

September 2022

Monthly Report on the Electricity System



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In September, electricity demand was 25,953 GWh, a decrease compared to the same month of the previous year (-3.9%) and was in line with September 2020 (-1.5%). There was also a drop in foreign exchange (-12.4%), compared to September 2021.

In 2022, electricity demand (240,923 GWh) increased slightly compared to the same period in 2021 (+1.3%) and compared to the cumulative figure for 2020 (+7.6%).

Considering that September 2022 had the same number of working days (22) but an average temperature 0.7°C lower than in September 2021, the figure adjusted for seasonal, temperature and calendar effects corresponds to a difference of -2.9%. The annual trend of September 2022 (compared to September 2021) for the industrial electricity consumption index decreased by 8% with raw data.

In September 2022, 55.0% of the electricity demand was met via production from Non-Renewable Energy Sources, 31.1% via Renewable Energy Sources and the remainder via foreign exchange.

In September, production from Renewable Energy Sources decreased (-2.1%) compared to the same month of the previous year. Specifically, there was a sharp decrease in renewable hydroelectric production (-30.0%) a strong increase in wind production (73.6%), as well as a slight increase in photovoltaic production (+1.7%).



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The September total for withdrawal programmes on the DAM was approximately €10.4Bn, down 22% compared to the previous month and up 165% compared to September 2021. In September, the spread between average bid-up and bid-down prices on the DSM was €280/MWh, down by 10% compared to the previous month and up by 132% compared to September 2021.

Total volumes decreased compared to the previous month (-2%).

In September, the spread between bid-up and bid-down prices on the Balancing Market was €457/MWh, down compared to the previous month (€519/MWh; -12%) and up compared to September 2021 (€121/MWh; +276%). Total volumes decreased compared to August (-3%).





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Monthly Summary and Short-Term Analysis

In September, electricity demand was 25,953 GWh, a decrease compared to the same month of the previous year (-3.9%) and was in line with September 2020 (-1.5%). There was also a drop in foreign exchange (-12.4%), compared to September 2021.

In 2022, electricity demand (240,923 GWh) increased compared to the same period in 2021 (+1.3%) and compared to the cumulative figure for 2020 (+7.6%).

Demand breakdown – coverage by sources

[GWh]	Sep 2022	Sep 2021	%22/21	Jan-Sep 22	Jan-Sep 21	%22/21
Hydro	2,240	3,124	-28.3%	23,221	37,229	-37.6%
of which Pumping Production	158	152	4.1%	1,365	1,390	-1.8%
Thermal	15,798	16,183	-2.4%	143,982	128,509	12.0%
of which Biomass	1,445	1,476	-2.1%	13,259	13,591	-2.4%
Geothermal	440	458	-3.9%	4,085	4,138	-1.3%
Wind	1,712	986	73.6%	15,487	14,410	7.5%
Photovoltaic	2,382	2,343	1.7%	23,547	21,437	9.8%
Net Total Production	22,572	23,094	-2.3%	210,322	205,723	2.2%
Pumping	226	217	4.1%	1,950	1,986	-1.8%
Net Total Production for Consumption	22,346	22,877	-2.3%	208,372	203,737	2.3%
of which Renewable Production ⁽³⁾	8,061	8,235	-2.1%	78,234	89,415	-12.5%
of which not Renewable Production	14,285	14,642	-2.4%	130,138	114,322	13.8%
Import	3,897	4,296	-9.3%	35,476	36,485	-2.8%
Export	290	179	62.0%	2,925	2,372	23.3%
Net Foreign Exchange	3,607	4,117	-12.4%	32,551	34,113	-4.6%
Electricity demand⁽¹⁾	25,953	26,994	-3.9%	240,923	237,850	1.3%

(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 = Hydro - Pumping production + Biomass + Geothermal + Wind + Photovoltaic

In September 2022, a significant increase in wind production (+73.6%) and a slight increase in photovoltaic production (+1.7%) was recorded, as was a decrease in thermoelectric production (-2.4%) and hydroelectric production (-28.3%), compared to the previous year.

In 2022, there was an increase in exports (+23.3%) compared to the same period in 2021. The trend of total net production in September was down (-2.3%) compared to the same period in 2021.

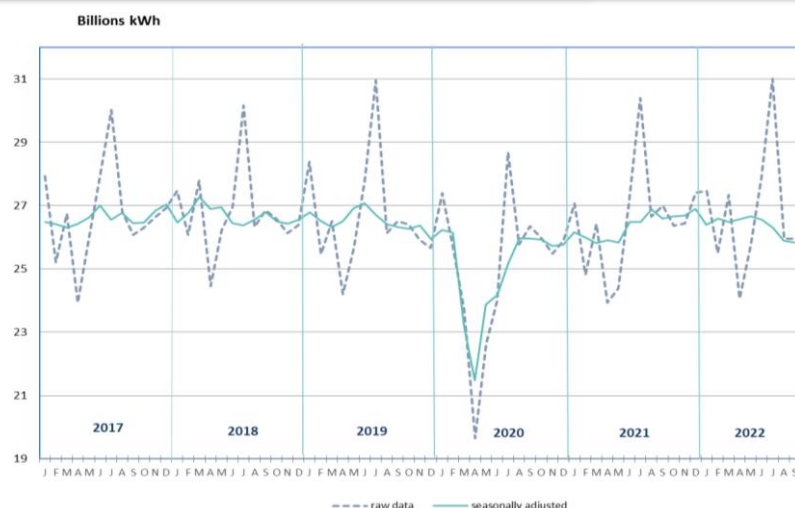
Source: Terna

Considering that September 2022 had the same number of working days (22) but an average temperature 0.7°C lower than in September 2021, the figure adjusted for seasonal, temperature and calendar effects corresponds to a difference of -2.9%.

Demand in the first nine months of 2022 increased by 1.3% compared to the same period in 2021 (+0.5% adjusted value).

The data for September 2022, adjusted for calendar and temperature effects, recorded a decrease of 0.2% in electricity demand compared to the previous month.

Demand – seasonality adjusted



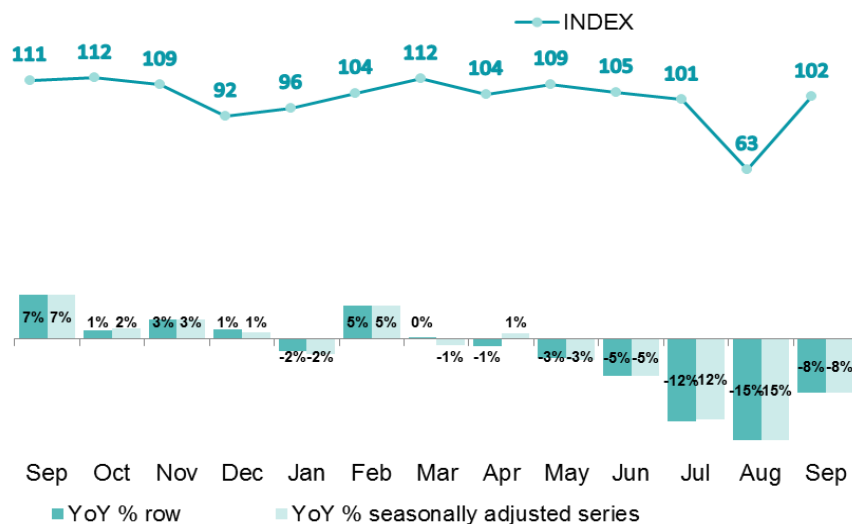
The value, adjusted for seasonal, calendar and temperature effects, shows a decrease of 0.2%.

Source: Terna

IMCEI

The trend for September 2022 (compared to September 2021) for the industrial electricity consumption index was down by 8% based on raw data. Using data adjusted for calendar differences, the change remains the same. In the first nine months of the year, the IMCEI change decreased by 4.4% compared to the same period in 2021.

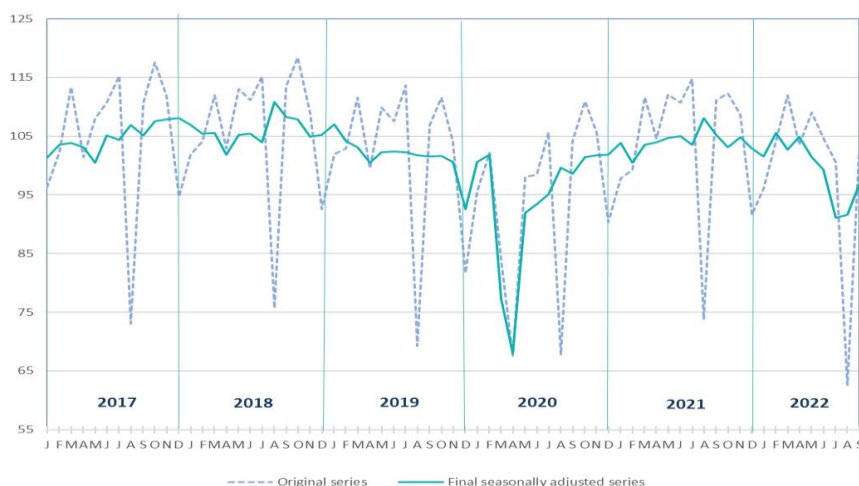
Monthly Industrial Electrical Consumption Index - IMCEI (2015 base = 100)



In September, the change in the monthly index of Italian electricity consumption decreased by 8% compared to September 2021.

The short-term data adjusted for seasonal and calendar effects for the industrial electricity consumption index increased by 5.6% in September 2022 compared to August 2022.

IMCEI short-term analysis (2015 base = 100)



When adjusted for seasonal and calendar effects, the figure for September 2022 represents an increase of 5.6% compared to the previous month.

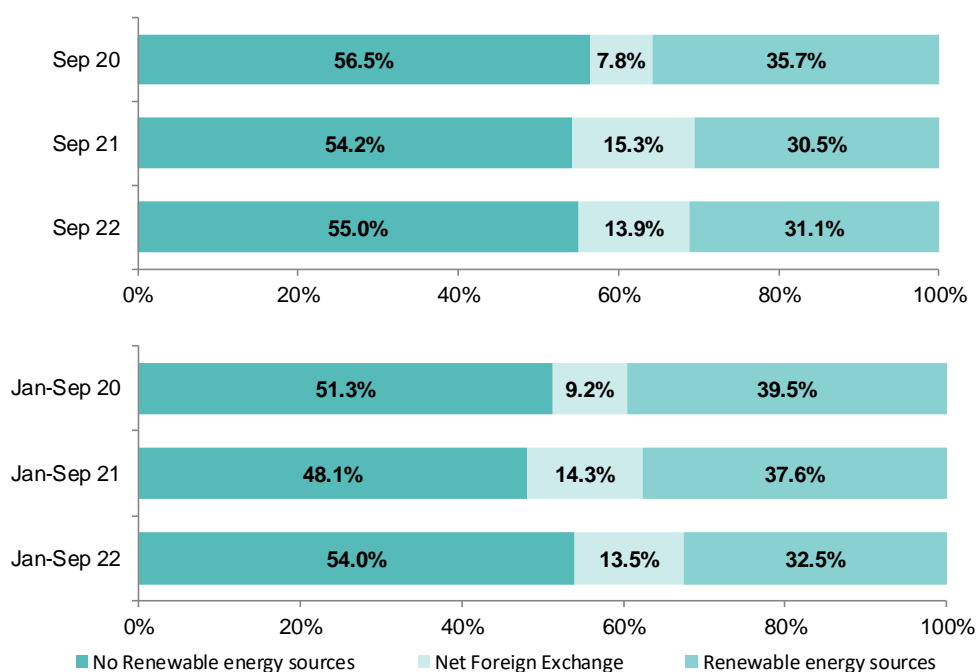
Source: Terna

Energy Demand Mix

In September 2022, 55.0% of the electricity demand was met via production from Non-Renewable Energy Sources, 31.1% via Renewable Energy Sources and the remainder via foreign exchange.

