2025

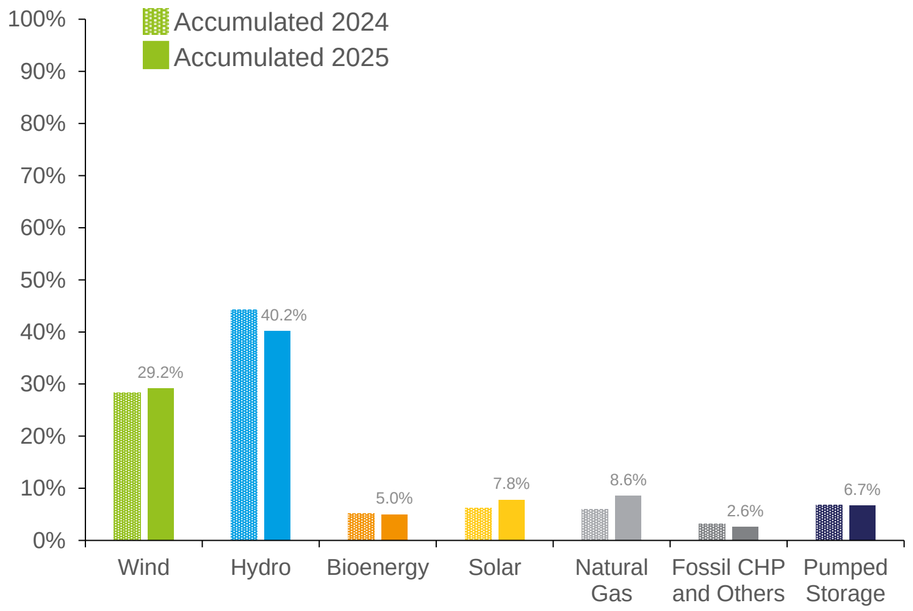
RENEWABLE ELECTRICITY BULLETIN

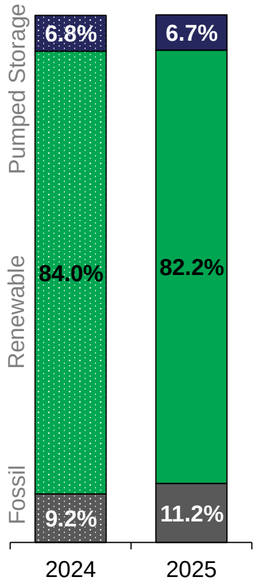
APRIL
2025

PORTUGAL NEEDS
OUR ENERGY

APREN Associação de Energias Renováveis

EXECUTIVE SUMMARY
CUMULATIVE GENERATION APR 2025





MAIN INDICATORS

WIND	5,393 GWh
HYDRO	7,423 GWh
SOLAR	1,434 GWh
BIOENERGY	926 GWh
NATURAL GAS	1,592 GWh
FOSSIL CHP AND OTHERS[b]	472 GWh
PUMPED STORAGE	1,232 GWh

1.04	Wind Index
1.44	Hydro Index
0.74	Solar Index

COMPARING TO THE SAME PERIOD IN 2024

▽ 4.4%	GWh	▽ 1.8 p.p.	%	△ 3.0%	GWh	△ 974%	GWh
	18,475		82.2		18,068		1,171
	Generation		Renewable Incorporation in Generation		Consumption		Net Imports

€/MWh	€/ tCO_2	$MtCO_2$ - eq	gCO_2 eq/kWh
70.3	71.1	0.74	40.3
MIBEL PT Price	CO_2 Price	CO_2 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

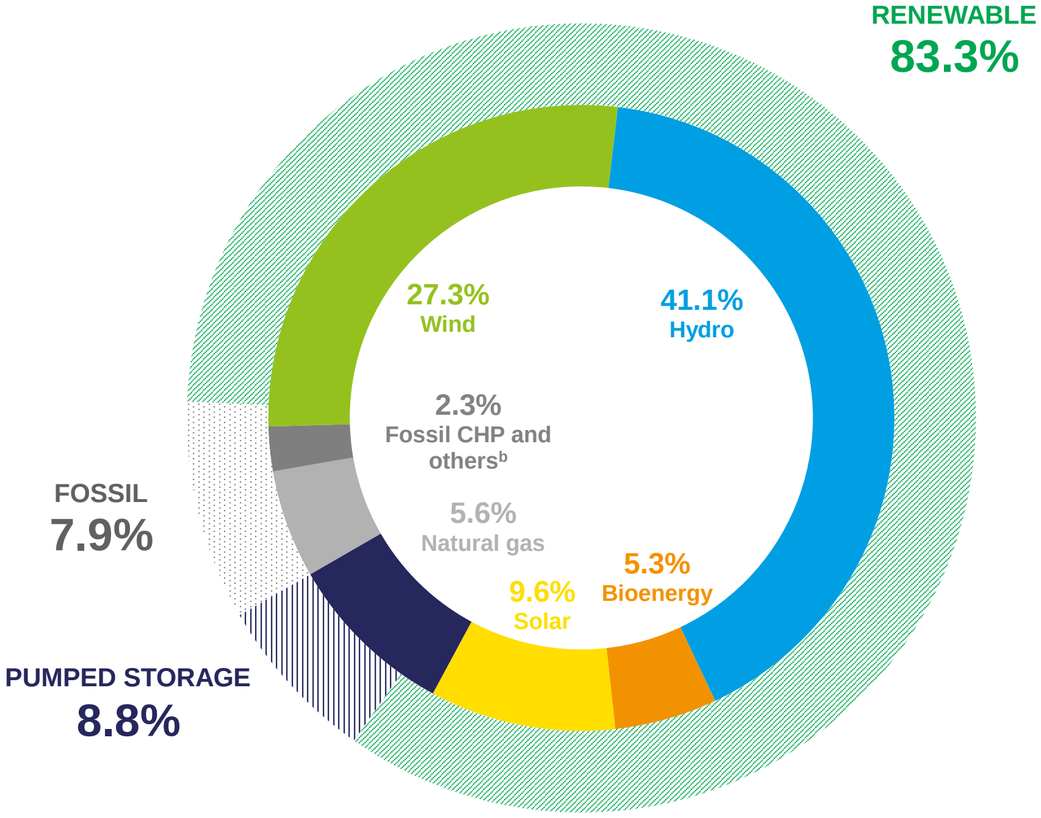
MONTHLY ANALYSIS IN MAINLAND PORTUGAL

APRIL 2025

Between 1 and 30 April 2025, renewable incorporation was 83.3%, making up 3,631 GWh of the 4,359 GWh produced in the month under review. Compared to April 2024, there was a 1.3 per cent increase in national electricity production, which was the result of an increase of 213 GWh in natural gas production.

In April 2025, imports totalled 2.5% of electricity consumption in mainland Portugal.

There was no disruption to production in April.



