

# Monthly Report on the Electricity System August 2023



# Monthly Report on the Electricity System

August 2023

### 1

#### Energy Balance Sheets

page 5

In the month of August, electricity demand was 25,688 GWh, down compared to the same month the previous year (-1.1%) and compared to August 2021 (-3.6%). There was also an increase in foreign exchange (+19.0%) compared to the same month in 2022. In 2023, electricity demand (206,282 GWh) increased compared to the same period in 2022 (-4.5%) and compared to the cumulative figure for 2021 (-2.9%). The value of electricity demand was achieved with the same number of working days (22) and with an average monthly temperature approximately 0.6°C lower than August last year. When adjusted for seasonal and temperature effects, the figure represents a +0.7% variation.

The annual trend for August 2023 (compared to August 2022) was null (0.0%) with raw data. In August 2023, electricity demand was met 43.3% by production from Non-Renewable Energy Sources, 43.8% via Renewable Energy Sources and the remainder via foreign exchange. In 2023, electricity demand was 206,282 GWh, 46.7% of which was met via production from Non-Renewable Energy Sources, 36.9% from Renewable Energy Sources and the remainder from the foreign balance.

In August, production from Renewable Energy Sources increased (+27.2%) compared to the same month of the previous year. Specifically, there was an increase in renewable hydroelectric production (+49.8%), in wind production (+43.8%), and in photovoltaic production (+19.8%). In 2023 the operating capacity of renewables increased by 3,470 MW. This value is 1,733 MW higher (+100%) compared to the same period of the previous year.

The August total for withdrawal programmes on the DAM was approximately €2.6 Bn, down 15% compared to the previous month and up 80% compared to August 2022.

In August, the spread between average bid-up and bid-down prices on the DSM was €124/MWh, down by 2% compared to the previous month and by 60% compared to August 2022.

Total volumes were down compared to the previous month (-25%).

In August, the spread between bid-up and bid-down prices on the Balancing Market was €144/MWh, up by 19% compared to the previous month (€121/MWh) and down compared to August 2022 (€519/MWh; -72%). The total volumes increased slightly compared to the previous month (+3%).



### 2

#### Electricity System

page 13

### 3

#### Electricity Market

page 18

# Monthly Report on the Electricity System

August 2023

### Monthly Summary and Short-Term Analysis

In the month of August, electricity demand was 25,688 GWh, down compared to the same month the previous year (-1.1%) and compared to August 2021 (-3.6%). There was also an increase in foreign exchange (+19.0%) compared to the same month in 2022.

In 2023, electricity demand (206,282 GWh) increased compared to the same period in 2022 (-4.5%) and compared to the cumulative figure for 2021 (-2.9%).

#### Demand breakdown – coverage by sources

[GWh]	Aug 2023	Aug 2022	%23/22	Jan-Aug 23	Jan-Aug 22	%23/22
Renewable Hydro	3,908	2,609	49.8%	24,346	19,564	24.4%
Pumping Production <sup>(2)</sup>	160	156	2.6%	1,070	1,207	-11.4%
Thermal	12,602	15,857	-20.5%	107,968	129,523	-16.6%
of which Biomass	1,415	1,440	-1.7%	11,061	11,548	-4.2%
of which Hard Coal	662	1,547	-57.2%	9,736	13,313	-26.9%
Geothermal	439	456	-3.7%	3,540	3,645	-2.9%
Wind	1,742	1,211	43.8%	14,438	13,879	4.0%
Photovoltaic	3,746	3,127	19.8%	22,697	21,038	7.9%
<b>Net Total Production</b>	<b>22,597</b>	<b>23,416</b>	<b>-3.5%</b>	<b>174,059</b>	<b>188,856</b>	<b>-7.8%</b>
<b>Pumping</b>	<b>228</b>	<b>223</b>	<b>2.2%</b>	<b>1,528</b>	<b>1,724</b>	<b>-11.4%</b>
<b>Net Total Production for Consumption</b>	<b>22,369</b>	<b>23,193</b>	<b>-3.6%</b>	<b>172,531</b>	<b>187,132</b>	<b>-7.8%</b>
of which RES <sup>(3)</sup>	11,250	8,843	27.2%	76,082	69,674	9.2%
of which not RES	11,119	14,350	-22.5%	96,449	117,458	-17.9%
Import	3,657	3,159	15.8%	35,944	31,611	13.7%
Export	338	371	-8.9%	2,193	2,641	-17.0%
<b>Net Foreign Exchange</b>	<b>3,319</b>	<b>2,788</b>	<b>19.0%</b>	<b>33,751</b>	<b>28,970</b>	<b>16.5%</b>
<b>Electricity demand<sup>(1)</sup></b>	<b>25,688</b>	<b>25,981</b>	<b>-1.1%</b>	<b>206,282</b>	<b>216,102</b>	<b>-4.5%</b>

In August 2023, there was a decrease in thermal production (-20.5%) an increase photovoltaic production (+19.8%), in wind production (+43.8%) and in renewable hydroelectric production (+49.8%), compared to the same month of the previous year. In 2023, there was a change in exports, which dropped (-17.0%) compared to 2022. The trend of total net production allocated for consumption in August was down (-3.6%) compared to the same period in 2022.

(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 -

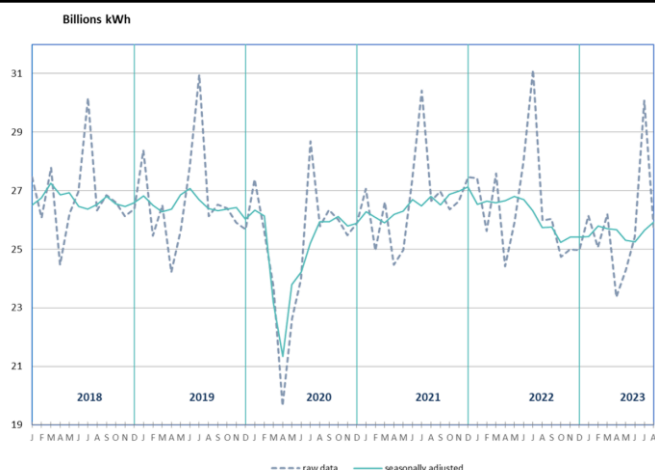
Source: Terna

The value of electricity demand was achieved with the same number of working days (22) and with an average monthly temperature approximately 0.6°C lower than August last year. When adjusted for seasonal and temperature effects, the figure represents a +0.7% variation.

In the eight seven months of the year, national demand decreased by 4.5% compared to the corresponding period in 2022 (-3.4% adjusted value).

The monthly data for August 2023, adjusted for calendar and temperature effects, recorded an increase (+1.0%) in electricity demand compared to July 2023.

#### Demand – seasonality adjusted



The value, adjusted for seasonal, calendar and temperature effects, shows positive cyclical change (+1.0%).

Source: Terna

# Monthly Report on the Electricity System

August 2023

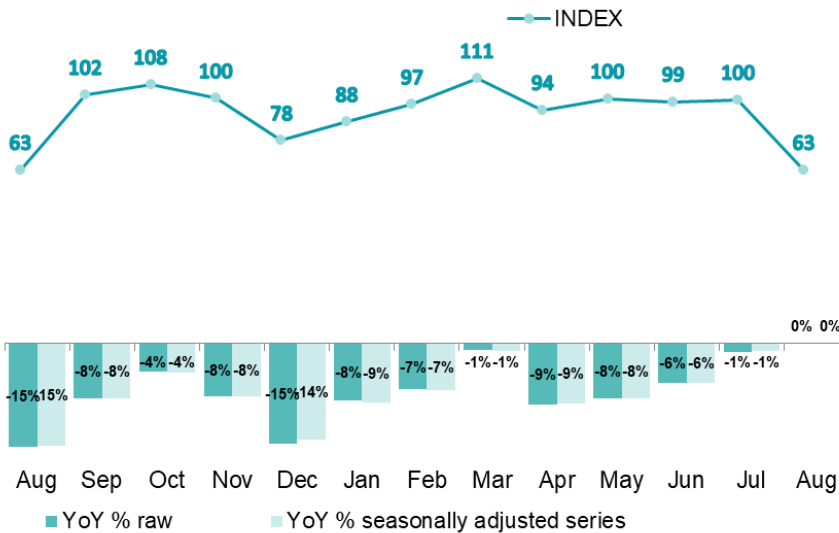
Energy Balance Sheets



## IMCEI

The trend for August 2023 (compared to August 2022) was null (0.0%) based on raw data. Using data adjusted for calendar differences, there is no change. In the first eight months of 2023, industrial electricity consumption decreased by 5.3% compared to the same period in 2022.

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

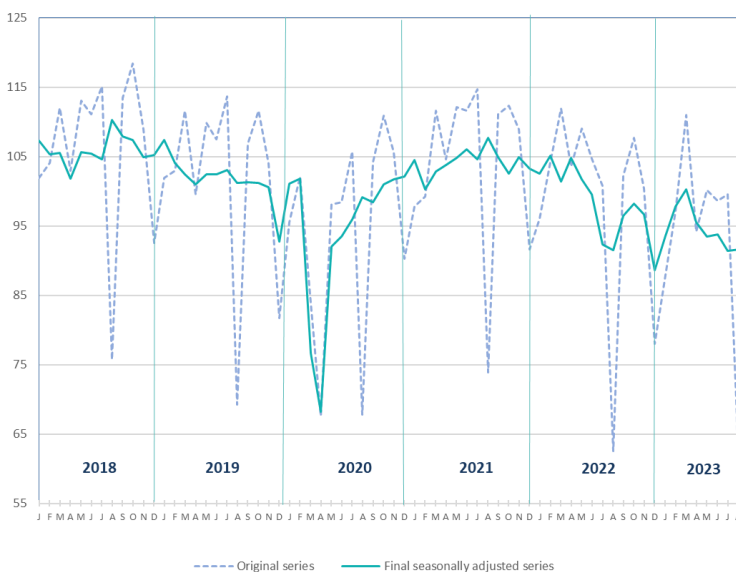


In August, the change in the monthly index of Italian electricity consumption was null compared to August 2022.

Source: Terna

The short-term data adjusted for seasonal and calendar effects for the industrial electricity consumption index was stable (0.2%) in August 2023 compared to July.

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



When adjusted for seasonal and calendar effects, the monthly figure for July 2023 remained stable compared to the previous month.

