2024

RENEWABLE ELECTRICITY BULLETIN

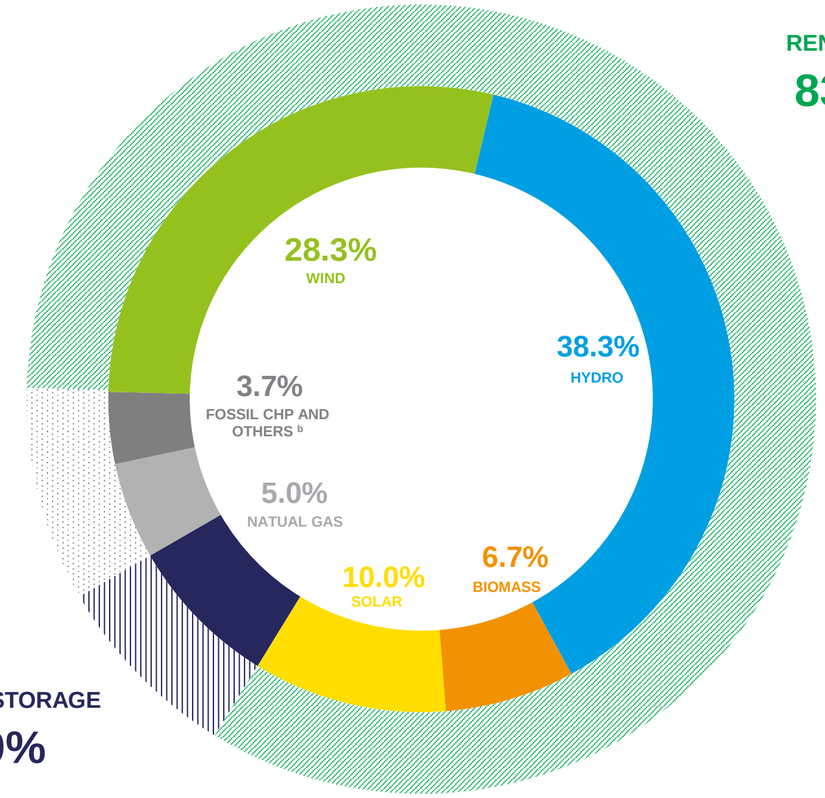
JULY
2024

SPECIAL EDITION
1ST SEMESTER AUTONOMOUS REGIONS

PORTUGAL NEEDS
OUR ENERGY

APREN Associação de Energias Renováveis

EXECUTIVE SUMMARY
GENERATION (JAN-JUL)



WIND 8,060 GWh

HYDRO 10,913 GWh

BIOMASS 1,903 GWh

SOLAR 2,860 GWh

PUMPED STORAGE 2,234 GWh

NATURAL GAS 1,423 GWh

FOSSIL CHP AND OTHERS[b] 1,065 GWh

MAIN INDICATORS (JAN-JUL)

GWh	€/ MWh	€/ tCO_2	$MtCO_2$ - eq	GWh	gCO_2 eq/kWh
28,458	44.3	64.2	0.9	4,236	30.8
Generation[a]	MIBEL PT Price	CO_2 Price	CO_2 Emissions	Import Balance	CO_2 Specific Emissions

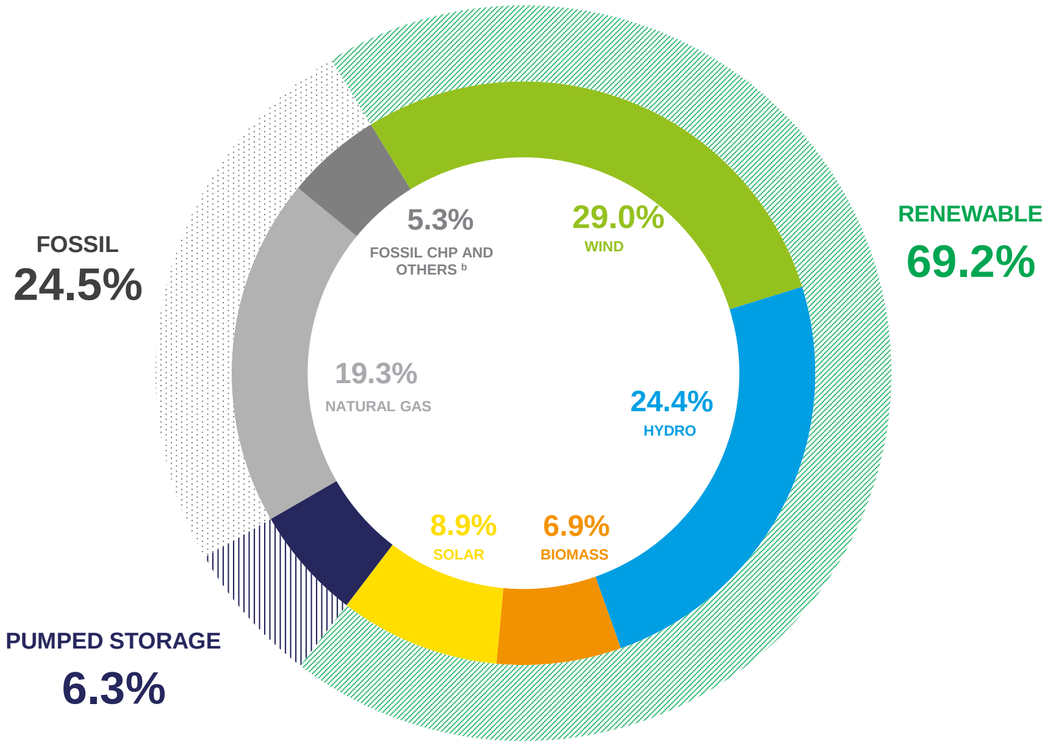
[a] Generation refers to the net energy generation of the power stations, taking into account the pumping production recently disclosed by REN. Production from pumping is not included in the percentage of production from renewable sources
[b] Includes fuel oil, diesel, the non-biodegradable fraction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

.

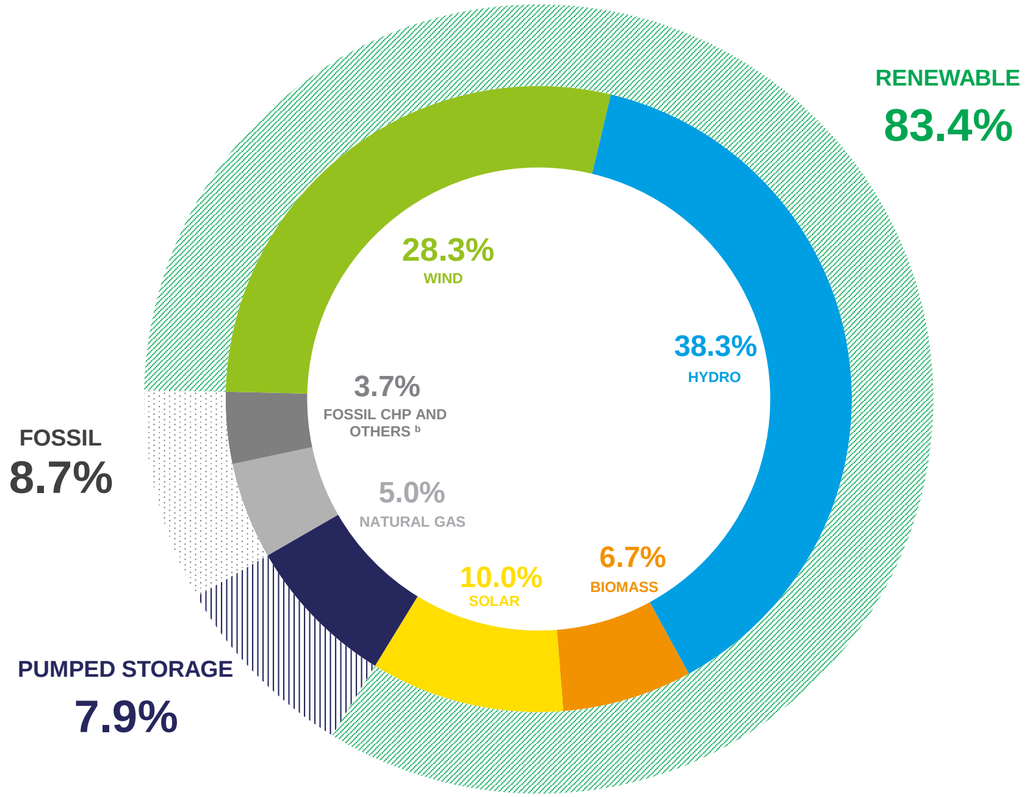
Source: REN, APREN Analysis

MAINLAND PORTUGAL
GENERATION (JAN-JUL)

JULY ACCUMULATED GENERATION 2023



JULY ACCUMULATED GENERATION 2024



MAIN INDICATORS COMPARED TO JULY 2023

▲ 11.6%	GWh 28,458 Generation[a]	▲ 14.2p.p.	% 83.4 Incorporation	▲ 1.8%	GWh 29,933 Consumption[c]

