

# Monthly Report on the Electricity System

## April 2024



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April 2024

### 1

#### Energy Balance Sheets

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In April, electricity demand was 23,492 GWh, an increase compared to the same month of the previous year (+1.1%) and down compared to April 2022 (-4.2%). There was also a drop in foreign exchange (-28.9%) compared to the same month of 2023. In 2024, electricity demand (101,204 GWh) was higher compared to the same period in 2023 (+0.8%) but was lower compared to the cumulative figure for 2022 (-3.5%). The value of electricity demand was achieved with two more working day (20 vs 18), and with an average monthly temperature that was 1.5°C higher compared to April of last year. The adjusted figure results in no change (+0.0%). The annual trend of April 2024 (compared to April 2023) for the industrial electricity consumption index was positive (+1.0%) with raw data.



### 2

#### Electricity System

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In March 2024, 34.2% of the electricity demand was met via production from Non-Renewable Energy Sources, 51.2% via Renewable Energy Sources and the remainder via foreign exchange. In April, production from Renewable Energy Sources increased (+43.8%) compared to the same month of the previous year. In 2024 the operating capacity of renewables increased by 2,356 MW. This value is 736 MW higher (+45%) compared to the same period of the previous year. In the first four months of 2024, photovoltaic operating capacity increased by 2,167 MW. During the same period of 2023 the increase was 1,419 MW, recording an increase of 748 MW (+53%). In the first four months of 2024, operating capacity increased by 209 MW. During the same period of 2023, the increase was 195 MW, which is an increase of 14 MW (+7%).



### 3

#### Electricity Market

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The April 2024 total for withdrawal programmes on the DAM was approximately €1.8 Bn, (-12% compared to the previous month and -36% compared to April 2023). In April 2024, the spread between average bid-up and bid-down prices on the MSD was €94/MWh, (+8% compared to the previous month and -13% compared to April 2023). Total volumes increased compared to the previous month (+2%). In April 2024, the spread between bid-up and bid-down prices on the MB was €138/MWh (+7% compared to the previous month and -26% compared to April 2023). Total volumes increased compared to the previous month (+16%).



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### Monthly Summary and Short-Term Analysis

In April, electricity demand was 23,492 GWh, an increase compared to the same month of the previous year (+1.1%) and down compared to April 2022 (-4.2%). There was also a drop in foreign exchange (-28.9%) compared to the same month of 2023.

In 2024, electricity demand (101,204 GWh) was higher compared to the same period in 2023 (+0.8%) but was lower compared to the cumulative figure for 2022 (-3.5%).

#### Demand breakdown – coverage by sources

[GWh]	Apr 2024	Apr 2023	% 24/23	Jan-Apr 24	Jan-Apr 23	% 24/23
Renewable Hydro	4.534	1.524	197,5%	14.027	6.710	109,0%
Pumping Production <sup>(2)</sup>	213	168	26,8%	542	575	-5,7%
Thermal	9.378	11.240	-16,6%	46.180	56.247	-17,9%
of which Biomass	1.264	1.135	11,4%	5.169	5.049	2,4%
of which Hard Coal	268	202	32,7%	1.323	6.245	-78,8%
Geothermal	438	442	-0,9%	1.788	1.756	1,8%
Wind	2.091	2.164	-3,4%	9.602	8.822	8,8%
Photovoltaic	3.703	3.098	19,5%	9.460	8.546	10,7%
<b>Net Total Production</b>	<b>20.357</b>	<b>18.636</b>	<b>9,2%</b>	<b>81.599</b>	<b>82.656</b>	<b>-1,3%</b>
<b>Pumping</b>	<b>305</b>	<b>240</b>	<b>27,1%</b>	<b>774</b>	<b>821</b>	<b>-5,7%</b>
<b>Net Total Production for Consumption</b>	<b>20.052</b>	<b>18.396</b>	<b>9,0%</b>	<b>80.825</b>	<b>81.835</b>	<b>-1,2%</b>
of which RES <sup>(3)</sup>	12.029	8.363	43,8%	40.046	30.883	29,7%
of which not RES	8.023	10.033	-20,0%	40.779	50.952	-20,0%
Import	3.805	5.006	-24,0%	21.355	19.474	9,7%
Export	365	170	114,7%	976	943	3,5%
<b>Net Foreign Exchange</b>	<b>3.440</b>	<b>4.836</b>	<b>-28,9%</b>	<b>20.379</b>	<b>18.531</b>	<b>10,0%</b>
<b>Electricity demand<sup>(1)</sup></b>	<b>23.492</b>	<b>23.232</b>	<b>1,1%</b>	<b>101.204</b>	<b>100.366</b>	<b>0,8%</b>

In April 2024, there was a notable increase in renewable hydroelectric production (+197.5%) and an increase in photovoltaic production (+19.5%), while there was a decrease in thermal production (-16.6%) and wind production (-3.4%), and a slight decrease in geothermal production (-0.9%) compared to the same month the previous year.

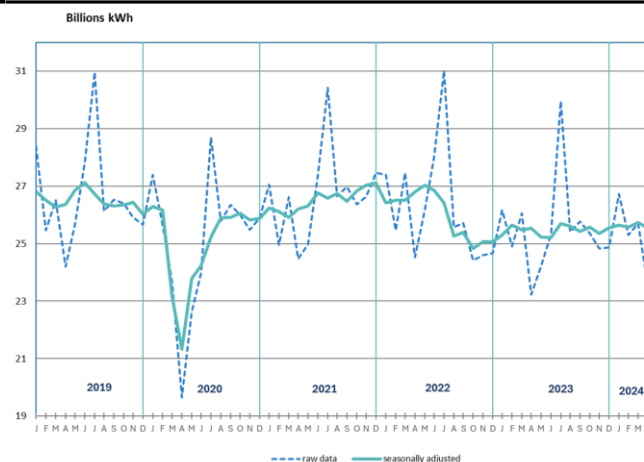
In 2024, there was a change in exports, which increased (+3.5%) compared to 2023. The trend in total net production for consumption in April was up (+9.0%) compared to the same month in 2023

(1) Electricity Demand = Net Total Production for Consumption + Foreign Balance  
 (2) Pumping production is calculated assuming theoretical efficiency during the pumping phase  
 (3) RES Production = Renewable Hydro + Biomass + Geothermal + Wind + Photovoltaic -

Source: Terna

The value of electricity demand was achieved with two more working day (20 vs 18), and with an average monthly temperature that was 1.5°C higher compared to April of last year. The adjusted figure results in no change (+0.0%). In the first four months of the year, national demand grew by 0.8% compared to the corresponding period of 2023 (+0.5% adjusted value). The short-term data, adjusted for seasonal, calendar and temperature effects, recorded a slight decrease in electricity demand for April 2024 compared to March (-0.8%).

#### Demand – seasonality adjusted



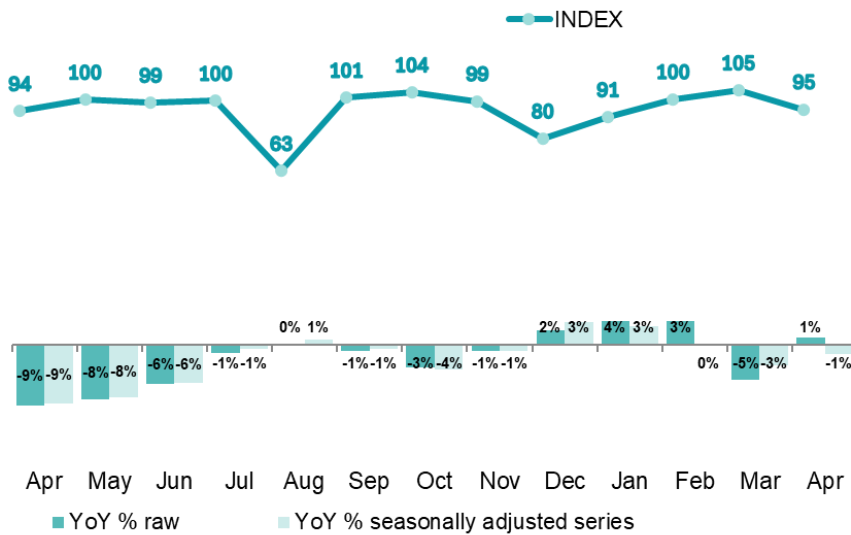
The value, adjusted for seasonal, calendar and temperature effects, shows negative cyclical change (-0.8%).

Source: Terna

## IMCEI

The trend for April 2024 (compared to April 2023) was positive (+1.0%) based on the raw data; using the data adjusted for calendar differences, the change is -1.4%. In the first four months of the year, the index remained stationary (+0.4%).

### IMCEI short-term analysis (2015 base = 100)

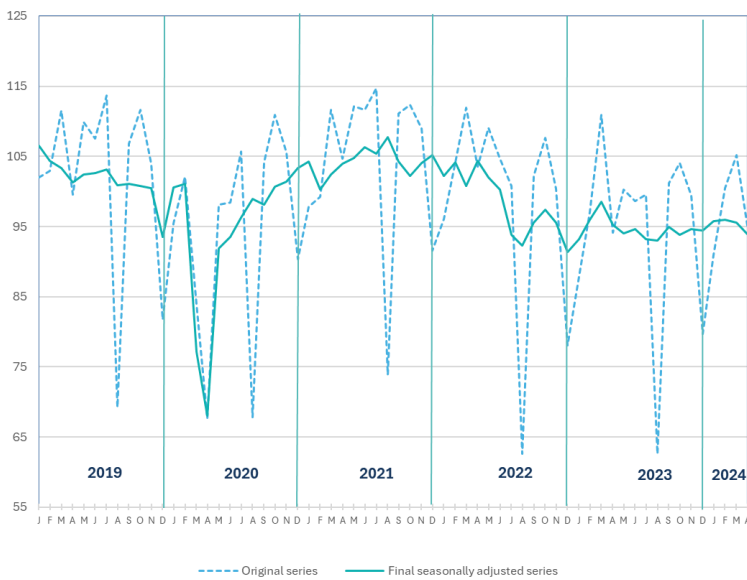


In April, the variation in the monthly index of Italian electricity consumption was positive, compared to April 2023

Source: Terna

The short-term data, adjusted for seasonal and calendar effects, showed a decrease in the industrial electricity consumption index in April 2024 (-1.7%) compared to March.

### Monthly Industrial Electrical Consumption Index - IMCEI (2015 base = 100)



When adjusted for seasonal and calendar effects, the monthly figure for April was negative compared to the previous month

Source: Terna

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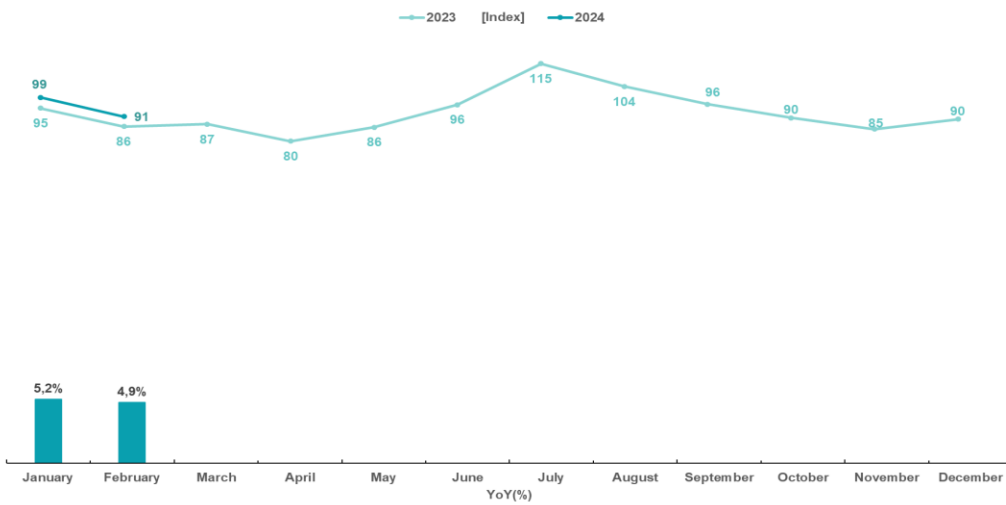
Energy Balance Sheets



## IMSER

The annual trend of February 2024 (compared to February 2023) increased by +4.9% with raw data. In the period January-February 2024, electricity consumption in the services sector had increased overall by +5.1% compared to 2023.

