

# 2024

**BOLETIM  
ELETRICIDADE  
RENOVÁVEL**  
JUNE  
2024

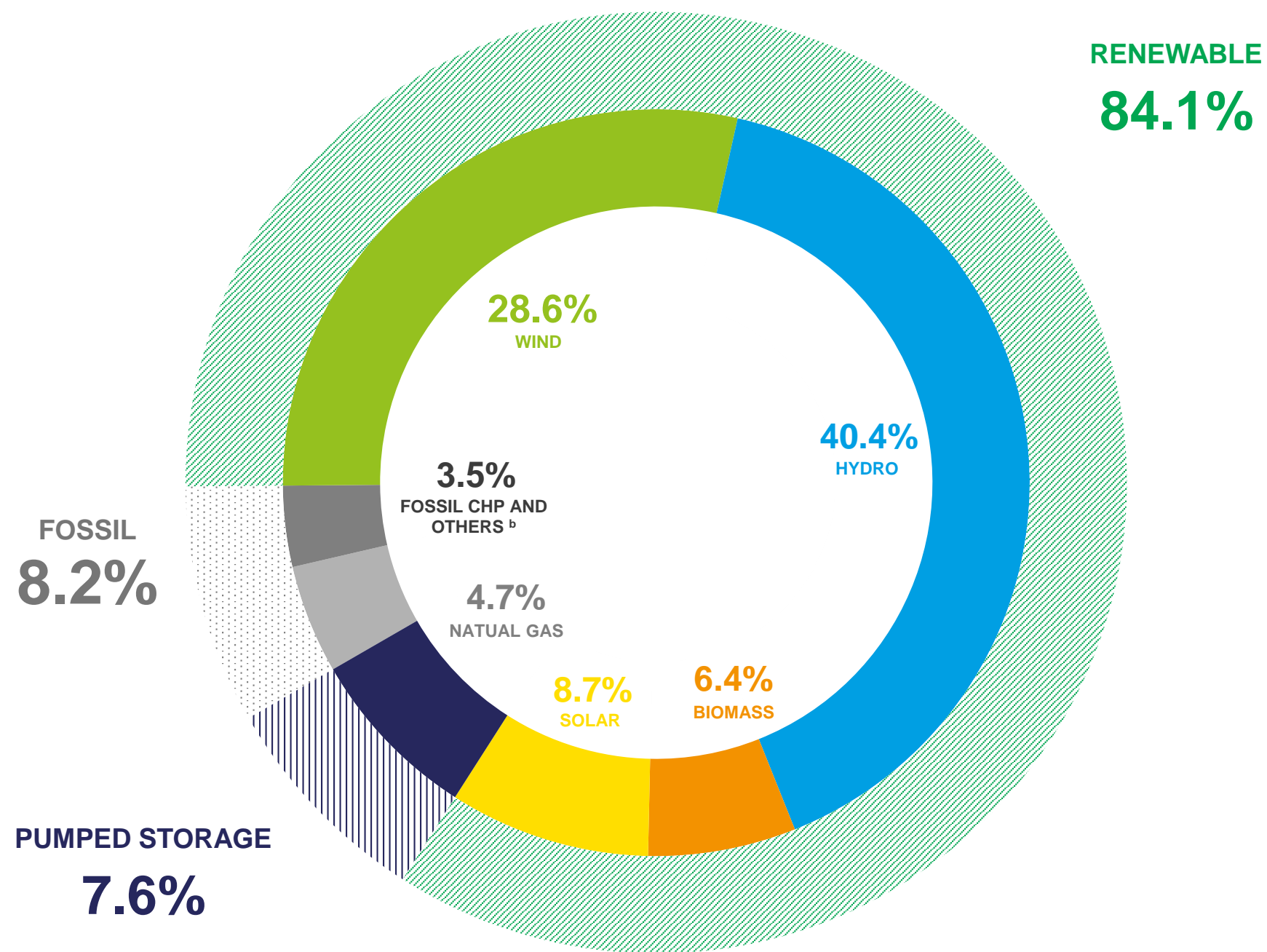
PORTUGAL PRECISA  
DA NOSSA ENERGIA.



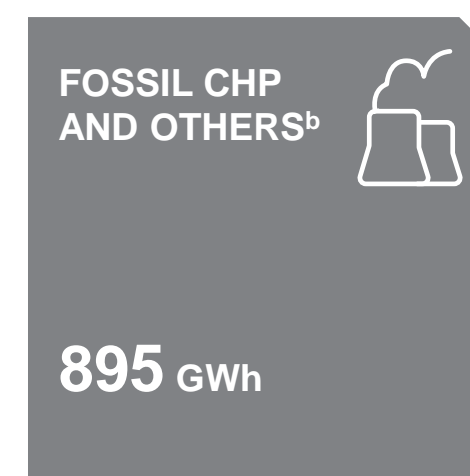
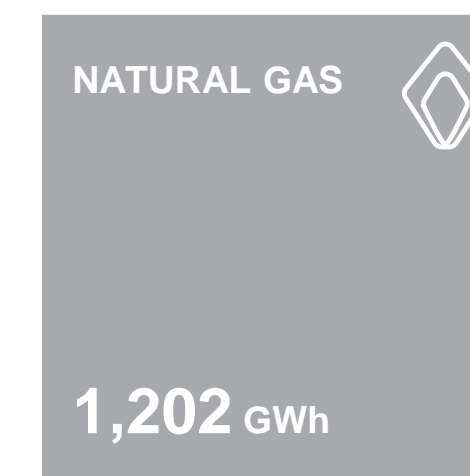
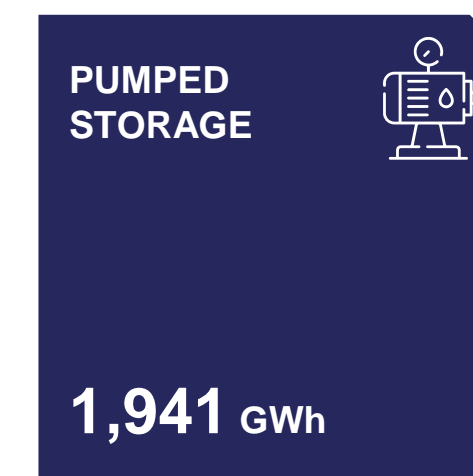
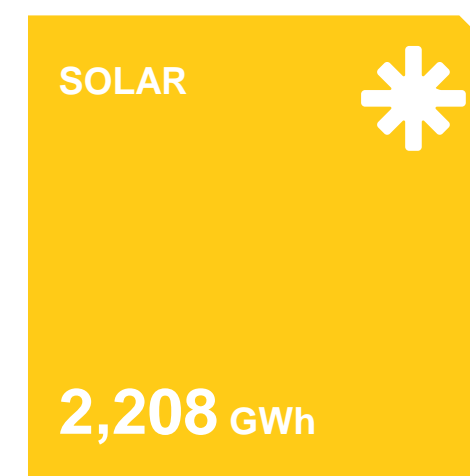
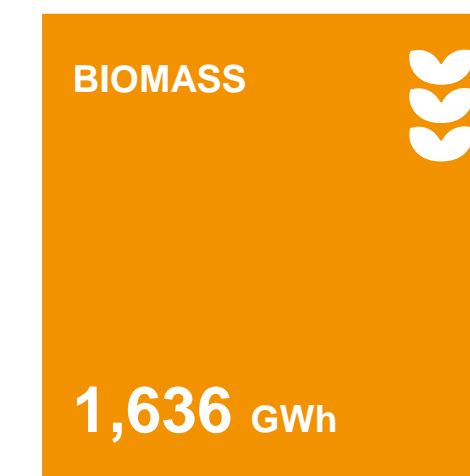
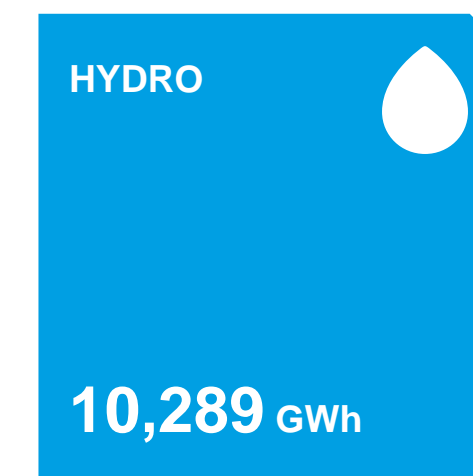
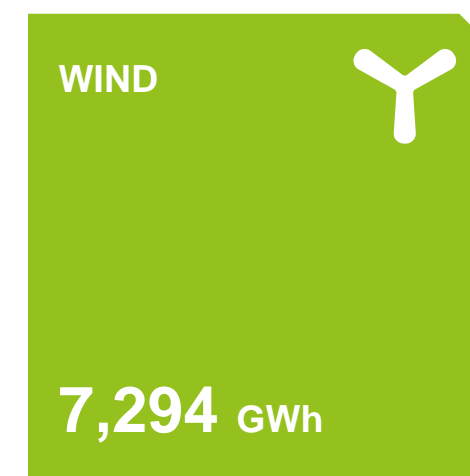
**APREN** Associação  
de Energias  
Renováveis

