**127,359**	**-2.5**	**11,175**	**9.2**	**138,534**	**-1.6**
Pumped storage consumption	-4,318	-6.7	-	-	-4,318	-6.7
Peninsula-Balearic Islands link (6)	-890	-37.6	890	-37.6	0	-
International exchange balance (7)	895	-72.7	-	-	895	-72.7
Demand (measured at busbars)	**242,492**	**2.4**	**13,991**	**5.2**	**256,482**	**2.6**

(1) Allocation of generation units based on primary fuel. The net production of non-renewable and non-Hydro Management Units (HMU) facilities have their own consumption discounted. In these types of production, negative generation indicates that the electricity consumed for the power station's uses exceeds its gross production.

(2) Includes biogas, biomass, marine and geothermal.

(3) Pure pumped storage (net supply) + estimate of mixed pumped storage (net supply).

(4) The Balearic Islands electricity system includes generation with auxiliary generation units.

(5) Includes operation in open-cycle mode. The Canary Islands electricity system uses diesel as its main fuel.

(6) Positive value: energy input into the system; negative value: energy output from the system.

(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 31.12.2021.

National electricity system

	Peninsular system		Non-peninsular system		National Total	
	MW	%21/20	MW	%21/20	MW	%21/20
Hydro	17,093	0.0	2	0.0	17,094	0.0
Hydro-wind	-	-	11	0.0	11	0.0
Wind	27,772	2.8	563	19.6	28,336	3.0
Solar photovoltaic	14,840	30.0	334	22.7	15,174	29.9
Solar thermal	2,304	0.0	-	-	2,304	0.0
Other renewables [1]	1,087	0.1	6	0.0	1,093	0.1
Renewable waste	132	10.8	38	0.0	170	8.1
Renewable generation	**63,227**	**7.1**	**954**	**19.2**	**64,182**	**7.2**
Pumped storage (net supply)	3,331	0.0	-	-	3,331	0.0
Nuclear	7,117	0.0	-	-	7,117	0.0
Coal	3,523	-35.9	241	0.0	3,764	-34.3
Fuel/Natural gas	8	-	2,400	0.0	2,408	0.0
Combined cycle	24,562	0.0	1,688	0.0	26,250	0.0
Cogeneration	5,613	-0.9	50	0.0	5,663	-0.9
Non-renewable waste	402	3.3	38	0.0	441	3.0
Non-renewable generation	**44,557**	**-4.3**	**4,418**	**0.0**	**48,975**	**-3.9**
Total	**107,784**	**2.1**	**5,372**	**2.9**	**113,156**	**2.1**

(1) Includes biogas, biomass, marine-hydro and geothermal.

Installed power capacity in the National Electricity System

113,156 MW

56.7 % installed renewable power capacity nationwide

The peninsular electricity system moved towards a more sustainable energy model.

As at 31 December 2021, the power generation fleet of the peninsular system had increased by 2.1% with respect to the previous year and had reached an all-time record with an installed power capacity of 107,784 MW.

In recent years, Red Eléctrica has successfully faced the challenge of integrating a large quota of new renewable power capacity, as a result of the 2017 renewable auctions carried out by the Ministry of Ecological Transition and the Demographic Challenge (MITERD). In 2019, the installed renewable power capacity in the peninsular electricity system increased by 6.4 GW and 4.7 GW in 2020. Similarly, in 2021, renewable installed power capacity increased by an additional 4.2 GW, bringing the total of installed renewable power capacity up to 63.2 GW in the peninsular electricity system. This represents a total installed power capacity of 58.7%.
The integration of this new renewable capacity, mostly wind and solar photovoltaic, represents a strong boost to the energy transition and furthermore complies with the integration roadmap set out in Spain's National Energy and Climate Plan (NECP), with a 2030 horizon.

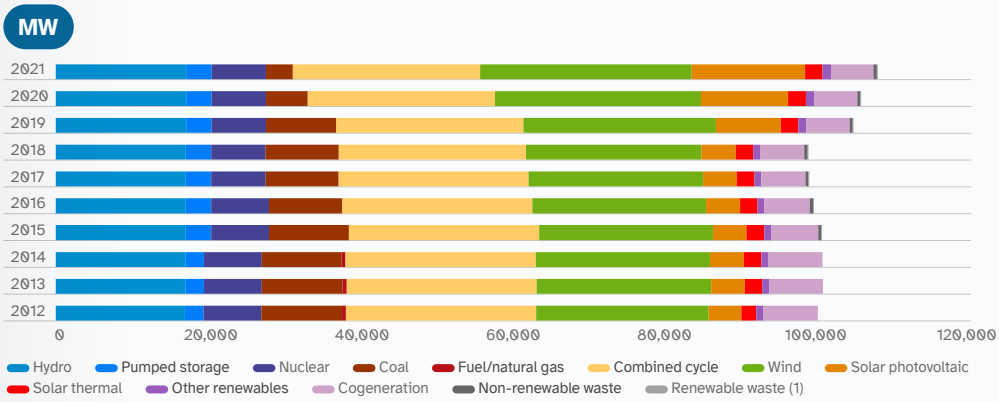
The power generation fleet on the mainland is increasingly renewable due to the increase in 2021 of installed wind power capacity, 2.8%, solar photovoltaic, 30% and renewable waste, 10.8%, compared to 2020.

On the other hand, installed non-renewable power capacity in the peninsular system decreased by 4.3%, as a result of the 35.9% reduction in installed coal-fired power capacity due to the definitive closure of thermal unit 4 of the Lada power station, thermal units 1 and 2 of the Litoral de Almería power station and thermal units 2 and 3 of the Narcea power station, which combined represent a reduction of 1,969 MW of installed non-renewable power capacity on the mainland.

In the non-peninsular systems, there was an increase of 2.9% in installed power capacity by the end of 2021. This increase is mainly explained by the growth in installed wind power capacity of 19.6% and solar photovoltaic of 22.7% with respect to 2020.

In Spain as a whole, which includes the peninsular and non-peninsular systems, installed power capacity increased by 2.1% compared to the previous year, closing 2021 at 113,156 MW. Renewable energy facilities account for 56.7% of the total installed power capacity nationwide.

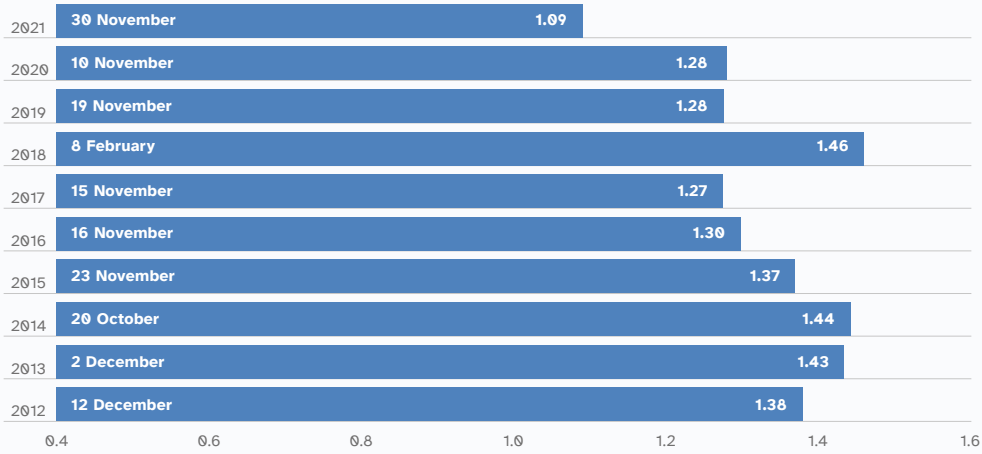
Evolution of the structure of installed power capacity on the Spanish peninsula



(1) Power capacity included in other renewables and cogeneration until 31/12/2014. // Source: National Commission on Markets and Competition (CNMC) until 2014 regarding: non-Hydro Management Units (HMU), wind, solar photovoltaic, solar thermal, other renewables, cogeneration and waste to energy.

> The minimum coverage index for the Spanish 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 1.09 in 2021.

Evolution of the Minimum Coverage Ratio (MinCR) for the Spanish peninsula



MinCR = Min (Pa/Pd)
MinCR: Minimum Coverage Ratio
Pa: Power available in the system.
Pd: Peak power demanded from the system.

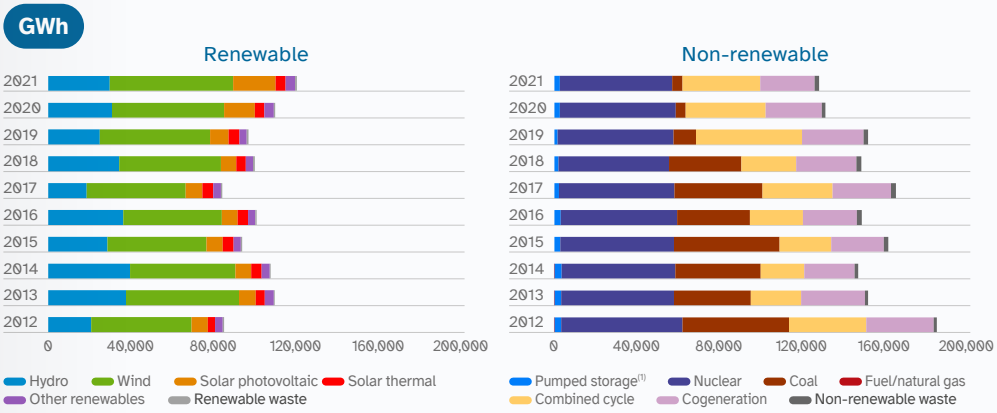
To enable the operation of an electricity system with such a high penetration of renewable energy under safe conditions, the control and supervision work carried out by Red Eléctrica's Control Centre for Renewable Energies (CECRE) is essential. In 2021, CECRE celebrated its 15th anniversary and, since its commissioning, it has continued to be a pioneering centre of worldwide reference for the integration of renewable energy.

The work of CECRE has made it possible that in 2021 the contribution of renewable energy to peninsular electricity generation set a new all-time high, reaching a share of 48.4% in the generation mix, 2.9 percentage points higher than the previous peak recorded in 2020 when renewables accounted for 45.5% of the mix. This higher share of renewable generation in 2021 is mainly due to the increase in wind and solar photovoltaic production, 10% and 37.4% higher respectively than in the previous year, as a result of weather conditions and the increase in installed power capacity in the peninsular system.

This significant growth in the share of renewables in the peninsular generation mix was counterbalanced by a reduction in the share of the various technologies that use fossil fuels as a primary energy source. The share of non-renewable generation stood at 51.6% of the mainland total, a decrease of 2.9 percentage points compared to the previous year, when the non-renewable share was 54.5%. This decrease in non-renewable generation is mainly due to the lower production of both nuclear and combined cycle power stations, which generated 3.1% and 2% less than in 2020, respectively.

> Maximum renewable generation on the mainland due to the increase in the contribution of wind and solar photovoltaic generation.

Evolution of renewable and non-renewable electricity production on the Spanish peninsula



The net production of non-renewable and non-Hydro Management Units (HMU) facilities have their own consumption discounted. In these types of production, negative generation indicates that the electricity consumed for the power station's uses exceeds its gross production.

(1) Pure pumped storage (net supply) + estimate of mixed pumped storage (net supply).

> This year saw the highest levels of clean electricity being registered since records began.

Peninsular renewable production in 2021 increased by 9.6% over the previous year, standing at 119,445 GWh and reaching a new all-time high for annual peninsular renewable production and a share of 48.4% in the generation mix on the Spanish mainland.

During almost every month of 2021 (except September, October and December) renewable generation was higher than the previous year, coinciding with the increase in wind and solar photovoltaic production. The highest increases in renewable energy occurred during the first half of the year, with the highest growth recorded in February with a value of 42.7%, and in the same month, a new all-time high share of renewable energy in the peninsular generation mix was set at 60.5%. In addition, the highest values to date for renewable generation were recorded for the months of January, June, July and August.

Regarding daily production, on the mainland on Saturday 30 January 2021 the all-time high was beaten for renewable generation reaching 544,980 MWh and, during that same day, 71.1% of the peninsular electricity production came from renewable sources.

Lastly, the hourly renewable production registered the all-time maximum level regarding its share in the generation mix on Saturday 30 January 2021 between 1:00 p.m. and 2:00 p.m. with a total of 76.6% of the peninsular production. The maximum hourly generation for the year was registered between 1:00 p.m. and 2:00 p.m. on Wednesday 8 December 2021 with a total of 27,826 MWh.

Wind power was the leading technology in the peninsular generation mix.

With regard to wind power, noteworthy was the 2.8% increase in installed power capacity registered during 2021, so wind power continued to be the generation technology with the most installed power capacity nationwide, with a total of 27,772 MW and represented more than a quarter of all the installed power capacity in the mainland electricity system.

In this way, in 2021 the peninsular power generation fleet added nearly 750 new MW of wind power capacity, which paved the way for several all-time records to be beaten during the year. Firstly, peninsular wind power production in 2021 set a new record with an annual total of 59,184 GWh, which is 10% more than that recorded the previous year. This increase occurred mainly in the first and second quarters of the year, when wind generated 31.8% and 13.2% more than in the same periods of 2020, with January registering a 53.7% increase in production compared to the same month in 2020. In addition, January, February and July recorded the highest monthly wind power production to date for each of these months.

As a consequence of this growth, wind power was the leading technology in the peninsular generation mix with a share of 24%, the highest percentage registered since records began. This situation had only occurred previously in 2013 when wind shared the leading role in the peninsular generation mix with nuclear, with both technologies registering a share of 20.9%.

Wind was the technology with the highest share in the mainland generation mix during half of the months of 2021, specifically in January (30.1%), February (30.8%), March (26.1%), May (23.7%), November (28.9%) and December (30%).

+2.8 %
Compared to 2020

Installed wind power capacity

27,772 MW

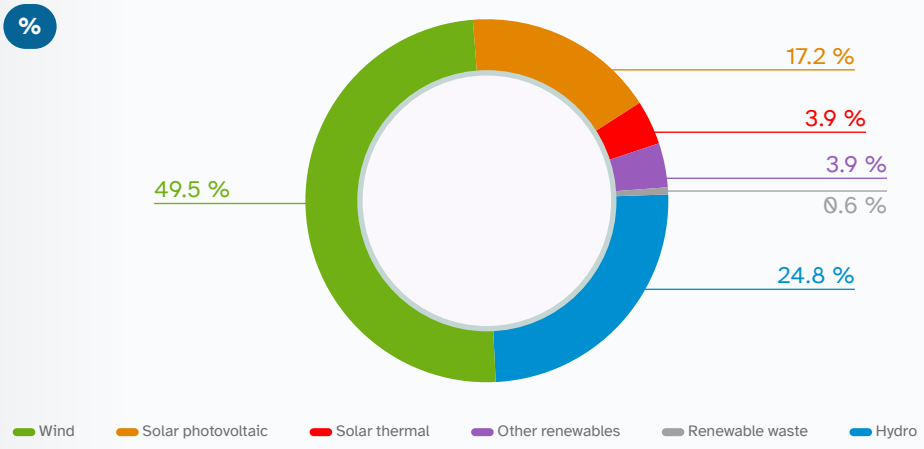
With regard to daily wind power generation, during 2021 the all-time maximum record for peninsular wind power production was beaten on several occasions registering a new all-time record of 423,224 MWh on Wednesday 8 December, which represents an increase of 6.5% compared to the previous record high registered on Friday 13 December 2019.

Also on Wednesday 8 December 2021, a new maximum value for hourly generation was set between 1:00 p.m. and 2:00 p.m. with a value of 20,293 MWh and at 1:34 p.m. the record for instantaneous power for wind generation in the peninsular electricity system was beaten with a value of 20,130 MWh. This new maximum value represented an increase of 2.8% over the previous record of 19,588 MW, registered on Monday 28 December 2020 at 2:28 p.m.

During the month of December 2021, the all-time maximum value for instantaneous demand coverage using wind power generation on the peninsular was beaten twice. The first time took place on Wednesday 8 December at 5:07 a.m. when instantaneous wind power generation accounted for 81.9% of instantaneous demand in the mainland electricity system. This new maximum value represented an increase of 6 percentage points compared to the previous maximum value recorded on Sunday 3 November 2019 at 5:20 a.m. The second occasion on which the record was broken in 2021 was on Tuesday 28 December at 3:03 a.m. with a percentage of instantaneous demand coverage with peninsular wind power generation of 83.6%.

Wind power continues to be the most relevant renewable technology in the peninsular system, as in 2021 its production accounted for 49.5% of total renewable energy.

Annual generation mix of renewable energy in the peninsular system in 2021



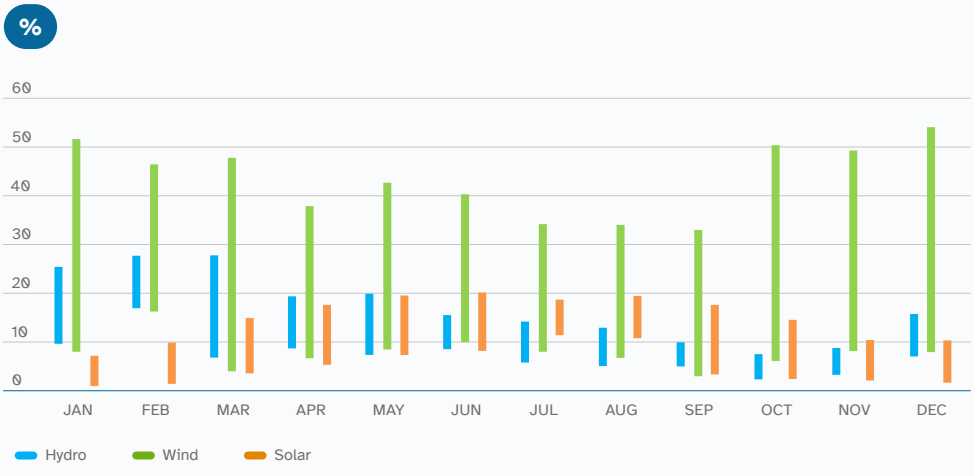
The enormous variability of wind power generation is evident as can be seen in the graph shown below of maximum and minimum daily coverage of renewable hydro, wind and solar technologies. During 2021, daily wind power production had a share in the generation mix that ranged from a minimum of 2.8% registered on 3 September to a maximum of 53.5% recorded on 8 December.

DAILY MAXIMUM AND MINIMUM

values of wind power in the peninsular generation mix

MAXIMUM	MINIMUM
53.5 %	**2.8 %**
8 December	3 September

Maximum, average and minimum daily coverage in 2021 using hydro, wind and solar



Hydroelectric generation on the mainland in 2021 reached 29,592 GWh, a decrease of 3.4% compared to 2020, which was a slightly wet year. Its contribution to the peninsular generation mix was 12% and this was 0.8 percentage points lower than the share this technology had in the energy mix the previous year. In 2021, the total electricity generated by hydroelectric power stations ranked this technology as the fourth source of generation in the peninsular total, as was the case in 2020.

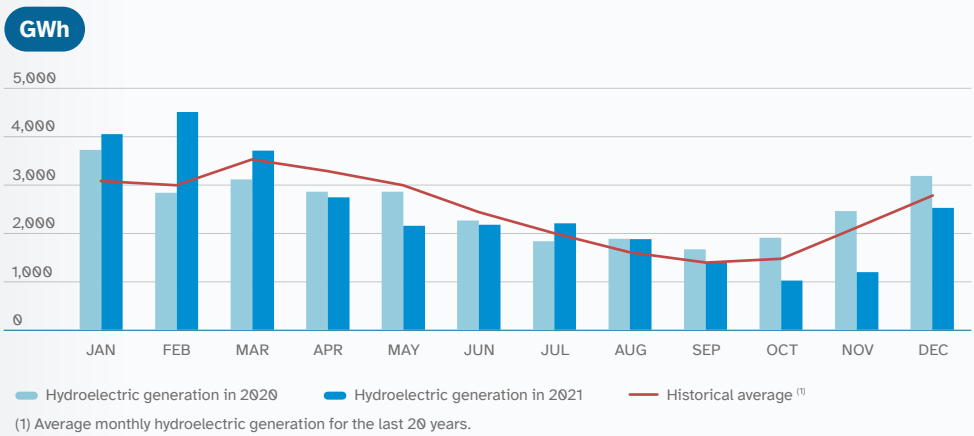
The comparative graph, shown below, regarding peninsular hydroelectric generation 2020-2021 shows how during all the months of 2021 hydroelectric production was only higher than that generated in 2020 in the period of January to March and during the month of July. The months in which hydroelectric production registered the greatest increases were February, with a growth of 59.2%, and July, with generation 20.1% higher than in the same period of the previous year. On the contrary, the largest reduction in monthly hydroelectric production took place in November when hydroelectric power stations generated 51.5% less than in the same month of 2020.

"In 2021, hydroelectric power stations on the mainland reduced their production compared to the previous year.

-3.4%
Compared to 2020

Peninsular hydroelectric generation
29.592 GWh

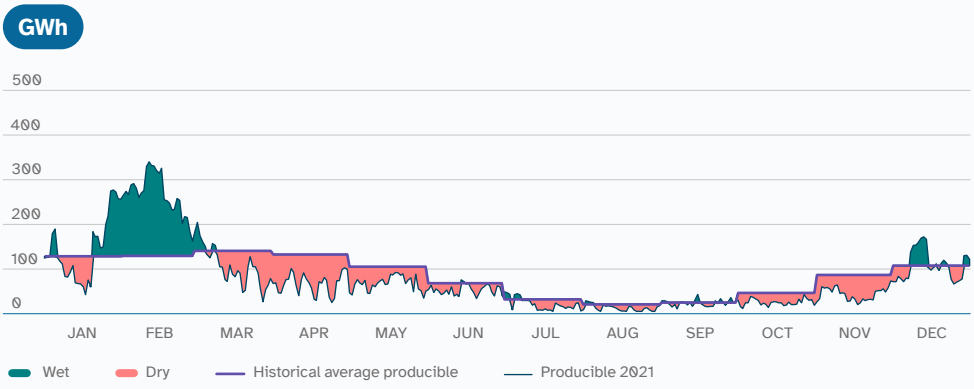
Peninsular hydroelectric generation 2020-2021 compared to average generation



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

This decrease in hydroelectric generation was in line with the producible hydroelectric energy (maximum amount of electricity that theoretically could be produced considering the water reserves available), which in 2021 reached a value of 26,852 GWh, 12.2% less than that recorded in 2020 and 9.4% more than the annual historical average value. Therefore, we can consider that 2021 as a whole was a dry year as the producible hydroelectric index, defined as the quotient between producible energy and average producible energy, registered a value of 0.91.

