2025

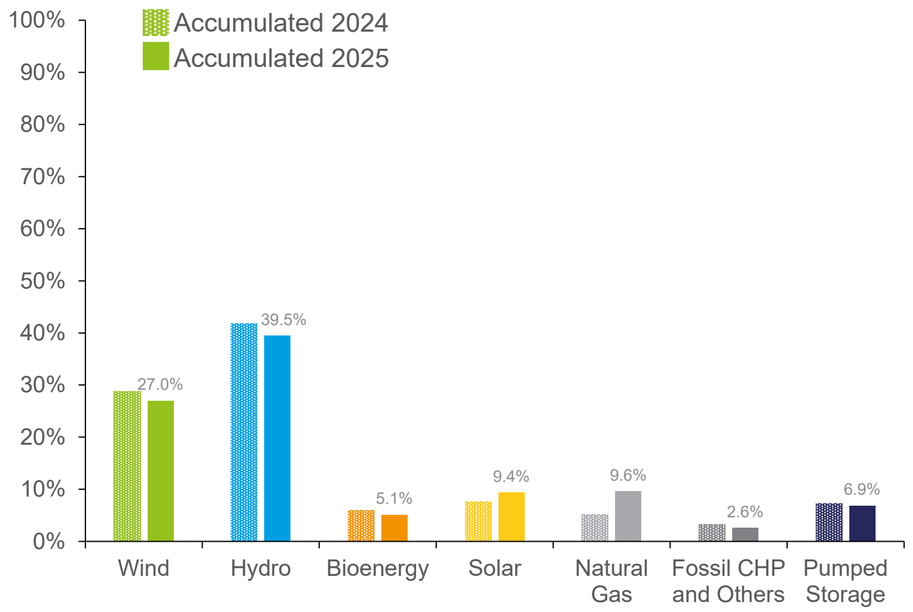
RENEWABLE ELECTRICITY BULLETIN

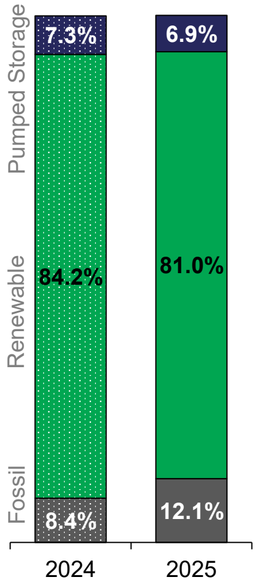
MAY
2025

PORTUGAL NEEDS
OUR ENERGY

APREN Associação de Energias Renováveis

EXECUTIVE SUMMARY
CUMULATIVE GENERATION MAY 2025





MAIN INDICATORS

WIND	6,127 GWh
HYDRO	8,944 GWh
SOLAR	2,132 GWh
BIOENERGY	1,152 GWh
NATURAL GAS	2,166 GWh
FOSSIL CHP AND OTHERS[b]	574 GWh
PUMPED STORAGE	1,561 GWh

0.99	Wind Index
1.45	Hydro Index
0.79	Solar Index

COMPARING TO THE SAME PERIOD IN 2024

▽ 0.4%	GWh	▽ 3.2 p.p.	%	△ 2.0%	GWh	△ 43.7%	GWh	€/MWh	€/ tCO_2	$MtCO_2$-eq	gCO_2-eq/kWh
	22,666		81.0		22,129		1,437	61.1	70.9	0.99 CO_2	43.9
	Generation[a]		Renewable Incorporation in Generation		Consumption[c]		Net Imports	MIBEL PT Price	CO_2 Price	Emissions	CO_2 Specific Emissions

a Generation refers to the net energy generation of the power stations, considering 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, considering the import-export balance.
Source: REN, APREN Analysis

MONTHLY ANALYSIS IN MAINLAND PORTUGAL

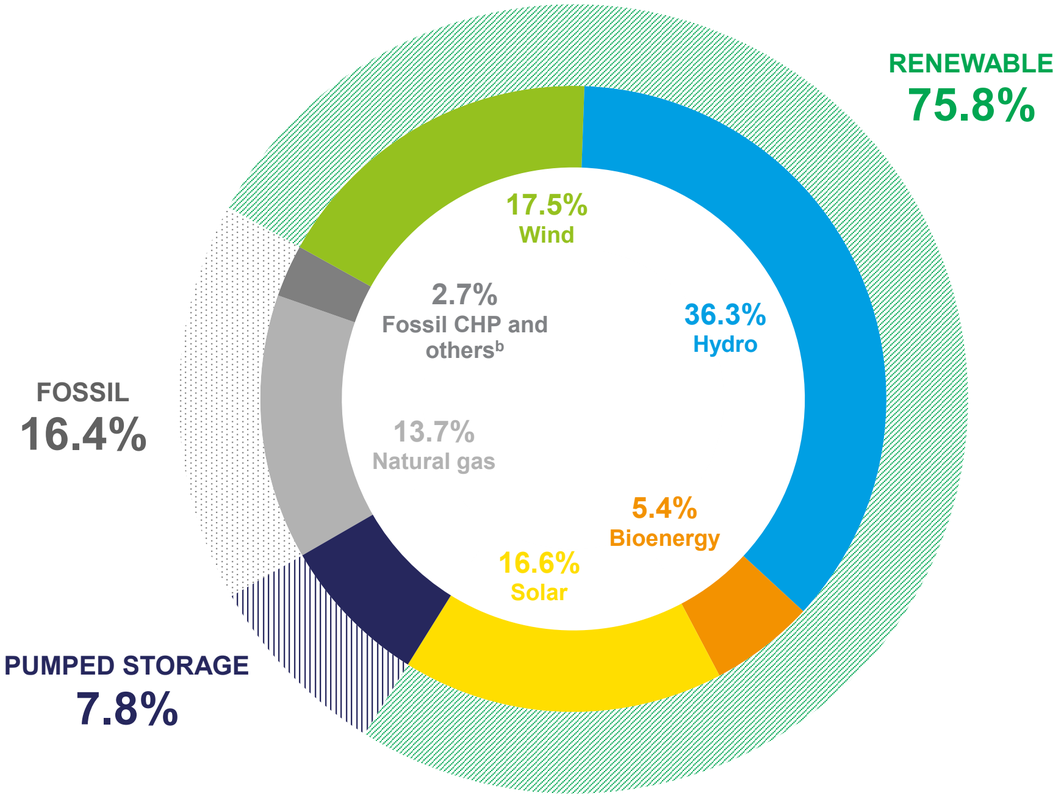
MAY 2025

Between 1 and 31 May 2025, the **renewable incorporation** equaled 75.8%, making up 3,179 GWh of the 4,194 GWh produced in the month under review.

Compared to May 2024, there was a 20.6% increase in national electricity production. This was due to an increment of 545 GWh from hydro and 556 GWh from natural gas generation, which were technologies that had a relevant role in the restart and stabilisation of the national electricity system after the "blackout" event occurred on the 28th of April.

In May 2025, **imports** totaled 6.6% of the electricity consumption in mainland Portugal.

There was also no production curtailment in May.



MAIN INDICATORS COMPARING TO MAY 2024

GWh	GWh	%
4,194	**4,061**	**75.8**
Generation[a]	Consumption[c]	Renewable incorporation
△ 20.6%	△ 2.6%	▽ 9.8 p.p.