1.04 Wind index		1.33 Hydro index		0.95 Solar index	

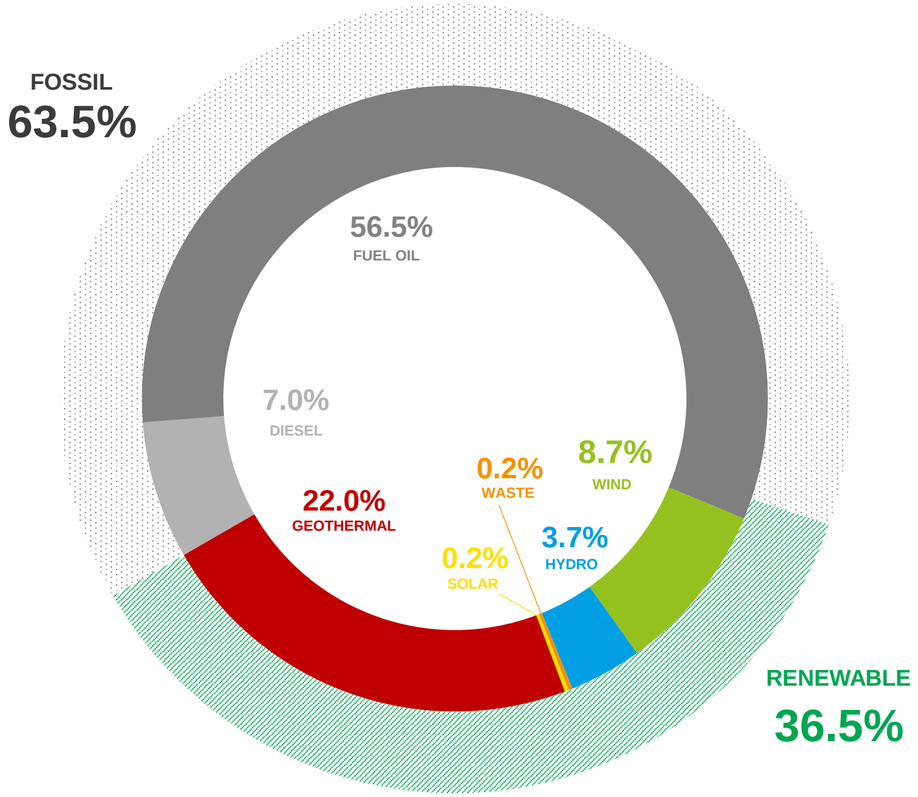
[a] Generation refers to the net energy generation of the power stations, taking into account the pumping production recently disclosed by REN. Production from pumping is not included in the percentage of production from renewable sources.
Source: REN, APREN Analysis

[b] Includes fuel oil, diesel, the non-biodegradable fraction of MSW and new waste

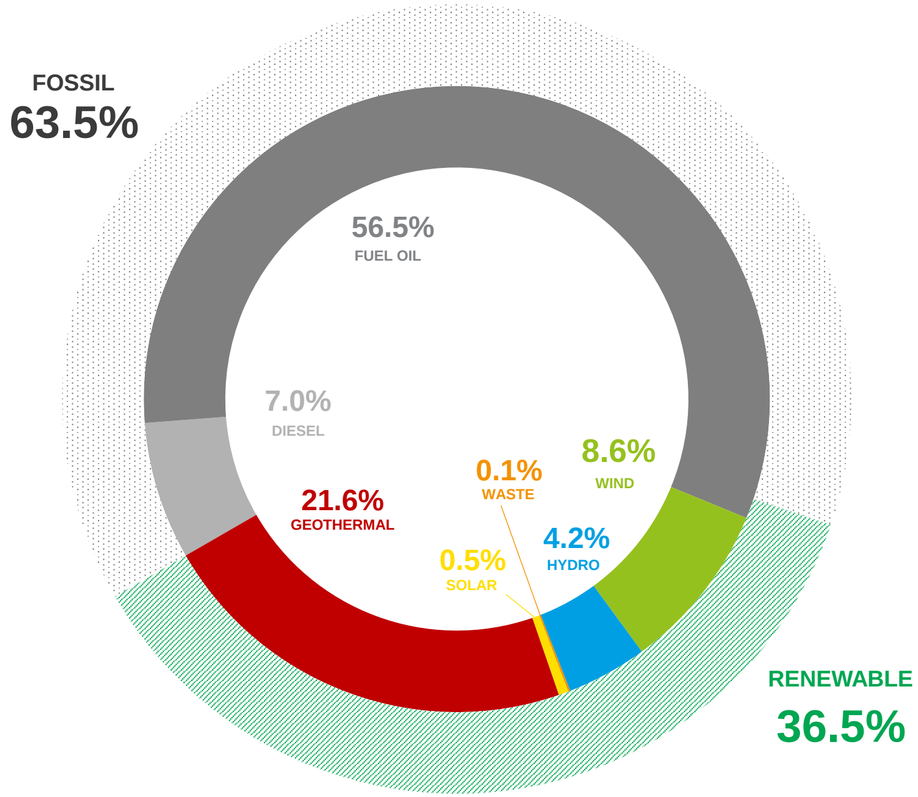
[c] Consumption refers to the net generation of energy by power stations, taking into account the import-export balance.
Source: REN, APREN Analysis

AUTONOMOUS REGION OF AZORES
GENERATION 1ST SEMESTER

JAN-JUN ACCUMULATED GENERATION 2023



JAN-JUN ACCUMULATED GENERATION 2024



MAIN INDICATORS COMPARED TO JUNE 2023

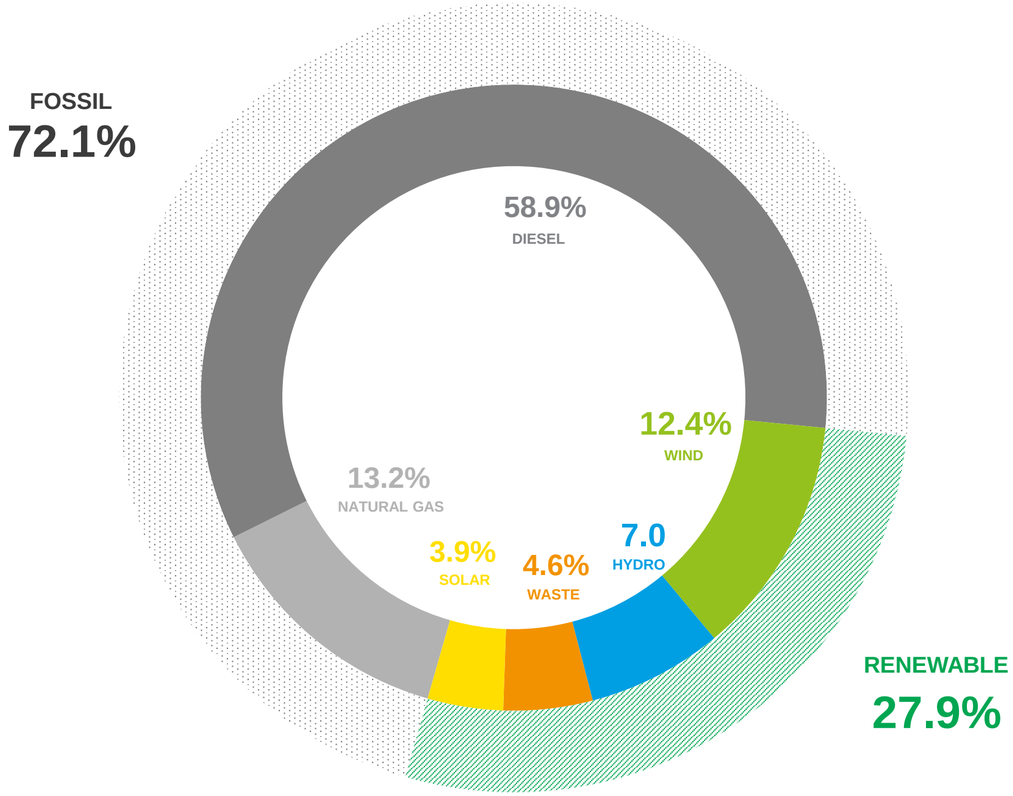
	GWh	%	GWh
	413	36.5	391
	2.5% Generation	0.0p.p. Incorporation	1.6% Consumption

NOTE: Solar includes Photovoltaic and Mini/Microgeneration.