### Monthly Service Sector Consumption Index (basis 2019 = 100)



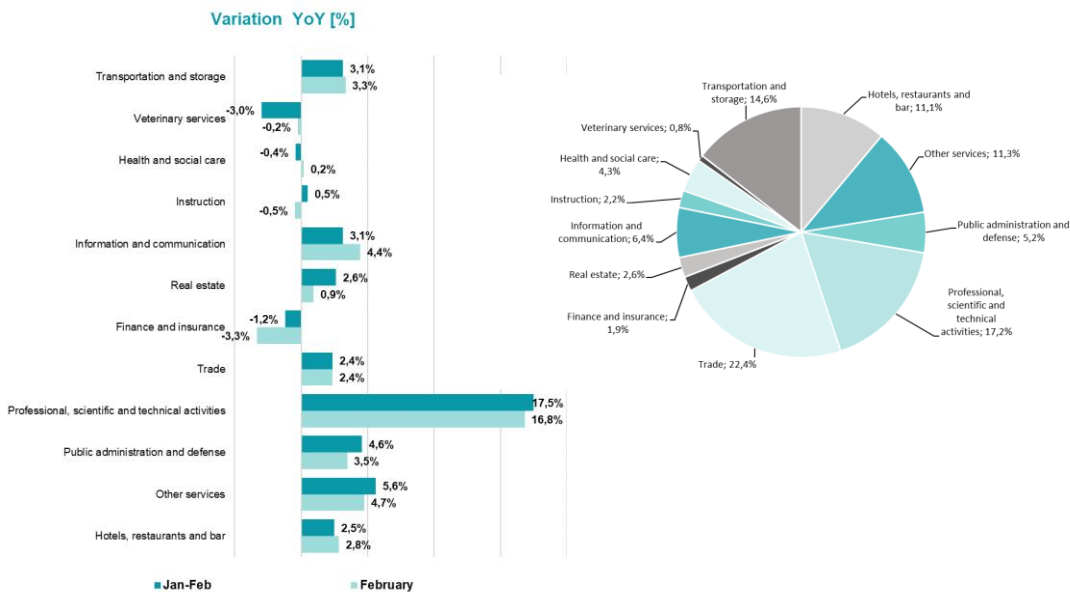
In February, the change in the monthly index of Italian electricity consumption for the services sector was positive (+4.9%) compared to February 2023.

Source: Terna elaboration of data based on a sample of distributors

In detail, there was an increase in almost all the monitored categories as of February 2024: Professional, scientific and technical services, Transportation and storage, Information and Communications, Real Estate, Hotels, restaurants and bars, Public Administration and Defence, Trade, Finance and insurance, Education, Health and social care, Veterinary services and Other services.

In the first two months of the year 2024, the categories of Finance and insurance, Health and social care, Veterinary services and Transportation and storage decreased compared to 2023. There was an increase in all the other sectors.

### IMSER sector analysis (basis 2019 = 100) - YOY change and annual cumulative contribution of the sectors



The cumulative figure for January-December 2024 was up by +5.1% compared to the same period in 2023.

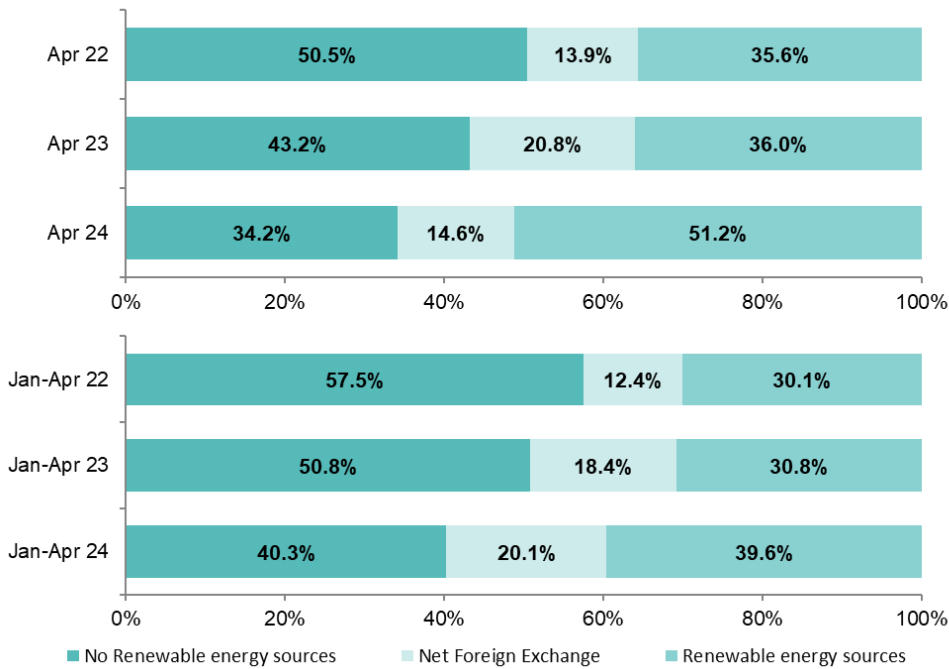
Source: Terna elaboration of data based on a sample of distributors

### Energy Demand Mix

In April 2024, 34.2% of the electricity demand was met via production from Non-Renewable Energy Sources, 51.2% via Renewable Energy Sources and the remainder via foreign exchange.

In 2024, electricity demand was 101,204 GWh, 40.3% of which was met via production from Non-Renewable Energy Sources, 39.6% from Renewable Energy Sources and the remainder from the foreign balance.

#### Demand breakdown – coverage by sources

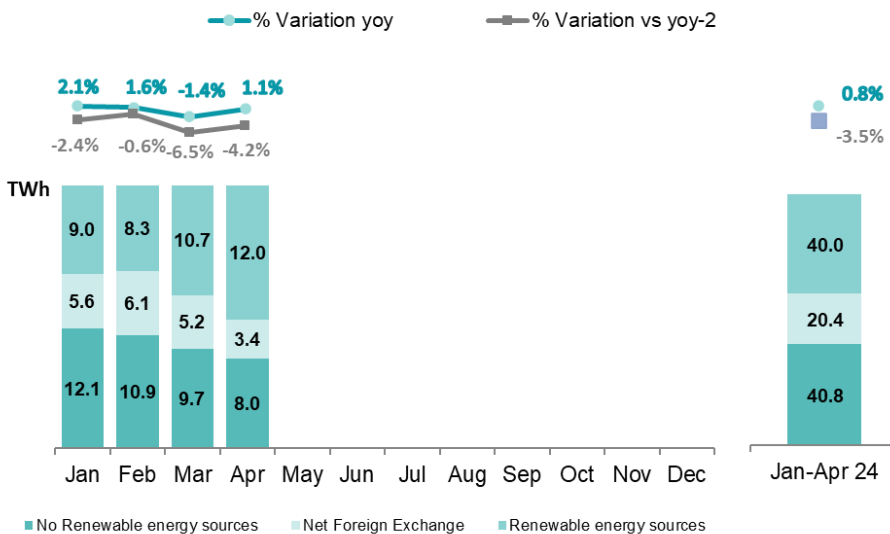


Coverage of demand from renewable sources grew from 36.0% in April 2023 to 51.2% in April 2024

In 2024 coverage of demand from non-renewables fell from 50.8% in 2023 to 40.3% in 2024

Source: Terna

#### 2024 trend in demand breakdown and difference from 2023 and 2022



In 2024, electricity demand on the grid is higher than 2023 (+0.8%) and down compared to the cumulative figure for 2022 (-3.5%). In 2024, energy production from renewable sources totalled 40.0 TWh, up compared to 2023 (+29.7%)

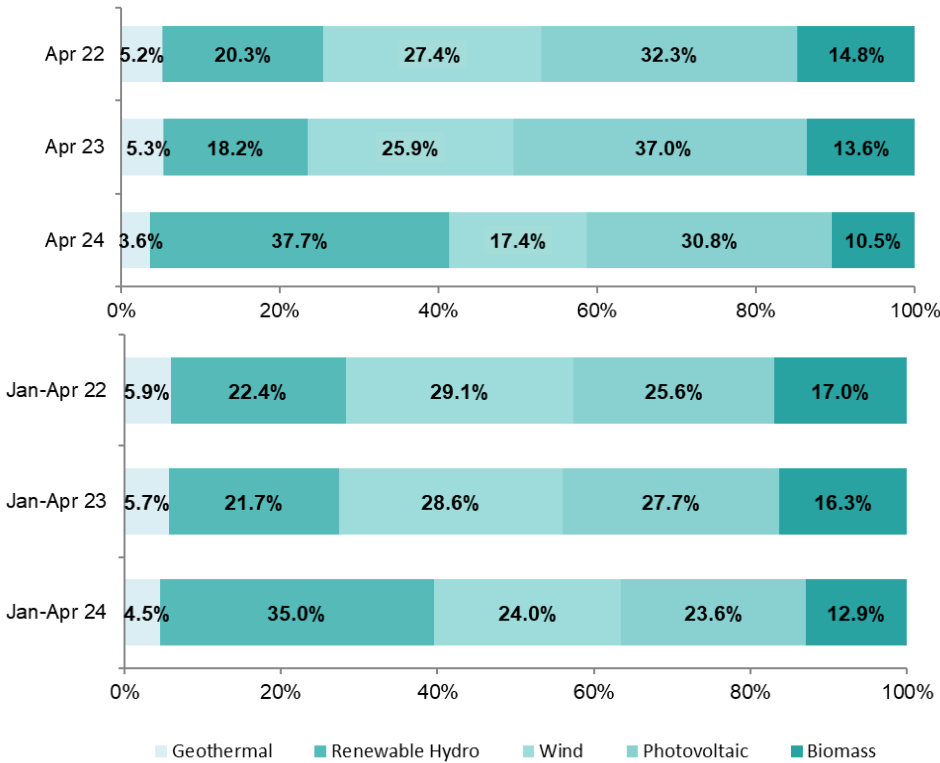
Source: Terna



### Details of Renewable Energy Sources

In April, production from Renewable Energy Sources increased (+43.8%) compared to the same month of the previous year. Specifically, there was a notable increase in renewable hydroelectric production (+197.5%), an increase in photovoltaic production (+19.5%) and a decrease in wind production (-3.4%).

#### RES Production - Breakdown

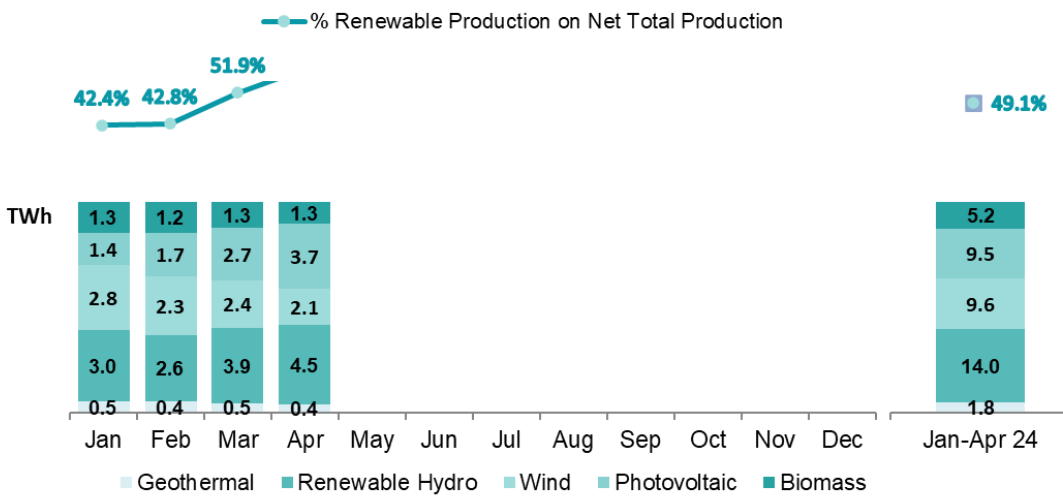


In April 2024, the greater contribution of renewable energy sources to the total is attributed to renewable hydroelectric production (37.7%) and photovoltaic production (30.8%)

In 2024 the ratio of renewable hydroelectric production increased while the contribution from the other sources decreased overall compared to 2023

Source: Terna

#### 2024 trend in net production from RES and difference from 2023



In April 2024, production from RES represented 59.1% of total net national production, an increase compared to the same month in 2023 (44.9%). In 2024, production from RES represented 49.1% of total net national production, an increase compared to the cumulative figure for 2023 (37.4%).