WIND INDEX **0.73**

HYDRO INDEX **1.52**

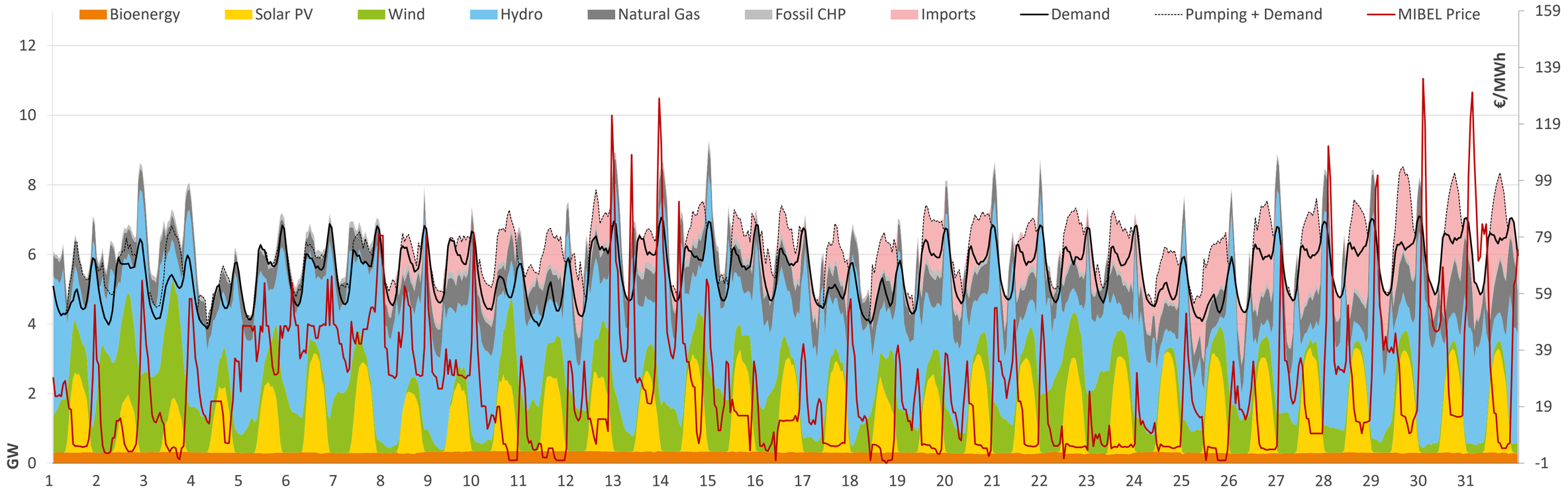
STORAGE IN DAMS **90.3%**

SOLAR INDEX **0.93**

a Generation refers to the net energy generation of the power stations, considering 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, considering the import-export balance.
Source: REN, APREN Analysis

