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BULLETIN RENEWABLE ELECTRICITY

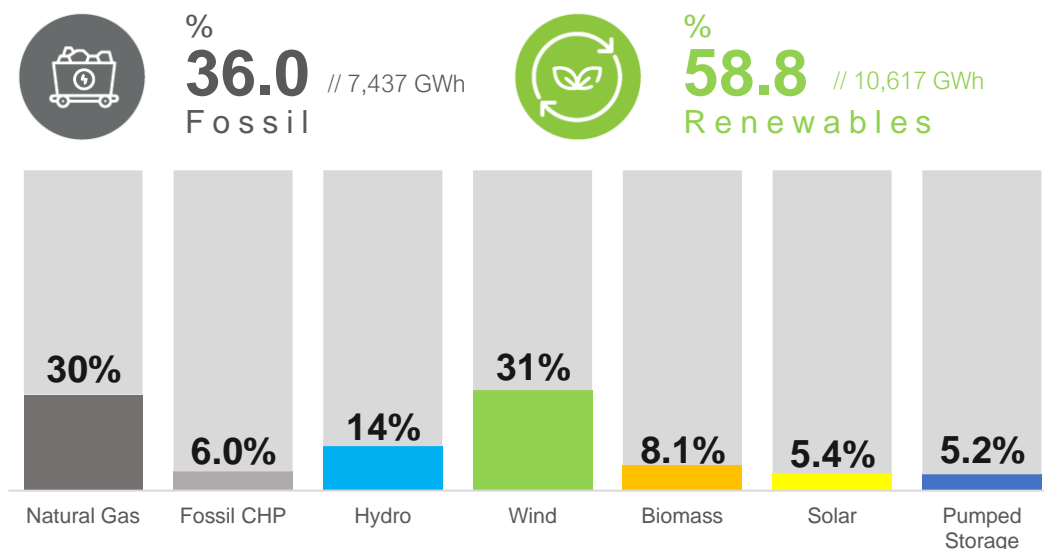
**Portugal precisa
da nossa energia!**

Portugal needs our energy!

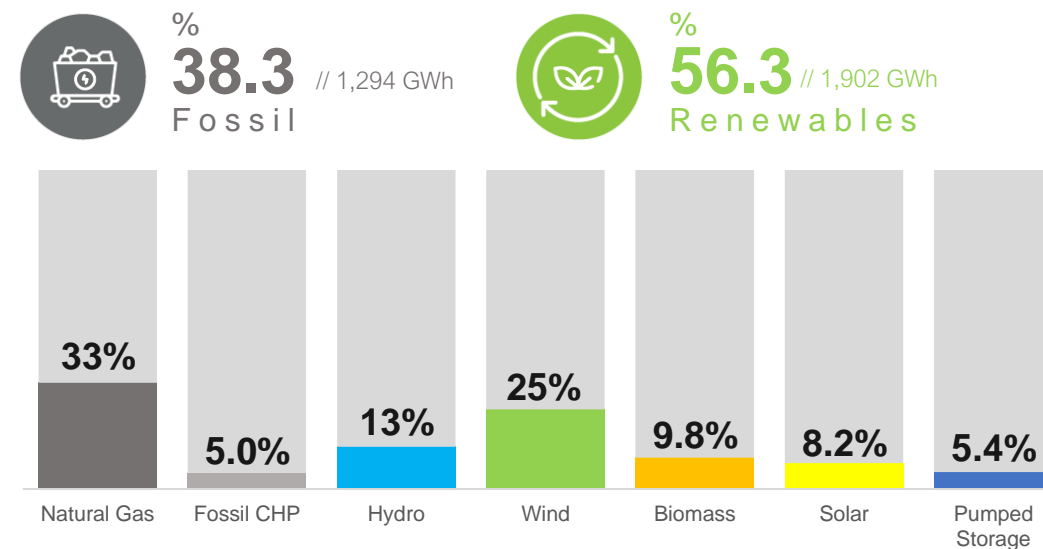


Executive Summary

ACCUMULATED GENERATION (Jan-May)



MONTHLY GENERATION (May)



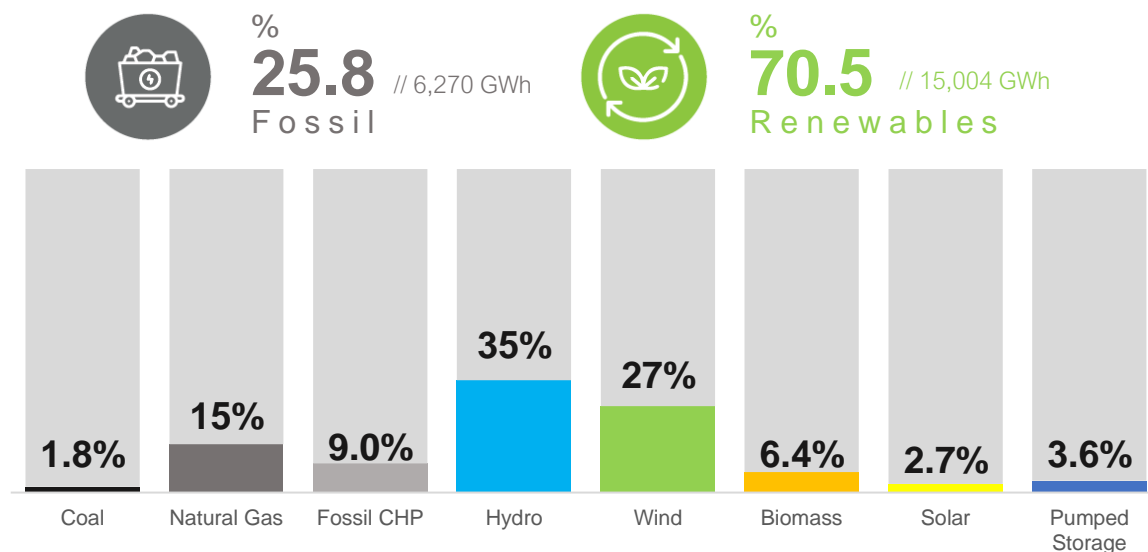
ELECTRICITY SECTOR INDICATORS (Jan-May)