MAIN INDICATORS COMPARING TO APRIL 2024

GWh
4,359
Generation[a]
△ 1.3%

GWh
3,999
Consumption[c]
▽ 2.3%

%
83.3
Renewable incorporation
△ 4.3 p.p.

WIND INDEX
1.10

HYDRO INDEX
1.52

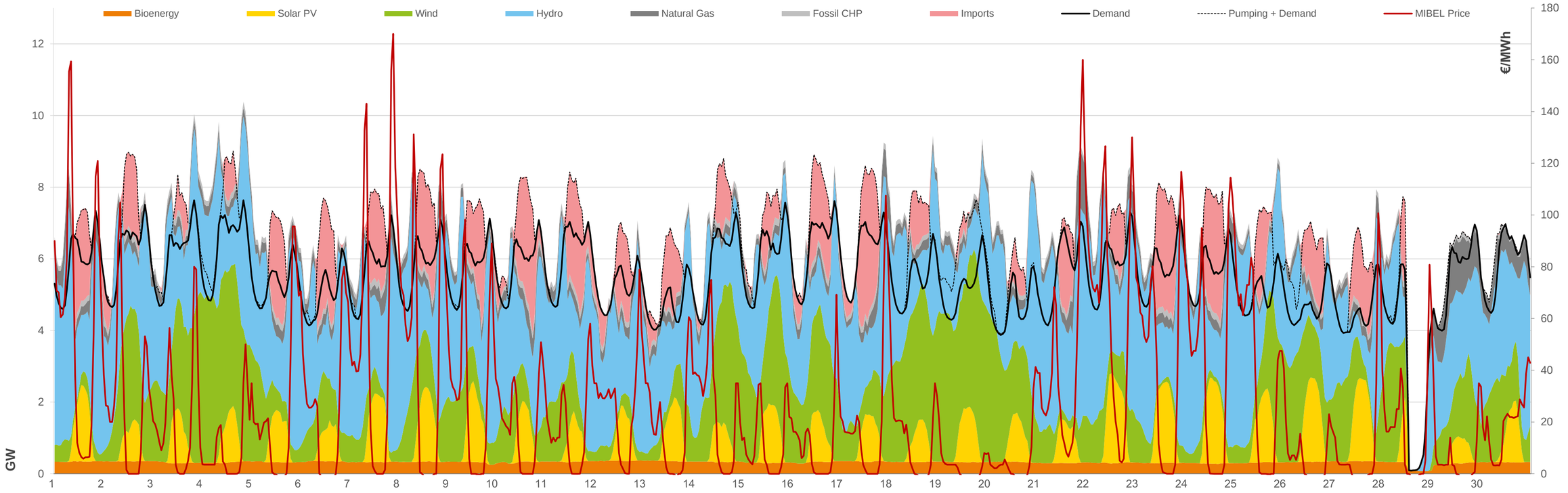
STORAGE IN DAMS
91.0%

SOLAR INDEX
0.67

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

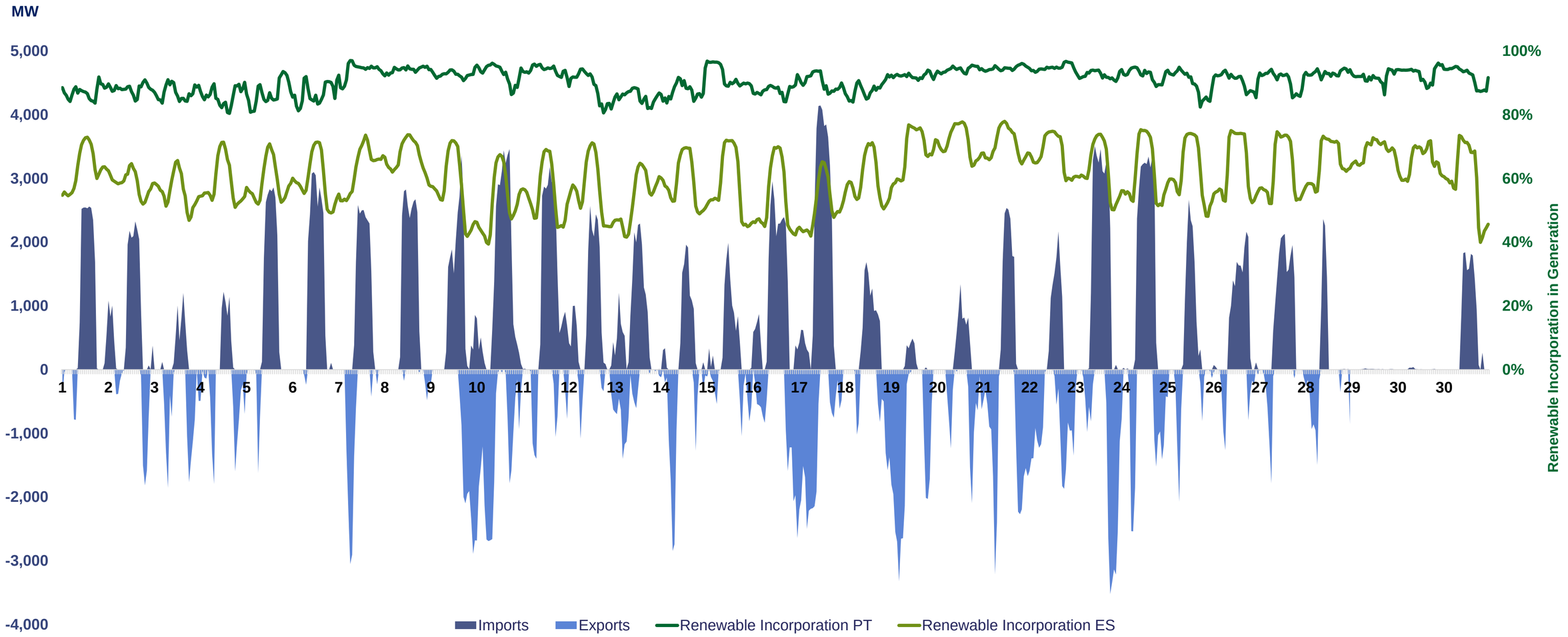
LOAD DIAGRAM FOR APRIL 2025



Source: REN, OMIE, APREN Analysis

MONTHLY ANALYSIS IN MAINLAND PORTUGAL

IMPORTS AND EXPORTS DIAGRAM



Source: REN, APREN Analysis

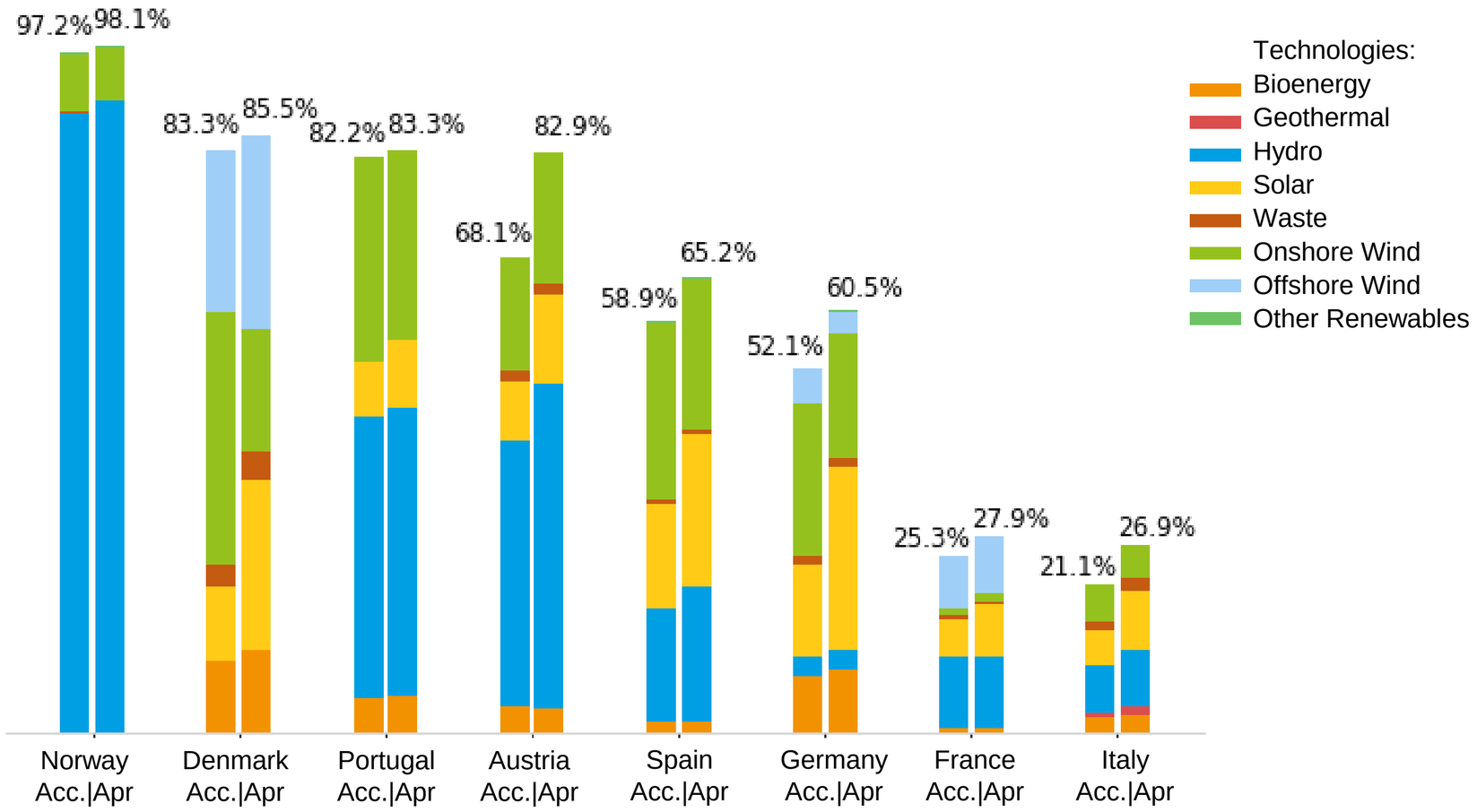
Note: For Monday 28 April, the date of the Iberian blackout, it should be noted that although in absolute terms electricity production from renewable sources was almost zero, in percentage terms it remains high due to production from biomass (see load diagram slide 4).