# EXECUTIVE SUMMARY

## GENERATION (JAN-JUN)



RENEWABLE  
**84.1%**



**MAIN INDICATORS (JAN-JUN)**

GWh  
**25,465**  
Generation<sup>a</sup>

€/ MWh  
**39.3**  
MIBEL PT Price

€/ tCO<sub>2</sub>  
**63.7**  
CO<sub>2</sub> Price

MtCO<sub>2</sub> - eq  
**0.7**  
CO<sub>2</sub> Emissions

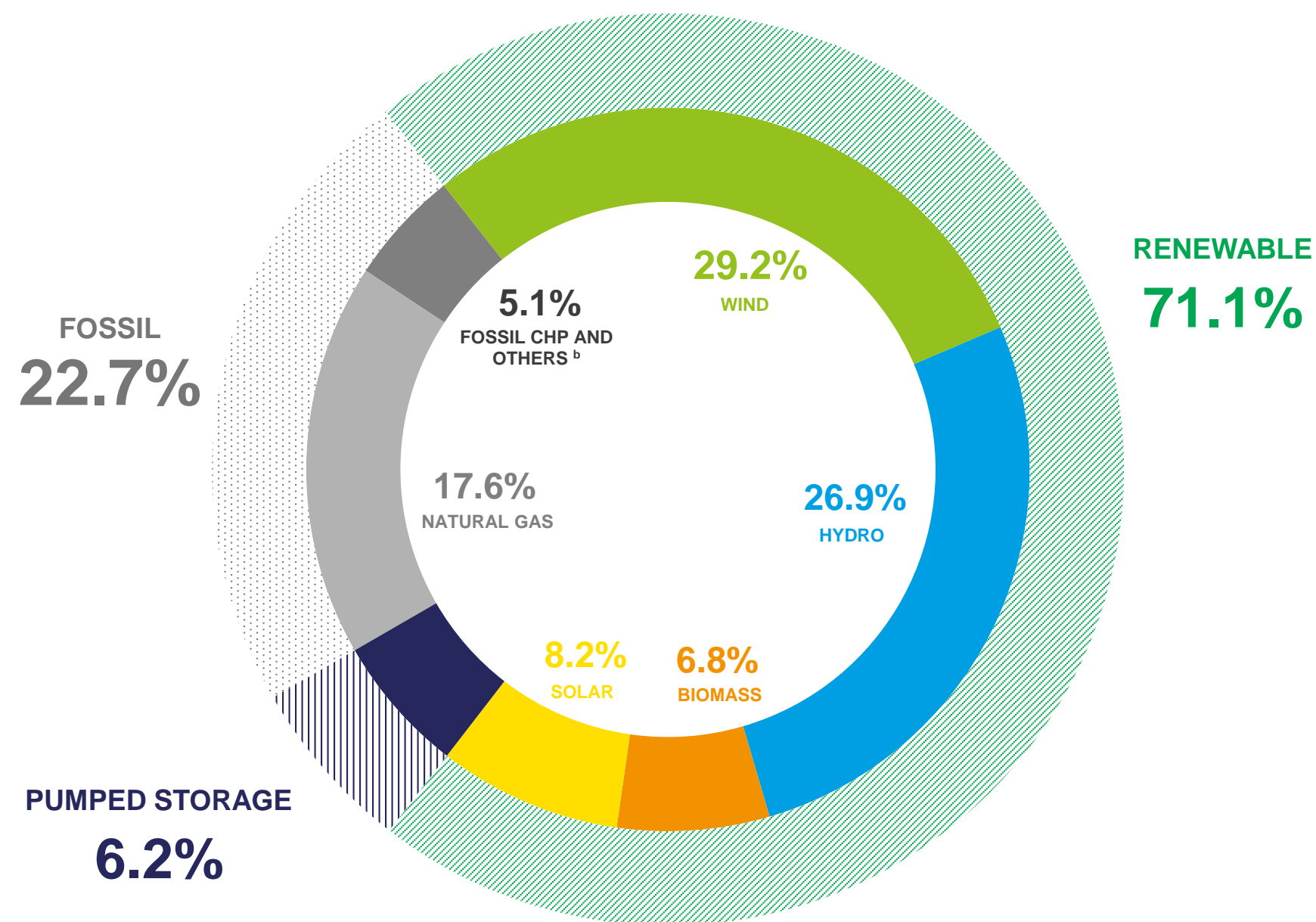
GWh  
**2,581**  
Import Balance

gCO<sub>2</sub> eq/kWh  
**29.2**  
CO<sub>2</sub> Specific Emissions

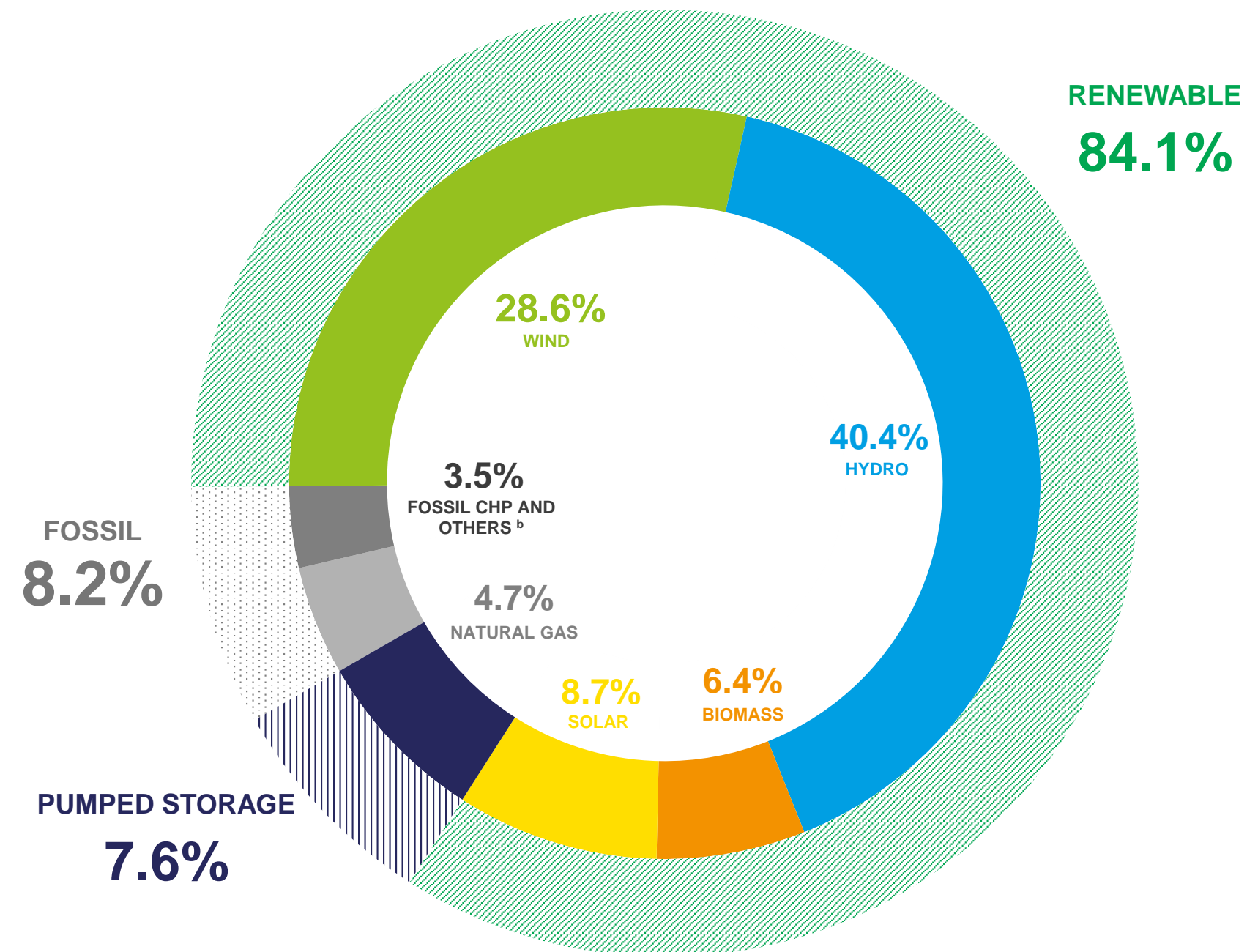
<sup>a</sup> Generation refers to the net energy generation of the power stations, taking into account the pumping production recently disclosed by REN. Production from pumping is not included in the percentage of production from renewable sources  
<sup>b</sup> Includes fuel oil, diesel, the non-biodegradable fraction of MSW and new waste

# EXECUTIVE SUMMARY

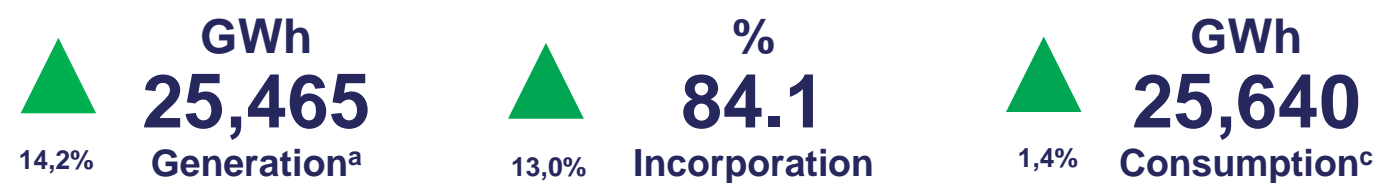
## JUNE ACCUMULATED GENERATION 2023



## JUNE ACCUMULATED GENERATION 2024



### MAIN INDICATORS COMPARED TO JUNE 2023



<sup>a</sup> Generation refers to the net energy generation of the power stations, taking into account the pumping production recently disclosed by REN. Production from pumping is not included in the percentage of production from renewable sources.  
Source: REN, APREN Analysis

<sup>b</sup> Includes fuel oil, diesel, the non-biodegradable fraction of MSW and new waste

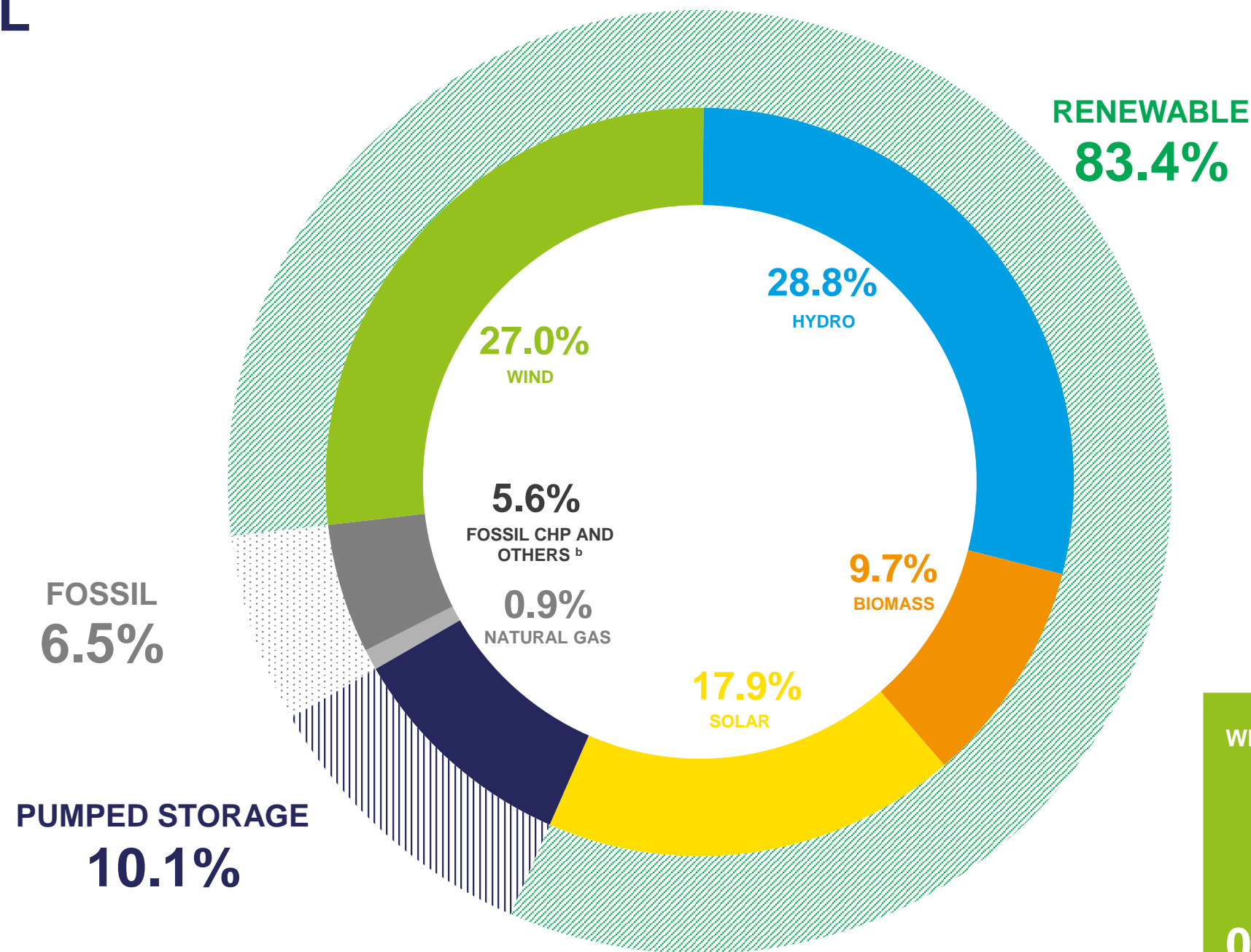
<sup>c</sup> Consumption refers to the net generation of energy by power stations, taking into account the import-export balance.  
Source: REN, APREN Analysis