In 2022, electricity demand was 240,923 GWh, 54.0% of which was met via production from Non-Renewable Energy Sources, 32.5% from Renewable Energy Sources and the remainder from the foreign balance.

Demand breakdown – coverage by sources

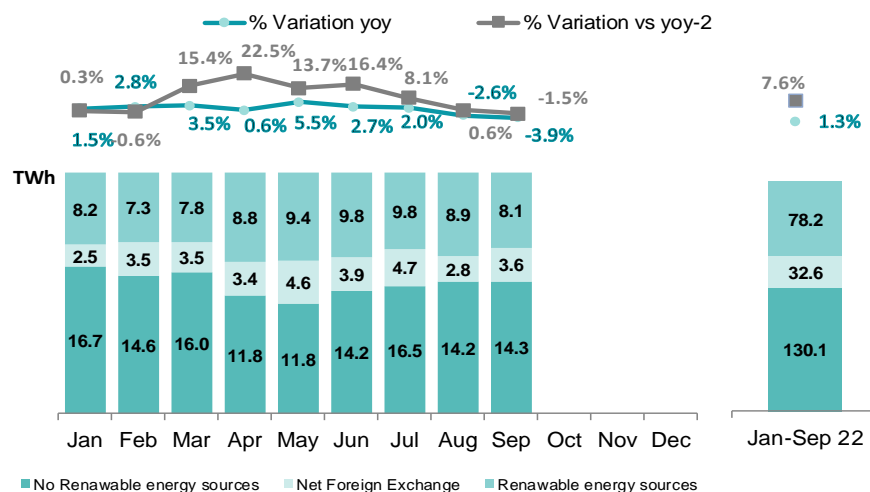


In September, production from renewable sources was down slightly compared to the same month of 2021 (-2.1%).

In 2022, production from Non-Renewable Energy Sources recorded an increase (+13.8%) compared to the same period in 2021.

Source: Terna

2022 trend in demand breakdown and difference from 2021 and 2020



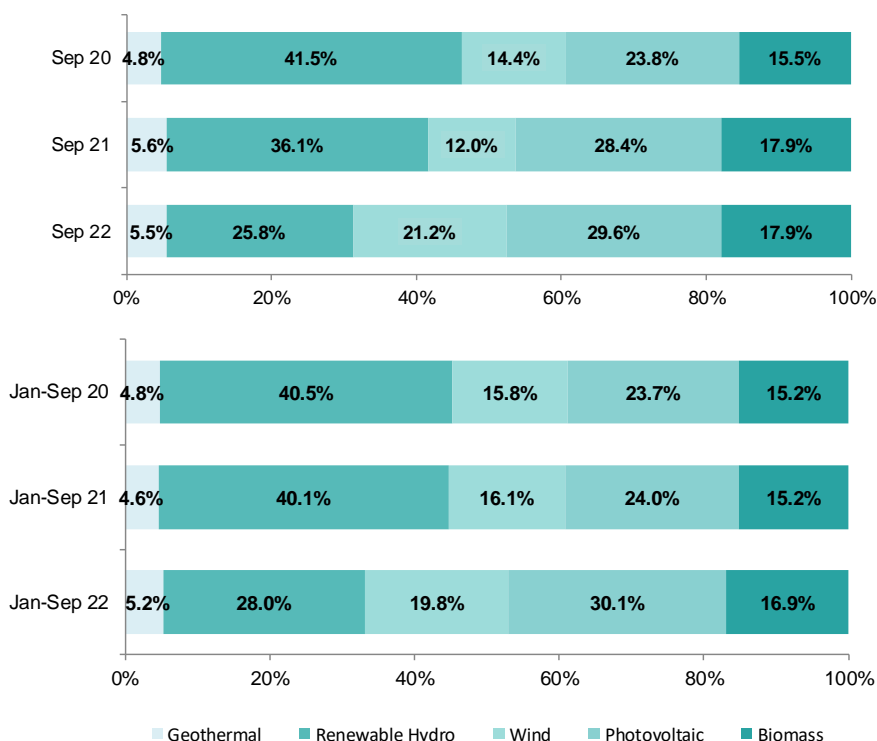
In 2022, electricity demand on the grid increased compared to 2021 (+1.3%) and compared to the cumulative figure for 2020 (+7.6%). In 2022, energy production from renewable sources totalled 78.2 TWh, a -12.5% reduction compared to 2021.

Source: Terna

Details of Renewable Energy Sources

In September, production from Renewable Energy Sources decreased (-2.1%) compared to the same month of the previous year. Specifically, there was a sharp decrease in renewable hydroelectric production (-30.0%) a strong increase in wind production (73.6%), as well as a slight increase in photovoltaic production (+1.7%).

RES Production - Breakdown

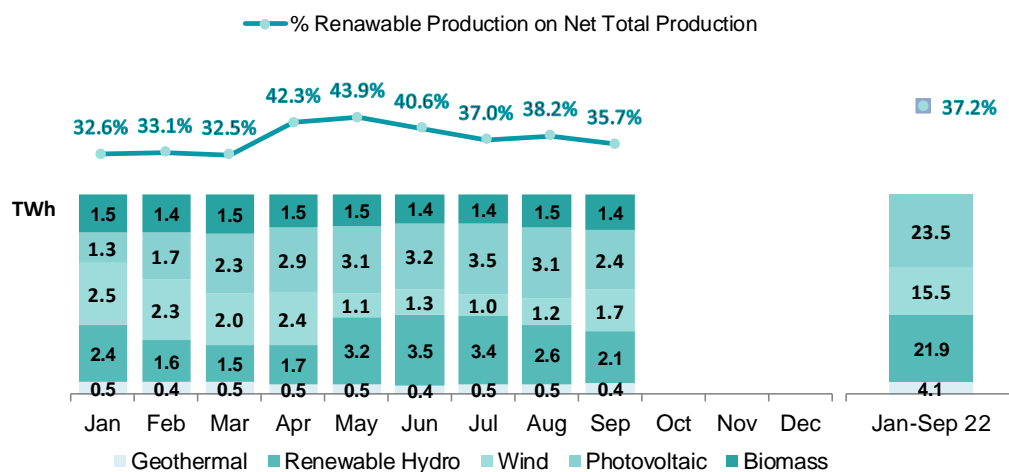


In September 2022, the greater contribution of renewable energy sources to total production is attributed to solar production (30%) and renewable hydroelectric production (26%).

In 2022, the greater contribution of renewable energy sources to total production is attributed to photovoltaic production (30%) and renewable hydroelectric production (28%).

Source: Terna

2022 trend in net production from RES and difference from 2021



In September 2022, renewable production represented 35.7% of total net national production, the same that was recorded for the same month in 2021 (35.7%). In 2022, production from RES represented 37.2% of total net national production, a decrease compared to the cumulative figure for 2021 (43.5%).

Source: Terna

Historical Energy Balance Sheets

In 2022, total net production allocated for consumption (208,372 GWh) met 86.5% of national electricity demand (240,923 GWh).

2022 Historical Monthly Energy Balance Sheet

[GWh]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Hydro	2,474	1,720	1,651	1,878	3,327	3,560	3,574	2,797	2,240				23,221
of which Pumping Production ⁽²⁾	117	165	181	176	146	102	165	156	158				1,365
Thermal	18,333	16,083	17,652	13,344	13,349	15,673	17,968	15,782	15,798				143,982
of which Biomass	1,542	1,395	1,548	1,469	1,511	1,417	1,439	1,492	1,445				13,259
Geothermal	479	435	474	457	461	429	454	456	440				4,085
Wind	2,532	2,254	2,012	2,365	1,121	1,269	1,016	1,206	1,712				15,487
Photovoltaic	1,280	1,710	2,331	2,851	3,119	3,234	3,494	3,146	2,382				23,547
Net Total Production	25,098	22,202	24,120	20,895	21,377	24,165	26,506	23,387	22,572				210,322
Pumping	167	236	259	251	208	145	235	223	226				1,950
Net Total Production for Consumption	24,931	21,966	23,861	20,644	21,169	24,020	26,271	23,164	22,346				208,372
of which Renewable Production ⁽³⁾	8,190	7,349	7,835	8,844	9,393	9,808	9,813	8,941	8,061				78,234
of which not Renewable Production	16,741	14,617	16,026	11,800	11,776	14,213	16,458	14,223	14,285				130,138
Import	3,183	3,923	3,719	3,831	4,768	4,057	4,947	3,151	3,897				35,476
Export	644	392	237	411	213	158	209	371	290				2,925
Net Foreign Exchange	2,539	3,531	3,482	3,420	4,555	3,899	4,738	2,780	3,607				32,551
Electricity demand ⁽¹⁾	27,470	25,497	27,343	24,064	25,724	27,919	31,009	25,944	25,953				240,923

In 2022, net total production was up (+2.2%) compared to 2021, and peak electricity demand was reached in July, with 31,009 GWh.

Source: Terna

The developments in the monthly balance sheet for 2021 are provided below

2021 Historical Monthly Energy Balance Sheet

[GWh]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Hydro	3,749	3,532	3,190	3,182	4,666	5,683	5,268	4,835	3,124	3,074	2,949	3,065	46,317
of which Pumping Production ⁽²⁾	136	174	168	185	199	132	102	143	152	149	215	225	1,979
Thermal	16,172	13,532	14,489	13,708	11,128	13,737	16,076	13,484	16,183	15,355	18,520	18,195	180,579
of which Biomass	1,543	1,408	1,531	1,518	1,452	1,459	1,519	1,524	1,458	1,520	1,524	1,569	18,025
Geothermal	465	427	475	459	465	456	470	463	458	472	448	468	5,526
Wind	2,604	1,697	1,826	1,541	1,969	960	1,403	1,424	986	1,665	1,720	2,824	20,619
Photovoltaic	914	1,467	2,415	2,425	2,998	3,003	2,944	2,928	2,343	1,788	930	913	25,068
Net Total Production	23,904	20,655	22,395	21,315	21,226	23,839	26,161	23,134	23,094	22,354	24,567	25,465	278,109
Pumping	194	249	240	264	284	189	145	204	217	213	307	321	2,827
Net Total Production for Consumption	23,710	20,406	22,155	21,051	20,942	23,650	26,016	22,930	22,877	22,141	24,260	25,144	275,282
of which Renewable Production ⁽³⁾	9,139	8,357	9,269	8,940	11,351	11,429	11,503	11,031	8,217	8,370	7,356	8,614	113,576
of which not Renewable Production	14,571	12,049	12,886	12,111	9,591	12,221	14,514	11,899	14,660	13,771	16,904	16,530	161,706
Import	3,863	4,602	4,472	3,188	3,675	3,766	4,630	3,993	4,296	4,458	2,746	2,875	46,564
Export	507	197	207	311	227	225	244	275	179	227	572	600	3,771
Net Foreign Exchange	3,356	4,405	4,265	2,877	3,448	3,541	4,386	3,718	4,117	4,231	2,174	2,275	42,793
Electricity demand ⁽¹⁾	27,066	24,811	26,420	23,928	24,390	27,191	30,402	26,648	26,994	26,372	26,434	27,419	318,075

In 2021, the month with the highest demand for electricity was July, with 30,402 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 = Hydro - Pumping production + Biomass + Geothermal + Wind + Photovoltaic

Demand by Operational Area

In September 2022, there was a decrease in demand in the Centre (RM-FI), on the Islands (CA-PA) and in the South (NA), and in the Northern zone (TO-MI-VE) compared to the corresponding period of the previous year.