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 30 April 2025, Portugal was the third country with the highest share of renewable energy in electricity generation, with 82.2%, behind Norway and Denmark, which had 97.2% and 83.3%, respectively.

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



Renewable incorporation in cumulative (1 Jan - 30 Apr) and monthly (Apr) electricity generation.
Source: REN, Fraunhofer, REE, Terna, National Grid, ENTSO-E, APREN Analysis.

ELECTRICITY MARKET
PORTUGAL

Between 1 January and 30 April, the average hourly price recorded on MIBEL in Portugal (70.27 €/MWhd) represents an increase of 91.1% compared to the same period last year.

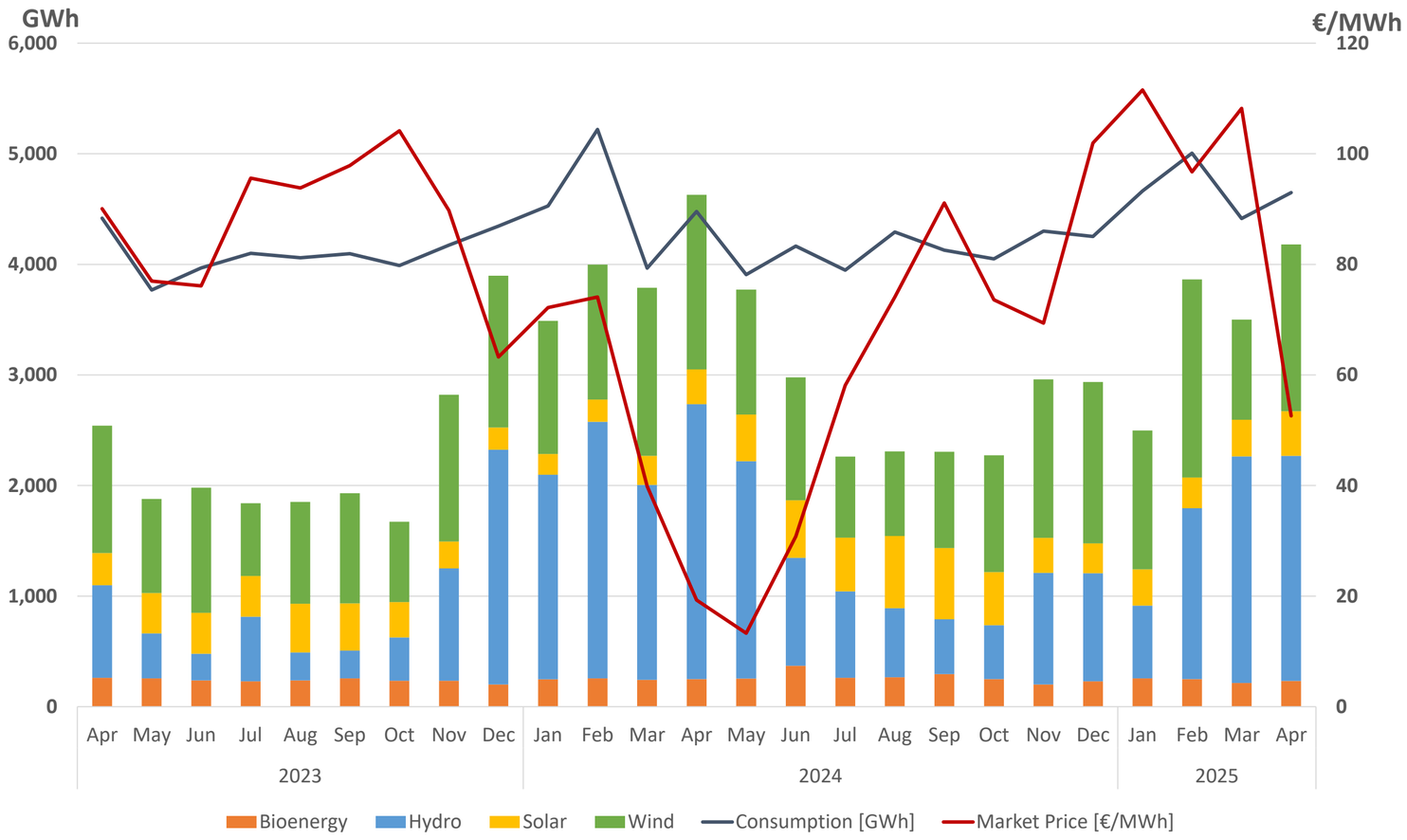
In the same period, there were 997 non-consecutive hours in which renewable generation was sufficient to supply mainland Portugal's electricity consumption, with an average hourly price in MIBEL of 65.1 €/MWh.

