

**20
22**

**Portugal precisa
da nossa energia!**

Portugal needs our energy!

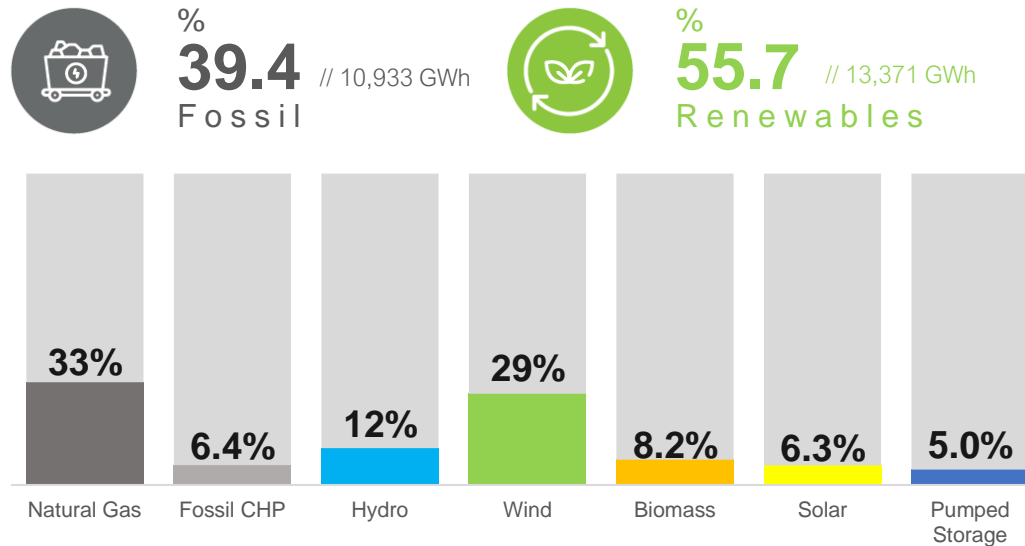
BULLETIN
RENEWABLE ELECTRICITY

JULY

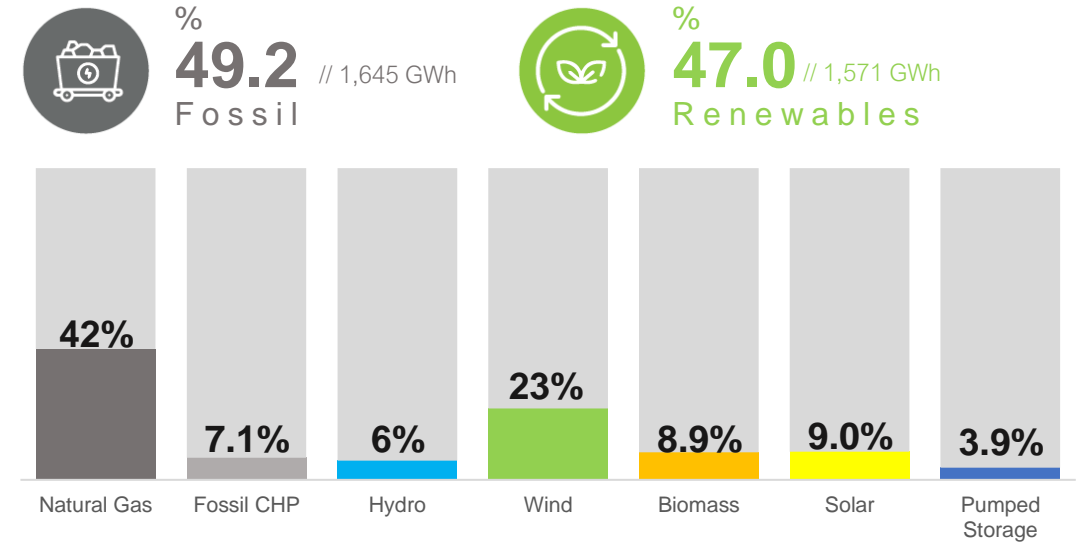


Executive Summary

ACCUMULATED GENERATION (Jan-Jul)



MONTHLY GENERATION (Jul)



ELECTRICITY SECTOR INDICATORS (Jan-Jul)



¹ 'Generation' refers to the net power generation of the plants, considering the pumping production recently disclosed by REN. Pumping production is not accounted for in the percentage of production from renewable sources.
Source: REN, Analysis APREN

Electricity Generation: Mainland Portugal

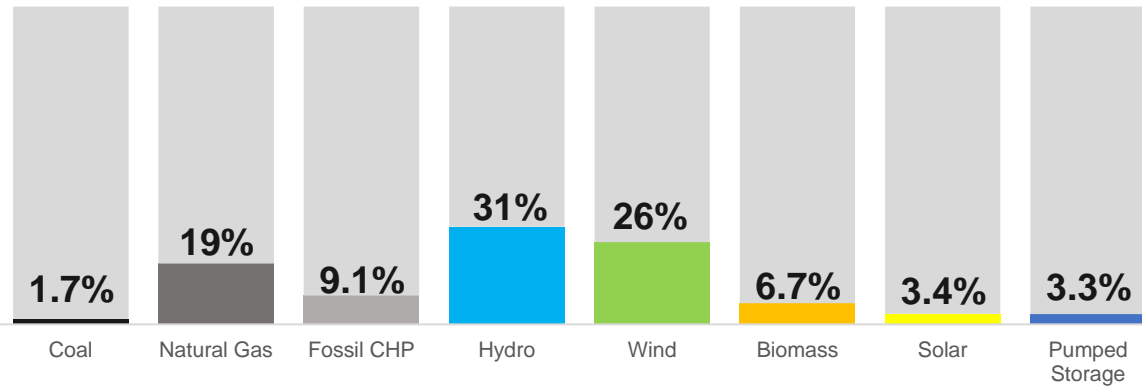
ACCUMULATED July 2021 (Jan-Jul)



%
30,1 // 9,519 GWh
Fossil



%
66,7 // 19,044 GWh
Renewables



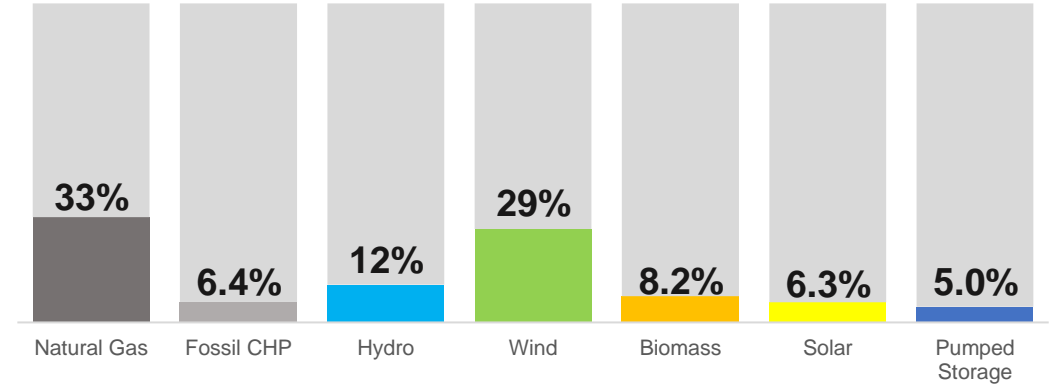
ACCUMULATED July 2022 (Jan-Jul)