Demand by Operational Area

[GWh]	Turin	Milan	Venice	Florence	Rome	Naples	Palermo	Cagliari
September 2022	2,582	5,522	4,028	4,011	3,662	3,724	1,683	741
September 2021	2,735	5,841	4,218	4,205	3,735	3,858	1,636	766
% September 22/21	-5.6%	-5.5%	-4.5%	-4.6%	-2.0%	-3.5%	2.9%	-3.3%
Cumulated 2022	23,631	51,593	37,062	37,249	34,297	35,291	14,875	6,925
Cumulated 2021	23,415	51,256	36,717	36,635	33,429	35,015	14,549	6,834
% Cumulated 22/21	0.9%	0.7%	0.9%	1.7%	2.6%	0.8%	2.2%	1.3%

In 2022, the Y-o-Y percentage change in demand is +0.8% in the Northern zone, +2.1% in the Centre, +0.8% in the South and +2.0% for the Islands.

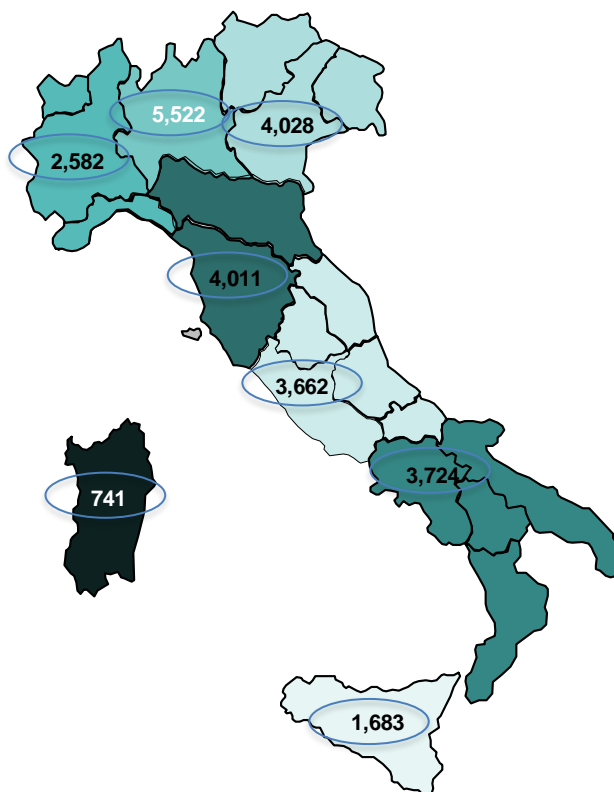
Source: Terna

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 - Marche
- NAPLES: Campania - Apulia - Basilicata - Calabria
- PALERMO: Sicily
- CAGLIARI: Sardinia



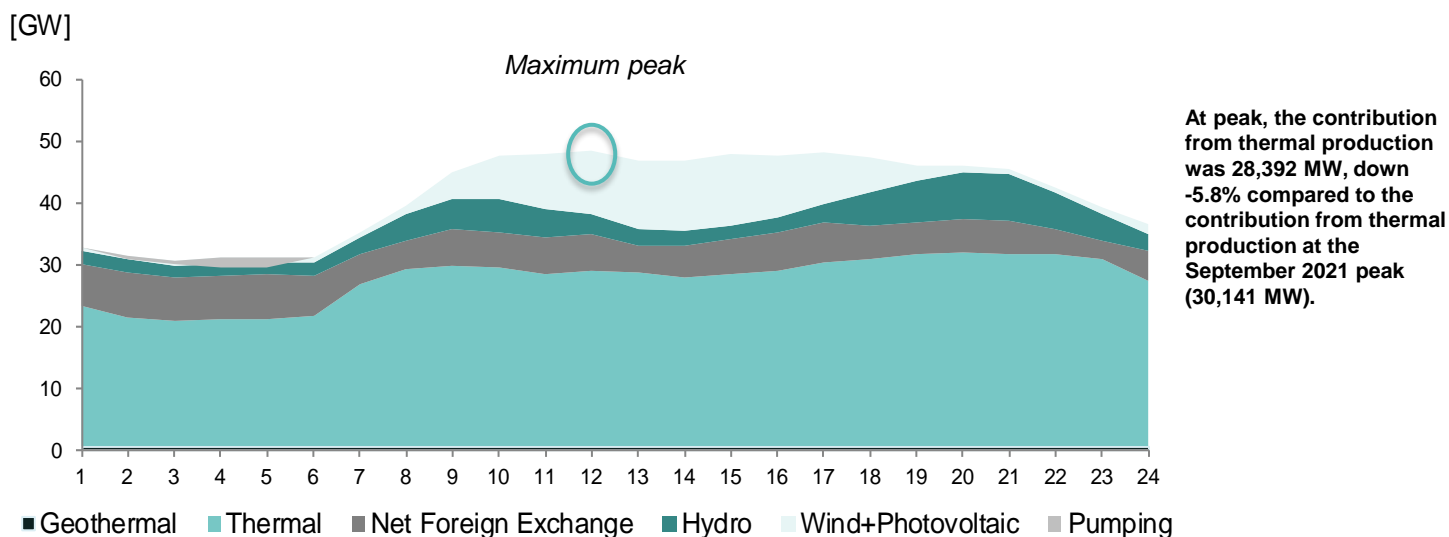
Source: Terna

(*) 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

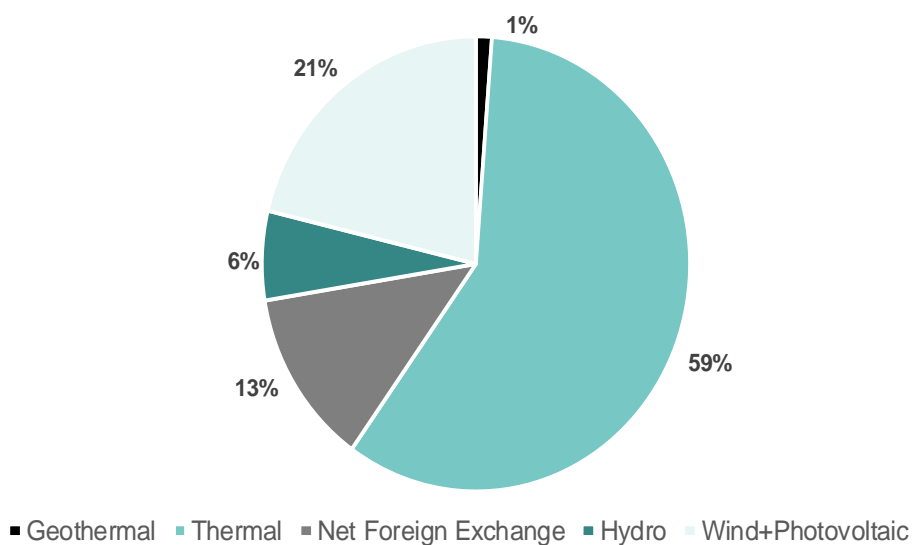
In September 2022, Peak Demand was recorded on **Wednesday 7 September between 11:00 and 12:00** and was 48,400 MW (-1.4% Y-o-Y). The hourly demand diagram of the peak day is presented below.

Peak Demand



Source: Terna

Coverage of demand - 7 September 2022 11:00-12:00



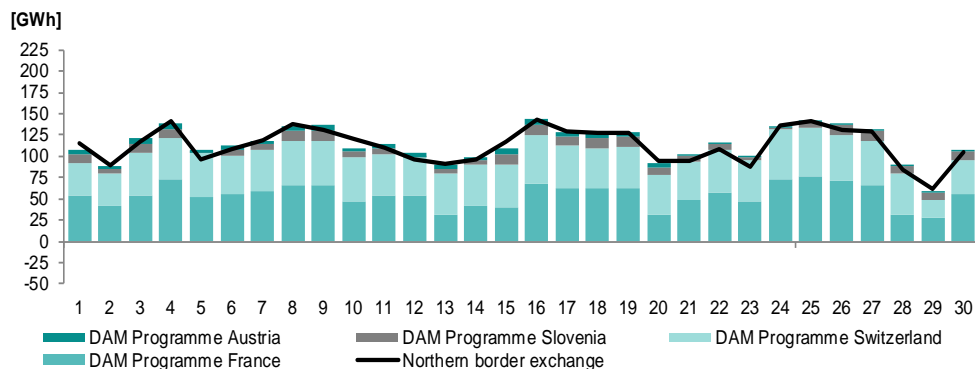
At its peak, production from renewable sources contributed to covering 29% of demand, with thermal production covering 59% and the remainder covered by the foreign balance. Production from Wind and Photovoltaic sources increased (14.7%) compared to the same production recorded at its peak in September 2021.

Source: Terna

Net Foreign Exchange – September 2022

In September there was good saturation on all of the Northern border.

Net Foreign Exchange on the Northern border



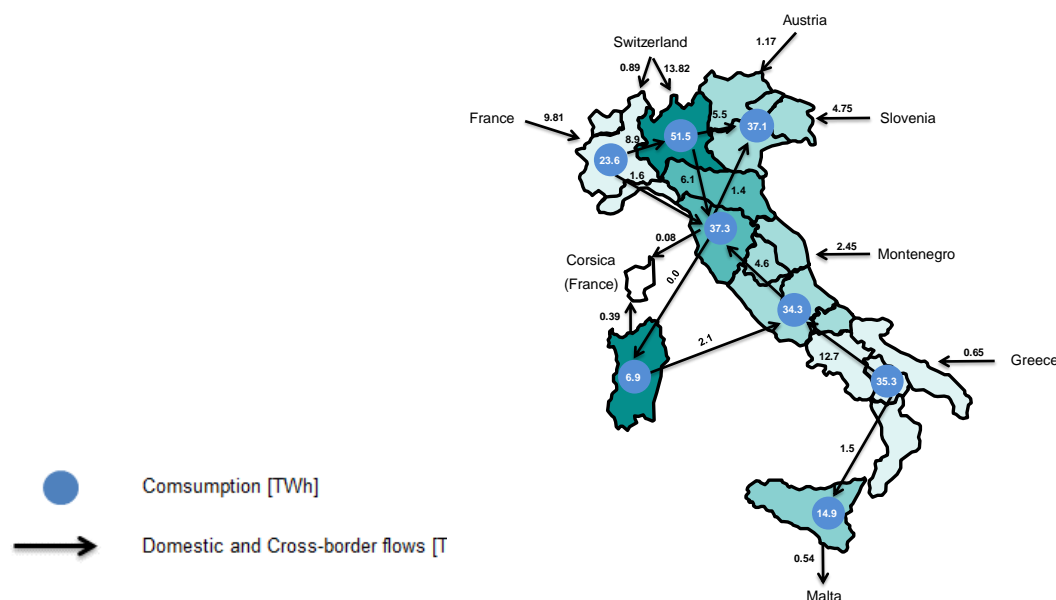
In September 2022, imports decreased Y-o-Y (-9.3%) amounting to 3,897 GWh and exports increased remarkably Y-o-Y (+62.0%) amounting to 290 GWh.