997
Hours
100% RENEWABLE HOURS [Accumulated]

65.1
€/MWh
MIBEL'S AVERAGE PRICE (IN 100% RENEWABLE HOURS) [Accumulated]

356
Horas
100% RENEWABLE HOURS [Mar]

32.8
€/MWh
PREÇO MÉDIO MIBEL (EM HORAS 100%RENOVÁVEIS) [Mar]



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

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

RENEWABLE ELECTRICITY
EUROPE

During the month of April 2025, there was **a minimum hourly price in MIBEL** in Portugal of -5.00 €/MWh*.

The maximum hourly price was 197.3 €/MWh*.

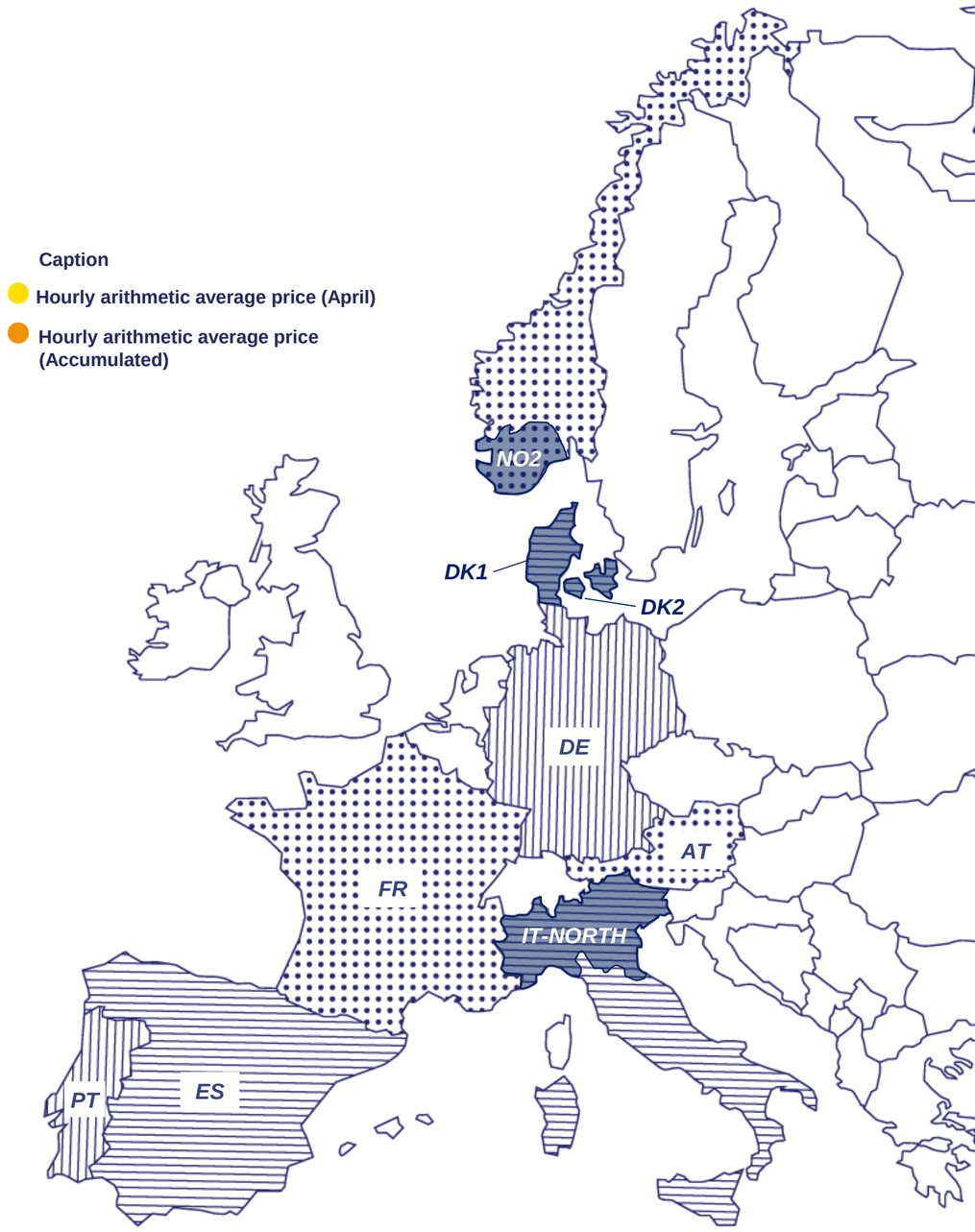
▽ MINIMUM PRICES (Apr)

1º	Austria	€/MWh -137,71
2º	Germany	€/MWh -129,81
3º	França	€/MWh -115,46

△ MAXIMUM PRICES (Apr)

1º	Dinamarca^{DK2}	€/MWh 265,11
2º	Alemanha Dinamarca^{DK1}	€/MWh 263,20
3º	Noruega^{NO2}	€/MWh 254,87

Portugal €/MWh	25.73	70.3
Spain €/MWh	26.64	70.6
France €/MWh	42.05	85.4
Italy$^{IT-NORD}$ €/MWh	100.25	128.5
Germany €/MWh	77.94	105.5
Austria €/MWh	81.04	114.5
Denmark^{DK1} €/MWh	75.2	92.2
Denmark^{DK2} €/MWh	75.8	93.8
Norway^{NO2} €/MWh	55.3	68.5