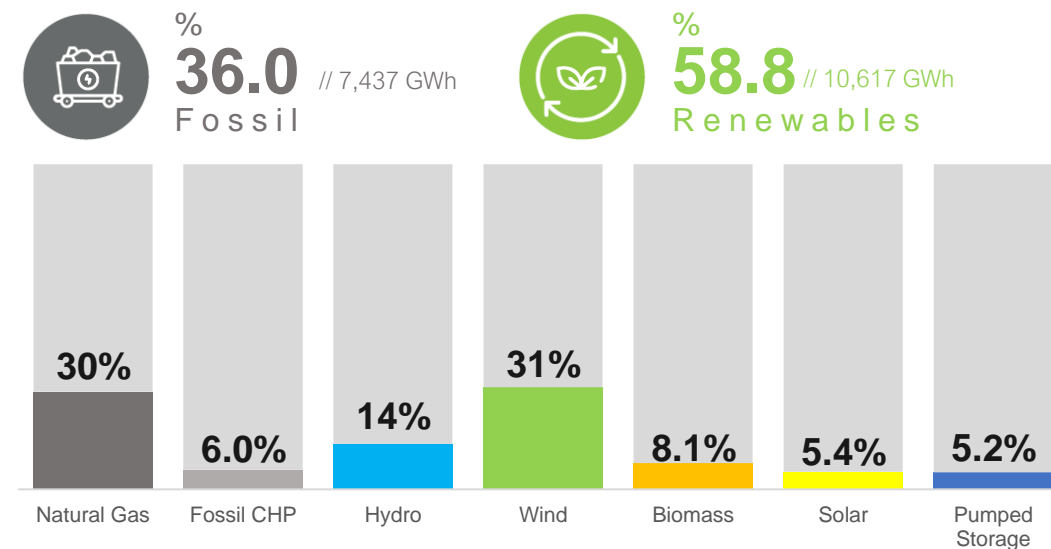
¹ 'Generation' refers to the net power generation of the plants, considering the pumping production recently disclosed by REN. Pumping production is not accounted for in the percentage of production from renewable sources.
Source: REN, Analysis APREN

Electricity Generation: Mainland Portugal

ACCUMULATED MAY 2021 (Jan-May)



ACCUMULATED MAY 2022 (Jan-May)



MAIN INDICATORS

18,054 GWh
Generation¹

58.8%
Renewable
incorporation

21,266 GWh
Consumption²

0.95
Wind index

0.35
Hydro index

1.06
Solar index

▼ **17.8%**

in comparison to May 2021

▼ **11.7%**

in comparison to May 2021

▲ **2.7%**

in comparison to May 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.

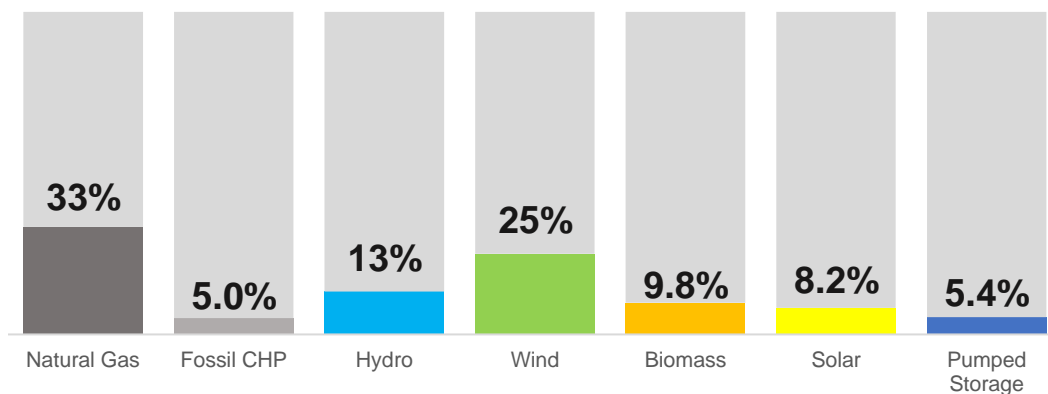
Source: REN, Analysis APREN

Monthly analysis in Portugal: May

From May 1 to May 31, 2022, the renewable incorporation was 56.3%, with a total of 3,377 GWh produced. The decrease of 4.2% compared to May 2021 is mainly due to the decrease in the wind and hydro indexes, which resulted in a decrease in wind and hydro production.

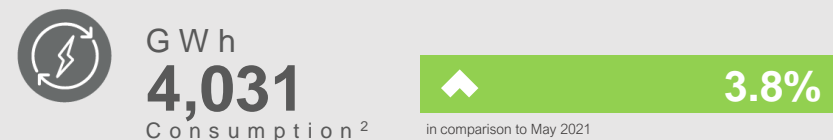
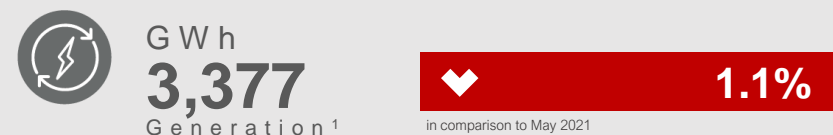
It should also be noted that in May solar production reached 8.2% of total production, which corresponds to the highest value ever recorded in Portugal.

