

Monthly Report on the Electricity System July 2023



Monthly Report on the Electricity System

July 2023

1

Energy Balance Sheets

page 5

In the month of July, electricity demand was 30,083 GWh, down compared to the same month of the previous year (-3.3%) and compared to July 2021 (-1.1%). There was also a drop in foreign exchange (-8.8%) compared to the same month of 2022. In 2023, electricity demand (180,594 GWh) decreased compared to the same period in 2022 (-5.0%) and compared to the cumulative figure for 2021 (-2.8%).

The value of electricity demand was achieved with the same number of working days (21) and with an average monthly temperature approximately 0.3°C lower than July last year. When adjusted for seasonal and temperature effects, the figure represents a -2.6% variation. The annual trend for July 2023 (compared to July 2022) decreased by 1.2% with raw data.

In July 2023, 47.2% of the electricity demand was met via production from Non-Renewable Energy Sources, 38.4% via Renewable Energy Sources and the remainder via foreign exchange. In 2023, electricity demand was 180,594 GWh, 47.2% of which was met via production from Non-Renewable Energy Sources, 35.9% from Renewable Energy Sources and the remainder from the foreign balance.

In July, production from Renewable Energy Sources increased (+18.7%) compared to the same month of the previous year. Specifically, there was an increase in renewable hydroelectric production (+32.4%), solar production (+12.0%) and wind production (+31.8%).

In 2023, the operating capacity of renewables increased by 2,956 MW. This value is 1,515 MW higher (+105%) compared to the same period of the previous year.

The July total for withdrawal programmes on the DAM was approximately €3.1 billion, up 25% compared to the previous month and down 76% compared to July 2022.

In July, the spread between average bid-up and bid-down prices on the MSD was € 127/MWh, up by 21% compared to the previous month and down by 49% compared to July 2022. Total volumes increased compared to the previous month (+36%).

In July, the spread between bid-up and bid-down prices on the Balancing Market was € 120/MWh, down on the previous month (€ 142/MWh) and down compared to July 2022 (€ 430/MWh; -72%). Total volumes increased compared to the previous month (+25%).



2

Electricity System

page 13

3

Electricity Market

page 18

Monthly Report on the Electricity System

July 2023

Monthly Report on the Electricity System

July 2023

Energy Balance Sheets



Monthly Summary and Short-Term Analysis

In the month of July, electricity demand was 30,083 GWh, down compared to the same month the previous year (-3.3%) and compared to July 2021 (-1.1%). There was also a drop in foreign exchange (-8.8%) compared to the same month of 2022.

In 2023, electricity demand (180,594 GWh) increased compared to the same period in 2022 (-5.0%) and compared to the cumulative figure for 2021 (-2.8%).

Demand breakdown – coverage by sources

[GWh]	Jul 2023	Jul 2022	%23/22	Jan-Jul 23	Jan-Jul 22	%23/22
Renewable Hydro	4.445	3.357	32,4%	20.438	16.955	20,5%
Pumping Production ⁽²⁾	104	165	-37,0%	910	1.051	-13,4%
Thermal	15.667	18.138	-13,6%	95.366	113.666	-16,1%
of which Biomass	1.429	1.429	0,0%	9.646	10.109	-4,8%
of which Hard Coal	1.041	2.130	-51,1%	9.074	11.766	-22,9%
Geothermal	447	454	-1,5%	3.101	3.189	-2,8%
Wind	1.354	1.027	31,8%	12.696	12.668	0,2%
Photovoltaic	3.886	3.471	12,0%	18.951	17.911	5,8%
Net Total Production	25.903	26.611	-2,7%	151.462	165.440	-8,4%
Pumping	148	235	-37,0%	1.300	1.501	-13,4%
Net Total Production for Consumption	25.755	26.376	-2,4%	150.162	163.939	-8,4%
of which RES ⁽³⁾	11.561	9.737	18,7%	64.832	60.832	6,6%
of which not RES	14.194	16.639	-14,7%	85.330	103.107	-17,2%
Import	4.651	4.956	-6,2%	32.287	28.452	13,5%
Export	323	211	53,1%	1.855	2.270	-18,3%
Net Foreign Exchange	4.328	4.745	-8,8%	30.432	26.182	16,2%
Electricity demand ⁽¹⁾	30.083	31.121	-3,3%	180.594	190.121	-5,0%

In July 2023, photovoltaic production (+12%), renewable hydroelectric production (+32.4%) and wind production (+31.8%) were up, and thermal production (-13.6%) was down compared to the same month the previous year. In 2023, there was a change in exports, which dropped (-18.3%) compared to 2022. The trend in total net production for consumption in July was down (-2.4%) 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 -

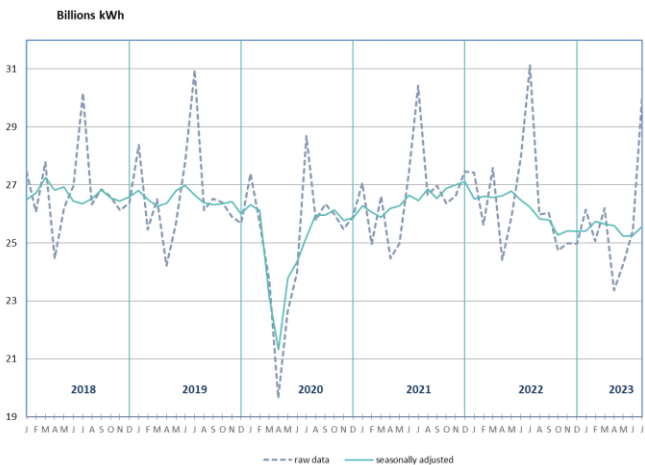
Source: Terna

The value of electricity demand was achieved with the same number of working days (21) and with an average monthly temperature approximately 0.3°C lower than July last year. When adjusted for seasonal and temperature effects, the figure represents a -2.6% variation.

In the first seven months of the year, national demand decreased by 5.0% compared to the corresponding period in 2022 (-4.0% adjusted value).

The monthly data for July 2023, adjusted for calendar and temperature effects, recorded an increase (+1.2%) in electricity demand compared to June 2023.

Demand – seasonality adjusted



The value, adjusted for seasonal, calendar and temperature effects, shows positive cyclical change (+1.2%).

Source: Terna

Monthly Report on the Electricity System

July 2023

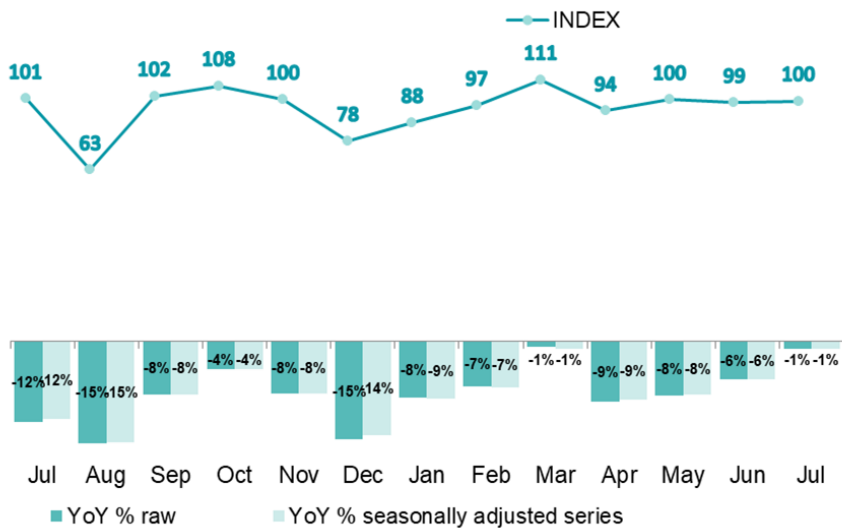
Energy Balance Sheets

1

IMCEI

The trend for July 2023 (compared to July 2022) was down by 1.2% based on raw data. Using data adjusted for calendar differences, there is no change. In the first seven months of 2023, industrial electricity consumption decreased by 5.7% compared to the same period in 2022.

IMCEI short-term analysis (2015 base = 100)

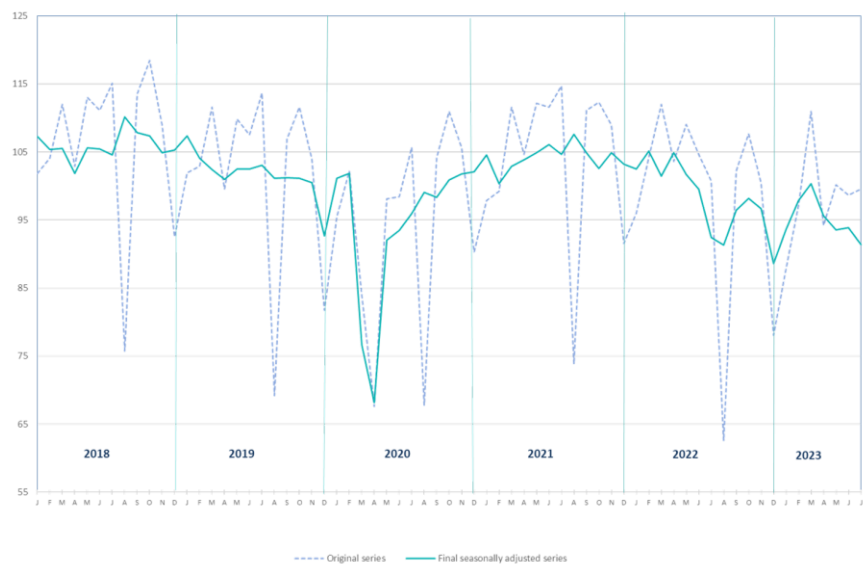


In July, the change in the monthly index of Italian electricity consumption decreased by 1.2% compared to July 2022.