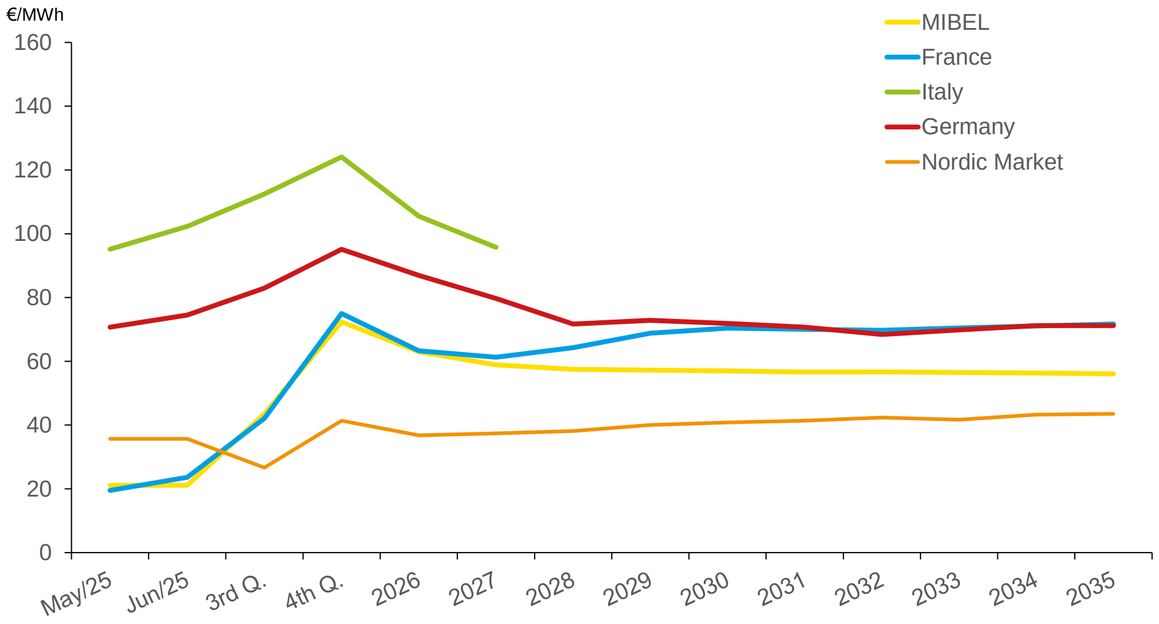
Source: ENTSO-E, OMIE, APREN Analysis
Note: given recent changes in the data reporting format by the ENTSO-E platform, the price values presented correspond to the bidding zones, when applicable. As such, in the case of Italy, Denmark and Norway only the bidding zones with interconnection with neighbouring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

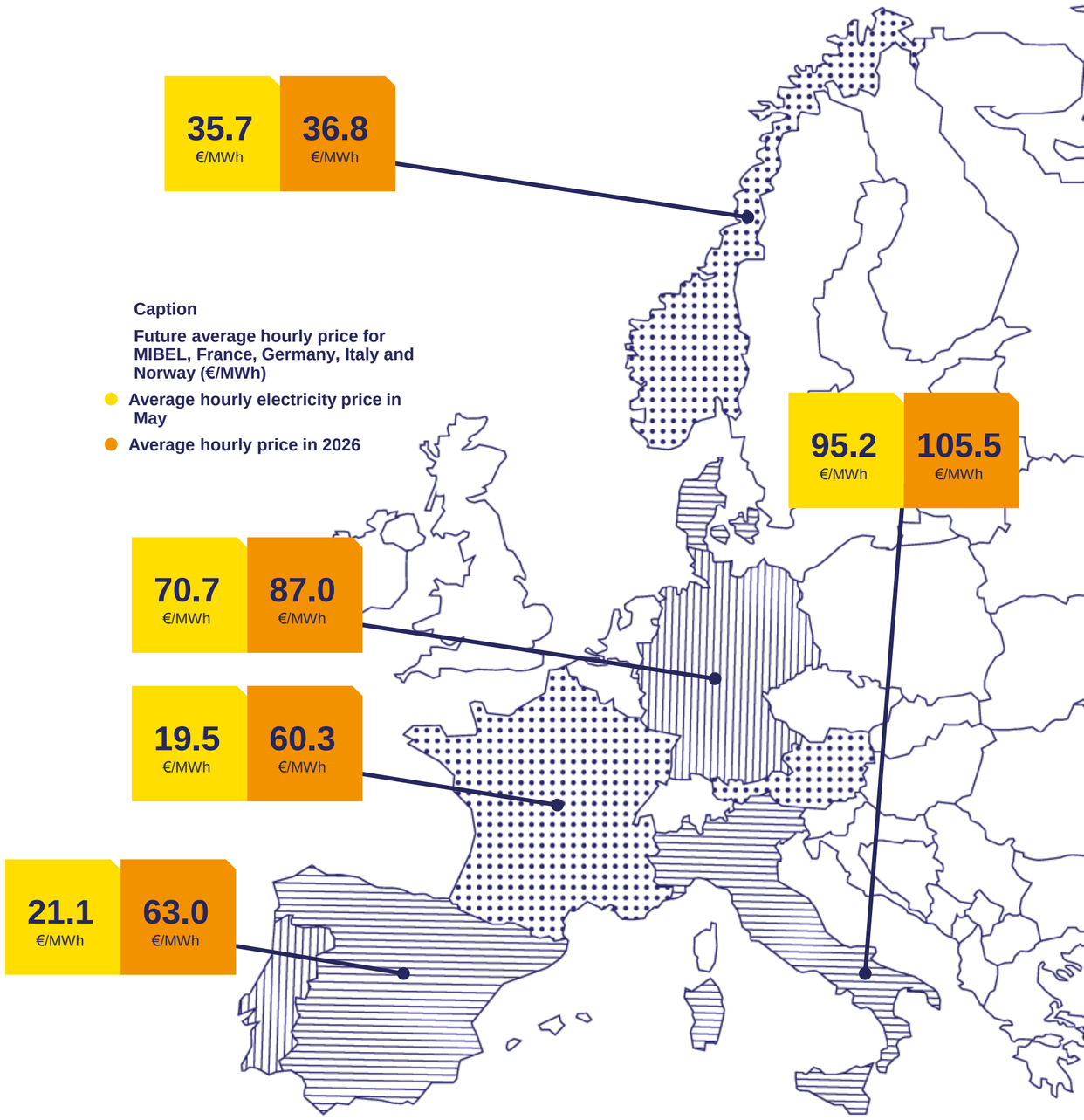
ELECTRICITY MARKET FUTURES

In the European futures market, the average hourly price values for next month (April) and next year, according to the records for a specific day, are an example. At the time of collection, in April 2025, MIBEL will be the second lowest electricity futures market.

From a long-term perspective, and according to the data for the specific day shown, 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 4th of April.