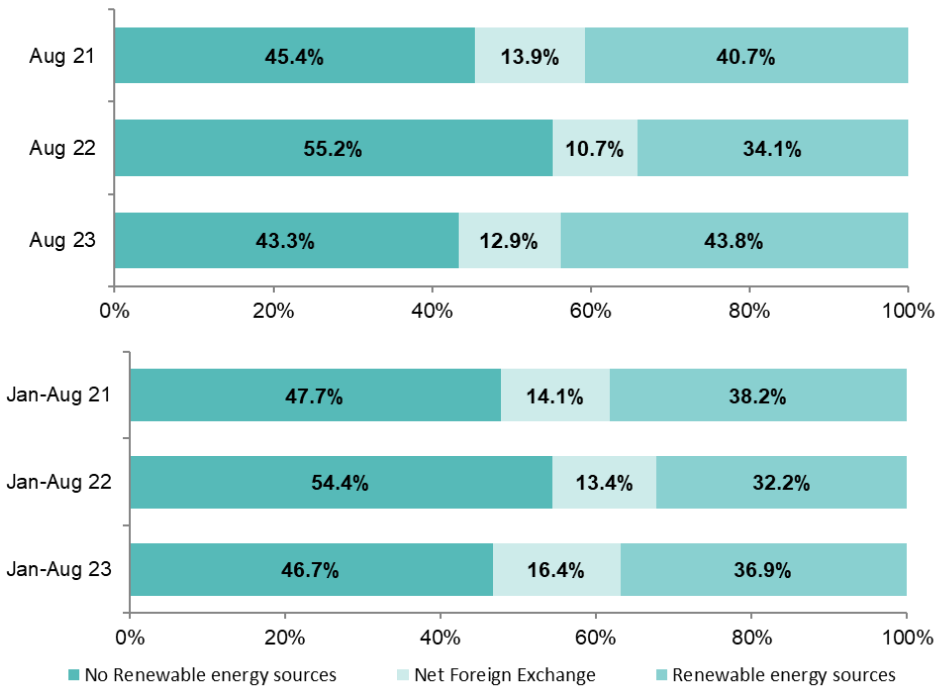
Source: Terna

### Energy Demand Mix

In August 2023, 43.3% of the electricity demand was met by production from Non-Renewable Energy Sources, 43.8% from Renewable Energy Sources and the remainder via foreign exchange.

In 2023, electricity demand was 206,282 GWh, 46.7% of which was met via production from Non-Renewable Energy Sources, 36.9% from Renewable Energy Sources and the remainder from the foreign balance.

#### Demand breakdown – coverage by sources

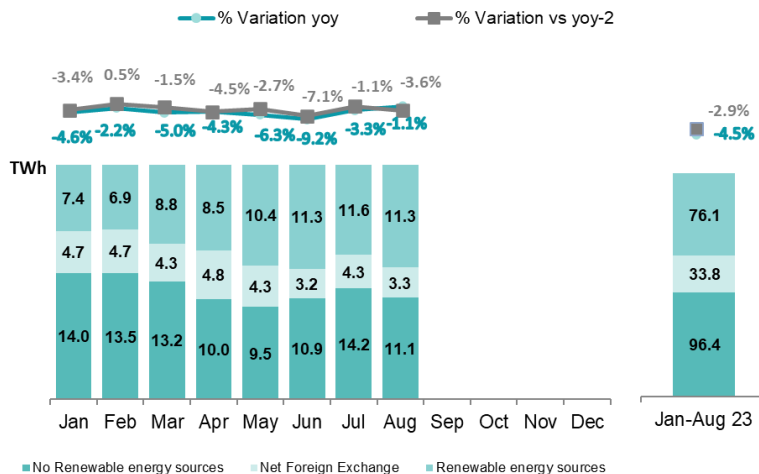


Coverage of demand from renewable sources grew from 34.1% in August 2022 to 43.8% in August 2023.

Coverage of demand from non-renewables fell from 54.4% in 2022 to 46.7% in 2023.

Source: Terna

#### 2023 trend in demand breakdown and difference from 2022 and 2021



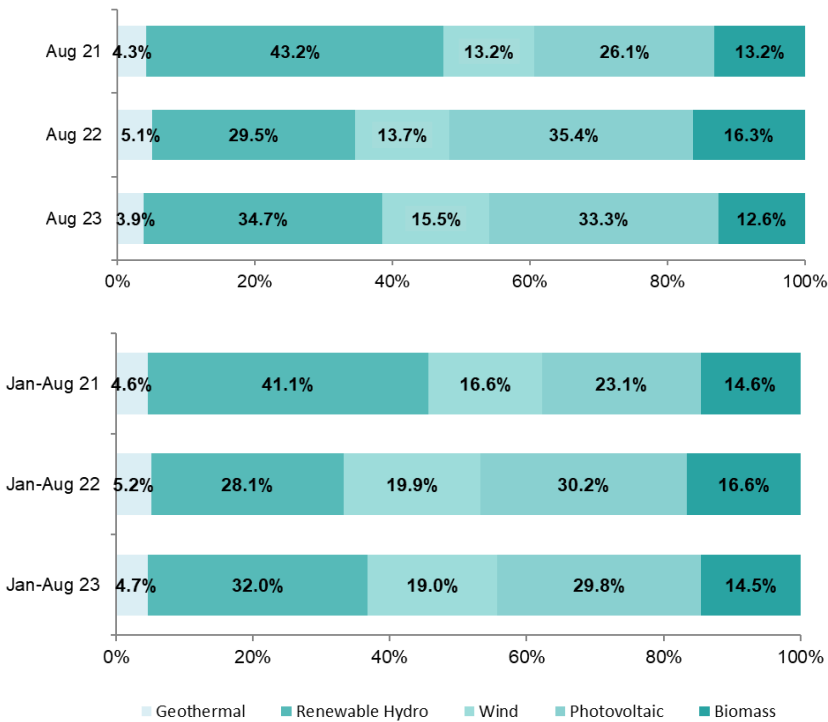
In 2023, electricity demand on the grid is lower than 2022 (-4.5%) and down compared to the cumulative figure for 2021 (-2.9%). In 2023, energy production from renewable sources totalled 76.1 TWh, an increase compared to 2022 (+9.2%).

Source: Terna

### Details of Renewable Energy Sources

In August, production from Renewable Energy Sources increased (+27.2%) compared to the same month of the previous year. Specifically, there was an increase in renewable hydroelectric production (+49.8%), in wind production (+43.8%), and in photovoltaic production (+19.8%).

#### RES Production - Breakdown

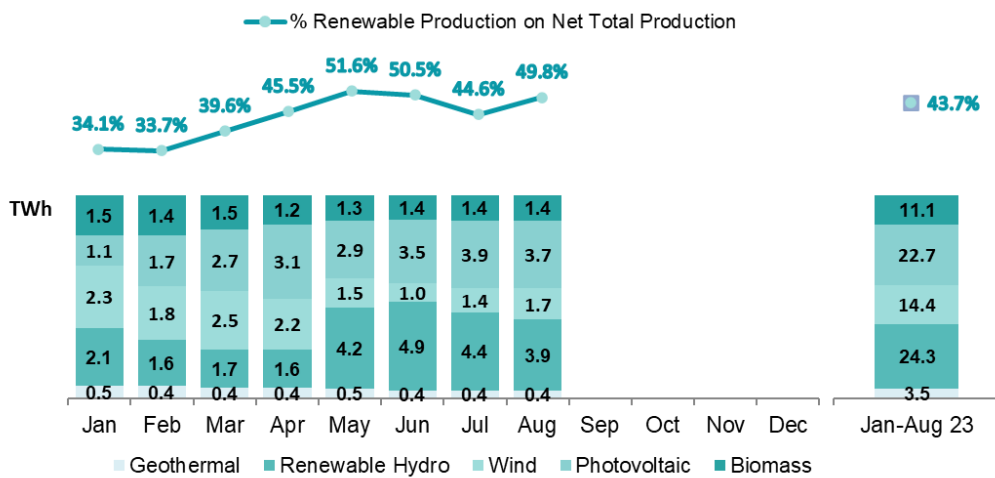


In August 2023, the greater contribution of renewable energy sources to the total is attributed to renewable hydroelectric production (34.7%) and photovoltaic production (33.3%).

In 2023 contribution from renewable hydroelectric production increased while the contribution from the other sources decreased overall compared to 2022.

Source: Terna

#### 2023 trend in net production from RES and difference from 2022



In August 2023, production from RES represented 49.8% of total net national production, an increase compared to the same month in 2022 (37.8%). In 2023, production from RES represented 43.7% of total net national production, an increase compared to the cumulative figure for 2022 (36.9%).

Source: Terna



# Monthly Report on the Electricity System

## August 2023

Energy Balance Sheets



### Historical Energy Balance Sheets

In 2023, total net production allocated for consumption (172,531 GWh) met 83.6% of national electricity demand (206,282 GWh).

#### 2023 Historical Monthly Energy Balance Sheet

[GWh]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Renewable Hydro	2,081	1,581	1,658	1,581	4,190	4,902	4,445	3,908					24,346
Pumping Production <sup>(2)</sup>	137	99	172	168	135	95	104	160					1,070
Thermal	15,569	14,866	14,712	11,307	10,915	12,330	15,667	12,602					107,968
of which Biomass	1,463	1,368	1,471	1,245	1,309	1,361	1,429	1,415					11,061
of which Hard Coal	2,295	1,888	1,881	202	561	1,226	1,041	662					9,736
Geothermal	458	414	442	442	462	436	447	439					3,540
Wind	2,277	1,802	2,547	2,165	1,515	1,036	1,354	1,742					14,438
Photovoltaic	1,095	1,734	2,665	3,105	2,929	3,537	3,886	3,746					22,697
<b>Net Total Production</b>	<b>21,617</b>	<b>20,496</b>	<b>22,196</b>	<b>18,768</b>	<b>20,146</b>	<b>22,336</b>	<b>25,903</b>	<b>22,597</b>					<b>174,059</b>
<b>Pumping</b>	<b>195</b>	<b>142</b>	<b>246</b>	<b>240</b>	<b>193</b>	<b>136</b>	<b>148</b>	<b>228</b>					<b>1,528</b>
<b>Net Total Production for Consumption</b>	<b>21,422</b>	<b>20,354</b>	<b>21,950</b>	<b>18,528</b>	<b>19,953</b>	<b>22,200</b>	<b>25,755</b>	<b>22,369</b>					<b>172,531</b>
of which RES <sup>(3)</sup>	7,374	6,898	8,783	8,538	10,405	11,272	11,561	11,250					76,082
of which not RES	14,048	13,456	13,167	9,990	9,548	10,928	14,194	11,119					96,449
Import	5,080	4,944	4,445	5,005	4,616	3,546	4,651	3,657					35,944
Export	352	233	188	170	275	314	323	338					2,193
<b>Net Foreign Exchange</b>	<b>4,728</b>	<b>4,711</b>	<b>4,257</b>	<b>4,835</b>	<b>4,341</b>	<b>3,232</b>	<b>4,328</b>	<b>3,319</b>					<b>33,751</b>
<b>Electricity demand <sup>(1)</sup></b>	<b>26,150</b>	<b>25,065</b>	<b>26,207</b>	<b>23,363</b>	<b>24,294</b>	<b>25,432</b>	<b>30,083</b>	<b>25,688</b>					<b>206,282</b>

In 2023, net total production was down (-7.8%) compared to the same period in 2022, and peak electricity demand was reached in July, with 30,083 GWh.