%
39,4 // 10,933 GWh
Fossil



%
55,7 // 13,371 GWh
Renewables



MAIN INDICATORS



GWh
24,664

Generation¹



%
55,7
Renewable
incorporation



GWh
29,372

Consumption²



0.94
Wind index



0.34
Hydro index



1.10
Solar index

▼ **11.0%**

in comparison to July 2021

▼ **15.8%**

in comparison to July 2021

▲ **2.4%**

in comparison to July 2021

¹ 'Generation' refers to the net power generation of the plants, considering the pumping production recently disclosed by REN. Pumping production is not accounted for in the percentage of production from renewable sources.

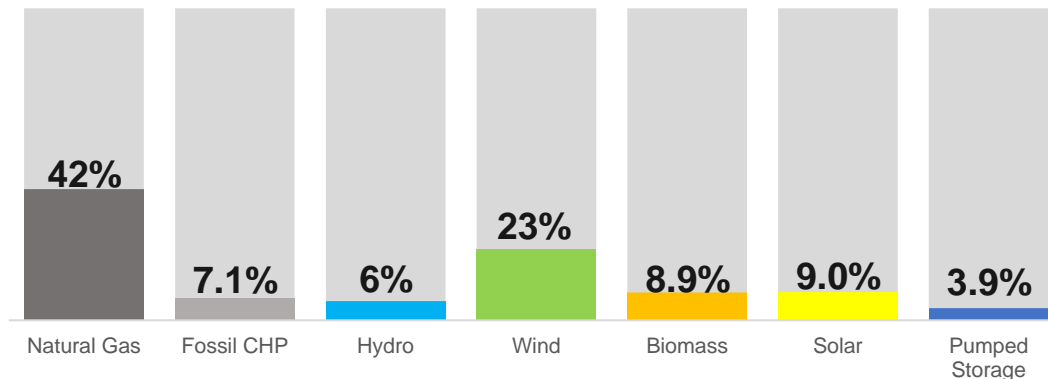
² Consumption refers to the liquid generation of power of the plants, considering the import-export balance.

Monthly analysis in Portugal: July

From July 1 to July 31, 2022, the renewable incorporation was 47.3%, with a total of 3,346 GWh produced. The decrease of 8,8% compared to July 2021 is mainly due to the decrease in the hydro index, resulting in a sharp decrease in hydro production.

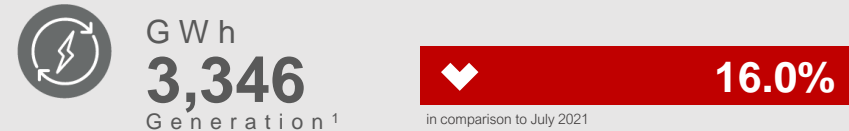
It should also be noted that hydro production and the maximum percentage of storage in dams have reached minimum values compared to the same period in the last 10 years, which contributed to an increase in production from fossil sources.

Source: REN, Analysis APREN



Source: REN, Analysis APREN

INDICATORS OF THE ELECTRICITY SECTOR



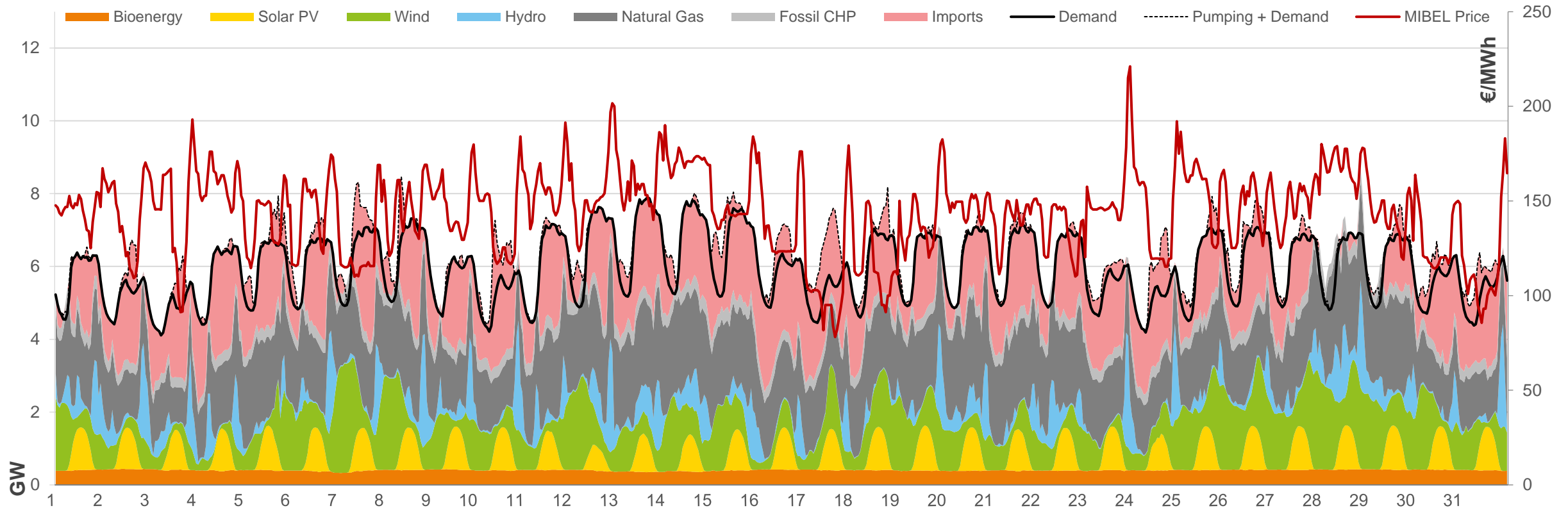
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Source: REN, Analysis APREN