Daily producible hydroelectric energy during 2021 compared to the historical average producible



> Hydroelectric reserves during 2021 registered values below the statistical average.

In terms of the amount of precipitation, 2021 was a dry year overall. It started with a wet January, with precipitation 19% above average, and with an episode of heavy and persistent rains in which Storm Filomena gave rise to heavy precipitation in the form of snow in many areas of the interior of the peninsula on the 8th and 9th of the month. February was also wet, with an average rainfall 35% above the normal value for the month. The rest of the year had a very dry spring, a wet summer and a dry autumn. Finally, the months of October and November were dry while the month of December was normal in terms of rainfall.

In 2021, hydroelectric reserves were above the statistical average (calculated with the values of the last twenty years) only in the months of January, February and March. From April onwards, reserves began to fall every month until reaching the lowest point of the year between October and November with a fill level of 32.1%, a value that is around 13 percentage points lower than in the same months of the previous year.

In the last month of the year, overall hydroelectric reserves rose slightly and registered a volume of water in hydroelectric reservoirs in Spain on 31 December 2021 that stood at 36% of their fill capacity, a value that is still 14.8 percentage points lower than that of the previous year.

> Solar photovoltaic generation reached all-time highs in 2021.

+37.4 %
Compared to 2020

Peninsular solar photovoltaic generation
20,504 GWh

In 2021, renewable energy once again improved its production values, especially in the case of solar photovoltaic. Thus, in 2021, the installed power capacity of this technology was the one that increased the most, incorporating almost 3,500 MW to the peninsular power generation fleet representing 13.8% of the mainland total.

This growth enabled its electricity production during 2021 to increase by 37.4%, reaching 20,504 GWh, which represented a new record for annual generation. The annual share of this technology in the peninsular mix also registered a maximum value with a share of 8.3%, representing a growth of 2.1 percentage points compared to the share of solar photovoltaic a year earlier.

During all the months of 2021, solar photovoltaic production was higher than in the previous year, reaching 67% more in November than in the same month of 2020. Furthermore, during the month of July solar photovoltaic produced the highest monthly amount ever recorded with 2,565 GWh and reached the highest share in the generation mix since records began with a value of 12.1%.

Regarding daily production, on Sunday 6 June 2021, solar photovoltaic production reached the highest share in the peninsular generation mix with 15.5% and on Tuesday 29 June 2021, the maximum value for solar photovoltaic production reached an all-time high of 90,594 MWh.

In terms of hourly generation, on Friday 14 May 2021, between 2:00 p.m. and 3:00 p.m. hourly solar photovoltaic energy broke the all-time record with a value of 9,351 MWh and on the same day, a new all-time high of instantaneous photovoltaic power generation in the peninsular electricity system was reached, with 9,337 MW recorded at 2:34 p.m.

Lastly, on Sunday 6 June 2021, between 1:00 p.m. and 2:00 p.m. peninsular solar photovoltaic production accounted for 32.8% of all peninsular generation and at 4:06 p.m. a new all-time high of instantaneous demand coverage using photovoltaic generation was reached in the peninsular electricity system with a value of 36.8%.

With regard to solar thermal generation on the Spanish peninsula, in 2021, a total of 4,706 GWh was generated with this technology, 3.7% more than the previous year, and it contributed 1.9% to the total generation on the peninsula.

Production from 'Other renewables' (biogas, biomass, marine-hydro and geothermal) increased by 5.3% in 2021, reaching a new record high of 4,709 GWh of annual generation and contributing a share of 1.9% to the peninsular generation mix.

Non-renewable energy in the peninsular system registered a total generation of 127,359 GWh in 2021, 2.5% lower than in 2020. This decrease in non-renewable generation resulted in a fall of 2.9 percentage points in its contribution to total peninsular generation, only reaching a share of 51.6% in 2021, compared to 54.5% in 2020.

Among non-renewable energy technologies, nuclear generated a total of 54,041 GWh in 2021, 3.1% less than the previous year. This drop occurred mainly during the first and last quarter of 2021, when nuclear production fell 6.2% and 15.3%, respectively. In February nuclear generation decreased by 10.8% due to the operational unavailability of the Trillo power station, and in March the decrease was 6.6%, coinciding with the unavailability of the Almaraz II power station, which started the work corresponding to its twenty-sixth refuelling. The sharpest decreases in nuclear production occurred in November (23.2%) and December (25.6%) due to the refuelling stoppages at the Ascó 1, Cofrentes and Almaraz I power stations.

As a consequence of this lower level of production, nuclear power stations were for the first time the second source of peninsular generation after ten consecutive years of having occupied the leading spot in the peninsular generation mix (in 2013 they shared the leading position with wind). In 2021, nuclear reached an overall share in peninsular generation of 21.9% (23.3% in 2020).

The utilisation rate (the ratio between actual production and the production that could have been achieved if the power stations had operated at their rated power for the entire time that they were available) was 97.5%.

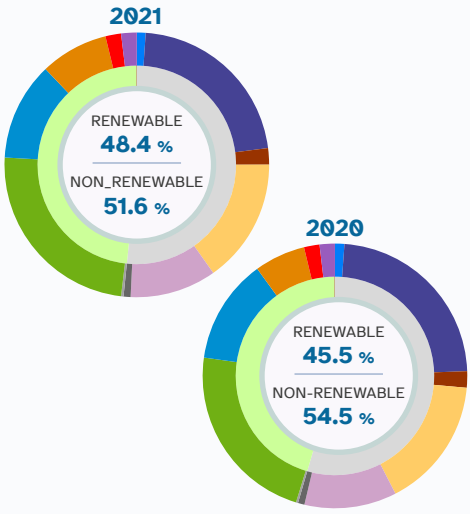
> Non-renewable generation fell due to lower production from nuclear and combined cycle power stations.

Peninsular electricity generation mix in 2020 and 2021

%

	2020	2021
Wind	22.5 %	24.0 %
Hydro	12.8 %	12.0 %
Solar photovoltaic	6.2 %	8.3 %
Solar thermal	1.9 %	1.9 %
Other renewables	1.9 %	1.9 %
Pumped storage (net supply)(1)	1.1 %	1.1 %
Nuclear	23.3 %	21.9 %
Coal	2.0 %	2.0 %
Combined cycle	16.0 %	15.2 %
Cogeneration	11.3 %	10.5 %
Non-renewable waste	0.8 %	0.9 %
Renewable waste	0.3 %	0.3 %

(1) Pure pumped storage (net supply) + estimate of mixed pumped storage (net supply).



Regarding coal-fired power stations on the peninsular in 2021, after the drafting of the pertinent decommissioning reports their installed power capacity was reduced by 35.9% due to the definitive closure of the following thermal units: in January, unit 4 (348 MW) of the Lada power station located in Langreo (Asturias), in February, units 2 (154 MW) and 3 (347 MW) of the Narcea power station located in Tineo (Asturias) and in December, units 1 (558 MW) and 2 (562 MW) of the Litoral de Almería power station located in Carboneras (Almería).

As a result, coal represented just 3.3% of the peninsular installed power capacity at the end of 2021, compared to the 5.2% share it had in 2020, and continues to be ranked in seventh position in the structure of the entire power generation fleet.

The peninsular coal-fired power stations in 2021 generated 4,941 GWh, which represented an increase of 3% compared to the previous year. In line with the energy transition, this technology maintains a reduced presence in the generation mix with a share of only 2% of all mainland generation.

During the first quarter of 2021, coal-fired production fell by 54.9% compared to the same period of the previous year, and in February, with 177 GWh, it recorded the sharpest decrease of the year, 78.5% lower than in February 2020, registering the lowest monthly production since records began. On the contrary, in the fourth quarter of the year, coal-fired power stations increased their production by 130.3% and in December it increased 224.8% due to the fact that December of the previous year was the second lowest record of coal-fired production registered to date.

> Generation from coal-fired power stations registered its all-time low in February 2021.

The challenges of decarbonisation set by the European Union with the aim of reducing CO_2 emissions have meant that coal production, which is more polluting than other technologies, maintains a reduced share in the energy mix, representing 2% of total generation in 2021. In addition, in February, coal recorded the lowest monthly share since 1990 with 0.9% of the peninsular generation mix.

Monthly coal-fired generation all-time low

177 GWh

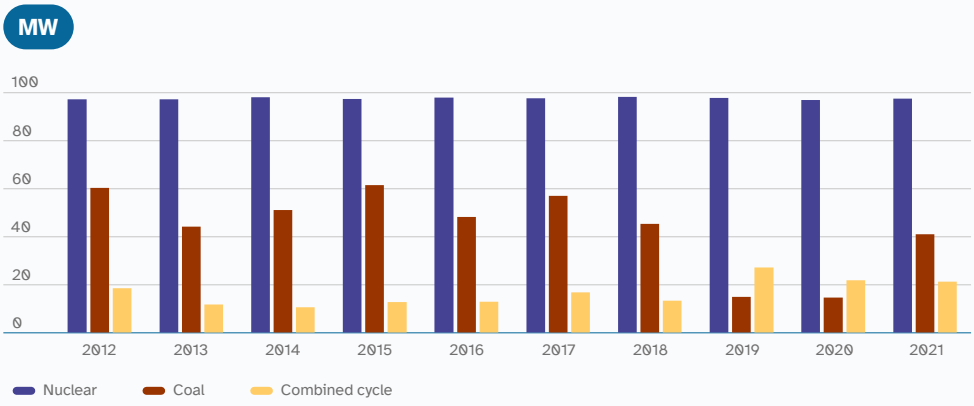
February 2021

There was also a repetition of the situation of a 'zero-day' regarding coal in 2021, that is, an entire day without production using this fossil fuel, which occurred for the first time ever on 14 December 2019. Specifically, in 2021 between 23 and 25 of January the peninsular electricity system was without coal-fired generation for a consecutive period of 50.5 hours, a situation that occurred again between 30 January and 1 February on this occasion for a consecutive period of 54 hours when there was no production from coal-fired power stations on the mainland.

As a direct consequence, 31 January was also the day with the lowest emissions associated with peninsular electricity production since records began, with a total of 30,667 tCO_2 equivalent, and February 2021 was the month in which CO_2 equivalent emissions set all all-time minimum value in the peninsular electricity system, with a 23.2% decrease compared to the previous monthly minimum recorded in April 2020.

The coal utilisation rate in 2021 was 41%, up from 14.6% the previous year.

Utilisation rate of peninsular thermal power stations (1)



(1) The utilisation rate is the quotient between actual production and the available production or maximum production that the power station could achieve by operating at its rated power during the entire time it is are available.

> In 2021, combined cycle power stations on the mainland reduced their output by 2%.

In line with the rest of the non-renewable technologies, combined cycle generation fell by 2% in 2021. Its annual production was 37,581 GWh, which is similar to the amount produced in 2012.

In 2021, combined cycle production was lower than in 2020, especially during the first and third quarters of the year. In the month of February, combined cycle recorded the lowest monthly generation in 2021, while in contrast, in November these power stations produced 76.9% more than in the same month of the previous year. In addition, on Tuesday 30 November 2021, the all-time record for combined cycle daily generation was broken with a value of 368,131 MWh and on the same day between 8:00 a.m. and 9:00 a.m. combined cycle generation reached a new maximum hourly production value with 17,579 MWh.

The lower annual production of combined cycle power stations resulted in a reduction of their share in the energy generation mix of 0.8 percentage points, reaching a share of 15.2% in the peninsular mix in 2021 (16% in 2020). Despite this lower share, combined cycle was the third largest source of generation in the mix for the third consecutive year.

The utilisation rate in 2021 was 21.2% (21.8% in 2020).

Electricity generation increases in the Balearic Islands and the Canary Islands.

Annual electricity production in the non-mainland systems as a whole in 2021 reached 13,100 GWh, 10.4% higher than in the previous year. The Balearic Islands registered the highest increase with 31.9% and in the Canary Islands production increased by 1.4%, while in Ceuta and Melilla production fell by 1.2% and 1.3%, respectively.

+10.4 %
Compared to 2020

Annual electricity generation in non-peninsular systems

13,100 GWh

New renewable energy records in the electricity system in the Balearic Islands.

The electricity produced in the Balearic Islands increased for the first time after three consecutive years of decreases, reaching 4,637 GWh in 2021, 31.9% more than the previous year. This is the highest growth since 2007.

In 2021, the installed power capacity of the power generation fleet of the Balearic Islands' electricity system increased 2.3%. The installed solar photovoltaic generation capacity in the Balearic Islands in 2021 grew to 149 MW compared to 103 MW in 2020, representing an increase of 44.2%, the largest increase in renewable installed power capacity in recent years.

As a consequence of this increase in installed power capacity, in 2021 renewable technologies reached an all-time record for annual production with 313 GWh, 32.2% higher than the renewable production value of the previous year. 6.8% of energy generation in the electricity system on the Balearic Islands came from renewable sources.

In May 2021, renewable production reached 10.6% of the Balearic Islands' generation mix and on Saturday 29 May renewable generation reached its maximum value with 14% of the total generation. With regard to the summer months, renewable generation broke the all-time record high on several occasions reaching its new maximum in August with 35,020 MWh, 51.3% above the same month of the previous year.

Noteworthy among the renewable generation sources is the increase in solar photovoltaic, which in 2021 grew 58.9% to reach an all-time record with 188,247 MWh. This technology accounted for 4.1% of the annual production of the Balearic Islands, occupying the fourth position in the generation mix and overtaking coal for the first time ever.

> As a consequence of the increase in installed power capacity in 2021 in the Balearic Islands, renewable energy technologies set an all-time record for its contribution in the annual generation mix.

Annual electricity generation from renewable energy technologies

313 GWh

+32.2 %
Compared to 2020

In May 2021, solar photovoltaic facilities reached their highest monthly share ever, generating 8.3% of the entire Balearic Islands' mix, reaching 10.6% of all the energy generated on Saturday 8 May. During July 2021, the highest amount of solar photovoltaic energy recorded to date was produced, with 22,966 MWh.

In January 2020, units 1 and 2 of the 227 MW Alcudia coal-fired power station in Majorca were definitively decommissioned following the drafting of the pertinent decommissioning report. In addition, according to Order TEC/1258/2019, from 1 January 2020, the operation of units 3 and 4 of the Alcudia power station was limited to 1,500 hours/year until 16 August and to 500 hours/year as of 17 August.

The closure of units 1 and 2 of the Alcudia power station and the limitation of the operating hours of groups 3 and 4 led to a major change in the generation mix in the Balearic Islands, due to the fact that during the first 8 months of 2020 the Balearic Islands' system did not produce electricity with coal and in 2021 coal-fired generation was only used in the months of June and July.

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As a result, coal-fired generation in the Balearic Islands in 2021 fell by 79.9%, reaching an all-time low of 44 GWh. The share of coal in the Balearic Islands' generation mix was only 1%, while in 2019 this technology was responsible for almost half of the production in the Balearic Islands, as its share was 45.2%. Coal is no longer the main source of generation in the archipelago, occupying the seventh position in the generation mix on the Balearic Islands.

On the other hand, diesel engines and gas turbines increased their production with growths of 41.3% and 6.5%, respectively. These increases in generation have favoured the use of diesel engines as the second source of generation in the Balearic Islands' generation mix with a share of 8.6%, while gas turbines moved up to the third position in the Balearic Islands' generation mix with a share of 4.8%.

In 2021, the combined cycle power stations of the Balearic Islands' electricity system generated 3,482 GWh, 44.4% more than in 2020, registering the highest production level since 2007. This technology was the leading source of generation in the Islands' generation mix, with a share of 75.1%, which represented an increase of 6.5 percentage points compared to the previous year.

> "The energy transferred from the mainland in 2021 covered 16.1% of the Balearic Islands' demand.

The energy transferred from the peninsula to the Balearic Islands through the HVDC Peninsula-Balearic Islands link covered 16.1% of the demand in the archipelago in 2021, reaching peaks of up to 37% of the hourly consumption, which made it possible to cover 13% of the demand with renewable energy generation.

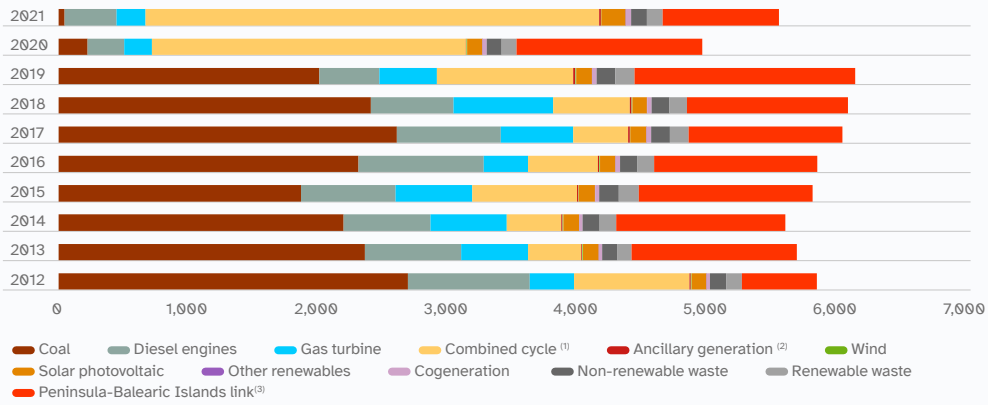
Demand covered with renewable energy generation

13%

This increase in the amount of energy transferred from the mainland via the link to help cover the demand on the Balearic Islands took place mainly at the beginning of the year, with the highest amount being registered in February with a 31.4% share in the generation mix.

Evolution of the electricity demand coverage on the Balearic Islands

GWh



The net production of non-renewable and non-Hydro Management Units (HMU) facilities have their own consumption discounted. In these types of production, negative generation indicates that the electricity consumed for the power station's uses exceeds its gross production.

(1) Includes operation in open cycle mode.

(2) Emergency generators installed temporarily in specific zones to cover a deficit in generation.

(3) Peninsula-Balearic Islands link working at the minimum technical level until 31/08/2012.

> Maximum share of renewables in the Canary Islands' energy mix.

Electricity production in the Canary Islands electricity system in 2021 increased by 1.4% compared to the previous year, reaching 8,061 GWh.

The installed renewable power capacity in the Canary Islands increased in the last year from 652 MW to 761 MW, representing an increase of 16.6%. This very high increase in installed renewable power capacity in the archipelago, particularly wind power, led to a review of the operating criteria for the electricity systems on the Islands, in order to ensure the integration of energy under safe conditions for the Canary Islands' electricity systems. Specifically, the increase in installed power capacity was a result of the growth of 19.7% in wind power and a 9.5% rise in solar photovoltaic.

Due to this higher installed power capacity, 2021 was a year of records regarding maximum renewable production registered in the Canary Islands' system. Specifically, renewable generation in the archipelago in 2021 was 15.4% higher than in 2020, reaching an annual record high of 1,606 GWh. The share of this renewable generation in the energy mix on the Canary Islands also beat the all-time record with a value of 19.9% compared to 17.5% registered the previous year.

In May 2021, this renewable generation achieved the highest share in the mix recorded to date with 30.7% of the energy produced that month in the Canary Islands. Regarding daily production, renewable energy reached a new maximum share in the Canary Islands' generation mix on Sunday 23 May with 46.6%, and on Tuesday 28 September renewable generation beat all previous records with a value of 9,523 MWh.

The installed wind power capacity on the Canary Islands grew from 467 MW in 2020 to 560 MW in 2021 and is the second source of generation ahead of gas turbines, diesel engines and steam turbines. By 31 December 2021, wind power represented 17.7% of the installed power capacity in the island system (15.3% in 2020). In this regard, wind power production continued to drive the energy transition in the archipelago and was the technology that on more occasions broke its own records during 2021.

May 2021 saw the highest share of this technology in the generation mix with 25.8% of the total produced in the Canary Islands. In addition, on Sunday 23 May wind power produced 41.8% of all the energy in the archipelago and on Tuesday 28 September wind power generation broke the all-time record with a value of 8,720 MWh.

> Generation from renewable sources on the Canary Islands during 2021 was 15.4% higher than in 2020, setting an annual all-time high of 1,606 GWh.