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



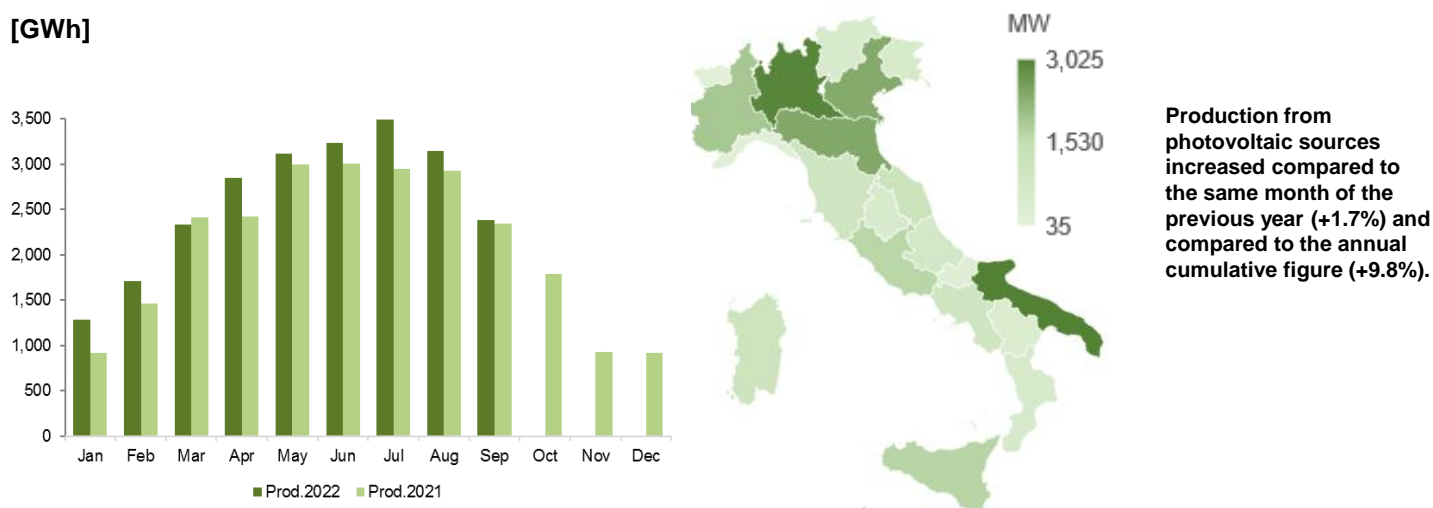
In 2022, a net exchange was recorded from the Northern zone to Emilia Romagna and Tuscany of 6.3 TWh. The mainland recorded a net exchange towards Sicily of 1.5 TWh.

Source: Terna

Production and installed capacity

Energy produced from photovoltaic sources in September 2022 reached 2,382 GWh, an increase compared to the same month of the previous year (+39 GWh). The annual cumulative figure increased compared to the previous year (+2,110 GWh).

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

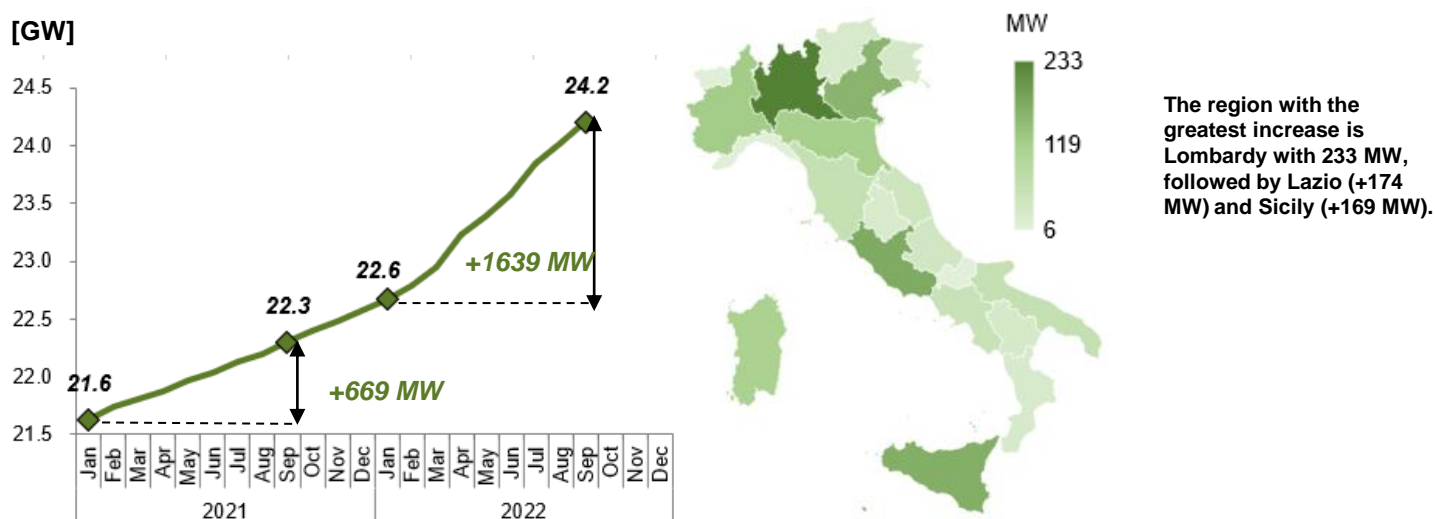


1. The operating capacity takes into account new activations, upgrades and decommissioning of plants

Source: Terna

In the first nine months of 2022 the operating capacity increased by 1,639 MW. In the same period of 2021 the increase was 669 MW, recording an increase of 970 MW (+145%) compared to 2021.

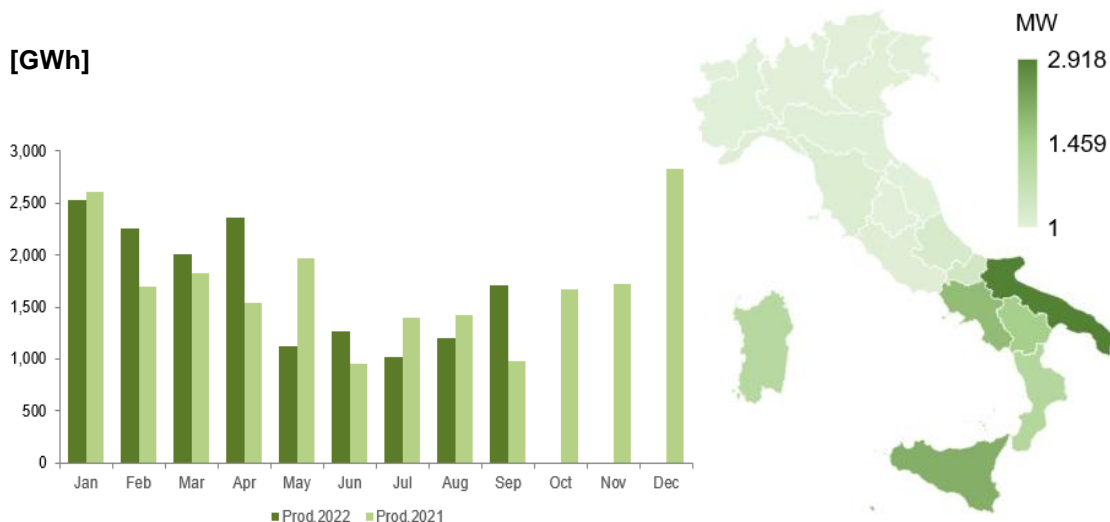
Cumulative operating capacity (left) and distribution of new activations 2022 (right)



Source: Terna

Energy produced from wind sources in September 2022 reached 1,712 GWh, an increase compared to the same month of the previous year (+726 GWh). The annual cumulative figure increased compared to the previous year (+1,077 GWh).

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



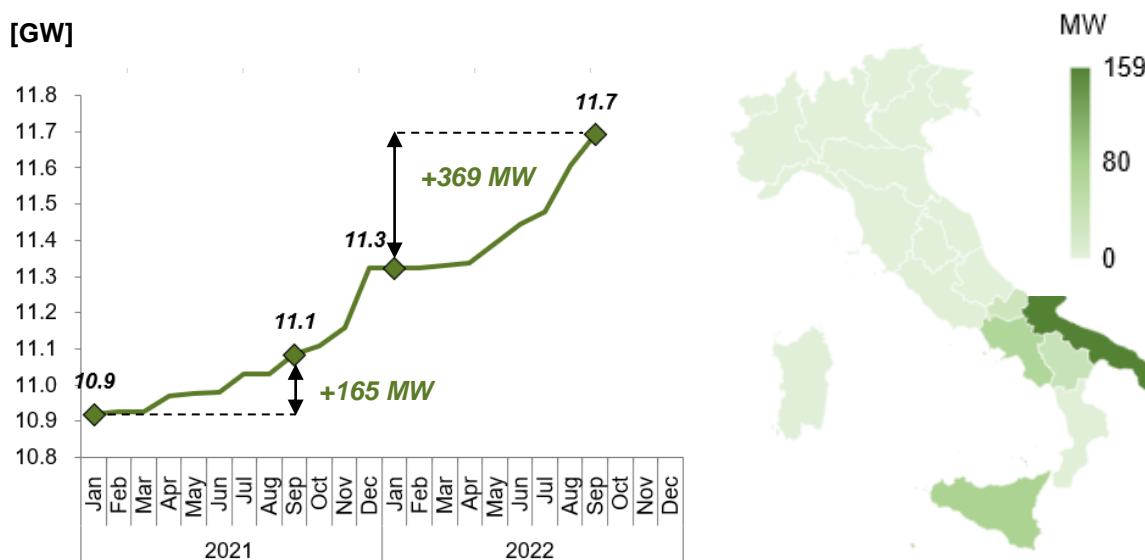
Production from wind sources increased compared to the same month of the previous year (+73.6%) and compared to the annual cumulative figure (+7.5%).

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

Source: Terna

In the first nine months of 2022 the operating capacity increased by 369 MW. In the same period of 2021 the increase was 165 MW, recording an increase of 203 MW (+122%) compared to 2021.