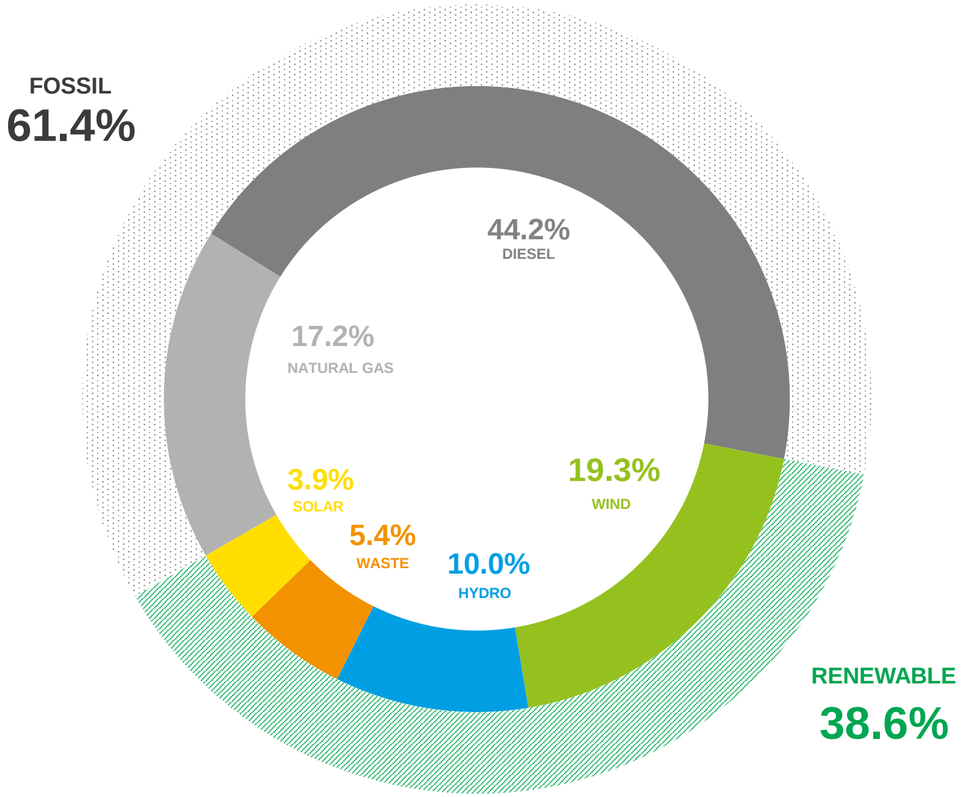
Source: EDA, APREN Analysis.

AUTONOMOUS REGION OF MADEIRA
GENERATION 1ST SEMESTER

JAN-JUN ACCUMULATED GENERATION 2023



JAN-JUN ACCUMULATED GENERATION 2024



MAIN INDICATORS COMPARED TO JUNE 2023

	GWh		%
▼ 1.6%	440 Generation	▲ 10.7p.p.	38.6 Incorporation

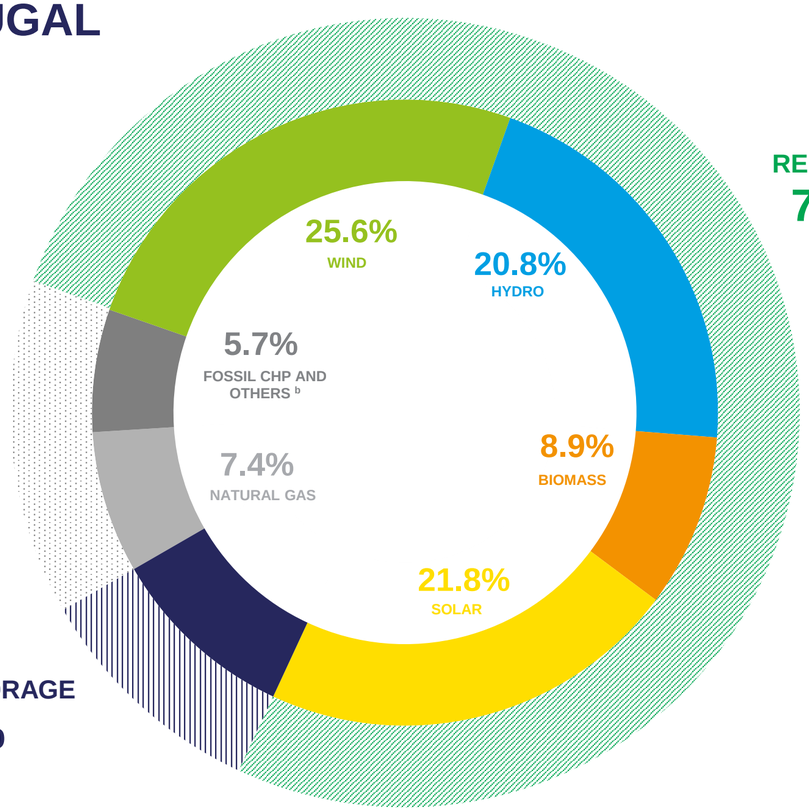
Source: EEM, APREN Analysis.

MONTHLY ANALYSIS IN MAINLAND PORTUGAL
JULY

Between 1 and 31 July 2024, the renewable incorporation achieved 77.1%, totaling 2,309 GWh of the 2,993 GWh produced in the month under review.

The 5.6% decrease in production compared to July 2023 is partly due to a reduction of 24 percentual points (p.p.) in electricity production by natural gas, having produced 221 GWh (997 GWh) in July 2024 (2023). In the same fashion, it must be highlighted an increase in the production by hydro and solar, in 12.7p.p ad 8.1p.p. respectively.

Additionally, a considerable increase in imports was registered, corresponding to 38% remainder of the electricity consumption.



ELECTRICITY SECTOR'S INDICATORS (IN COMPARISON WITH JULY 2023)

GWh
2,993
Generation[a]
▼ 5.6%

GWh
4,293
Consumption[c]
▲ 2.7%

%
77.1
Renewable incorporation
▲ 19.4p.p.