+19.7 %
Compared to 2020

Installed wind power capacity on the Canary Islands

560 MW

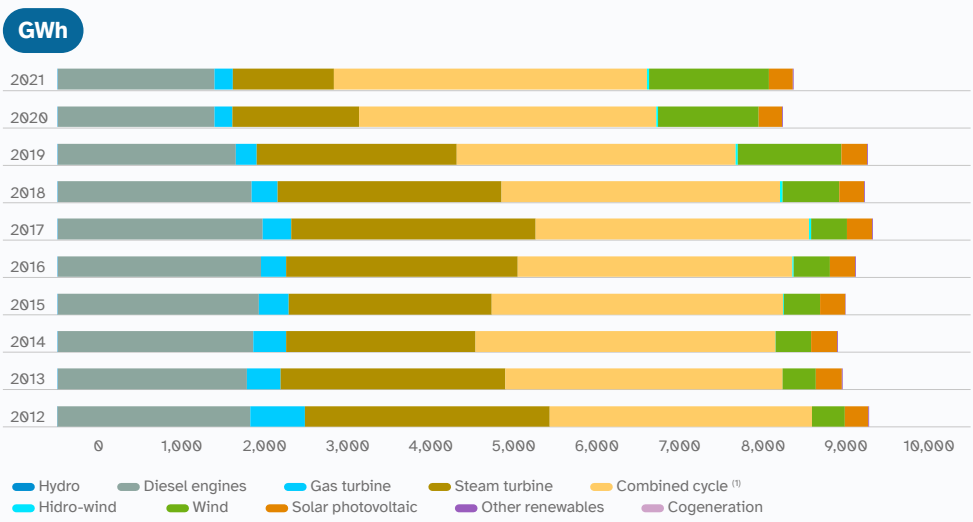
Throughout 2021 on the island of Gran Canaria, wind power repeatedly set new records in terms of instantaneous power, representing 55.9% of the demand on Tuesday 25 May at 23:55 and on Saturday 6 November at 3:33 p.m. a new maximum value was set at 197.57 MWh.

For its part, Tenerife reached its highest record on Thursday 9 December at 3:00 p.m., generating 208.6 MW with wind power. Also in 2021, Tenerife's solar photovoltaic generation beat its own record regarding its share in the generation mix by covering 28.6% of the island's demand on Tuesday 10 August at 3:45 p.m.

The Lanzarote-Fuerteventura unified system broke its own record for instantaneous production using wind power technology, registering its highest ever value of 70.35 MW on Friday 23 July at 4:27 p.m.

On the other hand, generation from fossil fuel power stations fell by 1.5%, due to the lower production from diesel engines and the 20.1% decrease in the use of steam turbines, which in both cases registered the lowest production since 2006. Combined cycle power stations generated 5.4% more than in 2020 and were once again, after ten consecutive years, the leading technology in the generation mix with a share of 42.6%, the highest value recorded to date.

Evolution of the electricity generation mix on the Canary Islands



(1) Includes open cycle operation. It uses fuel oil and diesel as the main fuel.

(2) Emergency generating units that are installed temporarily in certain areas to cover a deficit in generation.

Monthly renewable integration on the island of El Hierro reached 48.3% for the year as a whole.

For the island of El Hierro, a particularly important electricity system due to the Gorona del Viento hydro-wind power station, the continuous review of its operating criteria has made it possible to achieve very high levels of renewable integration. Thus, in July 2021, the monthly integration of renewables into this system reached 81%, achieving 48.3% for the year as a whole.

The Salto de Chira pumped storage hydroelectric power station project is a key element of the energy transition in the Canary Islands.

Integration of renewable energy on the island of El Hierro

48.3%

Red Eléctrica is, in accordance with Law 17/2013, the company responsible for developing energy storage projects through pumped-storage hydroelectric power stations with the main purpose of helping to ensure the electricity supply, system security and the integration of non-manageable renewable energy in electrically isolated systems.

The Salto de Chira project is a key element to promote the energy transition in the Canary Islands and will allow steps to be taken toward a new, safer, more efficient, decarbonised and environmentally friendly energy model.

The Salto de Chira pumped-storage hydroelectric power station, being built on the island of Gran Canaria, was designed by Red Eléctrica and involves the development of a facility capable of maximising the integration of renewable energy into the electricity system by storing the surplus of non-manageable renewable generation that will occur when the production of this type of energy is high. In this way, maximum use and efficiency of resources is obtained and this avoids or reduces the need for non-renewable sources to supply electricity at times when renewable energy sources are scarce.

In addition to storing a large amount of energy, the facility, through its flexibility and capacity to regulate, will be able to meet the objectives that drove its design: the integration of renewables, system security and the guarantee of supply.

With an investment of more than 400 million euros, Salto de Chira includes the construction of a 200-MW pumped-storage hydroelectric power station (equivalent to approximately 36% of the peak demand of Gran Canaria) which will have an energy storage capacity of 3.5 GWh. Additionally, the project includes the construction of a seawater desalination plant and the associated marine works, as well as the necessary facilities for connection to the transmission grid.

The new power station will be a facility to serve Gran Canaria's society and will promote the progress of society by strengthening the water-energy binomial and will integrate the four functions necessary to establish a sustainable and ecological development of the island, as it stores energy, desalinates water, cares for the territory, uses and produces clean energy while respecting the environment. In short, this type of facility, especially in isolated or weakly interconnected systems such as the Canary Islands, enables progress to be made towards a more sustainable and efficient energy model.

> The last quarter of 2021 saw the start of both preliminary and construction works for the Salto de Chira power station.

The year 2021 has seen a milestone in the development of the project, as once the Environmental Impact Statement (EIS) had been obtained, which has taken into account the strict environmental criteria adopted in the design phase, in addition to all the rest of the relevant permits, the preliminary and implementation works for the construction of the seawater desalination plant have begun.

The processing and subsequent issuance of the EIS and the terms under which this statement has been drafted constitutes an endorsement of the Red Eléctrica Group's commitment towards the Canary Islands society regarding sustainable development, respect for the environment and the conservation of biodiversity as priority axes adopted in the design of the project.

+36 %
of the demand of Gran Canaria

Salto de Chira
hydroelectric power station

200 MW

In 2021, the energy transition process marked a new milestone towards an emission-free model by recording a historic low in CO_2 equivalent emissions associated with national electricity generation: 35.9 million tonnes of CO_2 equivalent, 0.6% less than in 2020 and 67.7% below the emissions recorded in 2007.

This reduction in emissions is primarily due to the significant increase in the share of clean energy in the national energy mix. In 2021, renewable energy sources produced 46.7% of national generation and technologies that do not emit CO_2 equivalent accounted for 68.2% of the national total.

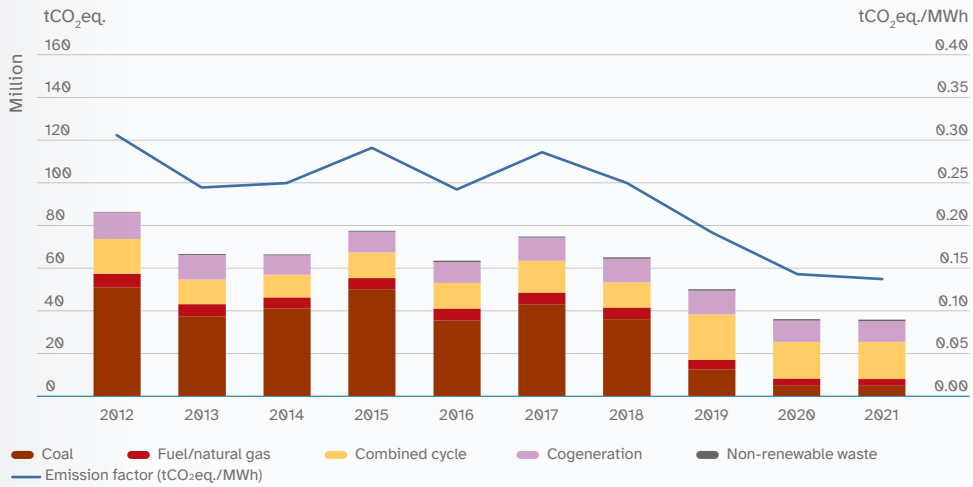
In addition, the decrease in production from coal-fired and fuel/natural gas power stations in the national electricity system that took place during 2021 meant that CO_2 equivalent emissions associated with these technologies were 0.4% and 4.6% lower, respectively, compared to 2020.

Looking at national data since 2007, February 2021 was the cleanest month in terms of CO_2 emissions since records began with 1.8 million tonnes of CO_2 equivalent and 31 January was the day with the lowest emissions associated with national electricity production, with a total of 42,995 tCO_2 equivalent.

> In 2021, the all-time minimum record of CO_2 equivalent emissions associated with electricity generation was set.

Emissions and CO_2eq emission factor associated with national electricity generation (1)

MW



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

Significant steps taken by the autonomous communities towards achieving the green transition.

Among the most relevant aspects of electricity generation during 2021 by autonomous community, the following are noteworthy:

- Andalusia is one of the regions leading the way in renewable energy in Spain. In 2021, generation from these technologies reached 55%, the highest annual share recorded to date. With a total of 16,265 GWh, 12.9% more than in 2020, it became the third region with the highest amount of green GWh produced in 2021, only surpassed by Castilla y León and Galicia.

  This boost to the green transition in Andalusia has been possible thanks to the progressive renewable transformation of its power generation fleet. For yet another year, in 2021 it was the autonomous community with the second highest renewable installed power capacity in Spain, reaching a total of 8,609 MW of green energy, surpassed only by Castilla y León. Thus, half of the Andalusian power generation fleet is already renewable (51.3%). In 2021, Andalusia added 374 new MW of solar photovoltaic and 44 new MW of wind power and decommissioned 1,120 MW of coal-fired capacity.

  The development of solar thermal in Andalusia is particularly noteworthy as it has 1,000 MW in service, and therefore it continues to be the leading region for this technology in Spain, accounting for 43.4% of the national total.

- 77.4% of power generation in Aragón in 2021 came from renewable resources, an increase of 20.6% over the previous year, driven largely by the increase in wind and solar photovoltaic, which produced 40.2% and 27.7% more than in 2020, respectively.

  In 2021, Aragón was the Spanish community with the highest proportion of wind generation in its energy mix, with 53.4%, and it was the second in terms of production from this technology (10,253 GWh).

  Furthermore, 2021 was the first year in the history of the region in which coal disappeared from the generation mix as it no longer has installed power capacity in the region.

- In Asturias, 28.6% of generation was of renewable origin, thanks to the boost of hydro and wind power, two technologies which, with respect to the previous year, increased their production by 14% and 9.6%, respectively.

  Installed power capacity, which reached 3,800 MW at the end of the year, fell by 15.8% in 2021, due to the decommissioning of 850 MW of coal power capacity. Wind power, on the other hand, increased its capacity in 2021 with 139 new MW.

- Castilla-La Mancha is making steady progress in the green transition, and this is reflected in the data: in 2021, 57.9% of the energy generated in the autonomous community was of renewable origin, with wind power, with 7,681 GWh, being the leading technology and generating 33.2% of the electricity. Solar photovoltaic increased its generation by 21.5% compared to the previous year, reaching a share of 16.2% of the total.

In 2021, Castilla-La Mancha consolidated its position as the community with the third largest renewable installed power capacity (8,140 MW), only surpassed by Castilla y León and Andalusia.

Wind power is the technology with the largest production capacity in Castilla-La Mancha, with more than 4,000 MW, representing a share of 38.6% of the total. For its part, solar photovoltaic, with 1,035 new MW installed during 2021, is the technology that has most increased its presence in the region's power generation fleet, 53.3% more than the previous year. Castilla-La Mancha is the region with the second largest share of solar photovoltaic capacity in Spain, accounting for 19.6% of the total installed power capacity nationwide.

— Castilla y León closed 2021 as the autonomous community with the highest renewable generation in Spain: 24,068 GWh, which accounted for 89.1% of the region's total production, an all-time maximum share since records began. Both generation and coverage in the mix were the highest figures in Spain in 2021, which consolidated Castilla y León's leadership role in renewable energy nationwide. In 2021, 8.7% more green energy was produced in the region than in the previous year.

  In 2021, wind power was the leading technology in the generation mix of Castilla y León, contributing almost half of the mix (49.1%). Thanks to this volume, it was the community that produced the most electricity from wind power (13,255 GWh). Wind is followed by hydro, responsible for 32.4% and which this year generated 9% more than in 2020.

  Furthermore, 2021 was the first time ever in this community in which coal disappeared from the generation mix as it no longer has installed power capacity in the region.

  Thus, the power generation fleet of Castilla y León reached 12,486 MW last year, of which 95.4% is renewable, the highest installed capacity figure in Spain. Wind power, with 51.1% of the total, is the technology with the greatest presence in the region and solar photovoltaic is the technology that has registered the greatest increase, putting 174 new MW into service and increasing its generation capacity by 20.5% with respect to 2020.

— In Catalonia, 17% of generation came from renewable sources, with hydro, with 8.5% of the total, being the renewable energy in Catalonia that registered the most GWh in 2021.

  In terms of installed power capacity in the region, at the close of 2021, renewables accounted for 30.3%.

— Extremadura has reconfirmed its national leadership in solar photovoltaic energy in 2021, both in terms of installed power capacity and electricity generation. Last year, it installed more than 1,300 new MW of this technology, 51% more than the previous year. Thus, the region closed the year with more than 3,879 MW in service, the largest installed photovoltaic capacity in the country. This momentum allowed production from this source to double, reaching a volume of more than 4,900 GWh.

  The progress in photovoltaic energy in Extremadura enabled the region to close the year with a 55.9% increase in renewable generation compared to 2020 data. In this regard, the share of green energies in the mix stood at 38%.

All this data gives the region a predominant position at a national level in the energy transition process. This is possible thanks to the spectacular transformation of its power generation fleet. By year-end, 77.8% of its installed power capacity was renewable. In total, more than 7,000 MW of green power, an increase of 22.7% compared to the previous year.

— In 2021, 74.3% of the electricity generated in Galicia came from renewable sources, with wind as the number one source of Galician generation with 39.5%. It is followed by hydro, which, with 7,692 GWh was the second technology that produced the most, reaching 31.8% of the total. Production with this technology is very significant with respect to the rest of Spain. In fact, one out of every four GWh of hydroelectric power produced in Spain originates in Galicia. Once again, in 2021 wind and hydroelectric power together accounted for more than 70% of the region's electricity production.

The decrease experienced by coal is significant, with a reduction in its generation of 65.8% with respect to 2020.

In terms of installed power capacity, renewables now account for 7,717 MW and 70.5% of the total Galician power generation fleet.

— In 2021, the Balearic Islands experienced an important boost in electricity generation from renewable energy, consolidating the practical disappearance of coal in the Balearic Islands' mix, initiated in 2020, thus confirming its progress in the energy transition. In this context, renewables on the Balearic Islands produced 32.2% more than in 2020 and beat its annual record of green energy achieving a share of 6.7% of the total.

Efforts to advance in the green transition are also reflected in the increase in renewable production capacity: at the end of the year, the Balearic Islands had a total of 149 MW solar photovoltaic capacity installed, 44.2% more than in 2020. In this way, renewable capacity accounted for 9.4% of the total Balearic Islands' power generation fleet in 2021.

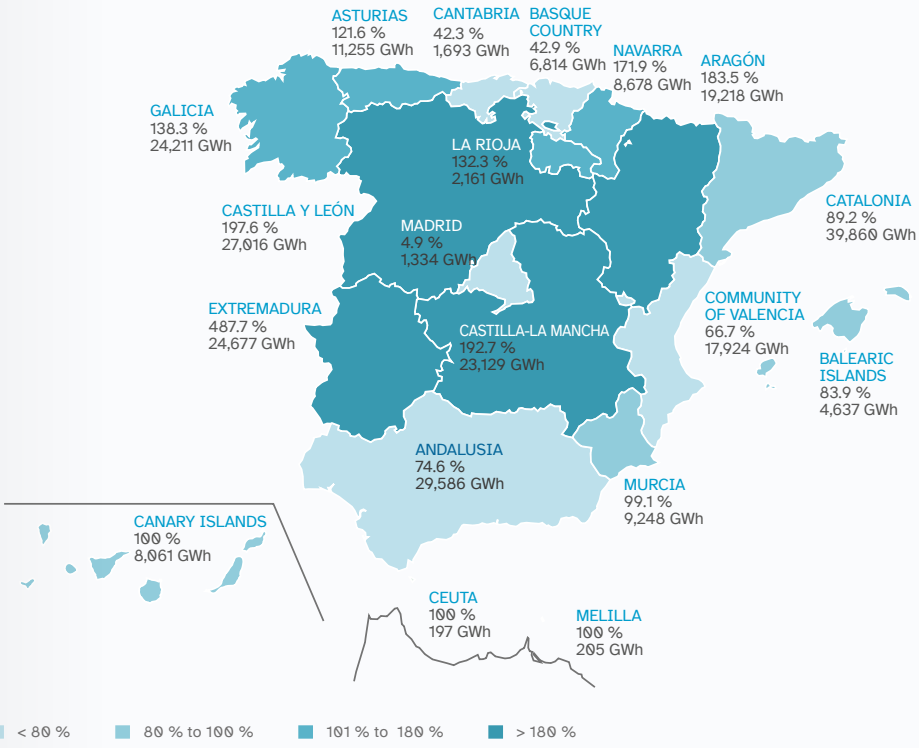
While renewable generation grew, in 2021, the use of coal declined to become a residual energy source: this technology only integrated into the system 1% of the Balearic Islands' total. This means a decrease of almost 80% compared to the previous year, when the drop in the use of coal was already drastic (it only contributed 6.3% in 2020), due to the hourly limitations established for this type of generation in the archipelago since December 2018 and the reduction of its installed power capacity. At year-end, this technology accounted for only 6.4% of the Balearic Islands' power generation fleet.

— In 2021, the Canary Islands generated 15.4% more renewable energy than in 2020, driven mainly by wind power generation, which reached its annual production peak (1.310 GWh) and accounted for 16.3% of all electricity in the Canary Islands.

These maximum values reached in the archipelago allowed renewables to cover almost 20% of the total, thus demonstrating the progress made in the energy transition in the Islands.

As for installed power capacity, in 2021 it increased by 3.6% thanks to the commissioning of 108 new MW of renewable power, 92 MW of wind and 16 MW of solar photovoltaic. Thus, green energies already represent 24.1% of the Canary Islands' power generation fleet.

Electricity generation/Demand ratio (%) and generation (GWh) in 2021 per autonomous community

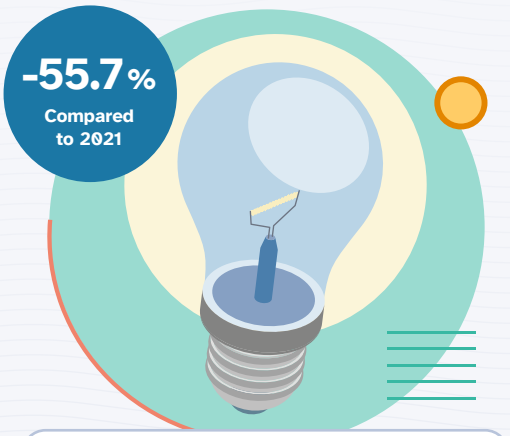


3

Scheduled International Electricity Exchanges

For the sixth consecutive year, Spain's electricity exchange programmes with other countries closed 2021 with an import balance.

Scheduled export electricity exchanges were 22.8% higher than in the previous year, while imports were 7.4% higher.

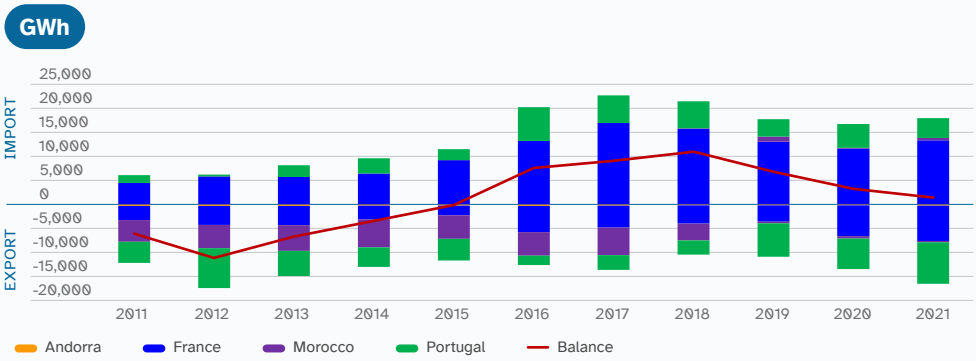


Import balance in 2021

1,462 GWh

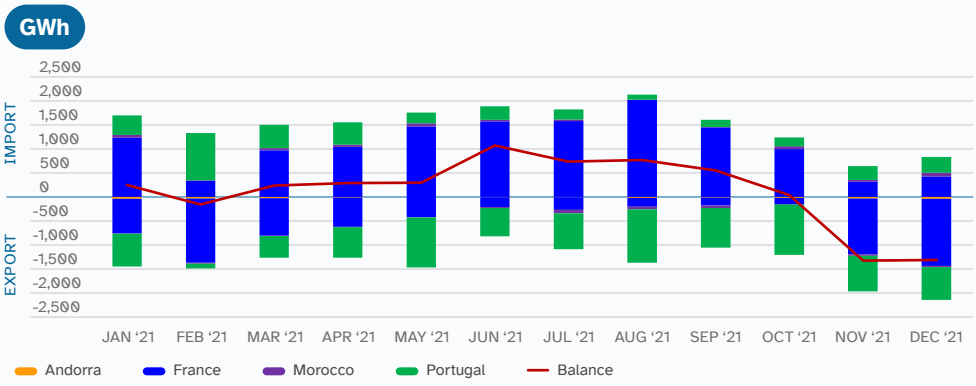
The total volume of energy scheduled through the interconnections reached 34,623 GWh, 14.2% higher than in 2020. A total of 16,581 GWh was scheduled for export, 22.8% more than the previous year, and a total of 18,043 GWh was scheduled for import, 7.4% more than in 2020. As in the previous year, the net balance is again as an importer, with a value of 1,462 GWh, 55.7% less than the previous year.