Monthly analysis in Portugal: July

Load diagram for the month of July 2022



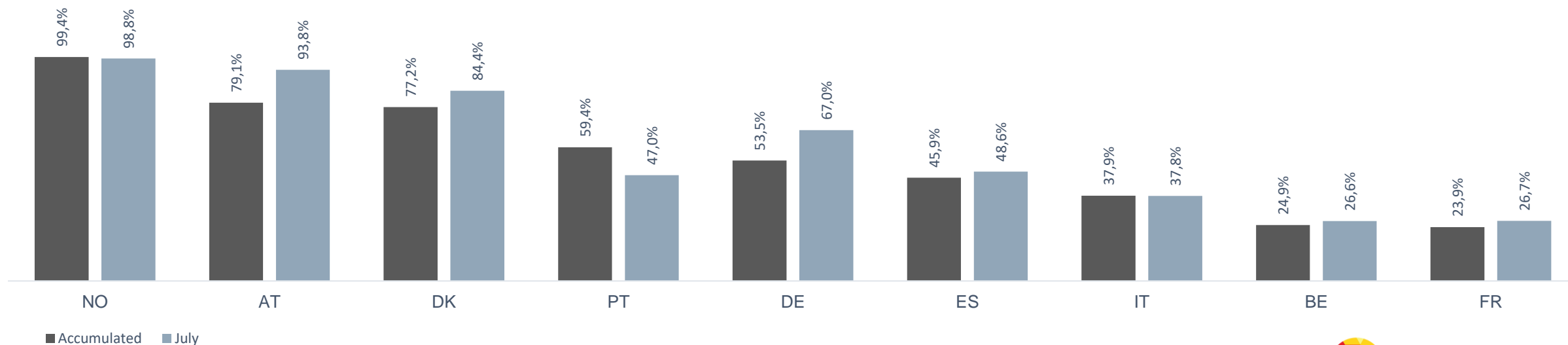
Source: REN, Analysis APREN

Renewable Electricity Europe

Between January 1 and July 31, 2022, Portugal was the fourth country with the highest renewable incorporation in electricity generation, behind Norway, Austria and Denmark, which achieved 99.4%, 79.1% and 77.2%, respectively, from RES. From July 1 to July 30, Portugal decreased its renewable incorporation by 0.3% compared to May, ranking fifth in the countries with the highest renewable incorporation in Europe.

This analysis only took the main European markets into account, in order to have a representative term of comparison.

Source: OMIE, Analysis APREN



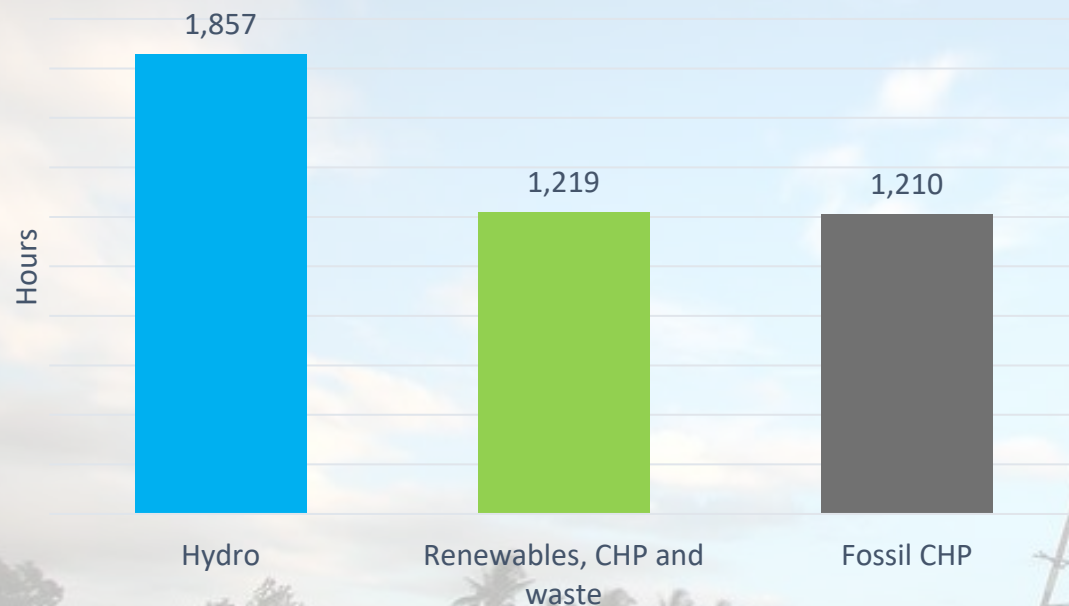
Renewable incorporation in the generation of accumulated electricity (Jan-Jul) and monthly (Jul).
Source: REN, Fraunhofer, REE, Terna, National Grid, ENTSO-E, Analysis APREN

Market Price Setting: Portugal

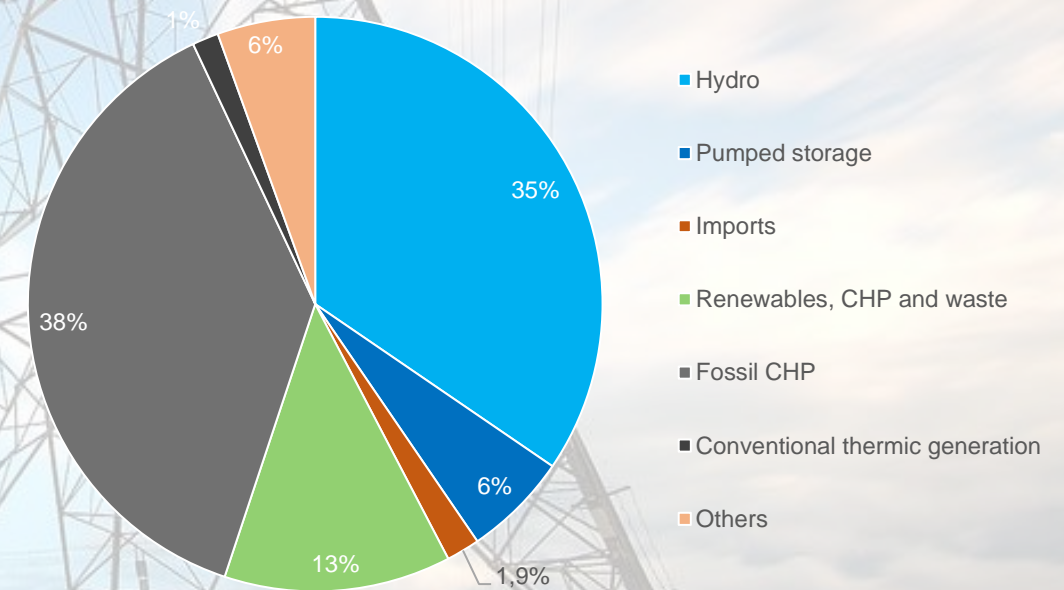
Between January 1 and July 31, hydro was the market price setting technology that recorded the most hours, with 1,857 non-consecutive hours, followed by cogeneration and waste with 1,219 hours and thermal generation combined cycle with 1,210 hours.