# MONTHLY ANALYSIS IN PORTUGAL

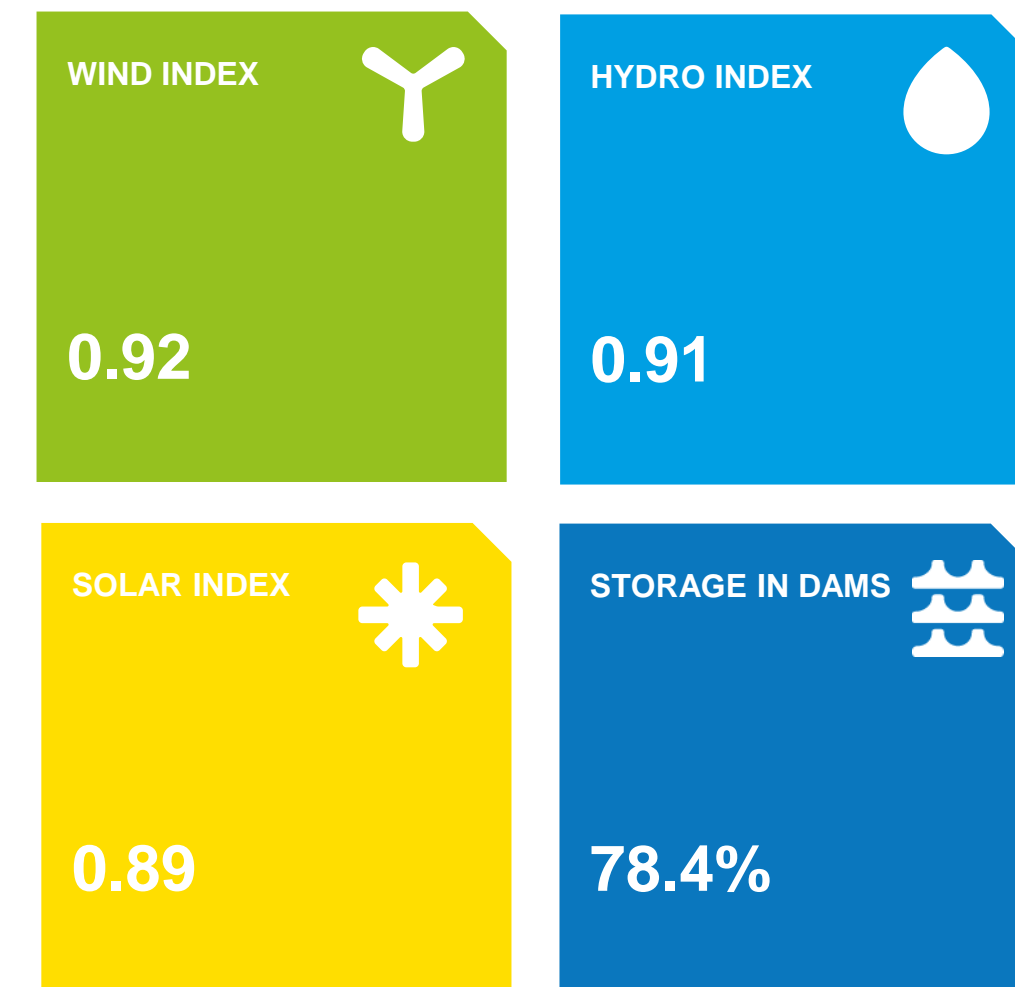
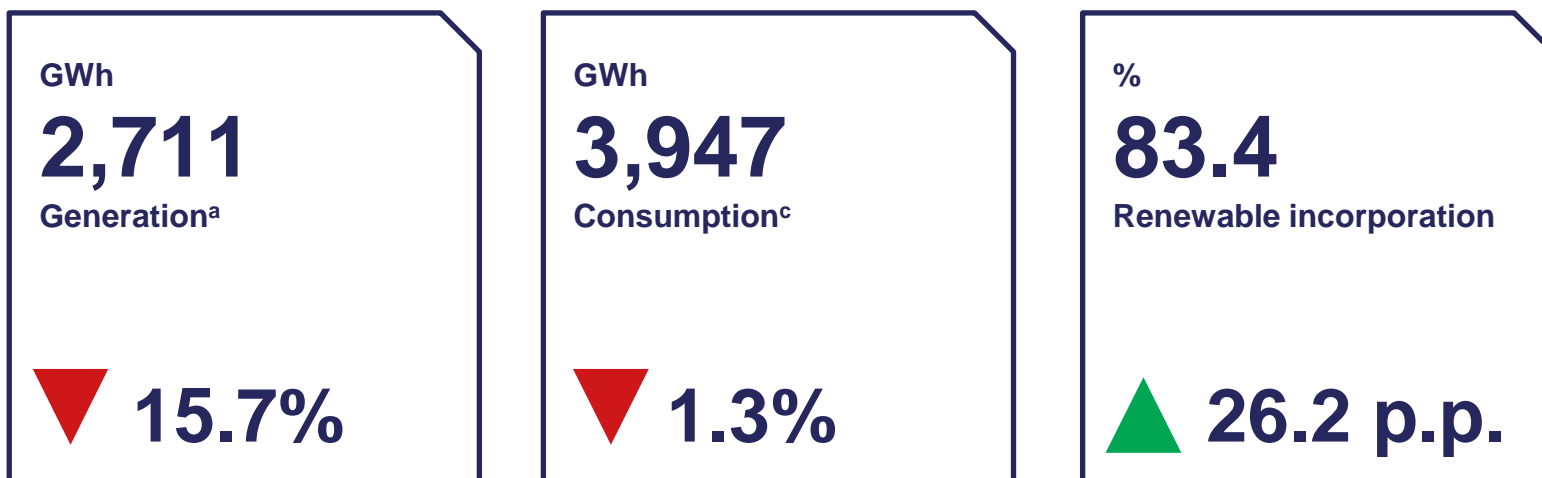
## JUNE

Between 1 and 30 June 2024, renewable incorporation was 83.4%, making up 2.262 GWh of the 2.771 GWh produced in the month under review.

The 15.7% increase in production compared to June 2023 is partly due to a reduction of 26.1 percentual points (p.p.) in electricity production from natural gas, having produced 879 GWh in June 2023, and 24 GWh in June 2024. Additionally, a considerable value for imports was registered, 39%, corresponding to the remainder of the electricity consumption.