MONTHLY ANALYSIS IN MAINLAND PORTUGAL

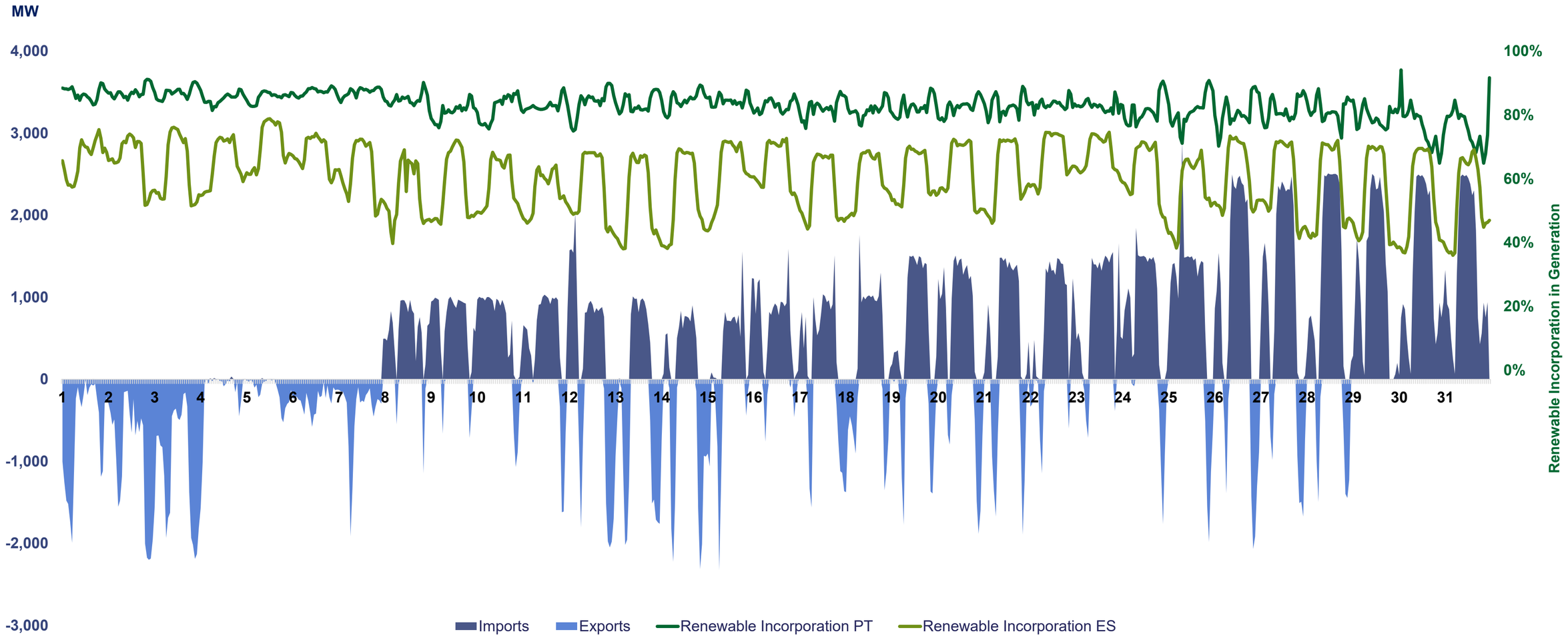
LOAD DIAGRAM FOR MAY 2025



Source: REN, OMIE, APREN Analysis

MONTHLY ANALYSIS IN MAINLAND PORTUGAL

IMPORTS AND EXPORTS DIAGRAM



Source: REN, APREN Analysis

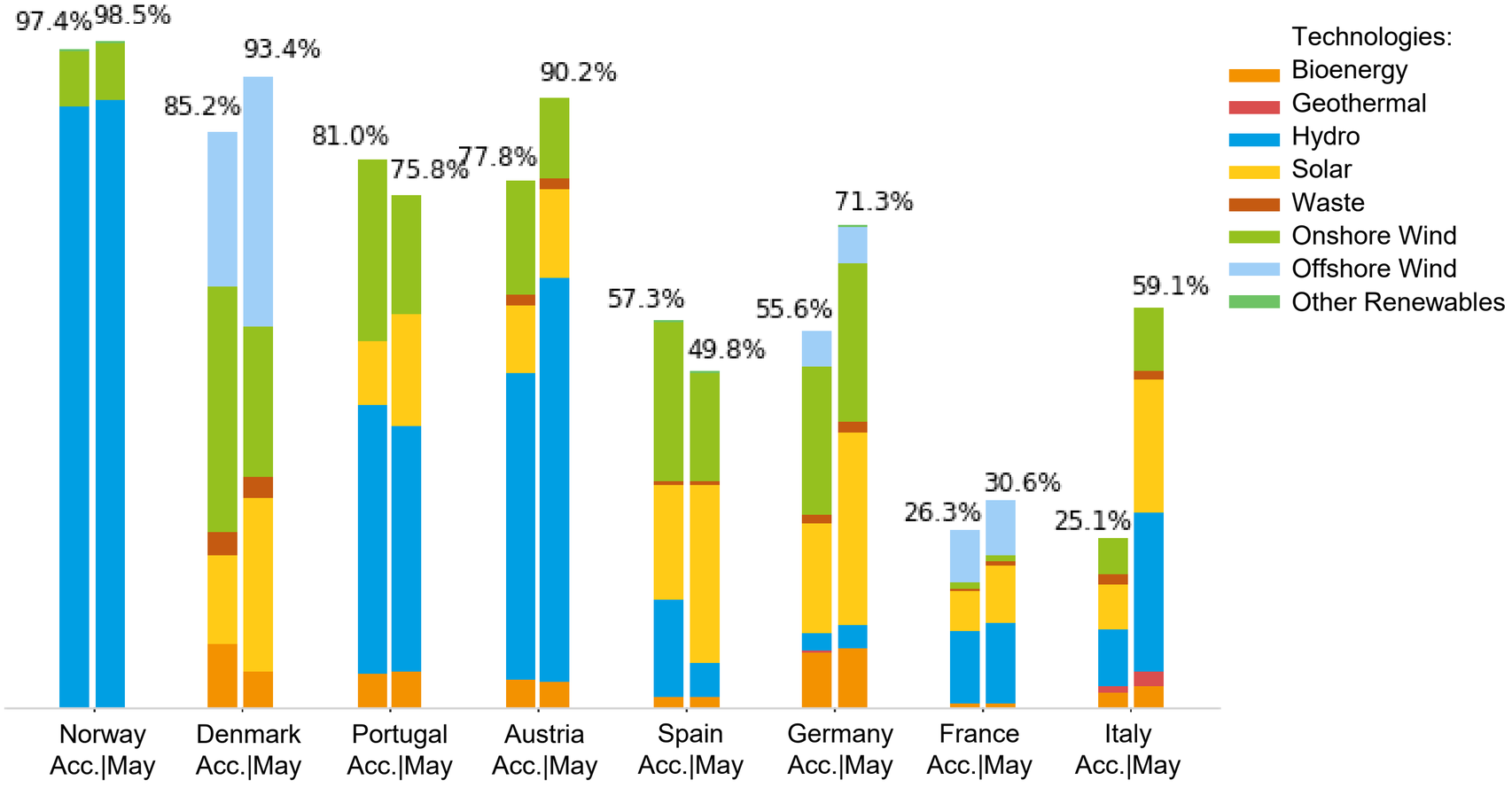
Note: The absence of imports from Spain during the first days of May is due to the stabilisation process of the National Electricity System following the blackout event on 28 April (also visible in the Load diagram presented earlier).

RENEWABLE ELECTRICITY
EUROPE

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

Between 1 January and 31 May 2025, Portugal was the third country with the highest **share of renewable energy in electricity generation**, with 81.0%, behind Norway and Denmark, which had 97.4% and 85.2%, respectively.

The renewable technology with the largest share of the European electricity generation mix this month was hydro, followed by onshore wind, with solar becoming more significant.



Renewable incorporation in cumulative (1 Jan - 31 May) and monthly (May) electricity generation.
Source: REN, Fraunhofer, REE, Terna, National Grid, ENTSO-E, APREN Analysis.

ELECTRICITY MARKET
PORTUGAL

Between 1 January and 31 May, the average hourly price recorded on **MIBEL in Portugal** (61.12 €/MWh[d]) represents an increase of 72.0% compared to the same period last year.

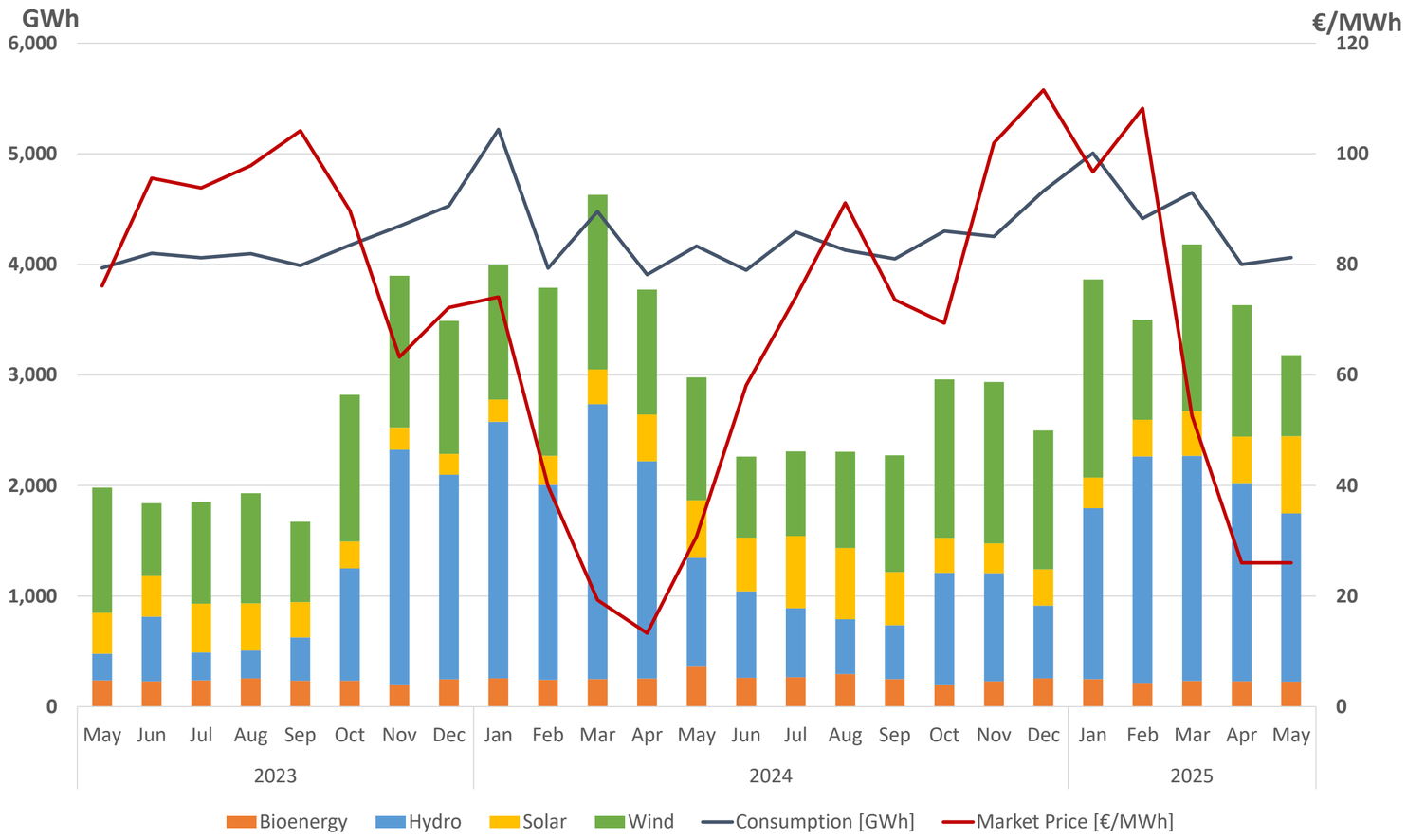
In the same period, there were 1,171 non-consecutive hours in which renewable generation was sufficient to supply mainland Portugal's electricity consumption, with an average hourly price in MIBEL of 57.8 €/MWh.