Source: REN, Analysis APREN



Source: REN, Analysis APREN

INDICATORS OF THE ELECTRICITY SECTOR



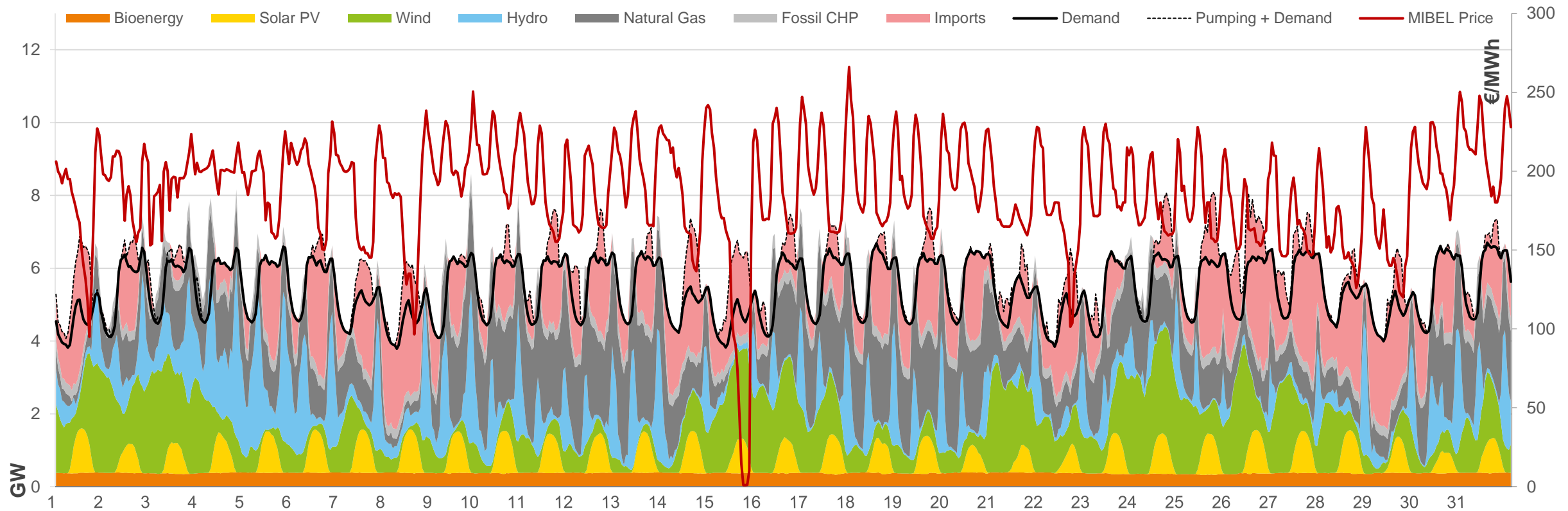
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Source: REN, Analysis APREN

Monthly analysis in Portugal: May

Load diagram for the month of May 2022



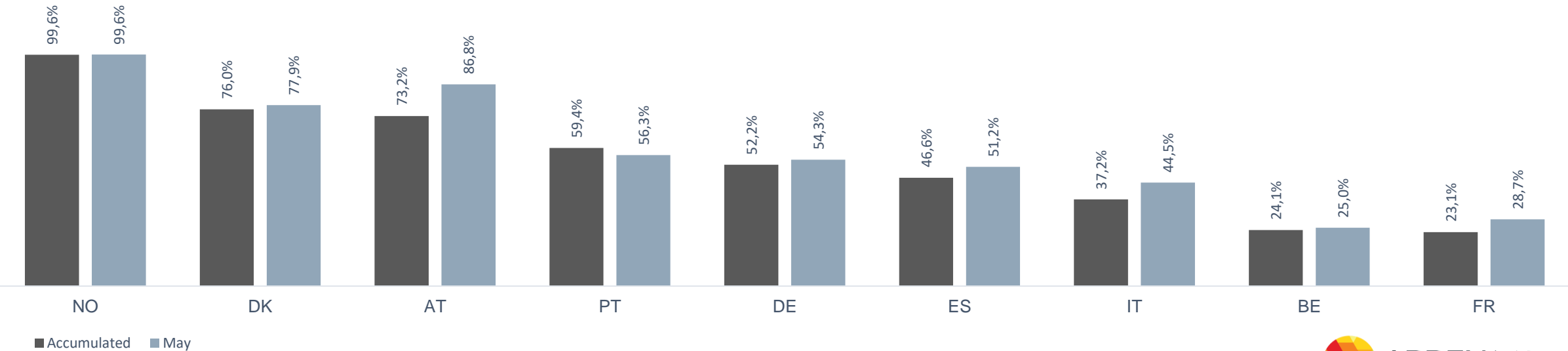
Source: REN, Analysis APREN

Renewable Electricity Europe

Between January 1 and May 31, 2022, Portugal was the fourth country with the highest renewable incorporation in electricity generation, behind Norway, Denmark and Austria, which achieved 99.6%, 76.1% and 73.2%, respectively, from RES. From May 1 to May 31, Portugal decreased its renewable incorporation by 5.8% compared to April, ranking fourth 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