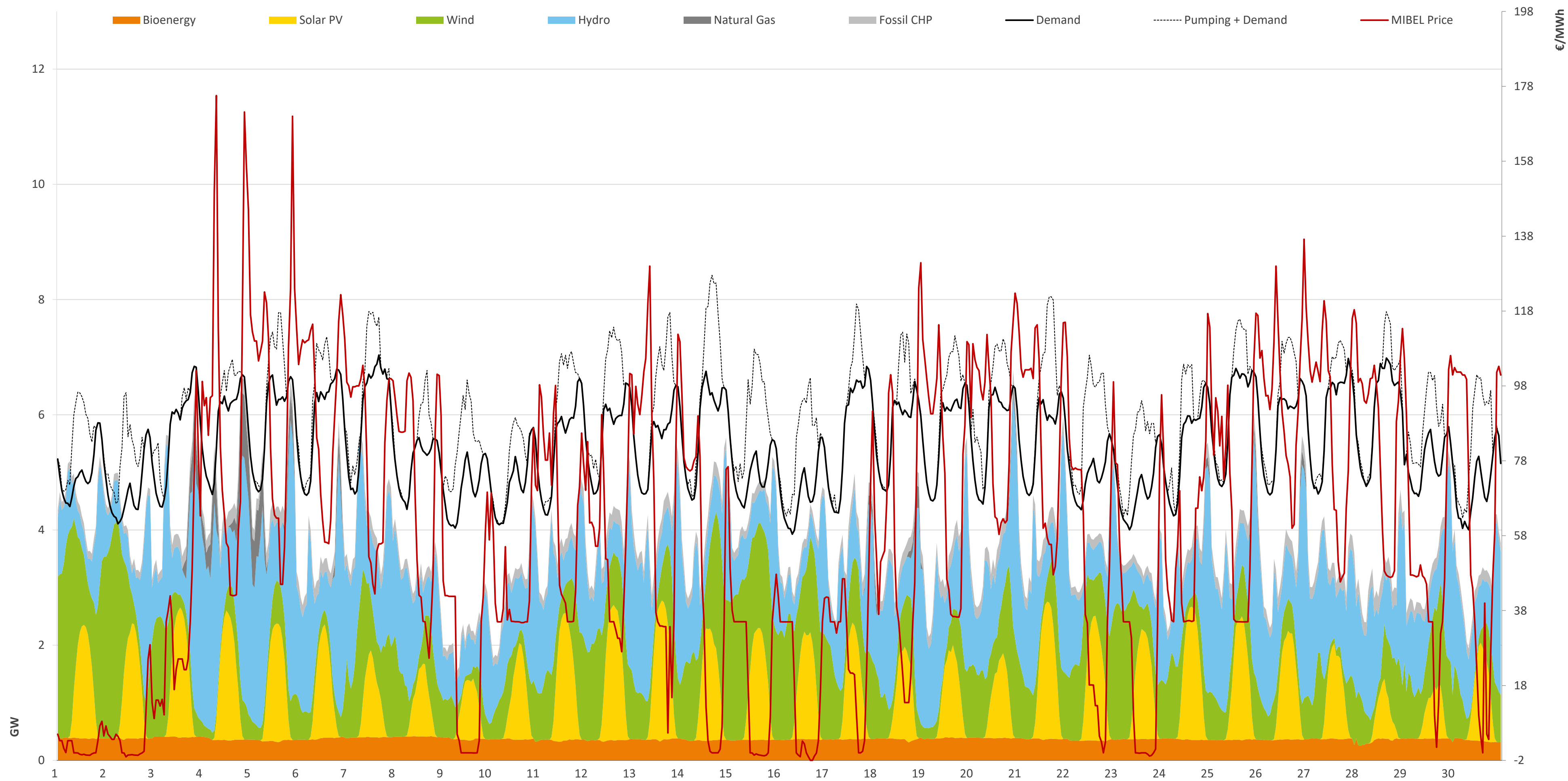


### ELECTRICITY SECTOR'S INDICATORS (IN COMPARISON WITH JUNE 2023)

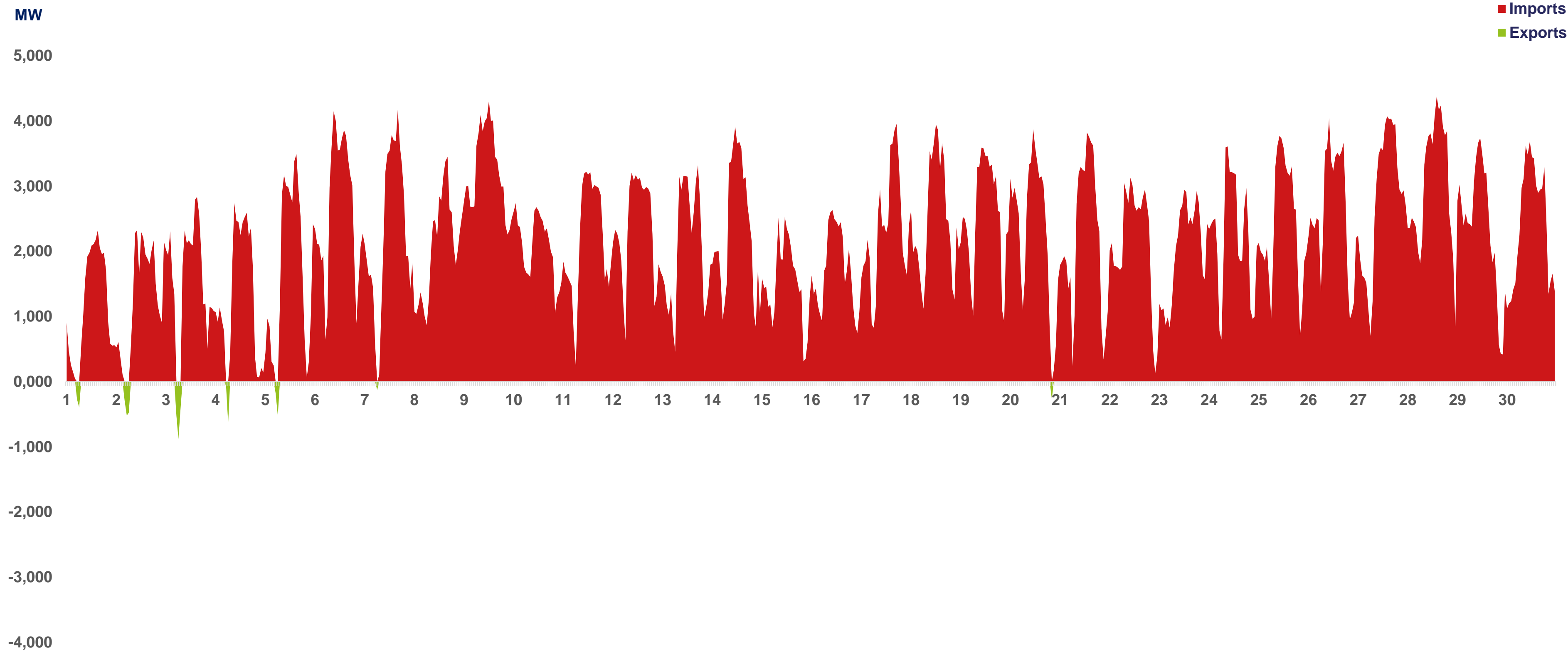


<sup>a</sup> Generation refers to the net energy generation of the power stations, taking into account the pumping production recently disclosed by REN. Production from pumping is not included in the percentage of production from renewable sources.  
<sup>b</sup> Includes fuel oil, diesel, the non-biodegradable fraction of MSW and new waste  
<sup>c</sup> Consumption refers to the net generation of energy by power stations, taking into account the import-export balance.  
 Source: REN, APREN Analysis

# MONTHLY ANALYSIS IN PORTUGAL: JUNE 2024 LOAD DIAGRAM



# MONTHLY ANALYSIS IN PORTUGAL: DIAGRAM OF IMPORTS AND EXPORTS IN PORTUGAL



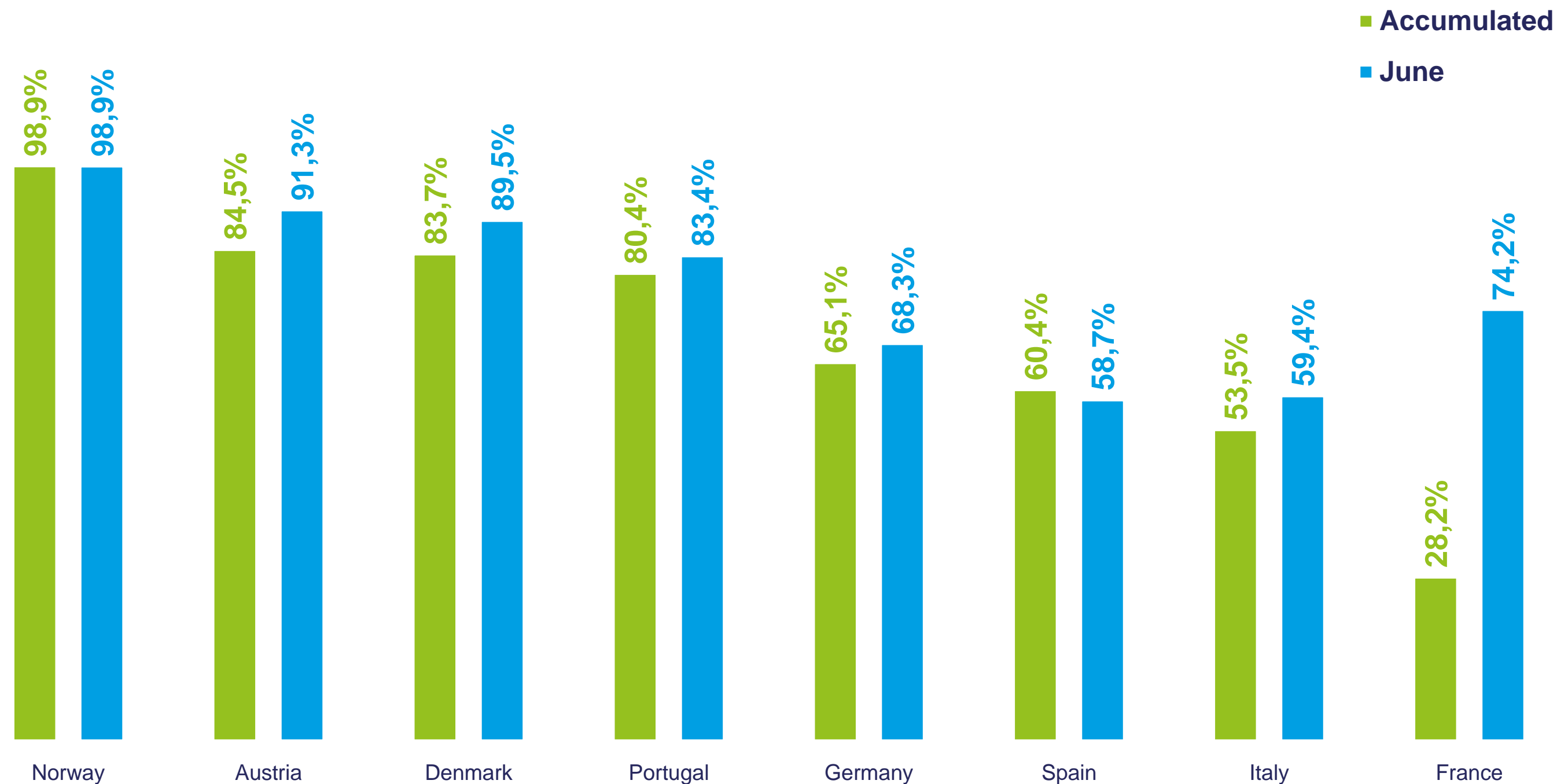
Source: REN, APREN Analysis

## RENEWABLE ELECTRICITY EUROPE

In this analysis, only the main countries in the different European markets were considered, in order to obtain a representative panorama for comparison.

Between 1 January and 30 June 2024, Portugal was the fourth country with the highest share of renewable energy in electricity generation, with 80.4%, figuring behind Norway, Austria and Denmark, which respectively achieved 98.9%, 84.5% and 83.7%.

From 1 to 30 June, Portugal came forth in the countries considered with the highest renewable incorporation in Europe, having reached 83.4%.



Renewable incorporation in cumulative (Jan-Jun) and monthly (Jun) electricity generation.

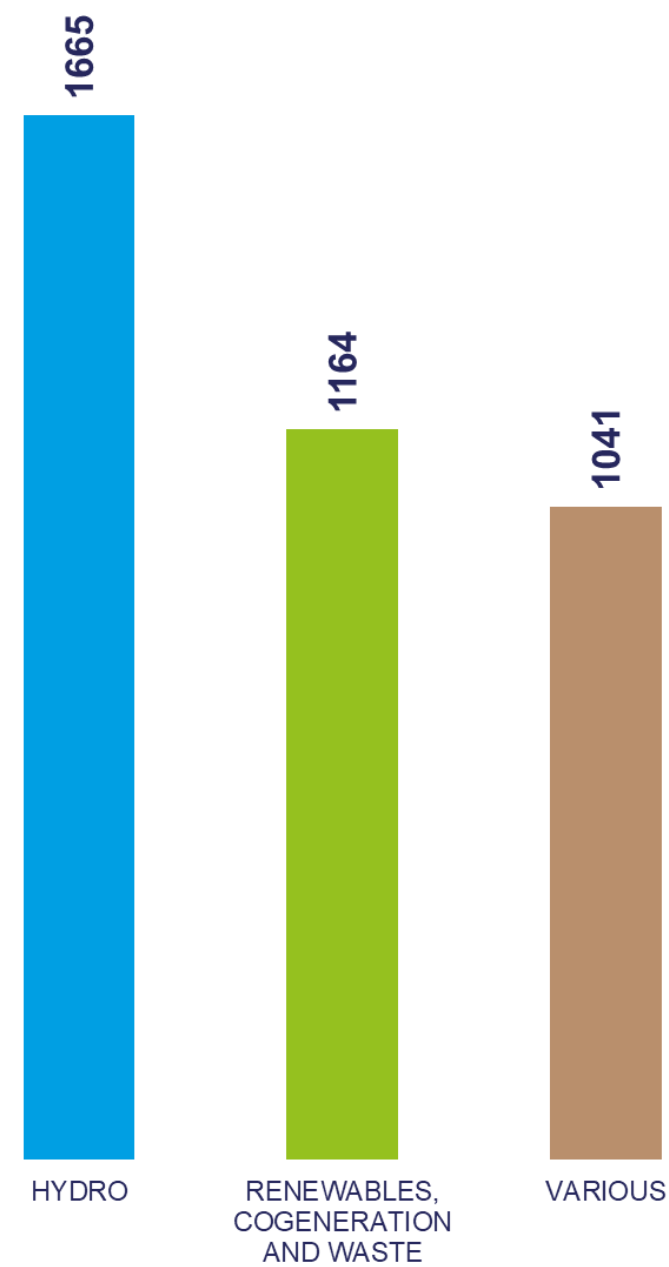
Source: REN, Fraunhofer, REE, Terna, National Grid, ENTSO-E, Análise APREN

# MARKET PRICE SETTING PORTUGAL

Between 1 January and 30 June, the closing technology that recorded the most hours was hydro, with 1,665 non-consecutive hours, followed by renewables, cogeneration and waste with 1,164 hours, and various technologies with 1,041 hours.