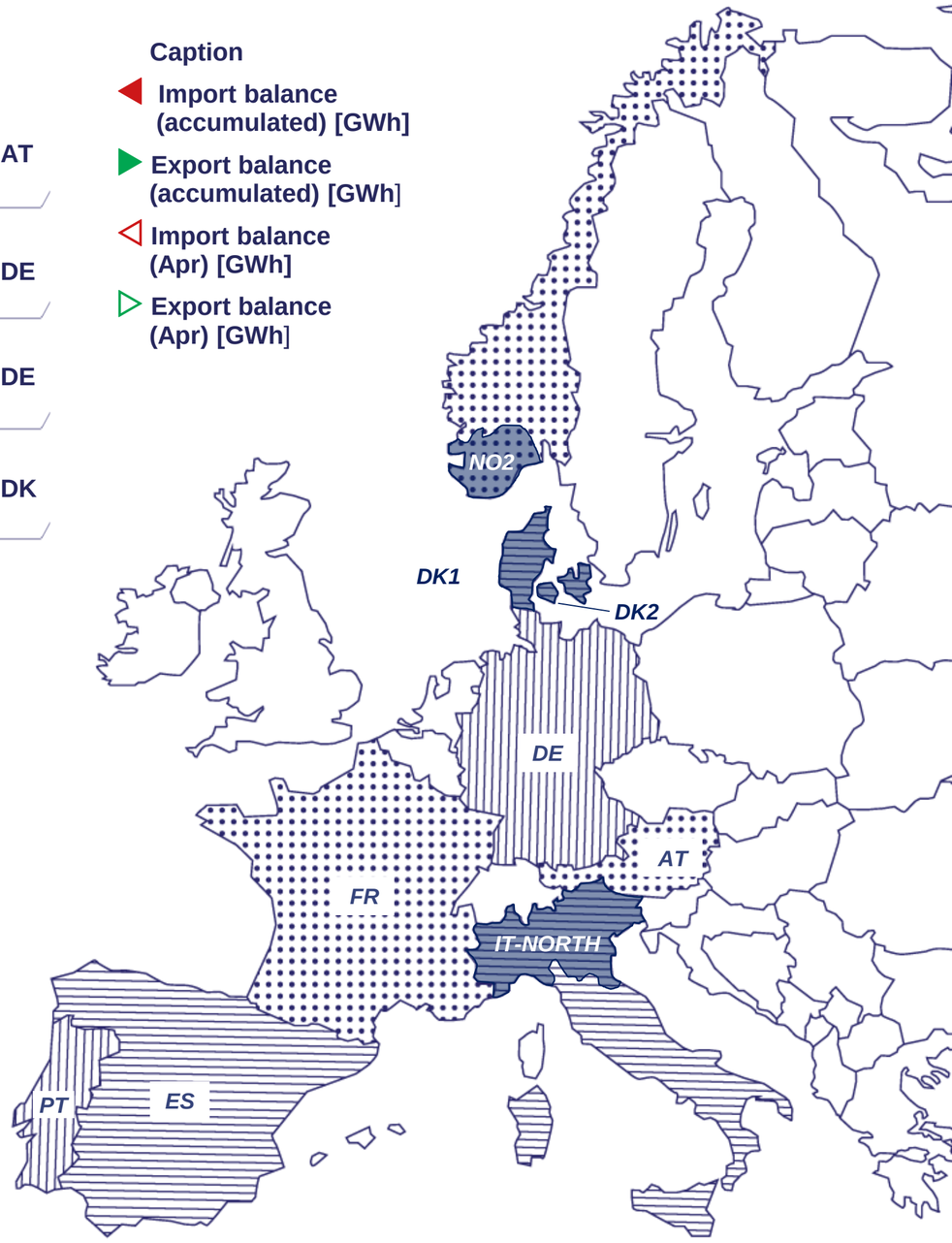
Source: OMIP, EEX, APREN Analysis

INTERNATIONAL TRADES
EUROPE

Between 1 January and 30 April 2025, the electricity system in mainland Portugal recorded **electricity imports** equivalent to **3,409 GWh** and **exports** of **2,238 GWh**.

Up until this month, Portugal was characterised as an electricity **importer**, with a balance of **1,171 GWh**.

PT	1,171	99	ES	DE	3,050	251	AT
ES	626	216	MA	DK	3,609	618	DE
FR	3,038	777	ES	NO	2,495	480	DE
IT	8,073	1,911	FR	NO	2,964	669	DK
DE	4,910	1,138	FR				



MAIN INDICATOR FOR PT-ES INTERCONNECTION

	PT-ES (apr)	PT-ES (jan-apr)	ES-PT (apr)	ES-PT (jan-apr)
usage	22.5%	18.9%	23.3%	27.3%
congestion	2.6%	2.3%	4.6%	4.1%
market split	10.1%	23.1%	62.2% (MIBEL-FR)	73.0%

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 30 April 2025, **specific emissions** reached 40.3 gCO2eq/kWh, giving total emissions from the electricity generation sector of 0.74 MtCO2eq.

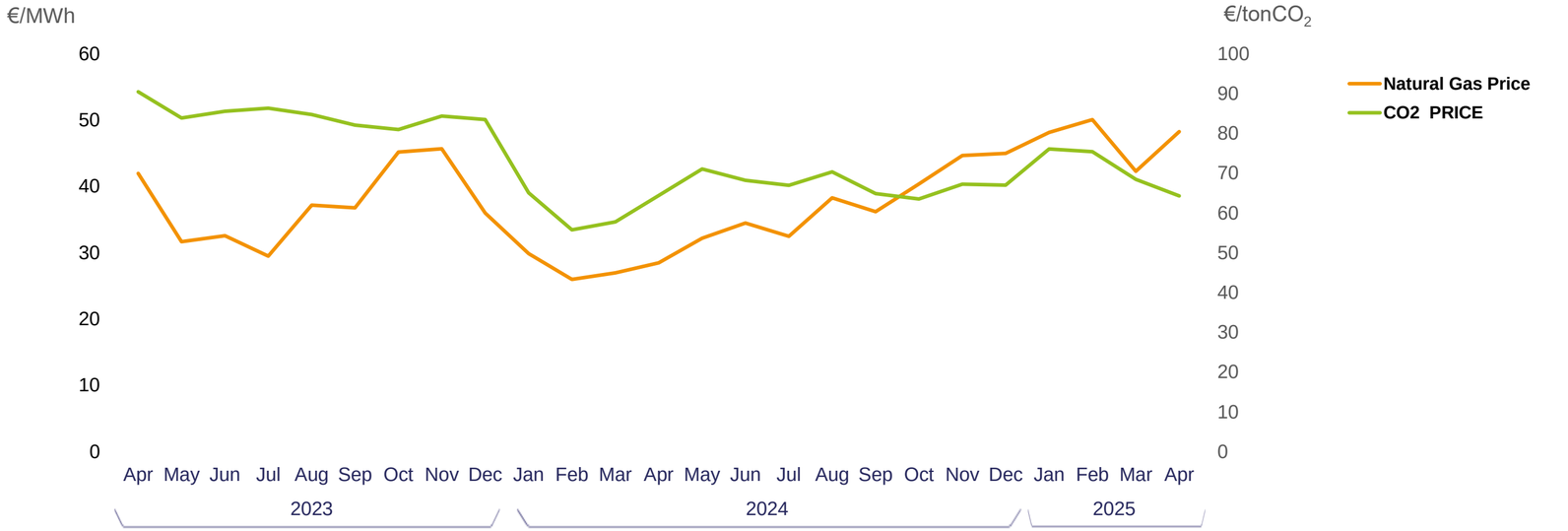
The **European CO2 Emissions Trading Scheme (ETS)** recorded a price of 71.1 €/tCO2d, which represents a reduction of 15.4% compared to the same period in 2024.