Annual evolution of scheduled international energy exchanges



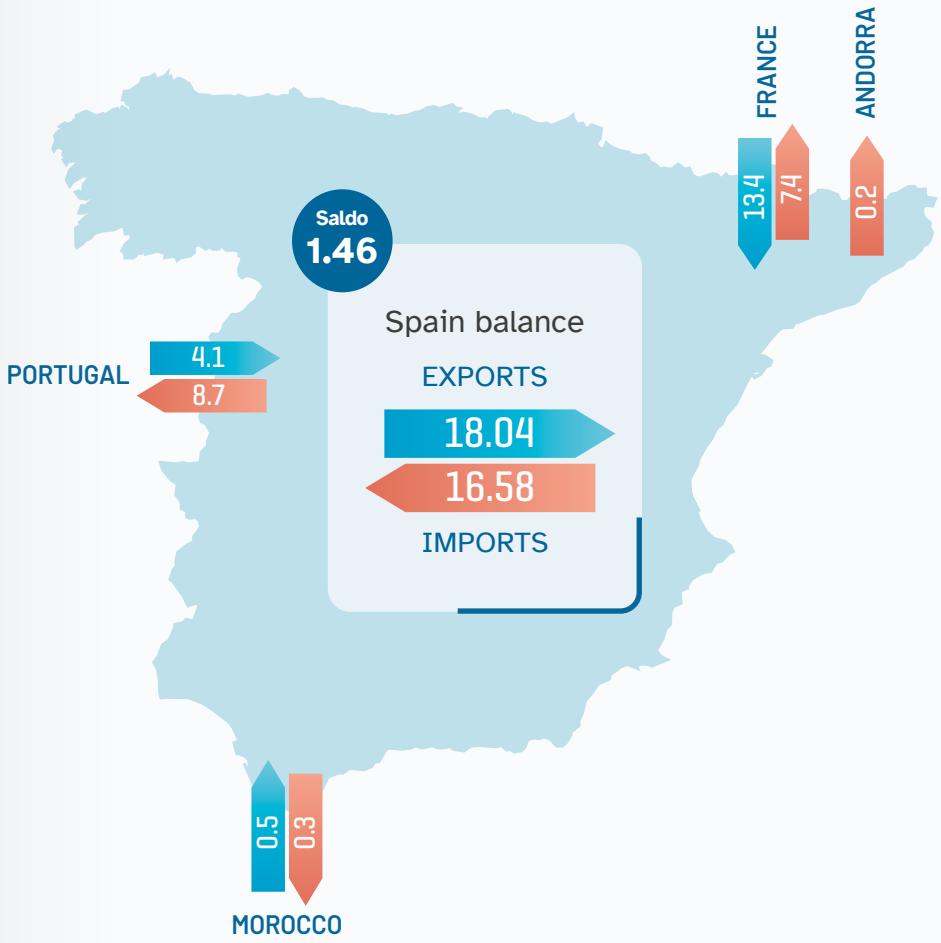
In 2021, the net monthly balance of scheduled energy exchanges in the Spanish cross-border connections was as an importer in January and from March to October. In February, December and November, the net balance was as an exporter due to a higher contribution of the energy exchange export programmes to the French system and in the last two months of the year also to the Portuguese system. February was the month that registered the highest level of renewable energy production in the year. In November and December, high prices in France meant a greater contribution from export programmes to the French system, so the net balance was also as an exporter. The maximum net import balance took place in June (1,073 GWh) and the maximum export balance occurred in November (1,322 GWh).

Monthly evolution of scheduled international energy exchanges in 2021



Scheduled international energy exchanges by cross-border connection in 2021

TWh



"The total volume of energy scheduled through the cross-border connections reached 34,623 GWh, 14.2% higher than in 2020.

FRANCE

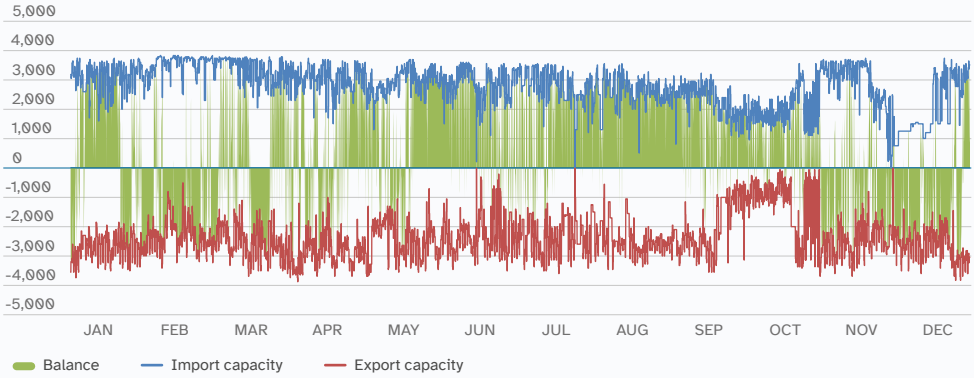
The net annual balance of electricity exchanges through the cross-border connection with France was as an importer with 6,054 GWh, 15.4% higher than in 2020. Scheduled cross-border imports totalled 13,442 GWh, 15.2% higher than the previous year, and exports totalled 7,388 GWh, 35.6% higher than the previous year. With the exception of February, November and December, the net monthly balances were as an importer in all months.

In 2021, a high utilisation rate of this cross-border connection was registered, most of the time in the direction from France to Spain (62% of the hours), a figure that is similar to that of 2020. The average utilisation rate of the cross-border capacity during 2021 stood at 81.9%. The change in the direction of the balance towards an exporter is generally due to two causes: the surplus of renewable energy in the Spanish system or high prices in France, generally due to the high non-availability of its nuclear power stations. This first scenario occurred in February, where there were 576 hours with an export balance with an average capacity utilisation of 87.3%. The second scenario was the one that has occurred most in the last two months of the period, with France reaching a maximum hourly price of 620 €/MWh. In those last months, the average utilisation of exchange capacity reached a value of 80.7%.

> In 2021, the cross-border connection with France registered a high utilisation rate, most of the time in the direction from France to Spain (62% of the hours), a figure that is similar to that of 2020.

Exchange capacity and net balance of scheduled exchanges at the cross-border connection with France in 2021

MW and MWh



With regard to the use of energy exchange capacity, congestion was registered for 35.7% of the hours in the import direction, while 20% of the hours were congested in the export direction Both of these values are higher than those registered in 2020. This fact confirms the lack of exchange capacity that exists with the European system through the existing interconnections with France. From June to October, the use of the cross-border connection was mainly as an importer (69% of the hours registered a utilisation rate above 85%), with 58% of hours being congested in the import direction. In February, November and December, the use was mainly as an exporter (81% of the hours) due to high non-availability of nuclear power in France and high renewable generation in Spain in February. In these months there was congestion in the export direction in 53.7% of the hours.

> The shift in the flow of the balance towards that of an exporter is generally due to the surplus of renewable energy in the Spanish system and high prices in France due to the high non-availability of its nuclear power stations.

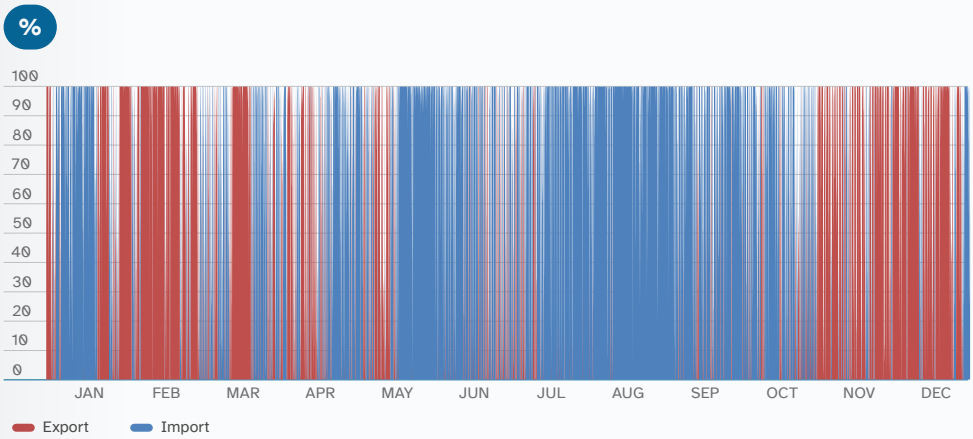
Utilisation of the cross-border connection with France was in the import direction for a total of 5 months

69 %

The hourly utilisation rate for this cross-border connection was greater than

85 %

Utilisation rate of exchange capacity in the interconnection with France in 2021

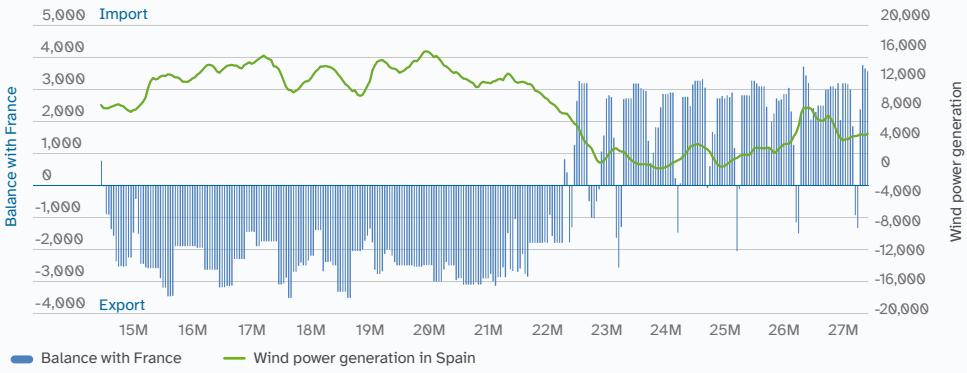


Wind power production influences day-ahead market prices and has an impact on the direction of energy exchanges. Thus, in the month of March, the balance of the energy exchange schedules with France was as an importer when low levels of wind power production were recorded in Spain, while the balance became mostly as an exporter when there were high levels of wind power production.

Net scheduled balance for the cross-border connection with France and wind power generation in Spain

15 to 27 March 2021

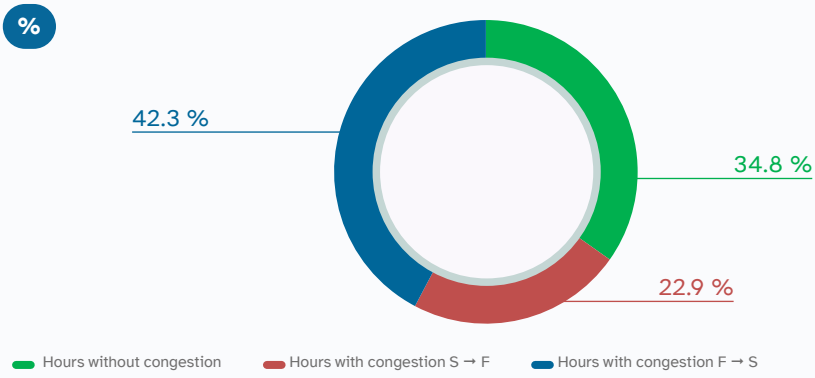
MWh



With regard to the level of utilisation of exchange capacity in the day-ahead horizon, a high rate of utilisation of this interconnection was recorded, slightly more than last year. Thus, in 42.3% of the hours it was congested in the direction from France to Spain, with an average price difference of 27.2 €/MWh; in 22.9% of the hours, it was congested in the direction from Spain to France, with an average price difference of 38.1 €/MWh, and in the remaining 34.9% of the hours there was no congestion in this cross-border connection.

Hours with and without congestion in the interconnection with France in 2021

%



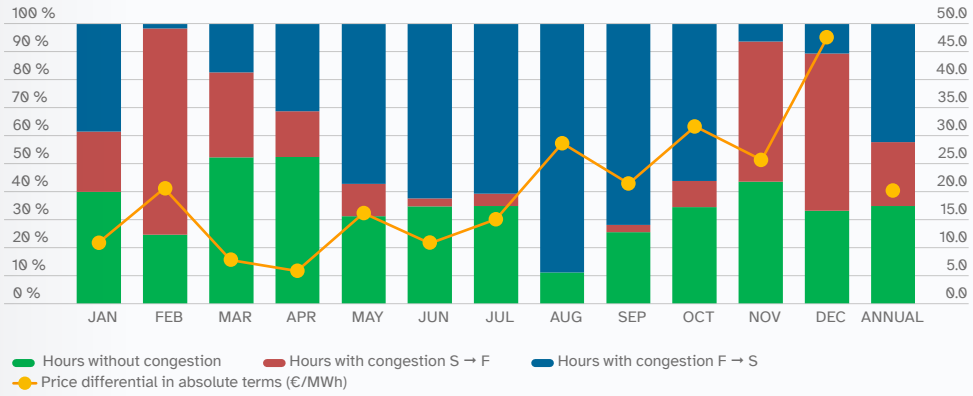
In 2021, only two full days without congestion on the day-ahead horizon were recorded in the interconnection with France. On 70% of the days, congestion was registered for more than 12 hours, compared to 62% the previous year.

> The average price differential in absolute terms in 2021 was equal to 20.2 €/MWh, more than three times higher than the previous year This value is 10 times higher than the threshold considered by the European Union to qualify a cross-border connection as weak.

Congestion levels of exchange capacity on the day-ahead horizon were higher in the direction from France to Spain every month, except in February, March November and December when prices in Spain were lower than in France. It was precisely in February November and December that the highest percentage of hours with congestion in the direction from Spain to France was recorded. The highest rates of hours without congestion were registered in April and March (with more than half of the hours without congestion).

Hours with and without congestion in the interconnection with France and difference in prices of the day-ahead market in 20211

% and €/MWh



It can be seen that the price differential in absolute terms is above 2 €/MWh at all times.

Congestion rents generated in 2021 in this interconnection totalled 318.4 million euros (180.3 million in the import direction and 138 million in the export direction), with 50% of this total corresponding to the Spanish electricity system. This is 135% higher than the revenue generated in 2020 (as a result of a 115% increase in imports and a 168% increase in exports).

Congestion rents resulting from the cross-border management mechanisms

€ Million

	France → Spain	France → Spain	Total
Annual auction	30.6	35.3	65.8
Monthly auction	56.7	39.8	96.5
Day-ahead horizon	89.3	61.4	150.7
Replacement Reserves	3.8	1.6	5.3
Total	**180.3**	**138.0**	**318.4**

Congestions rents come 51% from auctions (20.7% from annual and 30.3% from monthly auctions), 47.3% from the day-ahead horizon and 1.7% from the Replacement Reserves.

With regard to the prices resulting from the exchange capacity auctions, the marginal price of the annual capacity auction for 2021 in the direction Spain → France was equal to 5.03 €/MW, which represents an increase of 48% in the price compared to the annual auction for 2020 (3.40 €/MW). In the direction France → Spain, the resulting marginal price was equal to 4.36 €/MW, which represents a drop of 17% compared to the price registered in this direction in the annual auction for 2020 (5.25 €/MW).

The maximum price of allocated capacity in the monthly auctions was registered in September, in the direction France → Spain with a value of 14.10 €/MW, much higher than the 5.00 €/MW in February 2020 and very similar to the 14.05 €/MW recorded in May 2019. In the direction Spain → France the maximum price was reached in December with 25.67 €/MW, more than 4 times the value registered in January 2020.

The exchanges of balancing energy through the cross-border connections with France through the European platform for the management of balancing energy from Replacement Reserves, registered an import value of 340.9 GWh and an export value of 212.3 GWh.

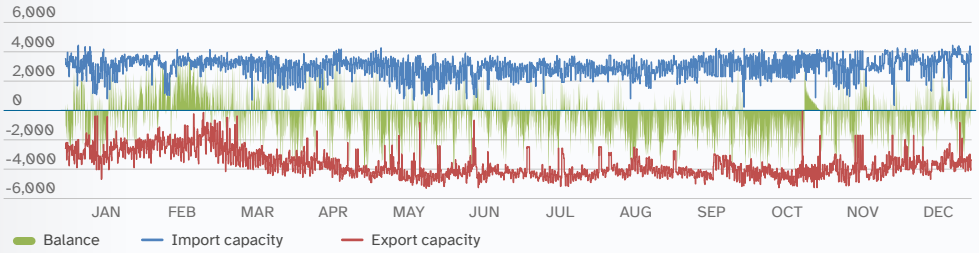
In 2021, it was necessary, to a much greater extent than in the previous year, for the Spanish and French electricity system operators to implement coordinated counter-trading actions (exchange programmes in the opposite direction to the existing flow established to guarantee the firmness of commercial programmes when faced with capacity reductions) by the operators of the Spanish and French electricity systems, for a total value of 1,062 GWh, a figure higher than the 646 GWh scheduled the previous year, thus setting a new all-time high. 35% was scheduled in the import direction and 65% in the export direction.

PORTUGAL

The net annual balance of scheduled energy exchanges in the interconnection with Portugal was once again as an exporter, with a value of 4,548 GWh, compared to 1,455 GWh in 2020. This is the third consecutive year with an export balance, previously not recorded since 2015. Scheduled imports totalled 4,124 GWh, showing a drop of 16.5% with respect to the previous year, while those for export totalled 8,673 GWh, a value that was 36% higher than last year.

Exchange capacity and net balance of scheduled exchanges in the cross-border connection with Portugal in 2021

MW and MWh

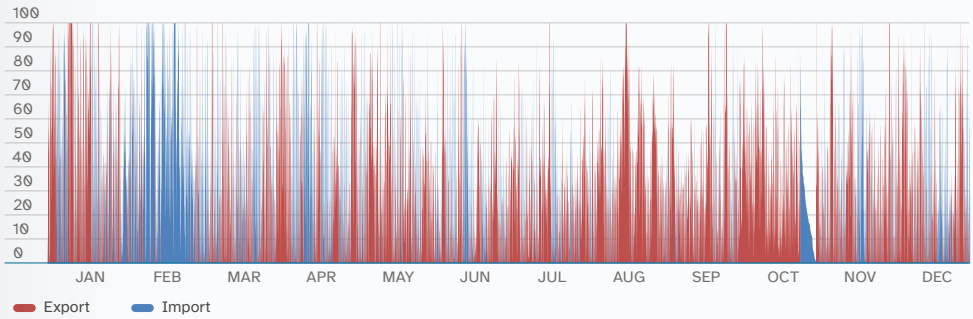


The net balance of the scheduled exchanges was as an exporter except for the months of February and March. In the year as a whole, 65.1% of the hours registered an export balance, with August being the month with the highest number of hours (644). February was the month with the highest number of hours with an import balance (582).

Regarding the final daily use of the exchange capacity, in this interconnection there were no days when there was congestion throughout the whole 24-hour period.

Utilisation rate of exchange capacity in the interconnection with Portugal in 2021

%

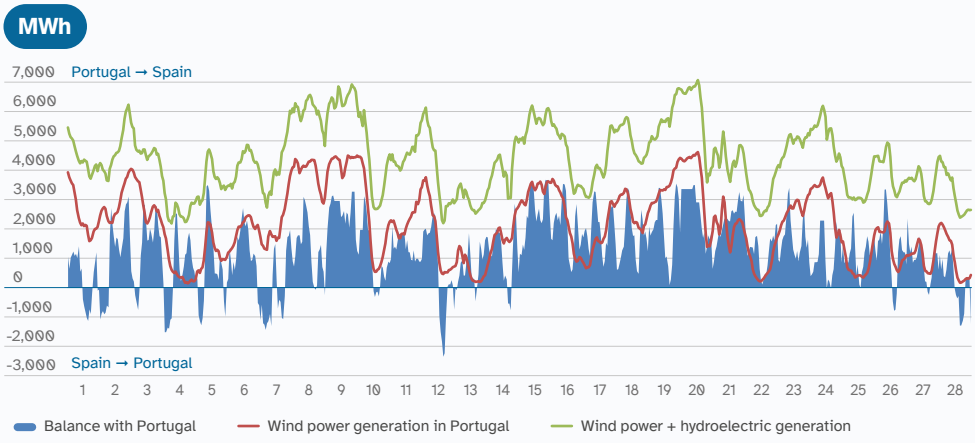


The import balances are largely due to high hydroelectric and wind power generation in Portugal. In 2020, the producible hydroelectric power index was 0.93 and the wind power index was 1.01 . February was the month with the highest import balance, being the month with the highest producible hydroelectric power index and the second highest in the wind power index in the Portuguese system. October, July and December were the months with the fewest hours of congestion (1 hour in October, 4 hours in July and 5 hours in December).

Both hydroelectric and wind power generation significantly influenced the scheduled balances in the interconnection with Portugal. As an example, it can be seen how in a month with high wind and hydroelectric power production in Portugal (such as February), the balance is as an importer, while in months with low production it is as an exporter, or with a low importer balance.

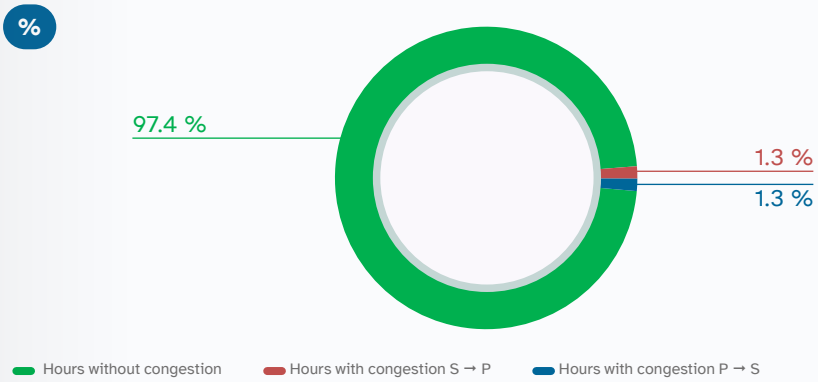
Balance of scheduled exchanges for the cross-border connection with Portugal and wind power generation in Portugal

February 2021



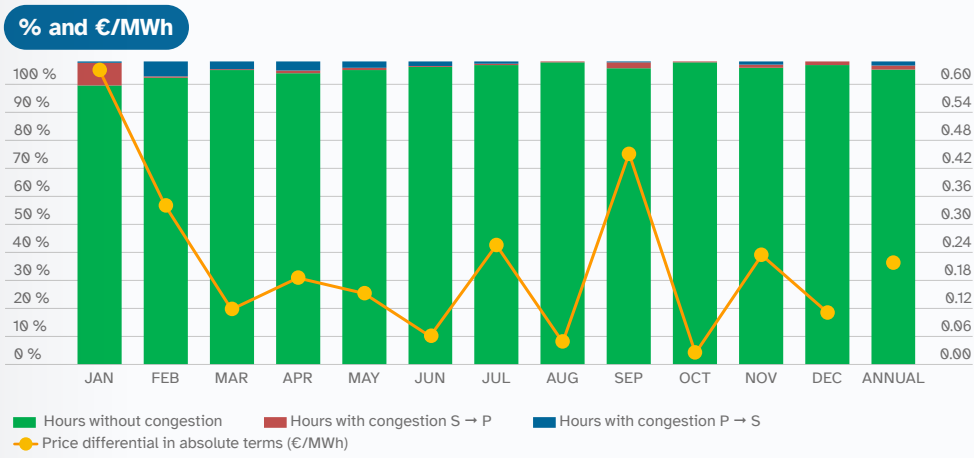
In the day-ahead horizon, the convergence levels registered in the interconnection with Portugal in 2021 were high, resulting in a percentage of hours with congestion in the day-ahead market of slightly lower than 3%. Consequently, prices in one system or the other were very similar, with the hourly price differential in absolute terms being 0.20 €/MWh.