WIND INDEX
0.89

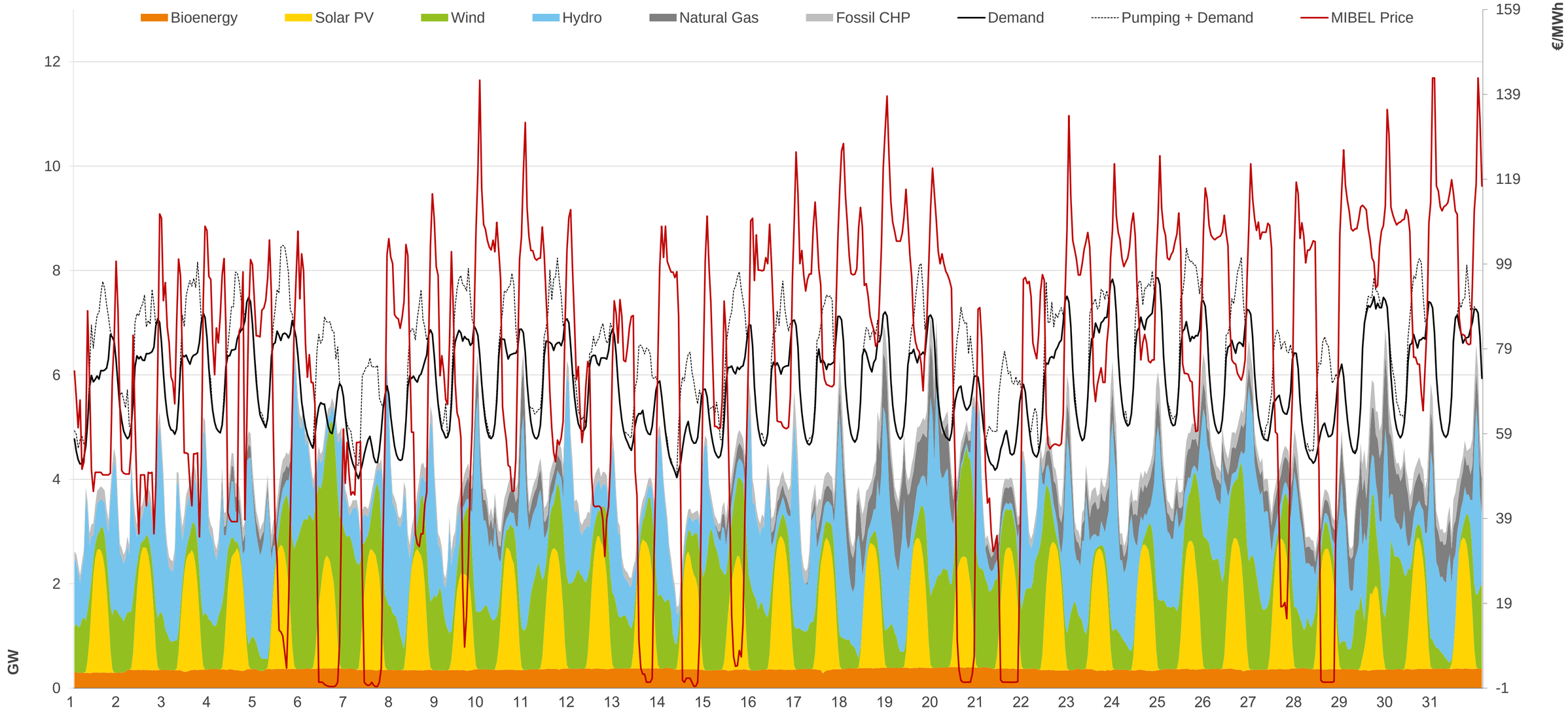
HYDRO INDEX
1.32

SOLAR INDEX
1.01

STORAGE IN DAMS
71.2%

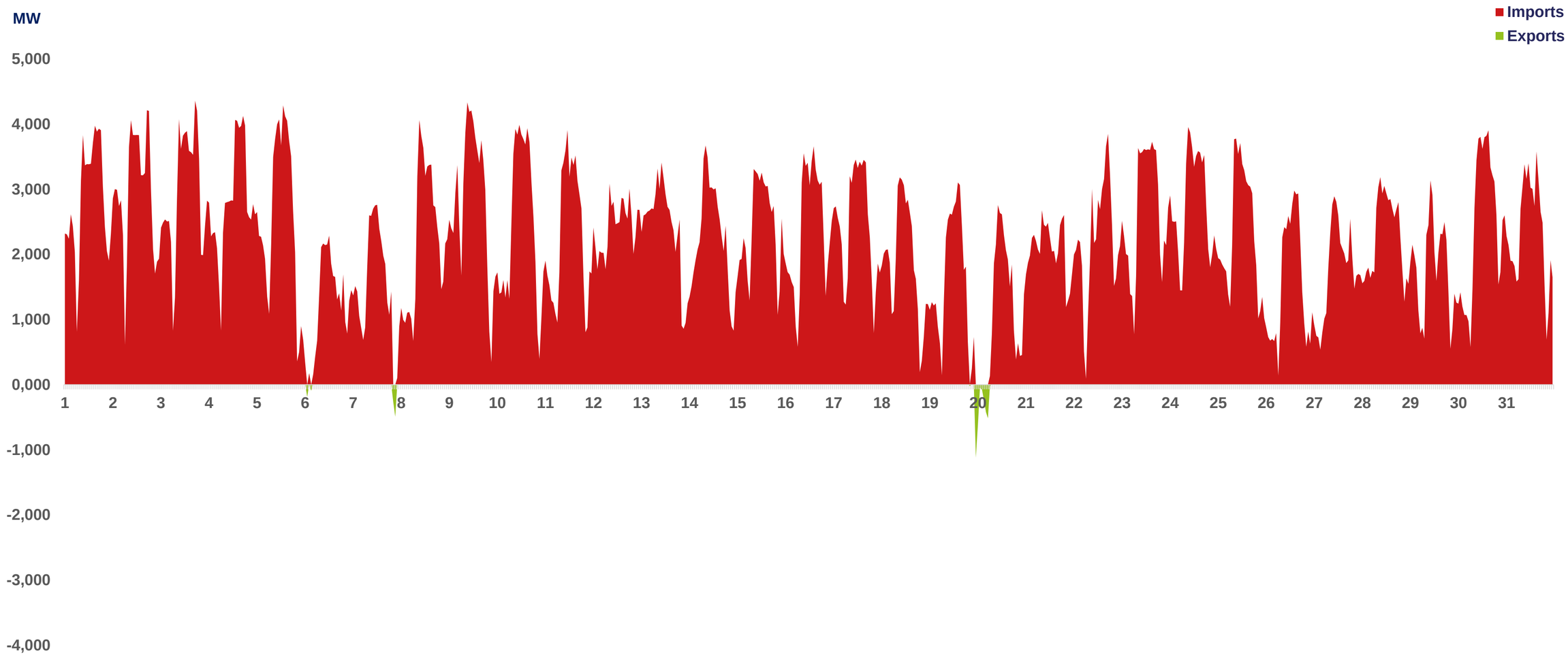
[a] Generation refers to the net energy generation of the power stations, taking into account the pumping production recently disclosed by REN. Production from pumping is not included in the percentage of production from renewable sources.
[b] Includes fuel oil, diesel, the non-biodegradable fraction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

MONTHLY ANALISYS IN PORTUGAL:
JULY 2024 LOAD DIAGRAM



Source: REN, OMIE, APREN Analysis

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



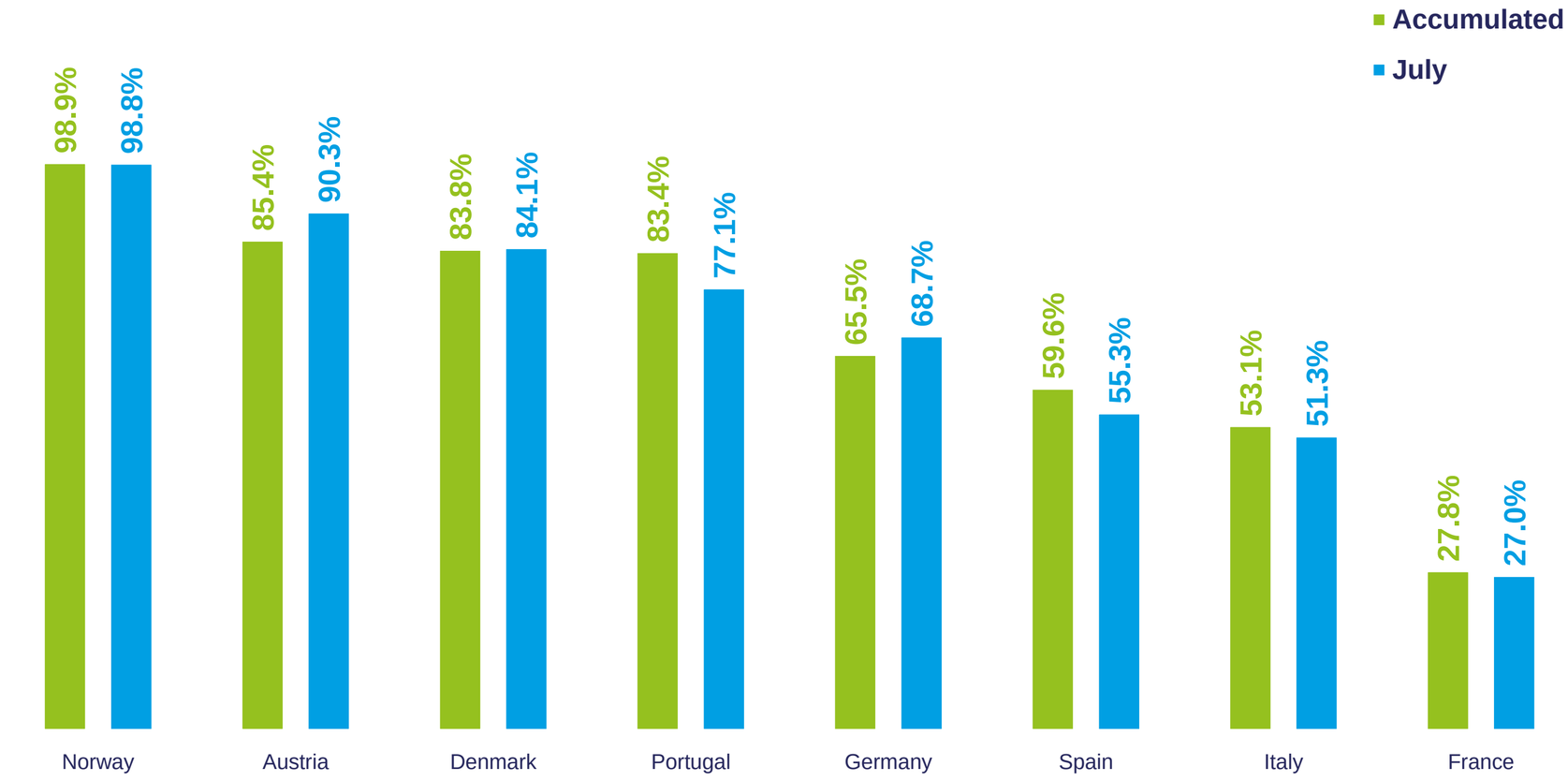
Source: REN, APREN Analysis

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 31 July 2024, Portugal was the fourth country with the highest share of renewable energy in electricity generation, with 83.4%, figuring behind Norway, Austria and Denmark, which respectively achieved 98.9%, 85.4% and 83.8%.

From 1 to 31 July, Portugal came forth in the countries considered with the highest renewable incorporation in Europe, having reached 77.1%.

