Press release

Spanish electricity system reports 2024

Electricity generation from renewable energies in Spain grows by 10.3% in 2024, reaching record levels

56.8% of all electricity generated in Spain over the last year came from natural sources such as wind, sun, or water.

The Spanish electricity system added 7.3 GW of new photovoltaic and wind power capacity, the highest increase ever recorded in a single year. This makes photovoltaic energy the first technology in terms of installed capacity.

Electricity demand in Spain increased by 1.4% compared to the same period the previous year, after adjusting for working patterns and temperatures.

In 2024, Red Eléctrica commissioned 487 new km of electrical circuits, bringing Spain's total to 45,674 km. When Red Eléctrica was established in 1985, the company had a total of 10,500 km.

Madrid, 18 March 2025

Spain closed 2024 with 148,999 GWh of renewable energy generation, marking a 10.3% increase from the previous year and accounting for 56.8% of the total energy mix. These annual figures, the highest ever recorded by Red Eléctrica, highlight the significant progress of the ecological transition in Spain. The growth in installed capacity from renewable energy generation, along with favourable weather conditions in 2024, led to a 35.5% increase in hydroelectric electricity generation compared to 2023. Additionally, solar photovoltaic energy saw an 18.9% increase, setting a new record for the sixth consecutive year.

These findings are part of the *Spanish electricity system report 2024* and *Renewable energies in the Spanish electricity system 2024*, two documents by Red Eléctrica, Redeia's subsidiary responsible for transmission and operation of the Spanish electricity system since 1985. The reports analyse the performance of the electricity system over the past year and were presented today at the Ministry for Ecological Transition and the Demographic Challenge. The event also examined the evolution of Spain's energy system over the past decades in celebration of the company's 40th anniversary.

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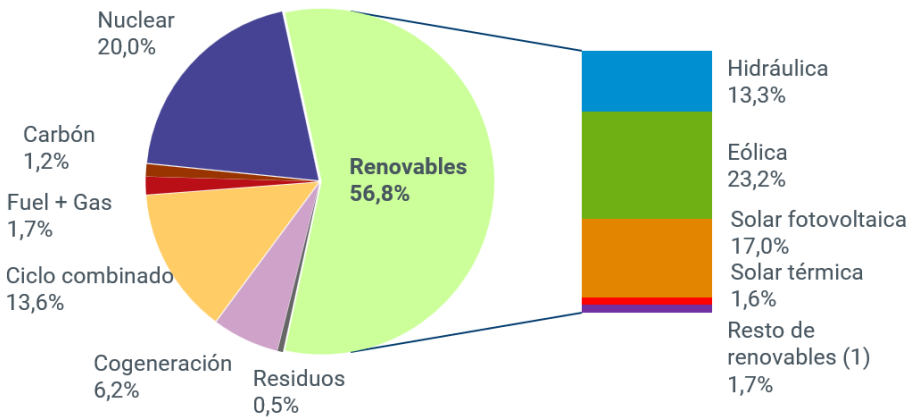
Beatriz Corredor, chairwoman of Redeia, Red Eléctrica's parent company, highlighted the significant progress of Spain's electricity system. So, she stated that 'Spain achieved its best-ever indicators in 2024, setting a double record in both renewable electricity generation and its share of the generation mix.' In the context of Red Eléctrica's 40th anniversary, Corredor reflected on the transformation of the electricity system over the past four decades, noting that 'we have positioned ourselves at the forefront of Europe's energy transition.'

Looking at the 2024 data, wind power led the national generation structure with a 23.2% share, followed by nuclear energy (20%), solar photovoltaic (17%), combined cycle (13.6%), and hydroelectric power (13.3%) as the main technologies.

Estructura de generación de energía eléctrica (%) en 2024 en España



(1) Incluye biogás, biomasa, geotérmica, hidráulica marina, hidroeólica y residuos renovables.

Nuclear	Nuclear
Carbón	Coal
Fuel+Gas	Fuel+Gas
Ciclo combinado	Combined cycle
Cogeneración	Cogeneration
Residuos	Waste
Hidráulica	Hydro

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Eólica	Wind
Solar fotovoltaica	Solar photovoltaic
Solar térmica	Solar thermal
Resto de renovables	Other renewables
(1) Incluye biogas, biomasa, geotérmica, hidráulica marina, hidroeólica y residuos renovables.	Includes biogas, biomass, geothermal, marine hydro, hydro-wind, and renewable waste.
Consulta aquí los datos del gráfico	Check the graph for more details

Driven by this surge in renewables, CO_2-equivalent emissions from electricity generation reached an all-time low in 2024: 27 million tCO_2 equivalent, a 16.8% reduction compared to the previous year. Overall, 76.8% of total electricity generated in Spain in 2024 was emission-free.