Hours with and without congestion in the interconnection with Portugal in 2021



The monthly evolution shows that August and October were the months with the highest coupling rate, while January saw the highest percentage of hours with congestion, with almost 8% of the hours of the month and a price difference of 0.58 €/MWh, which is the highest price difference ever registered. September, with slightly more than 2% of the hours with congestion, is the month with the second largest price difference (0.42 €/MWh).

Monthly congestion levels and difference in prices in the interconnection with Portugal in 2021



Congestion rents reached 4 million euros, with 56.9% coming from the day-ahead market, 3% from the intraday market, 1.9% from Replacement Reserves and 38.2% from the auctions (13.6% in the annual, 7.5% in the quarterly and 17.1% in the monthly). 50% of this amount corresponds to the Spanish electricity system.

Congestion rents resulting from the cross-border management mechanisms with Portugal

€ Million

	Portugal → Spain	Spain → Portugal	Total
Annual auction	0.25	0.30	0.54
Quarterly auction	0.12	0.18	0.30
Monthly auction	0.40	0.28	0.68
Day-ahead coupling	0.60	1.67	2.28
Intraday market	0.07	0.04	0.12
Replacement Reserves	0.01	0.07	0.08
Total	**1.46**	**2.54**	**4.00**

A total of 526.5 GWh of imports and 572 GWh of exports were allocated through the European platform for the management of balancing energy from Replacement Reserves.

In 2021, coordinated counter-trading actions were required for a total of 7.3 GWh, lower than the 14.2 GWh programmed in the previous year. In the import direction, 94.7% were programmed in the import direction and the remaining 5.3% were in the export direction.

> Congestion rents reached 4 million euros, with 56.9% coming from the day-ahead market, 3% from the intraday market, 1.9% from Replacement Reserves and 38.2% from the auctions.

-48.6 %
Compared to 2020

Implementation of coordinated counter-trading actions

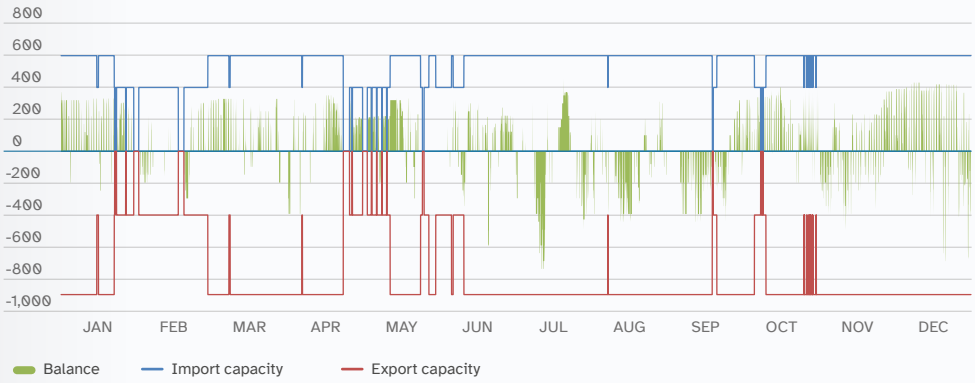
7.3 GWh

MOROCCO

The annual balance of the scheduled exchanges with Morocco was again as an importer this year, with a value of 182 GWh, compared to 298 GWh exported last year. The months of February, July to September and November showed a net balance as an exporter, while the rest of the months the net balance is as an importer. The total volume of energy exchanged was 772 GWh, 11.7% more than last year, but far from the values of other years.

Exchange capacity and net balance of scheduled exchanges in the interconnection with Morocco in 2021

MW and MWh

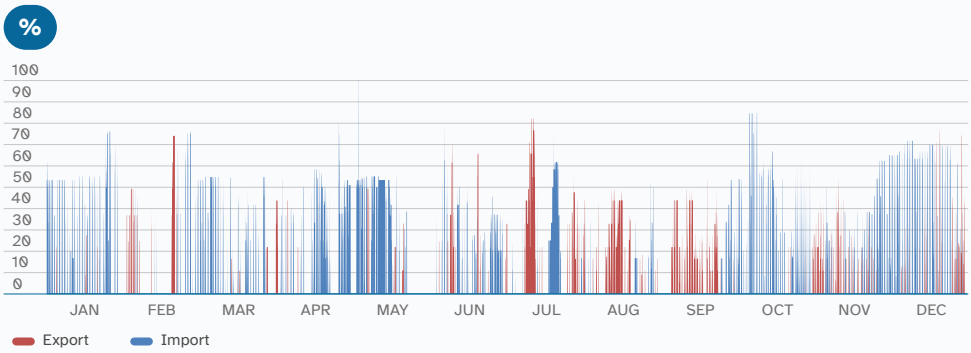


The average utilisation rate of the exchange capacity of this interconnection changed last year, exporting 14% in 2021 compared to 24% the previous year, while imports stood at 24% compared to 13% the previous year. The interconnection was used for only 38.1% of the hours, compared to 37,1% the previous year.

The average utilisation of the interconnection two-way energy flows (import-export) in 2021 was 13.9% while in 2020 it was 12%. If only days are taken into account when scheduled exchanges were programmed, the average utilisation rate in 2021 was 36.5%, compared to 32% in 2020, but still far from the 50.5% registered in 2019.

The following graph clearly shows that the daily interconnection exchange capacity with Morocco in 2021 was only congested for 2 hours in the import direction (capacity reduced to 400 MW), while in the previous year the interconnection was not congested at any time, and in 2019 it was congested for 18 hours in the import direction and for 12 hours in the export direction.

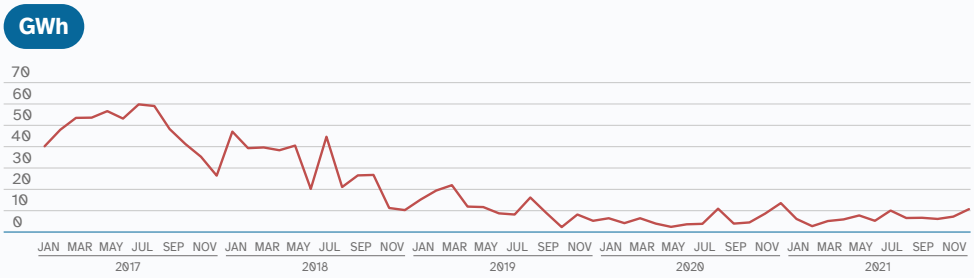
Daily interconnection capacity utilisation in the cross-border connection with Morocco in 2021



The reductions in the exchange capacity through this cross-border connection were due to the non-availability of one of the two links that make up this interconnection that had a significant impact on exchange capacity. For 287 hours (3.3% of the hours) the exchange capacity was 0 MW due to the unavailability of both links. In 1,607 hours (18.3% of the hours) the capacity on this interconnection was limited to 400 MW in both directions, as one of the circuits was inoperative.

Although the energy traded through this interconnection was slightly higher than last year, there was a significant reduction compared to previous years, which shows that Morocco is becoming more and more self-sufficient, with a consequent reduction in the energy traded through this border.

Evolution of the volume of scheduled energy at the cross-border connection with Morocco



A change in trading was also observed. The following table shows trading in the day-ahead markets (DM) and intraday markets (IM), in GWh and the % traded in each market with respect to the total volume scheduled.

It can be clearly seen how a greater volume of energy has usually been managed in the intraday market, although in the first years shown in the table, the IM values ranged between 40-60%; in 2018 it changed, with just over 70% of the energy traded in the intraday market; in 2019 it was 90%, in 2020 there was 100% traded in this market and in 2021 the value stood at 97%.

	%MI	%MD	MD Contracted	MI Contracted	Scheduled volume
2017	58%	42%	2,389	3,352	5,747
2018	73%	27%	986	2,653	3,640
2019	90%	9%	124	1,211	1,351
2020	100%	0%	0	691	691
2021	97%	3%	20	749	772

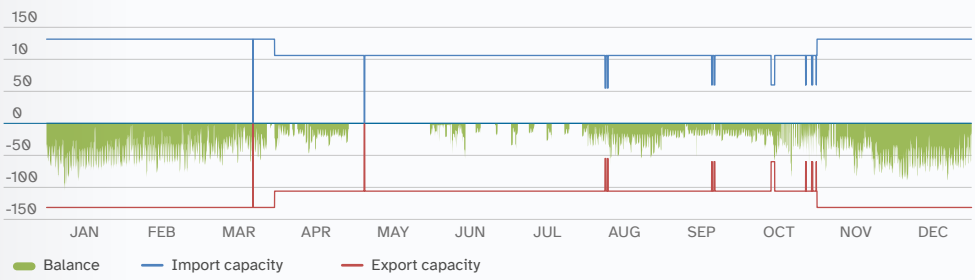
The monthly invoicing of access tolls for the Moroccan interconnection registered a total income of 4.1 million euros, 8.5% lower than last year's value.

ANDORRA

The annual balance of the electricity exchanges scheduled in the interconnection with Andorra was as an exporter, with a value of 225 GWh, which represented an increase of 15.1% with respect to 2020. The average utilisation rate of the exchange capacity of this interconnection in the export direction was 17.9% compared to 18.5% the previous year.

Exchange capacity and net balance of scheduled exchanges in the interconnection with Andorra in 2021

MW and MWh



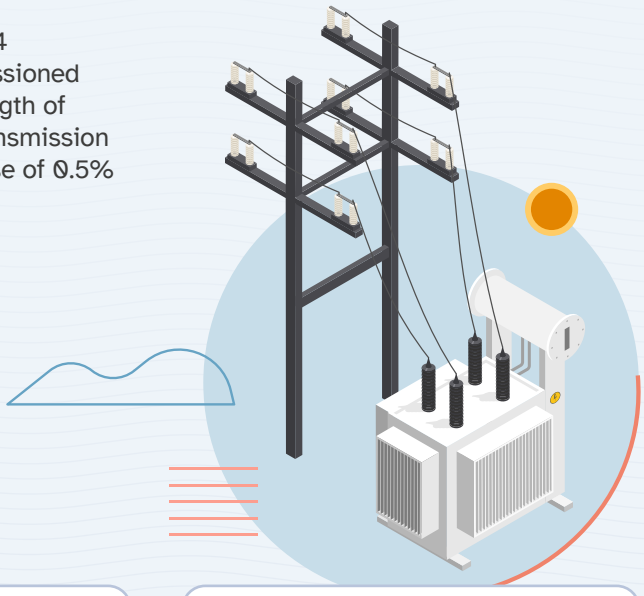
Monthly invoicing for access tolls for the Andorran interconnection totalled 1.6 million euros, 35.5% higher than the previous year.

4

Electricity Transmission

In 2021, the transmission grid continued to be strengthened, increasing investment in the grid to 391 million euros, 2.1% higher than in the same period of the previous year.

206 km of line circuit and 134 substation bays were commissioned in 2021, bringing the total length of line circuit in the national transmission grid to 44,769 km, an increase of 0.5% compared to 2020.



Total length of line circuit in the national grid

44,769 Km

Installed transformer capacity nationwide

93,871 MVA

In 2021, in a context still impacted by the pandemic, the transmission grid continued to be strengthened, increasing investment in the grid to 391 million euros, 2.1% higher than in the same period of the previous year. In this regard, facilities were commissioned that contribute to help integrate as much renewable generation as possible, improve grid meshing and promote electrification, to guarantee the security of supply and the levels of service quality.

There were 206 km of line circuit and 134 substation bays commissioned in 2021, bringing the total length of line circuit in the national transmission grid to 44,769 km, an increase of 0.5% compared to 2020. In regard to transformer capacity, this increased by 850 MVA, bringing the total transformer capacity nationwide to 93.871 MVA (an increase of 0.9% compared to 2020).

Electricity transmission grid facilities in Spain

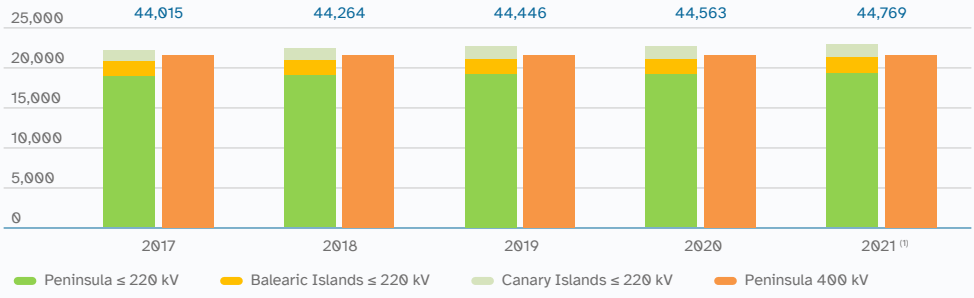
	400 kV	≤ 220 kV			
	Peninsula	Peninsula	Balearic Islands	Canary Islands	Total
Total line circuit (km)	**21,768**	**19,493**	**1,929**	**1,578**	**44,769**
Overhead lines (km)	21,651	18,702	1,141	1,237	42,731
Submarine cable (km)	29	236	582	30	877
Underground cable (km)	88	556	206	311	1,161
Transformer capacity (MVA)	**84,790**	**1,363**	**3,838**	**3,880**	**93,871**

Provisional data pending audit (currently underway).

Cumulative figures regarding kilometres of line circuit and for transformer capacity as at 31 December 2021.

Evolution of the electricity transmission grid in Spain

km of circuit



Provisional data pending audit (currently underway).

Cumulative figures regarding kilometres of line circuit as at 31 December of each year. Includes the transmission grid assets of those utility companies whose electricity distribution facilities are considered as an integral part of the overall transmission grid infrastructure nationwide.

Among the projects carried out in 2021 in the transmission grid, the following are noteworthy and are listed according to the geographical area in which the work was carried out:

— **Andalusia:** The Gabias-Orgiva, the Arroyovalle-Montecillo Bajo and the Cártama-Los Montes 220 kV lines had their power transmission capacity increased to provide greater security of supply in the area and provide support for the distribution network. The enlargement works for the 220 kV Torrearenillas line were carried out and the 220 kV El Zumajo (Nueva Parralejo) substation was commissioned to contribute to the resolution of technical constraints, provide support for the distribution network, evacuate renewable energy generation, and improve security of supply.

— **Aragón:** Progress continued on the bolstering of the transmission grid around the metropolitan area of Zaragoza with the commissioning of the 200 kV Los Leones-Villanueva double circuit line. In addition, the new 400 kV Cariñena substation and its incoming/outgoing feeder lines for the 400 kV Almazán-Fuendetodos line will enable the Zaragoza-Teruel high-speed railway axis to be powered. On the other hand, progress was made in strengthening the transmission grid in different areas with the commissioning of the 220 kV Mezquita-Valdeconejos and the 220 kV Valdeconejos-Escucha lines, and the 220 kV T Foradada-Escalona, the 220 kV Escalona-T Escalona and the 400 kV Aragón-Mequinenza lines had their power transmission capacity increased.

— **The Balearic Islands:** Noteworthy was the enlargement of the 132 kV Bossa substation to improve the security of supply in the area and of the 66 kV San Martin and the 132 kV Ciudadela substations, which will enable the evacuation of renewable energy generation.

— **The Canary Islands:** The new 220/66 kV El Rosario (Nueva Geneto) substation was commissioned, which together with the two 250 MVA combined capacity transformers, will improve the security of supply in the northern area of Tenerife. In Fuerteventura, the integration of renewable generation has been improved with the enlargement of the 66 kV Puerto del Rosario substation. Finally, on the island of Gran Canaria, the 66 kV Barranco de Tirajana dual node has been enlarged, which will improve the security of supply in the area.

— **Castilla La Mancha:** To promote the evacuation of renewable energy, the 220 kV Torrijos, the 220 kV Villares de Saz and the 400 kV Olmedilla substations were commissioned, continuing with the ambitious plan for the integration of this type of energy in the area. Similarly, and to facilitate the transit of energy flows through the area, works were completed to increase the power transmission capacity of the 220 kV Villares del Saz-Olmedilla1 line.

— **Castilla y León:** Construction work continued on the 400 kV Tordesillas-Galapagar-San Sebastián de los Reyes (SUMA) axis for the meshing between Castilla y León and Madrid, in the section between Segovia and the Community of Madrid. Similarly, in order to increase the security of supply, the 220 kV T Renedo was dismantled and the new 220 kV Renedo-Mudarrita line was commissioned. Lastly, the enlargement of the 220 kV Zamora substation was completed to promote the generation of renewable energy.

> In 2021, 16 new substation bays were commissioned to increase the overall renewable power capacity. Noteworthy are those in the Almaraz, Brovales and Carmonita substations, with a capacity that ranges between 0.7 and 1 GW.

- **Catalonia:** The 220 kV Begues and Puigpelat substations were enlarged to facilitate support for the distribution networks, industrial consumers and to contribute to the resolution of technical constraints. On the other hand, progress was made in the development of the 220 kV grid by commissioning the enlargement of the Hospitalet substation that will connect up to the future Cerdá substation.

- **Extremadura:** Special mention should be made of the new 600 MVA transformer in the 400 kV Almaraz CN substation, which will increase support to the distribution network and contribute to the resolution of technical constraints in the area. The 220 kV Jose María Oriol substation received a new reactor, which will improve voltage control in the area. Similarly, the new 220 kV Arenales substation with its connection to the 220 kV Jose María Oriol substation was commissioned and work continued to connect this substation with the 220 kV Cáceres and the 220 kV Trujillo substations. Lastly, the 66 kV Riocaya-Alcaçova interconnection line has replaced the previous 66 kV Badajoz-Alcaçova line, and the new 400 kV Carmonita substation was completed, along with the incoming/outgoing feeder lines for the 400 kV Almaraz CN-San Serván line, which will facilitate the supply of the Toledo-Cáceres-Badajoz railway axis and improve the evacuation of renewable energy.

- **Levante:** The commissioning of the new 400 kV Montesa substation and its incoming/outgoing feeder lines for the 400 kV Benejama-Catadau line has enabled the powering of the Albacete-Alicante-Valencia railway axis. In the Murcia region, the enlargement of the 400 kV Carril substation will promote the integration of new renewable generation.

- **The central area:** Progress was made on the actions proposed in the 2015-2020 Planning regarding permitting processes and works.

- **The northern area:** In the Basque Country, the construction of the 400 kV Güeñes-Ichaso double circuit line continued, noteworthy being the commissioning of the enlargement of the 400 kV Ichaso substation. This action is part of the axis that will connect the west of the Basque Country (Abanto-Güeñes axis) with the 400 kV grid in Navarra (Muruarte-Castejón axis) and will increase the evacuation of renewable generation and ensure the committed values of exchange capacity between Spain and France are met. In Cantabria, construction continued on the 220 kV line between Astillero and Cacicedo, which will significantly strengthen the security of supply in the entire city and the port area of Santander. Works were completed for the increase in the power transmission capacity of the 220 kV Garoña-Puentelarrá and the 220 kV Cillamayor-Mataporquera lines, which will allow greater integration of renewable energy and will mean an improvement in the resolution of technical constraints in the area. In Galicia, the new 220 kV Tomeza substation was commissioned in order to help power the high-speed train, with connections to the 220 kV Lourizán-Pazos and the 220 kV Lourizán-Tibo lines. Lastly, to increase the connection of renewable generation, the new 220 kV Lousame-Mazaricos line was commissioned.

> “For the connection of railway axes, new substation bays were commissioned at the Carmonita substation (Plasencia-Badajoz axis), Tomeza substation (La Coruña-Vigo line), Montesa substation (Játiva-La Encina line) and Cariñena substation (Zaragoza- Zaragoza line).

INTERNATIONAL CROSS-BORDER CONNECTIONS

Cross-border connections continue to be key elements in the energy transition in order to achieve greater integration of renewable energy and to advance along the road to decarbonisation. The strengthening of interconnections will continue to be a priority in the development of the transmission grid in the coming years.

The last interconnection commissioned between Spain and France (Baixas-Santa Llogaia) at the end of 2014 doubled the electricity exchange capacity between Spain and France (from 1,400 MW to 2,800 MW), which has contributed to strengthening the security of the two electricity systems and to boosting the integration of a greater volume of renewable energy. However, despite this increase, the degree of interconnection of Spain still continues to be far below the targets set by the European Union of 10% and 15%, for 2020 and 2030, respectively.

Spain's National Energy and Climate Plan (NECP) makes this clear and proposes increasing the exchange capacity with Portugal up to 3,000 MW and up to 8,000 MW with France, by means of three new electricity interconnections.
The interconnection between Gatika (Spain) and Cubnezais (France) will basically be the first underwater interconnection between Spain and France ('Bay of Biscay' project), and there are two other projects via the Pyrenees(1).