Source: Terna

The developments in the monthly balance sheet for 2022 are provided below.

#### 2022 Historical Monthly Energy Balance Sheet

[GWh]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Renewable Hydro	2,335	1,562	1,459	1,698	3,140	3,405	3,357	2,609	2,067	1,785	2,243	2,299	27,959
Pumping Production <sup>(2)</sup>	117	165	181	176	146	102	165	156	158	148	139	122	1,773
Thermal	18,298	16,210	17,911	13,688	13,608	15,813	18,138	15,857	15,859	15,853	14,986	17,066	193,287
of which Biomass	1,537	1,435	1,548	1,395	1,404	1,361	1,429	1,440	1,362	1,401	1,397	1,412	17,120
of which Hard Coal	1,315	1,729	1,833	1,366	1,566	1,827	2,130	1,547	1,861	1,774	1,659	2,161	20,768
Geothermal	479	435	474	457	461	429	454	456	440	457	442	460	5,444
Wind	2,544	2,261	2,032	2,391	1,132	1,281	1,027	1,211	1,724	1,080	1,955	1,720	20,358
Photovoltaic	1,272	1,697	2,316	2,842	3,097	3,216	3,471	3,127	2,402	2,087	1,207	818	27,552
<b>Net Total Production</b>	<b>25,045</b>	<b>22,330</b>	<b>24,373</b>	<b>21,252</b>	<b>21,584</b>	<b>24,245</b>	<b>26,611</b>	<b>23,416</b>	<b>22,650</b>	<b>21,410</b>	<b>20,972</b>	<b>22,485</b>	<b>276,373</b>
<b>Pumping</b>	<b>167</b>	<b>236</b>	<b>259</b>	<b>251</b>	<b>208</b>	<b>145</b>	<b>235</b>	<b>223</b>	<b>226</b>	<b>211</b>	<b>198</b>	<b>174</b>	<b>2,533</b>
<b>Net Total Production for Consumption</b>	<b>24,878</b>	<b>22,094</b>	<b>24,114</b>	<b>21,001</b>	<b>21,376</b>	<b>24,100</b>	<b>26,376</b>	<b>23,193</b>	<b>22,424</b>	<b>21,199</b>	<b>20,774</b>	<b>22,311</b>	<b>273,840</b>
of which RES <sup>(3)</sup>	8,167	7,390	7,829	8,783	9,234	9,692	9,737	8,843	7,995	6,810	7,244	6,709	98,433
of which not RES	16,711	14,704	16,285	12,218	12,142	14,409	16,639	14,350	14,429	14,389	13,530	15,602	175,407
Import	3,184	3,923	3,719	3,832	4,774	4,064	4,956	3,159	3,897	4,008	4,552	3,323	47,391
Export	643	392	239	412	214	159	211	371	289	474	339	661	4,404
<b>Net Foreign Exchange</b>	<b>2,541</b>	<b>3,531</b>	<b>3,480</b>	<b>3,420</b>	<b>4,560</b>	<b>3,905</b>	<b>4,745</b>	<b>2,788</b>	<b>3,608</b>	<b>3,534</b>	<b>4,213</b>	<b>2,662</b>	<b>42,987</b>
<b>Electricity demand <sup>(1)</sup></b>	<b>27,419</b>	<b>25,625</b>	<b>27,594</b>	<b>24,421</b>	<b>25,936</b>	<b>28,005</b>	<b>31,121</b>	<b>25,981</b>	<b>26,032</b>	<b>24,733</b>	<b>24,987</b>	<b>24,973</b>	<b>316,827</b>

In 2022, the month with the highest demand for electricity was July, with 31,121 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 August 2023, demand increased in the Northern zone (TO-MI-VE), and in the Southern zone (NA) while it decreased 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
August 2023	2,453	5,168	3,682	3,684	3,671	4,320	1,900	810
August 2022	2,464	4,888	3,757	4,094	3,814	4,249	1,851	864
% August 23/22	-0.4%	5.7%	-2.0%	-10.0%	-3.7%	1.7%	2.6%	-6.3%
Cumulated 2023	20,401	43,572	31,414	31,928	29,377	30,713	13,100	5,777
Cumulated 2022	21,451	45,848	33,166	34,079	30,778	31,751	12,857	6,172
% Cumulated 23/22	-4.9%	-5.0%	-5.3%	-6.3%	-4.6%	-3.3%	1.9%	-6.4%

In 2023, the Y-o-Y percentage change in demand was -5.1% in the North, -5.5% in the Centre, -3.3% in the South and -0.8% on the Islands.

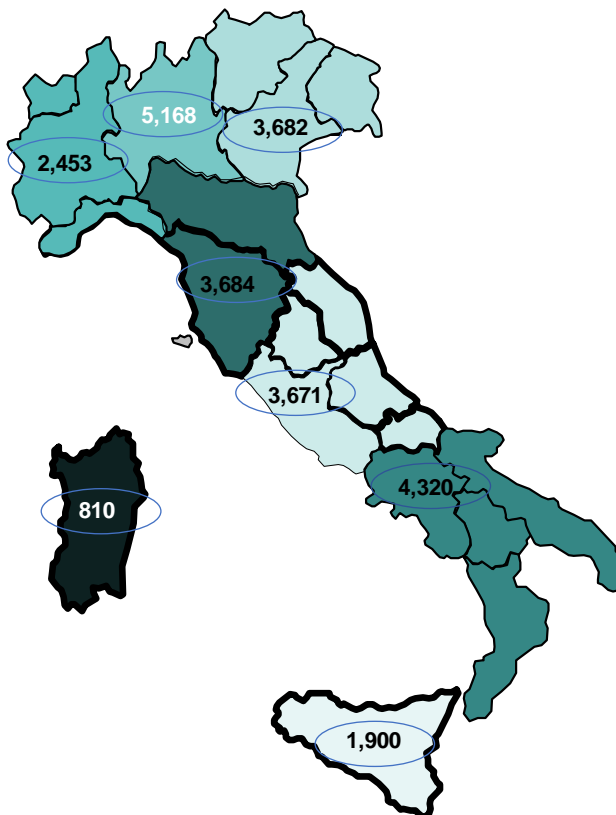
Source: Terna

### 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



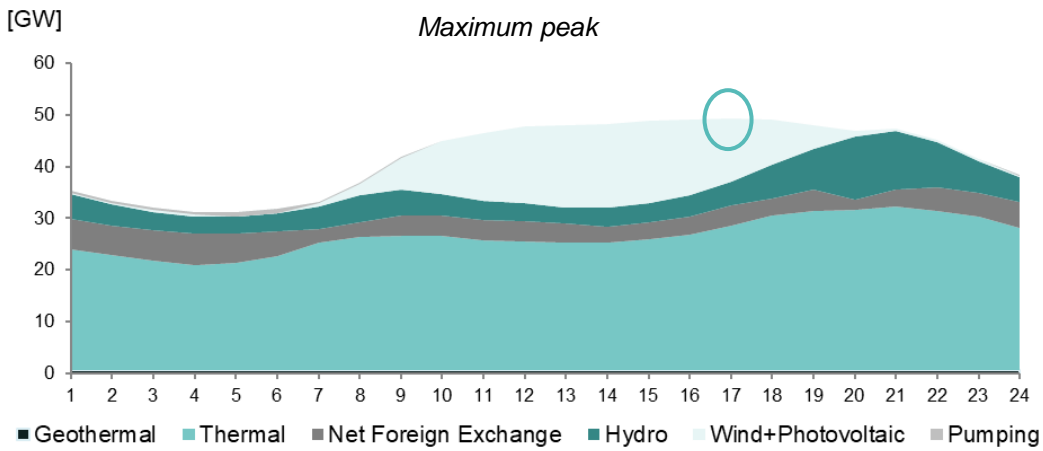
Source: Terna

(\*) 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 August 2023, Peak Demand was recorded on **Thursday 24 August between 16:00 and 17:00** and was 49,335 MW (-3.3% Y-o-Y). The hourly demand diagram of the peak day is presented below.

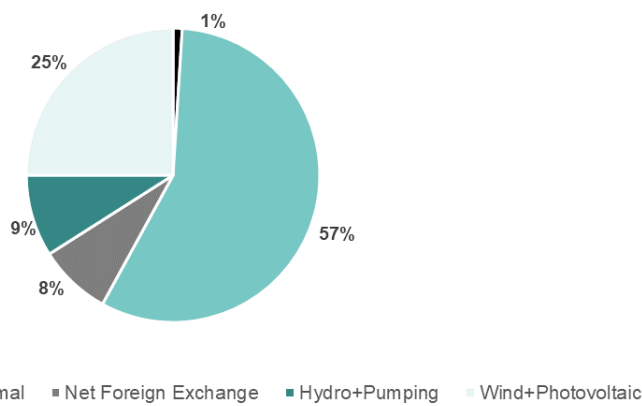
#### Peak Demand



At peak, the contribution from thermal production was 27,977 MW, a slight decrease (-0.9%) compared to the contribution from thermal production at the August 2022 peak (28,231 MW).

Source: Terna

#### Coverage of demand - 24 August 2023 16:00-17:00



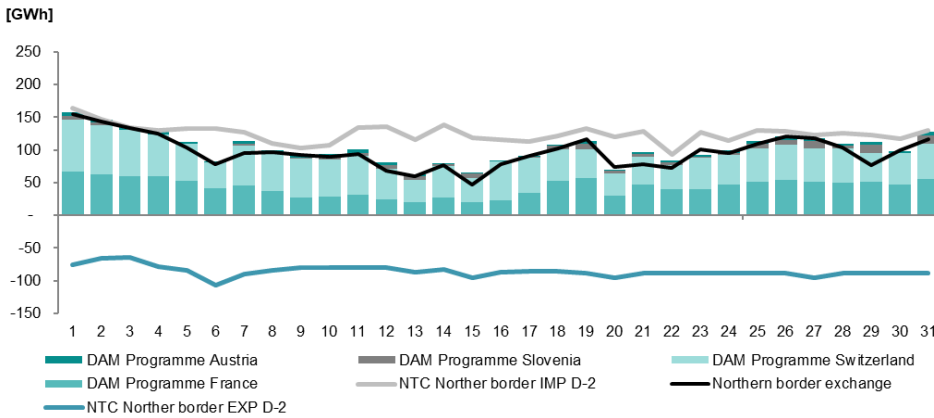
At its peak, production from wind and photovoltaic sources contributed to covering 25% of demand, with thermal production covering 57% and foreign exchange covering 8%.