ACCUMULATED JAN-JUL

JULY 2022



Number of market price setting hours of the three main technologies (Jan-2022 July-2022).
Source: OMIE, Analysis APREN



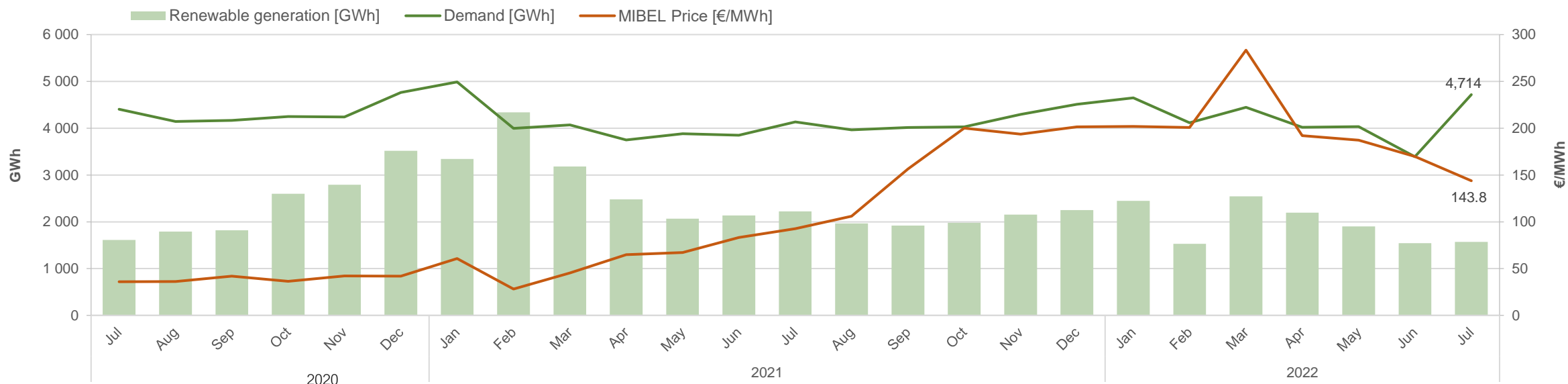
Percentage distribution of the number of market price setting hours of the various technologies, totaling 744 hours (July).
Source: OMIE, Analysis APREN

Electricity Market: Portugal

Between January 1 and July 31, the average hourly price registered in the MIBEL in Portugal (197.0 €/MWh³) represents a more than threefold increase when compared to the same period last year.

In the same period, 57 non-consecutive hours were recorded in which renewable generation was sufficient to supply electricity consumption in mainland Portugal, with an average hourly price in the MIBEL of 151.5 €/MWh, and from 1 to 31 July, renewable generation was not enough to supply consumption for one consecutive hour.

³Arithmetic average hourly prices
Source: OMIE, Analysis APREN

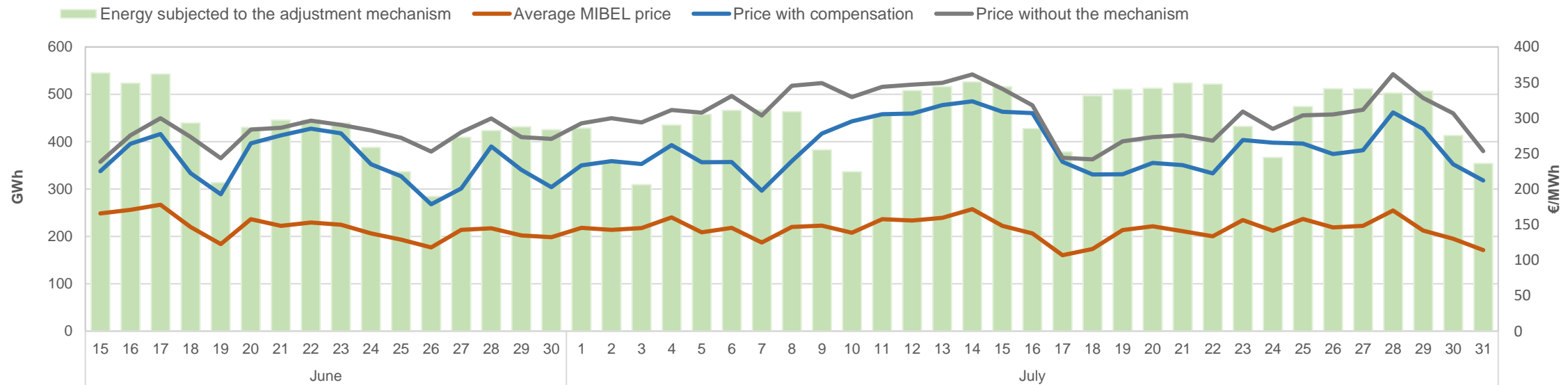


Market price, electricity consumption and renewable generation (July 2020 to July 2022).
Source: OMIE, REN, Analysis APREN

Electricity Market: Iberian Gas Price Cap Mechanism

Since June 15, when the Iberian gas price cap mechanism came into operation, and until July 31, the natural gas price cap generated savings in Portugal of 46.4 €/MWh³, which was equivalent to a 15.6 % reduction in the average hourly price in MIBEL. The saving due to the natural gas price cap reached a maximum of 105.9 €/MWh³, and a minimum of 5.62 €/MWh³. In total, 20.5 from the 40.9 TWh produced were subject to the consumer adjustment mechanism in MIBEL.

³Arithmetic average of hourly prices
Source: OMIE, APREN Analysis



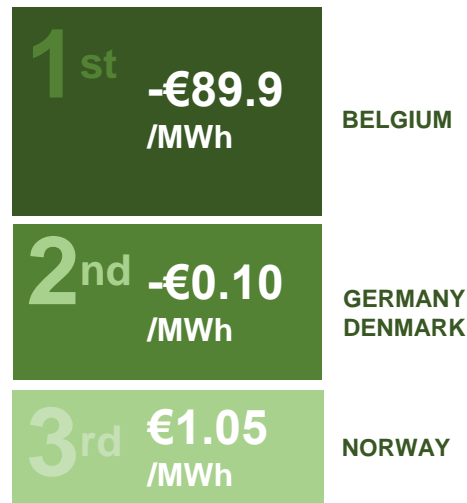
Preço de mercado, com e sem mecanismo de limite do preço do gás natural.
Fonte: OMIE, Análise APREN.

Electricity Market: Europe

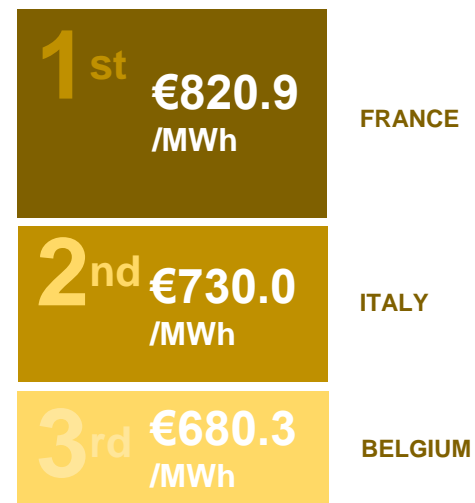
During the month of July 2022, there was a minimum hourly price at MIBEL in Portugal of €78.1/MWh³, for an hour in which the market price setting was due to thermal generation combined cycle. The maximum hourly price reached €221.1/MWh, where market price setting was hydro, due to the inversion of the flow from import to export in this time period.

Concerning the prices in Europe, it should be noted that the average values increased in comparison to the previous month, as well as minimum and maximum prices.