Source: Terna

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## Historical Energy Balance Sheets

In 2024, total net production allocated for consumption (80,825 GWh) met 79.9% of national electricity demand (101,204 GWh).

### 2024 Historical Monthly Energy Balance Sheet

[GWh]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Renewable Hydro	3,033	2,606	3,855	4,534									14,027
Pumping Production <sup>(2)</sup>	64	106	158	214									542
Thermal	13,496	12,178	11,128	9,378									46,180
of which Biomass	1,332	1,231	1,343	1,264									5,169
of which Hard Coal	345	467	243	268									1,323
Geothermal	458	432	460	438									1,788
Wind	2,802	2,295	2,414	2,091									9,602
Photovoltaic	1,371	1,714	2,672	3,703									9,460
<b>Net Total Production</b>	<b>21,224</b>	<b>19,331</b>	<b>20,687</b>	<b>20,357</b>									<b>81,599</b>
Pumping	92	151	226	305									774
<b>Net Total Production for Consumption</b>	<b>21,132</b>	<b>19,180</b>	<b>20,461</b>	<b>20,052</b>									<b>80,825</b>
of which RES <sup>(3)</sup>	8,995	8,278	10,743	12,029									40,046
of which not RES	12,137	10,902	9,718	8,023									40,779
Import	5,868	6,258	5,424	3,805									21,355
Export	279	145	187	365									976
<b>Net Foreign Exchange</b>	<b>5,589</b>	<b>6,113</b>	<b>5,237</b>	<b>3,440</b>									<b>20,379</b>
<b>Electricity demand <sup>(1)</sup></b>	<b>26,721</b>	<b>25,293</b>	<b>25,698</b>	<b>23,492</b>									<b>101,204</b>

In 2024, net total production was down (-1.3%) compared to the same period in 2023, and peak electricity demand was reached in January, with 26,721 GWh.

Source: Terna

The developments in the monthly balance sheet for 2023 are provided below.

### 2023 Historical Monthly Energy Balance Sheet

[GWh]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Renewable Hydro	2,053	1,530	1,604	1,524	4,145	4,878	4,402	3,884	3,546	3,269	4,125	3,284	38,244
Pumping Production <sup>(2)</sup>	135	99	172	168	136	95	104	160	100	137	129	95	1,530
Thermal	15,618	14,756	14,633	11,240	10,890	12,256	15,608	12,365	13,529	12,763	11,269	13,007	157,934
of which Biomass	1,366	1,200	1,349	1,135	1,201	1,233	1,342	1,317	1,273	1,274	1,207	1,212	15,108
of which Hard Coal	2,294	1,868	1,881	202	560	1,226	1,041	662	914	461	579	419	12,108
Geothermal	458	414	442	442	462	436	445	439	445	462	444	458	5,347
Wind	2,281	1,816	2,561	2,164	1,519	1,034	1,347	1,735	1,645	1,863	2,968	2,441	23,374
Photovoltaic	1,092	1,721	2,635	3,098	2,928	3,515	3,868	3,738	2,991	2,277	1,534	1,198	30,595
<b>Net Total Production</b>	<b>21,637</b>	<b>20,336</b>	<b>22,047</b>	<b>18,636</b>	<b>20,080</b>	<b>22,214</b>	<b>25,774</b>	<b>22,321</b>	<b>22,256</b>	<b>20,770</b>	<b>20,469</b>	<b>20,483</b>	<b>257,023</b>
Pumping	193	142	246	240	194	136	148	228	143	195	184	136	2,185
<b>Net Total Production for Consumption</b>	<b>21,444</b>	<b>20,194</b>	<b>21,801</b>	<b>18,396</b>	<b>19,886</b>	<b>22,078</b>	<b>25,626</b>	<b>22,093</b>	<b>22,113</b>	<b>20,575</b>	<b>20,285</b>	<b>20,347</b>	<b>254,838</b>
of which RES <sup>(3)</sup>	7,250	6,680	8,591	8,363	10,255	11,096	11,405	11,113	9,900	9,145	10,278	8,593	112,668
of which not RES	14,194	13,514	13,210	10,033	9,631	10,982	14,221	10,980	12,213	11,430	10,007	11,754	142,170
Import	5,080	4,943	4,445	5,006	4,615	3,546	4,651	3,657	3,908	4,987	4,810	4,924	54,572
Export	352	233	188	170	275	314	323	338	248	211	266	402	3,320
<b>Net Foreign Exchange</b>	<b>4,728</b>	<b>4,710</b>	<b>4,257</b>	<b>4,836</b>	<b>4,340</b>	<b>3,232</b>	<b>4,328</b>	<b>3,319</b>	<b>3,660</b>	<b>4,776</b>	<b>4,544</b>	<b>4,522</b>	<b>51,252</b>
<b>Electricity demand <sup>(1)</sup></b>	<b>26,172</b>	<b>24,904</b>	<b>26,058</b>	<b>23,232</b>	<b>24,226</b>	<b>25,310</b>	<b>29,954</b>	<b>25,412</b>	<b>25,773</b>	<b>25,351</b>	<b>24,829</b>	<b>24,869</b>	<b>306,090</b>

In 2023, the month with the highest demand for electricity was July, with 29,954 GWh

Source: Terna

(1) Electricity Demand = Net Total Production for Consumption + Foreign Balance  
 (2) Pumping production is calculated assuming theoretical efficiency during the pumping phase  
 (3) RES Production = Renewable Hydro + Biomass + Geothermal + Wind + Photovoltaic

## Demand by Operational Area

In April 2024, demand decreased in the Northern zone (TO-MI-VE), and in the Southern zone (NA), while it increased in the Centre (RM-FI) and on the Islands (PA-CA) compared to the same period of the previous year.

### Demand by Operational Area

[GWh]	Turin	Milan	Venice	Florence	Rome	Naples	Palermo	Cagliari
April 2024	2,340	4,672	3,639	3,849	3,448	3,368	1,519	657
April 2023	2,294	4,896	3,568	3,612	3,352	3,397	1,460	653
% April 24/23	2.0%	-4.6%	2.0%	6.6%	2.9%	-0.9%	4.0%	0.6%
Cumulated 2024	10,245	20,741	15,947	16,506	14,406	14,439	6,150	2,770
Cumulated 2023	10,273	21,064	15,583	15,963	14,160	14,476	6,060	2,787
% Cumulated 24/23	-0.3%	-1.5%	2.3%	3.4%	1.7%	-0.3%	1.5%	-0.6%

In 2024, the Y-o-Y percentage change in demand is 2.6% in the Centre, 0.8% in the Islands, -0.3% in the South and essentially unchanged in the North

Source: Terna

### Demand by Operational Area – Map Chart

[GWh]

The regions are combined in clusters on the basis of production and consumption:

- TURIN: Piedmont - Liguria - Valle d'Aosta
- MILAN: Lombardy (\*)
- VENICE: Friuli Venezia Giulia - Greater Venice - Trentino Alto Adige
- FLORENCE: Emilia Romagna (\*) - Tuscany
- ROME: Lazio - Umbria - Abruzzo - Molise - April
- NAPLES: Campania - Apulia - Basilicata - Calabria
- PALERMO: Sicily
- CAGLIARI: Sardinia



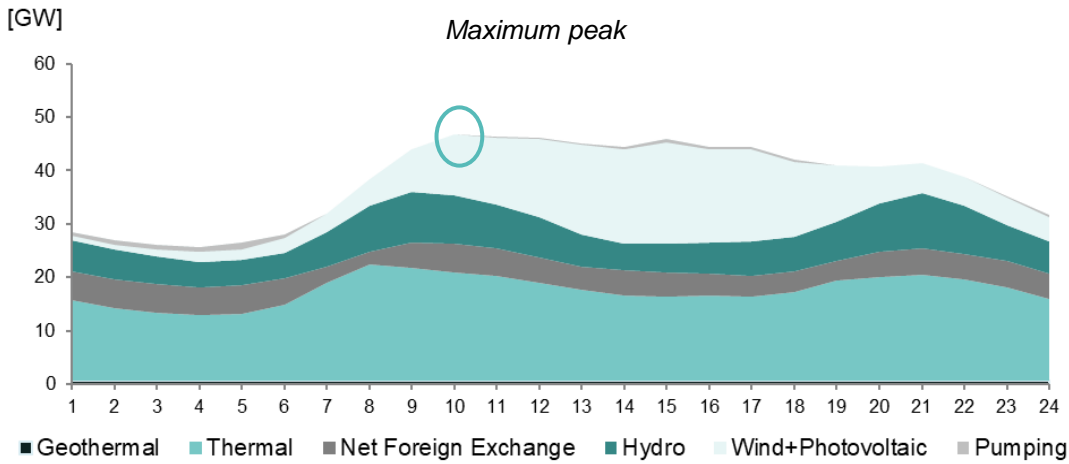
Source: Terna

(\*) In these two regions, the geographical borders do not correspond to the electrical borders. Lombardy includes production plants that are part of the geographical administrative territory of Emilia Romagna.

### Peak Demand

In April 2024, Peak Demand was recorded on **Tuesday 23 April, 09:00-10:00** and was 46,779 MW (-2.7% Y-o-Y). The hourly demand diagram of the peak day is presented below.

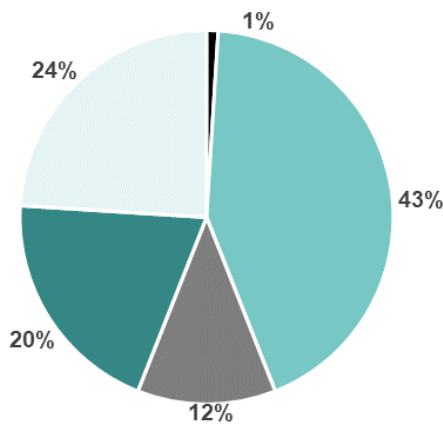
#### Peak Demand



At peak, the contribution from thermal production was 20,302 MW, down (-6.8%) compared to the contribution at the April 2023 peak (21,781 MW)

Source: Terna

#### Coverage of demand – 23 April 2024 09:00-10:00



At its peak, production from wind and photovoltaic sources contributed to covering 24% of demand, with thermal production covering 43% and foreign exchange covering 12%.

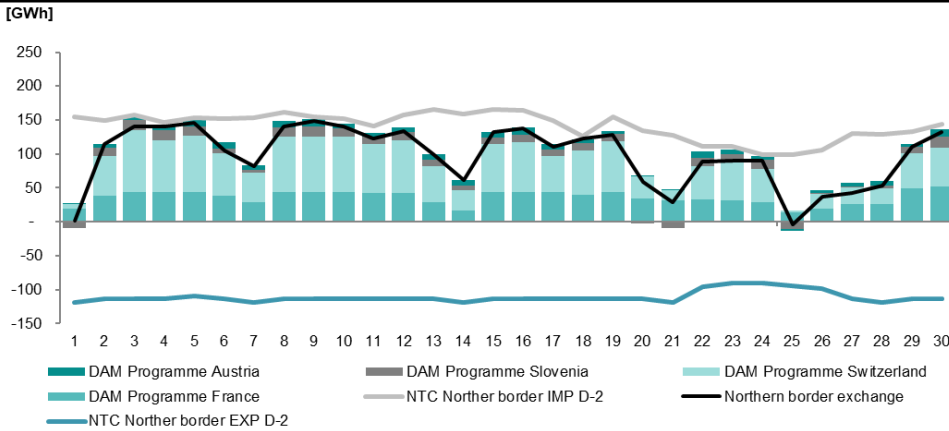
■ Geothermal ■ Thermal ■ Net Foreign Exchange ■ Hydro+Pumping ■ Wind+Photovoltaic

Source: Terna

## Net Foreign Exchange – April 2024

In April, there was good saturation of the planned figure for imported NTC compared to the exchange programmes on the Northern border.