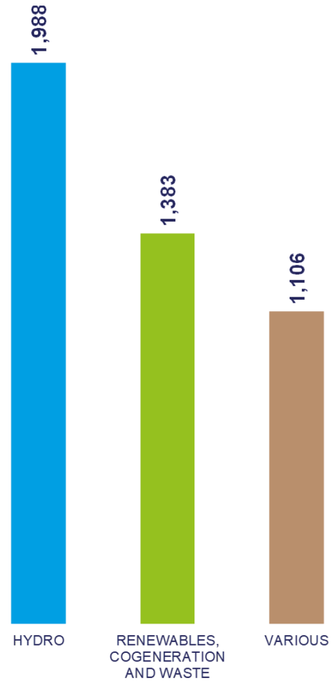


Renewable incorporation in cumulative (Jan-Jul) and monthly (Jul) electricity generation.
Source: REN, Fraunhofer, REE, Terna, National Grid, ENTSO-E, Análise APREN

MARKET PRICE SETTING
PORTUGAL

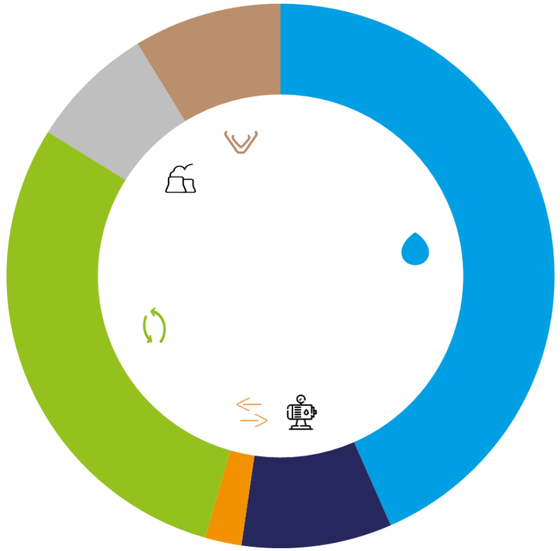
Between 1 January and 31 July, the market-clearing technology that recorded the most hours was hydro, with 1,988 non-consecutive hours, followed by renewables, cogeneration and waste with 1,383 hours, and various technologies with 1,106 hours.

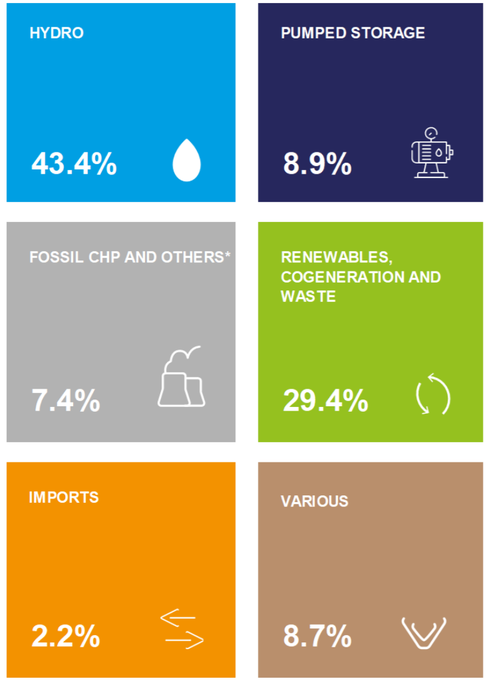
ACCUMULATED JULY 2024



Number of market-clearing hours (accumulated) for the three main clearing technologies (Jul).
Source: OMIE, APREN Analysis

JULY 2024





Percentage distribution of the number of hours of market closure for the various technologies, totaling 744 hours (Jul).
Source: OMIE, APREN Analysis

ELECTRICITY MARKET
PORTUGAL

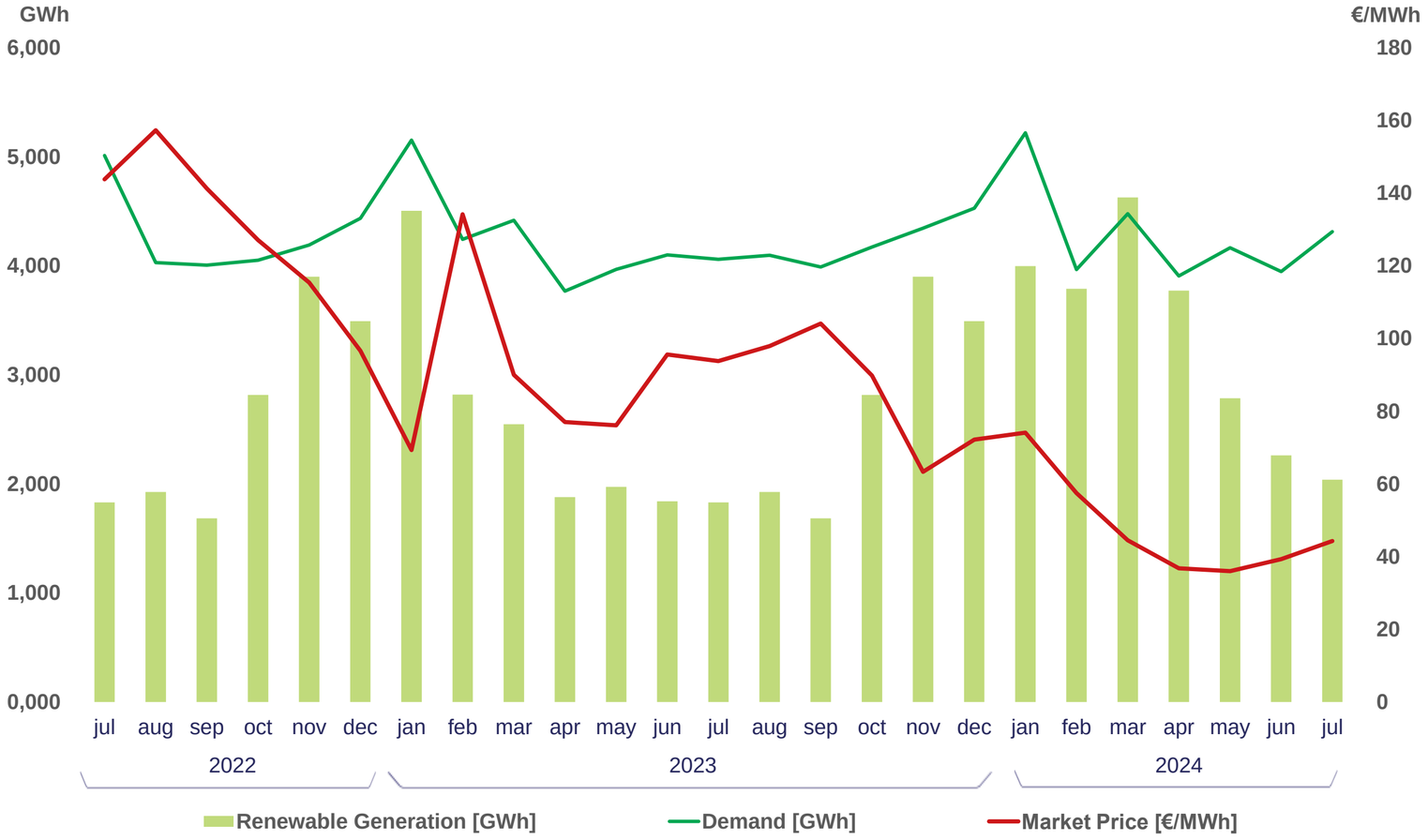
Between January 1 and July 31, the average hourly price recorded in MIBEL in Portugal (44.3 €/MWh[d]) represents a 50.9% reduction compared to the same period last year. In the same period, there were 1,627 non-consecutive hours in which renewable generation was sufficient to supply mainland Portugal's electricity consumption, with an average hourly price in MIBEL of 35.1 €/MWh.

1,627
Hours
100% RENEWABLE HOURS [Accumulated]

33.9
€/MWh
MIBEL'S AVERAGE PRICE (IN 100% RENEWABLE HOURS) [Accumulated]

7
Hours
100% RENEWABLE HOURS [JULY]

42.3
€/MWh
MIBEL'S AVERAGE PRICE (IN 100% RENEWABLE HOURS) [JULY]



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

[d] arithmetic average of MIBEL prices.
Source: OMIE

RENEWABLE ELECTRICITY
EUROPE

During the month of July 2024, there was a minimum hourly price in MIBEL in Portugal of -1.01 €/MWh, where the market was cleared by renewables, cogeneration and waste. The maximum hourly price was 142.48 €/MWh, where the market was either cleared by hydro or combined cycle thermal cogeneration.