Source: Terna

## Net Foreign Exchange – August 2023

In August, 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



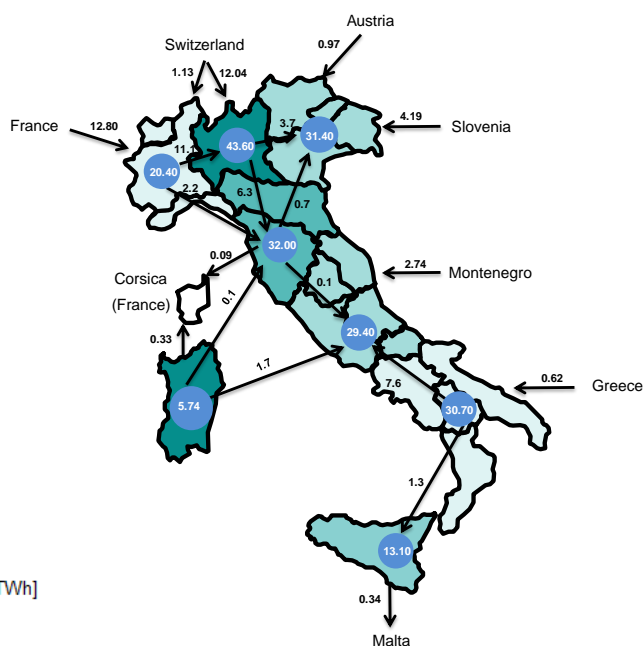
In August 2023, imports increased Y-o-Y (+15.8%), amounting to 3,657 GWh, and exports declined Y-O-Y (-8.9%) amounting to 338 GWh.

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



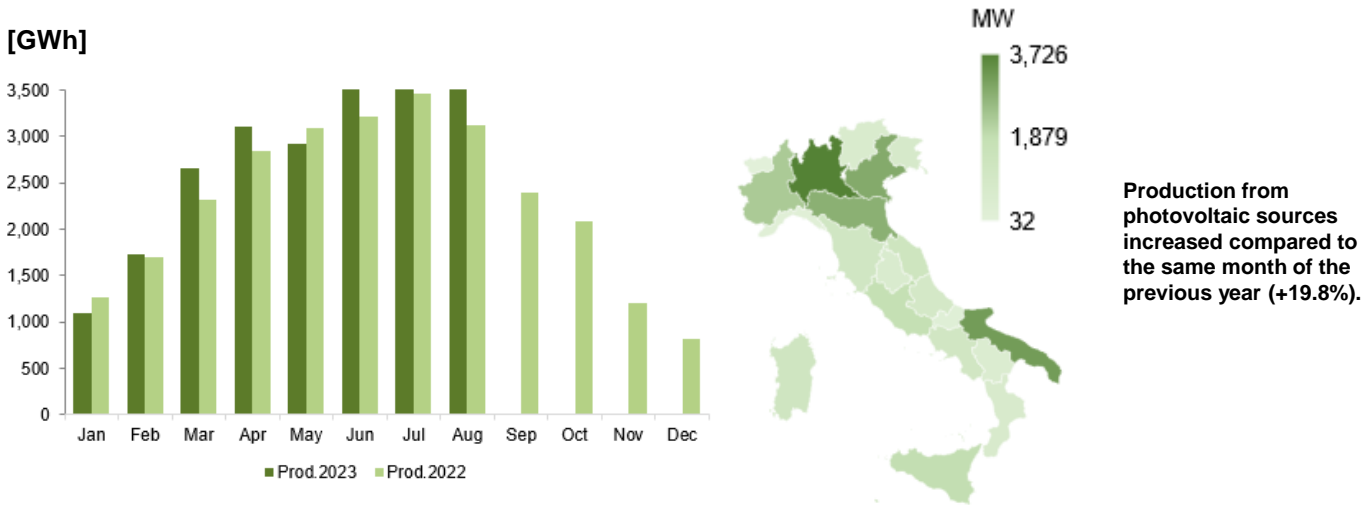
In 2023, a net exchange was recorded from the Northern zone to Emilia Romagna and Tuscany of 7.8 TWh. The mainland recorded a net exchange towards Sicily of 1.3 TWh.

Source: Terna

### Production and Installed Capacity

Energy produced from photovoltaic sources in August 2023 reached 3,746 GWh, an increase compared to the same month of the previous year (+619 GWh).

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

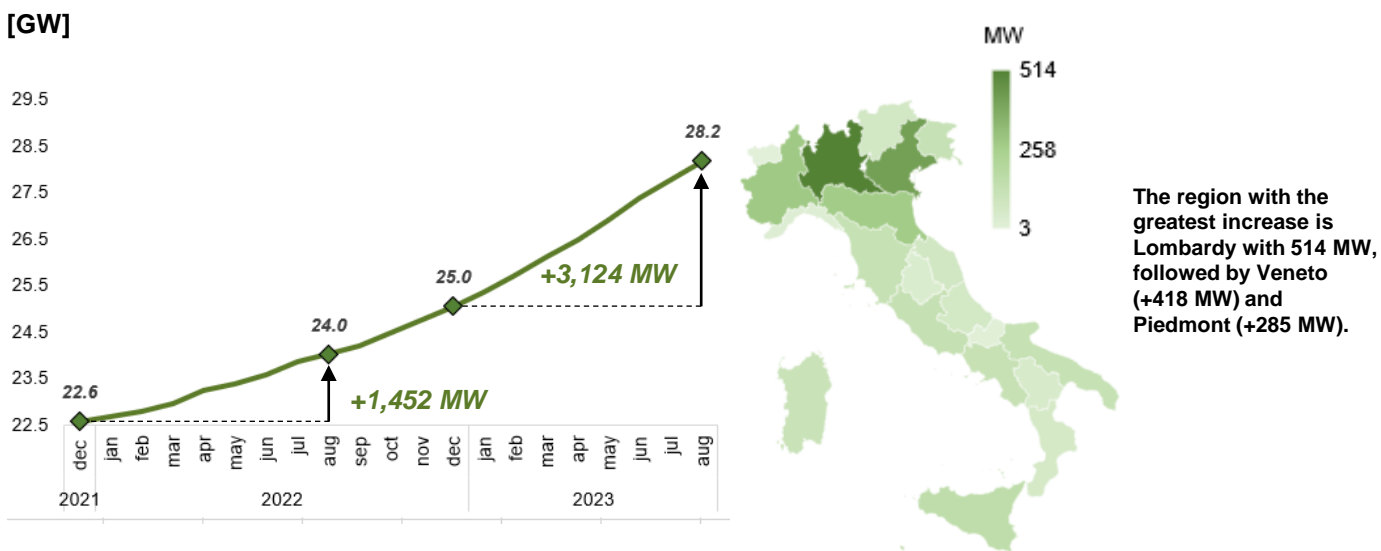


1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

In the first eight months of 2023, operating capacity increased by 3,124 MW. During the same period of 2022 the increase was 1,452 MW, recording an increase of 1,671 MW (+115%).

Cumulative operating capacity (left) and distribution of new activations 2023 (right)



Source: Terna

# Monthly Report on the Electricity System

## August 2023

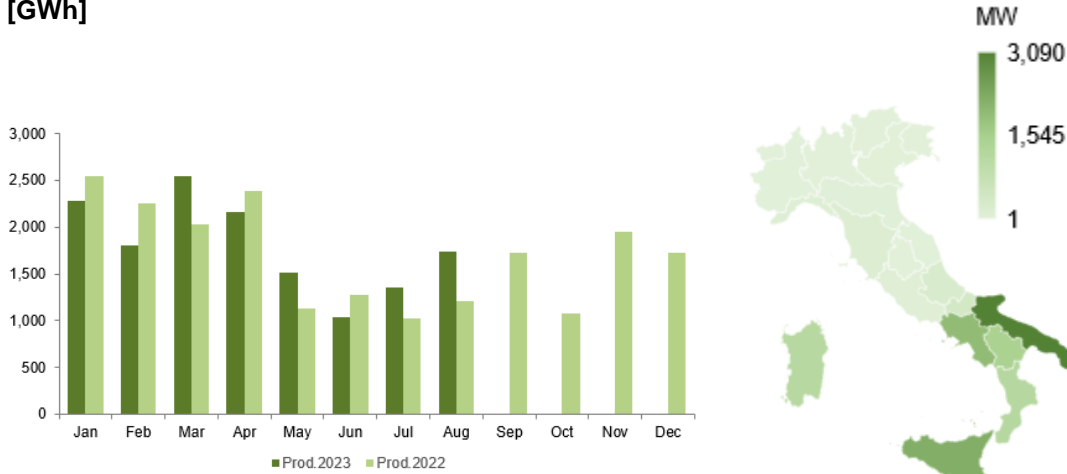
Electricity System



Energy produced from wind production sources in August 2023 reached 1,742 GWh, an increase compared to the same month of the previous year (+531 GWh).

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

[GWh]



Production from wind sources decreased compared to the same month of the previous year (+43.8%).

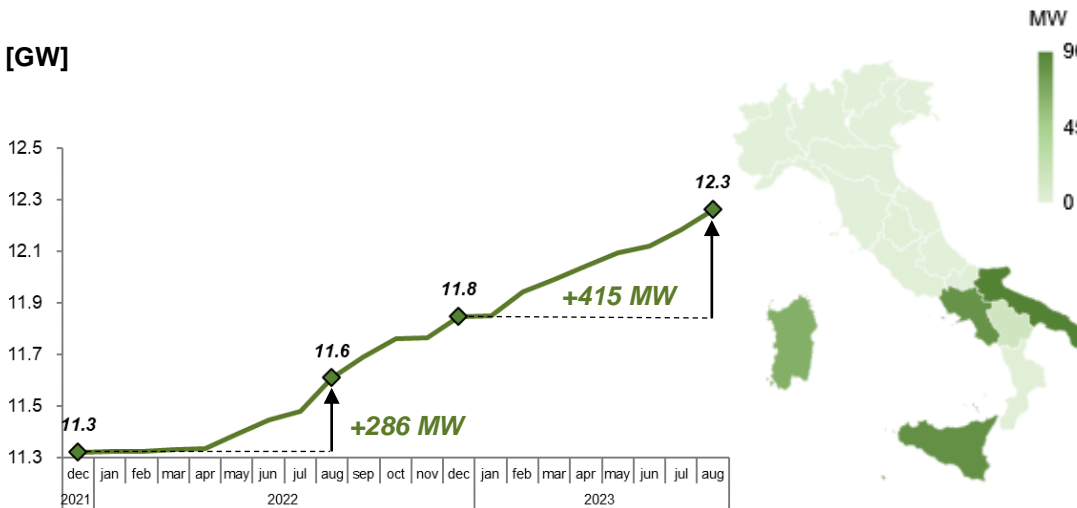
1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

In the first eight months of 2023, operating capacity increased by 415 MW. During the same period of 2022 the increase was 286 MW, recording an increase of 129 MW (+45%).