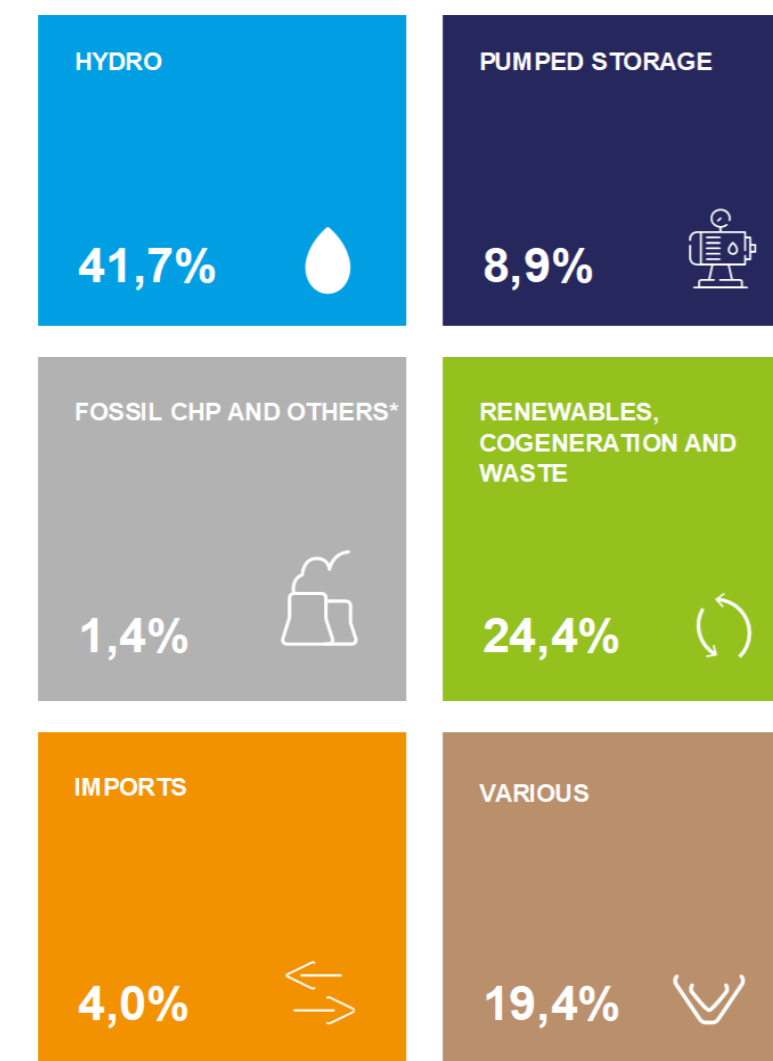


## ACCUMULATED JUNE 2024



Number of market closing hours (accumulated) for the three main closing technologies (Jun).  
**Source:** OMIE, APREN Analysis

## JUNE 2024



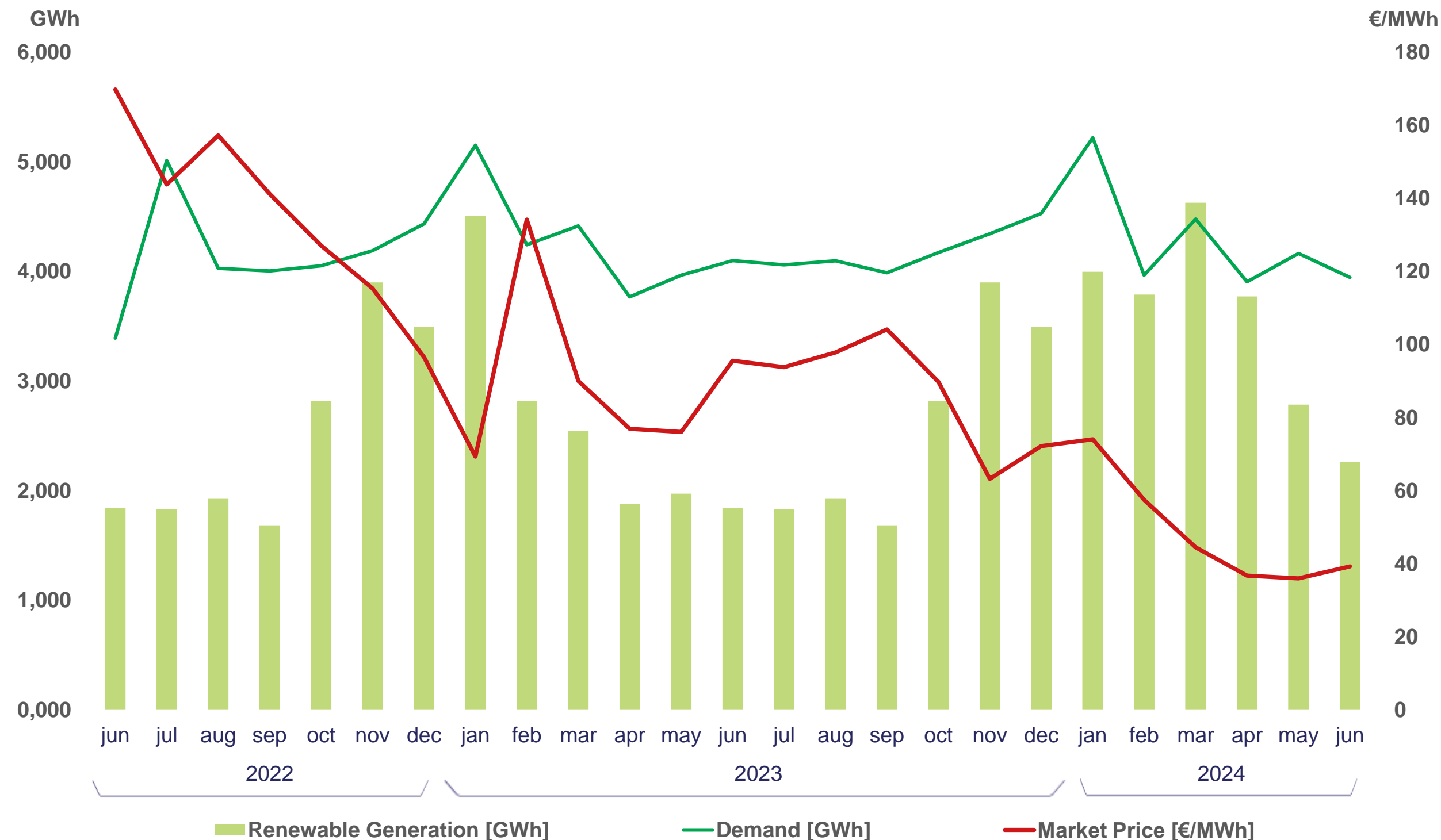
Percentage distribution of the number of hours of market closure for the various technologies, totaling 720 hours (Jun).  
**Source:** OMIE, APREN Analysis



# ELECTRICITY MARKET PORTUGAL

Between January 1 and June 30, the average hourly price recorded in MIBEL in Portugal (39.3 €/MWh<sup>d</sup>) represents a 56.2% reduction compared to the same period last year. In the same period, there were 1,620 non-consecutive hours in which renewable generation was sufficient to supply mainland Portugal's electricity consumption, with an average hourly price in MIBEL of 33.9 €/MWh.

<p style="font-size: 24px; font-weight: bold;">1,620</p> <p>Hours</p> <p style="font-size: 12px; font-weight: bold;">100% RENEWABLE HOURS</p> <p>[Accumulated]</p>	<p style="font-size: 24px; font-weight: bold;">33.9</p> <p>€/MWh</p> <p style="font-size: 10px; font-weight: bold;">MIBEL'S AVERAGE PRICE (IN 100% RENEWABLE HOURS)</p> <p>[Accumulated]</p>
<p style="font-size: 24px; font-weight: bold;">14</p> <p>Hours</p> <p style="font-size: 12px; font-weight: bold;">100% RENEWABLE HOURS [JUNE]</p>	<p style="font-size: 24px; font-weight: bold;">14.7</p> <p>€/MWh</p> <p style="font-size: 10px; font-weight: bold;">MIBEL'S AVERAGE PRICE (IN 100% RENEWABLE HOURS) [JUNE]</p>



<sup>d</sup> arithmetic average of MIBEL prices.  
Source: OMIE

Electricity market analysis, renewable generation, consumption and market price (jun-2022 a jun-2024)  
Source: OMIE, APREN analysis

# RENEWABLE ELECTRICITY EUROPE

During the month of June 2024, there was a minimum hourly price in MIBEL in Portugal of -2.00 €/MWh, where the market was closed by renewables, cogeneration and waste. The maximum hourly price was 175.55 €/MWh, where the market was closed by hydro.