1,171
Hours
100% RENEWABLE HOURS [Accumulated]

57.8
€/MWh
MIBEL'S AVERAGE PRICE (IN 100% RENEWABLE HOURS) [Accumulated]

174
Horas
100% RENEWABLE HOURS [May]

28.7
€/MWh
PREÇO MÉDIO MIBEL (EM HORAS 100%RENOVÁVEIS) [May]



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

Electricity aprket analysis, renewable generation, consumption and market price (May-2023 a May-2025)
Source: OMIE, APREN analysis

RENEWABLE ELECTRICITY
EUROPE

During the month of May 2025, there was **a minimum hourly price in MIBEL** in Portugal of -1.00 €/MWh*.

The maximum hourly price was 135.0 €/MWh*.

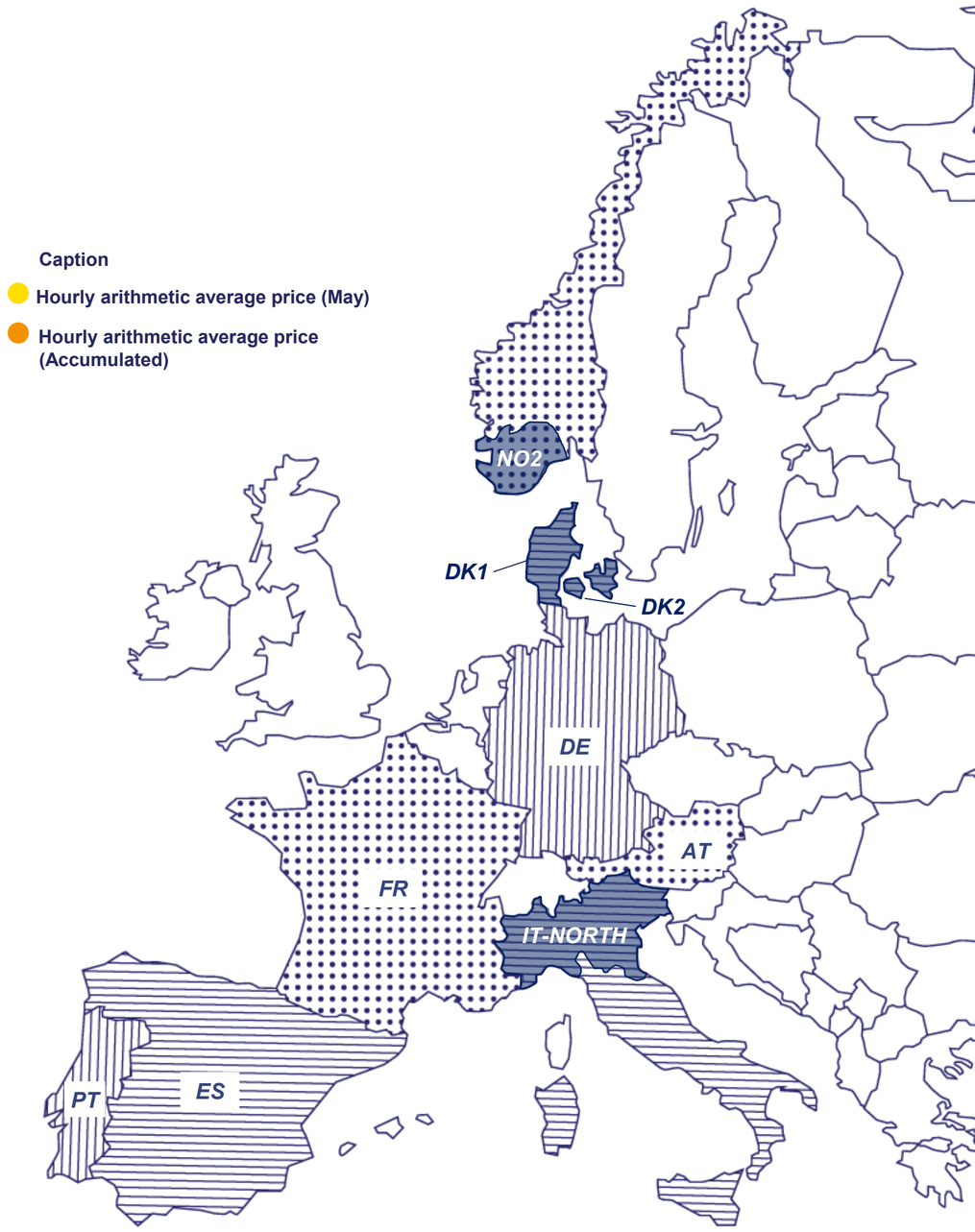
▽ MINIMUM PRICES (May)

		€/MWh
1º	Austria Germany	-250.32
2º	France	-118.01
3º	Denmark^{DK1}	-22.78

△ MAXIMUM PRICES (May)

		€/MWh
1º	Austria Germany	229.11
2º	Denmark^{DK1}	212.97
3º	Denmark^{DK2}	212.92

Portugal €/MWh	25.67	61.12
Espanha €/MWh	16.84	59.57
França €/MWh	19.29	71.85
Itália$^{IT-NORD}$ €/MWh	93.42	122.06
Alemanha €/MWh	67.33	96.04
Áustria €/MWh	67.33	104.84
Dinamarca^{DK1} €/MWh	64.17	86.48
Dinamarca^{DK2} €/MWh	64.85	87.45
Noruega^{NO2} €/MWh	n.a.	n.a.