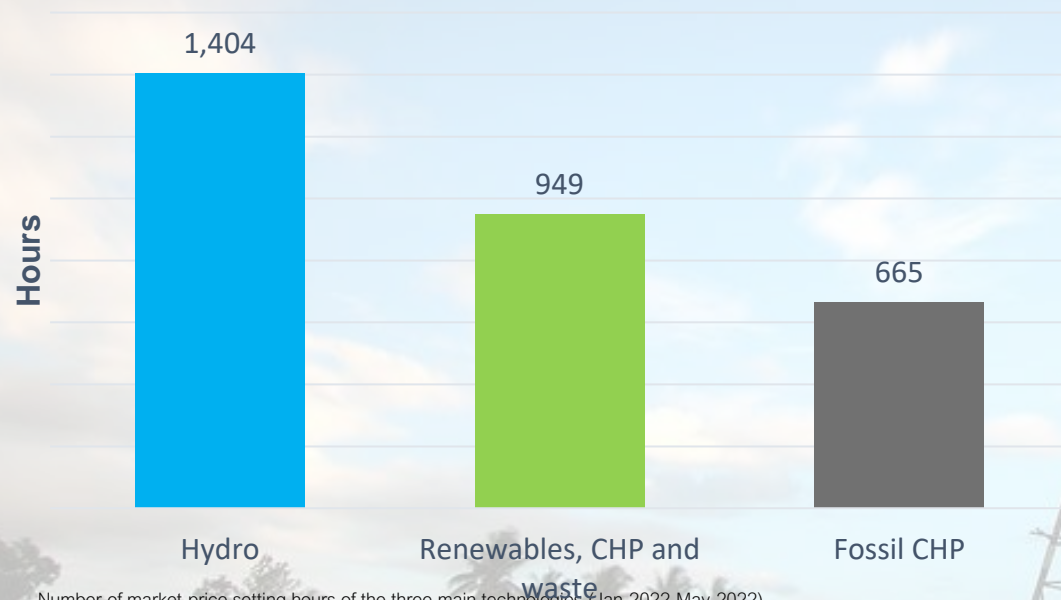


Renewable incorporation in the generation of accumulated electricity (Jan-May) and monthly (May).
Source: REN, Fraunhofer, REE, Terna, National Grid, ENTSO-E, Analysis APREN

Market Price Setting: Portugal

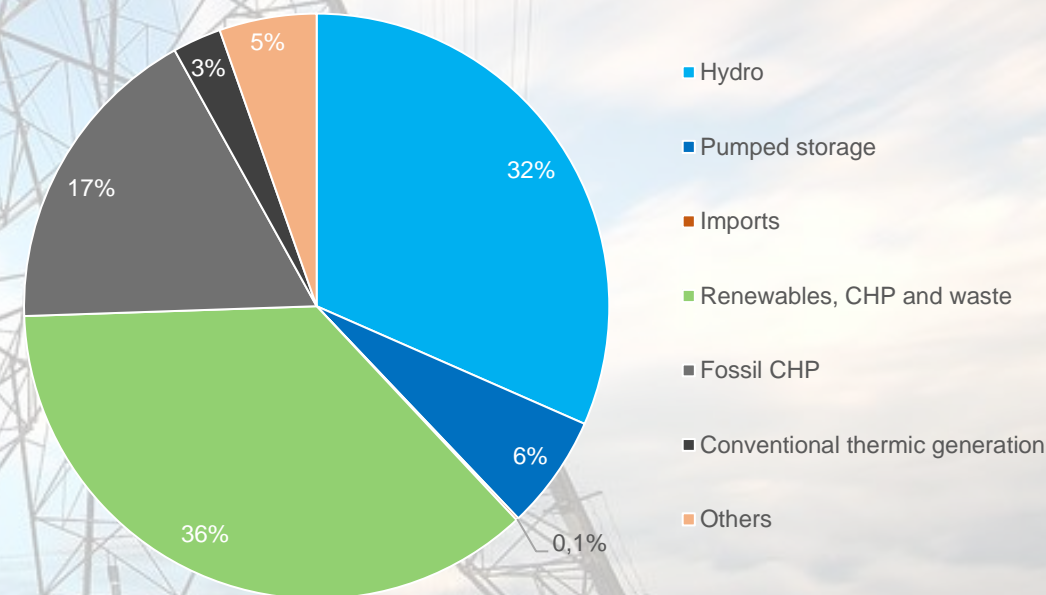
Between January 1 and May 31, hydro was the market price setting technology that recorded the most hours, with 1,404 non-consecutive hours, followed by cogeneration and waste with 949 hours, and thermal generation combined cycle with 665 hours.

ACCUMULATED JAN-MAY



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

MAY 2022



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

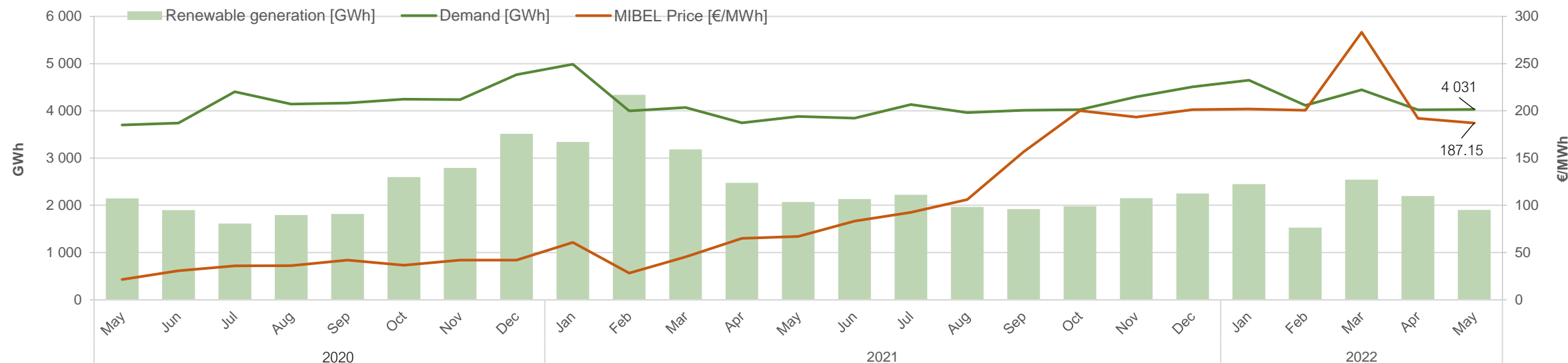
Electricity Market Portugal

Between January 1 and May 31, the average hourly price recorded in MIBEL in Portugal (213.4 €/MWh³) represents an increase of more than four times compared to the same period last year.