Source: Terna

The short-term data adjusted for seasonal and calendar effects for the industrial electricity consumption index decreased by 2.6% in July 2023 compared to June.

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



When adjusted for seasonal and calendar effects, the monthly figure for July 2023 dropped 2.6% compared to the previous month.

Source: Terna

Monthly Report on the Electricity System

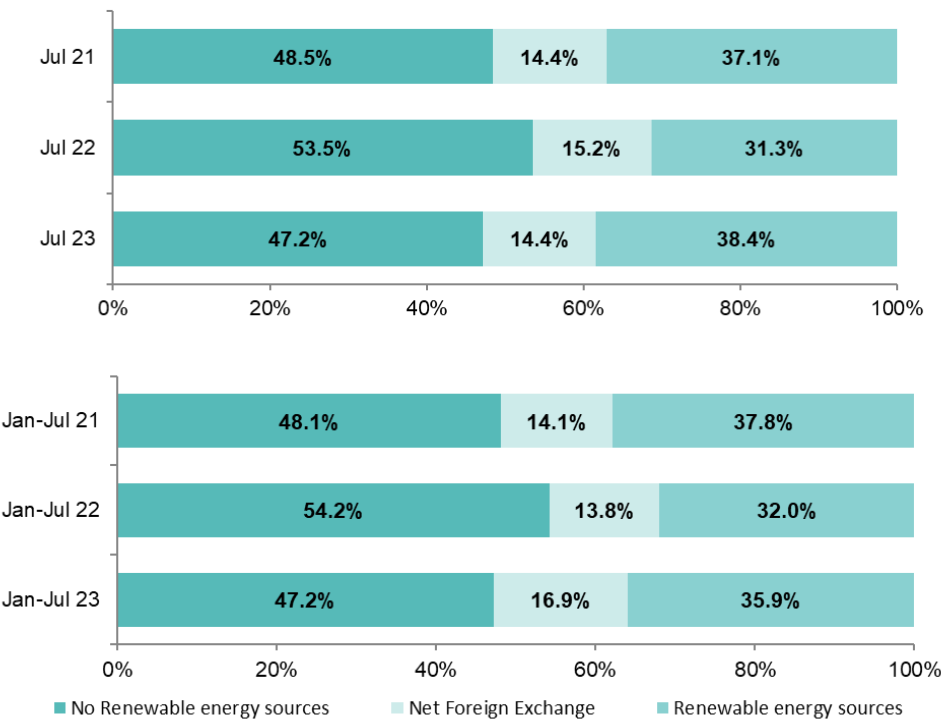
July 2023

Energy Demand Mix

In July 2023, 47.2% of the electricity demand was met by production from Non-Renewable Energy Sources, 38.4% from Renewable Energy Sources and the remainder via foreign exchange.

In 2023, electricity demand was 180,594 GWh, 47.2% of which was met via production from Non-Renewable Energy Sources, 35.9% from Renewable Energy Sources and the remainder from the foreign balance.

Demand breakdown – coverage by sources

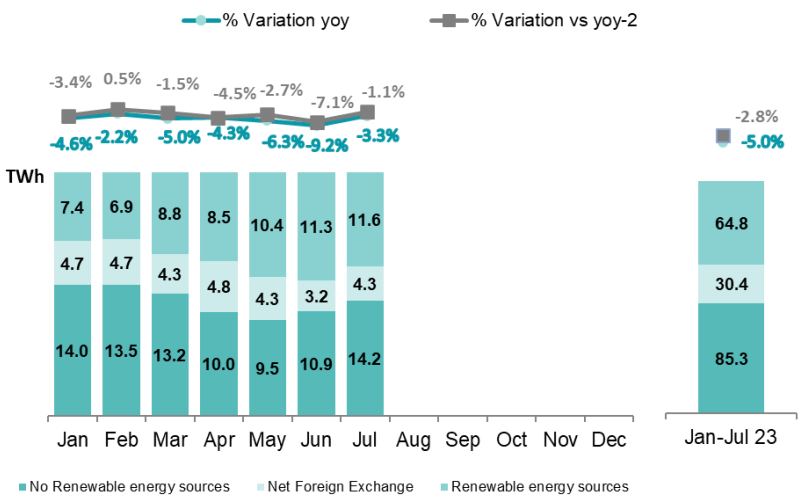


Coverage of demand from renewable sources grew from 31.3% in July 2022 to 38.4% in July 2023.

Coverage of demand from non-renewables fell from 54.2% in 2022 to 47.2% 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 (-5.0%) and down compared to the cumulative figure for 2021 (-2.8%). In 2023, energy production from renewable sources totalled 64.8 TWh, an increase compared to 2022 (+6.6%).

Source: Terna

Monthly Report on the Electricity System

July 2023

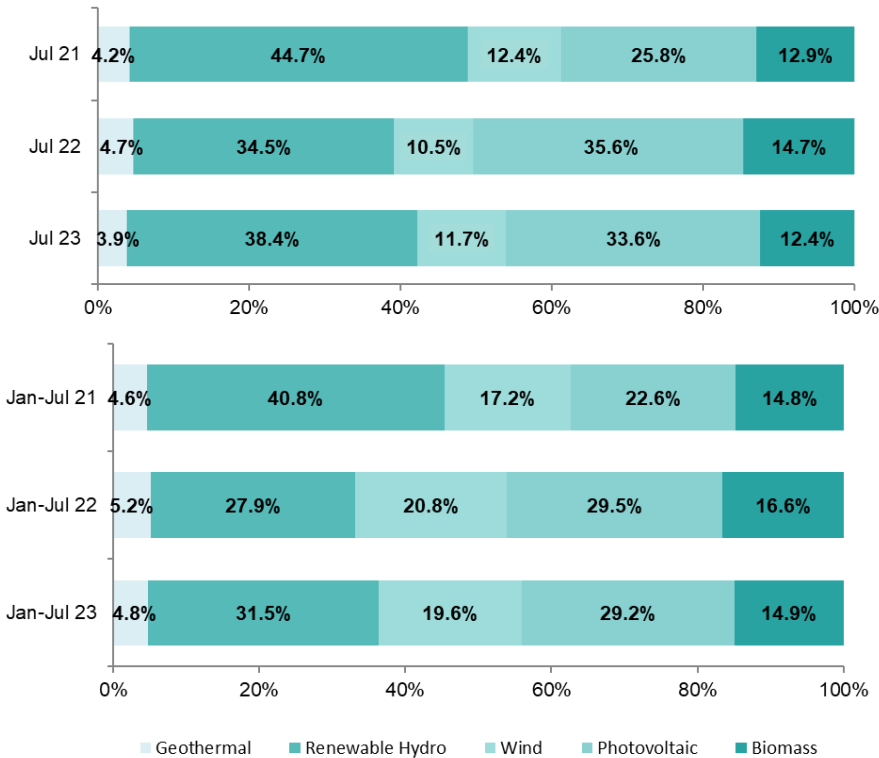
Energy Balance Sheets

1

Details of Renewable Energy Sources

In July, production from Renewable Energy Sources increased (+18.7%) compared to the same month of the previous year. Specifically, there was an increase in renewable hydroelectric production (+32.4%), solar production (+12.0%), and wind production (+31.8%).

RES Production - Breakdown

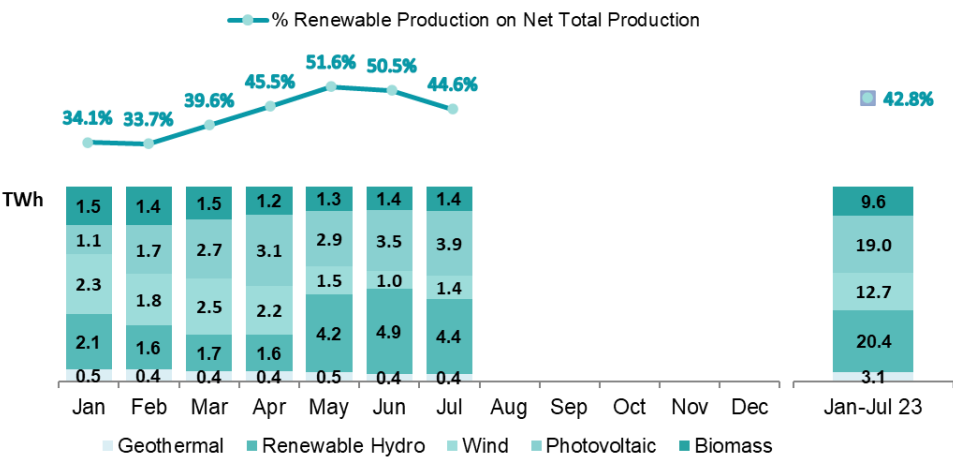


In July 2023, the greater contribution of renewable energy sources to the total is attributed to renewable hydroelectric production (38.4%) and photovoltaic production (33.6%).

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 July 2023, production from RES represented 44.6% of total net national production, an increase compared to the same month in 2022 (36.6%). In 2023, production from RES represented 42.8% of total net national production, an increase compared to the cumulative figure for 2022 (36.8%).