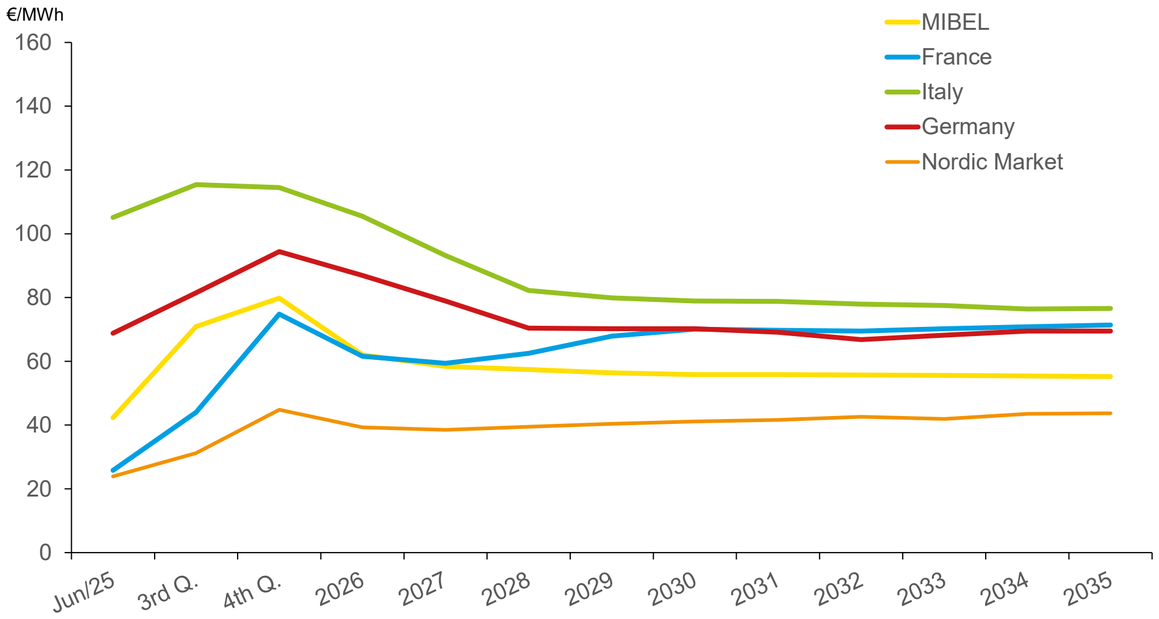
Source: ENTSO-E. OMIE, APREN Analysis
Note: given recent changes in the data reporting format by the ENTSO-E platform, the price values presented correspond to the bidding zones, when applicable. As such, in the case of Italy, Denmark and Norway only the bidding zones with interconnection with neighbouring countries were considered.
* Due to the unavailability of information on the OMIE platform, it is currently not possible to provide data regarding market closing technologies.

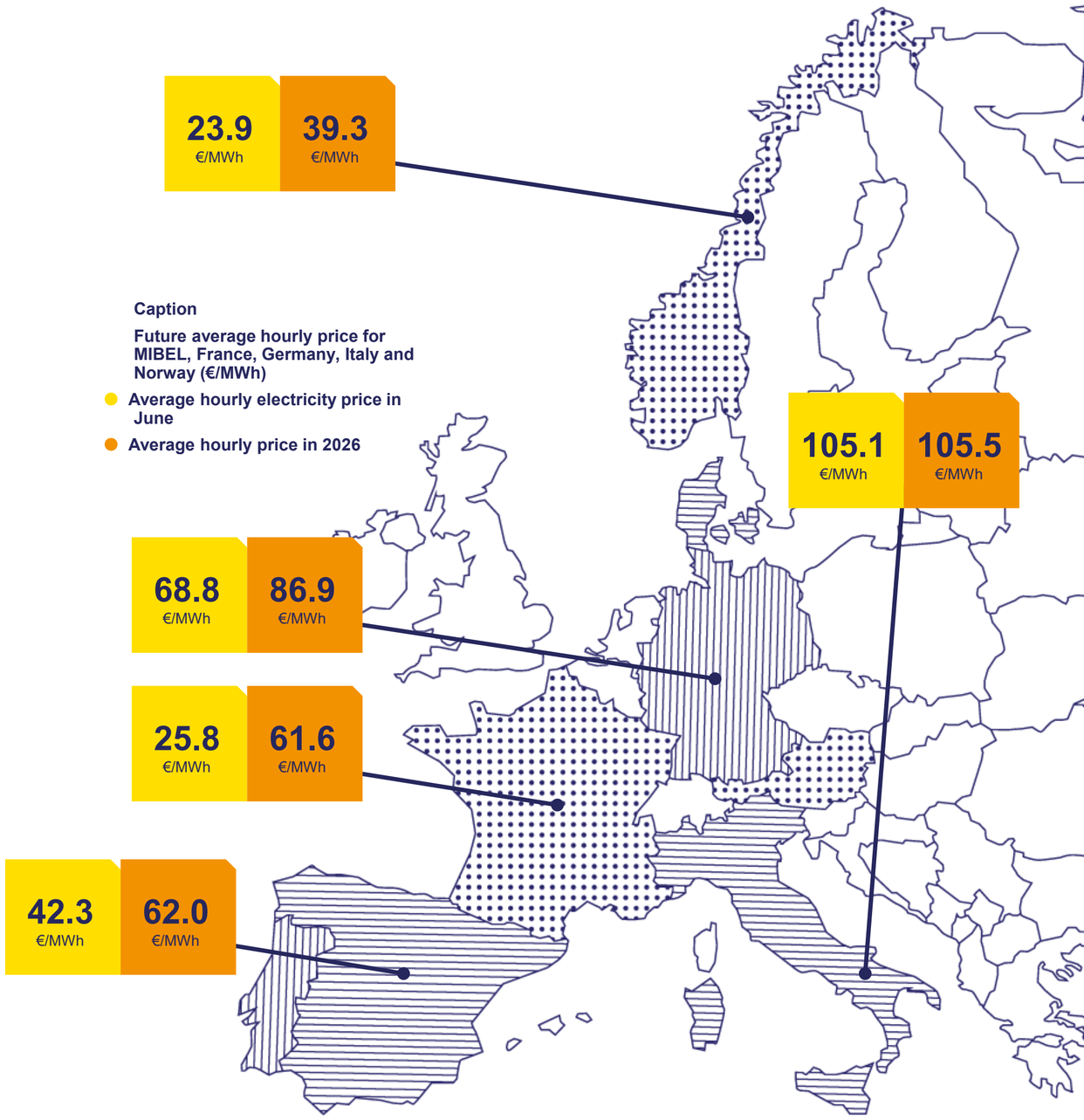
ELECTRICITY MARKET FUTURES

In the European futures market panorama, example is provided for the **average hourly price** values for next month (June) and next year (2026), according to the records for a specific day[e].

At the time of collection, in May 2025, MIBEL will be the third lowest electricity futures market. From a long-term perspective, and according to the data for the selected day[e], MIBEL will have the second lowest values **until 2035**, due to investment in renewable production.

The evolution of the average hourly future price shown is calculated based on electricity purchase and sale contracts. However, it should be emphasised that the respective volumes traded represent very low quantities when compared to the countries' consumption.





[e] values updated as of 3rd of June.