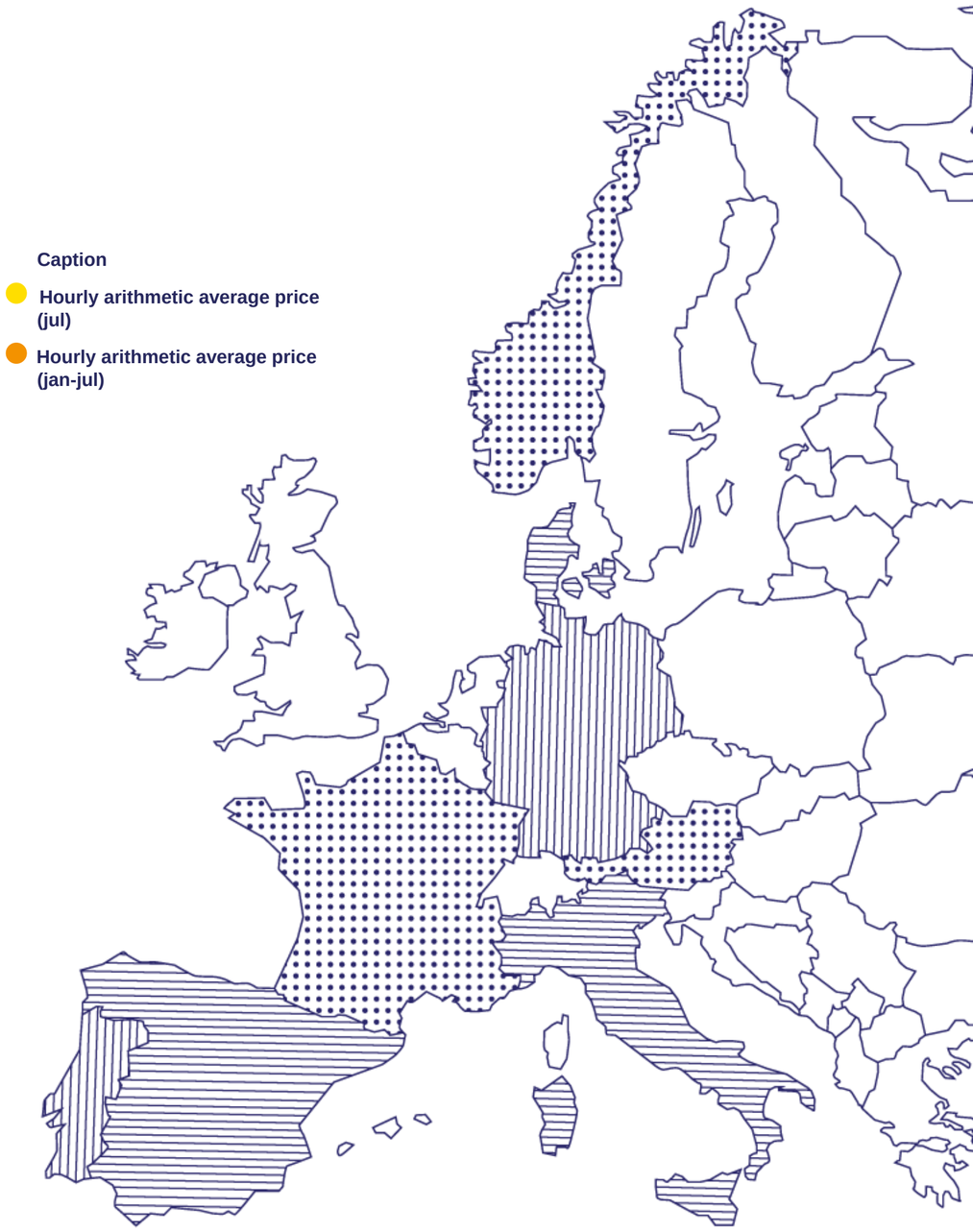
MINIMUM PRICES (JUL)

		€/MWh
1º	Austria	-92.34
2º	France	-74.02
3º	Germany	-73.96

MAXIMUM PRICES (JUL)

		€/MWh
1º	Germany	257.35
2º	Denmark	253.18
3º	Italy	173.02

	€/MWh		
Portugal	74.1	44.3	
Spain	72.3	44.0	
France	47.0	47.0	
Italy	107.6	95.4	
Germany	67.7	67.6	
Austria	63.4	66.4	
Denmark	62.4	62.9	
Norway	26.5	44.2	

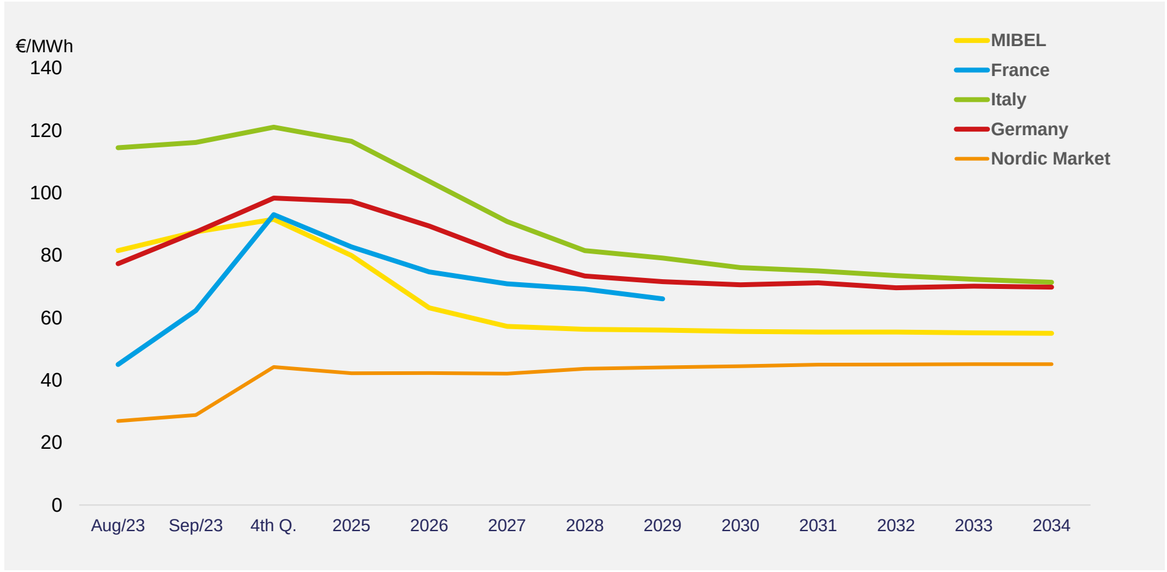


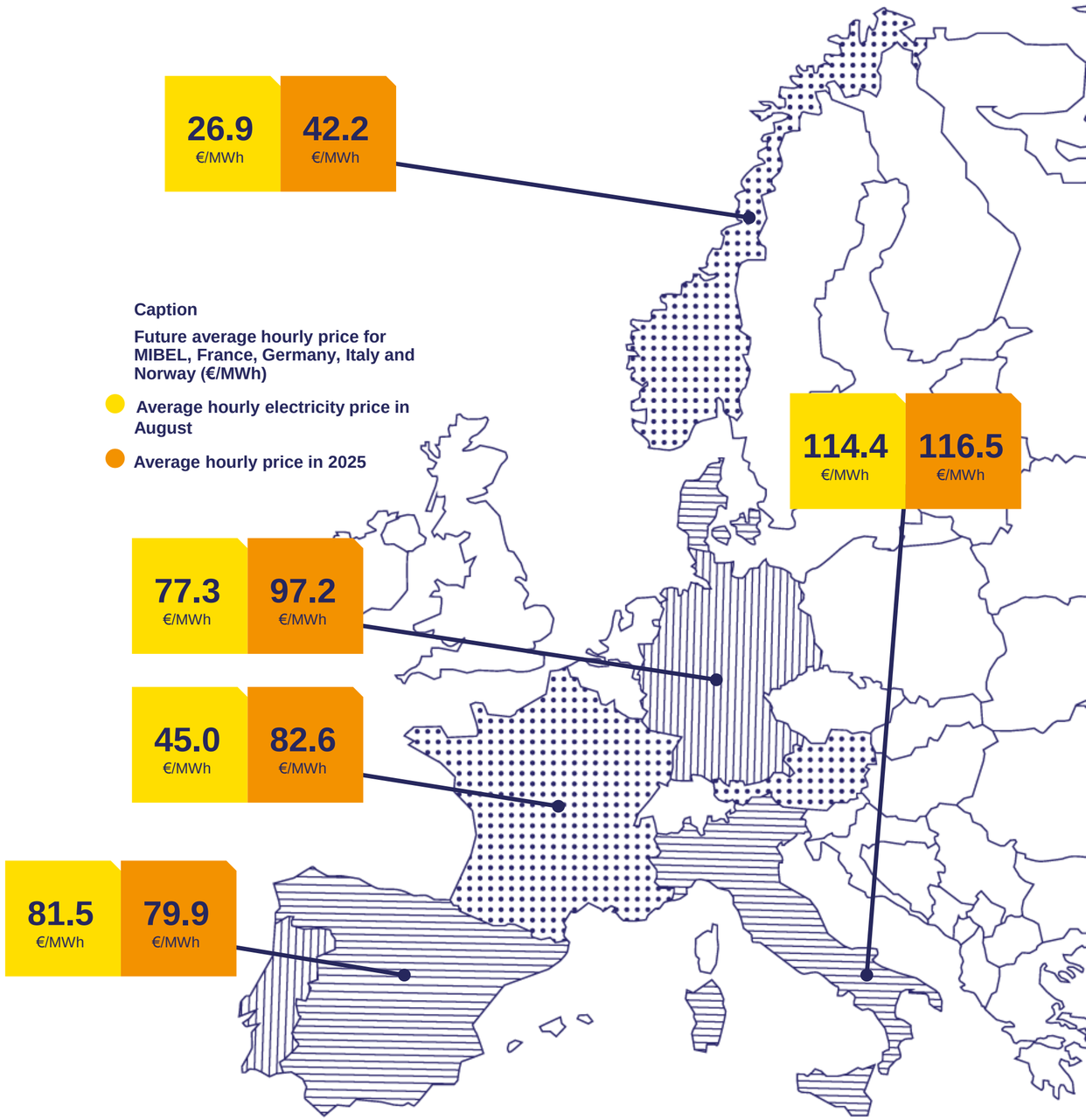
Fonte: ENTSO-E, OMIE, APREN Analysis

ELECTRICITY MARKET FUTURES

The evolution of the average hourly future price shown is calculated on the basis of electricity[e] purchase and sale contracts. The map on the right shows the price values for next month (August) 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.





