

2022 in review, by APREN and ZERO:

Renewable capacity exceeds 16 GW.

Natural gas prices reach historic highs.

Carbon dioxide emissions from electricity production stabilized in 2022.

- 2022 was marked by the ambitious targets set in the REPowerEU, in response to Russia's invasion of Ukraine (which led to a sharp increase in the price of natural gas), and the consequent awareness of the importance of energy independence and security of supply.
- At the legislative level, the simplification of the permitting process was highlighted during the year, as well as the definition of the regulation to produce hydrogen and offshore wind, to accelerate the energy transition.
- Extreme drought has led to the lowest hydro production in the last 10 years (minus 45% than in 2021), namely in the Summer and Autumn, which led to a decrease in renewable production compared to 2021, and an increase in energy imports;
- The increase in renewable production from solar, of about 47%, despite representing only 5.8% of the total electricity production in Portugal, is gaining a growing prominence;
- 2022 was the first year without the use of electricity production in thermal power plants using coal.

What marked the most the year of 2022 in the renewable electricity sector?

The year 2022 was marked by Russia's invasion of Ukraine, and the energy sector was the most affected one. Due to the abrupt increase in the price of natural gas as a consequence of the European Union sanctions on Russia (which is the main supplier of natural gas to Europe), in March the price of electricity reached an increase of 400% compared to March 2021.

In this context, the governments of Portugal and Spain decided in June to create the Iberian mechanism for limiting the price of natural gas for electricity production, with the main objective of protecting final consumers. The so-called cap set a limit of €40/MWh, which contributed to savings of €4.1M.

At European level, the European Commission (EC) launched the REPowerEU legislative package, also as a response to the conflict in Europe, with the aim of reducing dependence on Russian fossil fuels, and accelerate the transition to renewable energy, to a more resilient and secure energy system. Specifically, the renewable incorporation target for 2030 has increased to 45%; the share of renewable fuels of non-organic origin to 75% in industry, and 5% in transports; by 2030 the capacity of solar energy and wind energy should double; and a set of measures have also been defined for energy savings.

Still at European level, funding for the development of the entire green hydrogen value chain has been strengthened. The investment fund for the development of hydrogen projects (the "hydrogen bank") has been set up, and the legislation has had considerable progress, with the change of the Renewable Energy Directive II, the definition of the principle of additionality. In Portugal, projects that make up a production capacity of around 500 MW, have been announced. It was also announced that the first green hydrogen auction will be in 2023, highlighting the important role that Portugal can play in green hydrogen at European level.

In addition to hydrogen, Portugal has the potential to be a country with a high installed capacity of offshore wind. A working group was defined and established by the Portuguese Government for the exploitation of this technology, in order to meet the Government's target of 10 GW installed by 2030.

The sector has also witnessed the long-awaited revision of the legislation, with the publication of Decree-Law No. 15/2022, of January 14, where the organization and functioning of the National Electric System is established. It is thus ensured that the country follows up the development of the tools necessary to meet the targets to which it has set itself as a Member State.

Also, in 2022 was held the pioneer auction of floating photovoltaic solar energy in reservoirs, which allocated the exploitation of 182 MW of solar energy in seven dams in the country. The auction recorded the lowest bid value ever in energy auctions, with a negative value of -4.13 €/MWh, in variable premium mode for differences.

In 2022, at national and European levels, several measures have been taken to speed up electricity generation from renewable energy sources. At European level, the measures are within the REPowerEU package. At the national level, in March, the Joint Order of APA and DGEG simplified the permitting of small solar production units; in April the Government published Decree-Law No. 30-A/2022 with the aim of ensuring exceptional measures to simplify renewable energy production procedures; and in October, the Decree-Law No. 72/2022 was published, also with the aim of accelerating the installation of solar power plants. At the end of the year, the Government announced the new SIMPLEX package of measures. This eliminates several situations in which a case-by-case analysis would be required; the need for AIA for equipment replacement, fulfilled certain conditions; and the elimination of AIA to produce green hydrogen.

What was the performance of renewable electricity in 2022?