Source: Terna

Monthly Report on the Electricity System

July 2023

Historical Energy Balance Sheets

In 2023, total net production allocated for consumption (150,162 GWh) met 83.1% of national electricity demand (180,594 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						20,438
Pumping Production ⁽²⁾	137	99	172	168	135	95	104						910
Thermal	15,569	14,866	14,712	11,307	10,915	12,330	15,667						95,366
of which Biomass	1,463	1,368	1,471	1,245	1,309	1,361	1,429						9,646
of which Hard Coal	2,295	1,868	1,881	202	561	1,226	1,041						9,074
Geothermal	458	414	442	442	462	436	447						3,101
Wind	2,277	1,802	2,547	2,165	1,515	1,036	1,354						12,696
Photovoltaic	1,095	1,734	2,665	3,105	2,929	3,537	3,886						18,951
Net Total Production	21,617	20,496	22,196	18,768	20,146	22,336	25,903						151,462
Pumping	195	142	246	240	193	136	148						1,300
Net Total Production for Consumption	21,422	20,354	21,950	18,528	19,953	22,200	25,755						150,162
of which RES ⁽³⁾	7,374	6,898	8,783	8,538	10,405	11,272	11,561						64,832
of which not RES	14,048	13,456	13,167	9,990	9,548	10,928	14,194						85,330
Import	5,080	4,944	4,445	5,005	4,616	3,546	4,651						32,287
Export	352	233	188	170	275	314	323						1,855
Net Foreign Exchange	4,728	4,711	4,257	4,835	4,341	3,232	4,328						30,432
Electricity demand ⁽¹⁾	26,150	25,065	26,207	23,363	24,294	25,432	30,083						180,594

In 2023, net total production was down (-8.4%) 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 ⁽²⁾	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
Net Total Production	25,045	22,330	24,373	21,252	21,584	24,245	26,611	23,416	22,650	21,410	20,972	22,485	276,373
Pumping	167	236	259	251	208	145	235	223	226	211	198	174	2,533
Net Total Production for Consumption	24,878	22,094	24,114	21,001	21,376	24,100	26,376	23,193	22,424	21,199	20,774	22,311	273,840
of which RES ⁽³⁾	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
Net Foreign Exchange	2,541	3,531	3,480	3,420	4,560	3,905	4,745	2,788	3,608	3,534	4,213	2,662	42,987
Electricity demand ⁽¹⁾	27,419	25,625	27,594	24,421	25,936	28,005	31,121	25,981	26,032	24,733	24,987	24,973	316,827

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

Monthly Report on the Electricity System

July 2023

Energy Balance Sheets

1

Demand by Operational Area

In July 2023, there was a decrease in demand in the Northern zone (TO, MI, VE) and in the Centre (RM, FI), and an increase in the Southern zone (NA) 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
July 2023	2,827	6,081	4,367	4,630	4,417	4,800	2,102	859
July 2022	2,995	6,481	4,623	4,969	4,535	4,711	1,884	923
% July 23/22	-5.6%	-6.2%	-5.5%	-6.8%	-2.6%	1.9%	11.6%	-6.9%
Cumulated 2023	17,948	38,404	27,732	28,244	25,706	26,393	11,200	4,967
Cumulated 2022	18,987	40,960	29,409	29,985	26,964	27,502	11,006	5,308
% Cumulated 23/22	-5.5%	-6.2%	-5.7%	-5.8%	-4.7%	-4.0%	1.8%	-6.4%

In 2023, the Y-o-Y percentage change in demand is -5.9% in the North, -5.3% in the Centre, -4.0% in the South and -0.9% for 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.

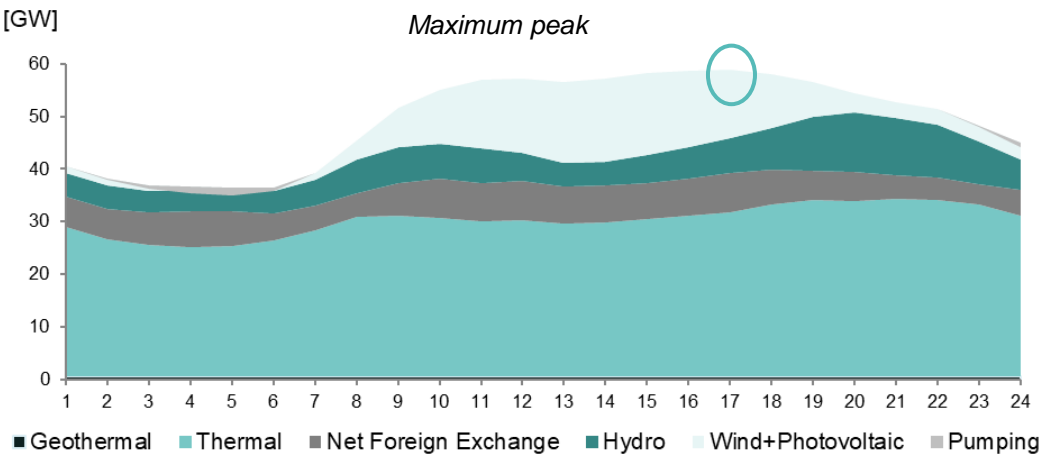
Monthly Report on the Electricity System

July 2023

Peak Demand

In July 2023, peak demand was recorded on **Wednesday 19 July, 16:00-17:00** and was 58,778 MW (+2.5% Y-o-Y). The hourly demand diagram of the peak day is presented below.

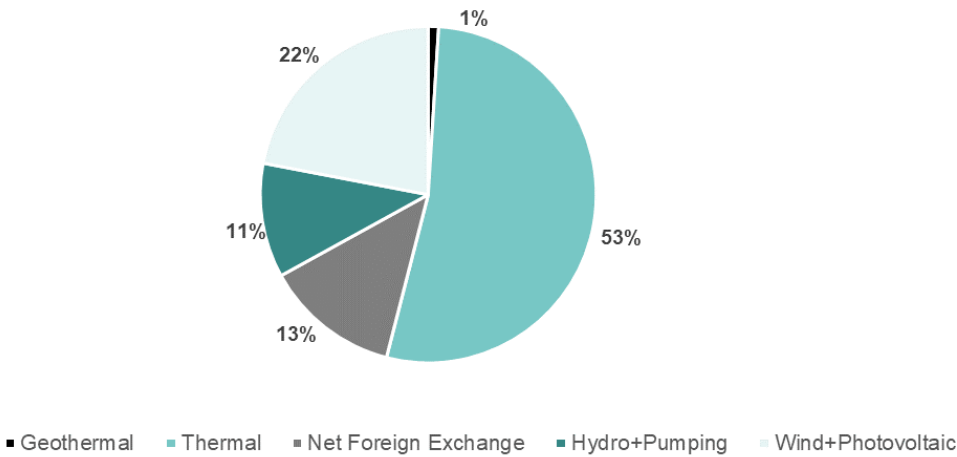
Peak Demand



At peak, the contribution from thermal production was 31,170 MW, a slight increase (+0.6%) compared to the contribution from thermal production at the July 2022 peak (30,986 MW).

Source: Terna

Coverage of demand – 19 July 2023 16:00-17:00



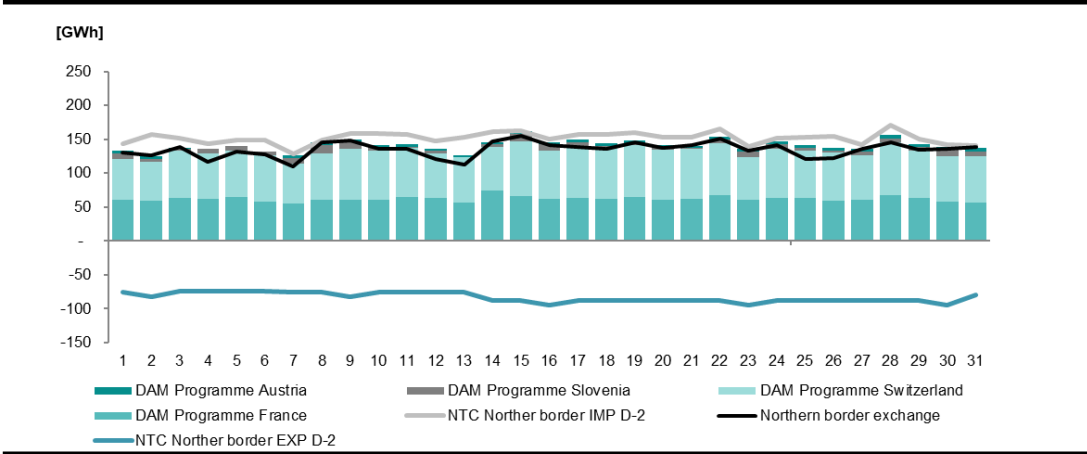
At its peak, production from wind and photovoltaic sources contributed to covering 22% of demand, with thermal production covering 53% and foreign exchange covering 13%.