### Net Foreign Exchange on the Northern border



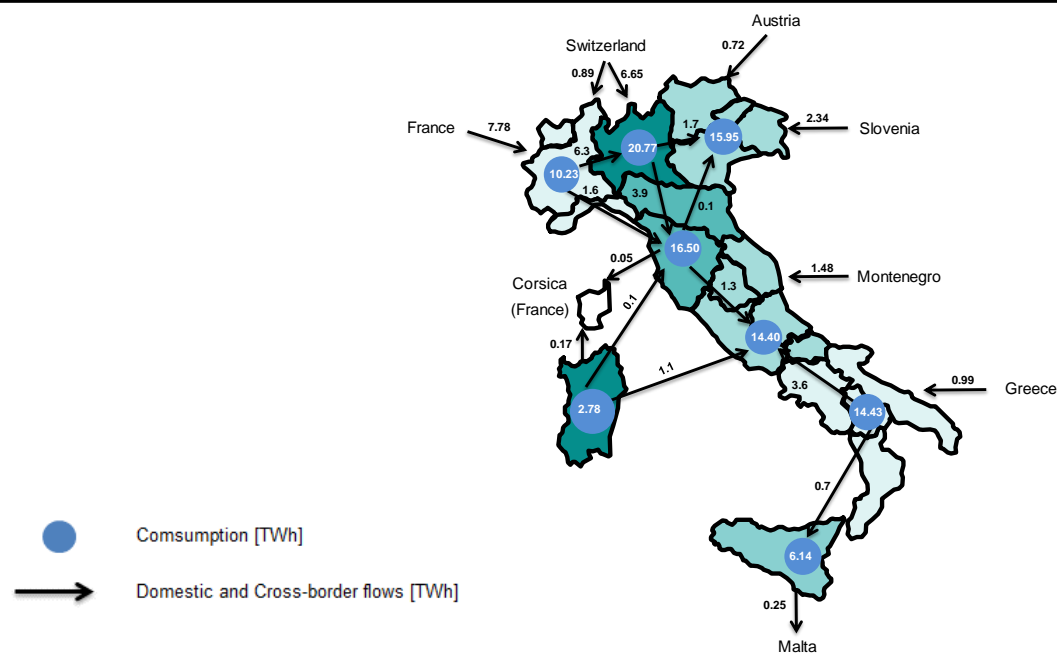
In April 2024, imports decreased Y-o-Y (-24.0%) amounting to 3,805 GWh, and exports rose sharply Y-o-Y (+114.7%), amounting to 365 GWh

Source: Terna

## Balance of Physical Exchanges – Annual Cumulative Figure

The balance of physical electricity exchanges mainly shows the energy flows among the various areas identified in the Italian electricity system.

### Balance of physical electricity exchanges: map



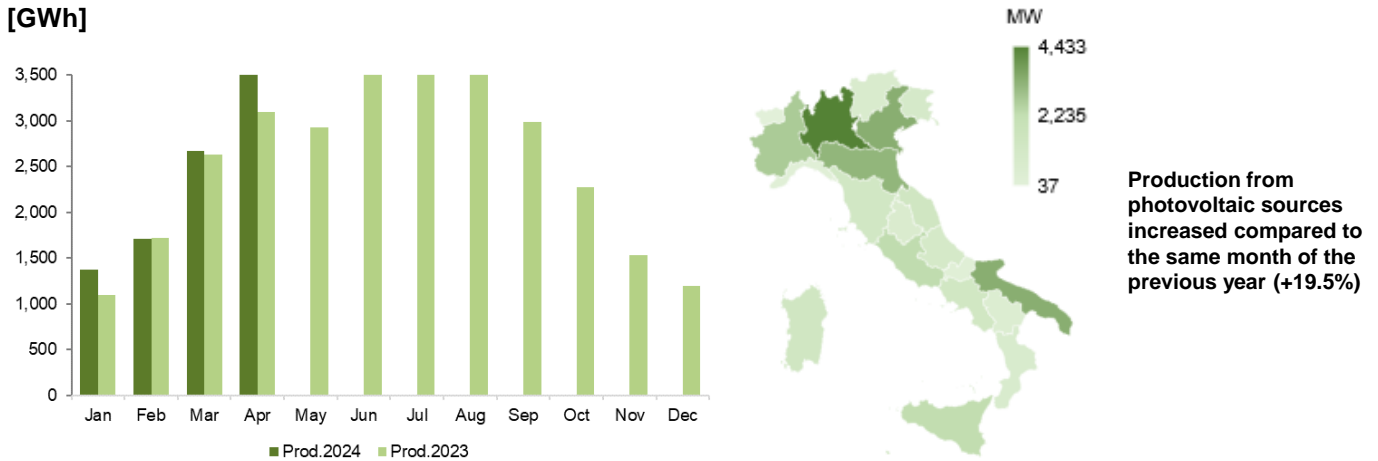
In 2024, a net exchange was recorded from the Northern zone to Emilia Romagna and Tuscany of 5.3 TWh. The mainland recorded a net exchange towards Sicily of 0.7 TWh.

Source: Terna

### Production and Installed Capacity

Energy produced from photovoltaic sources in April 2024 reached 3,703 GWh, an increase compared to the same month of the previous year (+605 GWh).

Photovoltaic production (left) and distribution of operating capacity<sup>1</sup> (right)

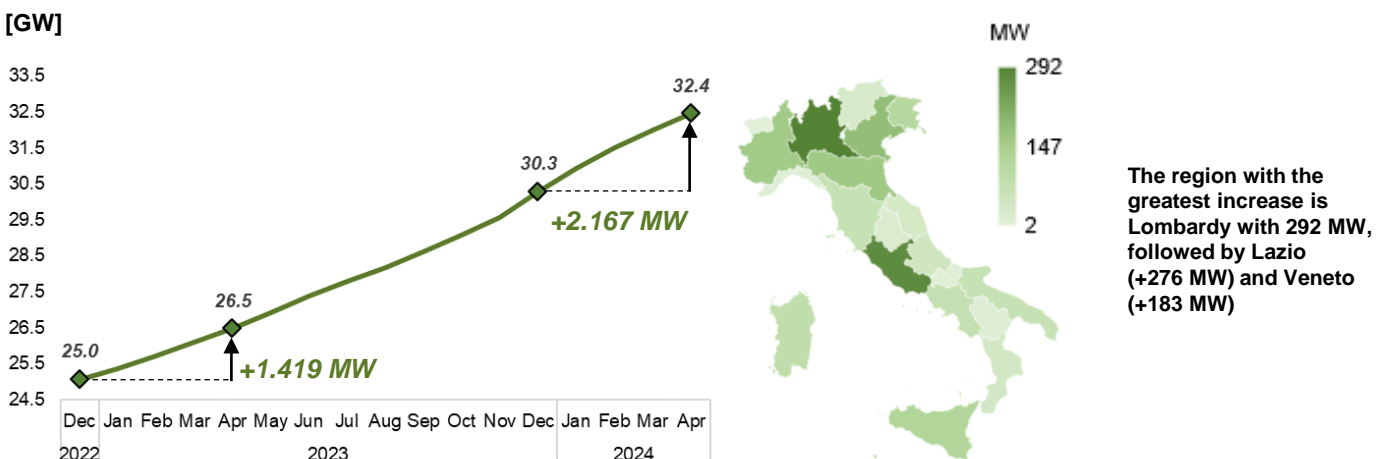


1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

In the first four months of 2024, operating capacity increased by 2,167 MW. During the same period of 2023 the increase was 1,419 MW, recording an increase of 748 MW (+53%).

Cumulative operating capacity (left) and distribution of new activations 2024 (right)



Source: Terna

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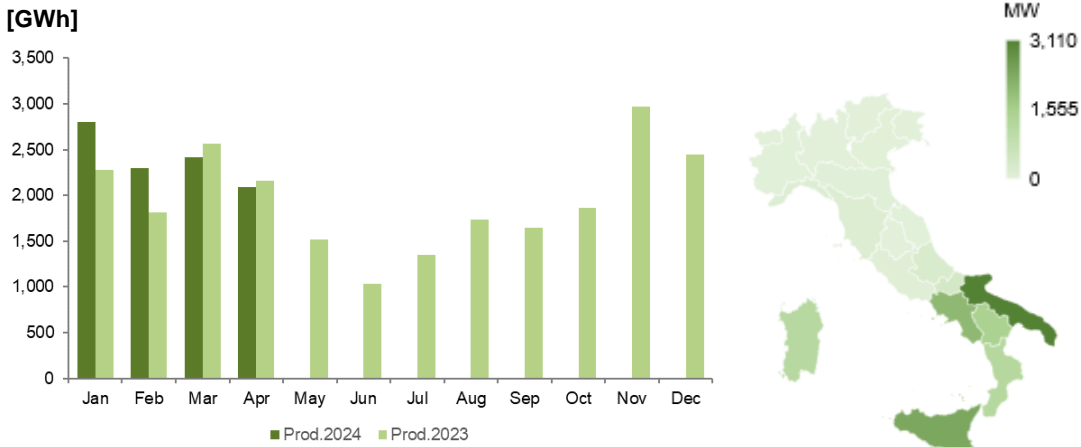
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Energy produced from wind production sources in April 2024 reached 2,091 GWh, a decrease compared to the same month of the previous year (-73 GWh).

## Wind production (left) and distribution of operating capacity<sup>1</sup> (right)



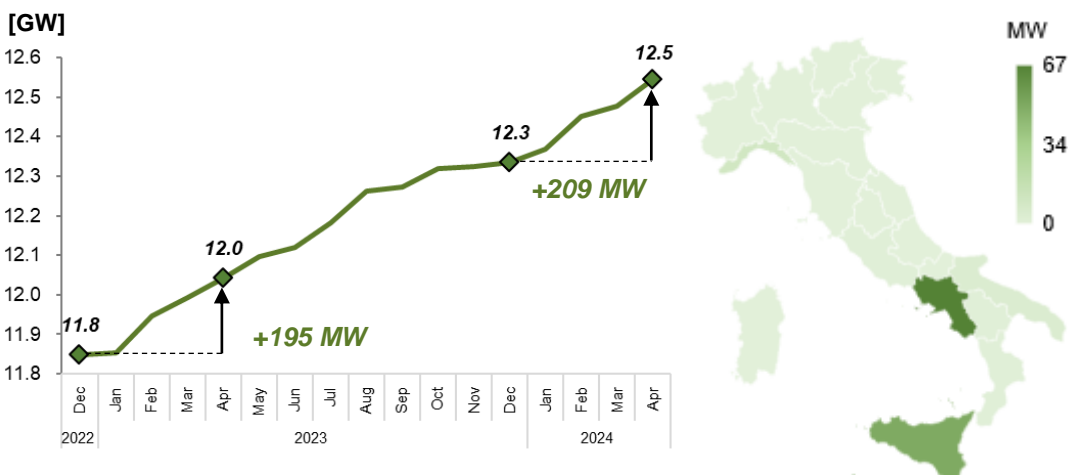
Production from wind sources decreased compared to the same month of the previous year (-3.4%)

1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

In the first four months of 2024, operating capacity increased by 209 MW. During the same period of 2023, the increase was 195 MW, which is an increase of 14 MW (+7%).

## Cumulative operating capacity (left) and distribution of new activations 2024 (right)



The region with the greatest increase is Campania with 67 MW, followed by Sicily (+50 MW) and Liguria (+10 MW)

Source: Terna

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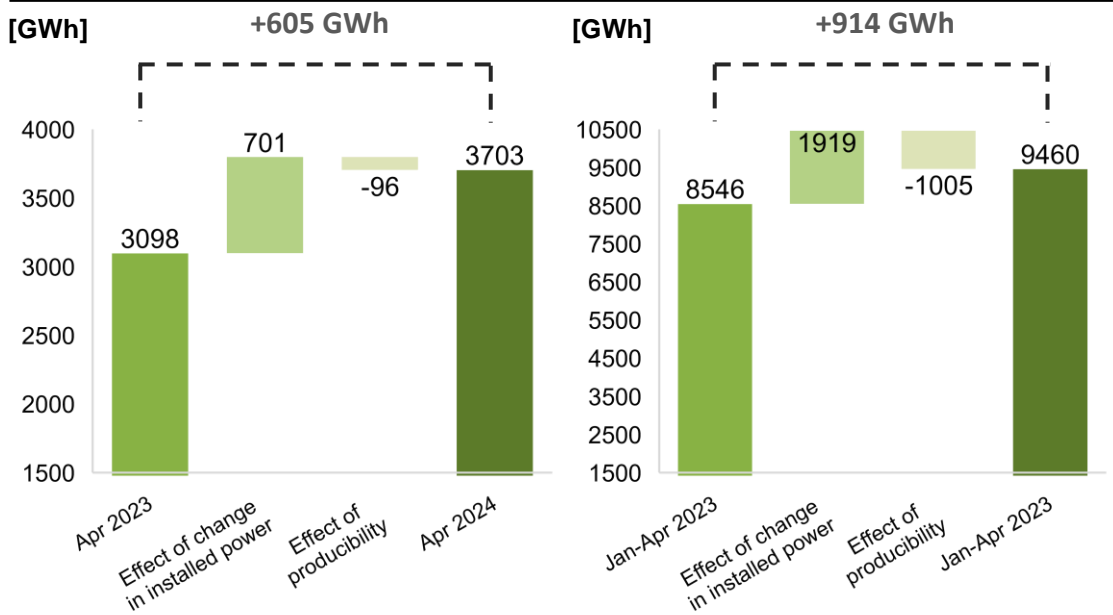
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In the month of April, the increase in photovoltaic production (+605 GWh) was due exclusively to the effect of increased operating capacity (+701 GWh).