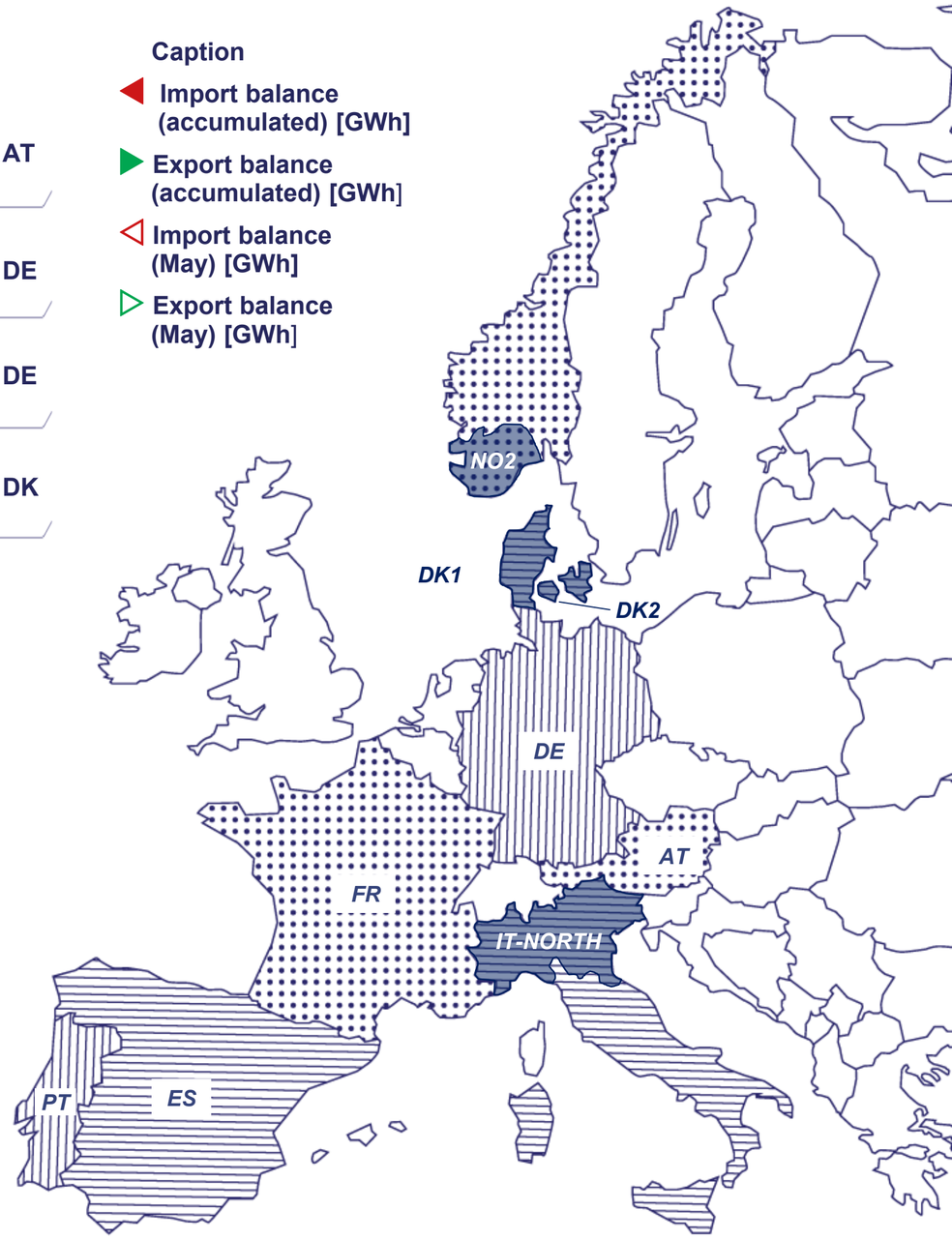
Source: OMIP, EEX, APREN Analysis

INTERNATIONAL TRADES
EUROPE

Between 1 January and 31 May 2025, the electricity system in mainland Portugal recorded **electricity imports** equivalent to 4,006 GWh and **exports** of 2,569 GWh.

Up until this month, Portugal was characterised as an electricity **importer**, with a balance of 1,437 GWh.

PT	1,437 ◀	266 ◁	ES	DE	3,425 ▶	376 ▷	AT
ES	1,069 ▶	445 ▷	MA	DK	3,792 ▶	183 ▷	DE
FR	3,323 ◀	285 ◁	ES	NO	2,861 ▶	366 ▷	DE
IT	10,188 ◀	2,115 ◁	FR	NO	2,159 ▶	195 ▷	DK
DE	6,550 ◀	1,640 ◁	FR				



MAIN INDICATOR FOR PT-ES INTERCONNECTION

usage	11.8% (may)	PT-ES	17.2% (jan-may)	42.1% (may)	ES-PT	30.6% (jan-may)
congestion	0.9% (may)	PT-ES	2.0% (jan-may)	36.4% (may)	ES-PT	11.3% (jan-may)
market split	66.8% (may)	PT-ES	32.0% (jan-may)	47.2% (may)	MIBEL-FR	67.7% (jan-may)

Source: ENTSO-E, OMIE, APREN Analysis
Note: given recent changes in the data reporting format by the ENTSO-E platform, the price values presented correspond to the bidding zones, when applicable. As such, in the case of Italy, Denmark and Norway only the bidding zones with interconnection with neighbouring countries were considered.

POWER PRODUCTION EMISSIONS

Between 1 January and 31 May 2025, **specific emissions** reached 43.9 gCO_2-eq/kWh, giving total emissions from the electricity generation sector of 0.99 $MtCO_2$-eq.

The **European CO_2 Emissions Trading Scheme (ETS)** recorded a price of 70.9 €/tCO_2[d], which represents a reduction of 12.9% compared to the same period in 2024.

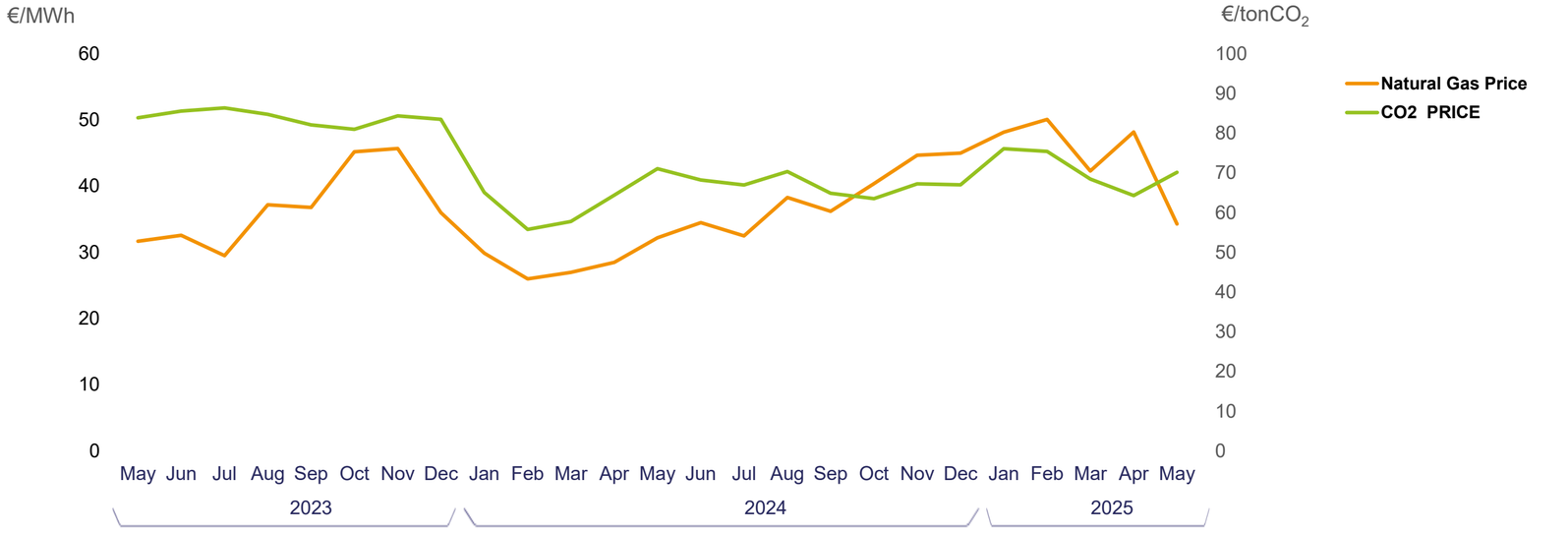
0.99
$MtCO_2eq$
SECTOR'S EMISSIONS

31.6
%
▼
COMPARED TO MAR 2024 [Accumulated]