## MINIMUM PRICES (JUN)

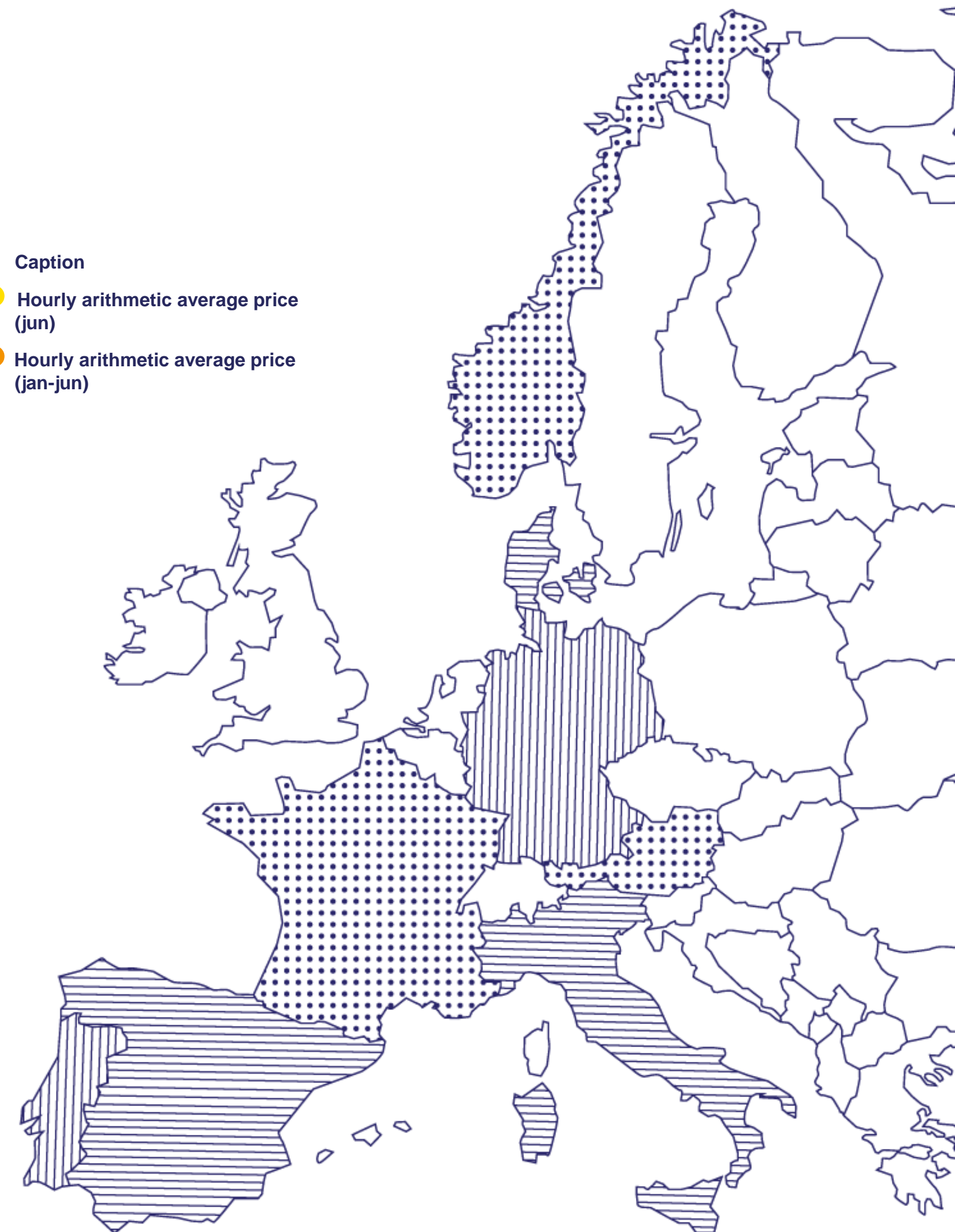
1 <sup>o</sup>	Austria	€/MWh	<b>-83.62</b>
2 <sup>o</sup>	France	€/MWh	<b>-80.02</b>
3 <sup>o</sup>	Germany	€/MWh	<b>-80.01</b>

## MAXIMUM PRICES (JUN)

1 <sup>o</sup>	Germany	€/MWh	<b>235.52</b>
2 <sup>o</sup>	Austria	€/MWh	<b>214.10</b>
3 <sup>o</sup>	Denmark	€/MWh	<b>209.32</b>

Portugal €/MWh	58.1	39.3
Spain €/MWh	56.1	39.1
France €/MWh	37.6	47.0
Italy €/MWh	101.4	93.3
Germany €/MWh	72.9	67.6
Austria €/MWh	67.7	66.9
Denmark €/MWh	65.3	63.0
Norway €/MWh	31.0	47.2

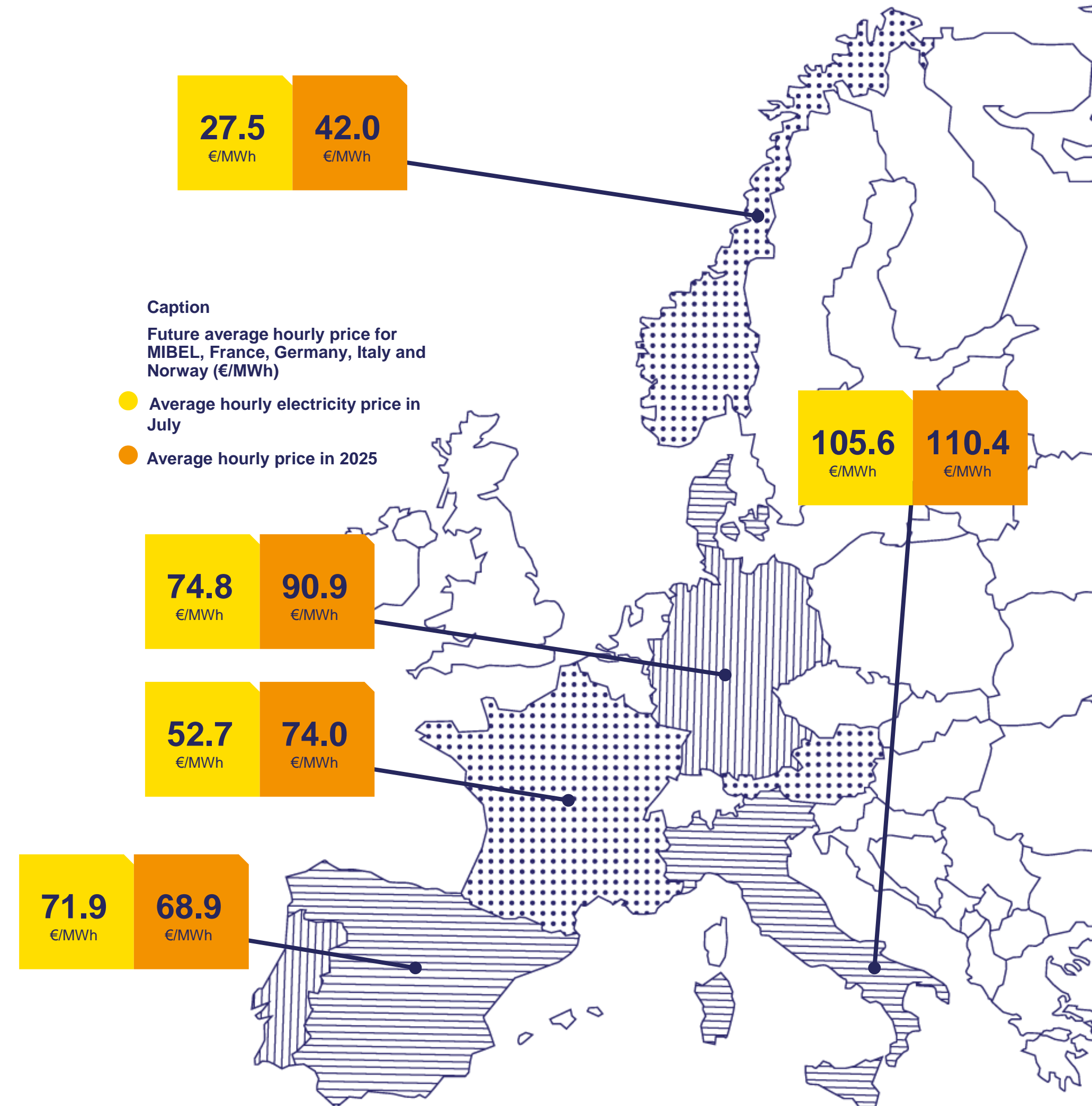
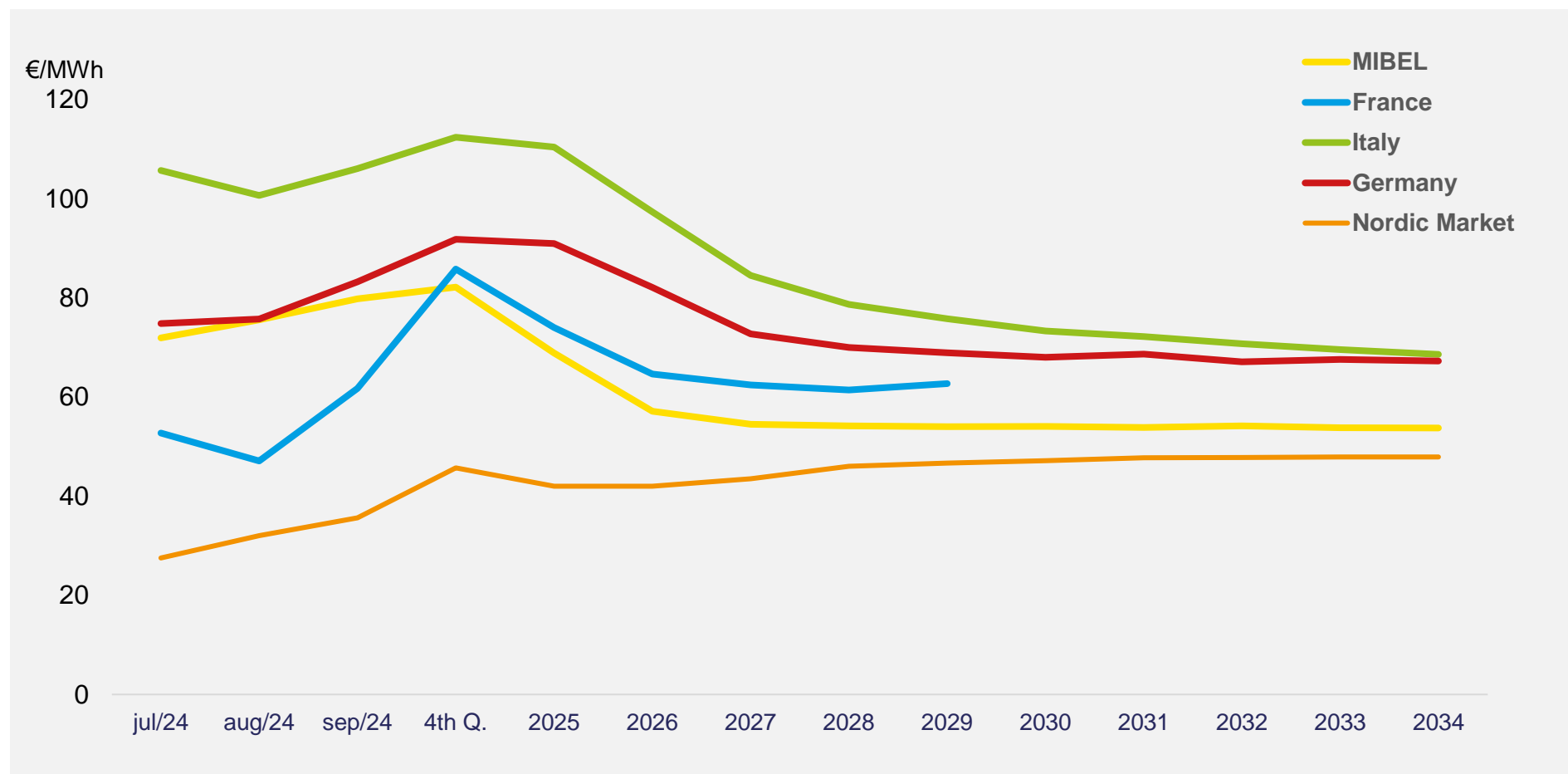
Caption  
 ● Hourly arithmetic average price (jun)  
 ● Hourly arithmetic average price (jan-jun)



# ELECTRICITY MARKET FUTURES

The evolution of the average hourly future price shown is calculated on the basis of electricity<sup>e</sup> purchase and sale contracts. The map on the right shows the price values for next month (July) and next year. In both cases, MIBEL and the Nordic Market present the lowest figures, whereas the Italian market presents the highest figures amongst the markets analyzed.