2030 European Union Target

15 %

interconnection exchange capacity over the total installed capacity nationwide

> Spain's National Energy and Climate Plan (NECP) proposes increasing the exchange capacity with Portugal up to 3,000 MW and up to 8,000 MW with France, by means of three new electricity interconnections.

(1) The three projects were endorsed by the Heads of State and the Governments of Portugal, Spain and France, as well as by representatives of the European Commission (EC) and the European Investment Bank (EIB) within the framework of the two Summits on cross-border connections held in 2015 (Madrid Declaration) and in Lisbon in 2018 (Lisbon Declaration). The three projects are included in the 5th list of Projects of Common Interest (PCIs), adopted by the European Commission on 19 November 2021. This list is to be approved through the Commission Delegated Regulation after the deadline for scrutiny by the co-legislators (Parliament and Council). For the time being, the European Parliament already gave its approval on 9 March after an objection was rejected.

SERVICE QUALITY

The service quality indicators for 2021 remain within the acceptable values set out in Royal Decree 1955/2000.

The key performance indicators of global quality according to Royal Decree 1955/2000 are Average Interruption Time (AIT) and Energy Not Supplied (ENS).

In the peninsular electricity system, 17 supply interruptions were registered in 2021, 42% more than in 2020. This rise is reflected in the increase in the ENS compared to the previous year (188 MWh in 2021 compared to 95 MWh in 2020). Similarly, an AIT value of 0.41 minutes was recorded (0.21 minutes in 2020), despite this result, it is still well below the reference value of 15 minutes established in article 26.2 of Royal Decree 1955/2000. The main incident occurred at the 220 kV Dos Hermanas facility with an ENS of 81 MWh.

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
2017	60	33	47	0.13	2.88	2.75
2018	250	38	63	0.52	3.27	3.77
2019	47	1	2,626	0.10	0.09	155.52
2020	95	4	65	0.21	0.47	4.29
2021 (1)	**188**	**1**	**33**	**0.41**	**0.07**	**2.33**

ENS: Energy not supplied. AIT: Average interruption time.

Average Interruption Time (AIT) = Energy Not Supplied (ENS) / Average System Power.

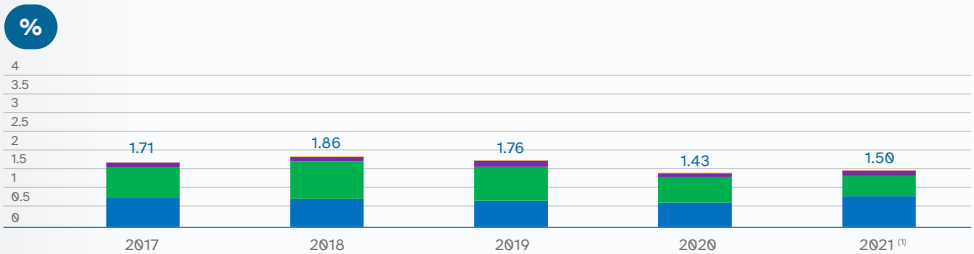
(1) Provisional data pending audit (currently underway).

In the Balearic Islands electricity system, the continuity of supply indicators for 2021 also showed a clear improvement over the previous year. One supply interruption was recorded, resulting in an ENS of 1 MWh (4 MWh in 2020) and an AIT of 0.07 minutes (0.47 minutes in 2020). Something similar occurred in the Canary Islands' electricity system, with an ENS of 33 MWh (corresponding to 4 supply interruptions) and an AIT of 2.33 minutes.

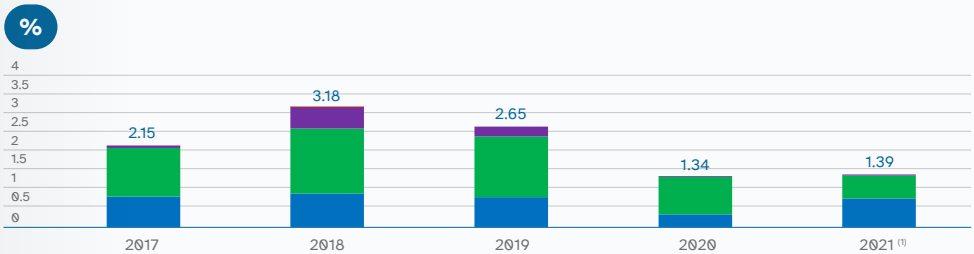
The quality of the transmission grid is also assessed on the basis of the availability of its facilities. Availability measures the capacity or possibility of use by the system of the various elements of the transmission grid, these being the electricity line circuits, transformers and active or reactive 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 following graphs show the evolution of the non-availability rate indicator over the last five years. The availability rate of the peninsular transmission grid in 2021 reached a value of 98.50%, slightly lower than the rate of 98.57% registered in 2020. In the Balearic Islands and the Canary Islands systems, the grid availability rate stood at 98.61% (98.66% in 2020) and 99.20% (99.07% in 2020) respectively. In general, 2021 showed an increase in the non-availability rate due to preventive and predictive maintenance carried out during the year, which contrasts with the decrease in scheduled non-availability of facilities as a result of improvement actions carried out on grid assets.

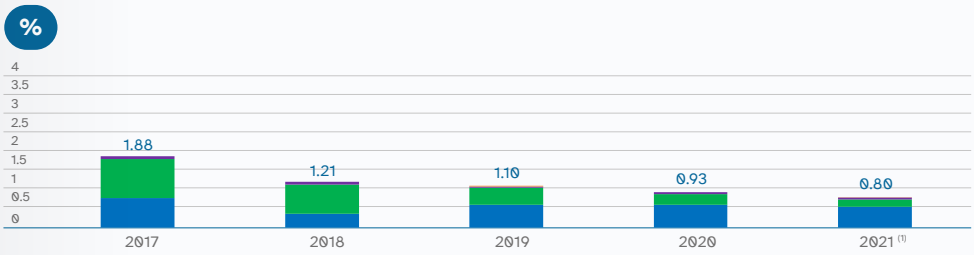
Annual evolution of the non-availability rate of the peninsular transmission grid



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



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



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

Note: Classification according to RD 1955/2000.

The total non-availability rate of the transmission grid does not include non-availabilities due to force-majeure or third-party actions.

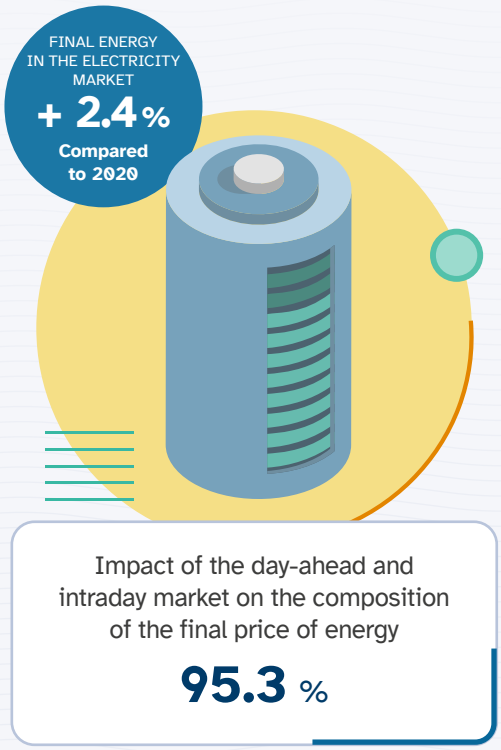
(1) Provisional data pending audit (currently underway).

5

Electricity Markets

The average final price of energy registered an all-time high in 2021. It is almost triple that of last year and doubles the figures registered between 2017 and 2019.

The average final energy price in the electricity market in 2021 was 118.65 €/MWh, the highest price ever.



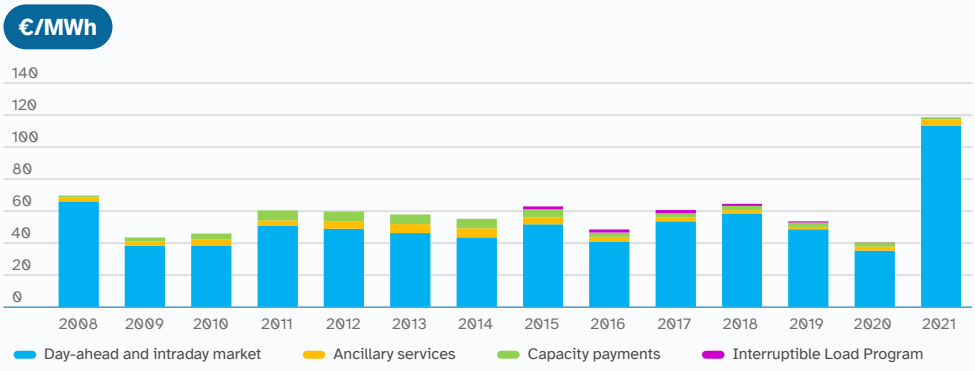
Impact of the day-ahead and intraday market on the composition of the final price of energy

95.3 %

In 2021, the total energy managed in the electricity market (reference supply plus free contracting) was 2.4% higher than the previous year.

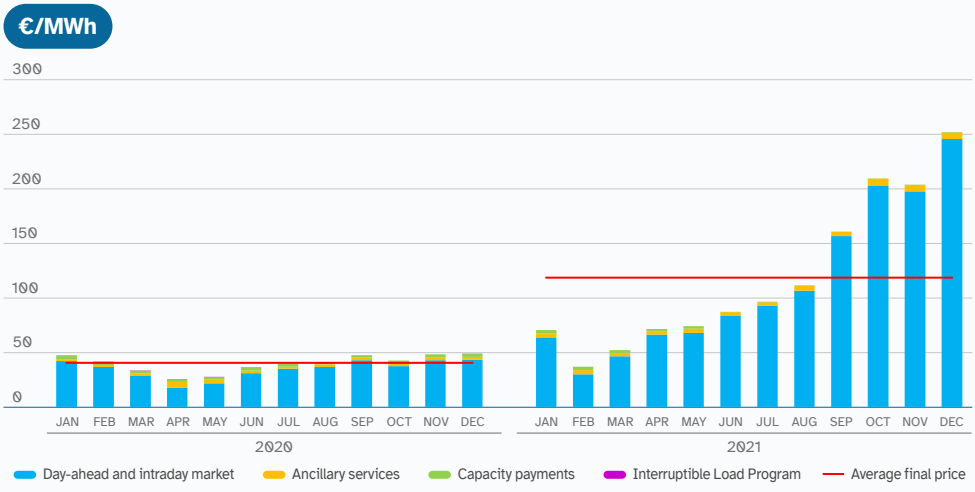
The average final energy price in the electricity market in 2021 was 118.65 €/MWh, the highest price ever. The previous all-time high was registered in 2008 when it reached a value slightly below 70 €/MWh, with the price this year being 70.6% higher. This is nearly triple the price registered in 2020 and double that of the figures registered between 2017 and 2019.

Components of the average final price of energy



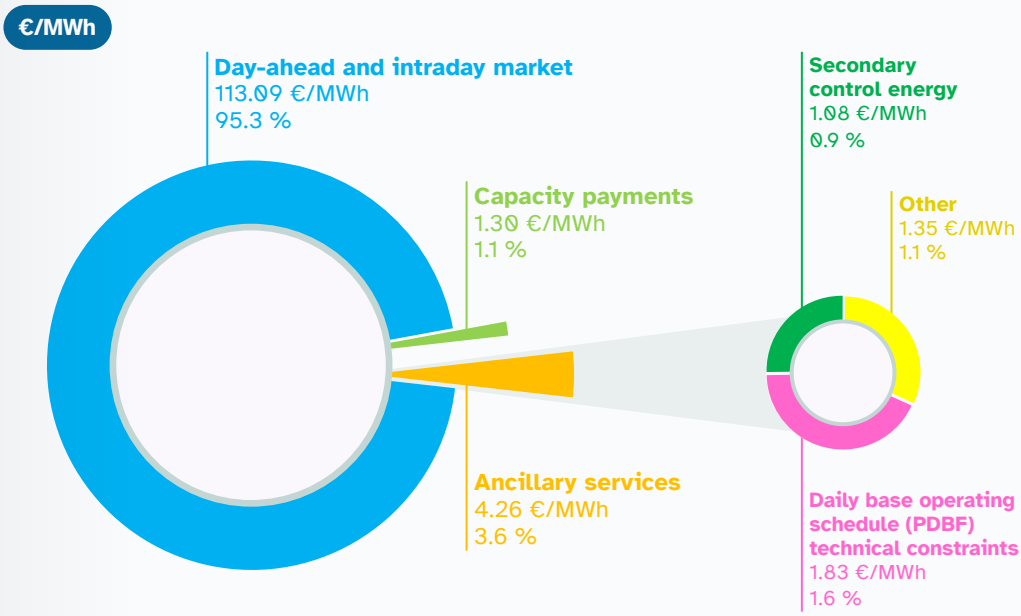
A month-on-month comparison shows that, with the exception of February, prices were higher than in the same months of the previous year. The previous year, due to the pandemic, prices were very low from March to June, registering an all-time monthly low in April, but the biggest increases compared to the previous year did not occur in these months, but in the last four months of the year. In those last months of the year, the variation was more than 200% compared to the same month of the previous year.

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



The weight of the day ahead and intraday market component increased in 2021, reaching 95.3%, which is the highest percentage ever, surpassing the 94.8% of 2008. The share of ancillary services represents 3.6%, very similar to that of 2018 and below the 6.3% registered in 2020. The share of capacity payments represents only 1.1%, much lower than in previous years, and only comparable to the 1.5% in 2008.

Components of the average final price of energy in the electricity market in 2021



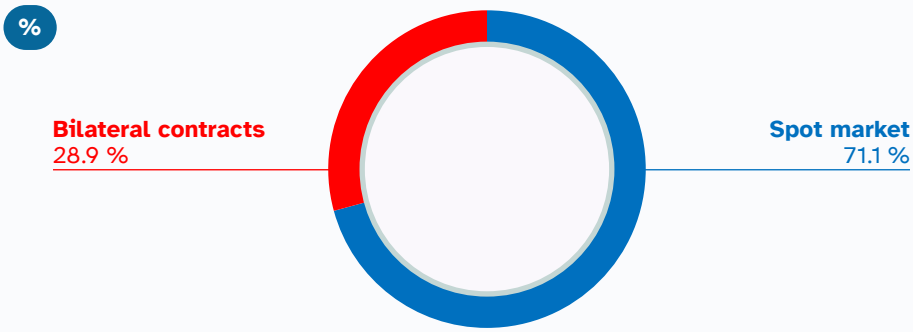
Comparing the impact of the price on demand served showed that the price of the day-ahead and intraday market almost tripled compared to the previous year, the price of ancillary services increased by 68.5% and capacity payments were reduced by almost 51%.

> The weight of the day ahead and intraday market component increased in 2021, reaching 95.3%, which is the highest percentage ever, surpassing the 94.8% of 2008.

DAY-AHEAD MARKET

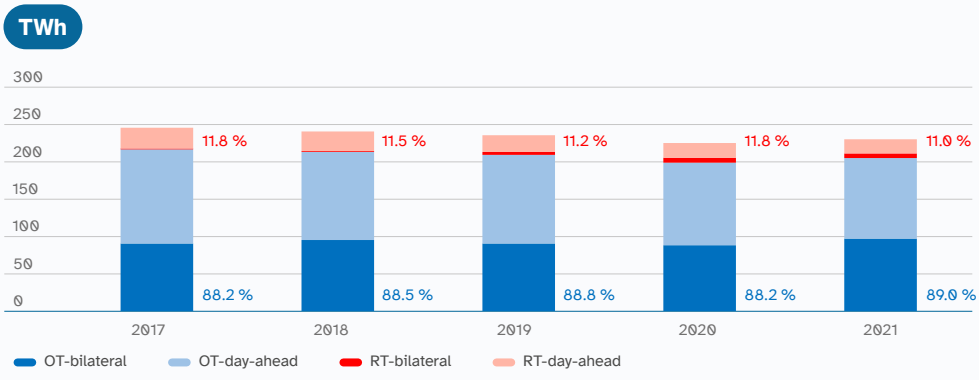
Energy in the day-ahead market stood at 248 TWh in 2021 (176 TWh in the spot market without bilateral contracts), an increase of 2.9% compared to 2020. 71.1% of energy was traded in the spot market and the remaining 28.9% through bilateral contracts, the same values as those registered in the previous year. These percentages have remained quite similar since 2015.

Percentage of energy purchased in the day-ahead market and through bilateral contracts



The share of energy supplied by market traders who are not classified as reference suppliers grew slightly this year, reaching a market share of 89% in 2021, compared to 88.2% in the previous year. The share is very similar to that registered in 2019.

Evolution of purchases in PDBF from Reference Traders (RT) and Other Traders (OT)

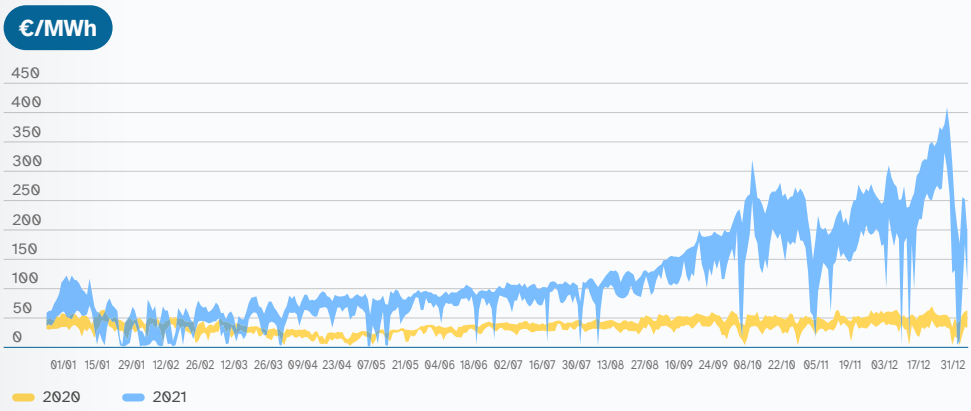


The share of energy supplied by market traders who are not classified as reference suppliers grew slightly this year, reaching a market share of 89% in 2021, compared to 88.2% in the previous year. The share is very similar to that registered in 2019.

The average day-ahead electricity market price in 2021 was 111.93 €/MWh, the highest ever, much more than the maximum value registered in 2008 (76 €/MWh). The price is more than triple that of last year's price (which was very low due to the pandemic). This price increase, shown in the graph, which was mainly as of August, actually started earlier with prices already above 90 €/MWh as of the end of May.

The year began with high values in January, but in February they were quite low, the following months, although high, were stable, and as of August, they had been rising steadily, registering a small fall in November and in the last few days of the year.

Evolution of maximum and minimum prices in the day-ahead market



It can be seen in the graph how the minimum prices were quite high. Worth highlighting was the month of September, whose minimum hourly value was almost 100 €/MWh. In the graph we can see how prices were rising, repeatedly exceeding the maximum registered values until, on 23 December it reached the all-time daily maximum all-time high (383.67 €/MWh) and the hourly record (409.00 €/MWh between 7:00 pm and 8:00 pm).

230 %
Compared to 2020

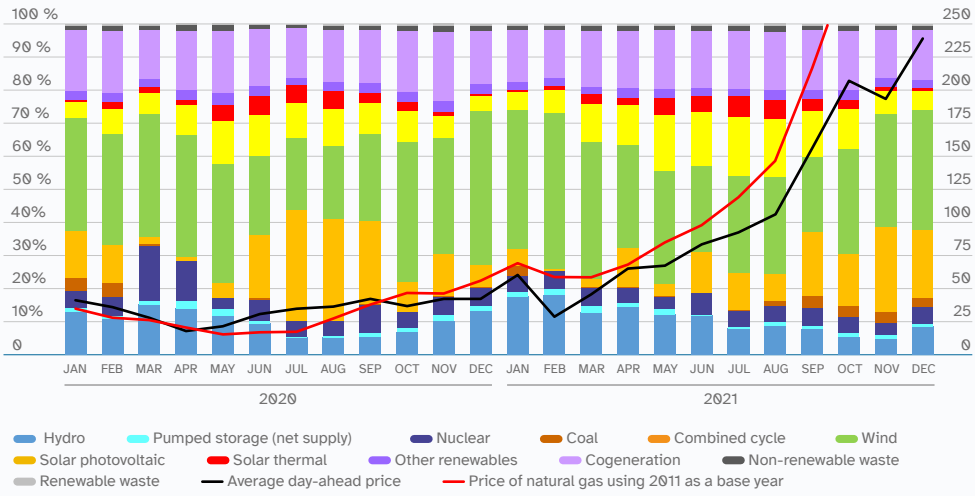
Average day-ahead electricity market price
111.93 €/MWh

As of April monthly prices set all-time highs and June registered the all-time monthly maximum since the start of the market. As of June, each month saw a new monthly record high, with the exception of November, finishing the month of December with a monthly record high of 239.16 €/MWh. However, February's price was low, the eighth lowest price ever registered for the month of February.

If we take into account the generation mix in the day-ahead market, an important factor in the calculation of the price, it can be seen that the month of February 2021 was the month with the lowest price, as it was the month with the highest share of renewables and with the lowest share of combined cycle.