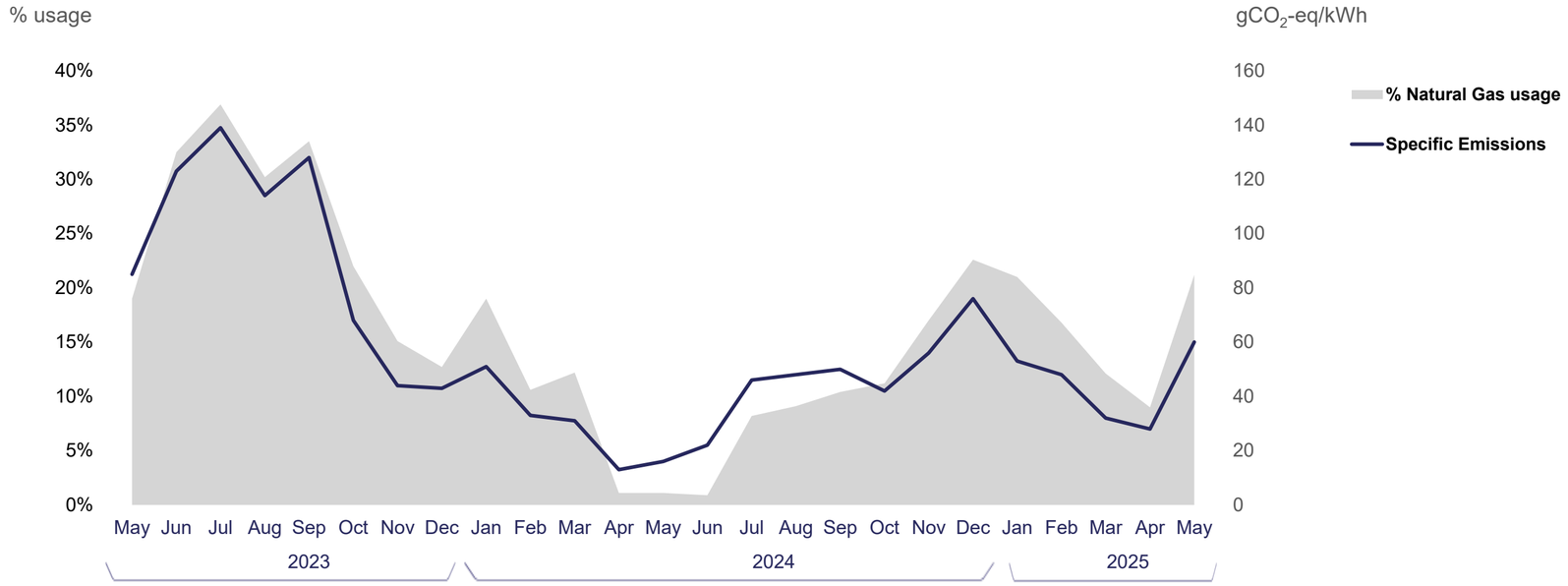
70.9
€/tCO_2
AVERAGE ALLOWANCE PRICE

12.9
%
▼
COMPARED TO MAR 2024 [Accumulated]

[d] Arithmetic mean of the hourly prices
Source: OMIE, MIBGAS.



Price of CO_2 allowances in the ETS and price of natural gás in Europe (May-2023 a May-2025).
Source: SendeCO2, WorldBank, REN



Specific emissions from the electricity sector in mainland Portugal, % use of coal and natural gas power stations (May-2023 to May-2025).
Source: REN, DGEG, ERSE, APREN Analysis

SIMULATION OF PRICE FORMATION WITHOUT SPECIAL REGIME PRODUCTION (PRE)

RENEWABLES HAVE AVOIDED:

The indicators below identify the savings achieved by the **Order of Merit** between the 1st of January and the 31st of May of 2025 given the contribution of special regime production (PRE).

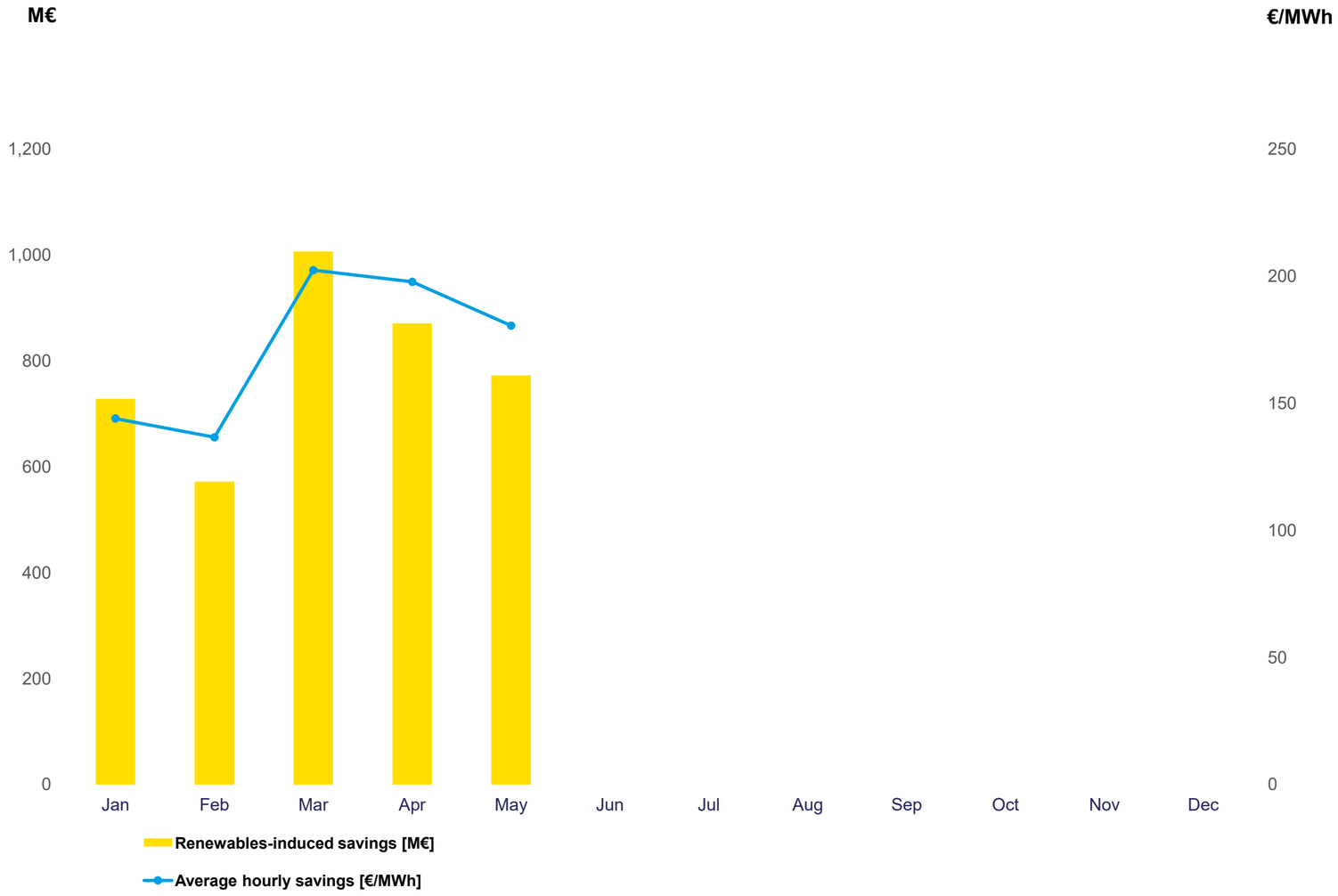
This study is carried out for PRE, which includes all installed fossil cogeneration power. Considering that the capacity equivalent to this technology within PRE is residual and that the other technologies are renewable, the figures are close to the real savings generated by renewables.