In 2024, increased production (+914 GWh) is the result of the positive contribution of greater installed power (+1919 GWh) and the negative contribution of producibility (-1005 GWh).

## Breakdown of effects of photovoltaic production - monthly (left) and annual cumulative (right)



In the month of April, photovoltaic production increased by 19.5% compared to April 2023.

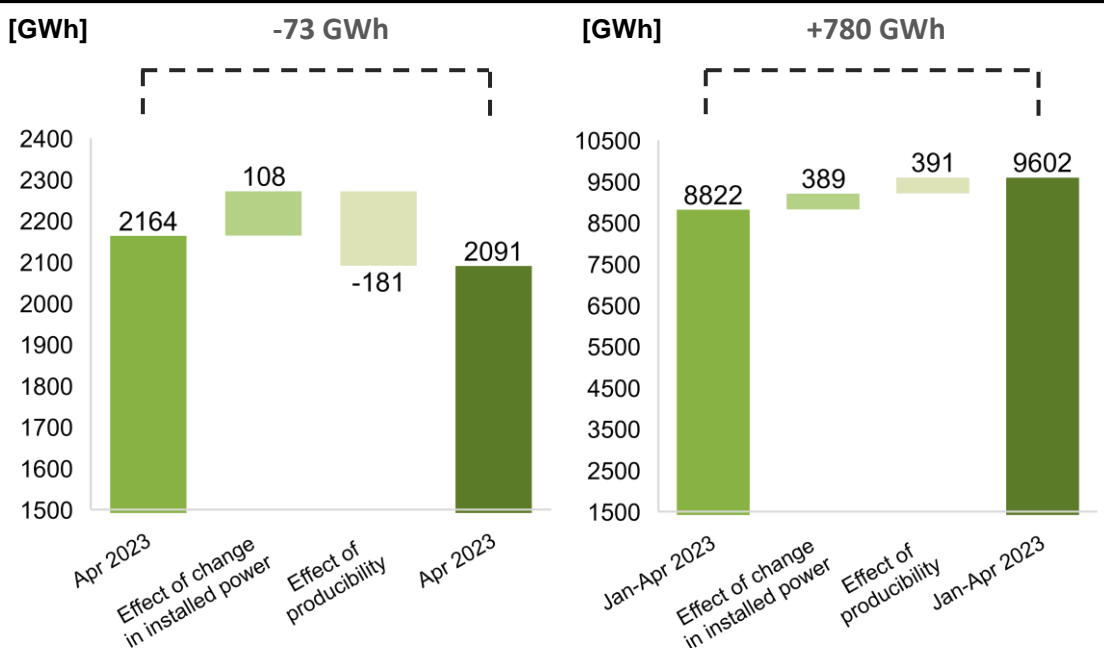
In 2024, production increased 10.7% compared to the same period of 2023.

Source: Terna calculation

In April 2024, there was a drop in production (-73 GWh). The positive effect of the increase in operating wind capacity (+108 GWh) did not offset the negative effect of producibility (-181 GWh) due to less wind.

In 2024, increased production (+780 GWh) is the result of the positive contribution of greater installed power (+389 GWh) and producibility (+391 GWh).

## Breakdown of effects of wind production - monthly (left) and annual cumulative (right)



In the month of April, wind production decreased by -3.4% compared to April 2023.

In 2024, production increased 8.8% compared to the same period of the previous year.

Source: Terna calculation

Note: for calculation of breakdown of the effect of power and producibility see legend.



# Monthly Report on the Electricity System

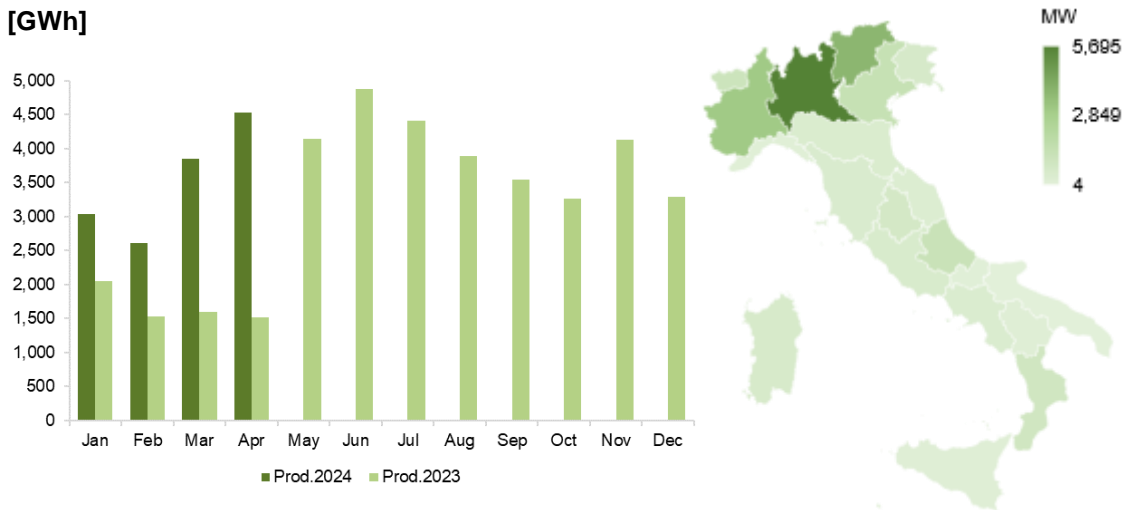
April 2024

Electricity System



Energy produced from renewable hydroelectric production sources in April 2024 reached 4,534 GWh, a net increase compared to the same month of the previous year (+3,010 GWh).

## Renewable hydroelectric production (left) and distribution of operating capacity<sup>1</sup> (right)



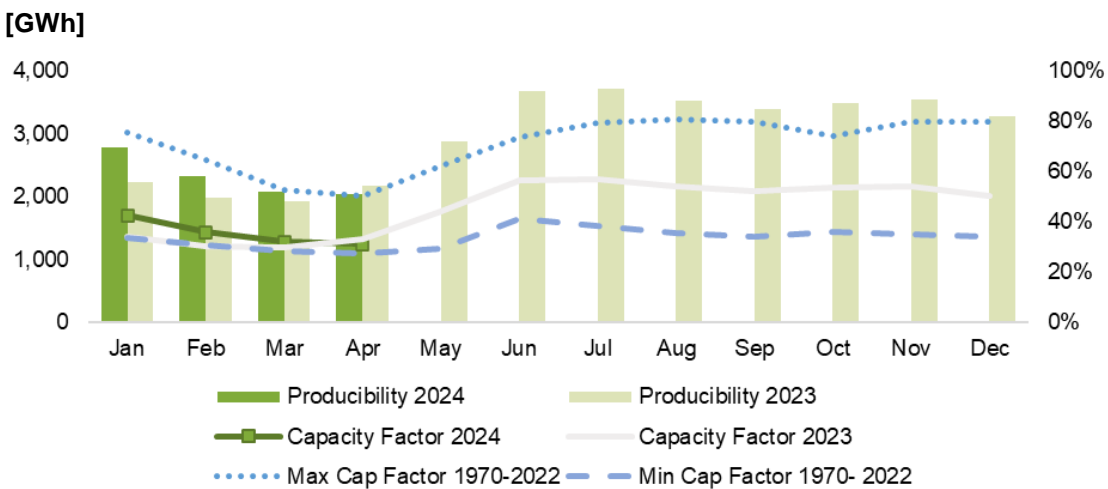
Production from renewable hydroelectric production sources increased sharply compared to the same month of the previous year (+197.5%)

1. The operating capacity takes into account new activations, upgrades and decommissioning of plants.

Source: Terna

In April, hydroelectric producibility decreased (-6.4%) compared to the same month of the previous year.

## Hydroelectric Producibility and Reservoir Percentage



In April 2024, considering Italy as a whole, the ratio between the reservoir and the maximum reservoir capacity was 31.2%, a drop compared to the same month in 2023 (33.3%).

	Reservoir Capacity	NORTH	CENTRE	SOUTH	ISLANDS	TOTAL
Apr 23 - Apr 24	[GWh]	916	955	164		2.035
	% (capacity/max capacity)	21.2%	52.7%	42.9%		31.2%
	[GWh]	908	1.057	209		2.174
	% (capacity/max capacity)	21.0%	58.3%	54.9%		33.3%

Source: Terna

# Monthly Report on the Electricity System

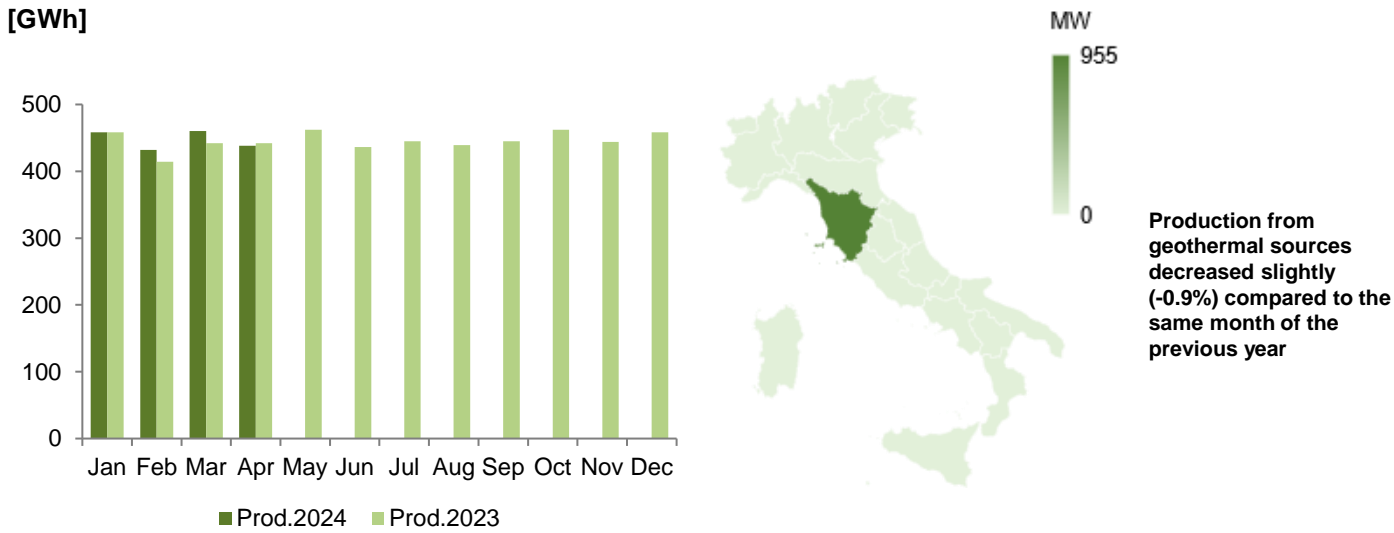
April 2024

Electricity System



Energy produced from geothermal production sources in April 2024 reached 438 GWh, a slight decrease compared to the same month of the previous year (-4 GWh).