In the same period, 56 non-consecutive hours were recorded in which renewable generation was sufficient to supply the electricity consumption of mainland Portugal, with an average hourly price in MIBEL of €151.6/MWh. Doing the same analysis for the period from May 1 to May 31, a total of 4,3 non-consecutive hours were recorded, with an average hourly price in the MIBEL of €209.4/MWh.

Also, worth noticing the reduction in electricity price, influenced by the cap set to the natural gas price.

³Arithmetic average hourly prices
Source: OMIE, Analysis APREN



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

Electricity Market: Europe

During May 2022, there was a minimum hourly price at MIBEL in Portugal of €1.03/MWh³, for an hour in which the market price setting was due to renewable technologies, cogeneration and waste. The maximum hourly price reached €265.9/MWh, where the market price setting depended on pumping.

Concerning the prices in Europe, it should be noted that the average values remained like those of the previous month. However, the maximum price decreased in most countries.

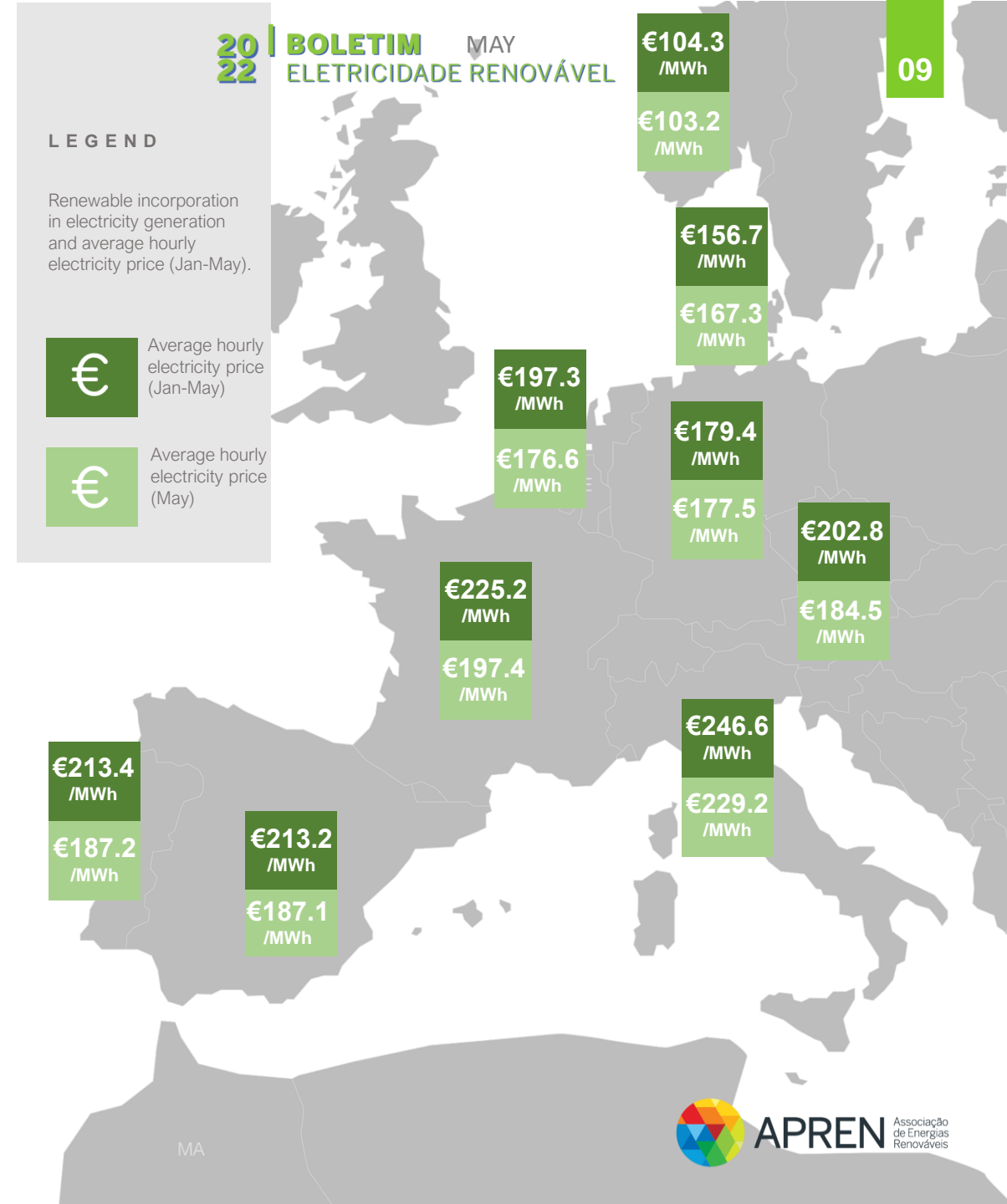
PRICES MINIMUM(May)

1 st	-€88.6 /MWh	BELGIUM
2 nd	-€12,9 /MWh	GERMANY
3 rd	-€5.37 /MWh	DENMARK

PRICES MAXIMUM (May)