0.74
$MtCO_2eq$
SECTOR'S EMISSIONS

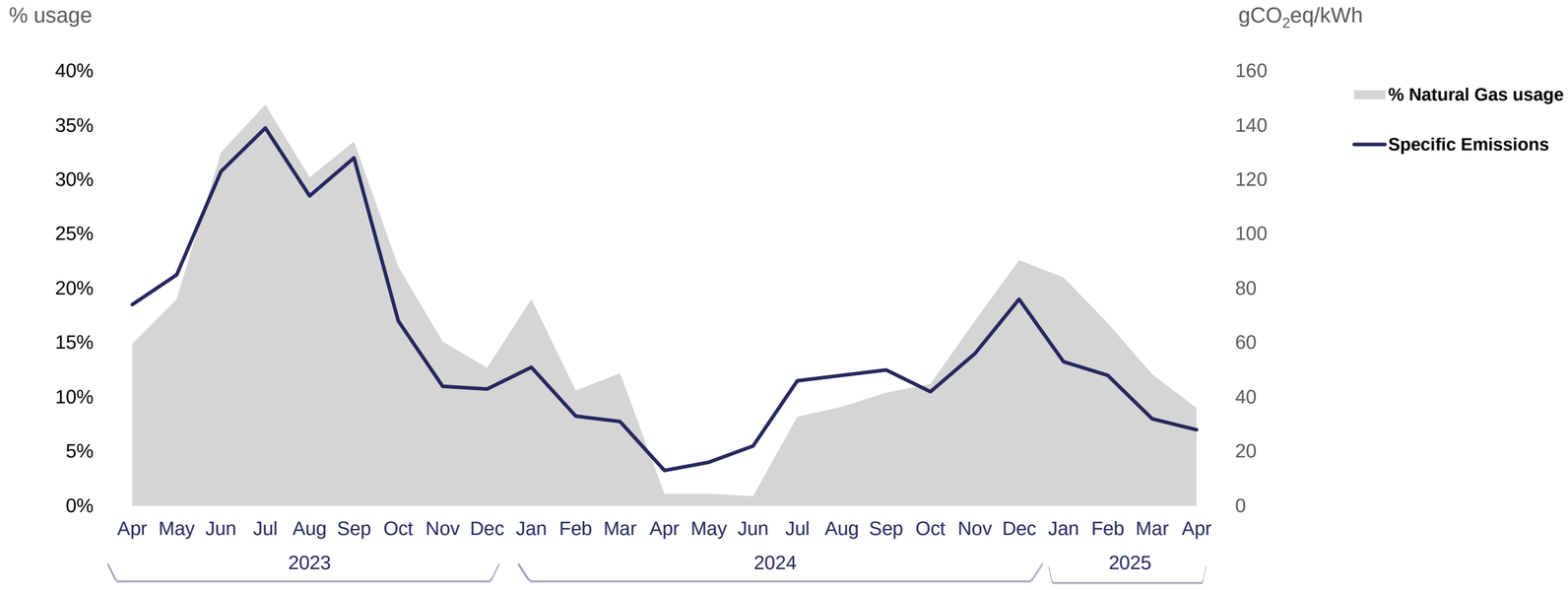
71.1
$€/tCO_2$
AVERAGE ALLOWANCE PRICE

15.4
%
▼
COMPARED TO MAR 2024 [Accumulated]

0.2
%
▼
COMPARED TO MAR 2024 [Accumulated]



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



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

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

SIMULATION OF PRICE FORMATION WITHOUT SPECIAL REGIME PRODUCTION (PRE)

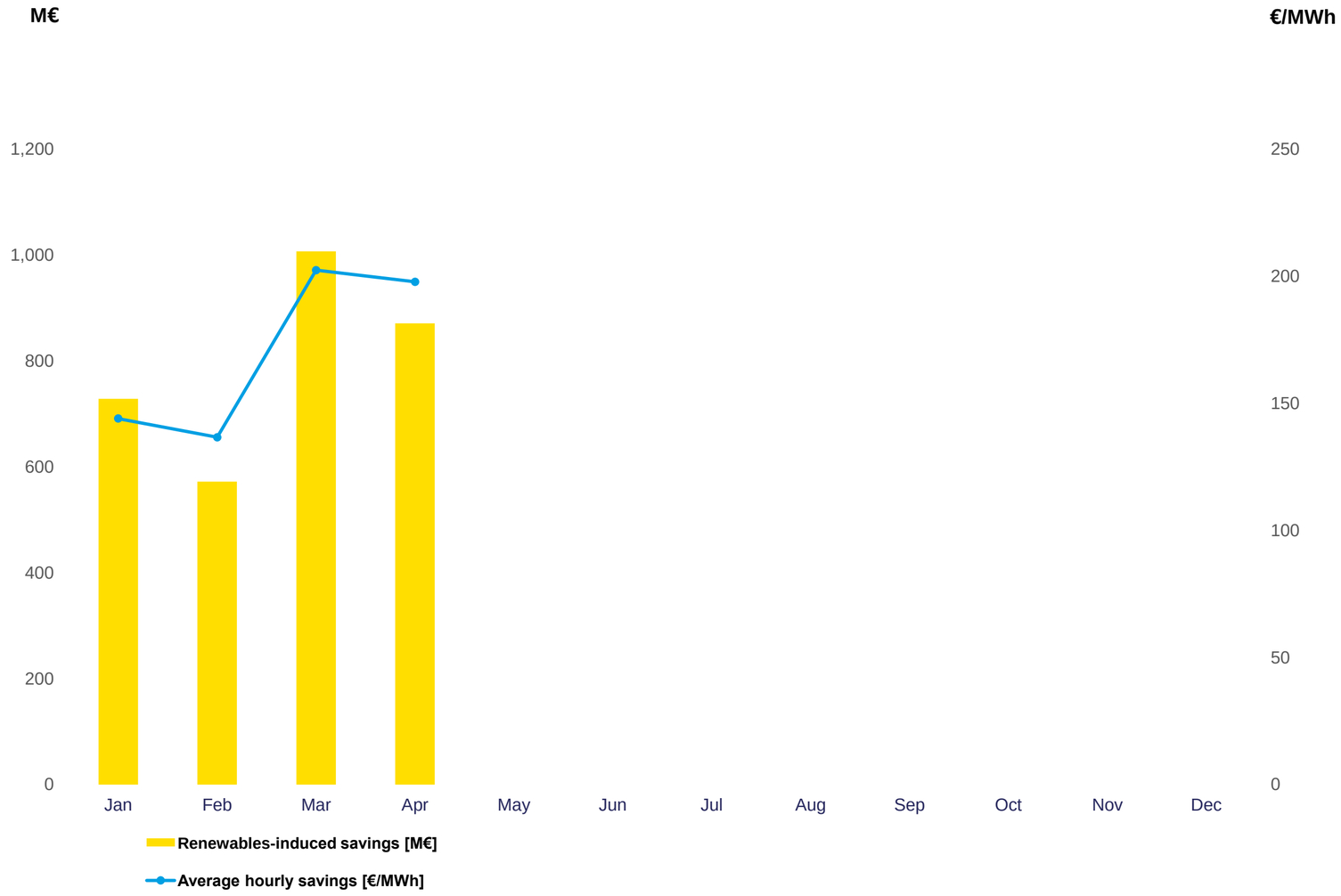
RENEWABLES HAVE AVOIDED:

The indicators below identify the savings achieved by the **Order of Merit** between the 1st of January and the 30th of April 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.

170.3
€/MWh
AVERAGE HOURLY SAVINGS (Accumulated)

3,180
M€
CUMULATIVE SAVINGS (Mar)



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 30th of April 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.

129 M€
NATURAL GAS IMPORTS (Apr)

26 M€
ELECTRICITY IMPORTS (Apr)

1.1 $Mtco_2eq$
CO_2 EMISSIONS (Apr)

64 M€
CO_2 ALLOWANCES (Apr)

439 M€
NATURAL GAS IMPORTS (Accumulated)

439 M€
ELECTRICITY IMPORTS (Accumulated)

4 $Mtco_2eq$
CO_2 EMISSIONS (Accumulated)

244 M€
CO_2 ALLOWANCES (Accumulated)

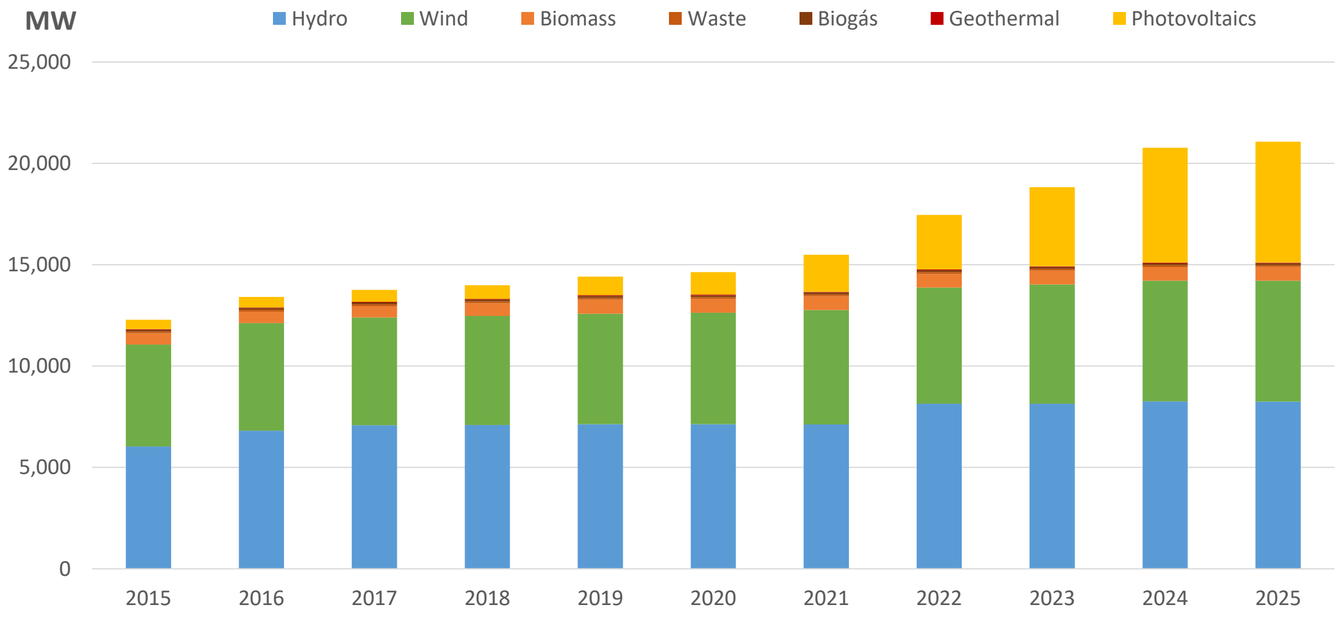
Source: OMIE, APREN Analysis

RENEWABLE INSTALLED CAPACITY
PORTUGAL

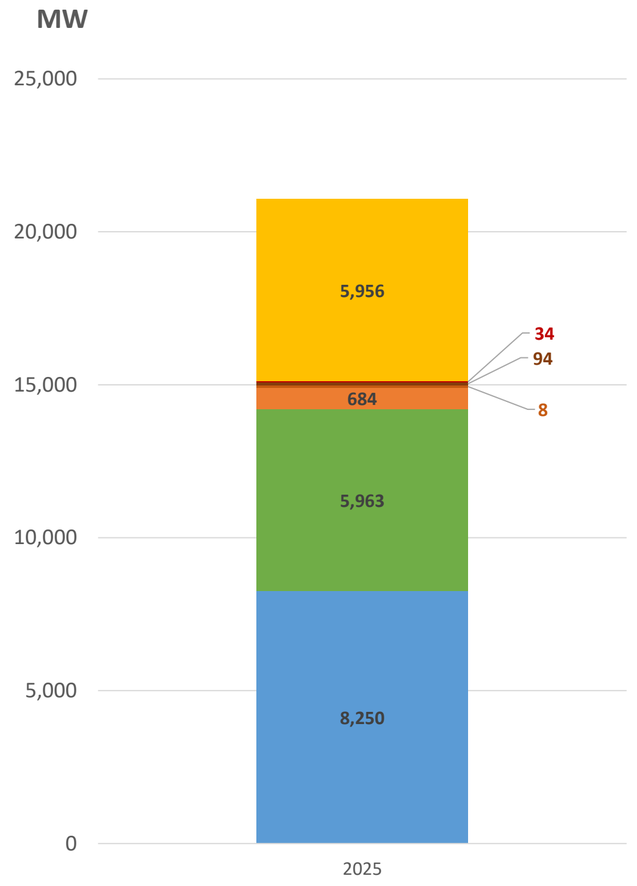
From 2015 to 2025 (March), installed renewable capacity increased by 8,787 MW, representing growth of 71.5 per cent.

From December 2024 to March 2025, installed capacity increased by 292 MW, especially solar photovoltaic technology, which grew by 287 MW in the centralised component and 124 MW in the decentralised component.

At the end of March 2025, renewable capacity accounted for around 78.3 per cent of total installed capacity in Portugal.



MARCH 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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