172.3
€/MWh

AVERAGE HOURLY SAVINGS (Accumulated)

3,951
M€

CUMULATIVE SAVINGS (Accumulated)



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 the 1st of January and the 31st of May of 2025 in natural gas, CO_2 emissions and CO_2 emission allowances, because of incorporating renewables into electricity generation.

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

75 M€
NATURAL GAS IMPORTS (May)

17 M€
ELECTRICITY IMPORTS (May)

0.9 $Mtco_2eq$
CO_2 EMISSIONS (May)

57 M€
CO_2 ALLOWANCES (May)

502 M€
NATURAL GAS IMPORTS (Accumulated)

462 M€
ELECTRICITY IMPORTS (Accumulated)

5 $Mtco_2eq$
CO_2 EMISSIONS (Accumulated)

295 M€
CO_2 ALLOWANCES (Accumulated)

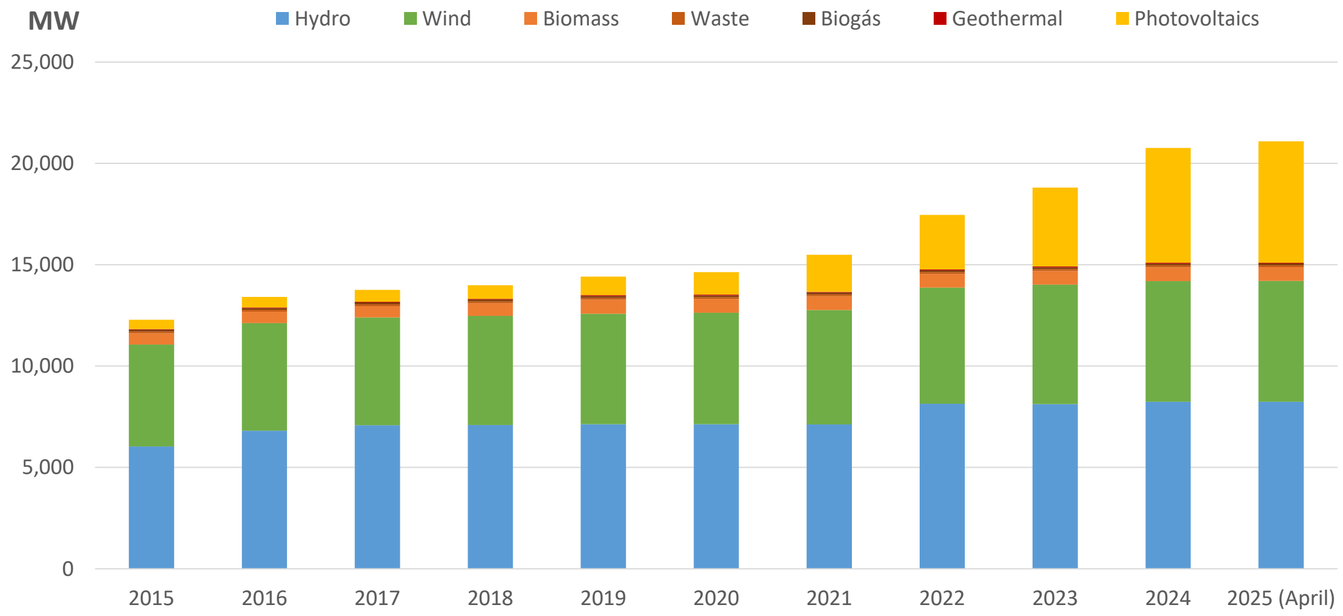
Source: OMIE, APREN Analysis

RENEWABLE INSTALLED CAPACITY
PORTUGAL

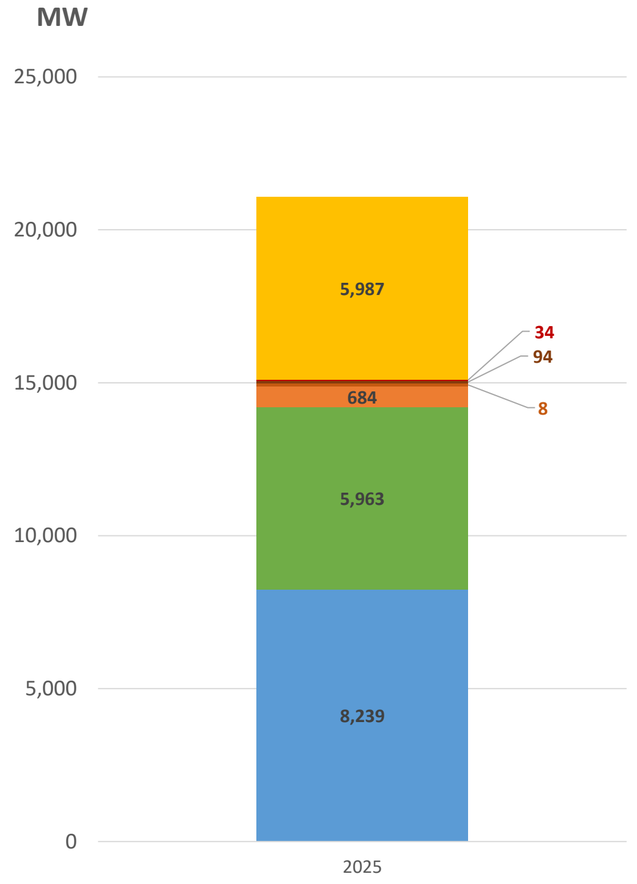
From 2015 to 2025 (April), installed renewable capacity increased by 8,807 MW, representing growth of 71.7%.

From December 2024 to April 2025, installed capacity increased by 323 MW, especially solar photovoltaic technology, which grew by 186 MW in the centralised component and 198 MW in the decentralised component.

At the end of April 2025, renewable capacity accounted for around 78.3% of total installed capacity in Portugal.



APRIL 2025



Source: DGEG, APREN Analysis
Nota: information available at the source with one month of delay to the month under analysis.

2025

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