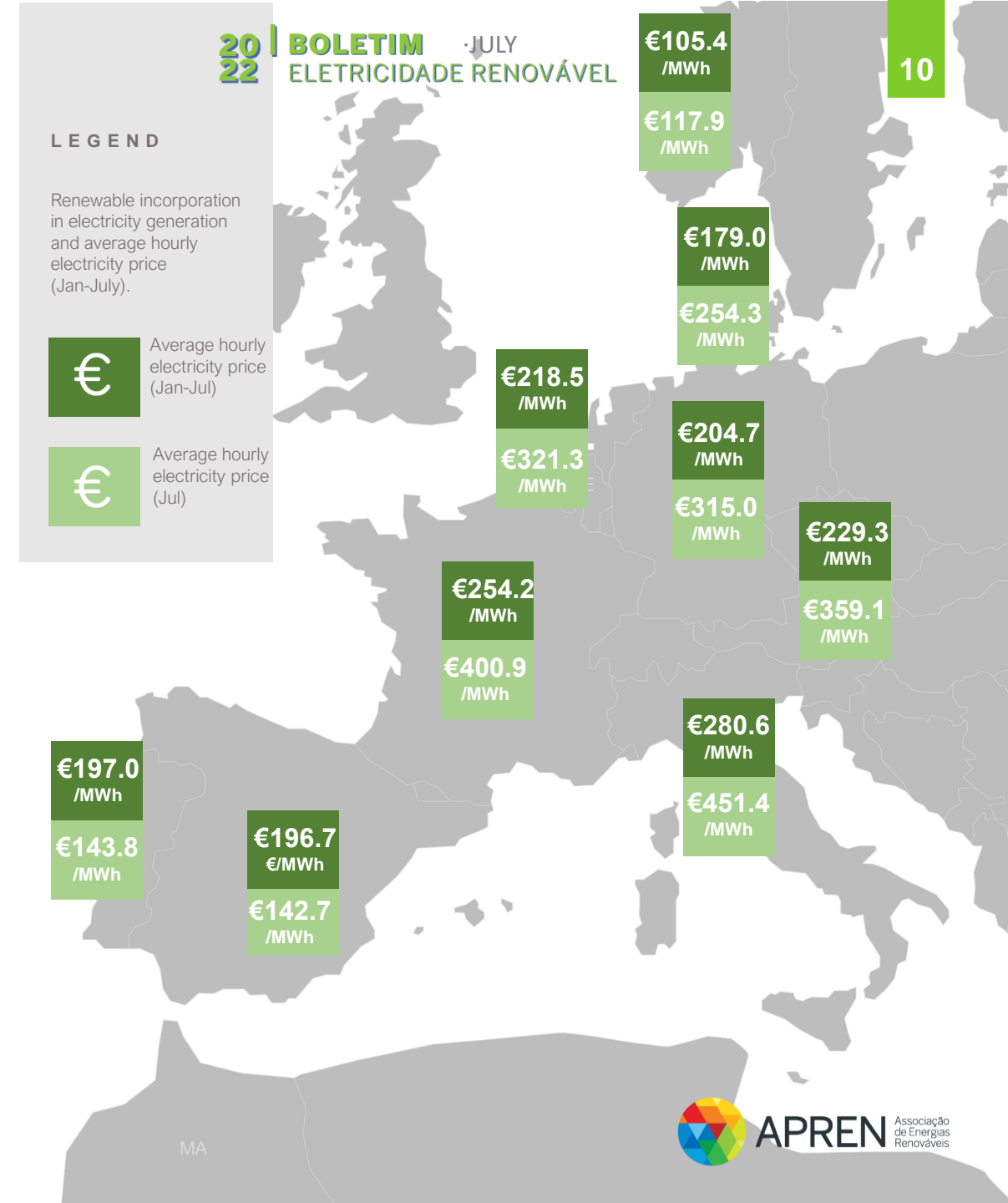
PRICES MINIMUM (Jul)



PRICES MAXIMUM (Jul)



³Arithmetic average hourly prices
Source: ENTSO-E, OMIE, Analysis APREN



Electricity Futures Market



The evolution of the average hourly future price shown is calculated based on the electricity purchase and sale contracts*.