Cumulative operating capacity (left) and distribution of new activations 2022 (right)

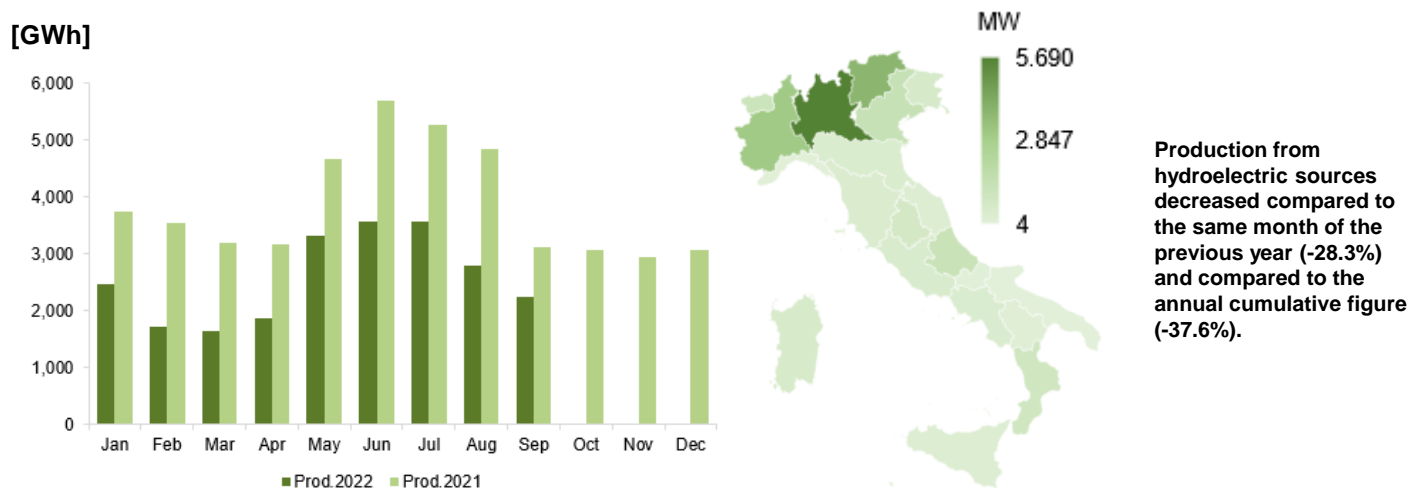


The region with the greatest increase is Apulia with 159 MW, followed by Sicily (75 MW) and Campania (68 MW).

Source: Terna

Energy produced by hydroelectric sources (e.g. reservoirs and run-of-river) in September 2022 was 2,240 GWh, down compared to the same month of the previous year (-884 GWh). The annual cumulative figure was down (-14,008 GWh) compared to the previous year.

Hydroelectric production (left) and distribution of operating capacity¹ by region (right)

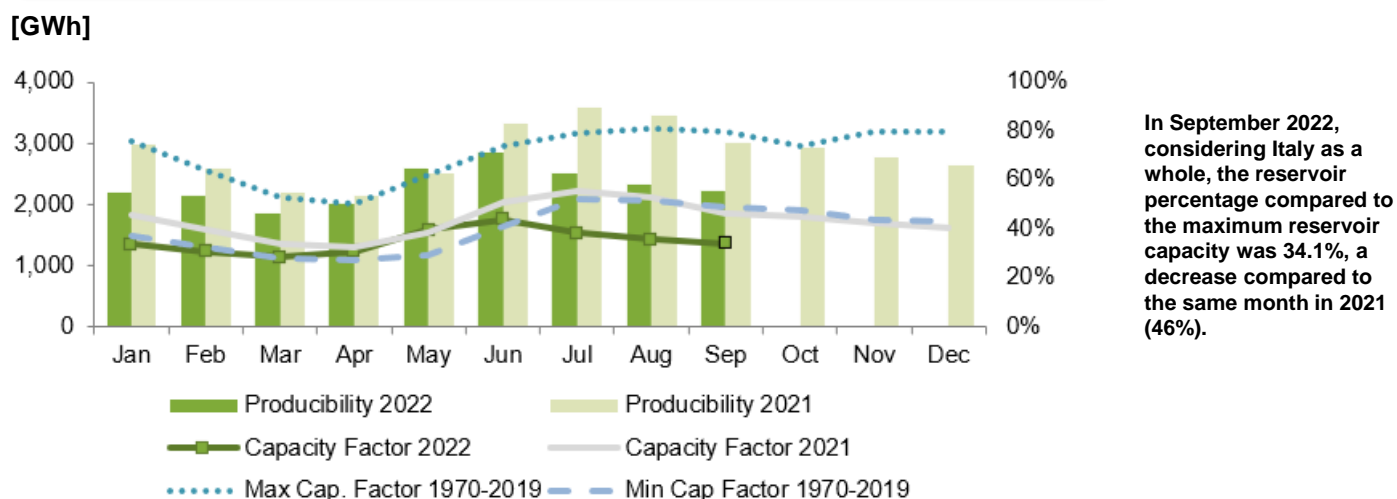


1. The operating capacity takes into account new activations, upgrades and decommissioning of plants.
The operating capacity is net of pure pumping

Source: Terna

In September, hydroelectric producibility fell significantly (-25.9%) compared to the same month of the previous year.

Hydroelectric Producibility and Reservoir Percentage



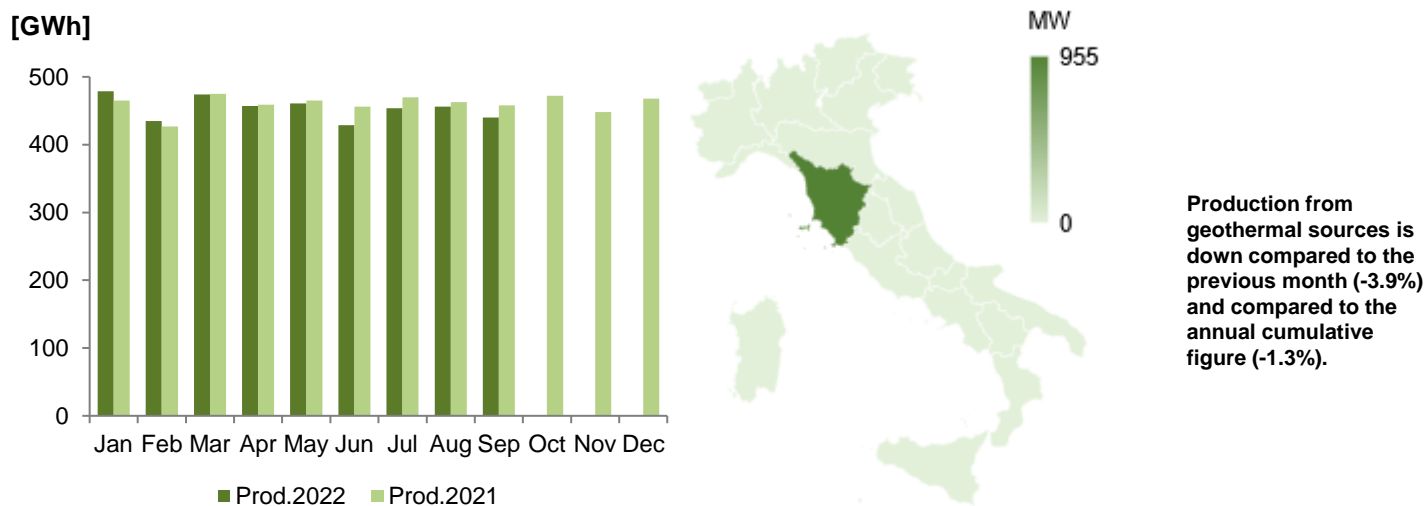
In September 2022, considering Italy as a whole, the reservoir percentage compared to the maximum reservoir capacity was 34.1%, a decrease compared to the same month in 2021 (46%).

Sep 21 Sep 22	Reservoir Capacity	NORTH	CENTRE SOUTH	ISLANDS	TOTAL
	[GWh]	1,362	706	155	2,222
	% (capacity/max capacity)	31.5%	38.9%	40.6%	34.1%
	[GWh]	2,196	668	138	3,002
	% (capacity/max capacity)	59.1%	42.7%	47.1%	53.9%

Source: Terna

Energy produced from geothermal sources in September 2022 reached 440 GWh, a decrease compared to the same month of the previous year (-18 GWh). The annual cumulative figure underwent a decrease (-53 GWh) compared to the previous year.

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



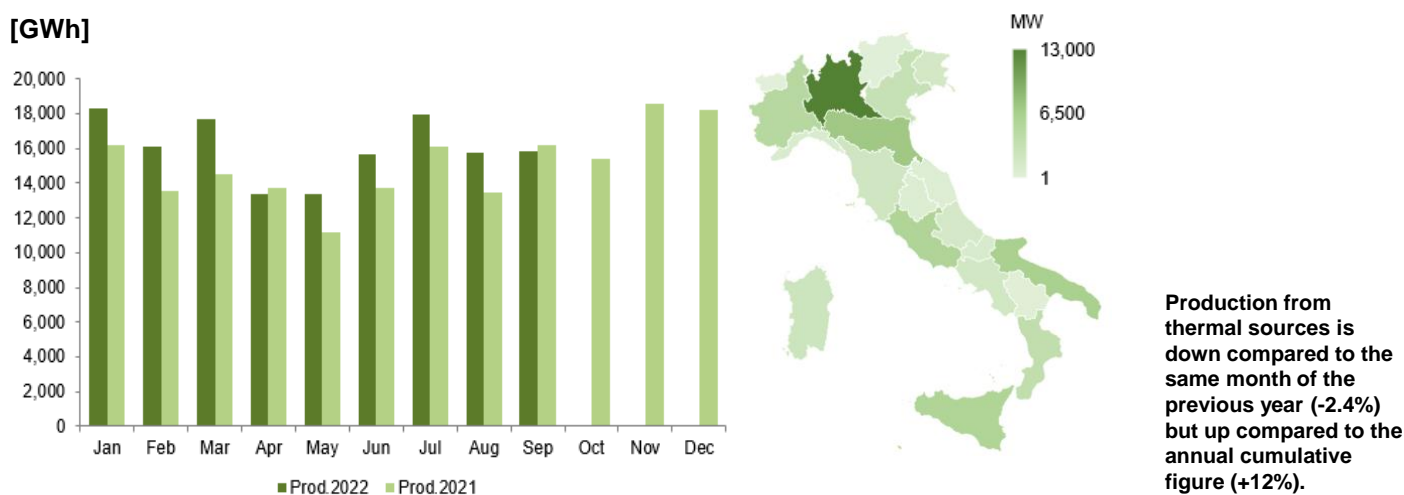
Production from geothermal sources is down compared to the previous month (-3.9%) and compared to the annual cumulative figure (-1.3%).

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

Source: Terna

Energy produced from thermal sources in September 2022 reached 15,798 GWh, essentially, a decrease compared to the same month of the previous year (-385 GWh). The annual cumulative figure increased (+15,473 GWh) compared to the previous year.

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



Production from thermal sources is down compared to the same month of the previous year (-2.4%) but up compared to the annual cumulative figure (+12%).

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

Source: Terna

In the first nine months of 2022 the operating capacity increased by 2,011 MW. This value is 1,173 MW higher (+140%) compared to the same period of the previous year.

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				1.639
Wind	1	1	7	5	57	53	34	129	83				369
Hydroelectric	3	2	-3	4	-6	3	2	-5	5				6
Geothermal & Biomass	0	1	0	1	-5	0	0	1	0				-3
Total	110	120	159	292	210	245	305	296	274	0	0	0	2.011

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				122.135
Wind	6	6	18	10	7	19	18	14	18				116
Hydroelectric	14	6	12	10	8	12	7	7	13				89
Geothermal & Biomass	3	4	0	7	-3	6	2	5	6				30
Total	9.026	10.049	13.424	10.516	14.383	14.698	15.694	15.642	18.938				122.370

Source: Terna

The evolution of operational capacity by Source in 2021 is shown below.