Source: Terna

Net Foreign Exchange – July 2023

In July, 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

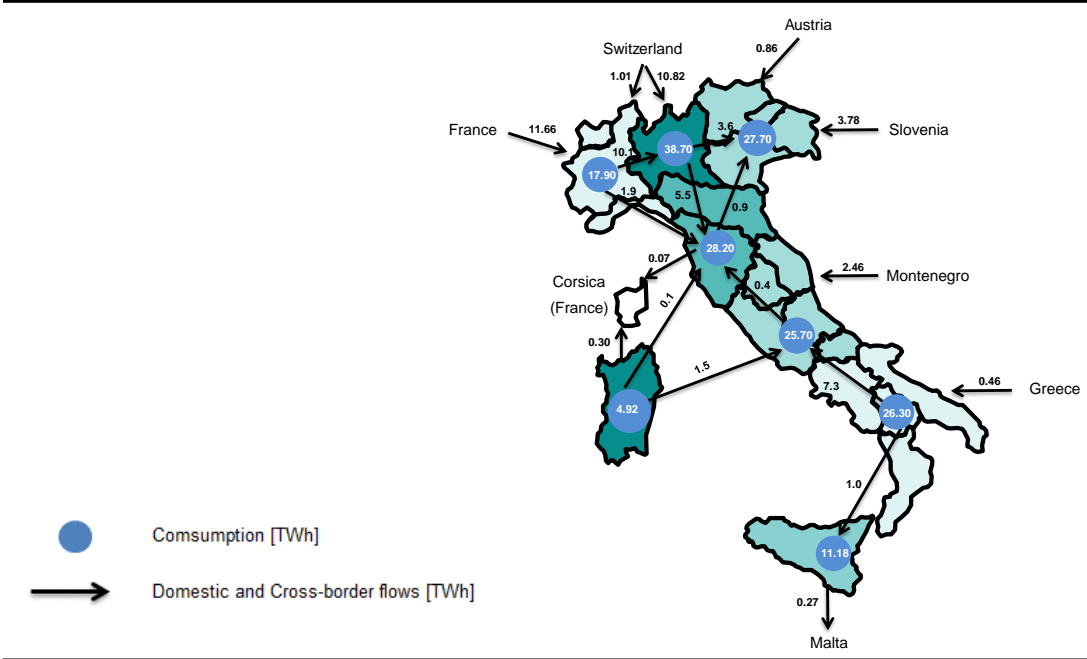


Source: Terna

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



Source: Terna

Monthly Report on the Electricity System

July 2023

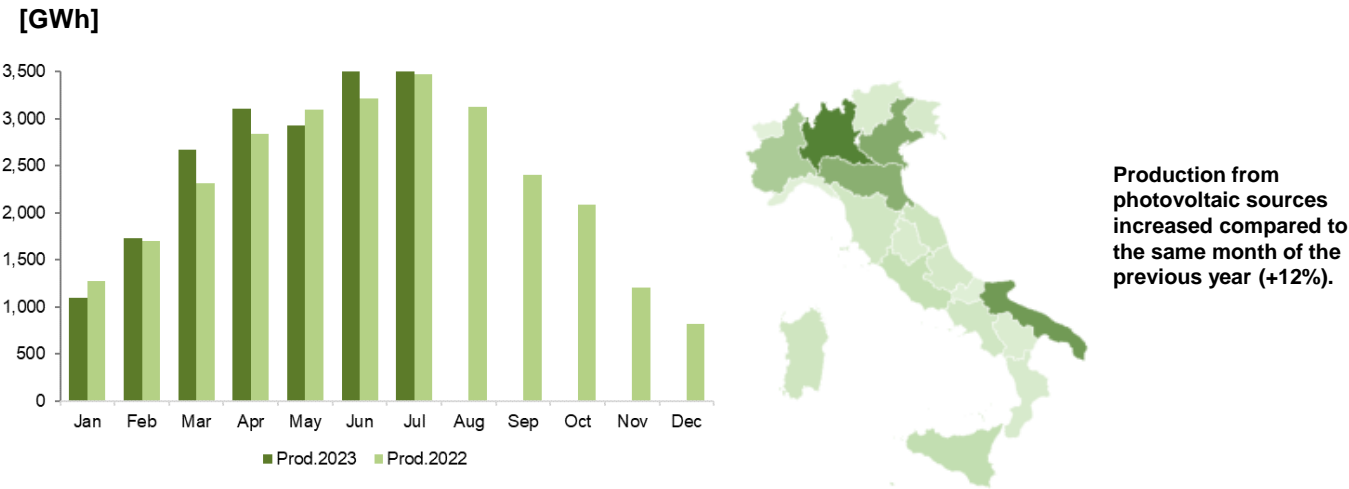
Electricity System

2

Production and Installed Capacity

Energy produced from photovoltaic sources in July 2023 reached 3,886 GWh, an increase compared to the same month of the previous year (+415 GWh).

Photovoltaic production (left) and distribution of operating capacity¹ (right)

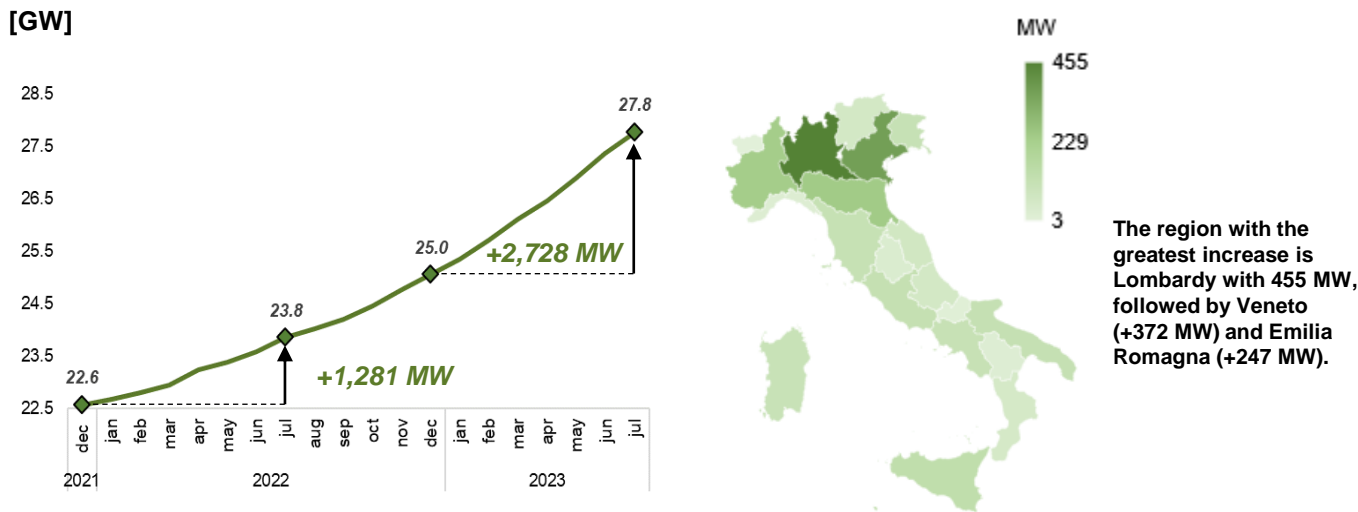


1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

In the first seven months of 2023, operating capacity increased by 2,728 MW. During the same period of 2022 the increase was 1,281 MW, recording an increase of 1,447 MW (+113%).

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



Source: Terna

Monthly Report on the Electricity System

July 2023

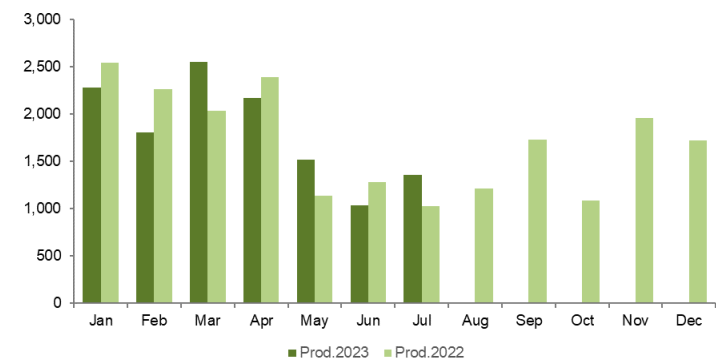
Electricity System



Energy produced from wind production sources in July 2023 reached 1,354 GWh, an increase compared to the same month of the previous year (+327 GWh).

Wind production (left) and distribution of operating capacity¹ (right)

[GWh]



Production from wind sources increased compared to the same month of the previous year (+31.8%).

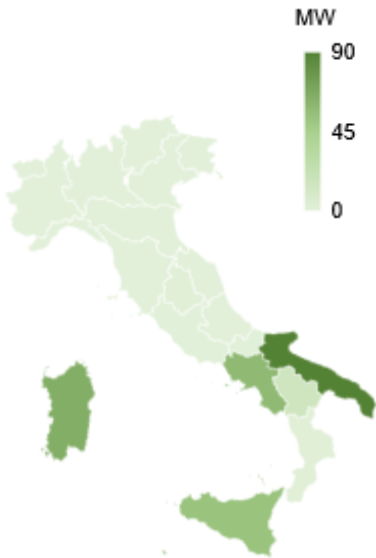
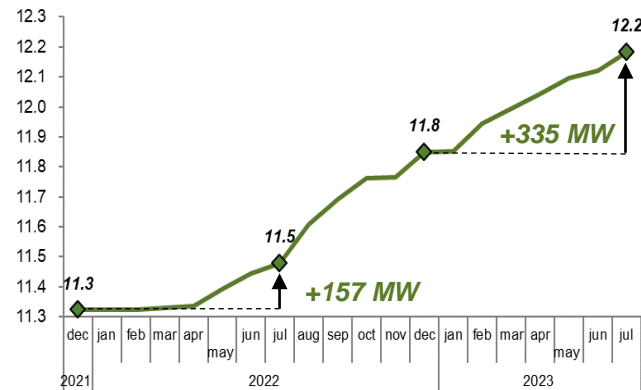
1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

In the first seven months of 2023, operating capacity increased by 335 MW. During the same period of 2022 the increase was 157 MW, recording an increase of 178 MW (+113%).