Photovoltaics: the leading technology in an increasingly sustainable generation fleet

In 2024, Spain's electricity system added 7.3 GW of new renewable capacity, primarily from solar photovoltaic and wind power—the largest annual increase ever recorded.

With 6 GW commissioned this year, photovoltaic energy has become the leading technology in Spain's generation fleet, accounting for 25.1% of total capacity. It is followed by wind power, which added 1.3 GW and now represents 24.9%. Beyond the new power plants that began operation last year, the country's installed capacity was also affected by the permanent shutdown of the As Pontes coal power plant in Galicia, which removed 1.4 GW of non-renewable capacity from the system. As at 31 December 2024, Spain's total installed generation capacity stands at 129 GW, with renewables making up 66% of the energy mix.

'In 1985, the peninsular electricity system relied on just one renewable technology—hydroelectric power. Today, we are making the most of all available sources, such as wind and solar power. Indeed, we have integrated 98% of them reliably and securely into the system,' explained Corredor.

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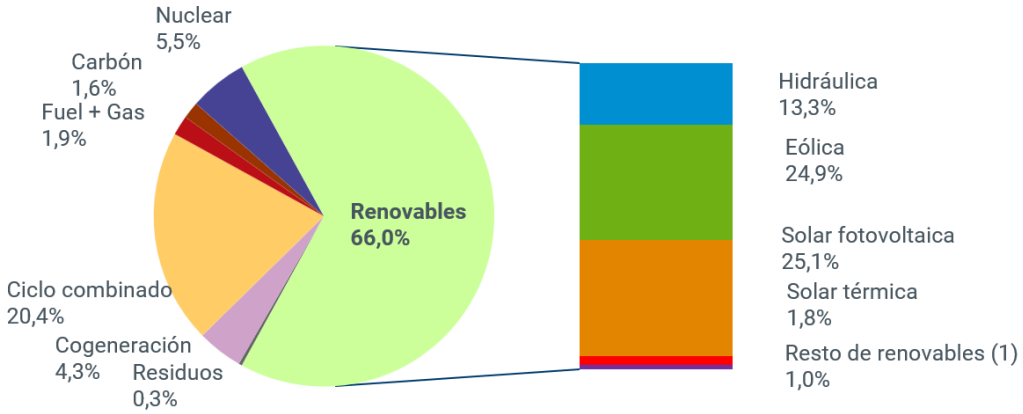
Estructura de potencia instalada de generación (%) en España a cierre de 2024



(1) Incluye biogás, biomasa, geotérmica, hidráulica marina, hidroeólica y residuos renovables.

Check the graph for more details.

New energy storage indicators

For the first time, Red Eléctrica has included energy storage metrics in its annual reports, covering technologies such as batteries and pumped storage. These optimise renewable energy integration and enable energy to be fed back into the system. As a result, some generation and installed capacity indicators have been updated compared to previous editions. However, the company has already incorporated these revised figures into its various data platforms (the Data section of its website, the redOS app, and eSios).

Spain has an installed energy storage capacity of 3,356 MW, which allowed the integration of 8,666 GWh into the system this year.

Other key metrics of the electricity system

The reports presented today by Red Eléctrica also analyse other key indicators, such as electricity demand trends. In 2024, demand increased by 1.4% compared to the previous year, after adjusting for working patterns and temperatures. In gross terms, electricity demand for 2024 reached 248,811 GWh, marking a 0.9% increase, a variation in line with trends observed in other European countries.

Meanwhile, the grid availability index reached 98% for the national electricity system, with the Balearic and Canary Islands registering 98.5% and 98.8%, respectively.

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In 2024, Red Eléctrica added 487 km of new transmission circuits, expanding the grid to 45,674 km nationwide—a significant increase from the 10,500 km the company had when it was founded in 1985.

Over the past 40 years, Spain has commissioned several international interconnection projects with neighbouring countries such as France and Portugal. As a result, the Spanish electricity system has ended 2024 as a net exporter for the third consecutive year, with a surplus balance of 10,227 GWh.

See the full reports

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