2019

PROVISIONAL DATA ON OPERATION OF THE ITALIAN ELECTRICITY SYSTEM

Terna

ENERGY IS OUR RESPONSIBILITY

2019

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PROVISIONAL OPERATIONAL DATA

NATIONAL DISPATCHING:

Dispatching activities are carried out by Terna through Terna Rete Italia's National Dispatching and Conduction department. "Dispatching" is the combination of activities that are necessary in order to ensure that electricity production and demand are always balanced in the national electricity system, thus guaranteeing continuity and security in the provision of the service to the Country. The high degree of organisation and expertise, necessary to ensure the correct functioning of the system, requires the identification of a central coordinator. Namely, this is the dispatcher, which has the power to supervise all production plants that form part of the system. It is a very intricate process, which involves a large number of participants- production side and demand side - and which, notwithstanding the traditional variability in demand, has had to add a more flexible management of resources due to the increasingly variable component linked to the production of "non-programmable" renewable sources.

Preparation for operation in real time includes the planning of unavailability (of grids and production plants) within various time frames, the forecasting of the national electricity demand, comparing it for consistency with the production schedule established as a result of the free energy market (Electricity Exchange and off-Exchange contracts), the acquisition of resources for dispatching and the checking of power transits for all of the grid's lines.

Terna exercises control over the Italian National Electricity System in "real time", ensuring that the dispatching of electricity is done according to pre-established standards for the security, economy, efficiency and quality of the service. Through the National Control Centre, the Italian National Electricity System's nerve-centre, Terna coordinates the other centres within the territory, monitors the entire system and performs dispatching activities by intervening - issuing commands to the producers and Remote Conduction and Control Centres, in order to modulate the supply and structure of the grid. In order to prevent potential risks of grid degeneration or extensive disconnections, in emergency situations it can also intervene to reduce demand. Terna also manages the Dispatching Services Market (MSD), through which resources for the dispatching services are supplied.

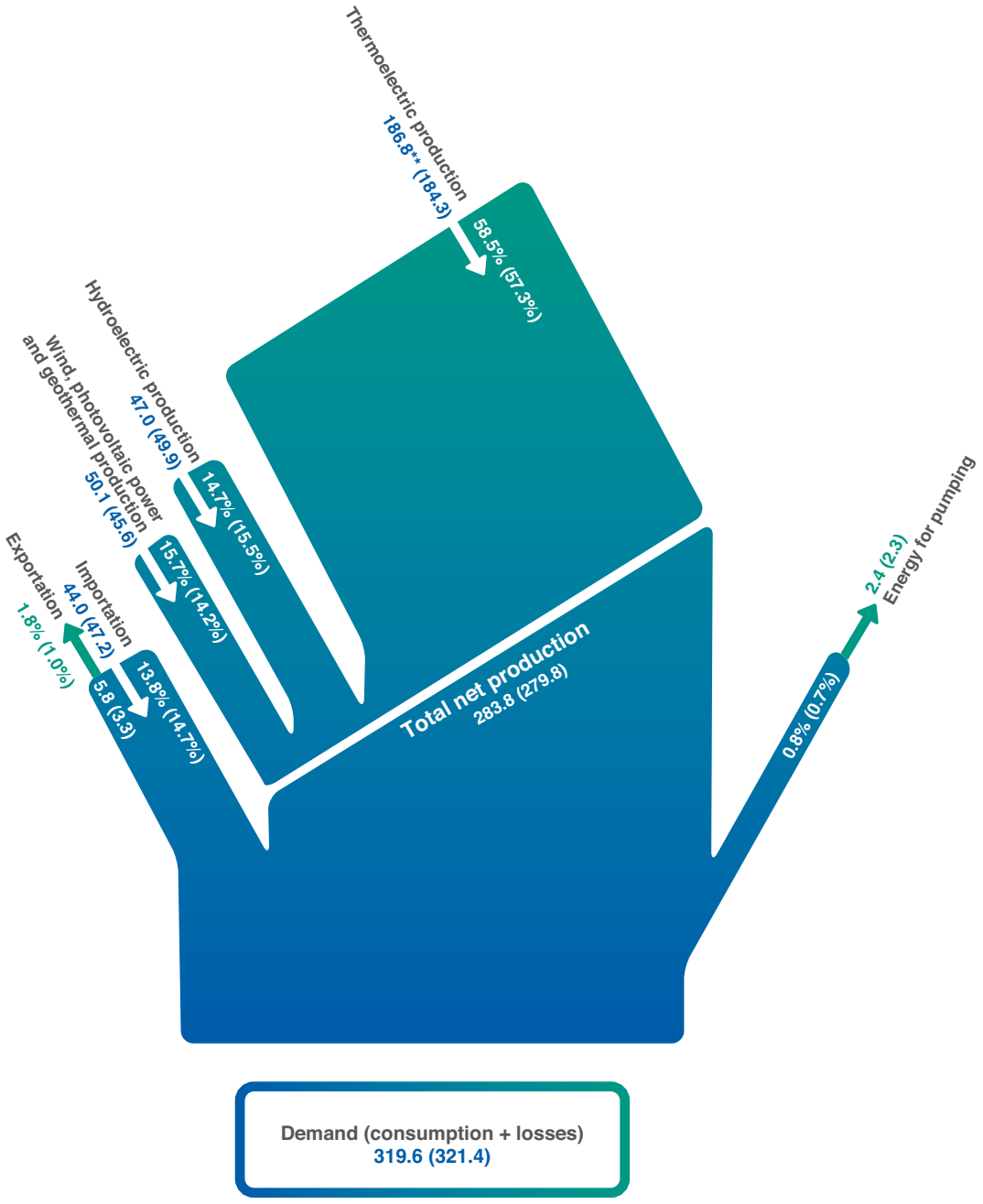
The data presented in the document for 2018 are provisional and subject to recalculation.