Variation in monthly operating capacity and number of plants per Source in Italy 2021¹

[MW]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	53	60	61	73	90	69	95	70	98	103	73	92	936
Wind	33	-24	1	43	6	3	51	2	52	24	49	165	404
Hydroelectric	5	30	5	-2	-36	1	0	1	2	2	5	1	13
Geothermal & Biomass	-6	3	-1	-19	1	1	1	16	2	1	-1	2	0
Total	85	69	66	96	61	74	146	88	154	130	127	259	1.354

Number of Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Photovoltaic	4.441	4.986	5.363	5.740	6.602	6.338	7.179	5.781	7.896	8.409	8.170	8.973	79.878
Wind	1	5	0	2	7	9	6	4	7	9	10	16	76
Hydroelectric	14	12	9	18	17	7	14	7	10	10	10	9	137
Geothermal & Biomass	-10	21	5	-4	4	7	4	10	12	7	3	7	66
Total	4.446	5.024	5.377	5.756	6.630	6.361	7.203	5.802	7.925	8.435	8.193	9.005	80.157

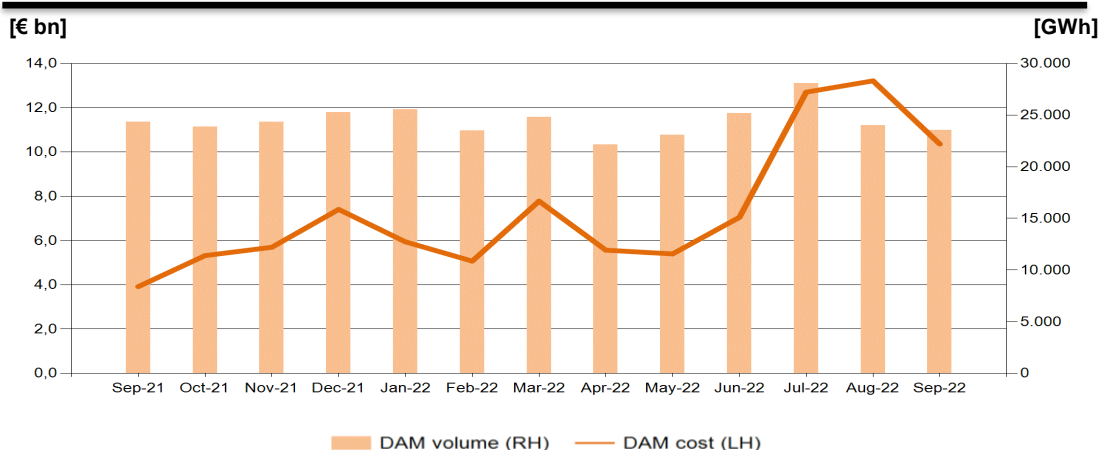
Source: Terna

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

Day-Ahead Market

The September total for withdrawal programmes on the DAM was approximately €10.4Bn, down 22% compared to the previous month and up 165% compared to September 2021. The decrease compared to August is due to a decrease in both average PUN and demand, while the increase over the previous year is mainly due to growth in average PUN from €158.6/MWh (September 2021) to €429.9/MWh (September 2022).

Day Ahead Market – amounts and volumes

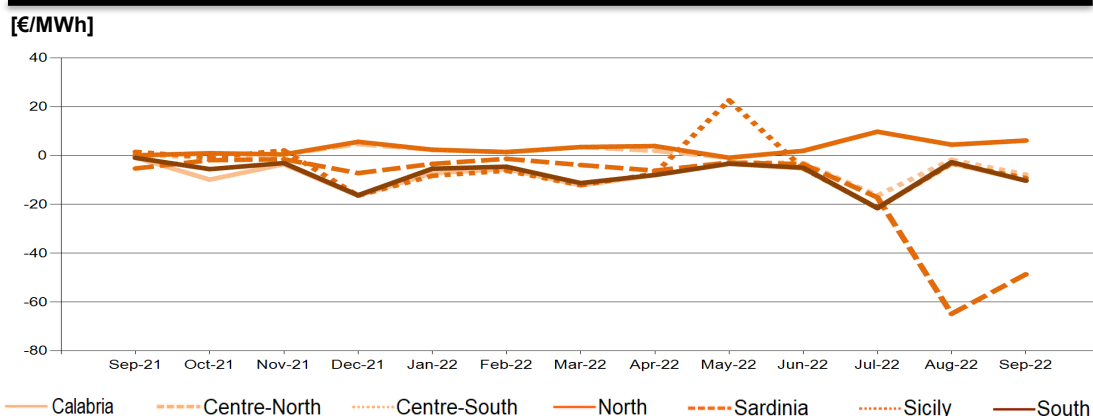


Total amount in September 2022 up by 165% compared to September 2021

Source: Terna calculation on GME data

In September, the zonal prices were substantially in line with the PUN, with an average deviation of -€9.4/MWh for Sicily, Calabria, the South and Centre-South areas, and equal to +€6.1/MWh for the North and Centre-North areas. Sardinia is the exception and recorded a spread of -€-48.7/MWh.

Spread compared to the PUN



September 2022 zonal prices in line with the PUN for all zones with the exception of Sardinia

Source: Terna calculation on GME data

In September, the spread between the peak and off-peak prices was, on average, €77.5/MWh for the Northern and Centre-North zones, and -€3.6/MWh for Sardinia, while for the other areas, the average was €41.8/MWh.

In August, the spread between the peak and off-peak prices was, on average, €41.5/MWh for the Northern and Centre-North zones, and -€78.8/MWh on average for Sardinia, while for the other areas, the average was €23/MWh.

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

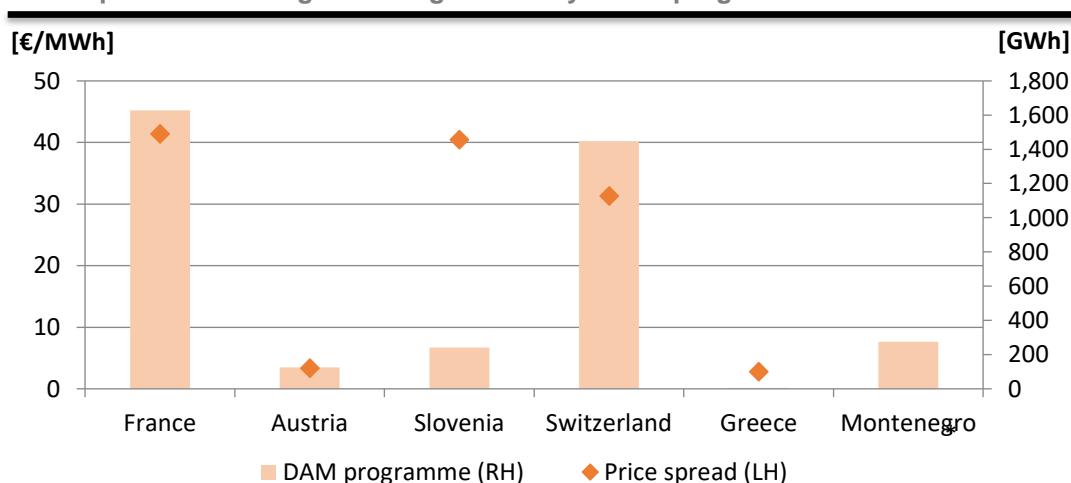
€/MWh	PUN	North	Centre-North	Centre-South	South	Sicily	Sardinia	Calabria
Average	429.9	436.1	436.1	422.1	419.6	420.7	381.3	419.6
Y-o-Y	271.3	277.4	277.4	263.2	262	260.6	228	261.9
Δ vs PUN	-	6.1	6.1	-7.8	-10.3	-9.2	-48.7	-10.3
Δ vs PUN 2021	-	0.1	0.1	0.3	-0.9	1.5	-5.3	-0.8
Peak	471.2	485.1	485.1	451.3	444.5	447.5	379	444.5
Off-peak	406	407.6	407.6	405.2	405.2	405.2	382.6	405.2
Δ Peak v Off Peak	65.2	77.5	77.5	46.1	39.3	42.3	-3.6	39.3
Minimum	84.9	84.9	84.9	40	40	40	0	40
Maximum	815.6	840	840	840	840	840	840	840

Peak-off peak spread up compared to the previous month across all zones

Source: Terna calculation on GME data

September saw a decrease in the price spread on all borders compared with the previous month, with a significant drop especially along the borders with Austria and Greece. Imports totalled 3.4 TWh, with France and Switzerland accounting for 42% and 38% of the total respectively. Total exports were 0.19 TWh, with Greece accounting for 52%.

Price spread with foreign exchanges and day ahead programmes



Net imports on the northern border of 3.4 TWh

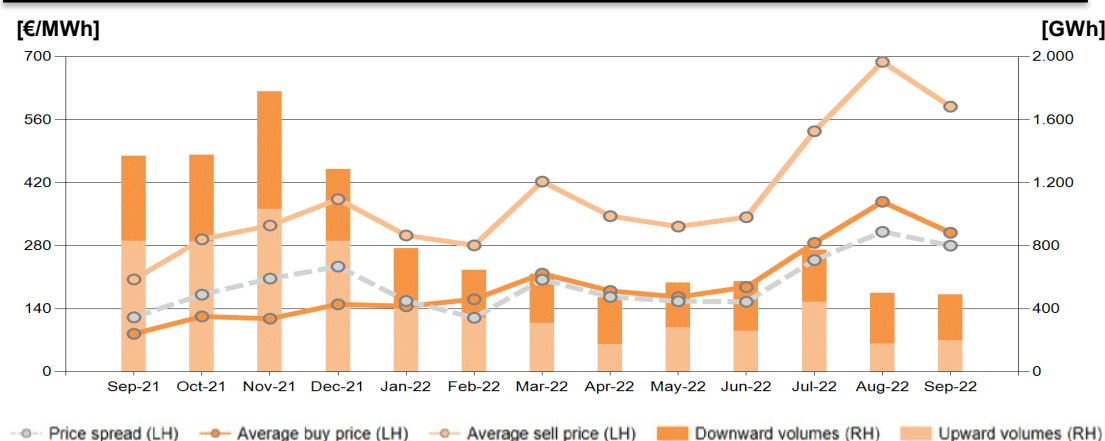
Source: Terna calculation

*No spread is represented for Montenegro because there is no power exchange

Ex-ante Ancillary Services Market

In September, the spread between average bid-up and bid-down prices was €280/MWh, down compared to the previous month by 10% and up by 132% compared to September 2021. The total volumes decreased compared to the previous month (-2%), in particular upward volumes increased by 13% and downward volumes fell by 10%. Upward volumes fell by 76%, while downward volumes fell by 47% compared to the same month of the previous year.