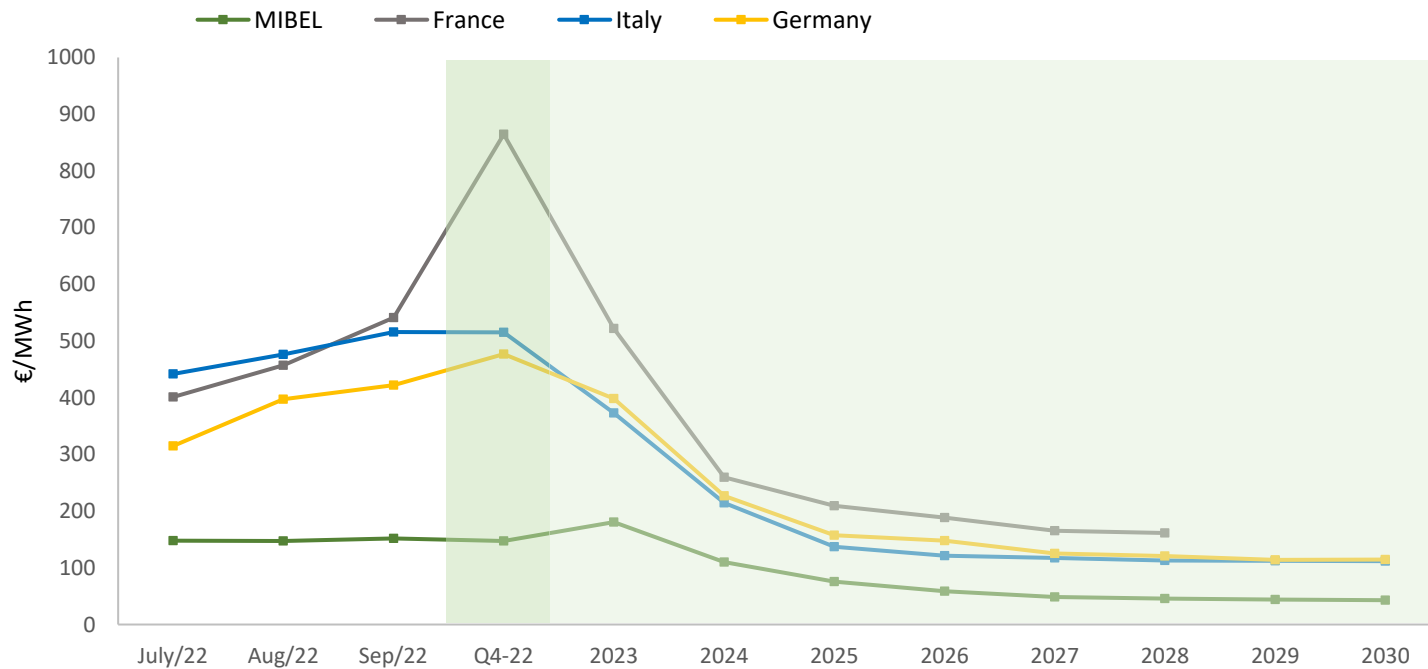
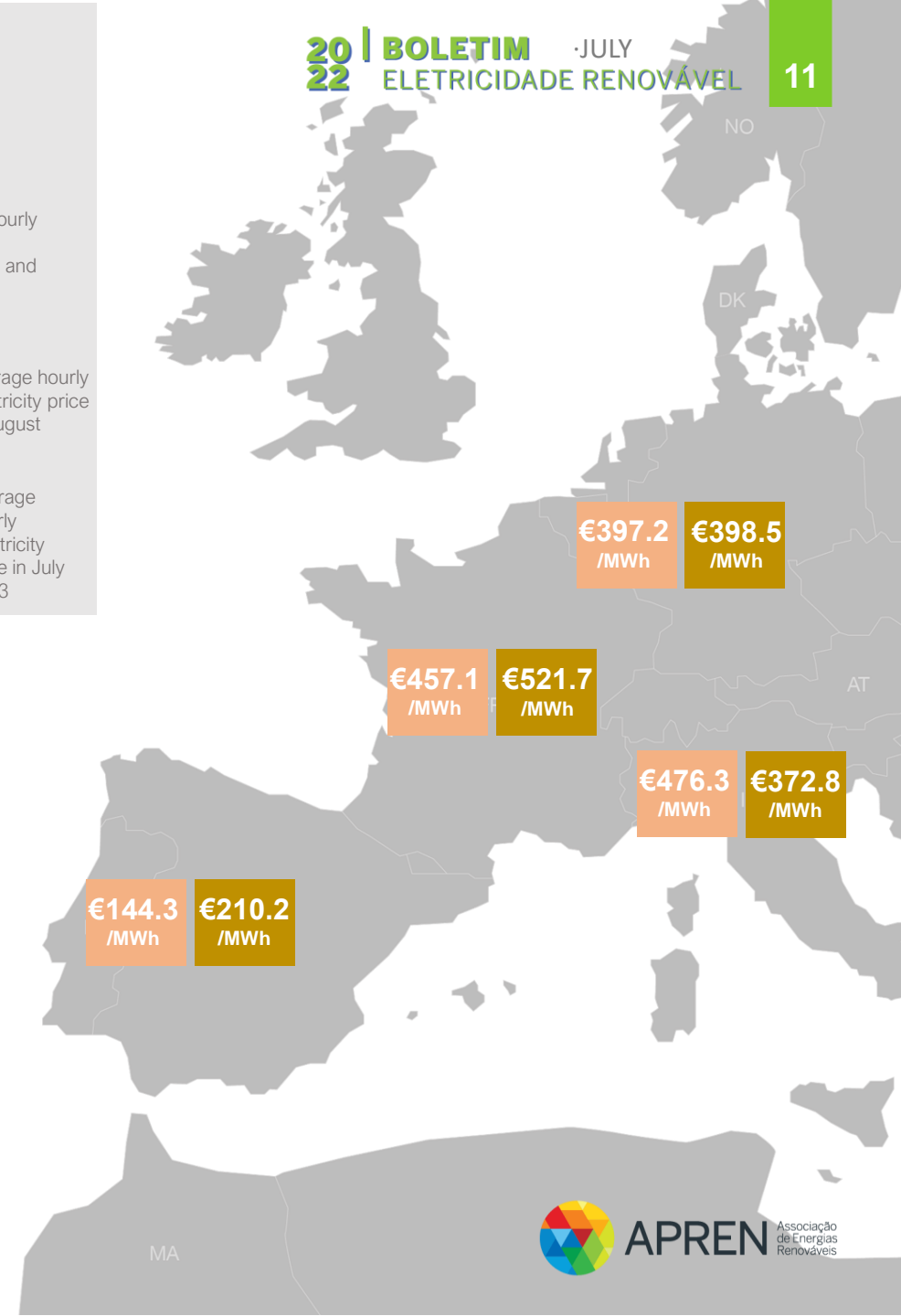
The map on the right shows the price values for next month (August) and for July next year. In both cases, the MIBEL presents the lowest values, while the French market presents the highest. MIBEL also presents the lowest values until 2030, coming from the Iberian gas price limit mechanism until July of next year, and from the investment in renewable production.

*Values updated on August 3.
Source: OMIE, EEX, APREN Analysis

LEGEND

Future average hourly price in MIBEL, France, Germany and Italy (€/MWh)

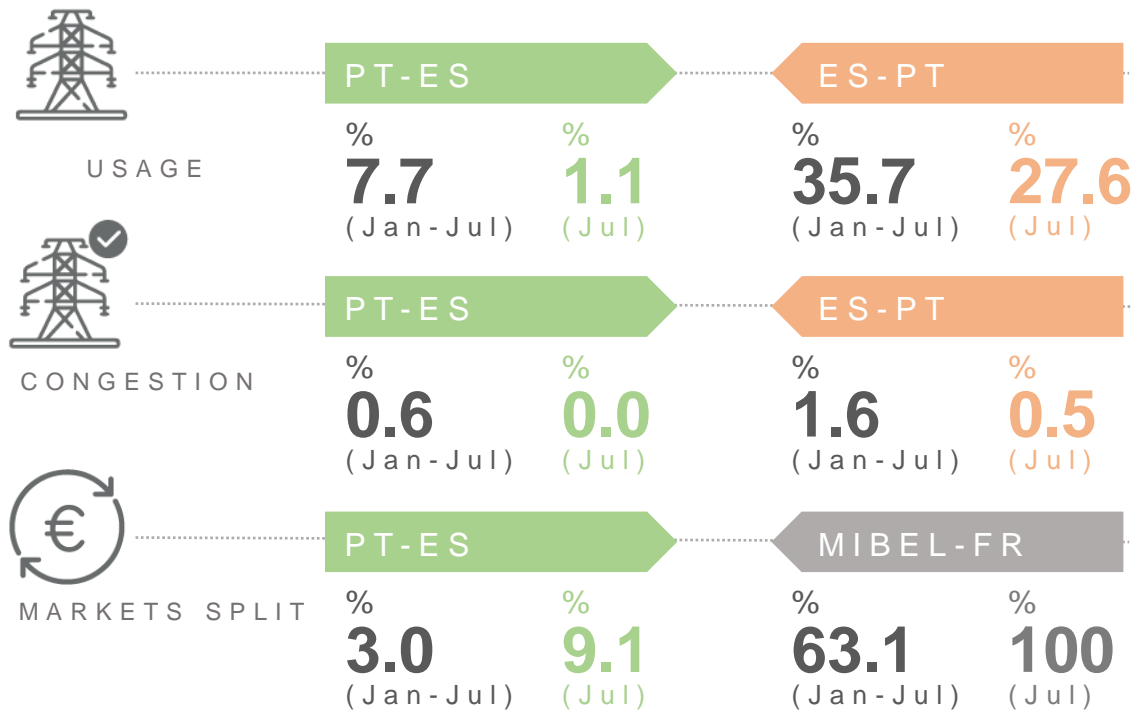
-  Average hourly electricity price in August
-  Average hourly electricity price in July 2023