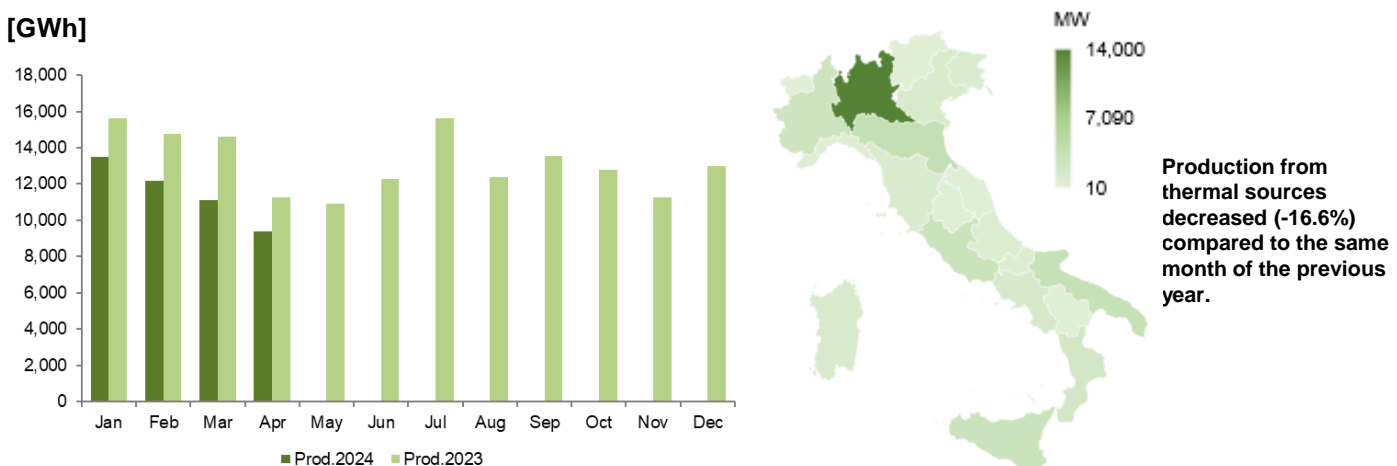
Geothermal production (left) and distribution of operating capacity<sup>1</sup> (right)



Source: Terna

Energy produced from thermal production sources in April 2024 reached 9,378 GWh, down compared to the same month of the previous year (-1,862 GWh).

Thermal production (left) and distribution of operating capacity<sup>1</sup> (right)



Source: Terna

# Monthly Report on the Electricity System

April 2024

Electricity System



In 2024 the operating capacity of renewables increased by 2,356 MW. This value is 736 MW higher (+45%) compared to the same period of the previous year.

## Variation in monthly operating capacity and number of plants per Source in Italy 2024<sup>1</sup>

[MW]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	656	562	503	446									2.167
Wind	32	85	25	67									209
Hydroelectric	-1	-1	3	1									2
Geothermal & Biomass	0	-3	-17	-1									-21
<b>Total</b>	<b>687</b>	<b>643</b>	<b>514</b>	<b>513</b>									<b>2.356</b>

Number of Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	31.380	32.737	29.257	25.241									118.615
Wind	12	8	5	4									29
Hydroelectric	6	2	6	0									14
Geothermal & Biomass	-1	5	3	4									11
<b>Total</b>	<b>31.397</b>	<b>32.752</b>	<b>29.271</b>	<b>25.249</b>									<b>118.669</b>

Source: Terna

The evolution of operational capacity by source in 2023 is shown below.

## Variation in monthly operating capacity and number of plants per Source in Italy 2023<sup>1</sup>

[MW]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	296	376	386	360	435	468	406	396	424	470	492	724	5.234
Wind	4	93	48	50	53	25	63	80	11	45	6	11	487
Hydroelectric	1	2	7	1	2	3	-6	-1	6	7	6	4	33
Geothermal & Biomass	-4	0	1	-2	9	1	-5	39	0	1	0	0	42
<b>Total</b>	<b>297</b>	<b>471</b>	<b>442</b>	<b>409</b>	<b>499</b>	<b>498</b>	<b>458</b>	<b>514</b>	<b>441</b>	<b>523</b>	<b>503</b>	<b>740</b>	<b>5.795</b>

Number of Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	29.651	35.807	37.586	30.690	35.485	33.722	29.478	25.845	27.249	30.145	26.723	31.548	373.929
Wind	0	17	7	3	3	3	5	9	5	18	6	6	82
Hydroelectric	6	3	9	3	12	6	3	2	8	6	4	8	69
Geothermal & Biomass	2	7	3	6	9	6	0	8	7	5	1	2	56
<b>Total</b>	<b>29.659</b>	<b>35.834</b>	<b>37.604</b>	<b>30.702</b>	<b>35.509</b>	<b>33.737</b>	<b>29.486</b>	<b>25.864</b>	<b>27.269</b>	<b>30.174</b>	<b>26.734</b>	<b>31.564</b>	<b>374.136</b>

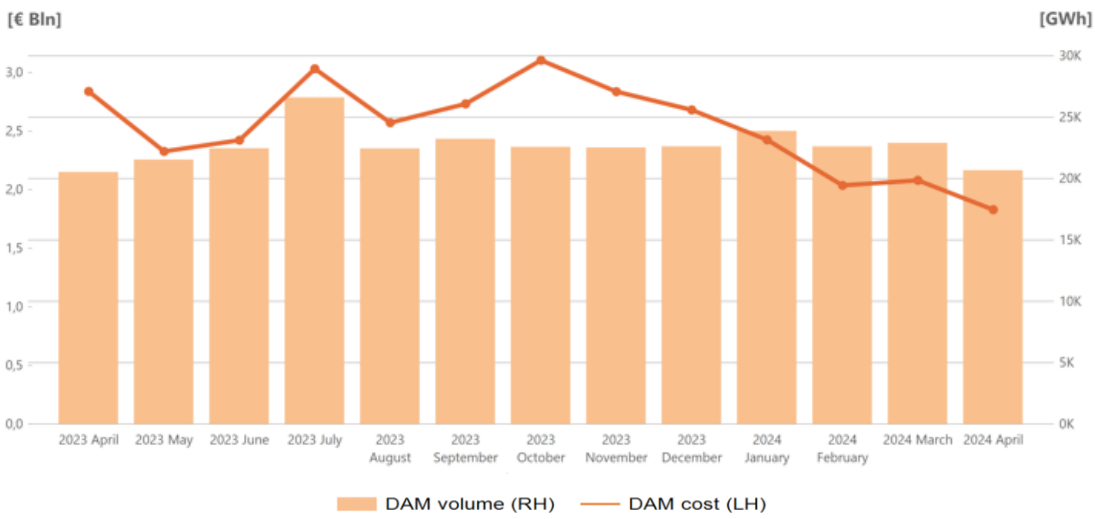
Source: Terna

1. The operating capacity and the number of plants take into account new activations, upgrades and decommissioning of plants

### Day-Ahead Market

The April total for withdrawal programmes on the DAM was approximately € 1.8 Bn, (-12% compared to the previous month and -36% compared to April 2023). The average PUN in March 2024 was approximately 88.9 €/MWh (-2% compared to the previous month and -36% compared to April 2023). There was also a change of -10% in demand compared to the previous month and of +1% compared to April 2023.

#### Day Ahead Market – amounts and volumes

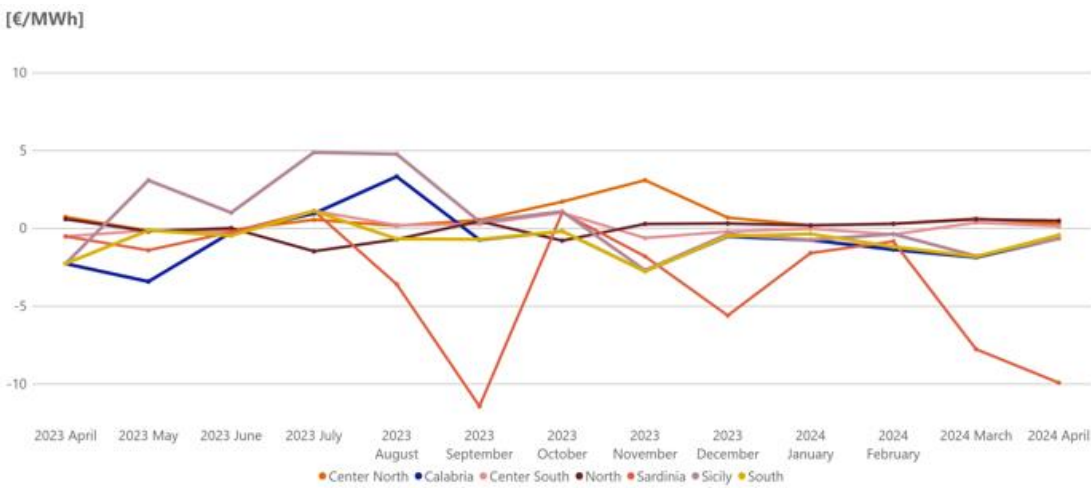


Total value in April 2024 - 36% compared to April 2023.

Source: Terna calculation on GME data

In the month of April, the zonal prices were essentially in line with the PUN, apart from Sardinia. Specifically, the Sardinia zone recorded a spread of -€9.9/MWh compared to the PUN.

#### Spread compared to the PUN



Average spread April 2024 -€1.5/MWh.

Source: Terna calculation on GME data

# Monthly Report on the Electricity System

April 2024

Electricity Market



The spread between the peak and off-peak prices in April 2024 was, on average, -€15/MWh. The highest spread was recorded in the North zone, where it was -€10/MWh.

## Day Ahead Market – PUN and zonal prices [€/MWh]

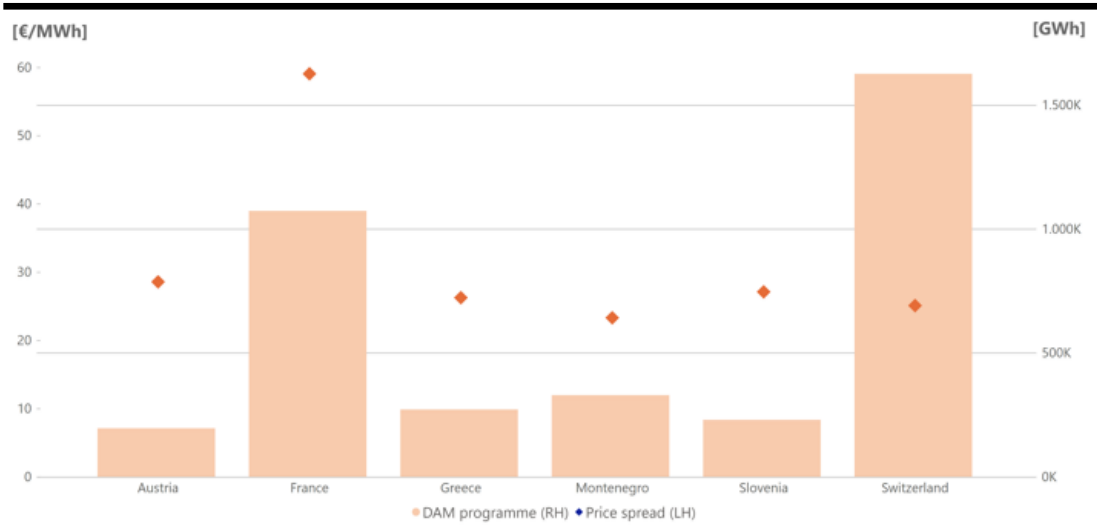
	PUN	Calabria	Centre-North	CSouth	North	Sardinia	Sicily	South
Average	86.8	86.1	87.1	86.9	87.3	76.9	86.1	86.4
Average Month Y-1	135.0	132.7	135.7	134.4	135.6	134.4	132.7	132.7
Δ vs PUN	-	-0.7	0.3	0.1	0.5	-9.9	-0.7	-0.4
Δ vs PUN Y-1	-	-2.3	0.7	-0.5	0.6	-0.5	-2.3	-2.3
Maximum	162.5	162.5	162.5	162.5	162.5	162.5	162.5	162.5
Minimum	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Peak	81.0	79.5	81.4	81.1	82.1	61.0	79.5	79.9
Off Peak	92.6	92.8	92.8	92.8	92.5	92.8	92.8	92.8
Δ Peak vs Off Peak	-11.6	-13.3	-11.4	-11.7	-10.4	-31.8	-13.3	-12.9

Peak-off peak spread down compared to the previous month and negative due to lowering of prices during hours in the middle of the day

Source: Terna calculation on GME data

The price spreads with France and Switzerland were €59.0/MWh and €25.1/MWh respectively (+0.6% and +0.5% compared to the previous month). Imports totalled 3.9 TWh, -29.8% compared to the previous month, with France and Switzerland accounting for 43% and 28% of the total respectively. Total exports were 0.2 TWh, with Slovenia accounting for 43% and Switzerland 20%.

## Price spread with foreign exchanges and day ahead programmes



Net imports on the northern border of 3.1 TWh.

Source: Terna calculation

### Ex-ante Ancillary Services Market

In April 2024, the spread between bid-up and bid-down prices was €94/MWh (+8% compared to the previous month and -13% compared to April 2023). Total volumes increased compared to the previous month (+2%). Specifically, upward volumes increased by 21% while downward volumes decreased by 16%. Upward volumes fell by 60%, while downward volumes fell by 73% compared to the same month of the previous year.