Ex-ante Ancillary Services - prices and volumes

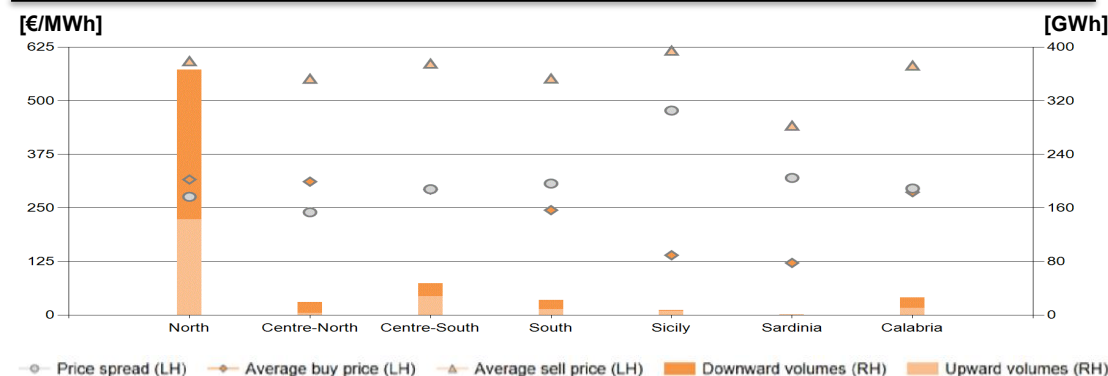


Average bid-up price in September 2022 of €589/MWh
Average bid-down price in September 2022 of €309/MWh

Source: Terna

The market zone with the highest spread (€477/MWh) was Sicily. This spread recorded a 37% increase compared to the previous month, due both to a decrease in the average bid-up price of 4% (from €645/MWh of August to €617/MWh of September) and to the average bid-down price of 53% (from €297/MWh in August to €140/MWh in September).

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



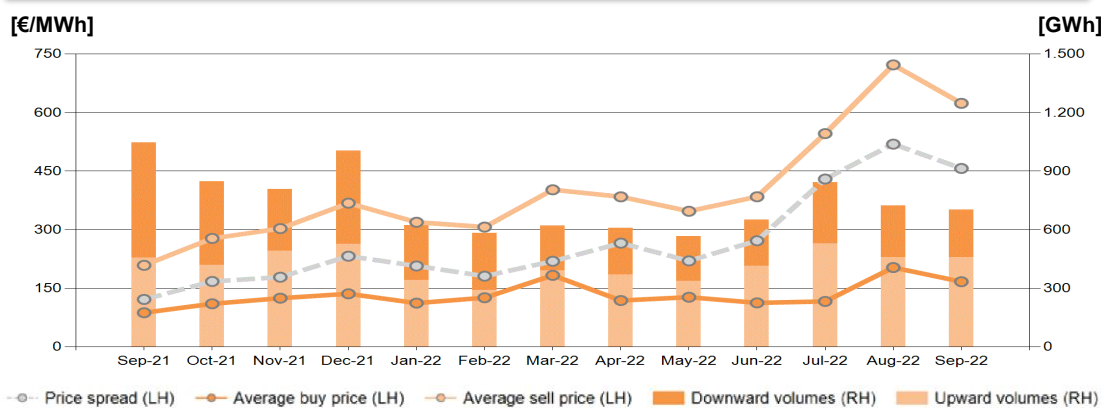
Sicily: zone with the highest price spread
North: zone with the largest volume moved

Source: Terna

Balancing Market

In September, the spread between bid-up and bid-down prices was €457/MWh, up compared to the previous month (€519/MWh; -12%) and compared to September 2021 (€121/MWh; +276%). The total volumes decreased compared to August (-3%), in particular upward volumes remained largely the same with the previous month while downward volumes fell by 7%. Compared to September 2021, upward volumes increased by 1% and downward volumes fell by 59%.

Balancing market – prices and volumes

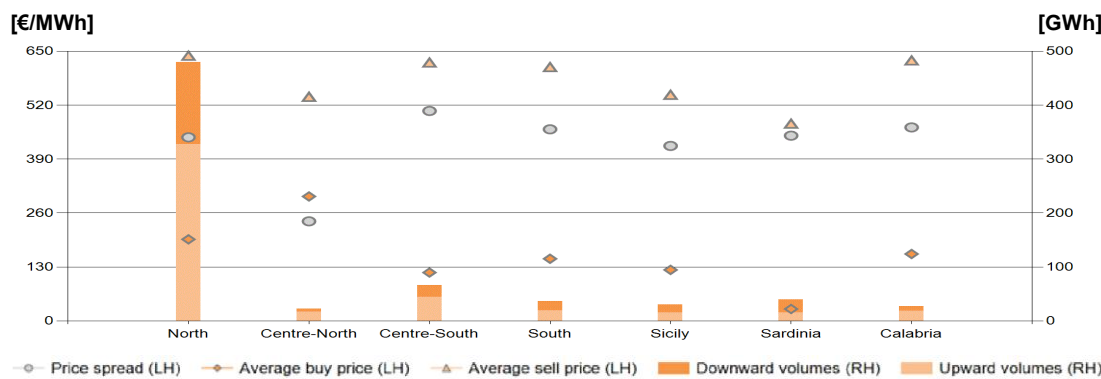


Average bid-up price in September 2022 of €623/MWh
Average bid-down price in September 2022 of €167/MWh

Source: Terna

The market zone featuring the highest spread (€542/MWh) was the Centre-South. All the zones have lower spreads compared to the previous month, with the exception of Sardinia where the spread is increasing (+€19/MWh). The biggest decrease in the spread on a monthly basis was recorded in the North.

Balancing market – prices and volumes by market zone



Centre-South: zone featuring the highest price spread

Source: Terna

Commodities – Spot Market

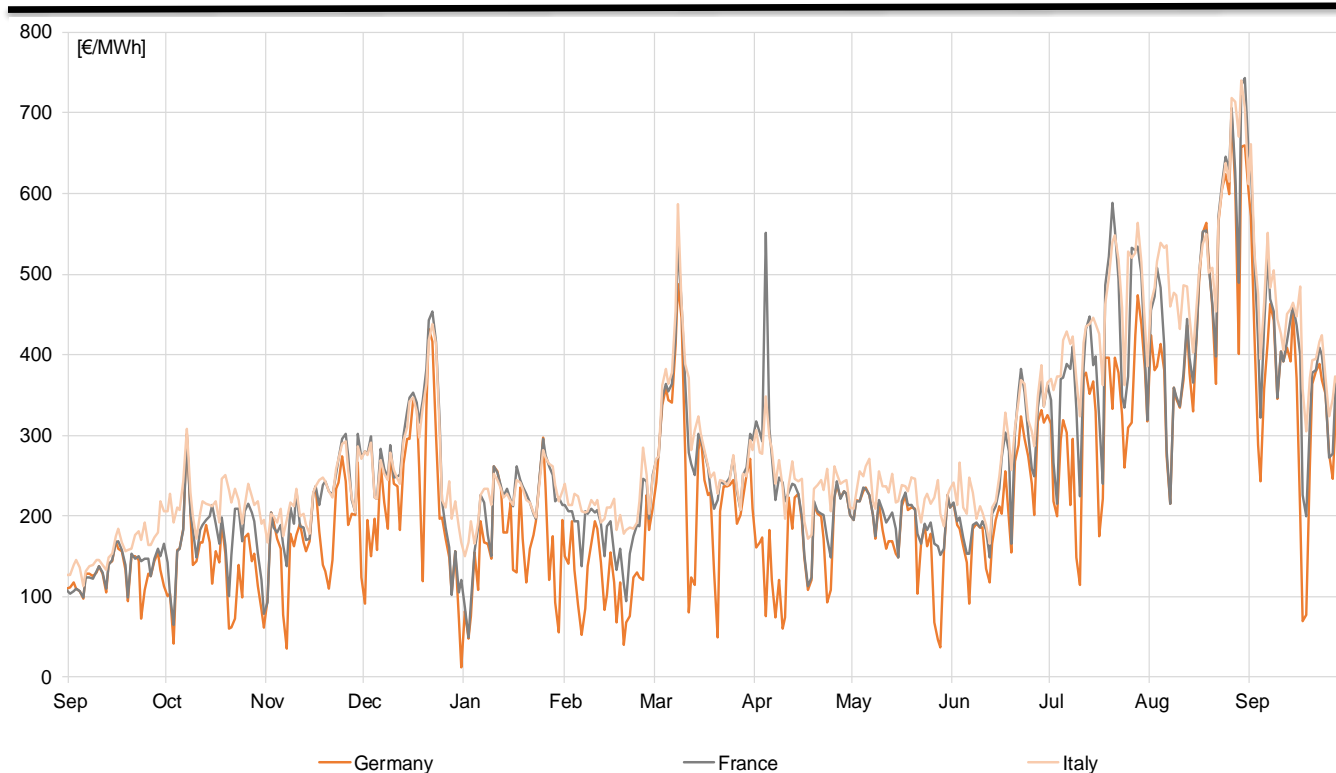
In September, Brent prices decreased compared to August, recording an average value of \$90.3/bbl (-8.3%).

Coal prices (API2) stood at \$341.3/t, down compared to the previous month (-3.8%).

Gas prices in Europe (TTF) decreased in September to a monthly average of €184.8/MWh (-22.1% compared to the previous month); the PSV also decreased and settled at €182.2/MWh (-21.6%).

Electricity prices in Italy fell in September compared to the previous month, with a monthly average of €429.9/MWh (-20.8%). The French power exchange decreased, with the price of electricity at €394.7/MWh (-19.9%), as did the German exchange, priced at €346.1/MWh (-25.6%).