### Cumulative operating capacity (left) and distribution of new activations 2023 (right)

[GW]



The region with the greatest increase is Apulia with 90 MW, followed by Sicily (+82 MW) and Campania (+81 MW)

Source: Terna

# Monthly Report on the Electricity System

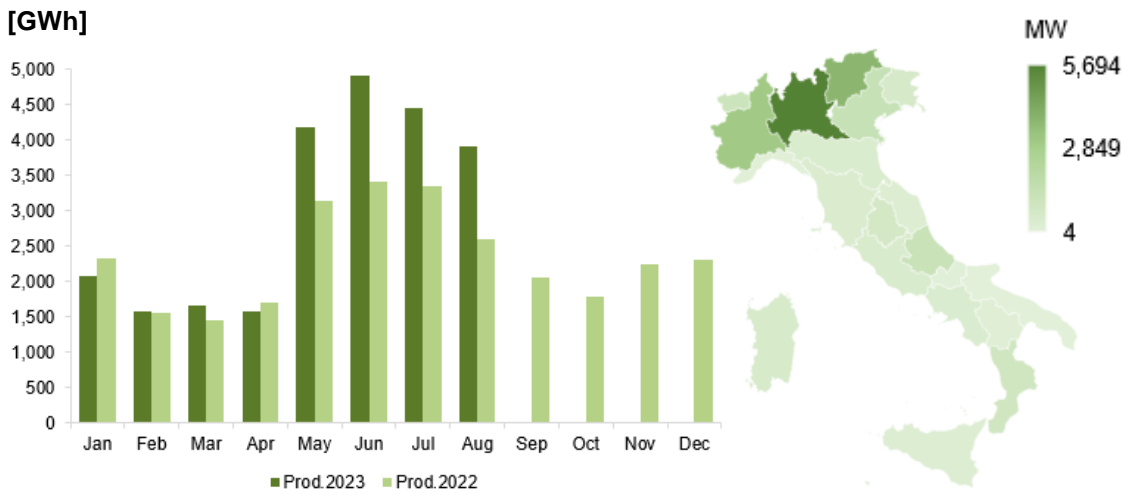
## August 2023

Electricity System



Energy produced from renewable hydroelectric production sources in August 2023 reached 3,908 GWh, an increase compared to the same month of the previous year (+1,300 GWh).

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



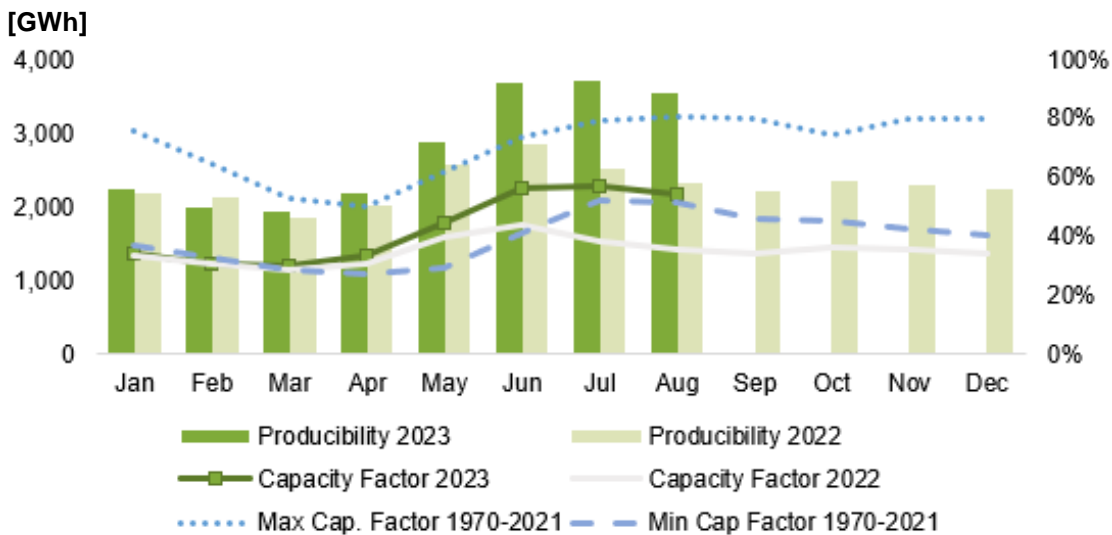
Production from renewable hydroelectric production sources increased compared to the same month of the previous year (+49.8%).

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

Source: Terna

In August, hydroelectric producibility grew (+52.4%) compared to the same month of the previous year.

### Hydroelectric Producibility and Reservoir Percentage



In July 2023, considering Italy as a whole, the ratio between the reservoir and the maximum reservoir capacity was 54.2%, up compared to the same month in 2022 (35.6%).

	Reservoir Capacity	NORTH	CENTRE SOUTH	ISLANDS	TOTAL
Aug Aug 23	[GWh]	1,286	994	149	3,534
	% (capacity/max capacity)	55.2%	54.8%	39.2%	54.2%
Aug 22	[GWh]	1,286	838	195	2,319
	% (capacity/max capacity)	29.7%	46.2%	51.3%	35.6%

Source: Terna

# Monthly Report on the Electricity System

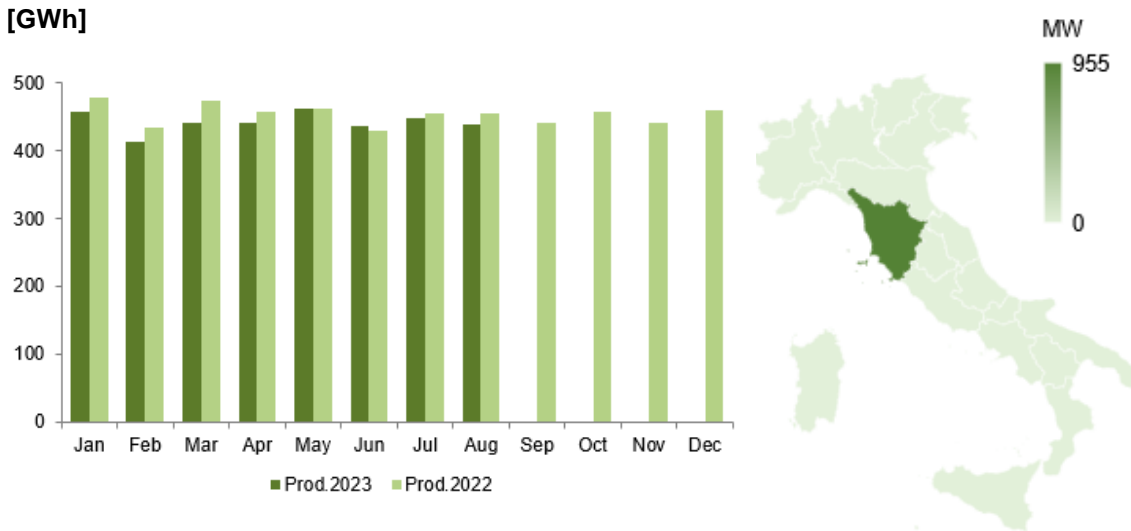
## August 2023

Electricity System



Energy produced from geothermal production sources in August 2023 reached 439 GWh, a decrease compared to the same month of the previous year (-17 GWh).

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



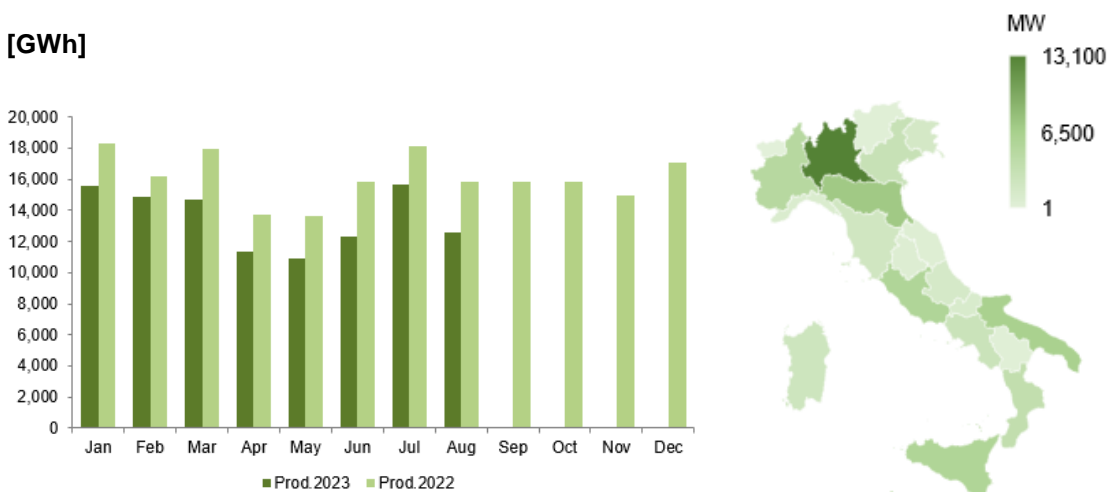
Production from geothermal sources decreased (-3.7%) compared to the same month of the previous year.

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

Source: Terna

Energy produced from thermal production sources in August 2023 reached 12,602 GWh, down compared to the same month of the previous year (-3,255 GWh).

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



Production from thermal sources decreased (-20.5%) compared to the same month of the previous year.

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

Source: Terna



# Monthly Report on the Electricity System

## August 2023

Electricity System



In 2023 the operating capacity of renewables increased by 3,470 MW. This value is 1,733 MW higher (+100%) compared to the same period of the previous year.

### 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					3,124
Wind	4	93	48	50	53	25	63	80					415
Hydroelectric	1	2	-111 <sup>2</sup>	1	2	3	-6	-1					-109
Geothermal & Biomass	-4	0	1	-2	9	1	-5	39					40
<b>Total</b>	<b>297</b>	<b>471</b>	<b>324</b>	<b>409</b>	<b>499</b>	<b>498</b>	<b>458</b>	<b>514</b>					<b>3,470</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					258,264
Wind	0	17	7	3	3	3	5	9					47
Hydroelectric	6	3	8	3	12	6	3	2					43
Geothermal & Biomass	2	7	3	6	9	6	0	8					41
<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>258,395</b>

Source: Terna

The evolution of operational capacity by source in 2022 is shown below.