Generation structure in the matching process and price of the day-ahead market and of natural gas

% and €/MWh



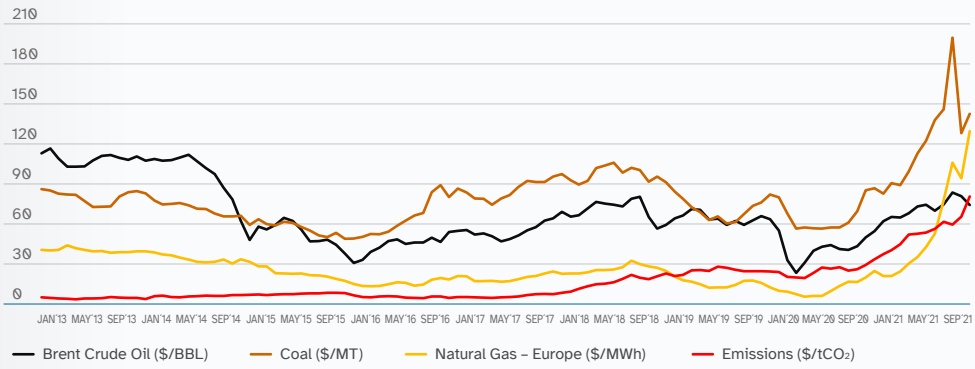
The share of renewable energy in the electricity generation mix for the energy matching process for 2021 was 62.6%, up from 57.6% the previous year. Nuclear saw its share in the mix reduced by 2.1 percentage points, as this year more energy was again managed through bilateral contracts, whereas during the pandemic much less was negotiated via bilateral contracts (down 1.7 percentage points in 2020 compared to the previous year). The share of combined cycle decreased by 2.1 percentage points, while that of coal increased slightly (0.8 percentage points). Wind and solar increased by 1.3 and 3.1 percentage points, respectively. This scenario would have led us to expect a reduction in prices, however, this was not the case.

Another factor influencing the price is fuel reserves. These were above historical average levels until April. In February, reserves almost reached their maximum levels, a situation that also influenced the fall in prices in that month. In the last few months of 2021, fuel reserves were below the average values, which caused an increase in prices.

The increase in the market price during most of 2021 was mainly due to the increase in fuel prices and for CO_2 emissions.

The graph below shows the sharp increase in fuel prices. The price of European natural gas, after reaching its lowest price ever in May 2020 (during the pandemic), began to rise which led it to repeatedly reach the highest prices since August, with the exception of November, reaching a value of 129.65 $/MWh in December, a value which is much higher than the 19.97 €/MWh in December 2020. The price of coal followed a similar trend, reaching its maximum prices in October, as after the fall in November (stronger than that of gas) prices did not reach the maximum again. The price of Brent Crude Oil, which during the pandemic was also low, reached values that had not been seen since 2002, increasing throughout the year and exceeding the values of 2018, but this was still far from the prices recorded between 2011 and 2014.

Evolution of the price of fuel and CO_2 emissions



With regard to the price of CO2 emissions, a slight fall was recorded from March to May 2020, which was below the values registered the previous year, and then it began to rise and repeatedly beat the all-time monthly maximum prices as of December 2020. The annual price was 120% higher than in 2020 and 119% higher than in 2019.

If the energy matching process of the generation mix is represented in a graph showing the times of the day in which the day-ahead market price set the annual minimum and maximum values, it can be seen how these are quite different. Regarding the time of day at which the minimum price was set, it can be seen how wind power was the technology that had an impact on the marginal price (with a percentage higher than 43%), with renewable energy matched at that time being nearly 80%. Looking at the mix during the hour of the day in which the maximum price was registered, it can be seen that hydro determined the marginal price, although it was combined cycle that had the highest percentage in the mix (around 35%). At that time of the day, renewables represented a share of just under 40% of the generation mix. On that day, the greatest volume of energy matched with prices close to the marginal price corresponds to combined cycle followed by hydro.

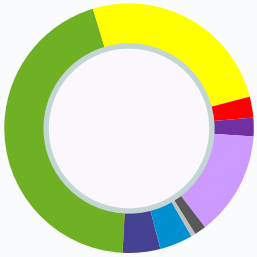
Generation mix in the Day-Ahead Market (DAM) energy matching process in 2021 (annual minimum and maximum hourly price)

%

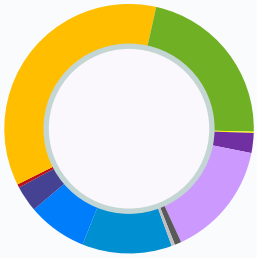
	Minimum price	Maximum price
Hydro	4.3 %	11.6 %
Pumped storage (net supply)	0 %	7.7 %
Nuclear	4.9 %	3.4 %
Coal	0 %	0.4 %
Combined cycle	0 %	35.9 %
Wind	44.5 %	21.9 %
Solar photovoltaic	25.6 %	0.2 %
Solar thermal	2.7 %	0 %
Other renewables	2.4 %	2.6 %
Cogeneration	13.5 %	15.0 %
Non-renewable waste	1.5 %	0.9 %
Renewable waste	0.6 %	0.4 %

Energy technology that sets the marginal price

Minimum price (DAM)
9 May (4:00 pm)



Maximum price (DAM)
23 Dec (7:00 pm)

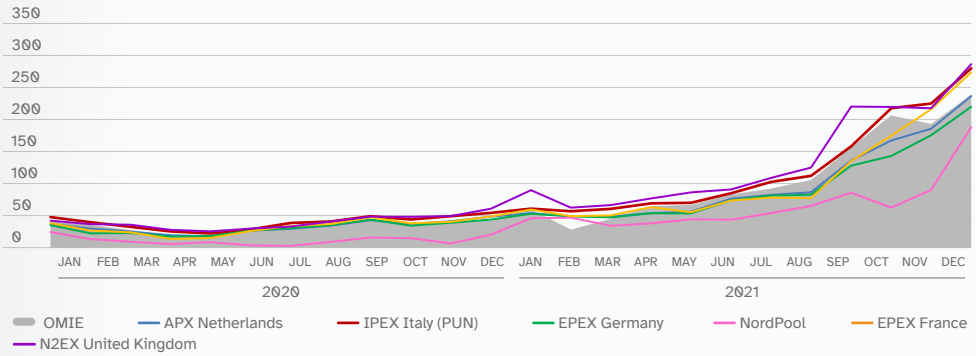


The maximum day-ahead price was recorded on 23 December (383.67 €/MWh) and the minimum on 31 January (1.42 €/MWh).

European prices recorded the same behaviour as those of Spain, all setting annual and monthly record highs. A comparison between the Spanish day-ahead market price and the European market prices shows that prices in Italy, Spain and the United Kingdom are among the highest in Europe. In February, the prices in Spain were the lowest in Europe.

European market prices

€/MWh



INTRADAY MARKET

Energy trading in the intraday market auctions stood at 31 TWh (includes all transactions in which at least one Spanish agent participated), which represents 17.6% of what was traded in the day-ahead market.

The arithmetic average price of the intraday market in 2021 stood at 112.58 €/MWh, a value that was 0.6% higher than the day-ahead market.

On the other hand, energy trading in the continuous intraday market stood at 6.5 TWh, compared to 5.2 TWh the previous year. The average weighted price in Spain stood at 113.73 €/MWh, fluctuating between 37.35 €/MWh in February and 234.84 €/MWh in December.

+5.9 %
Compared to 2020

Energy sales in the intraday market auctions
31 TWh

ANCILLARY SERVICES

The energy needs managed through the ancillary services in 2021 were 5.8% higher than in the previous year. Energy scheduled for security reasons was 6.2% lower, as a result of the decrease in energy for technical constraints of the Daily Base Operating Schedule (PDBF), which stood at 19.4%, while the energy for real-time technical constraints doubled. Balancing energy increased by 21.4%, mainly as a result of the increase in secondary control power and the coming into force at the end of 2020 of the International Grid Control Cooperation (IGCC - imbalance netting process that avoids the need for secondary control power).

Energy requirements covered through ancillary services

GWh

	January-December 2021			January-December 2020			%2021/2020		
	Upward energy	Downward energy	Total	Upward energy	Downward energy	Total	Upward energy	Downward energy	Total
Energy scheduled for security reasons	**9,475**	**912**	**10,386**	**10,159**	**914**	**11,074**	**-6.7**	**-0.3**	**-6.2**
Technical constraints (PDBF)	7,789	253	8,042	9,431	548	9,979	-17.4	-53.8	-19.4
Real-time technical constraints	1,686	659	2,345	728	366	1,094	131.5	80.0	114.3
Balancing energy used	**5,824**	**4,480**	**10,305**	**4,890**	**3,599**	**8,490**	**19.1**	**24.5**	21.4
Replacement Reserve (RR)	2,168	852	3,020	2,107	872	2,979	2.9	-2.2	1.4
Secondary control	1,300	1,541	2,840	1,212	1,631	2,843	7.2	-5.5	-0.1
Tertiary control	2,160	1,322	3,482	1,543	1,061	2,603	40.0	24.7	33.7
IGCC [1]	197	765	962	28	36	64	599	2,023	1,398
Total energy managed	**15,299**	**5,392**	**20,691**	**15,050**	**4,514**	**19,563**	**1.7**	**19.5**	**5.8**

(1) Secondary control power avoided thru the use of the European platform for secondary control imbalance netting.

The volume of energy for technical constraints of the Daily Base Operating Schedule represented 38.9% of the total, a percentage that is lower than the value of 51% registered the previous year.

Average weighted prices of ancillary services

GWh

	2020		2021		%21/20	
	Upward energy	Downward energy	Upward energy	Downward energy	Upward energy	Downward energy
Daily base operating schedule (PDBF) technical constraints	75.3	30.7	145.9	89.0	93.8	189.5
Real-time technical constraints	146.1	7.4	269.7	37.6	84.6	405.8
Secondary control	35.8	29.0	112.1	100.5	213.1	246.8
Tertiary control	42.6	19.3	137.4	59.1	222.6	206.4
Replacement Reserves (1)	43.1	22.0	144.3	70.2	235.0	218.4

(1) Balancing energy from replacement reserves (RR) has a single price. The value represented in the table corresponds to the weighted average price according to the activated upward or downward balancing energy needed to cover the need of the Spanish Electricity System. Up to and including February 2020, the figures correspond to the weighted average price of the energy managed through the generation-consumption deviation management service.

> In 2021, the cost of the ancillary services was 1,032 million euros, 71.7% higher than in the previous year.

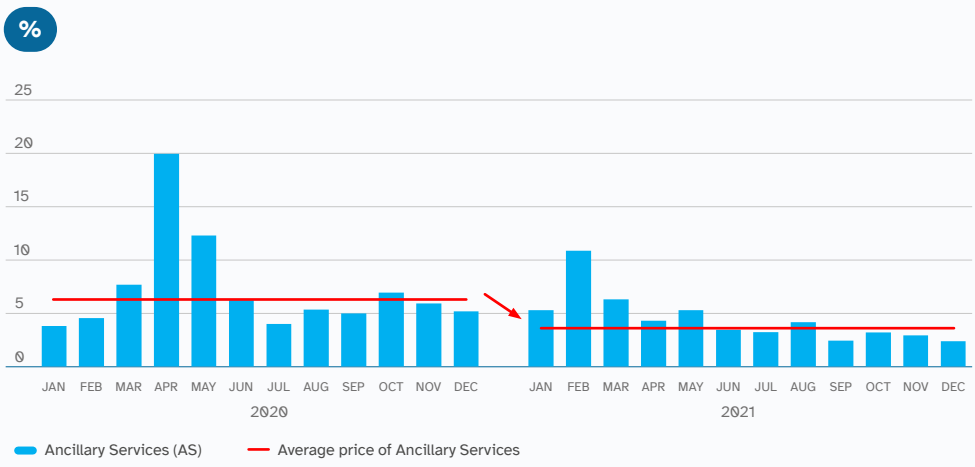
Cost of ancillary services in M€

	2020	2021
Daily base operating schedule (PDBF) technical constraints	**501**	**724**
Real-time technical constraints	423	443
Technical constraints	78	281
Secondary control	95	262
Deviation management	40	107
Other*	-19	-46
Power control factor	-17	-15
Total Ancillary services	**601**	**1,032**
Δ2021/2020		**71.7%**

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

The impact of ancillary services on the average final price of energy was 4.26 €/MWh, higher than the 2.54 €/MWh of 2020. This increase was due to the high prices registered in all markets. If we compare the impact of this service in the final average price, we can see that this year's price was reduced (3.6% compared to 6.3% the previous year).

Weight of the impact of the ancillary services on the final price



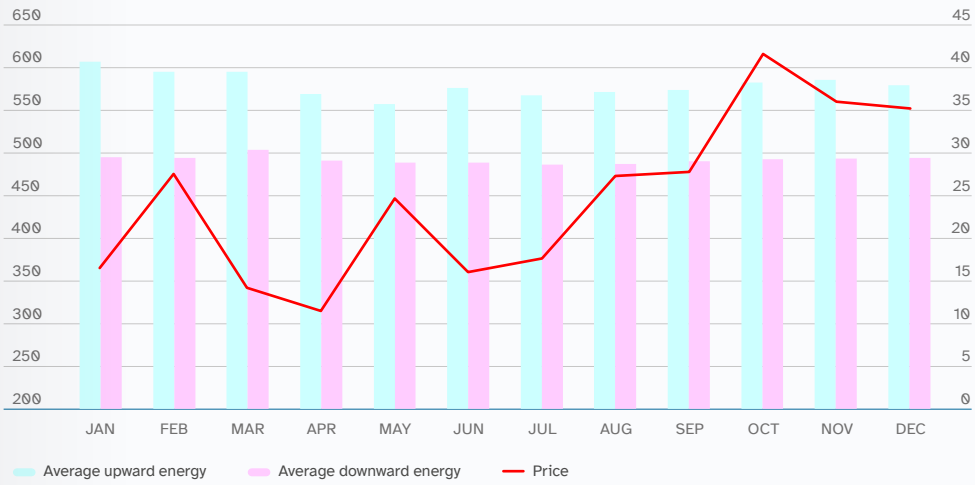
In April 2020, ancillary services accounted for 20% of the average final price of energy, when they are usually below 5%. The exceptional situation in the operation of the system due to COVID-19 led to a greater need for the use of ancillary services. In February 2021, the month with the highest percentage of renewables during the year, its weight is the highest this year.

Replacement Reserves Markets

The average hourly band of secondary regulation assigned to upward energy was 580 MW, compared to 593 MW the previous year, with an impact of 1.08 €/MWh on demand served, 170% higher than the previous year. The annual weighted average price stood at 24.5 €/MW, and the highest monthly price was registered in October with 41.45 €/MW).

Secondary control power and price

MW and €/MW



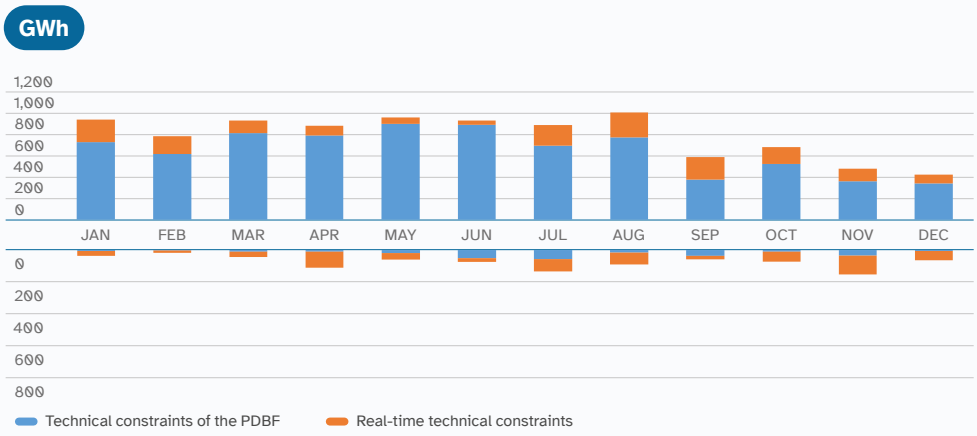
> The impact of ancillary services on the average final price of energy was 3.6%, a value that is lower than the impact of 6.3% registered in 2020.

Energy scheduled for security reasons

The energy scheduled to resolve technical constraints amounted to 10,386 MWh, 6.2% less than the previous year. Upward energy scheduled accounted for 91.2% of the total energy.

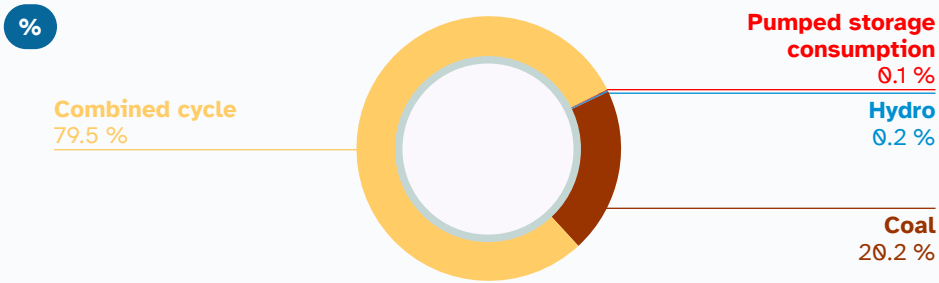
The energy scheduled to resolve technical constraints of the Daily Base Operating Schedule (PDBF) was 7,789 GWh of upward energy (17% less than the previous year) and 253 GWh of downward energy (half that of the previous year). The average value of the price of upward energy was 135.8 €/MWh, 80.4% higher than in 2020, and that of the price of downward energy was 82.8 €/MWh, nearly three times that of 2020. The impact on the average final price of energy was 1.83 €/MWh compared to 1.79 €/MWh the previous year.

Monthly evolution of energy scheduled for security reasons



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

Upward Energy in phase 1



The energy scheduled for technical constraints in real time totalled 2,345 GWh, slightly more than double the value of the previous year. 71.9% corresponds to allocations of upward energy and the remaining 28.1% to downward energy. The impact on the average final price was 1.16 €/MWh compared to 0.33 €/MWh the previous year.

Balancing markets

Evolution of energy requirements covered through balancing energy

The balancing markets (secondary control, tertiary control, replacement reserve and secondary control power avoided through the use of the European platform for secondary control imbalance netting) had total energy requirements of 10,305 GWh. Of this total, 56.5% corresponded to upward energy managed and the remaining 43.5% to the downward energy managed.

The largest energy requirements were covered by tertiary and replacement reserve. Noteworthy is the significant share of renewable generation in these services.

> The energy scheduled for technical constraints in real time totalled 2,345 GWh, slightly more than double the value of the previous year.

Total energy requirements covered by the balancing markets

49.8 %

of the total energy required

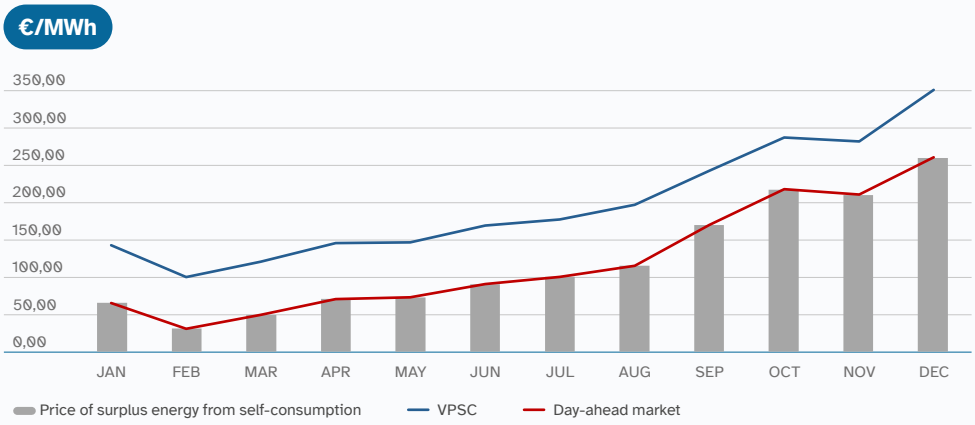
VOLUNTARY PRICE FOR SMALL CONSUMERS

In the following graph, it can be seen how the voluntary price for small consumers (VPSC), known as PVPC in Spain, is conditioned by the day-ahead market. For this reason, the highest VPSC price was registered in December, while the lowest was registered in February.

The price of surplus energy from self-consumption is paid at a price very similar to the day-ahead market price.

Evolution of the VPSC, Day-ahead market and surplus energy from self-consumption

General tariff 2.0TD and 2.0A, prior to June

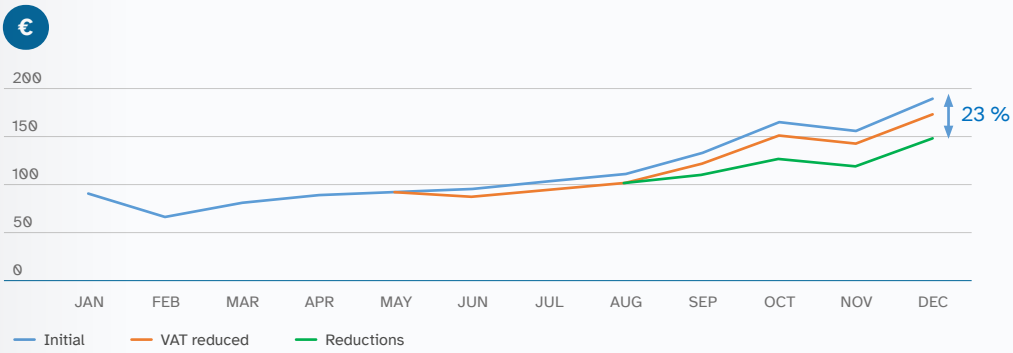


On 1 June, the tariffs were modified, reducing their number and modifying the tolls and charges (which had remained unchanged since 2014). From that moment on, practically all domestic consumers are now covered by the 2.0 TD access tariff, which now includes hourly discrimination broken down into three periods each day for energy (peak, standard and off-peak) and two for the contracted power (peak and off-peak).

The new tolls and charges make the VPSC on weekdays much more expensive during peak hours. Thus, depending on the distribution of the percentage of consumption in the different periods, the cost of the access toll concept is affected and, therefore, this affects the total cost of the electricity bill.