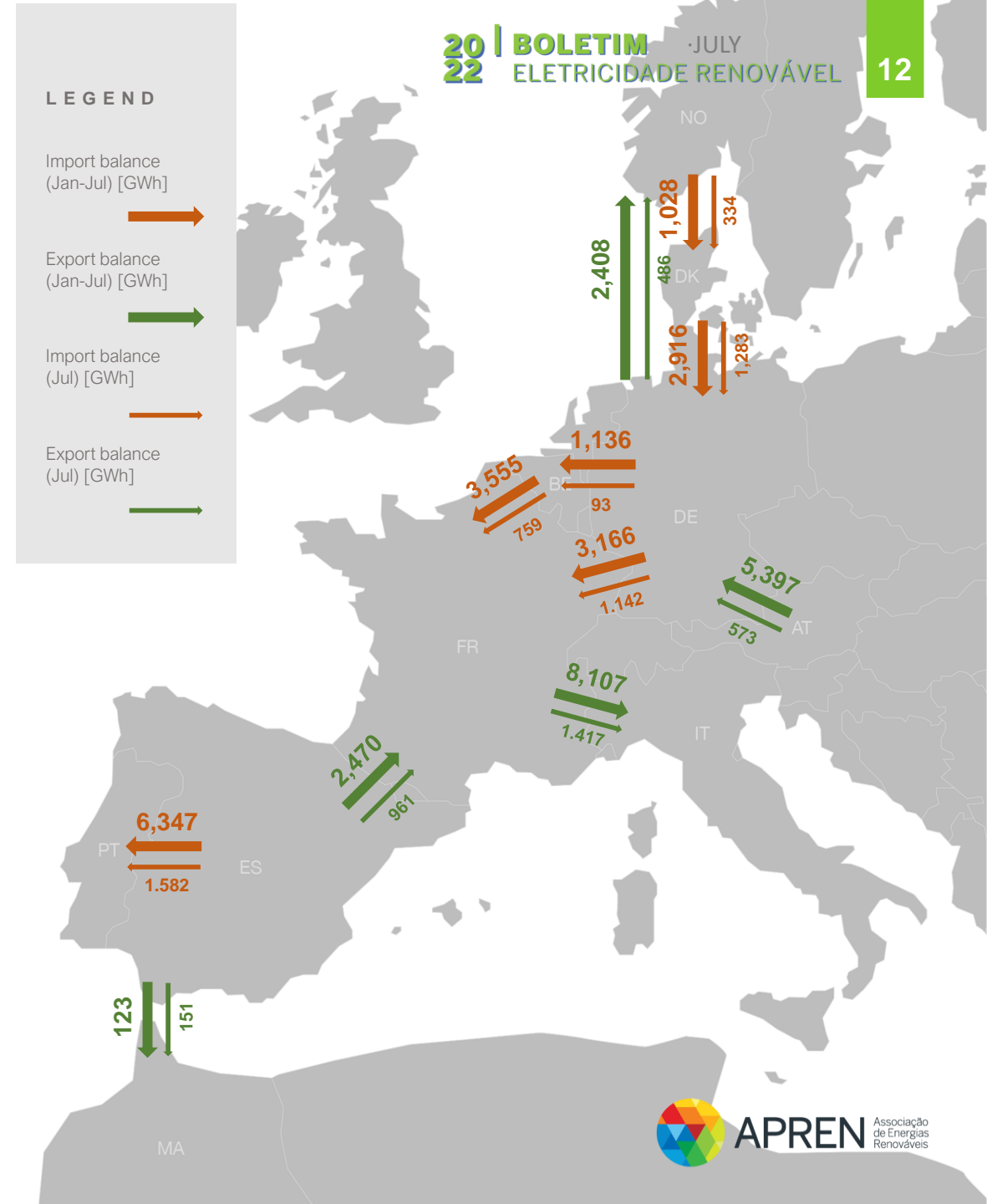
International Trade

Between January 1 and July 31, 2022, the electricity system of Mainland Portugal recorded electricity imports equivalent to 7.648 GWh and exports of 1.301 GWh, with Portugal being an importer with a balance of 6.347 GWh.

MAIN INTERCONNECTION INDICATORS PT-ES



Source: REN, Analysis APREN.



Simulation of price formation without SRP

SRP ESTIMATED SAVINGS

The indicators on the right identify the savings achieved between January 1 and July 31, 2022, by the contribution of production under special regime (SRP).

This is a study for SRP, which includes all installed capacity of fossil cogeneration. Given that the capacity equivalent to this technology within the SRP is quite residual and that the other technologies are renewable, the figures are very close to the real savings that renewables generated.



€205.7/MWh
Accumulated savings (Jan-Jul)

€220.3/MWh
Monthly savings (Jul)



€5,089 M
Accumulated savings (Jan-Jul)

€670 M
Monthly savings (Jul)

Note: This analysis is prepared using a program developed by APREN, based on Deloitte's calculation method.

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Power sector emissions

Between January 1 and July 31, 2022, specific emissions reached 143 gCO₂eq/kWh, while the total emissions from the electro-producing sector reached 3.5 MtCO₂eq.

The European Emissions Trading System (EU-ETS) recorded an average price of €83.1/tCO₂³, doubling the increase compared to the same period in 2021.