### Variation in monthly operating capacity and number of plants per Source in Italy 2022<sup>1</sup>

[MW]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	106	117	155	282	163	189	269	171	186	257	299	287	2,482
Wind	1	1	7	5	57	53	34	129	83	72	3	82	526
Hydroelectric	3	2	-3	4	-6	3	2	-5	5	11	12	3	31
Geothermal & Biomass	0	1	0	1	-5	0	0	1	0	3	1	-4	-2
<b>Total</b>	<b>110</b>	<b>121</b>	<b>159</b>	<b>292</b>	<b>210</b>	<b>245</b>	<b>305</b>	<b>296</b>	<b>274</b>	<b>343</b>	<b>314</b>	<b>368</b>	<b>3,037</b>

Number of Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	9.003	10.033	13.394	10.489	14.371	14.661	15.667	15.616	18.901	26.003	28.514	29.154	205.806
Wind	6	6	18	10	7	19	18	14	18	76	6	10	208
Hydroelectric	14	6	12	10	8	12	7	7	13	33	11	10	143
Geothermal & Biomass	3	4	0	7	-3	6	2	5	6	6	5	2	43
<b>Total</b>	<b>9.026</b>	<b>10.049</b>	<b>13.424</b>	<b>10.516</b>	<b>14.383</b>	<b>14.698</b>	<b>15.694</b>	<b>15.642</b>	<b>18.938</b>	<b>26.118</b>	<b>28.536</b>	<b>29.176</b>	<b>206.200</b>

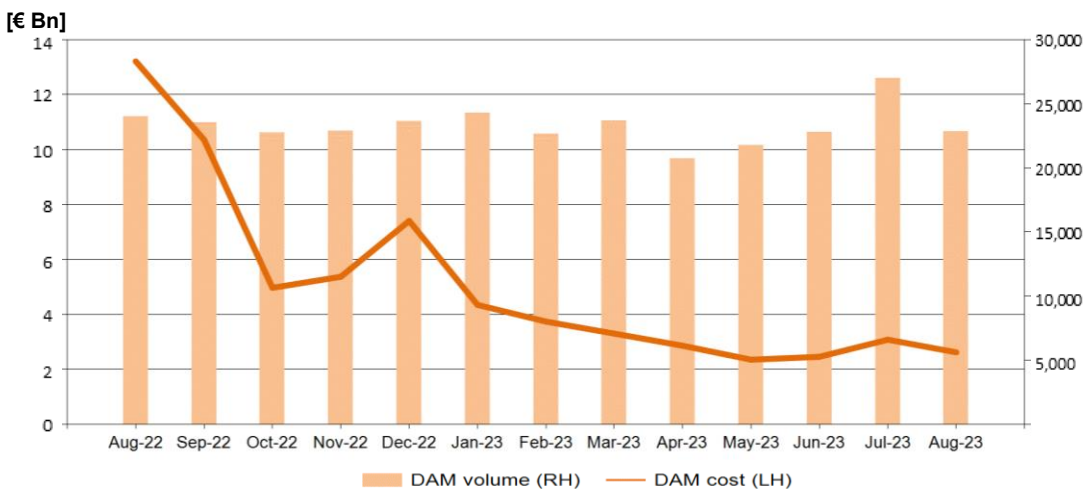
Source: Terna

1. The operating capacity and the number of plants take into account new activations, upgrades and decommissioning of plants
2. The decrease in renewable hydroelectric capacity is due to a change in the master data on the technical sub-type of a plant, changed from mixed pumping (Renewable) to pure pumping (Non-Renewable). Therefore, the plant has not been decommissioned, but excluded from renewables

### Day-Ahead Market

The August total for withdrawal programmes on the DAM was approximately €2.6 Bn, down 15% compared to the previous month and up 80% compared to August 2022. The change compared to July is due to a reduction both in average PUN and demand. The decrease compared to the previous year can be attributed to a drop in the average PUN, which went from €543.2/MW (August 2022) to €111.9/MWh (August 2023).

#### Day Ahead Market – amounts and volumes

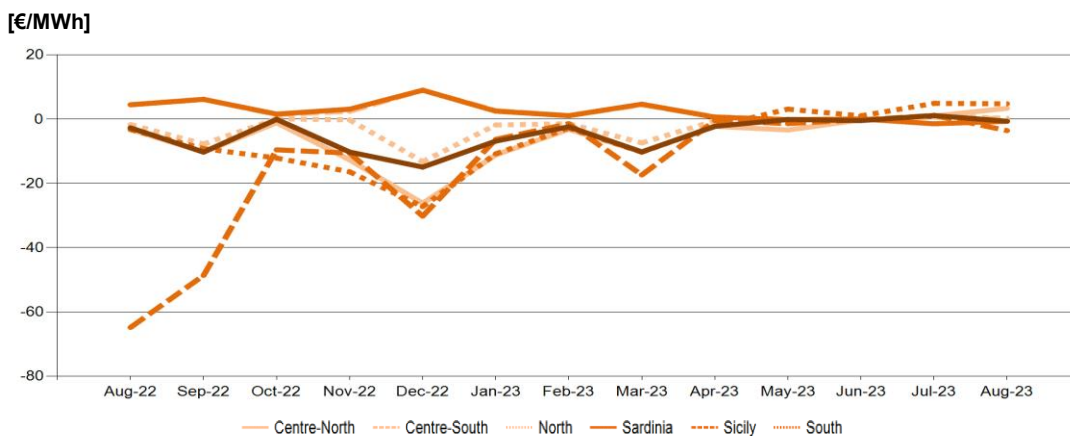


Total value in August 2023 decreased by 80% compared to August 2022.

Source: Terna calculation on GME data

In August the zonal prices were essentially in line with the PUN with the exception of the Sicily zone which recorded a spread of +€4.8/MWh.

#### Spread compared to the PUN



Zonal prices in August 2023 in line with PUN for all zones with the exception of Sicily.

Source: Terna calculation on GME data

# Monthly Report on the Electricity System

## August 2023

Electricity Market



The spread between the peak and off-peak prices in August 2023 was, on average, € 0.2/MWh. Specifically, the highest spread was recorded in the North, where it was €5,2/MWh and in Sardinia where it was € -5.6/MWh.

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

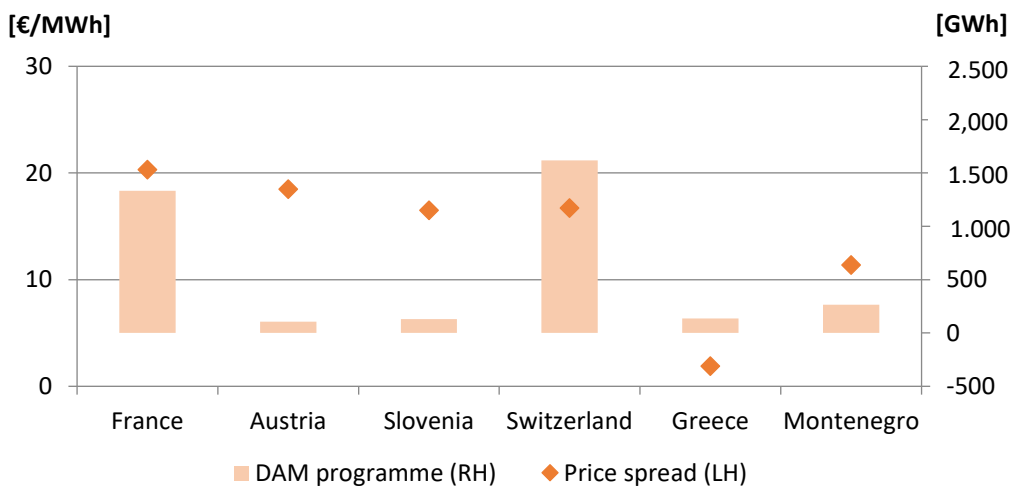
€/MWh	PUN	North	Centre-North	Centre-South	South	Sicily	Sardinia	Calabria
Media	111.9	111.2	112	112.1	111.2	116.6	108.3	115.2
Y-o-Y	-431.3	-436.4	-435.5	-429.4	-429.2	-423.2	-370	-424.7
Δ vs PUN	-	-0.7	0.2	0.2	-0.7	4.8	-3.6	3.3
Δ vs PUN 2022	-	4.4	4.4	-1.7	-2.7	-3.3	-64.8	-3.3
Peak	114.1	114.5	114.7	114.7	112.3	113.7	104.7	112.8
Off-peak	110.7	109.3	110.6	110.6	110.6	118.3	110.3	116.5
Δ Peak v Off Peak	3.4	5.2	4.1	4.1	1.7	-4.6	-5.6	-3.7
Minimum	40	40	40	40	20	20	6.7	20
Maximum	265.1	265.3	265.3	265.3	265.3	263.3	265.3	263.3

Peak-off peak spread down compared to the previous month for all zones.

Source: Terna calculation on GME data

August 2023 saw a decrease in price spreads on the Northern border compared to the previous month. Imports totalled 3.8 TWh, down compared to the previous month (-22%), with France and Switzerland accounting for 35% and 43% of the total respectively. Total exports were 0.26 TWh, with Greece accounting for 34%.

### Price spread with foreign exchanges and day ahead programmes



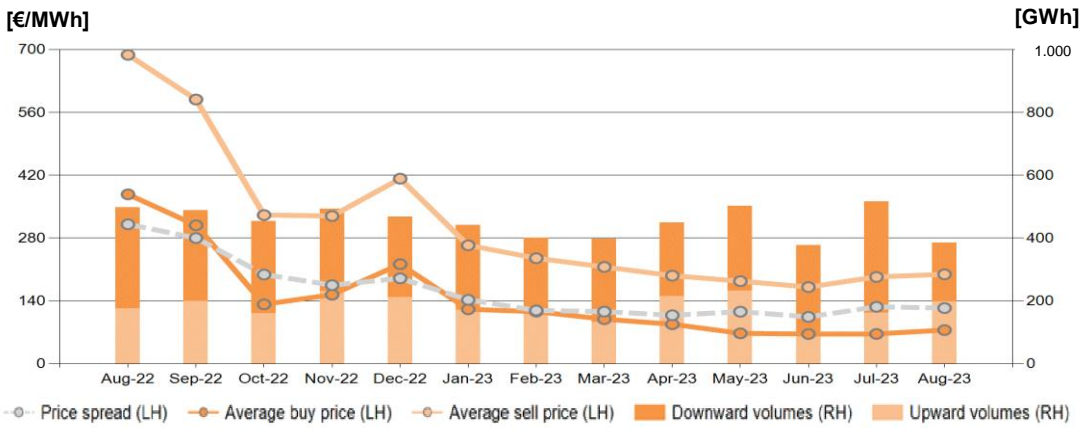
Net imports on the northern border of 3.2 TWh.