1 st	€419.7 /MWh	ITALY
2 nd	€298.7 /MWh	FRANCE
3 rd	€265.9 /MWh	AUSTRIA GERMANY BELGIUM DENMARK

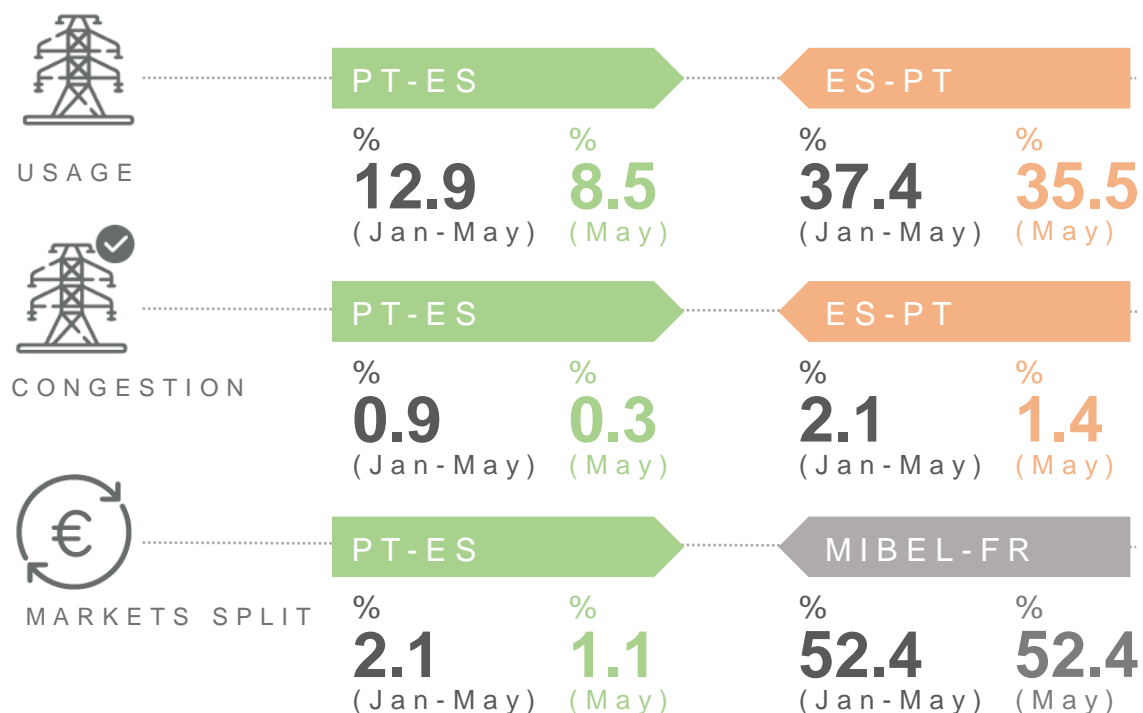
³Arithmetic average hourly prices
Source: ENTSO-E, OMIE, Analysis APREN