Spot electricity prices



Source: TERNA calculation on GME and EPEX data

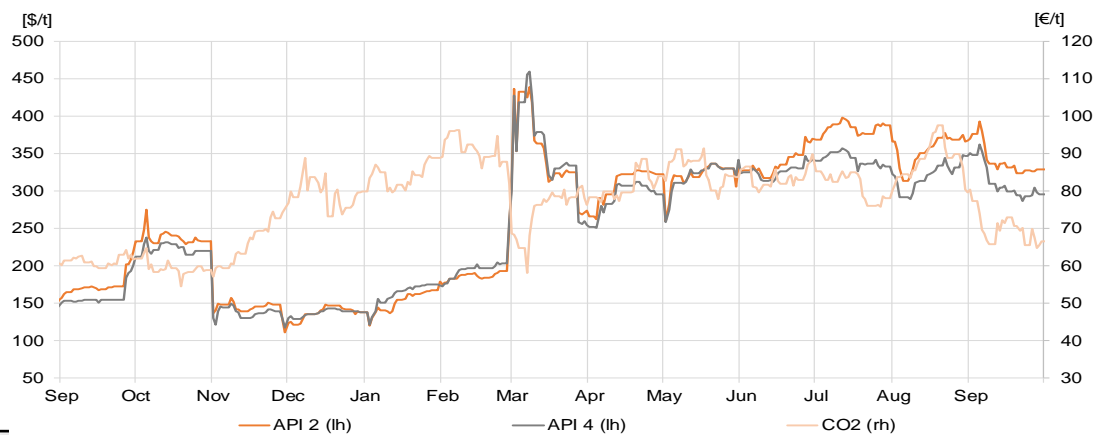
Gas & Oil spot prices



Monthly average change
PSV-TTF = €2.6/MWh

Source: Terna calculation on Bloomberg data

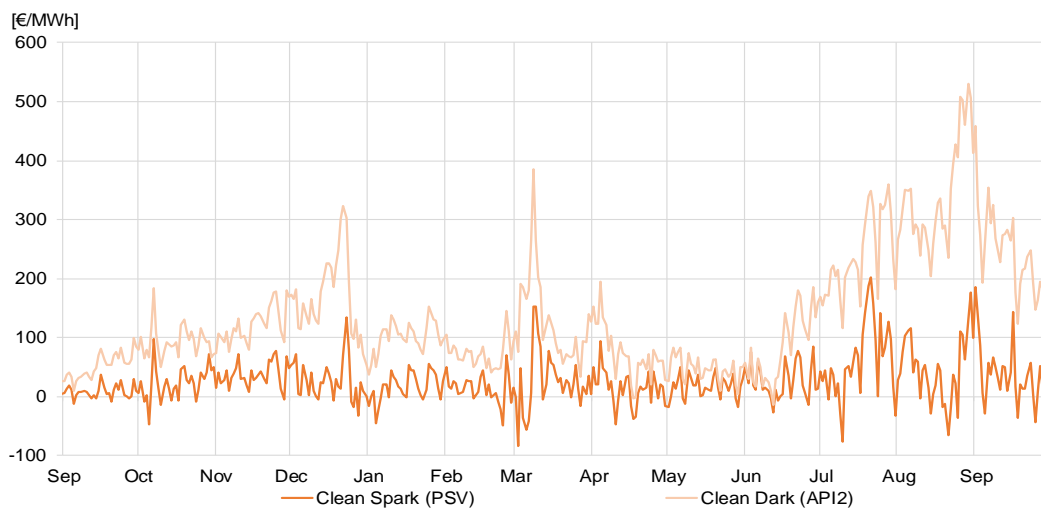
Coal & Carbon spot prices



Monthly average change
API2-API4 = +\$29.1/t

Source: Terna calculation on Bloomberg data

Clean Dark & Spark spreads Italy



Clean spark spread PSV
monthly average
= +€39.9/MWh

Clean dark spread API2
monthly average
= +€245.9/MWh

Source: Terna calculation on Bloomberg data

Commodities – Forward Market

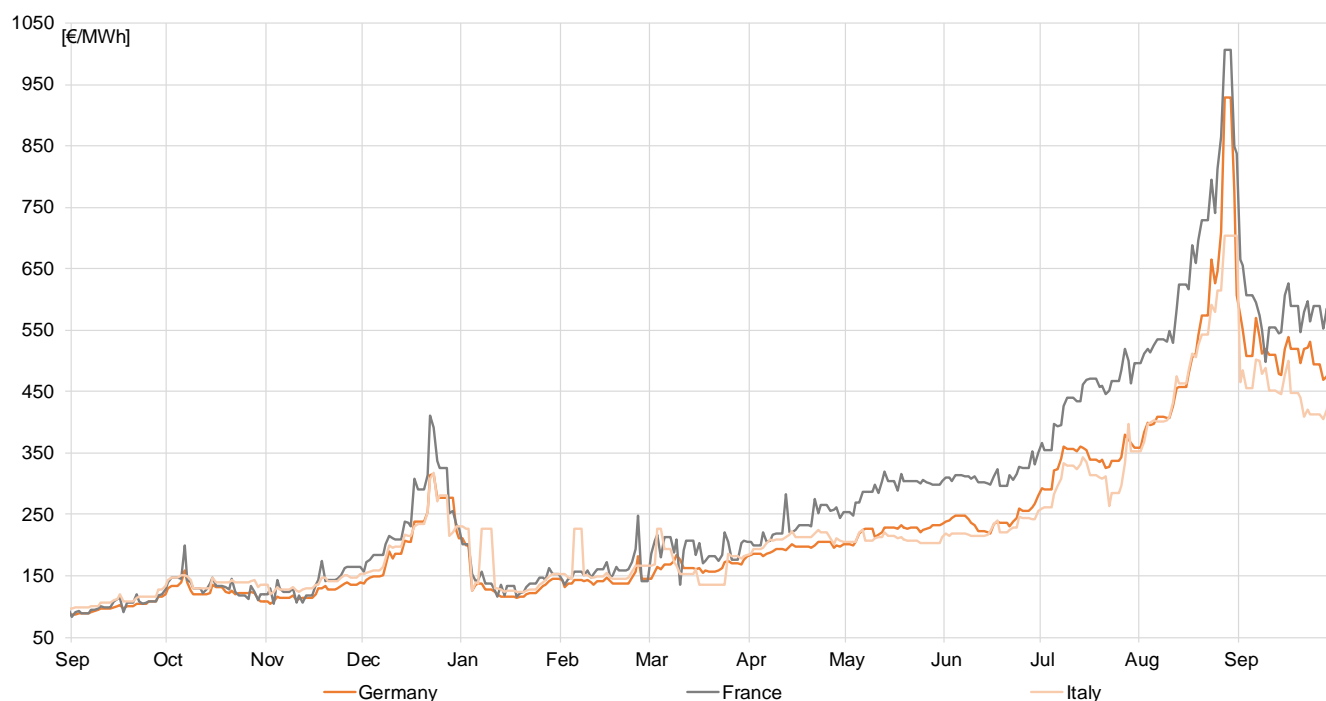
In September, Brent forward prices recorded an average value of \$80/bbl, down compare to August (-7.8%).

The average forward prices of coal (API2) were up compared to August, settling at around \$290.8/t (+11.6%).

The average forward prices of gas in Europe (TTF) decreased compared to the previous month (-11.6%), settling at around €189.3/MWh; forward prices in Italy (PSV) also decreased, reaching €190.3/MWh (-12.5%).

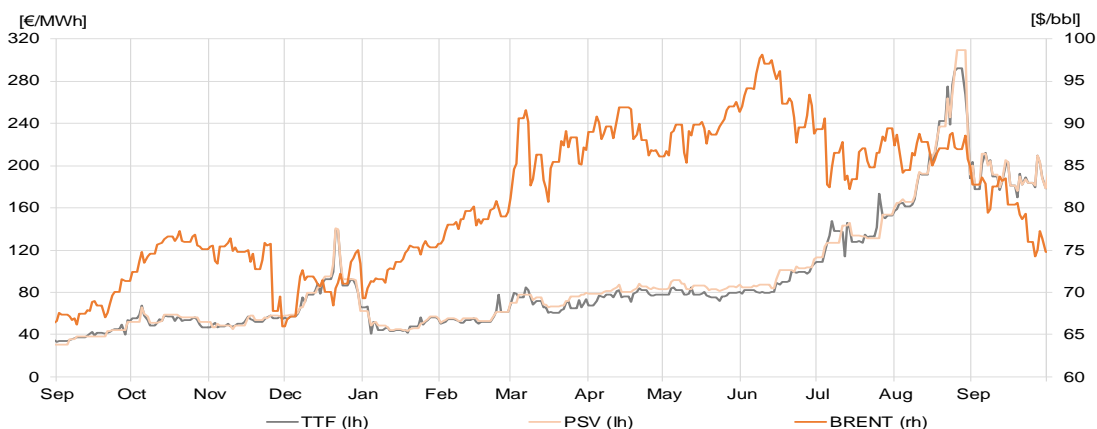
The average forward prices of electricity in Italy stood at around €449.4/MWh, down compared to the previous month (-11.9%). There was also a downward trend on the French power exchange, where the price came out at around € 580.1/MWh (-14.4%); as is the case in Germany, where the price was € 511.9/MWh (-5.6%).

Forward Electricity Prices – Year+1



Source: Terna calculation on Bloomberg data

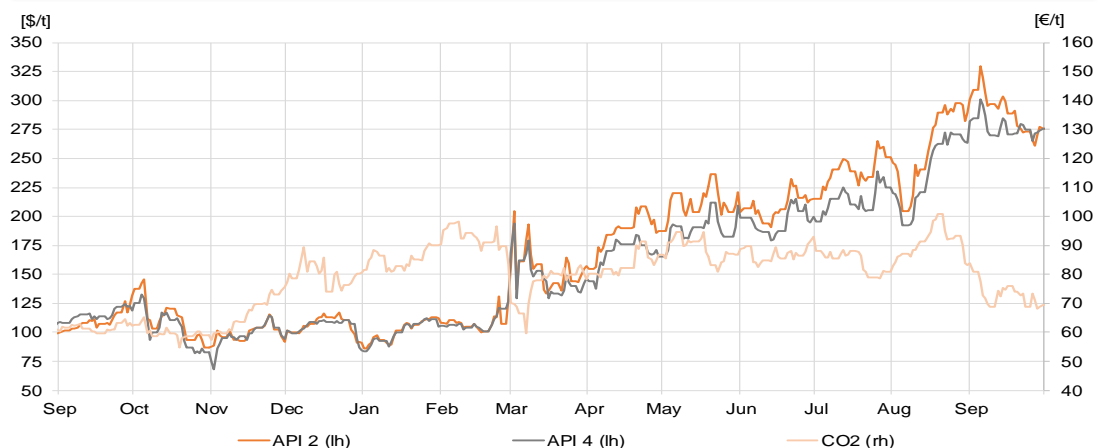
Year+1 Forward Gas & Oil Prices



Monthly average change
PSV-TTF = +€1/MWh

Source: Terna calculation on Bloomberg data

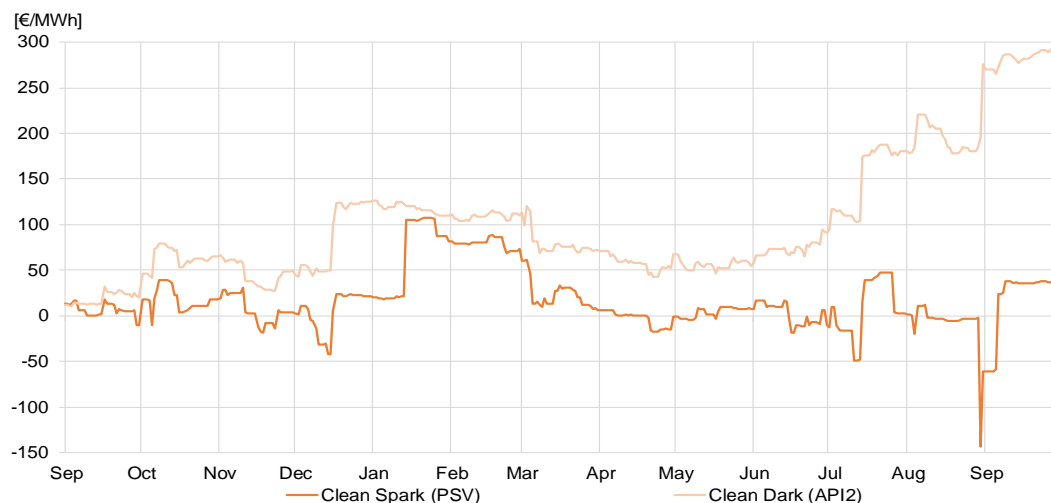
Year+1 Forward Coal & Carbon Prices



Monthly average change
API2-API4 = +\$13.4/t

Source: Terna calculation on Bloomberg data

Clean Year+1 Forward Dark & Spark spreads Italy



Clean spark spread PSV
monthly average
= +€19.4/MWh

Clean dark spread API2
monthly average
= +€283/MWh

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.



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.



Disclaimer

1. The monthly electricity balances and capacities for 2021 and for 2022 are provisional and the data for 2021 will be replaced by definitive values once the “Statistical data on electricity in Italy” is published.
2. More specifically, the monthly electricity reports for 2022 – 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.