Source: Terna calculation

### Ex-ante Ancillary Services Market

In August, the spread between average bid-up and bid-down prices was €124/MWh, down by 2% compared to the previous month and by 60% compared to August 2022. Total volumes decreased compared to the previous month (-25%), in particular, upward volumes increased by 23% and downward volumes fell by 47%. The upward volumes increased by 12%, while downward volumes fell by 42% compared to the same month of the previous year.

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



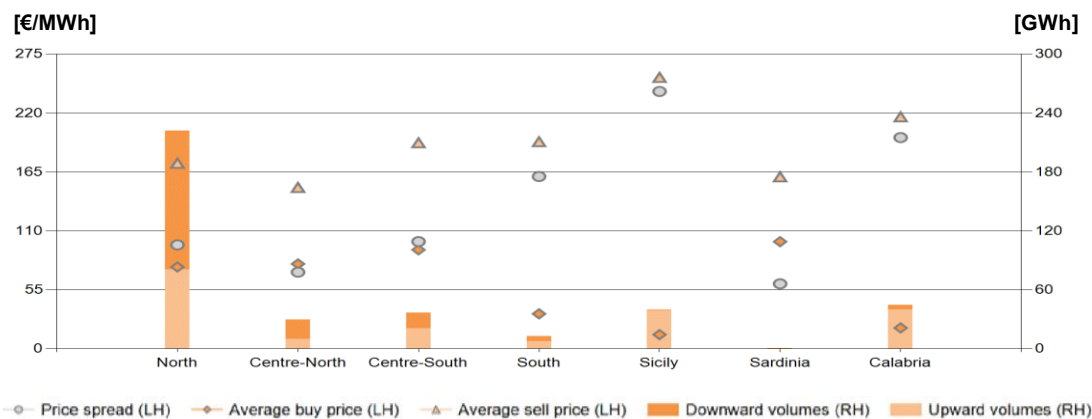
Average bid-up price in August 2023 of €199/MWh  
Average bid-down price in August 2023 of €75/MWh

Source: Terna

The market zone with the highest spread (€ 240/MWh) was Sicily, in line with the previous month.

This spread recorded an 8% increase compared to the previous month, due to an increase in the average bid-up price of 10% (from €229/MWh in July to €253/MWh in August) and to an increase in the average bid-down price of 92% (from €7/MWh in July to €13/MWh in August).

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



Sicily: zone with the highest price spread  
North: zone with the largest volume moved

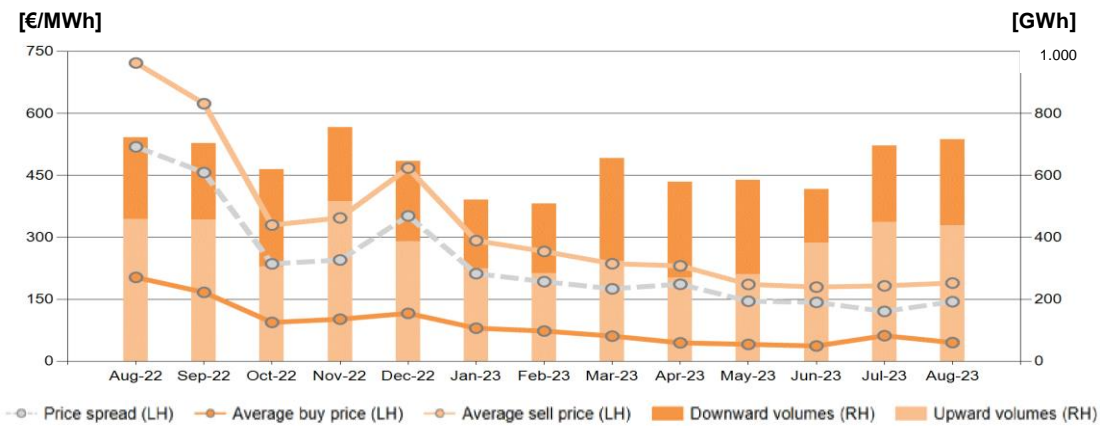
Source: Terna

### Balancing Market

In August, the spread between the bid-up and bid-down prices was €144/MWh, up by 19% compared to the previous month (€121/MWh) and down compared to August 2022 (€519/MWh; -72%).

The total volumes increased slightly (+3%) compared to the previous month. More specifically, upward volumes decreased by 2% and downward volumes rose by 13%. Compared to August 2022, upward volumes decreased by 4% and downward volumes rose by 5%.

#### Balancing market – prices and volumes



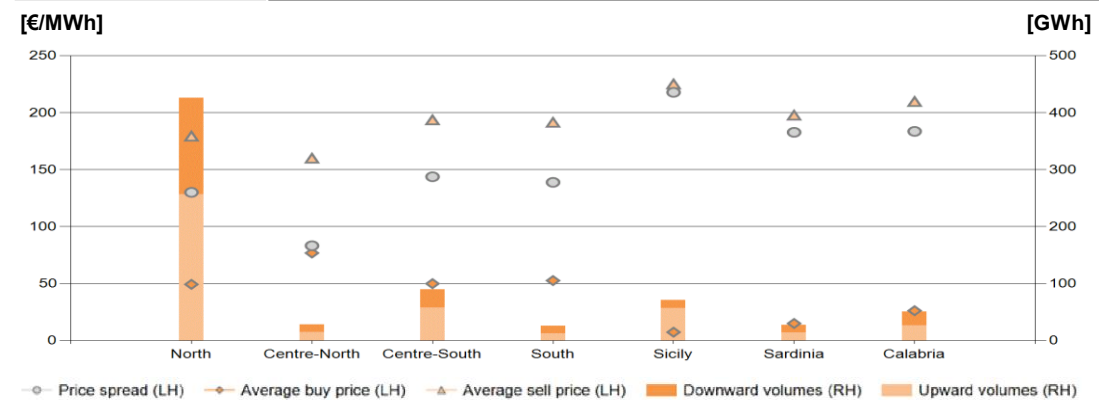
Average bid-up price in August 2023 of € 189/MWh  
Average bid-down price in August 2023 of € 45/MWh

Source: Terna

The market zone with the highest spread (€ 218/MWh) was Sicily, in line with the previous month.

In August, the Northern zone was confirmed as the zone featuring the highest upward volumes (257 GWh) and the highest downward volumes (169 GWh), as in the previous month. The price spread increased across all zones, with the exception of the South where it decreased compared to the previous month by approximately -€9/MWh.

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



Sicily: zone with the highest price spread  
North: zone with the largest volume moved

Source: Terna

## Commodities – Spot Market

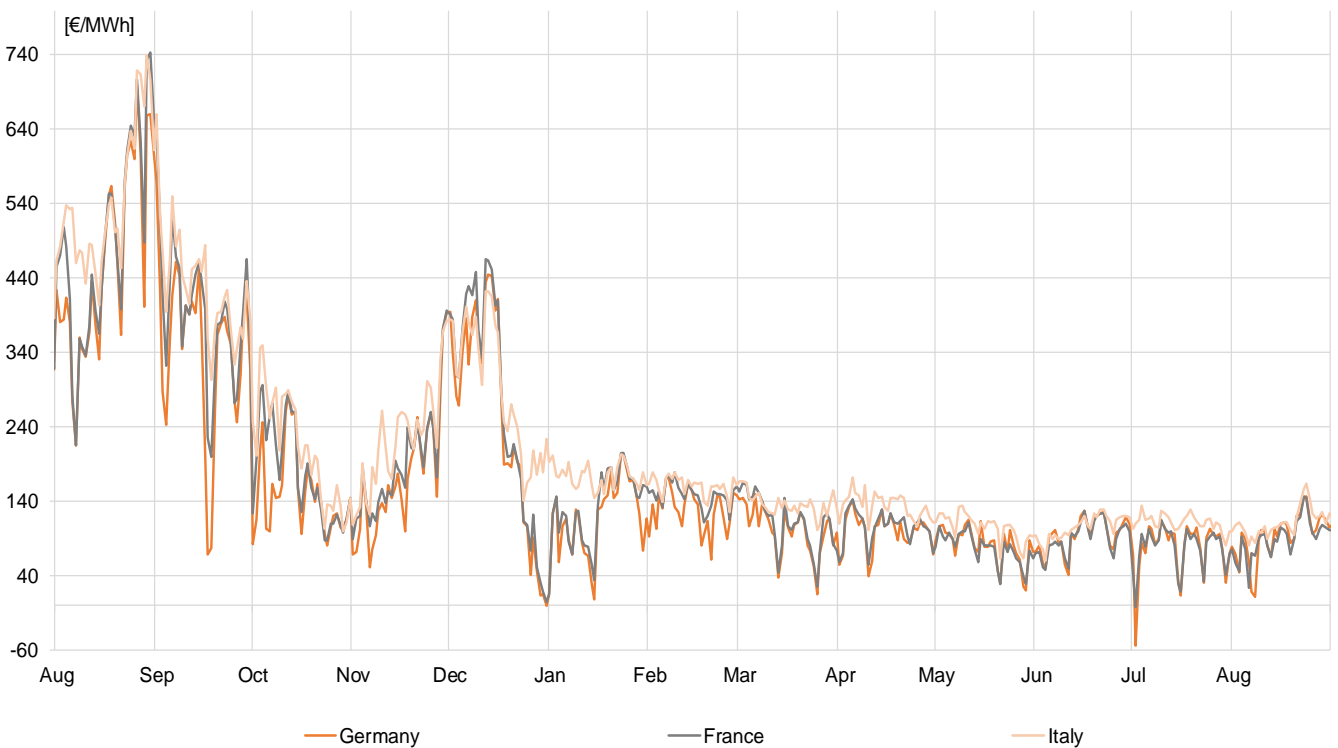
In August, Brent prices recorded an average value of \$86.2/bbl, up from July (+8%).

The average prices of coal (API2) were up compared to July, settling at around \$115.6/t (+3.9%).

European gas prices (TTF) in August increased compared to July, with a monthly average of €34/MWh (+14.1% compared to the previous month). The PSV recorded an increase, settling at €34.1/MWh (+4.8%).

Electricity prices in Italy remained in line in August compared to the previous month, with a monthly average of €111.9/MWh (-0.2%). The French power exchange was up, with the price of electricity at €90.9/MWh (+17%), as did the German exchange, priced at €94.3/MWh (+21.5%).