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 Sardinia (+65 MW) and Campania (+58 MW).

Source: Terna

Monthly Report on the Electricity System

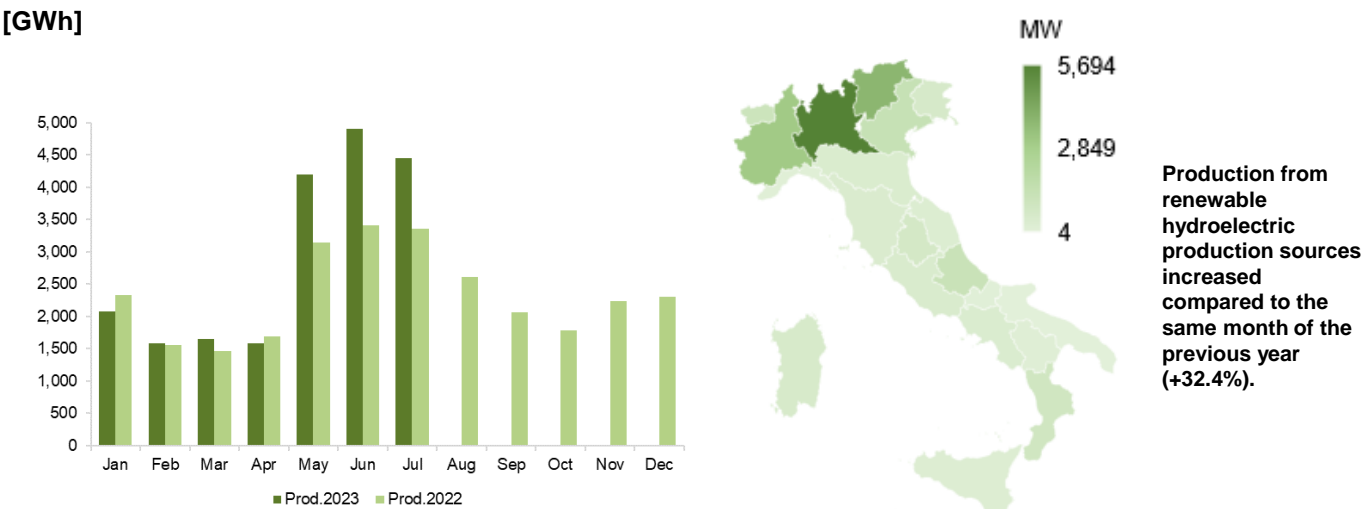
July 2023

Electricity System

2

Energy produced from renewable hydroelectric production sources in July 2023 reached 4,445 GWh, an increase compared to the same month of the previous year (+1,089 GWh).

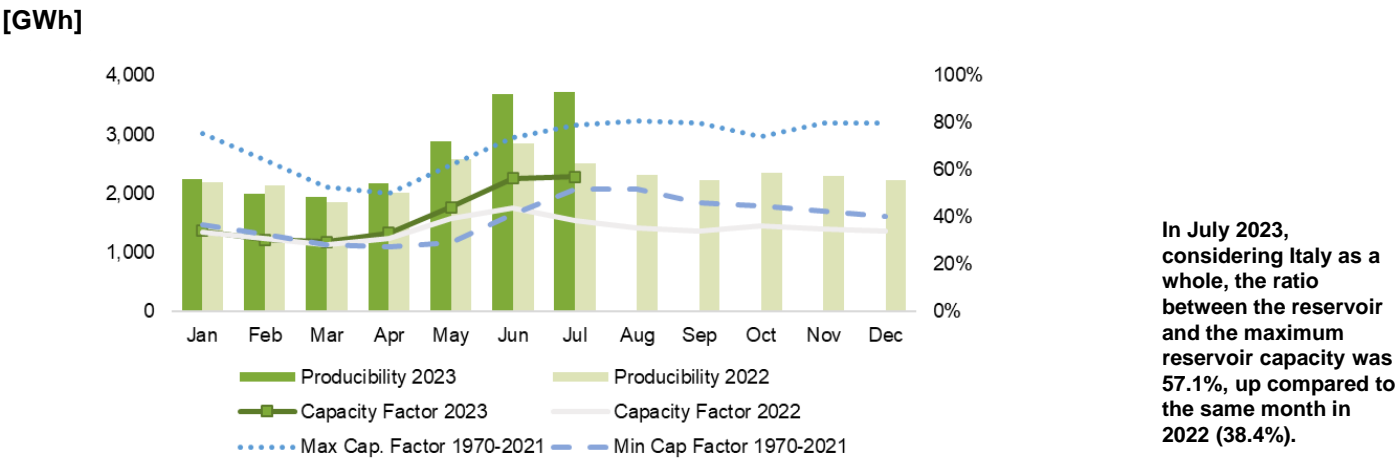
Renewable hydroelectric production (left) and distribution of operating capacity¹ (right)



Source: Terna

In July, hydroelectric producibility grew (+48.8%) 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 57.1%, up compared to the same month in 2022 (38.4%).

Reservoir Capacity		NORTH	CENTRE SOUTH	ISLANDS	TOTAL
Jul 23 Jul 22	[GWh]	2,329	1,192	205	3,726
	% (capacity/max capacity)	53.8%	65.7%	53.9%	57.1%
	[GWh]	1,292	986	227	2,505
	% (capacity/max capacity)	29.9%	54.4%	59.7%	38.4%

Source: Terna

Monthly Report on the Electricity System

July 2023

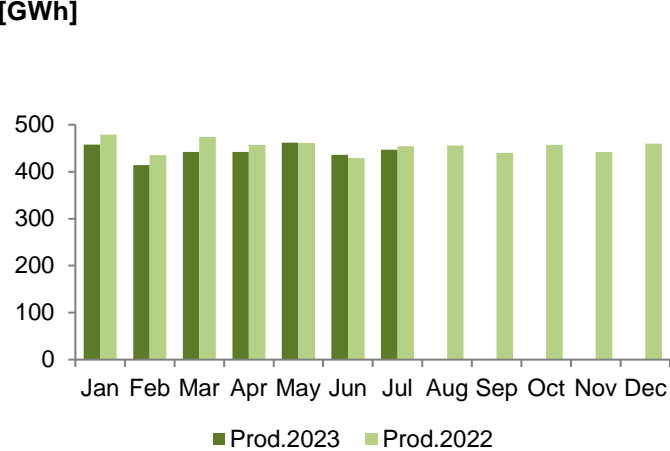
Electricity System



Energy produced from geothermal production sources in July 2023 reached 447 GWh, a decrease compared to the same month of the previous year (-7 GWh).

Geothermal production (left) and distribution of operating capacity¹ (right)

[GWh]



Production from geothermal sources decreased (-1.5%) compared to the same month of the previous year.

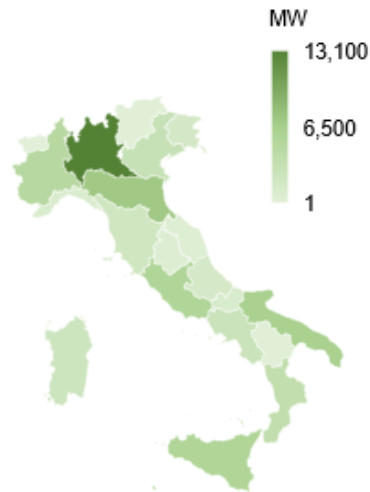
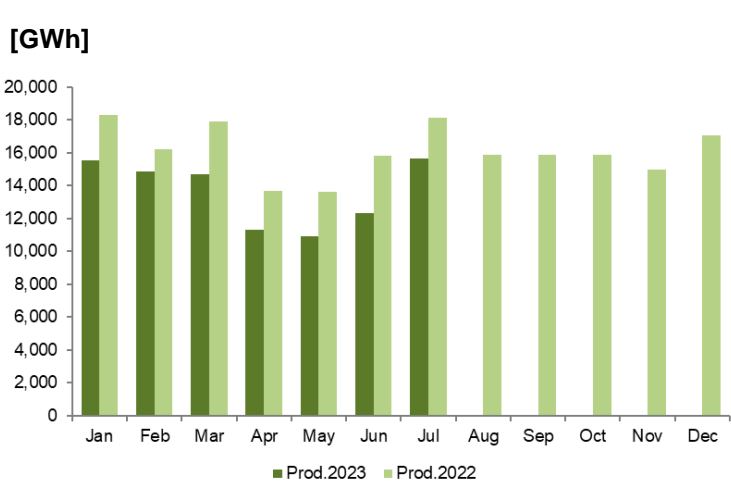
1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

Energy produced from thermal production sources in July 2023 reached 15,667 GWh, down compared to the same month of the previous year (-2,471 GWh).

Thermal production (left) and distribution of operating capacity¹ (right)

[GWh]



Production from thermal sources decreased (-13.6%) 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

July 2023

Electricity System



In 2023 the operating capacity of renewables increased by 2,956 MW. This value is 1,515 MW higher (+105%) compared to the same period of the previous year.