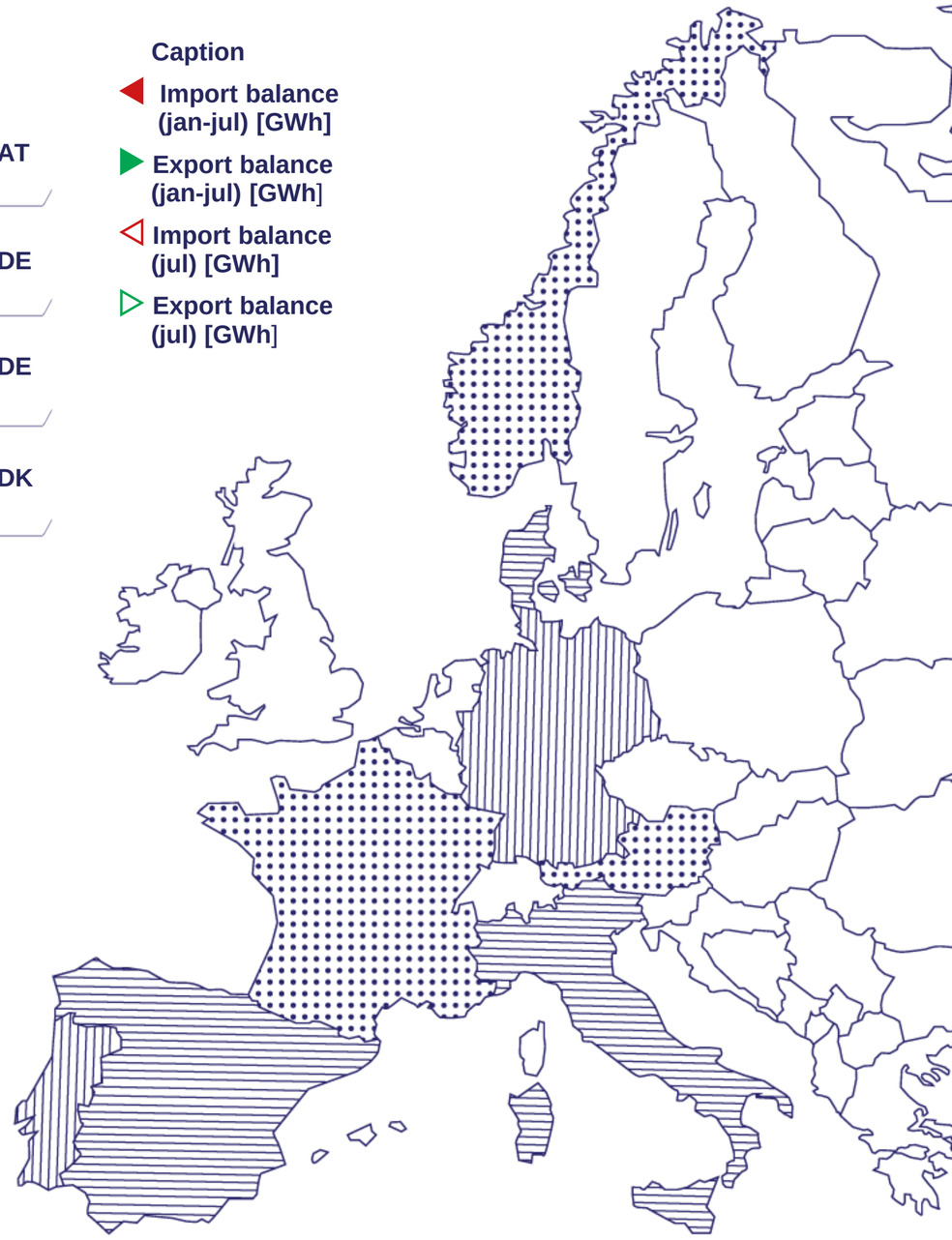
[e] Values updated as of 2nd August.

Source: OMIP, EEX, APREN Analysis

INTERNATIONAL EXCHANGES
EUROPE

Between 1 January and 31 July 2024, mainland Portugal's electricity system registered electricity imports equivalent to 7,652 GWh and exports of 3,416 GWh, with Portugal being an importer with a balance of 4,236 GWh.

PT	4,236 ◀	1,655 ◁	ES	DE	447 ▶	77 ▷	AT
ES	1,450 ▶	308 ▷	MA	DK	3,271 ▶	936 ▷	DE
FR	1,008 ◀	1,031 ▷	ES	NO	2,938 ▶	529 ▷	DE
IT	11,414 ◀	2,001 ◁	FR	NO	2,726 ▶	749 ▷	DK
DE	10,283 ◀	1,762 ◁	FR				



MAIN INDICATORS FOR PT-ES INTERCONNECTION

	PT-ES (jul)	PT-ES (jan-jul)	ES-PT (jul)	ES-PT (jan-jul)
usage	0.5%	14.0%	59.6%	35.4%
congestion	0.0%	2.1%	9.4%	6.4%
market separation	9.4%	7.8%	75.1% (MIBEL-FR)	67.5%

Source: ENTSO-E, OMIE, APREN Analysis

POWER PRODUCTION EMISSIONS

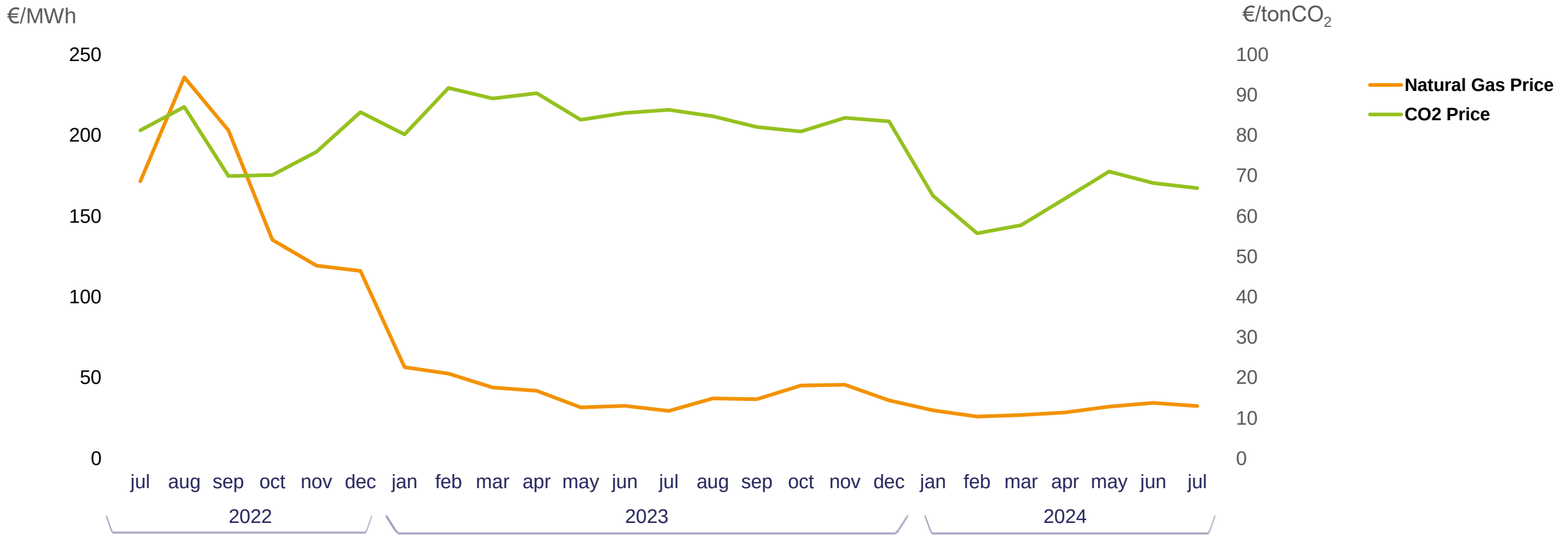
Between 1 January and 31 Jul 2024, the specific emissions reached the value of 30,8 gCO_2eq/kWh, corresponding to a total of 0.88 $MtCO_2eq$ of emissions from the electricity generation sector. The European CO_2 Emissions Trading Scheme (ETS) recorded a price of 64.2 €/tCO_2[d], a reduction of 26.1% compared to the same period in 2023.