MIBEL has the second lowest values until 2034, due to the increasing investment in renewable production.



**Caption**  
 Future average hourly price for MIBEL, France, Germany, Italy and Norway (€/MWh)

- Average hourly electricity price in July
- Average hourly price in 2025

<sup>e</sup>Values updated as of 1st June.  
 Source: OMIP, EEX, APREN Analysis

# INTERNATIONAL EXCHANGES EUROPE

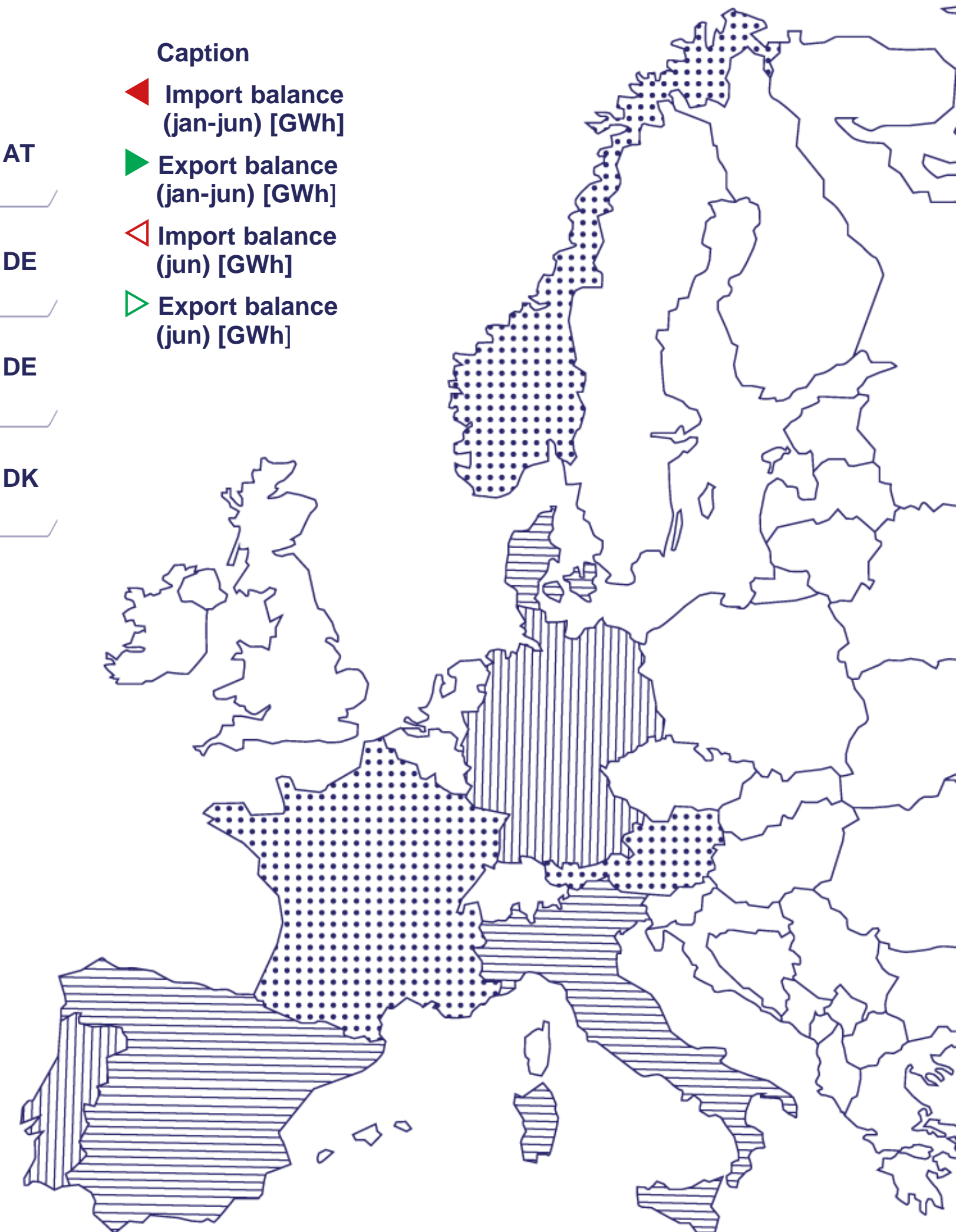
Between 1 January and 30 June 2024, mainland Portugal's electricity system registered electricity imports equivalent to 5,831 GWh and exports of 3,250 GWh, with Portugal being an importer with a balance of 2,581 GWh.

PT	2,581	1,581	ES	DE	492	303	AT
ES	1,141	199	MA	DK	2,335	649	DE
FR	2,039	536	ES	NO	2,407	529	DE
IT	9,413	1,683	FR	NO	1,977	713	DK
DE	8,343	1,569	FR				

**Caption**  
 ▲ Import balance (jan-jun) [GWh]  
 ▼ Export balance (jan-jun) [GWh]  
 ▲ Import balance (jun) [GWh]  
 ▼ Export balance (jun) [GWh]

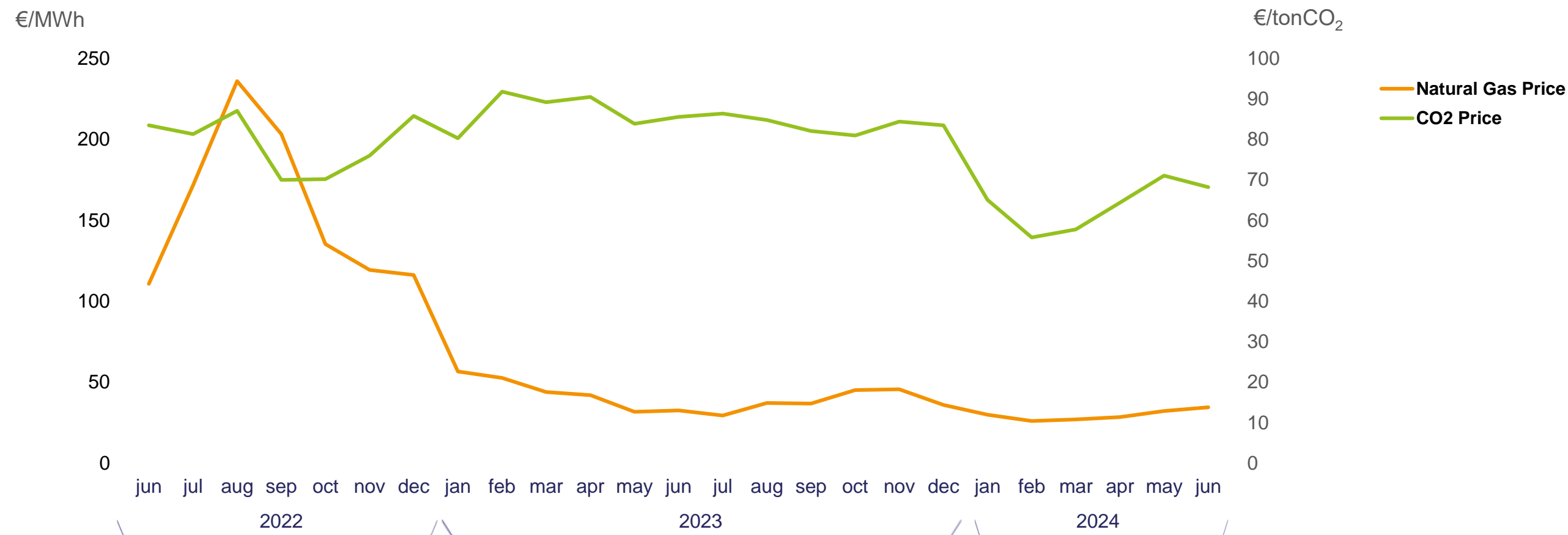
## MAIN INDICATORS FOR PT-ES INTERCONNECTION

<b>usage</b>	0.5% (jun) PT-ES	16.3% (jan-jun)	60.1% (jun) ES-PT	31.3% (jan-jun)
<b>congestion</b>	0.0% (jun) PT-ES	2.4% (jan-jun)	15.3% (jun) ES-PT	5.8% (jan-jun)
<b>market separation</b>	14.7% (jun) PT-ES	5.5% (jan-jun)	68.6% (jun) MIBEL-FR	69.9% (jan-jun)



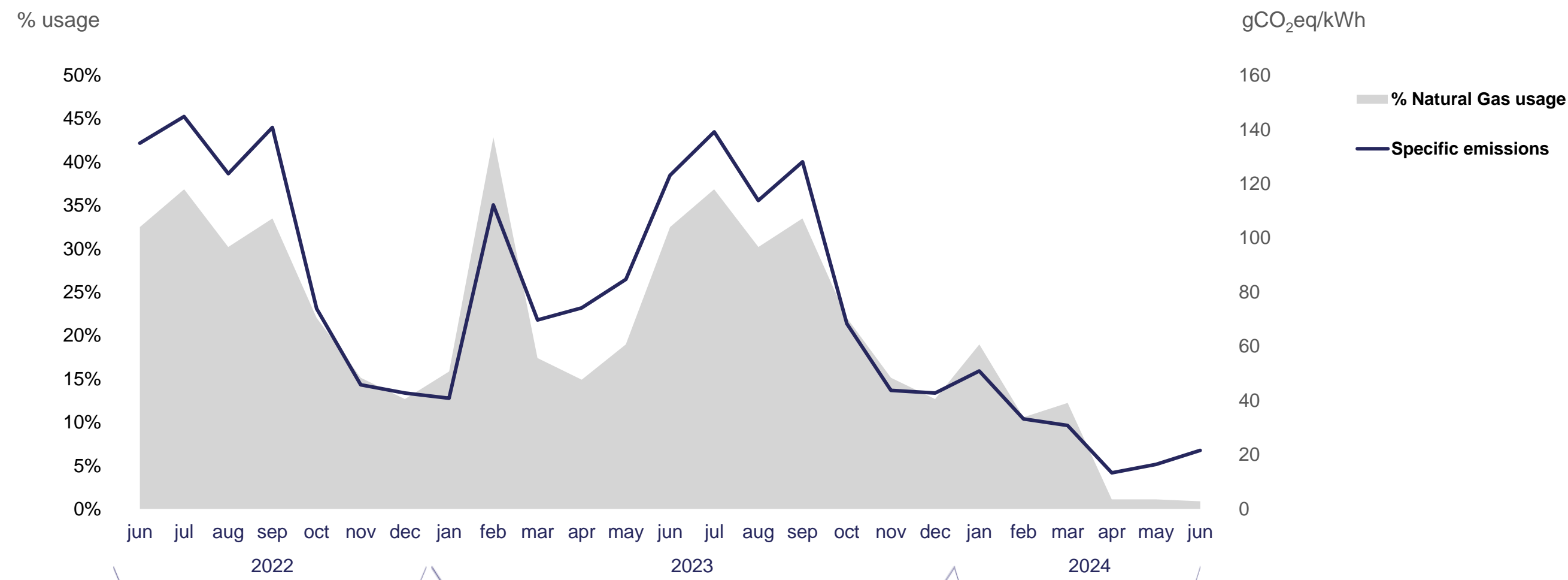
# POWER PRODUCTION EMISSIONS

Between 1 January and 30 Jun 2024, the specific emissions reached the value of 29.2 gCO<sub>2</sub>eq/kWh, corresponding to a total of 0.74 MtCO<sub>2</sub>eq of emissions from the electricity generation sector. The European CO<sub>2</sub> Emissions Trading Scheme (ETS) recorded a price of 63.7 €/tCO<sub>2</sub><sup>d</sup>, a reduction of 27 per cent compared to the same period in 2023.