### Spot electricity prices



Source: Terna calculation on GME and EPEX data

# Monthly Report on the Electricity System

## August 2023

Electricity Market



### Gas & Oil spot prices



Monthly average change  
PSV-TTF = +€0.1/MWh

Source: Terna calculation on Bloomberg data

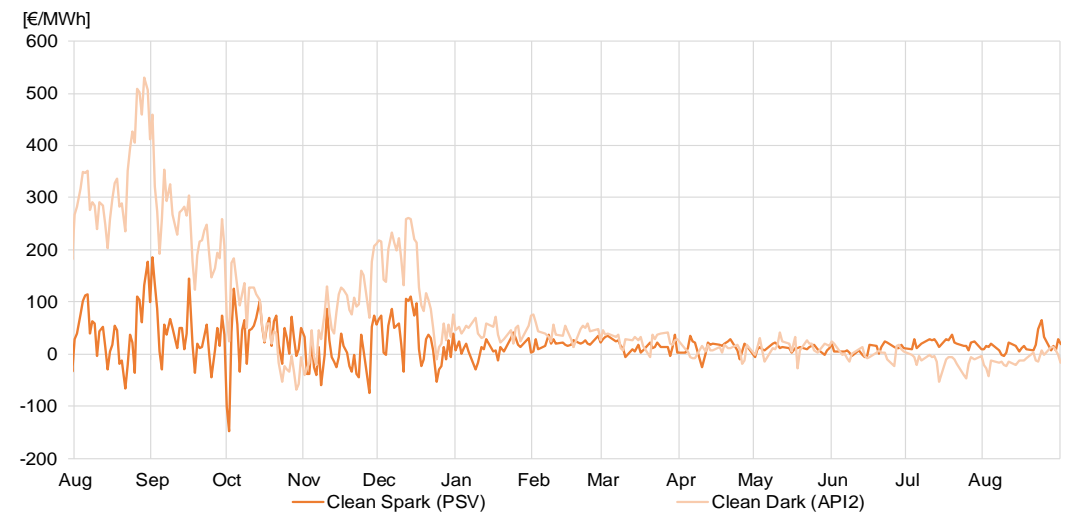
### Coal & Carbon spot prices



Monthly average change  
API2-API4 = +\$5.5/t

Source: Terna calculation on Bloomberg data

### Clean Dark & Spark spreads Italy



Clean spark spread PSV  
monthly average =  
+€16.1/MWh

Clean dark spread API2  
monthly average = €1.6/MWh

Source: Terna calculation on Bloomberg data

## Commodities – Forward Market

In August, Brent forward prices recorded an average value of \$84.3/bbl, an increase compared to July (+6.6%).

The average forward prices of coal (API2) were up compared to July, settling at around \$128.2/t (+6.6%).

Forward prices of gas in Europe (TTF) were up compared to the previous month (+1.2%), settling at around €52.1/MWh. Forward prices in Italy (PSV) were also up, which showed an average figure of €53.6/MWh (+2.5%).

The average forward prices of electricity in Italy stood at around €150.9/MWh, up compared to the previous month (+2.5%). The French power exchange was down, where the price stood at around €157/MWh (-3.2%), as was the German power exchange, where the price was €137.2/MWh (-1.4%).

### Forward Electricity Prices – Year+1



Source: Terna calculation on Bloomberg data



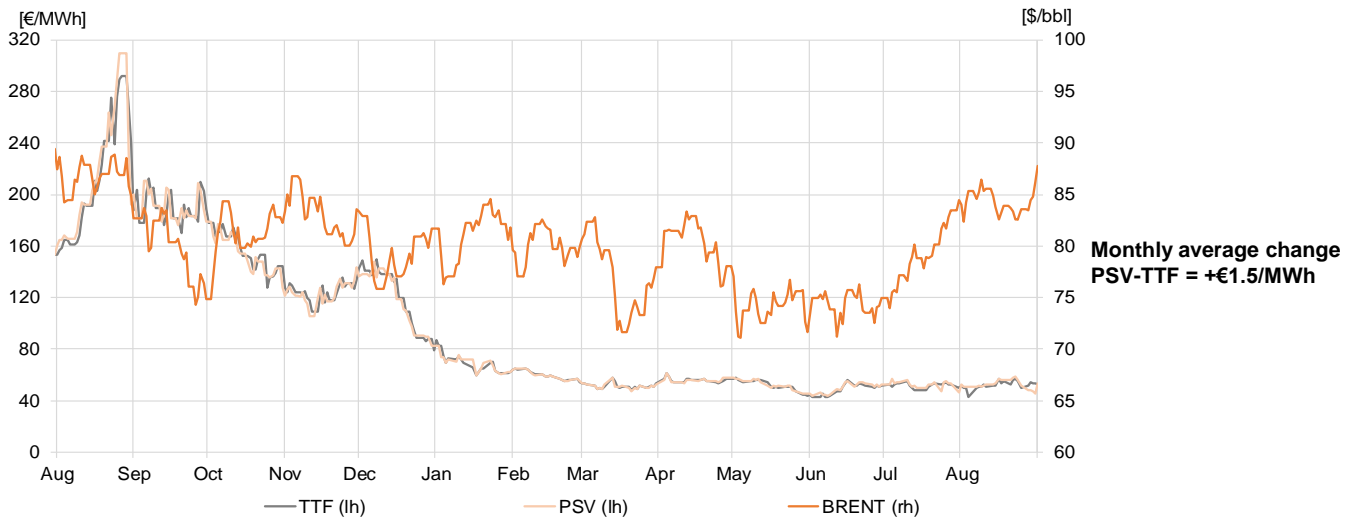
# Monthly Report on the Electricity System

## August 2023

Electricity Market

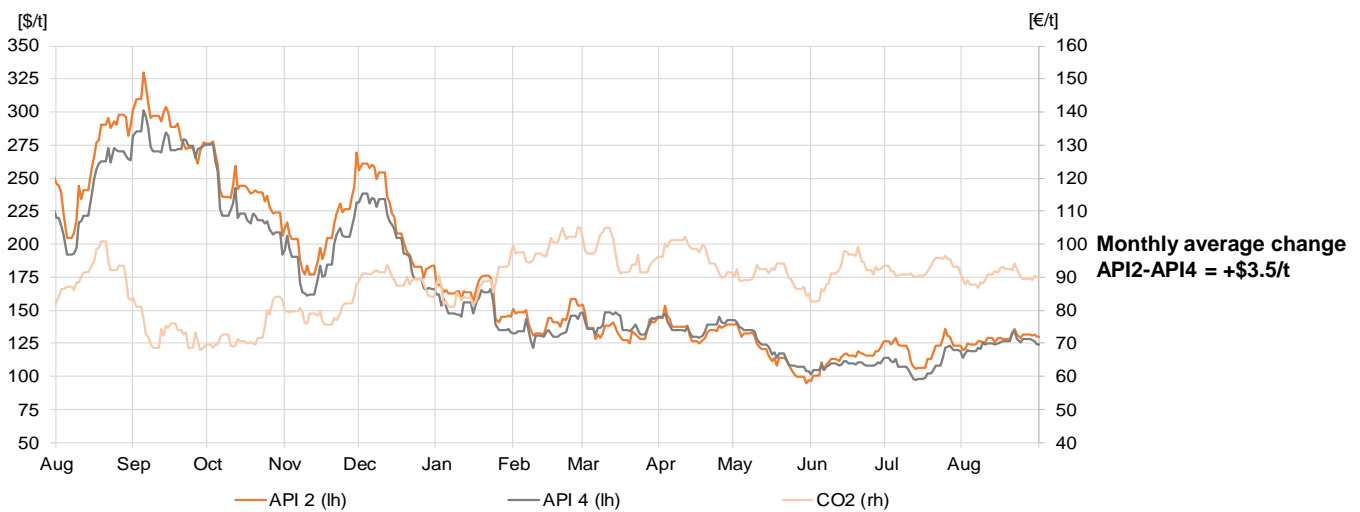


### Year+1 Forward Gas & Oil Prices



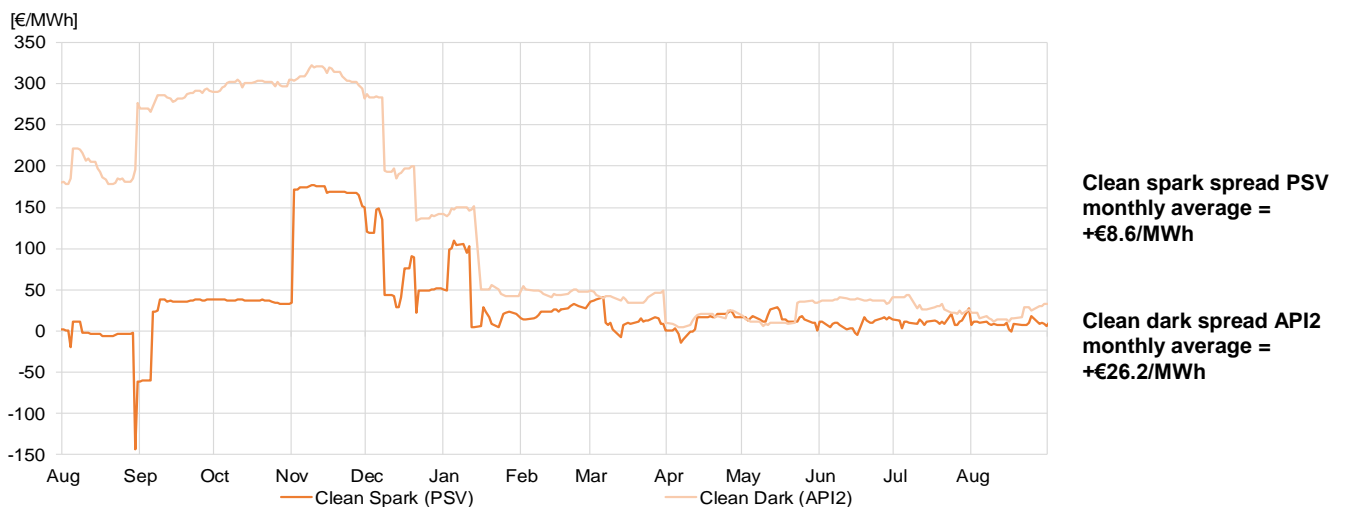
Source: Terna calculation on Bloomberg data

### 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 CO2 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 CO2 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.

# Monthly Report on the Electricity System

August 2023

**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 index was constructed based on the size of the monthly withdrawals of the approximately 530 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.

### Disclaimer

---

1. The 2022 and 2023 monthly electricity balances are provisional.
2. More specifically, the monthly electricity reports for 2023 – prepared at the end of each month – are subject to further and precise 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).