0.88
$MtCO_2eq$
SECTOR'S EMISSIONS

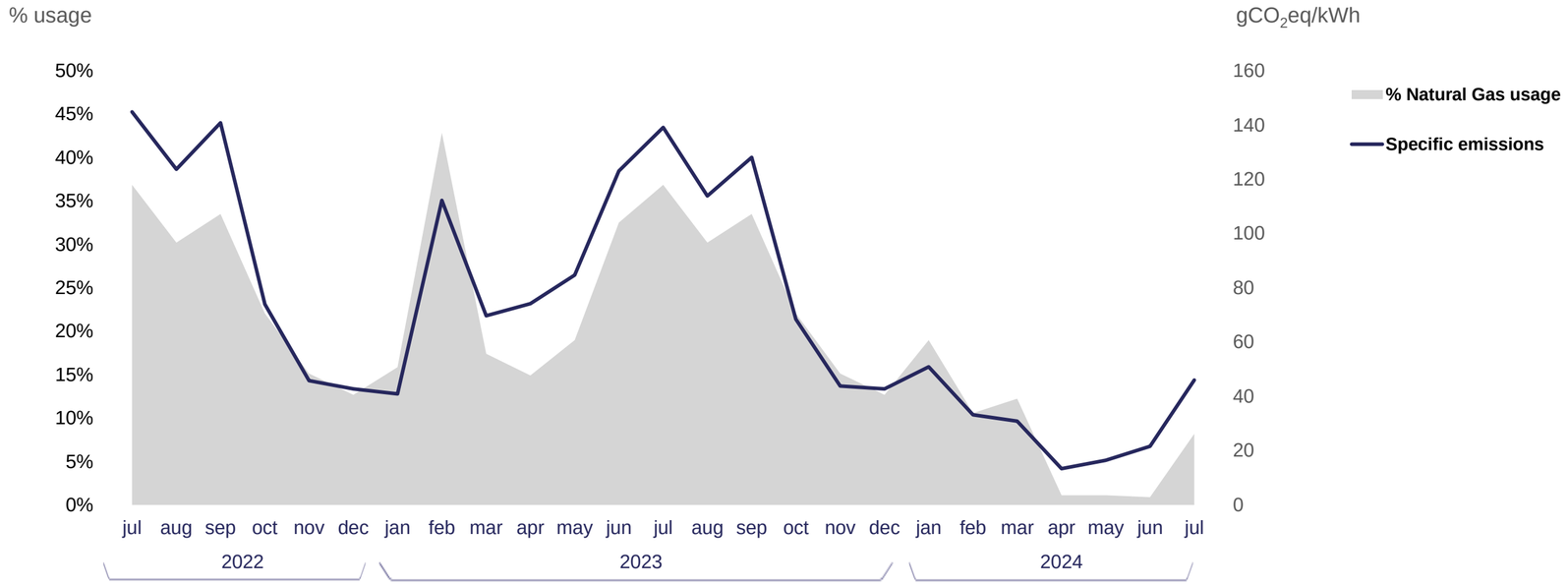
64.2
€/tCO_2
AVERAGE PRICE OF LICENCES

60.7
%
▼
COMPARED TO JULY 2023 [ACCUMULATED]

26.1
%
▼
COMPARED TO JULY 2023 [ACCUMULATED]



Price of CO_2 allowances in the EU ETS and price of natural gas in Europe (Jul-2022 to Jul-2024).
Source: SendeCO2, WorldBank.



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

[d] arithmetic average of hourly prices

Source: OMIE, WorldBank.

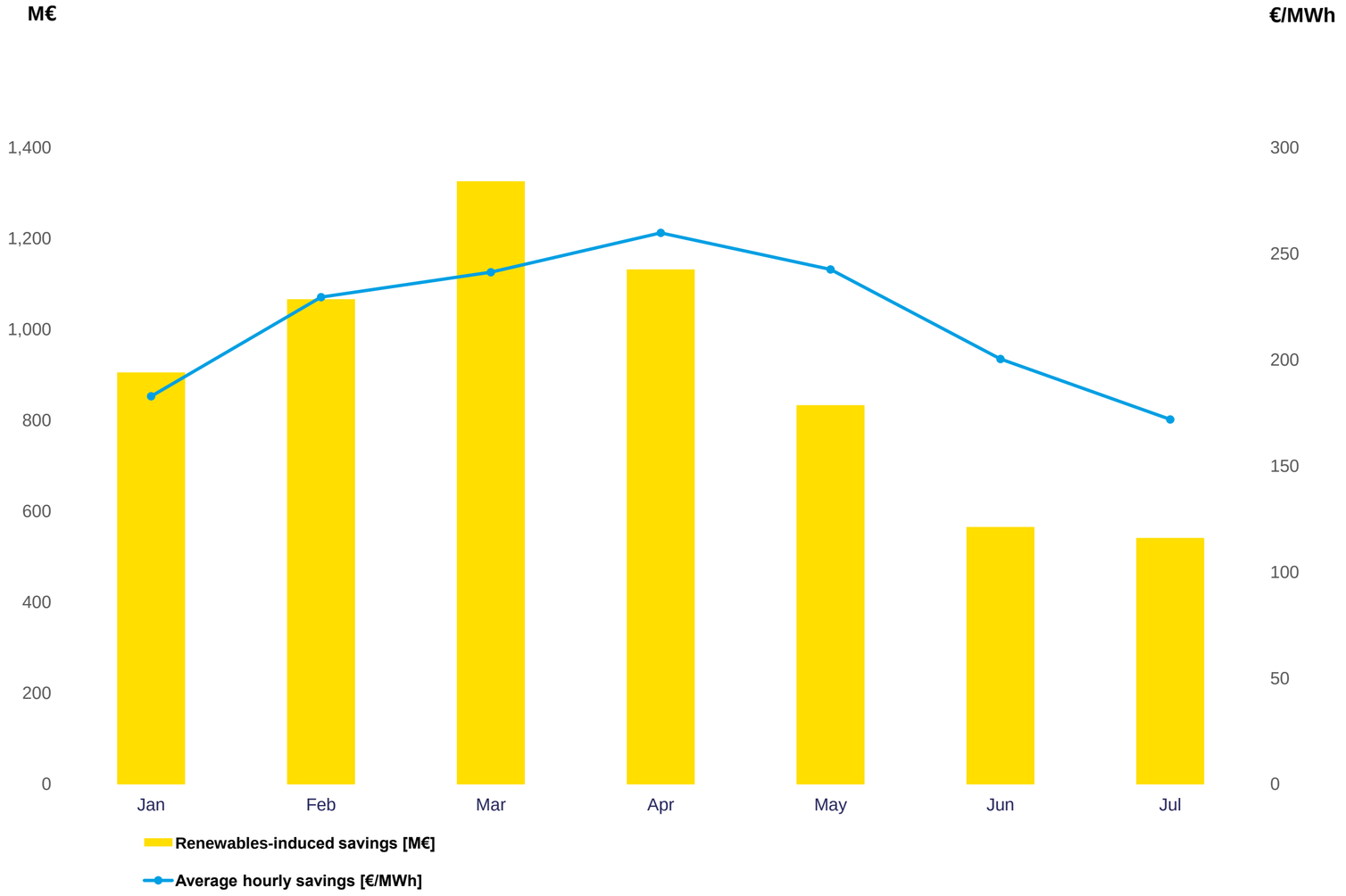
SIMULATION OF PRICE FORMATION WITHOUT SRP

RENEWABLES AVOIDED:

The indicators below show the savings achieved by the merit order between January 1 and July 31 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.

218
€/MWh
AVERAGE HOURLY SAVINGS (jan-jul)

6,392
M€
CUMULATIVE SAVINGS (jan-jul)



Disclaimer: This analysis is carried out using a program developed by APREN, based on the Deloitte calculation method.

ENVIRONMENTAL SERVICE
RENEWABLES AVOIDED:

The indicators below identify the savings achieved between January 1 and July 31 of 2024 in natural gas, CO_2 emissions and CO_2 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.

150 M€
IMPORTED NATURAL GAS (jul)

0 M€
IMPORTED ELECTRICITY (jul)

0.9 $Mtco_2eq$
CO_2 EMISSIONS (jul)

57.4 M€
CO_2 ALLOWANCES (jul)

1,012 M€
IMPORTED NATURAL GAS (jan-jul)

261 M€
IMPORTED ELECTRICITY (jan-jul)

6.9 $Mtco_2eq$
CO_2 EMISSIONS (jan-jul)

402 M€
CO_2 ALLOWANCES (jan-jul)

Source: OMIE, APREN Analysis.

2024

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