Variation in monthly operating capacity and number of plants per Source in Italy 2023¹

[MW]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	296	376	386	360	435	468	406						2,726
Wind	4	93	48	50	53	25	63						335
Hydroelectric	1	2	-111 ²	1	2	3	-6						-108
Geothermal & Biomass	-4	0	1	-2	9	1	-5						1
Total	297	471	324	409	499	498	458						2,956

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						232,419
Wind	0	17	7	3	3	3	5						38
Hydroelectric	6	3	8	3	12	6	3						41
Geothermal & Biomass	2	7	3	6	9	6	0						33
Total	29,659	35,834	37,604	30,702	35,509	33,737	29,486						232,531

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 2022¹

[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
Total	110	121	159	292	210	245	305	296	274	343	314	368	3,037

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
Total	9,026	10,049	13,424	10,516	14,383	14,698	15,694	15,642	18,938	26,118	28,536	29,176	206,200

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

Monthly Report on the Electricity System

July 2023

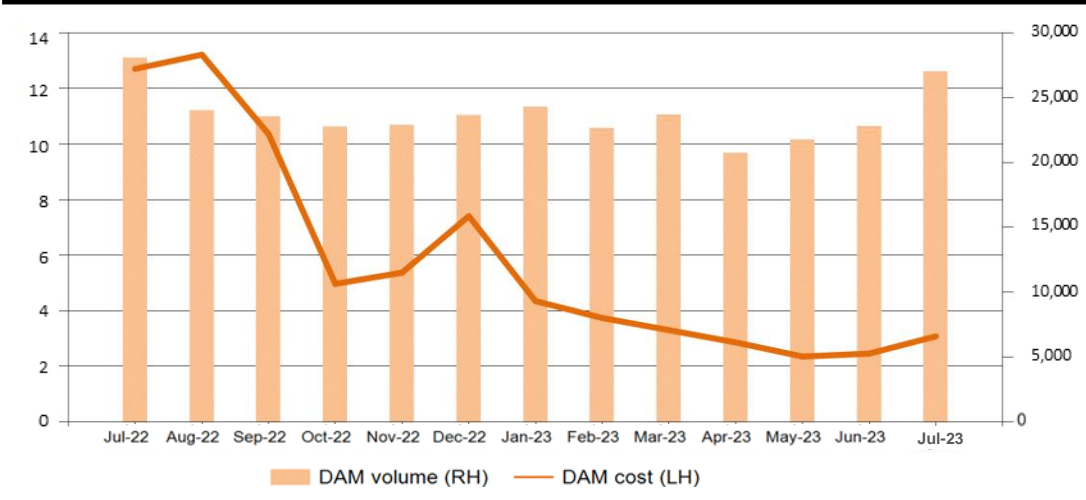
Electricity Market

3

Day-Ahead Market

The July total for withdrawal programmes on the DAM was approximately €3.1 billion, up 25% compared to the previous month and down 76% compared to July 2022. The change on a monthly basis is due to an increase in the PUN as well as volumes. The change on an annual basis is instead mainly due to a decrease in the average PUN from € 441.6/MWh (July 2022) to € 112.1/MWh (July 2023).

Day Ahead Market – amounts and volumes

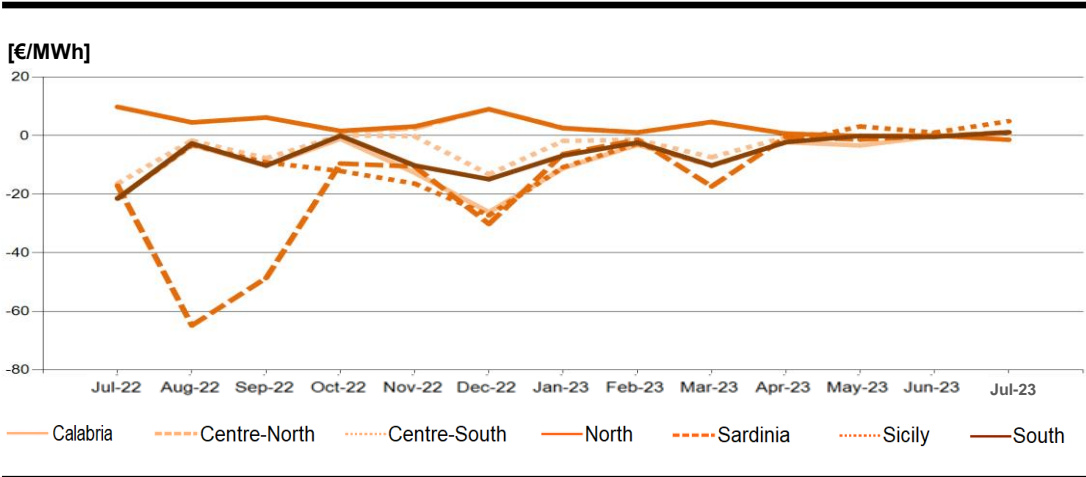


Total amount in July 2023 down 76% compared to July 2022.

Source: Terna calculation on GME data

In July, the zonal prices were basically in line with the PUN, with the exception of Sicily, which recorded a spread of +€4.9/MWh.

Spread compared to the PUN



July 2023 zonal prices in line with the PUN for all zones except Sicily.

Source: Terna calculation on GME data

Monthly Report on the Electricity System

July 2023

Electricity Market

3

The spread between the peak and off-peak prices in July 2023 was, on average, € 7.5/MWh. Specifically, the highest spread was recorded in the North, where it was € 9.8/MWh on average.

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

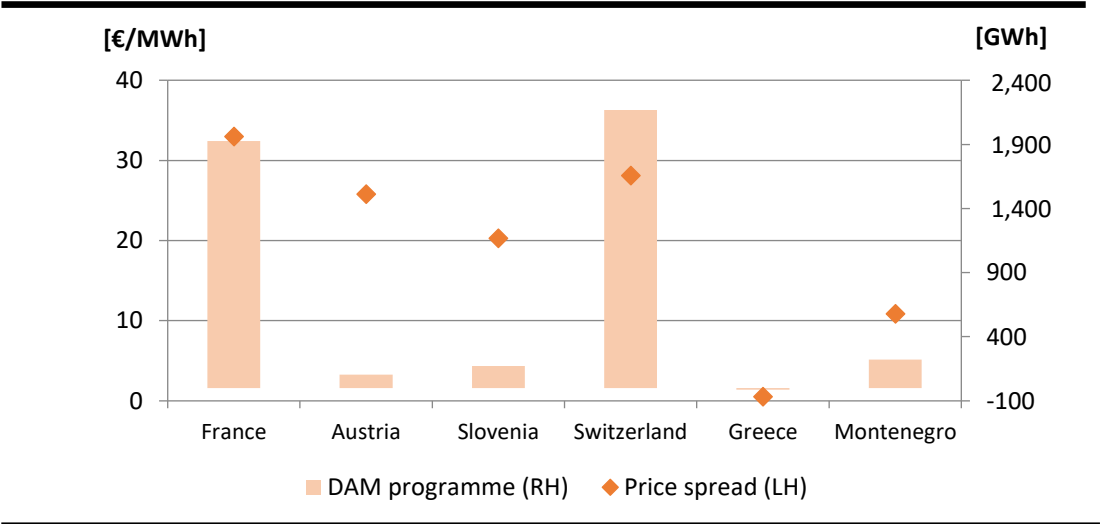
€/MWh	PUN	North	Centre-North	Centre-South	South	Sicily	Sardinia	Calabria
Average	112.1	110.6	112.6	113.2	113.2	117	113.2	113
Y-o-Y	-329.6	-340.8	-338.8	-312	-306.9	-303.3	-311.3	-307.2
Δ vs PUN	-	-1.5	0.5	1.1	1.1	4.9	1.1	0.9
Δ vs PUN 2021	-	9.8	9.8	-16.4	-21.5	-21.4	-17.2	-21.4
Peak	117.7	117.1	118	118.1	118	120.7	118.1	117.5
Off-Peak	109.2	107.3	109.9	110.7	110.7	115	110.7	110.7
Δ Peak vs Off-Peak	8.5	9.8	8.1	7.4	7.3	5.7	7.4	6.8
Minimum	40	40	40	40	40	40	40	40
Maximum	205	205	205	205	205	400	205	205

Peak/off-peak spread up compared to the previous month in the North, Centre-South, South, Sardinia and Calabria, down in all other zones.

Source: Terna calculation on GME data

July 2023 saw an increase in price spreads on the northern border compared to the previous month. Imports totalled 4.9 TWh, up compared to the previous month (+36%), with France accounting for 40% of the total and Switzerland 45%. Total exports were 0.3 TWh, with Greece accounting for 39%.

Price spread with foreign exchanges and day ahead programmes



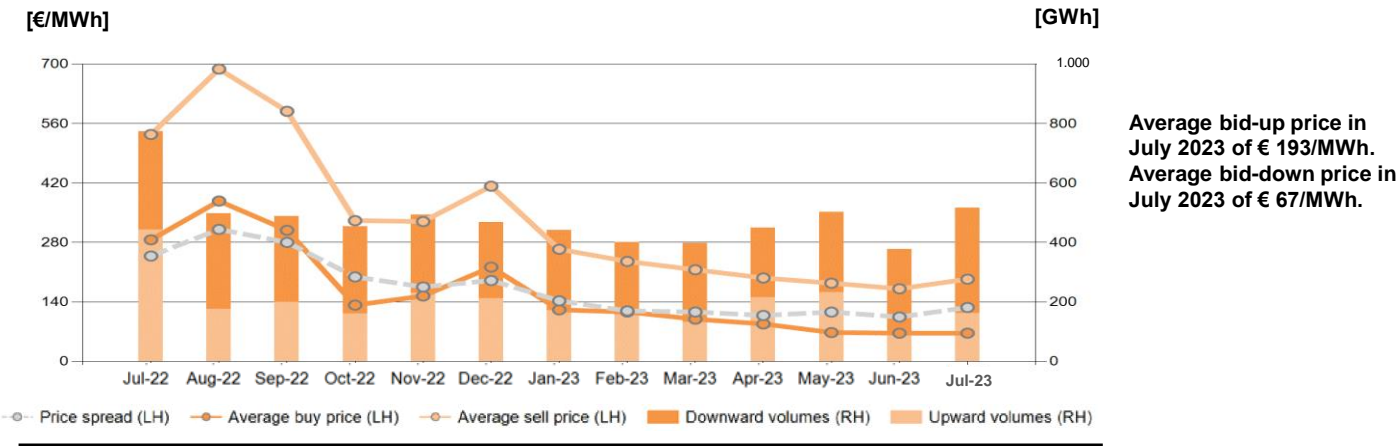
Net imports on the northern border of 4.4 TWh.