In short, all electric power plants in Mainland Portugal produced a total of 44,253 GWh of electricity in 2022, where 56.9% came from a renewable source. This total was mainly supported by wind technology, which represented 29.3 %, followed by hydro technology with 14 %, biomass with 7.5 % and solar photovoltaic with 5.7 %.

The production of electricity from fossil fuels showed an increase of 4.1% in comparison to the total of electricity from 2021, due to the periods of extreme drought that existed during the year, with water production decreasing by 11% compared to 2021. There was also a significant increase in electrical production through photovoltaic solar, resulting from the entry into operation of new plants, adding, by the end of November, 784 MW to the national installed capacity.

Electricity imports should also be highlighted as, compared to 2021, there was an increase in the importing balance from 4,715 GWh to 9,258 GWh. This is due to the sharp drought, which reduced water production by 5,254 GWh compared to 2021, corresponding to a reduction of 45 %, and the increase in consumption compared to 2021, making the import of electricity more competitive in terms of offers in the Iberian market.

Despite the extreme drought, the year closed with a month of high renewable productivity, which ensured 78% of electricity generation, the highest monthly value recorded. This led to a total of 328 non-consecutive of 100% renewable generation hours, while by December only 126 hours had been recorded. This resulted from a marked hydro and wind production, thus demonstrating the high resilience of the national electricity system to high levels of renewable integration.

How does it impact on carbon emissions?

If, on the one hand, there was a reduction of almost 700,000 tons of carbon dioxide associated with the absence of coal use in 2022, on the other hand, there was a lower fraction of renewables mainly due to the lower hydro contribution of about 45.2% between 2021 and 2022. Also, the increased use of production in natural gas combined cycle with thermal power plants, has led to a stabilisation of emissions. The almost doubling of the importing balance, partly of non-renewable and emission-based production, prevented a greater impact on the value of emissions at national level.

In total emissions, also encompassing the production of electricity associated with the cogeneration and burning of municipal waste, an estimated decrease from 8.3 to 6.2 million tons of carbon dioxide, a reduction of around 25%, a very significant record, being road transport, now and unequivocally, the main responsible for carbon dioxide emissions in Portugal.

These important milestones in the renewable sector have resulted in numerous benefits for society, to the economy and to the environment, of which we highlight:

- **8.0 Mt of CO₂ emissions avoided;**
- **Savings on fossil fuel imports of €4,531 M¹;**
- **Savings on electricity imports of €1,053 M²;**
- **Savings on CO₂ emission allowances of €557 €³**, reflecting the average annual price of allowances of €80.9/tCO₂.

Outlook for 2023

Pedro Amaral Jorge, President of the Board of APREN, states that: “For APREN, electricity produced from renewable energy, which will allow the production of green hydrogen and renewable synthetic fuels, will continue to be central on the road to European energy independence, stopping the sharp rise in electricity prices. To this end, it will be necessary to continue to increase the adoption of renewable power, overcoming the obstacles associated with the permitting of projects and the public service electricity grid (RESP), maintaining a stable regulatory framework. In the last 20 years, Portugal has installed between 10 and 12 GW of renewable electric power. Now it is necessary to install at least almost twice as much to reach 35 GW by 2030. It is necessary to move from words to action.”

For his part, Francisco Ferreira, President of ZERO, considers that: “2022 was an extremely challenging year due to the reduction of hydroelectric production because of the drought and high natural gas prices in the context of the war in Ukraine, but already with positive signs of the increased weight of solar. It is thus crucial that, in an as rapidly and sustainably way as possible, our electric system is made greener and more resilient, investing in reducing energy consumption, ensuring greater efficiency, and sustainably implemented renewable energy sources, ensuring new and more jobs and effective decarbonisation”.

¹ Value calculated using coal import prices (values by November 2020, DGEG) and natural gas (WorldBank) and the annual production of electricity using these fossil fuels (Data Hub REN).

² Value calculated using Spain's electricity prices (Entsoe) and the amount of electricity imported (REN).

³ Value calculated on the basis of avoided CO₂ emissions and the price of carbon allowances (SENDECO2).