³Arithmetic average of hourly prices
Source: OMIE, APREN Analysis

SECTOR EMISSIONS

3.5

MtCO₂eq

▼ **16.9%**

In comparison to Jul 2021

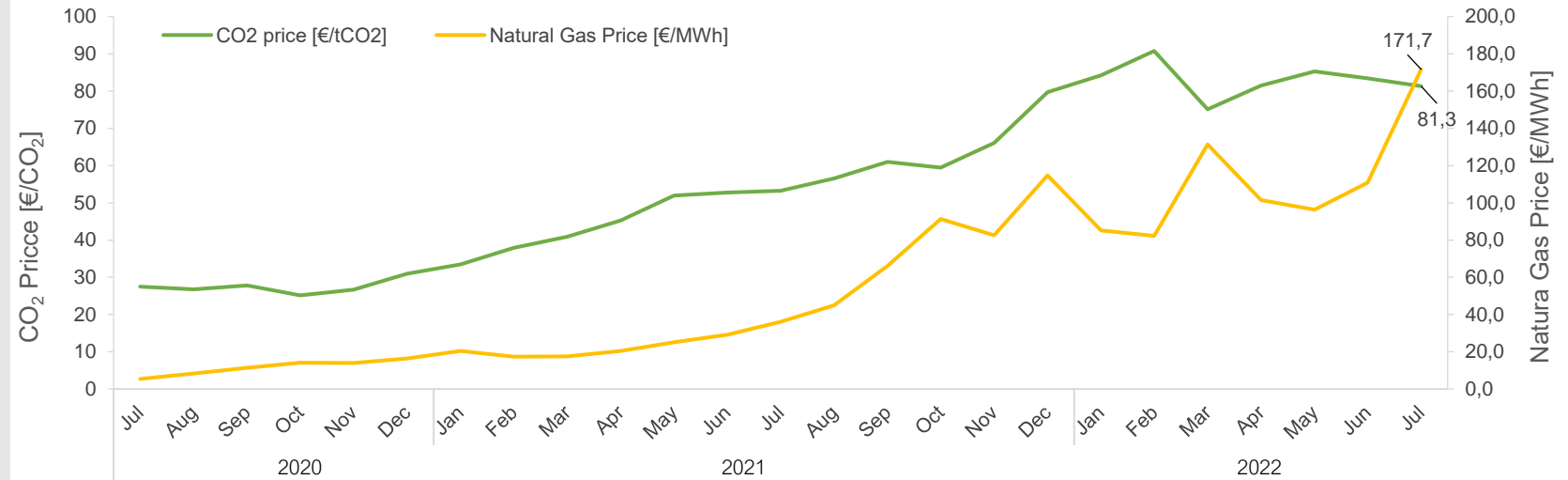
ALLOWANCES AVERAGE PRICE

83.1

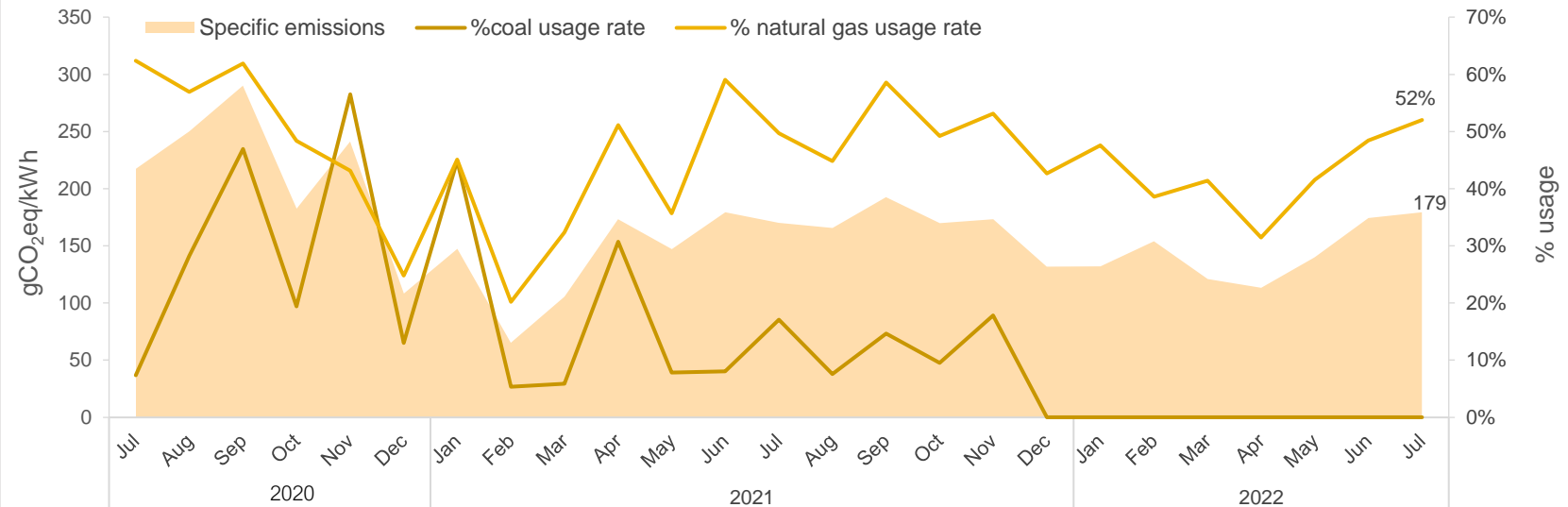
€/tCO₂

▲ **84.0%**

In comparison to Jul 2021



CO₂ allowances price at EU-ETS and natural gas price in Europe (July-2020 to July-2022).
Source: SendeCO₂, WorldBank.



Market price, electricity consumption and renewable generation (July-2020 to July-2022).
Source: OMIE, REN, Analysis APREN

Environmental Service

The indicators on the right identify the savings reached between January 1 and July 31, 2022, in natural gas, CO₂ emissions and CO₂ emission allowances, resulting from renewable incorporation into electricity generation.

This analysis assumes that, in the absence of renewables, production would be ensured primarily by natural gas and finally by imported electricity.

Renewables avoided:



€2,366 M

Imported natural gas (Jan-Jul)

€464 M

Imported natural gas (Jul)



4.5 MtCO₂eq

CO₂ emissions (Jan-Jul)

0.5 MtCO₂eq

CO₂ emissions (Jul)



€655 M

Imported electricity (Jan-Jul)

€31 M

Imported electricity (Jul)



€330 M

CO₂ allowances (Jan-Jul)

€41 M

CO₂ allowances (Jul)

Source: REN, REE, SendeCO2, WorldBank, DGEG, ERSE, Analysis APREN.

Note1: For the estimate of the savings in imported natural gas, the price of natural gas in Europe indicated in the WorldBank has been considered.

Note2: For the estimation of savings in imported electricity, the average price on the MIBEL market has been considered.

European Barometer

Taxonomy

The European Parliament voted on [July 6](#) in favour of considering investments in natural gas and nuclear energy as green energy investments.

State aid

The European Commission [approved](#) on July 15 the support of €5.4 billion to fifteen Member States for important projects of common European interest in the hydrogen value chain.

Reduction of natural gas consumption

On July 26 [a plan](#) to reduce European natural gas consumption by 15% between August and March 2023 was approved.

Price ceiling on Russian oil exports

The G7 group will be [defining](#) a price-limiting mechanism for Russian oil exports by December 5, when European Union sanctions banning maritime imports of Russian oil will take effect.

Trans-European transport network

The European Commission published on July 27 a [proposal to amend](#) the guide to the development of the trans-European transport network.

National Barometer

Electricity prices

[Directive No.17/2022](#) was published on July 6, approving the tariffs and prices for electricity from July to December 2022.

NES's risk and warranty management

[Directive No.18/2022](#) was published on July 11, approving the extraordinary amendment in the scope of risk and warranty management in the National Electricity System.

Cogeneration reference tariffs

[Dispatch No.20/2022](#) was published on July 13, updating the cogeneration reference tariffs for the 3rd quarter of 2022.

Storage – Tâmega Gigabattery

[The Tâmega Gigabateria](#) was inaugurated on July 17, capable of storing the energy consumed by 11 million people per day in their homes, and of avoiding the import of more than 160 000 tonnes of oil.



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