Source: Terna calculation

Ex-ante Ancillary Services Market

In July, the spread between average bid-up and bid-down prices was € 127/MWh, up by 21% compared to the previous month and down by 49% compared to July 2022. Total volumes increased compared to the previous month (+36%), in particular upward volumes increased by 62% and downward volumes increased by 27%. The upward volumes fell by 64%, while the downwards volumes rose by 7% compared to the same month of the previous year.

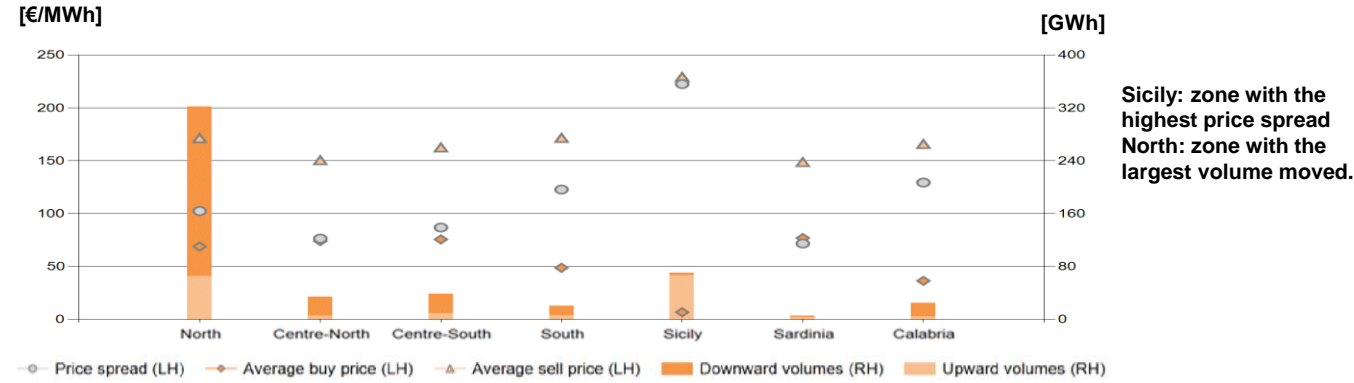
Ex-ante Ancillary Services - prices and volumes



Source: Terna

The market zone with the highest spread (€ 222/MWh) was Sicily, in line with the previous month. This spread was 18% higher than the previous month due to an 18% increase in the average bid-up price (from € 195/MWh in June to € 229/MWh in July) and a 20% increase in the average bid-down price (from € 6/MWh in June to € 7/MWh in July).

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

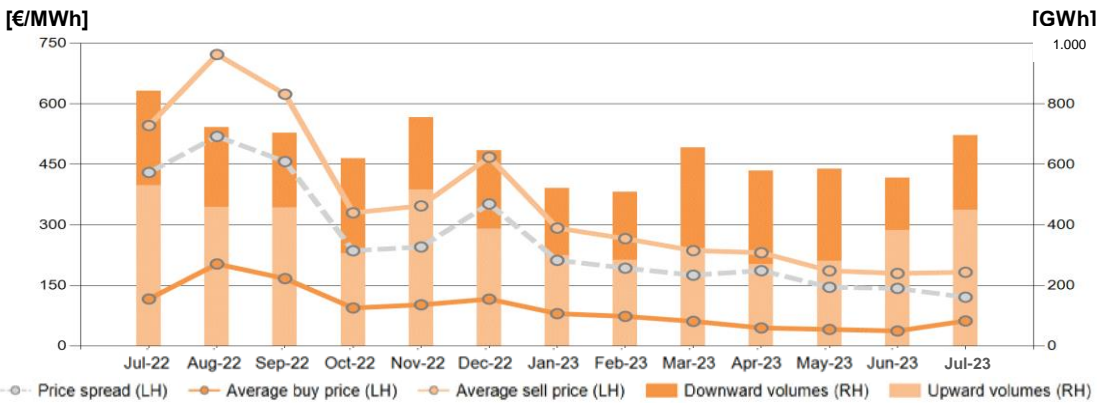


Source: Terna

Balancing Market

In July, the spread between bid-up and bid-down prices was € 120/MWh, down on the previous month (€ 142/MWh) and down compared to July 2022 (€ 430/MWh; -72%). Total volumes increased compared to the previous month (+25%), in particular upward volumes increased by 18% and downward volumes increased by 43%. Compared to July 2022, upward volumes decreased by 15% and downward volumes decreased by 21%.

Balancing market – prices and volumes

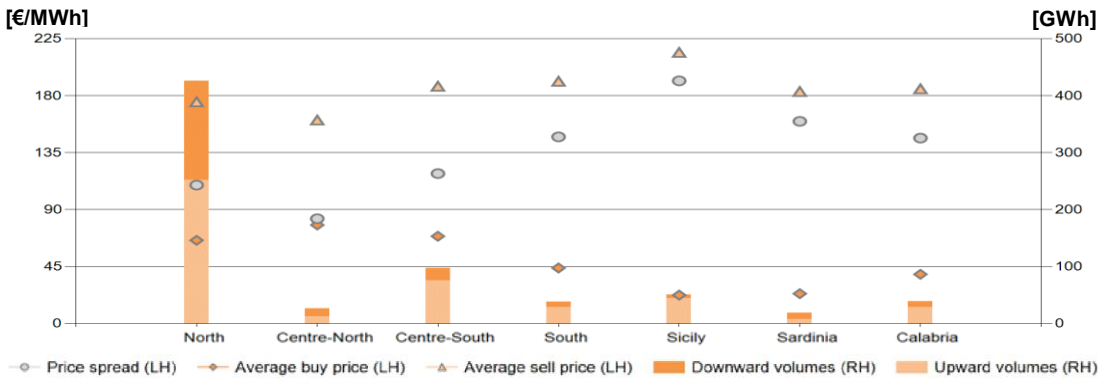


Average bid-up price in July 2023 of € 182/MWh. Average bid-down price in July 2023 of € 62/MWh.

Source: Terna

The market zone with the highest spread (€ 192/MWh) was Sicily, in line with the previous month (spread of € 217/MWh). In June, the Northern zone was confirmed as the zone featuring the highest downward volumes (174 GWh) and the highest upward volumes (252 GWh), as in the previous month. The price spread, on average equal to € 137/MWh, is decreasing in all zones, with the exception of Sardinia and the Southern zone.

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

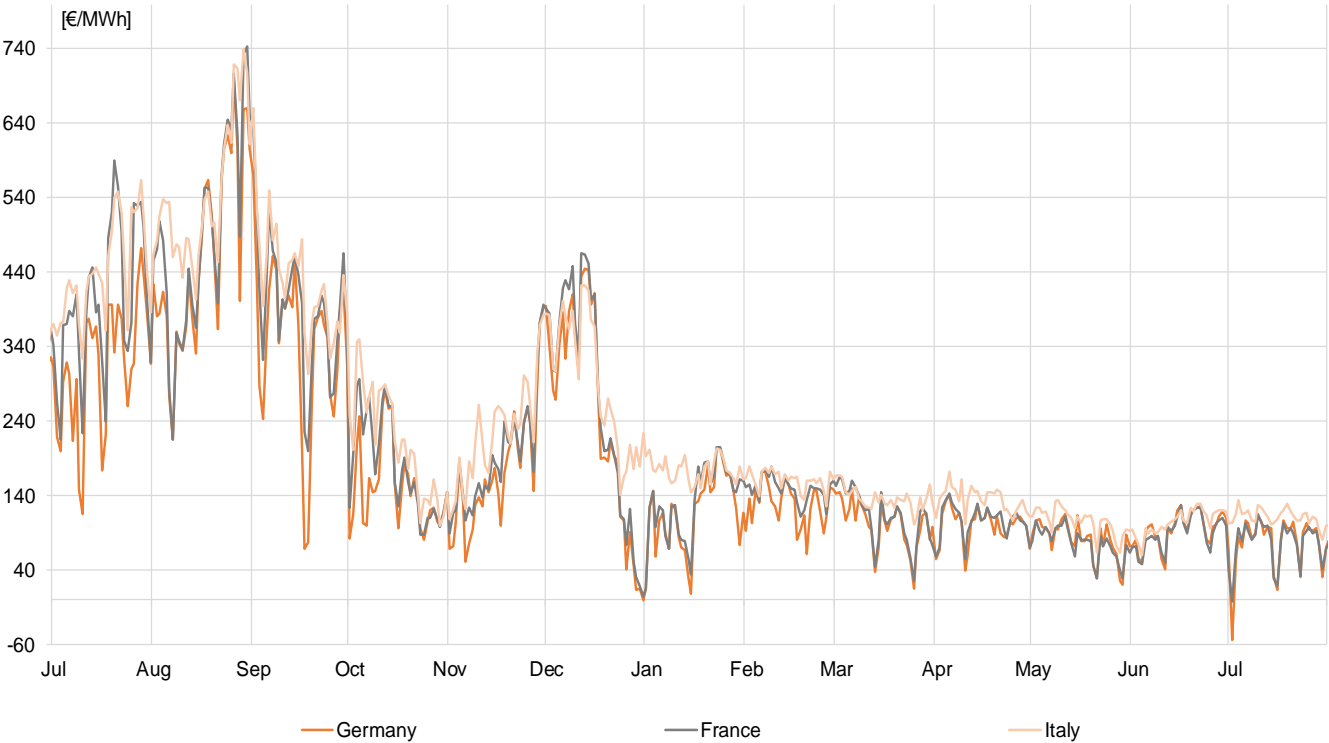
In July, Brent prices increased compared to June, recording an average value of \$80/bbl (+6.7%).