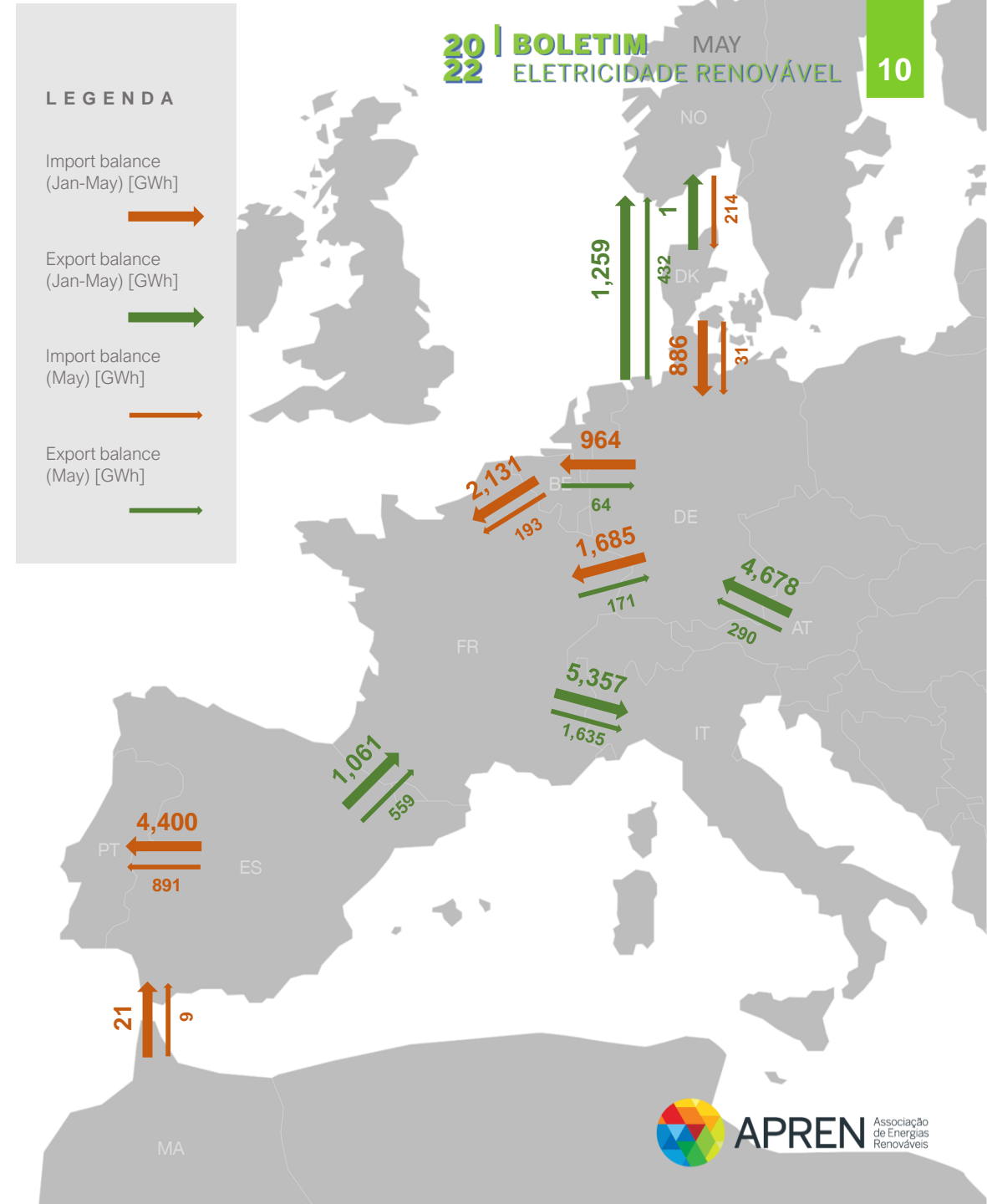
International Trade

Between January 1 and May 31, 2022, the electricity system of Mainland Portugal recorded electricity imports equivalent to 5,482 GWh and exports of 1,082 GWh, with Portugal being an importer with a balance of 4,400 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 May 31, 2022, by the contribution of production under special regime (SRP).

This is a study for SRP, which includes all the 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 have generated.



€208.2/MWh

Accumulated savings (Jan-May)

€215.2/MWh

Monthly savings (May)



€3,774 M

Accumulated savings (Jan-May)

€727 M

Monthly savings (May)

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

Power sector emissions

Between January 1 and May 31, specific emissions reached 131 gCO₂eq/kWh, while total emissions from the electro-producing sector reached 2.4 MtCO₂eq.

The European Emissions Trading System (EU-ETS) recorded an average price of €83.4 /tCO₂³, doubling the increase compared to the same period in 2021.