#### Ex-ante Ancillary Services - prices and volumes

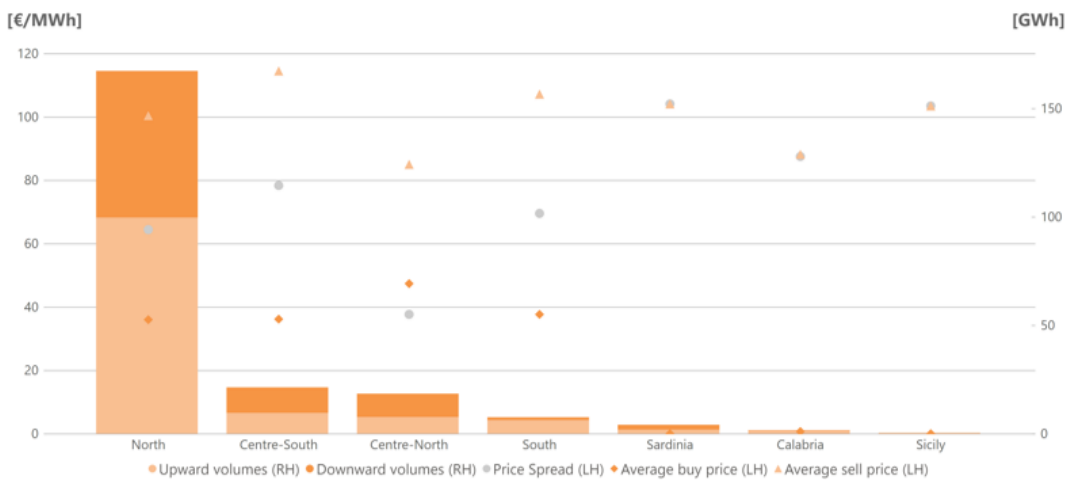


Average bid-up price in April 2024 of €147/MWh.  
Average bid-down price in April 2024 of €53/MWh.

Source: Terna

The market zone characterised by the highest spread (€152/MWh) is Sardinia. This spread recorded a difference of 3% compared to the previous month. The average bid-up price went from €149/MWh in March to €147/MWh in April; the average bid-down price went from €62/MWh in March to €53/MWh in April.

#### Ex-ante Ancillary Services - prices and volumes by market zone



Sardinia: zone with the highest price spread

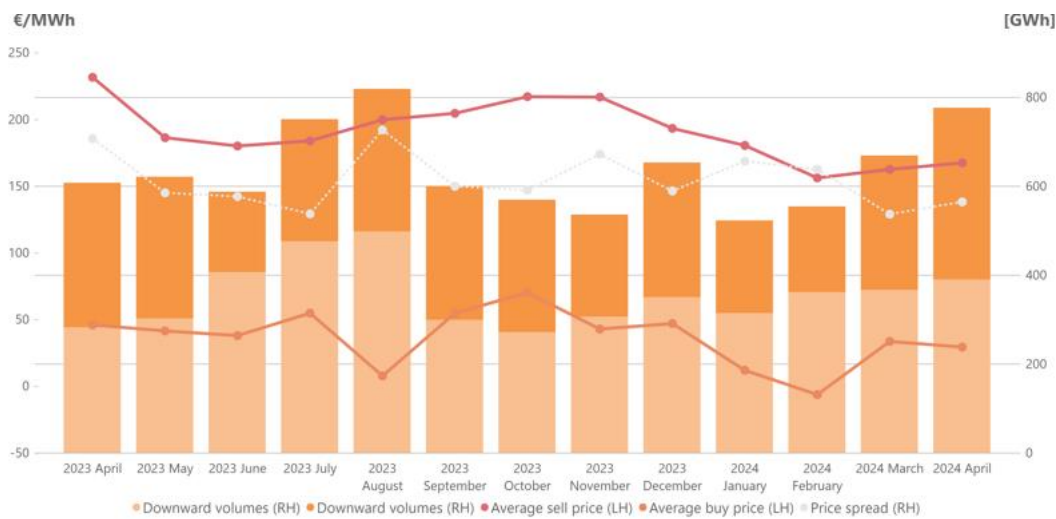
North: zone with the largest volumes moved

Source: Terna

### Balancing Market

In April 2024, the spread between bid-up and bid-down prices was €138/MWh (+7% compared to the previous month and -26% compared to April 2023). Total volumes increased compared to the previous month (+16%). Specifically, upward volumes increased by 6% while downward volumes increased by 28%. Upward volumes increased by 38%, while downward volumes increased by 19% compared to the same month of the previous year.

#### Balancing market – prices and volumes

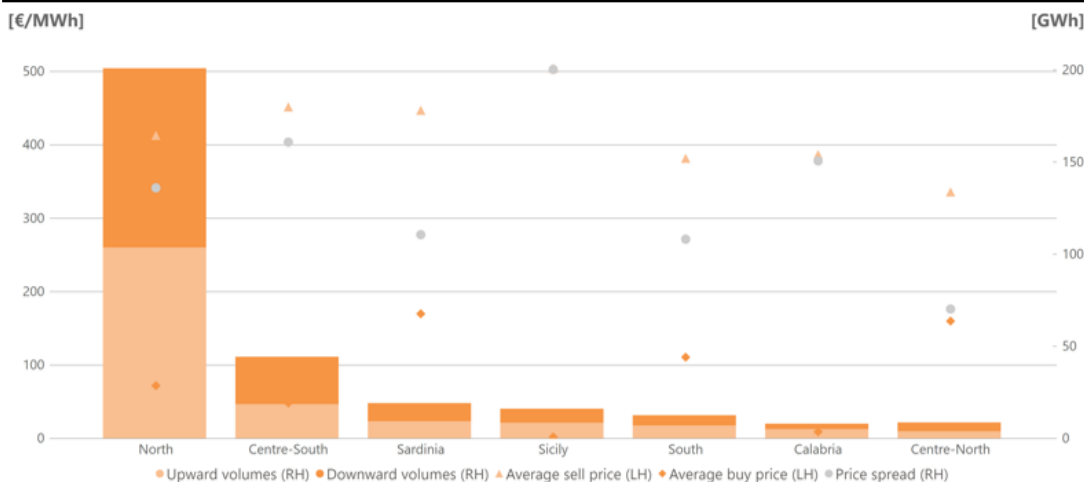


Average bid-up price in April 2024 of €167/MWh  
Average bid-down price in April 2024 of €29/MWh.

Source: Terna

The market zone characterised by the highest spread (€200/MWh) is Sicily. This spread recorded a difference of 9% compared to the previous month. The average bid-up price went from €162/MWh in March to €167/MWh in April; the average bid-down price went from €34/MWh in March to €29/MWh in April.

#### Balancing market – prices and volumes by market zone



Sicily: zone with the highest price spread

North: zone with the largest volumes moved

Source: Terna

## Commodities – Spot Market

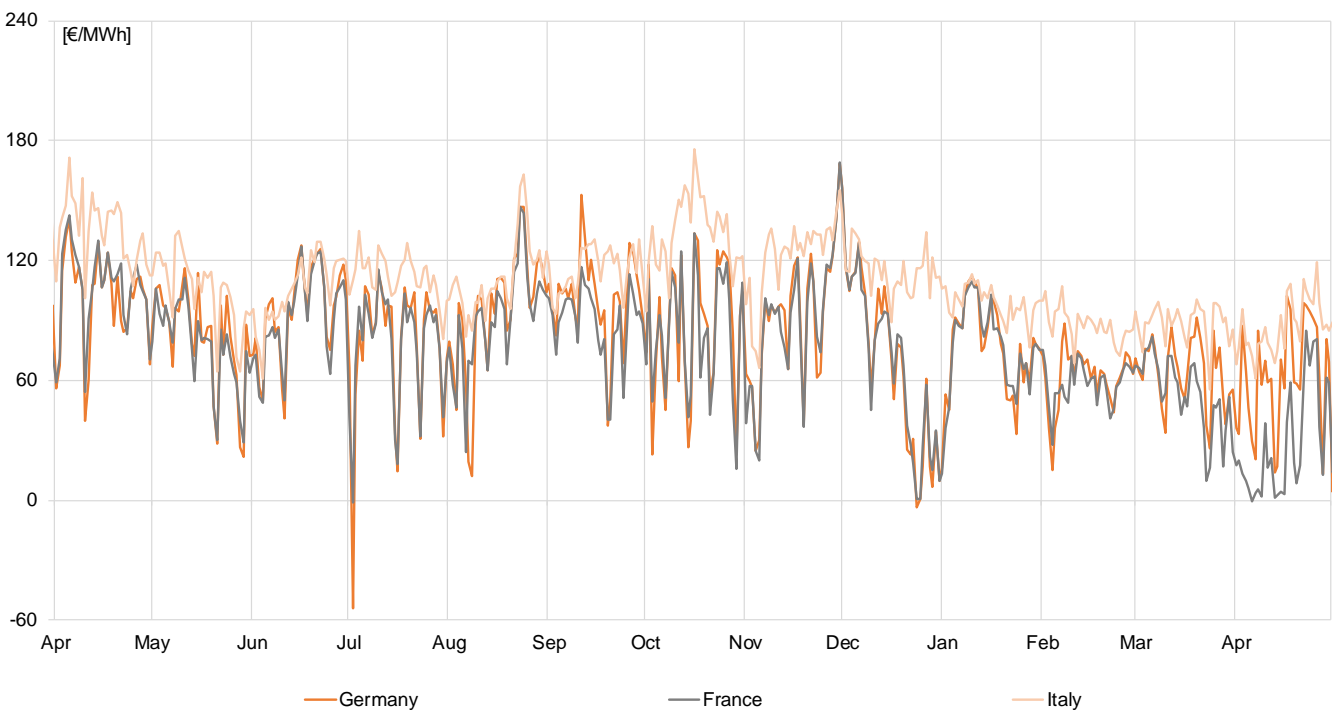
In April, Brent prices recorded an average value of \$90.2/bbl, up compared to March (+5.5%).

The prices of coal (API2) were up compared to March, settling at around \$118.5/t (+6.3%).

European gas prices (TTF) in April fell compared to March, with a monthly average of €29.0/MWh (+8.6% compared to the previous month); the PSV recorded an increase, settling at €30.9/MWh (+6.4%).

Electricity prices in Italy fell in April compared to the previous month, with a monthly average of €86.8/MWh (-2.3%). The French power exchange was down, with the price of electricity at €28.2/MWh (-47.3%), as did the German exchange, priced at €62.4/MWh (-3.6%).

### Spot electricity prices



Source: Terna calculation on GME and EPEX data



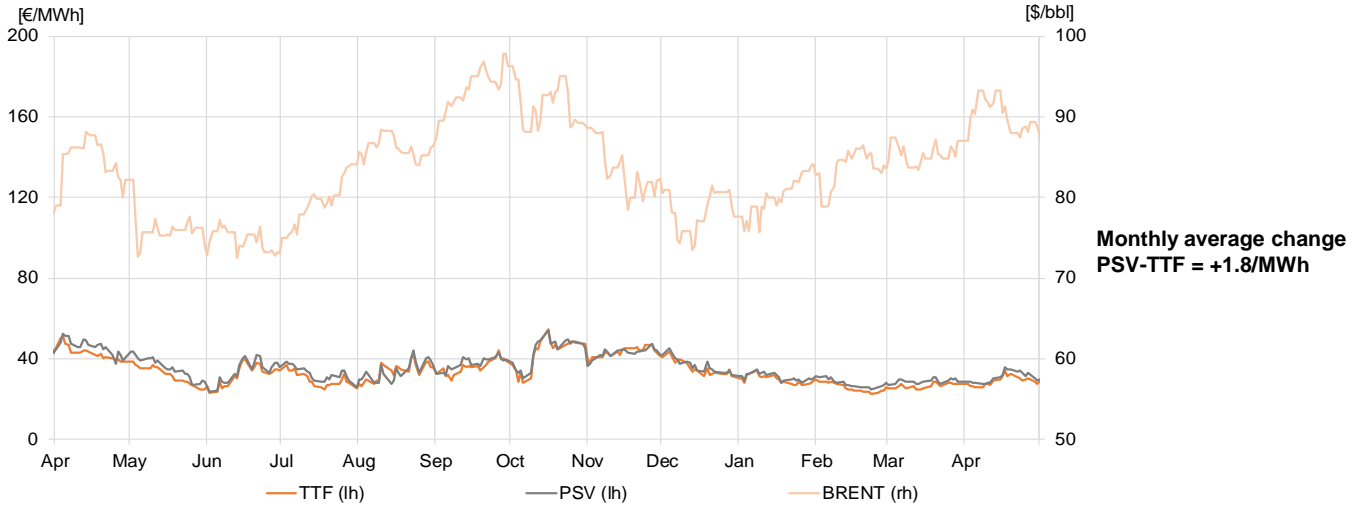
# Monthly Report on the Electricity System