Coal prices (AP12) stood at \$111.2/t, down compared to the previous month (-1.2%).

European gas prices (TTF) in July decreased compared to June, with a monthly average of €29.8/MWh (-7.4% compared to the previous month). The PSV also recorded a decrease, settling at €32.6/MWh (-4.3%).

Electricity prices in Italy rose in July compared to the previous month, with a monthly average of €112.1/MWh (+6.4%). The French power exchange was down, with the price of electricity at €77.6/MWh (-14.9%), as was the German exchange, with the same value priced at €77.6/MWh (-18.1%).

Spot electricity prices



Source: Terna calculation on GME and EPEX data

Monthly Report on the Electricity System

July 2023

Electricity Market

3

Gas & Oil spot prices



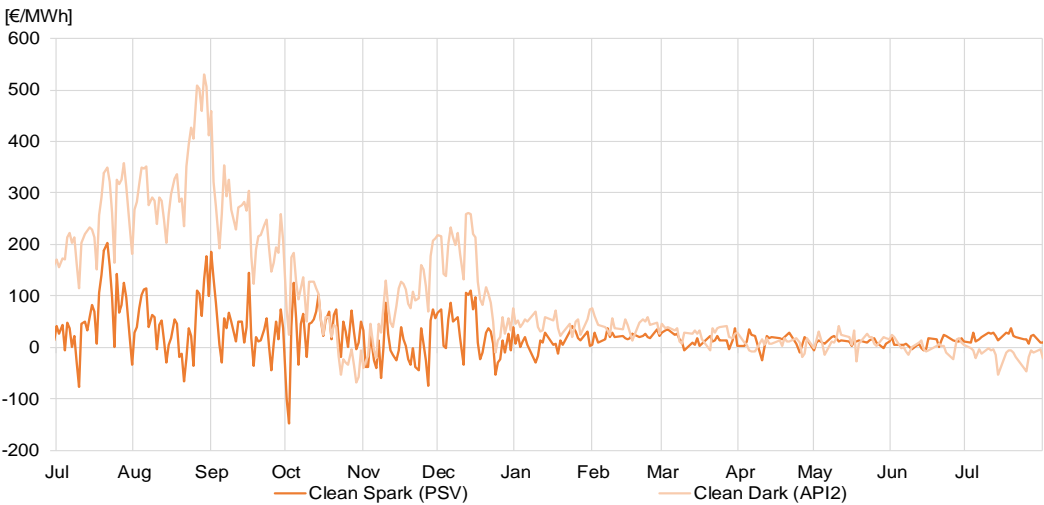
Source: Terna calculation on Bloomberg data

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 July, Brent forward prices recorded an average value of \$79.1/bbl, up compared to June (+6.3%).

The average forward prices of coal (API2) were up compared to June, settling at around \$120.3/t (+6.2%).

Forward prices of gas in Europe (TTF) were up compared to the previous month (+5.9%), settling at around €51.5/MWh. Forward prices in Italy (PSV) were also up, which showed an average figure of €52.3/MWh (+5.4%).

The average forward prices of electricity in Italy stood at around €147.3/MWh, up compared to the previous month (+3.2%). The French power exchange was down, where the price stood at around €162.2/MWh (-9.9%), with the opposite happening in Germany, where the price rose to around €139.1/MWh (+1.6%).

Forward Electricity Prices – Year+1



Source: Terna calculation on Bloomberg data

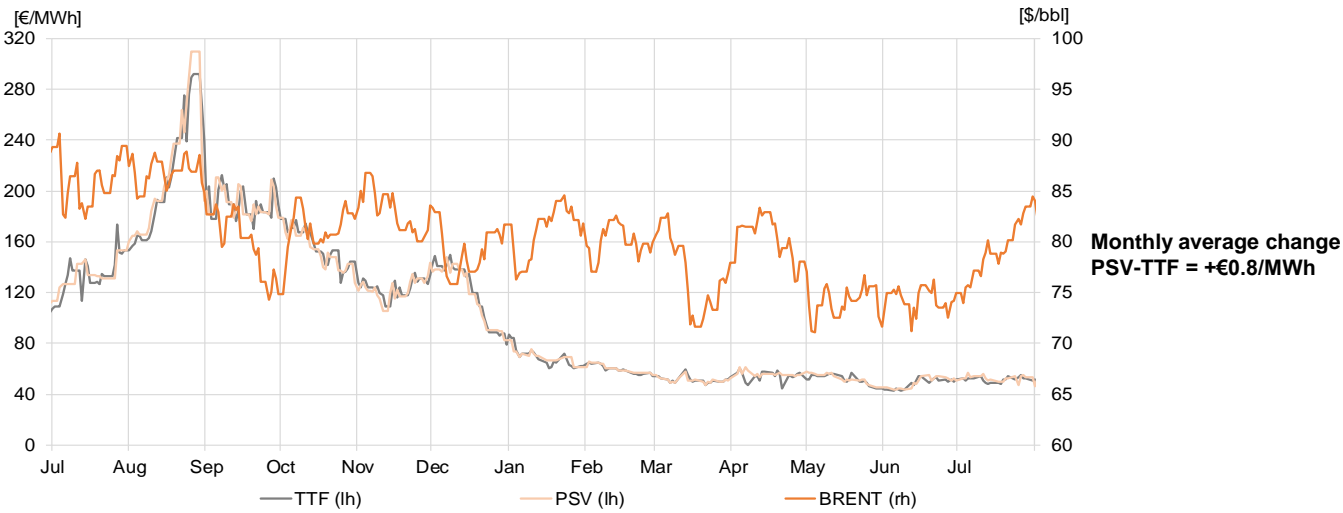
Monthly Report on the Electricity System

July 2023

Electricity Market

3

Year+1 Forward Gas & Oil Prices



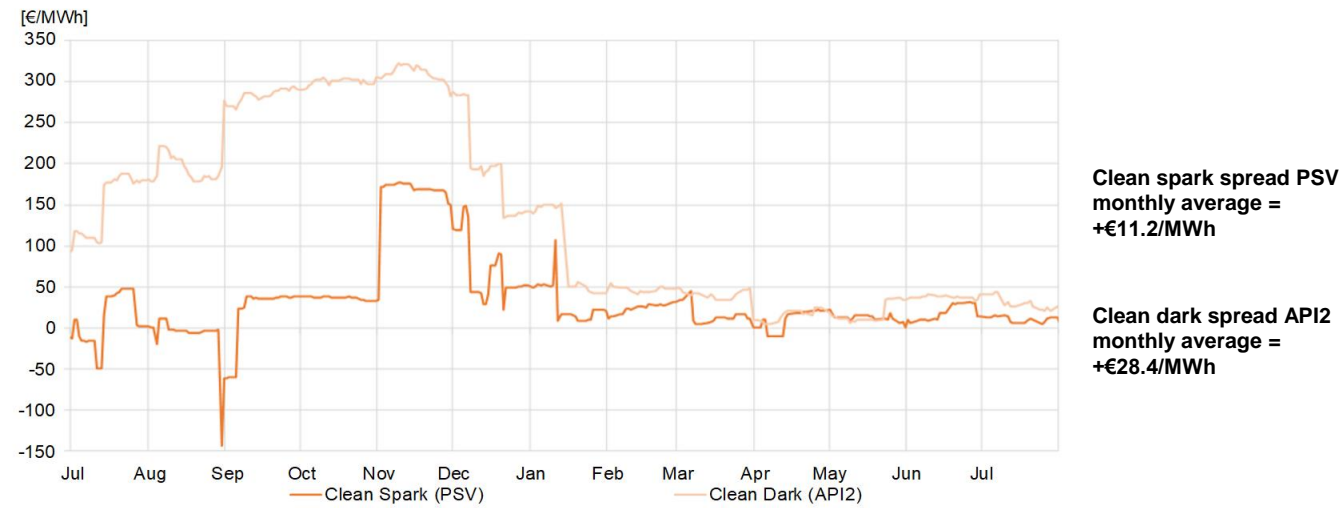
Source: Terna calculation on Bloomberg data

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

Monthly Report on the Electricity System

July 2023

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

July 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.

CO₂ 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.

Monthly Report On Electricity System

July 2023

Disclaimer

1. The monthly electricity balances for 2022 and 2023 are provisional
2. In particular, the monthly electricity reports of the year 2023 – prepared at the end of each month – are subject to further and precise verification or recalculation in the following months on the basis of 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.