³ Arithmetic average hourly prices
Source: OMIE, Analysis APREN

SECTOR
EMISSIONS

2.4

MtCO₂eq

♥ 16.7%

In comparison to May 2021

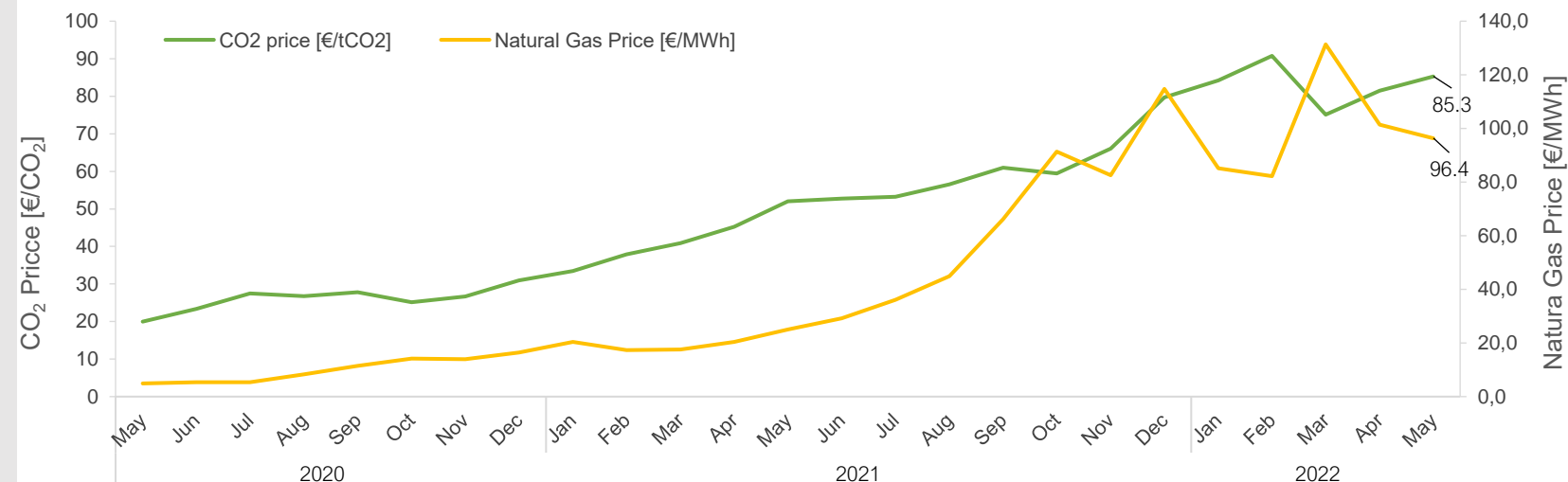
ALLOWANCES
AVERAGE PRICE

€83.4

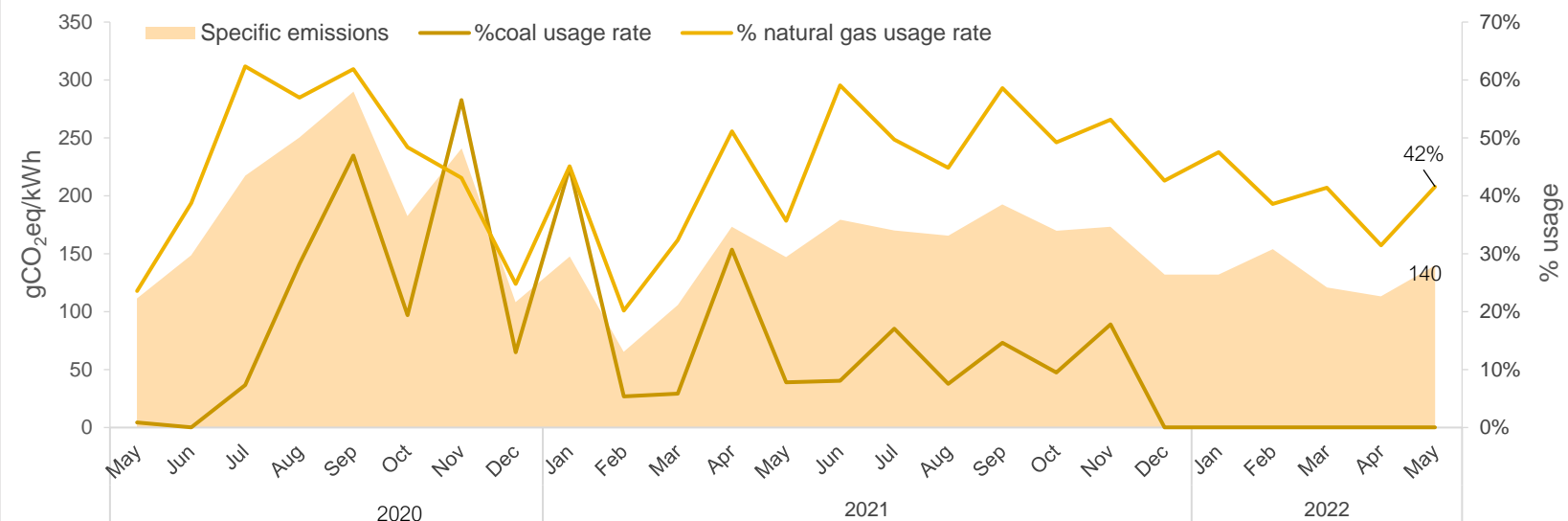
/tCO₂

▲ 99%

In comparison to May 2021



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



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

Environmental Service

The indicators on the right identify the savings reached between January 1 and May 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 have avoided:



€1,601 M

Imported natural gas (Jan-May)

€314 M

Imported natural gas (May)



3.4 MtCO₂eq

CO₂ emissions (Jan-May)

0.7 MtCO₂eq

CO₂ emissions (May)



€593 M

Imported electricity (Jan-May)

€50 M

Imported electricity (May)



€247 M

CO₂ allowances (Jan-May)

€52 M

CO₂ allowances (May)

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.

Nota2: For the estimation of savings in imported electricity, the average price on the MIBEL market has been considered.

European Barometer

ACER market study

ACER (*European Union Agency for the Cooperation of Energy Regulators*) has conducted and published its [report](#) on the electricity market, with an analysis of the current state of the market, and measures to improve its operation.

Grid codes

On May 6, ACER published a [draft](#) review of the grid code for connecting producers to the grid, electrical mobility, storage, among other.

REPowerEU

On May 18, the European Commission published the [REPowerEU plan](#), designing the European Union's energy response to Russia's invasion of Ukraine through measures to reduce dependence on fossil fuels.

Electricity Market

On May 18, the European Commission published an [action plan](#) with short- and long-term measures for an optimisation of the electricity market.

GHG emission

On May 20, the European Commission published a [draft](#) concerning greenhouse gas emissions, where a minimum reduction of emissions is established, setting also the method for the calculation of the emissions.

Principle of Additionality

On May 20, the European Commission published a [draft](#) regulating the principle of additionality to produce hydrogen and renewable fuels of non-organic origin (RFNBO).

Dependence on Russian fossil fuels

On May 31, EU members met and [announced](#) a sixth package of sanctions on Russia due to the invasion of Ukraine, with an impact on 75% of oil imports. However, EU members have downplayed the prospects of a ban on the purchase of Russian gas in a next round of sanctions.

National Barometer

Electro-intensive Client Statute

On May 13, [Dispatch No. 5975-B/2022](#) was published, approving the draft of the contract of membership to the Statute of the Electro-intensive Client.

Metering, measurement and control equipment

On May 13, [Dispatch No. 12/DGEG/2021](#) was published, extending the period provided for in Dispatch No. 5/DGEG/2021 for the installation of counting, measurement and control equipment in each subpark, until the date of transition resulting from the application of Decree-Law No.35/2013 or, by the end of 2022, whichever occurs later.

Electricity production costs

On May 14, [Decree-Law No. 33/2022](#) was published, establishing an exceptional and temporary mechanism for adjustments to the costs of electricity production within the Iberian Electricity Market. On the same day, ERSE's [Directive No 11/2022](#) was published, approving declarative obligations under the cost adjustment mechanism in the Iberian Electricity Market.

Regulation of the Qualification System of Energy Services Companies

On May 18, [Dispatch No. 6227/2022](#) was published, which approves the Regulation of the Qualification System of Energy Services Companies (SQESE) and repeals Normative Dispatch No. 15/2022.

Formation of average electricity prices

On May 19, [Dispatch No. 6287/2022](#) was published, setting out the parameter corresponding to the impact of out-of-market measures and events recorded within the European Union on the formation of average electricity prices on the wholesale market in Portugal, to be applied between 1 April and 30 June 2022.

Extension of time limits for projects for the installation of electro-producing centres in RES

The Secretary of State for the Environment and Energy published on May 20, a [Dispatch](#) extending multiple time limits for projects for the installation of electro-producing centres of renewable energy sources.



APREN | Departamento Técnico e Comunicação

Avenida da República,
59 - 2º andar
1050-189 Lisboa

[+351] 213 151 621
apren@apren.pt

www.apren.pt



APREN Associação
de Energias
Renováveis