April 2024

Electricity Market



## Gas & Oil spot prices



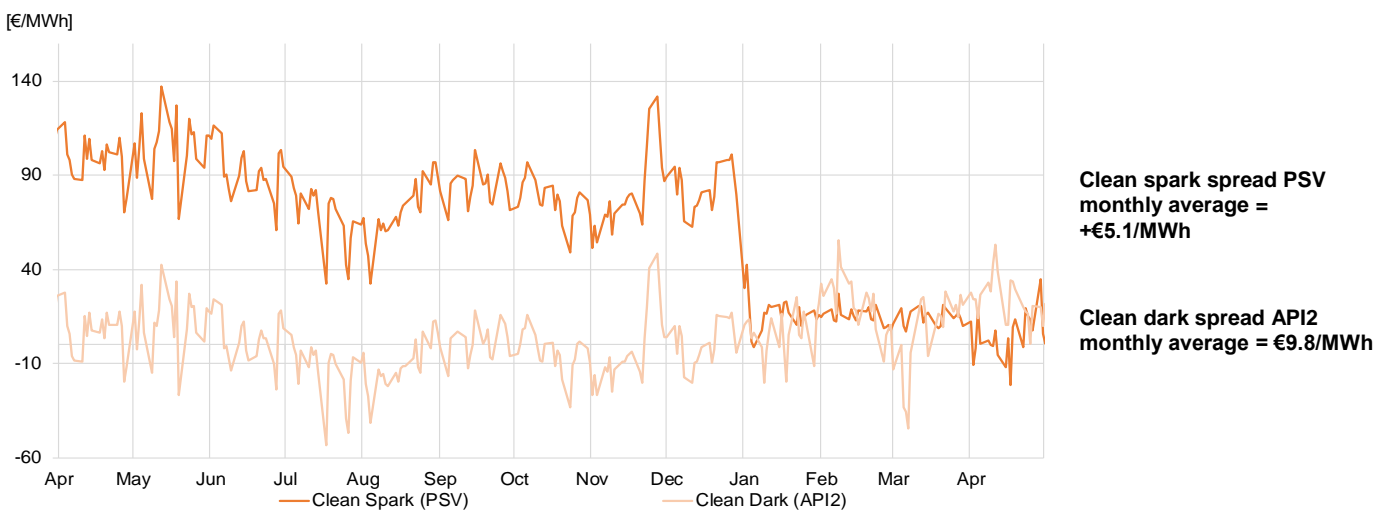
Source: Terna calculation on Bloomberg data

## Coal & Carbon spot prices



Source: Terna calculation on Bloomberg data

## Clean Dark & Spark spreads Italy



Source: Terna calculation on Bloomberg data

## Commodities – Forward Market

In April, Brent forward prices recorded an average value of \$78.3/bbl, up compared to March (+3.7%).

The average forward prices of coal (API2) were up compared to March, settling at around \$119.5/t (+7.6%).

Forward prices of gas in Europe (TTF) were up compared to the previous month (+9.5%), settling at around €33.3/MWh. Forward prices in Italy (PSV) were also up, which showed an average figure of €34.7/MWh (+10.8%).

The average forward prices of electricity in Italy stood at around €94.3/MWh, up compared to the previous month (+0.6%). The French power exchange was down, where the price stood at around €79.6/MWh (+4.8%), as was the German power exchange, where the price was €86.9/MWh (+12.1%).

### Forward Electricity Prices – Year+1



Source: Terna calculation on Bloomberg data

# Monthly Report on the Electricity System

April 2024

Electricity Market



## Year+1 Forward Gas & Oil Prices



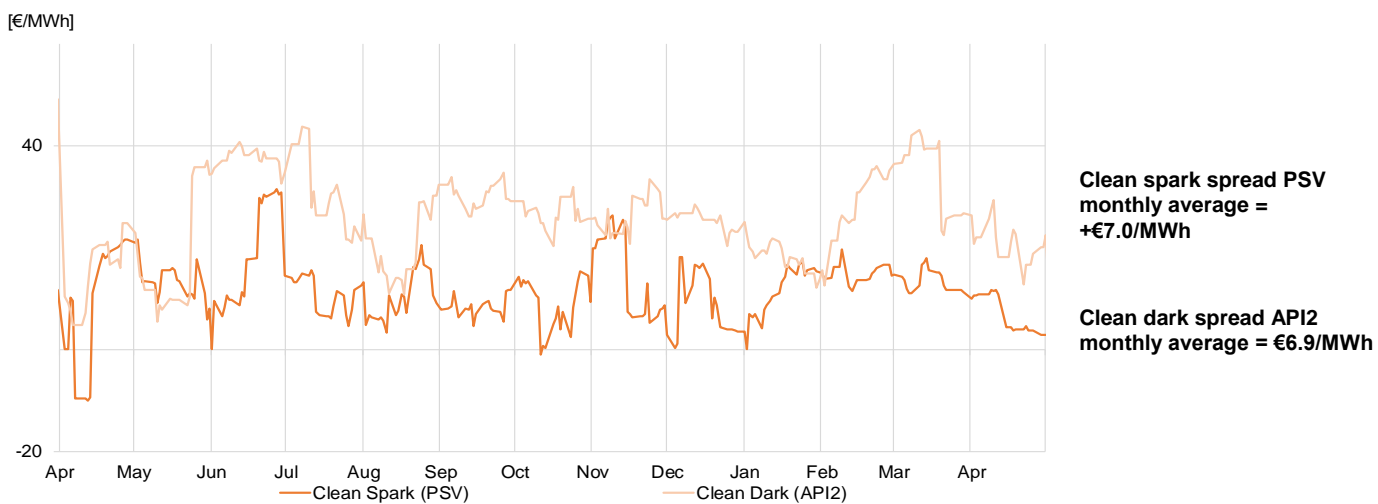
Source: Terna calculation on Bloomberg data

## Year+1 Forward Coal & Carbon Prices



Source: Terna calculation on Bloomberg data

## Clean Year+1 Forward Dark & Spark spreads Italy



Source: Terna calculation on Bloomberg data

### Key

**API2 – CIF ARA:** the reference index for the coal price (with PCI of 6,000 kcal/kg) imported from north-west Europe. It is determined on the basis of an assessment on the CIF (Cost, Insurance and Freight) prices of coal contracts, with delivery to the ports of Amsterdam – Rotterdam – Antwerp (ARA).

**API4 – FOB Richard Bay:** the reference index for the coal price (with PCI of 6,000 kcal/kg) exported from Richards Bay in South Africa. It is calculated on the basis of an assessment on the FOB (Free On Board) prices of contracts excluding transport starting from the port of Richards Bay.

**Territorial Areas:** these consist of one or more adjacent regions and are aggregated as indicated:

*TURIN: Piedmont - Liguria - Valle d'Aosta;*

*MILAN: Lombardy (\*);*

*VENICE: Friuli Venezia Giulia - Veneto - Trentino Alto Adige;*

*FLORENCE: Emilia Romagna (\*) - Tuscany;*

*ROME: Lazio - Umbria - Abruzzo - Molise - Marche;*

*NAPLES: Campania - Apulia - Basilicata - Calabria;*

*PALERMO: Sicily;*

*CAGLIARI: Sardinia;*

(\*) In these two regions, the geographical borders do not correspond to the electrical borders. Lombardy includes production plants that are part of the geographical administrative territory of Emilia Romagna.

The data related to the reservoirs table of tanks are **aggregated by ZONE** as indicated:

*NORTH - includes the Territorial Areas TURIN, MILAN and VENICE;*

*CENTRE and SOUTH – includes the Territorial Areas FLORENCE, ROME and NAPLES;*

*ISLANDS – includes the Territorial Areas PALERMO and CAGLIARI;*

**Brent:** the oil price as global reference for the crude oil market. Brent Crude is the result of a mixture deriving from the union of different types of oil extracted from the North Sea.

**Clean Dark Spread:** the difference between the price of electricity and the cost of the fuel of a coal power station and the cost of the CO<sub>2</sub> emission quotas.

**Clean Spark Spread:** the difference between the price of electricity and the cost of the fuel of a gas power station and the cost of the CO<sub>2</sub> emission quotas.

**Dirty Dark Spread:** the difference between the price of electricity and the cost of the fuel of a coal power station.

**Dirty Spark Spread:** the difference between the price of electricity and the cost of the fuel of a gas power station.

**Day-Ahead Market (DAM):** the trading venue of offers to buy and sell electricity for each relevant period of the day after that of trading.

**Balancing Market (MB):** the set of activities performed by the Operator for selecting the offers presented on the Dispatching Services Market to resolve the congestions and establish secondary and tertiary reserve power margins, carried out on the same day as that to which the offers refer.

**Dispatching Services Market (MSD):** the trading venue of the resources for the dispatching service.

**Dispatching Services Market - planning stage (Ex-ante Ancillary Services Market):** the set of activities performed by the Operator for selecting the offers presented on the Dispatching Services Market to resolve the congestions and establish secondary and tertiary reserve power margins, carried out in advance with respect to real time.

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**M-o-M - Month on Month:** percentage change of the difference between the reference month and the previous month.

**NET TRANSFER CAPACITY - NTC:** the maximum transfer capacity of the grid for interconnection with other countries. NTC D-2 indicates the same capacity defined in day D-2.

**Peak hours:** these, according to the agreement with the electricity market operator (Gestore del Mercato Elettrico - GME), are the hours between 8:00 and 20:00 of working days only. **Off-peak hours** are all hours that are outside of peak hours.

**CO<sub>2</sub> Price:** determined by the European Union Emissions Trading Scheme (EU ETS), a system for the trading of greenhouse gas emission quotas in Europe aimed at reducing emissions.

**Single National Price - PUN:** the Single National Price calculated as a result of the Day-Ahead Market (DAM).

**DAM Zonal Price:** the balanced price of each zone calculated as a result of the Day-Ahead Market (DAM).

**PSV - Punto Scambio Virtuale:** the price at the virtual exchange point for the buying and selling of natural gas in Italy.

**TTF - Title Transfer Facility:** the price at the virtual exchange point for the buying and selling of natural gas in the Netherlands.

**Y-o-Y – Year on Year:** percentage change of the difference between the period of the current year and the same period of the previous year

**IMCEI - Monthly Industrial Electrical Consumption Index:** the monthly IMCEI was constructed based on the size of the monthly withdrawals of the approximately 1,000 customers directly connected to the high voltage grid and for which Terna is responsible. These customers have been reclassified pursuant to the Ateco2007 Codes and aggregated by electrically relevant product class. The adimensional index has been created taking 2015 as a basis 100.

**IMSER - Monthly index of electricity consumption for the services sector.** The IMSER (Monthly Services Index) is produced according to the supply of electricity consumption in the Services sector for five Distributors - E-Distribuzione, UNARETI, A-Reti, Edyna and Deval. These consumption data are given according to the Ateco2007 codes and are aggregated by commodity class. The index has a fixed basis (2019=100) and represents around 80% of the electricity consumption in the Services sector with a time lag of two months.

**Effect of change in installed power and effect of producibility on solar and wind production:** The change in photovoltaic or wind production in a given period can be attributed to two factors: a change in capacity ("Effect of change in installed power") and a change in producibility hours ("Effect of producibility") linked to solar irradiation or amount of wind. To determine these two components of production in a given period of the year Y compared to the same period of the year Y-1, equivalent hours of use are considered (HU). The HU figure is calculated as the ratio between energy produced and installed capacity operational as resulting in the period Y-1. To calculate the effect of the change in installed power (in energy) the HU figure for the period Y-1 is multiplied by the change in capacity between the same periods of year Y and year Y-1. The producibility effect is calculated as the difference between the change in total energy and the effect of the change in installed power.

### Disclaimer

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1. The 2023 and 2024 monthly electricity balances are provisional.
2. More specifically, the monthly electricity reports for 2024 – prepared at the end of each month – are subject to further, more accurate verification or recalculation in the following months based on additional information. This operation to refine the monthly figures translates into a higher degree of precision compared to the sum of the data processed in the single Monthly Reports published on the website [www.terna.it](http://www.terna.it).