The high day-ahead market prices, which as has already seen have an impact on the regulated electricity bill, led to exceptional measures being taken to reduce the cost. Thus, in June, VAT was reduced (from 21% to 10%) if the contracted power does not exceed 10 kW and if the wholesale market price exceeds 45 €/MWh. As of 16 September, charges were reduced by 96% and the electricity tax was reduced from 5.11% to 0.5%.

Cost in the electricity bill (in €)



The graph shows how the one-off measures affected the cost of the electricity bill. With the first VAT reduction measure, a 9% reduction in the bill was achieved, while all the measures together reduced the bill by 23%.

In order to calculate the cost of the regulated tariff, if a comparison were made with the old 2.0A tariff, considering a contracted power of 4.6 kW and a consumption of 3,900 kWh/year, with the consumption scenario published on the CNMC website, which is weighted as follows: 45% off-peak hours, 26% standard hours and 29% peak hours. The cost of a typical electricity bill for 2021 as a whole would be €1,023, a value that is 43% higher than what would have been paid for the same consumption in 2020, i.e., almost €308 more per year. This would be the highest electricity bill ever (even though the calculation takes into account the tax reduction measures put in place by the Government).

Of the 1,023 euros that this typical customer would have paid for their electricity consumption in 2021, 561 euros would correspond to the purchase of energy in the market (55% of the bill), 311 euros (30%) would correspond to the regulated part of tolls and system charges and the remaining €151 would correspond to taxes (15%). Thus, although the cost of energy purchased on the electricity market would have increased by 178.7% compared to 2020, the total bill would only have increased by 43%.

The high prices of electricity experienced during 2021 meant that the final cost of energy had an ever-increasing impact on the cost of the electricity bill.

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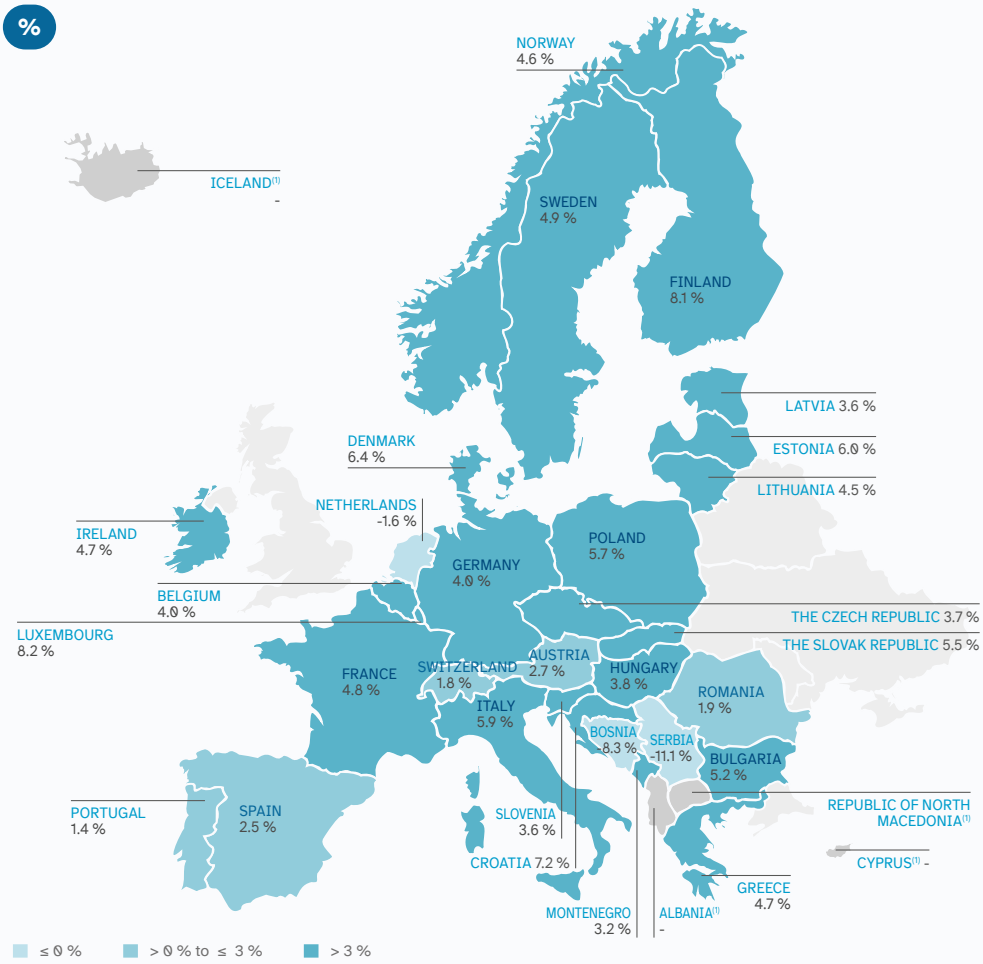
European Landscape

The purpose of this chapter is to establish a comparison between the European countries belonging to ENTSO-E in the different areas of the electricity system. Comparisons are based on information that is publicly available on the ENTSO-E Transparency Platform. The information used is governed by Regulation (EU) No 543/2013, which establishes the common and standardised criteria that must be followed by member states when submitting data. For this reason, certain discrepancies may arise with the rest of the chapters of this report for the specific case of Spain, where consolidated data at a national level is obtained using a power measurement system.

Energy generation from renewable sources (excluding pumped storage hydroelectric generation) continues to grow for yet another year, and despite the circumstances associated with the pandemic, it represented 38.7% of the energy produced in the ENTSO-E countries as a whole.

In a context still marked by the pandemic, ENTSO-E countries as a whole, showed an increase of 3.9% in electricity demand in 2021 compared to the previous year, an increase that offsets the decrease of 3.6% in 2020 compared to 2019. The majority of ENTSO-E member states registered increases in their demand, while only the Netherlands, Bosnia-Herzegovina and Serbia recorded a decrease in demand. The most significant increases have occurred in some of the most relevant European countries such as Finland or Italy.

Increase in electrical energy demand in ENTSO-E member states 2021/2020



Source: data obtained from the ENTSO-E Transparency Platform as at 26/1/2022. The data is governed by Regulation (EU) No 543/2013, and is obtained from real-time systems and therefore differs from the consolidated data used for the specific case of Spain at national level, which is obtained using a power measurement system.

(1) Data not available.

THE SHARE OF RENEWABLE ENERGY CONTINUES ITS GROWTH PATH

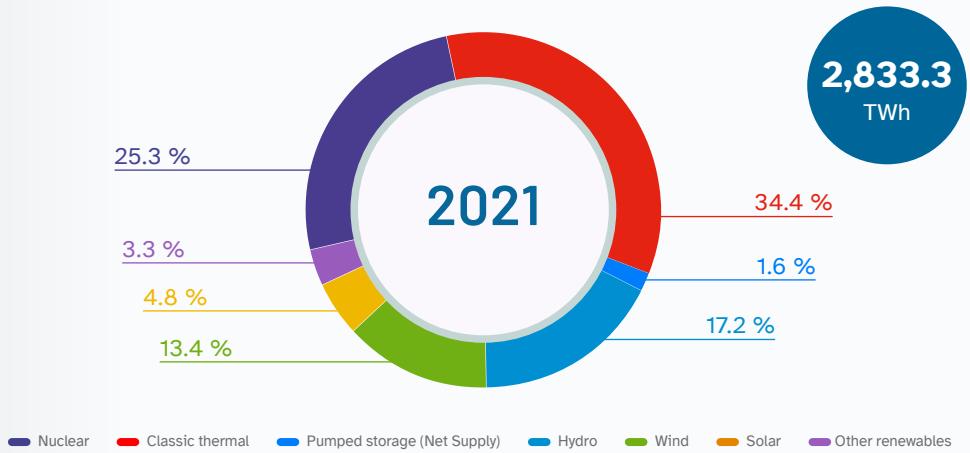
Energy generation from renewable sources (excluding pumped storage hydroelectric generation) continues to grow for yet another year, and despite the circumstances associated with the pandemic, it represented 38.7% of the energy produced in the ENTSO-E countries as a whole. The variation in renewable energy in 2021 stood at 0.4% compared to the previous year, with solar energy experiencing the greatest growth compared to other technologies with a variation of 10.4% compared to 2020. In 2021, Spain occupied the tenth position in terms of coverage with renewable energy, being the fifth country in terms of coverage with wind energy and second in terms of coverage with solar energy, both calculated as a percentage of total electricity production.

Origen of the total energy production in ENTSO-E member states

TWh and %

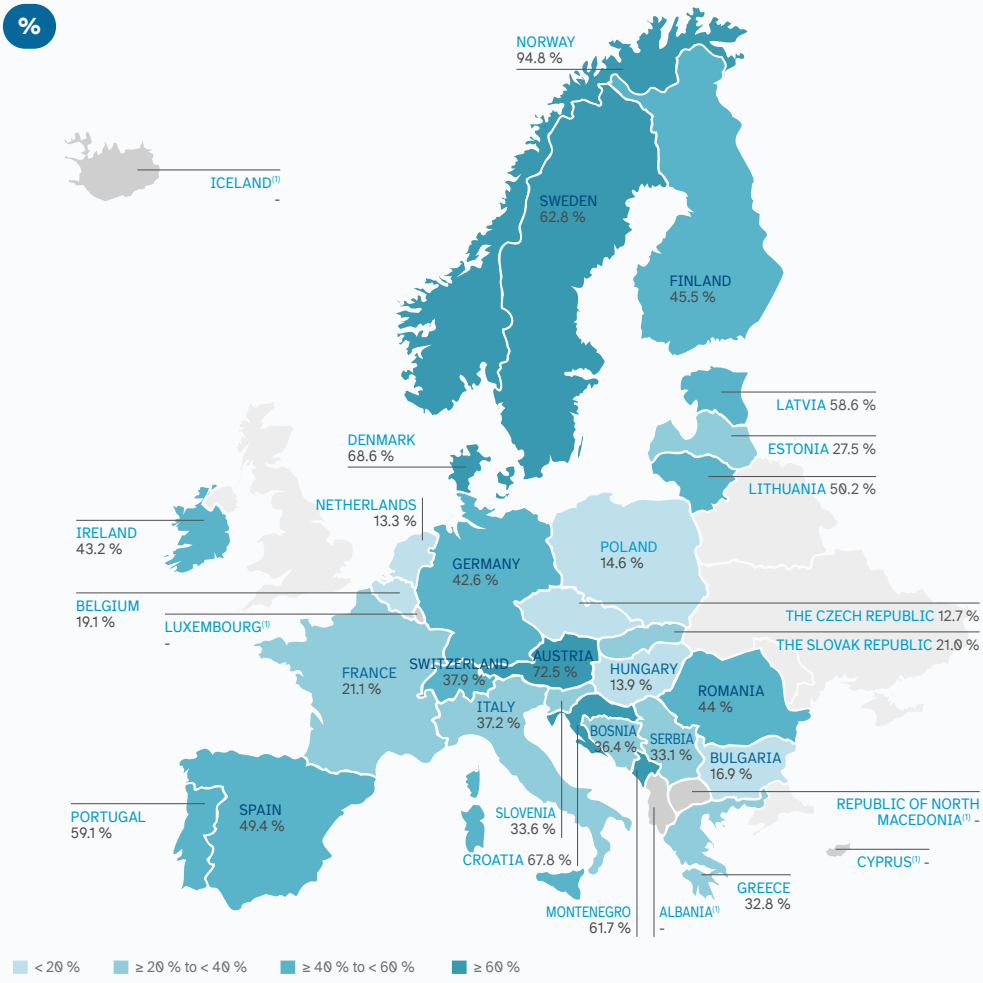
	2020	2021	%21/20
Nuclear	673.4	716.3	6.4
Classic thermal	927.1	974.5	5.1
Pumped storage (Net Supply)	44.3	46.3	4.6
Hydro	490.6	488.0	-0.5
Wind	388.0	380.7	-1.9
Solar	122.2	134.9	10.4
Other renewables	90.6	92.4	2.0
Total	**2,736.2**	**2,833.3**	**3.5**

Source: data obtained from the ENTSO-E Transparency Platform as at 26/1/2022. The data is governed by Regulation (EU) No 543/2013, and is obtained from real-time systems and therefore differs from the consolidated data used for the specific case of Spain at a national level, which is obtained using a power measurement system.



The following map shows the contribution of renewable generation to total demand coverage in each of the countries, with the Nordic countries, for yet another year, being ranked in the first positions.

Renewable energy structure over total production in ENTSO-E member states



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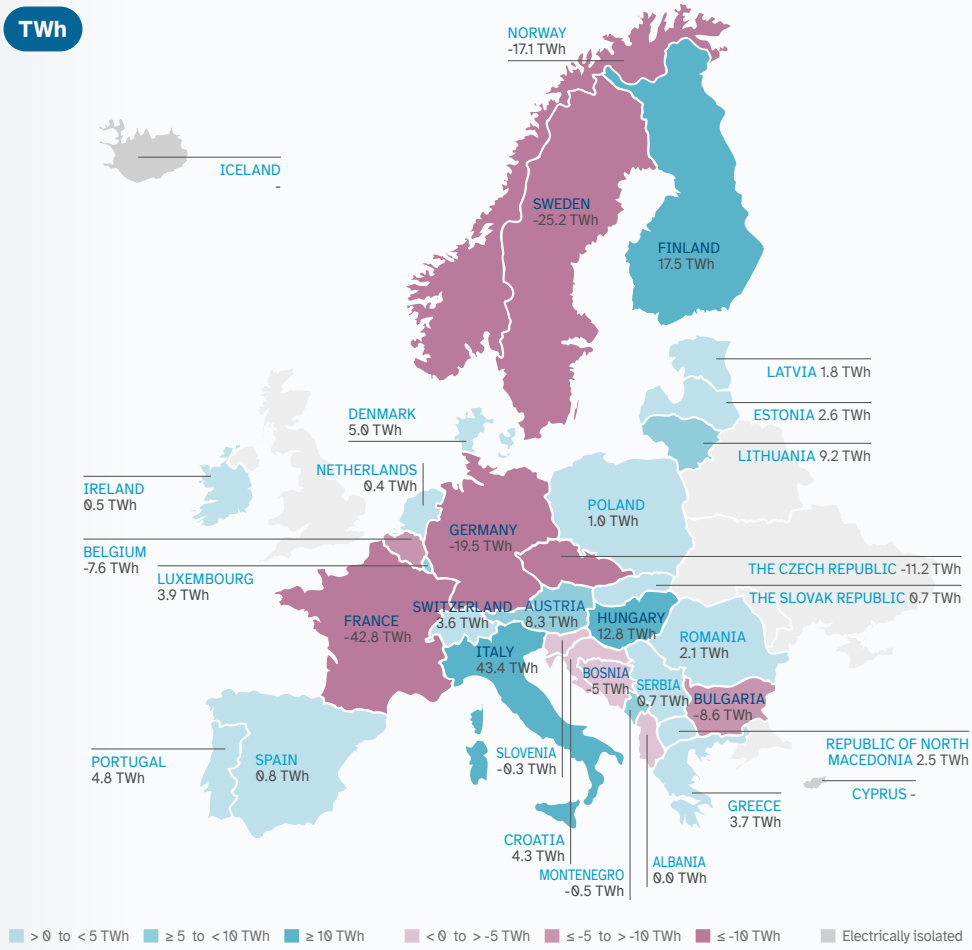
(1) Data not available.

ENERGY EXCHANGES IN 2021 WERE MOSTLY AS AN EXPORTER

A country's energy exchanges fluctuate every year, depending on factors such as exchange capacity, market coupling and the influence of energy prices. In 2021, the net balance of electricity exchanges among ENTSO-E countries and with their neighbouring countries (who are non-member states) was as an exporter with more than 8 TWh. The largest exporters include France, Sweden, Germany and Norway, with export balances of 43 TWh, 25 TWh, 20 TWh and 17 TWh, respectively. On the other hand, the largest importers were Italy and Finland, with 43 TWh and 18 TWh, respectively.

Balance of energy exchanges among ENTSO-E member states and with neighbouring non-member states



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Regulatory Framework

In the European context, 2021 was marked by the further development of the European Green Deal. An important milestone was the publication of **Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality** (known as the European Climate Law), which sets a greenhouse gas emission reduction target of 55% by 2030 (compared to 1990 levels) and climate neutrality by 2050. To meet this 55% reduction target, the European Commission presented the **'Fit for 55' package** on 14 July 2021. This new package consists of a roadmap entitled 'Fit for 55: delivering the EU's 2030 Climate Target on the way to climate neutrality', published together with a package of legislative initiatives, which are still in the approval phase, among which the following are noteworthy:

- **Proposal for a Directive revising the Renewable Energy Directive.**
  Among the main novelties of this proposal, the European Commission proposes to increase the EU's renewable energy target for 2030 to 40% compared to the current target of 32%.

- **Proposal for a Directive revising the Energy Efficiency Directive.**
  The proposal seeks to raise the level of ambition for energy efficiency for the EU: proposing energy efficiency targets of 39% and 36% for primary and final energy consumption, respectively.

- **Proposal for a Regulation establishing the Carbon Border Adjustment Mechanism.**
  The proposed mechanism would work as follows: EU importers will be required to buy carbon certificates corresponding to the carbon price that would have been paid if the goods had been produced under the EU's carbon pricing rules.

- **Proposal for a Directive amending Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity.**
  The main purpose of the proposal for a Directive is to meet the climate change and energy targets of the EU and is based on the need to adapt the taxation of energy products and electricity contained in Directive 2003/96/EC to current EU policies.

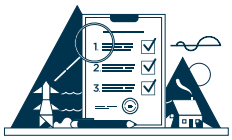
Beyond the 'Fit for 55' package, but within the European Green Pact, the agreement reached on 22 December 2021 between the European Parliament and the Council on the proposed **revision of Regulation 347/2013 on guidelines for trans-European energy infrastructures** was very important. Key elements of the political agreement include the introduction of mandatory sustainability criteria for all projects, the need to simplify and speed up the permitting and authorisation procedures, creating a reinforced framework for non-binding cooperation in the field of offshore grid planning, and strengthening the governance process.

Lastly, on 10 December, **Commission Delegated Regulation 2021/2139 of 4 June 2021 was published, setting out the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation.**

Regarding the national regulatory framework, one of the main regulatory milestones in the first half of 2021 was the publication on 21 May 2021 of **Law 7/2021 on Climate Change and Energy Transition**. This Law, which applies to various sectors, sets minimum energy and climate targets for Spain for 2030, in alignment with Spain's 2021-2030 National Energy and Climate Plan (NECP). Additionally, in line with the provisions of the European Climate Law, a net-zero emissions target has been set for 2050.

As of June 2021, the new regime applicable to **access tolls and fees** came into force. This was established in Royal Decree 148/2021, published on 9 March, which sets out the methodology for calculating the fees related to the electricity system, and in CNMC Circular 3/2020, of 15 January, which establishes the method for calculating the access tolls for electricity transmission and distribution. These new regulations allow all consumers to have a toll price that is based on hourly discrimination in terms of power and energy consumption, increasing the price difference between peak and off-peak consumption periods.

> An important milestone in 2021 as a continuation of the development of the European Green Pact was the publication of **Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality**.



As of last summer, as a result of the escalation of prices in the electricity and gas sectors, the Government began to introduce a series of measures aimed at reducing the cost of the electricity bill and protecting consumers:

- **Royal Decree-Law 12/2021 of 24 June adopting urgent measures in the field of energy taxation and energy generation, along with the management of the regulatory levy and the water-use tariff**. This Law introduces certain tax measures, such as the reduction of VAT, applied to the electricity bill, from 21% to 10% up until 31 December 2021, or the suspension of the Tax on Electricity Production (IVPEE), which is applied in Spain.
- In September, an even more relevant Royal Decree-Law was published due to the scope of the measures adopted; **Royal Decree-Law 17/2021, of 14 September, on urgent measures to mitigate the impact on the gas and electricity retail markets of the steep rise in natural gas prices**. The proposed temporary measures include the reduction of the Special Tax on Electricity (IEE) from 5.1% to 0.5%, the introduction of a mechanism to reduce the excess remuneration caused by the high price of natural gas on international markets (subsequently clarified in Royal Decree-Law 23/2021) and a 96% reduction in electricity system fees.
- A month later, **Royal Decree-Law 23/2021 of 26 October on urgent energy measures to protect consumers and introduce transparency in the wholesale and retail electricity and natural gas markets** was published. In this decree, the government has introduced new measures aimed at mitigating the impact of the price of electricity and natural gas on consumers, especially the most vulnerable ones, as well as increasing transparency in these markets.
- A few days before the end of the year, **Royal Decree-Law 29/2021 of 21 December was published, adopting urgent measures in the field of energy to promote electric mobility, self-consumption and the deployment of renewable energies**, which extends until 30 April 2022 the application of the reduced VAT rate of 10%, as well as the application of the reduced rate of 0.5% of the IEE. For its part, the IVPEE will remain suspended until 31 March 2022.

Lastly, it should be noted that 2021 saw the start of the new **Remuneration Framework for Renewable Energy** in Spain (REER), established at the end of 2020 through Royal Decree 960/2020, of 3 November, which regulates the remuneration scheme for the generation of electricity from facilities that use renewable energy sources.

Throughout 2021, **two auctions** were held under this new remuneration framework: the first in January and the second in October. With the holding of these two auctions, a total of 2,902 MW of photovoltaic energy and 3,256 MW of wind power were allocated, thus complying with the indicative calendar for allocating the new REER, which established a planned aggregate capacity of 2,500 MW from wind power technology and 2,800 MW from photovoltaic technology by 2021.

> With the escalation of prices in the electricity and gas sectors, the government began to introduce a series of measures aimed at reducing the cost of the electricity bill and protecting consumers.

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