Price of CO<sub>2</sub> allowances in the EU ETS and price of natural gas in Europe (Jun-2022 to Jun-2024).  
Source: SendeCO<sub>2</sub>, WorldBank.

<p><b>0.74</b> MtCO<sub>2</sub>eq</p> <p>SECTOR'S EMISSIONS</p>	<p><b>63.7</b> €/tCO<sub>2</sub></p> <p>AVERAGE PRICE OF LICENCES</p>
<p><b>46.7</b> %</p> <p>COMPARED TO JUNE 2023</p>	<p><b>27</b> %</p> <p>COMPARED TO JUNE 2023</p>



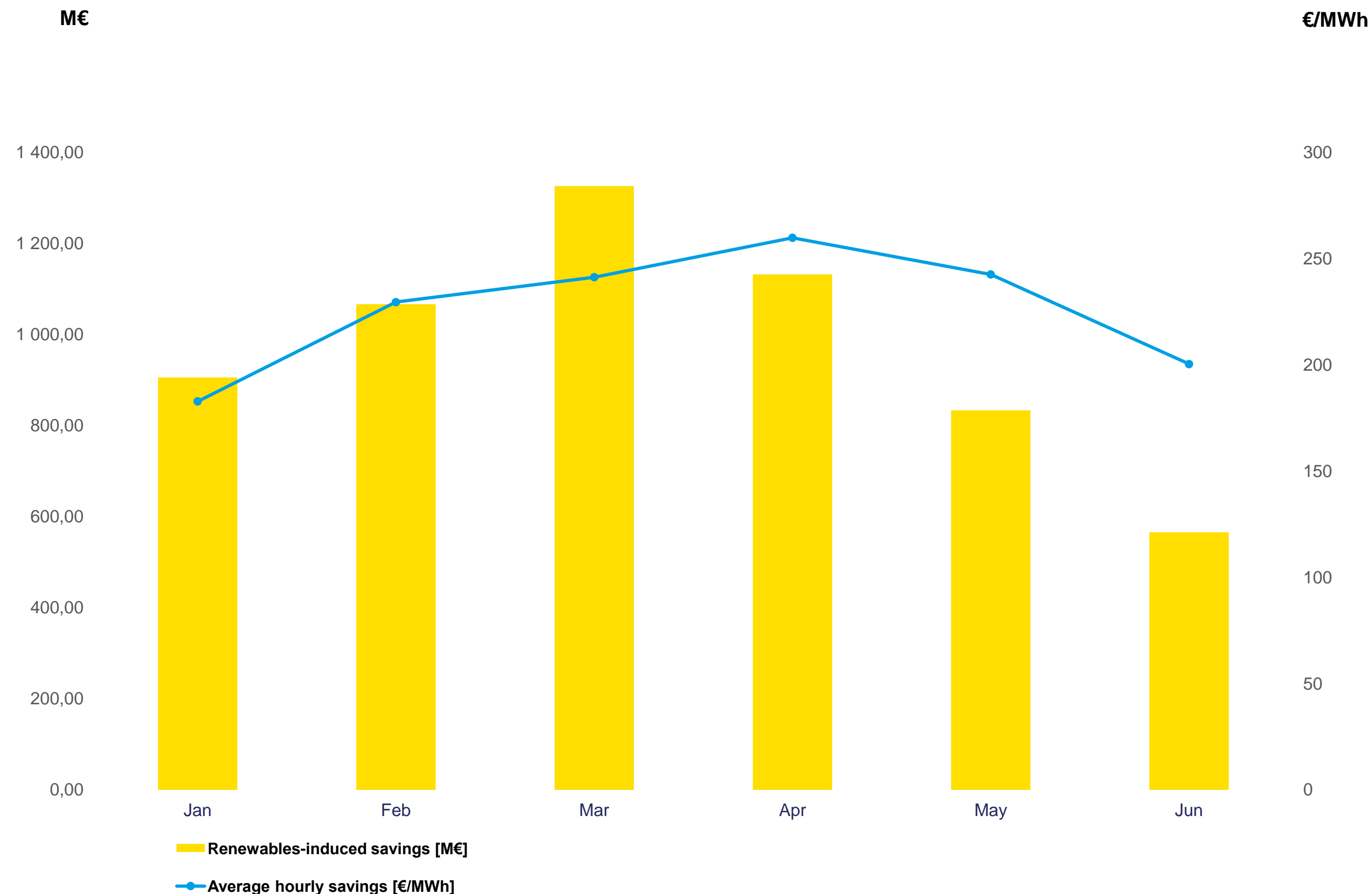
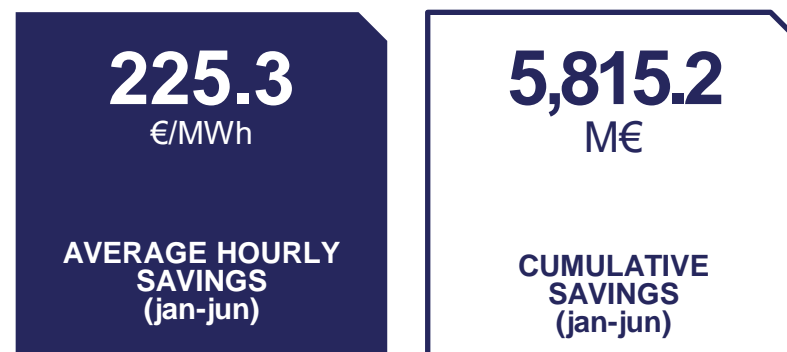
Specific emissions from the electricity sector in mainland Portugal, % use of coal and natural gas power stations (Jun-2022 to Jun-2024).  
Source: REN, DGEG, ERSE, APREN Analysis

<sup>d</sup> arithmetic average of hourly prices  
Source: OMIE, WorldBank.

# SIMULATION OF PRICE FORMATION WITHOUT SRP

## RENEWABLES AVOIDED:

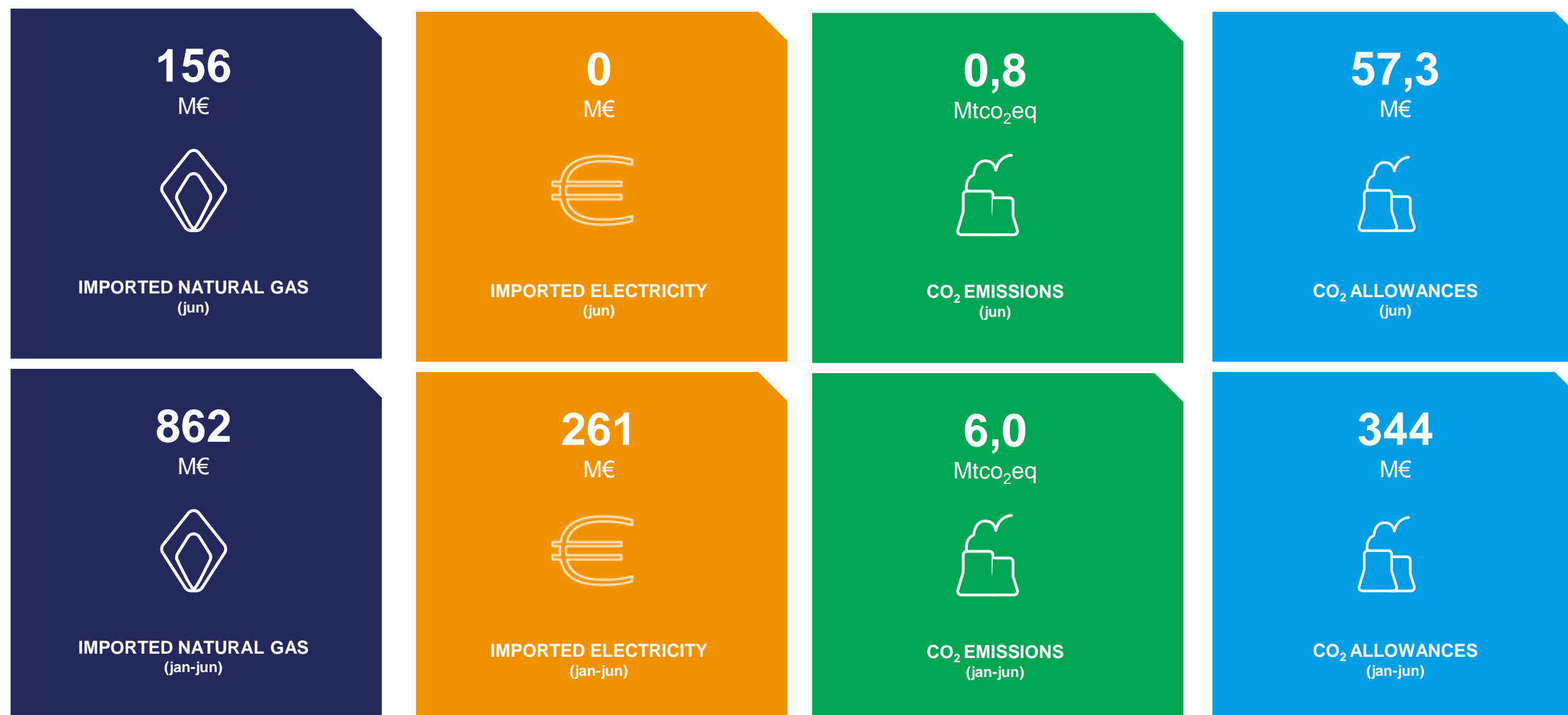
The indicators below show the savings achieved by the merit order between January 1 and June 30 of 2024 by the contribution of special regime production (PRE). This study is carried out for PRE, which includes all installed fossil cogeneration power. Bearing in mind that the capacity equivalent to this technology within PRE is fairly residual and that the other technologies are renewable, the figures are fairly close to the real savings generated by renewables.



# ENVIRONMENTAL SERVICE

## RENEWABLES AVOIDED:

The indicators below identify the savings achieved between January 1 and June 30 of 2024 in natural gas, CO<sub>2</sub> emissions and CO<sub>2</sub> emission allowances, resulting from incorporating renewables into electricity generation. This analysis is based on the assumption that, in the absence of renewables, production would be ensured primarily by natural gas, followed by the use of imports.



Source: OMIE, APREN Analysis.

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