Mission

Terna is a leading grid operator for energy transmission.
The Company manages electricity transmission in Italy and guarantees its security, quality and affordability over time. It ensures equal access conditions to all grid users. It develops market activities and new business opportunities with the experience and technical expertise acquired in managing complex systems.
It creates value for shareholders, with a strong commitment to professional excellence and conduct that is responsible with regard to communities, in respect of the environment in which it operates.

Annual Report on Electricity in Italy

TWh (2018 data shown in brackets)*



The national electricity demand was met 88% with internal sources of production and the remainder of the balance coming from abroad (12%).

* *the percentages express the ratio between the specified source and the Demand*
** *17,546 GWh of which came from Biomass*

ELECTRICITY DEMAND DISTRIBUTED BY GEOGRAPHICAL TERRITORIAL AREA (GWh)

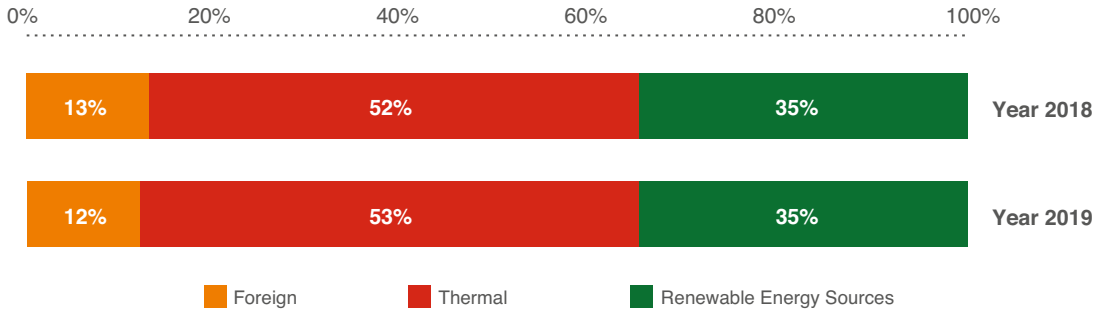
During the year, **electricity demand** reached 319,597 GWh, down -0.6% on 2018.
In 2019, electricity demand was met 88% by national production for consumption (87% in 2018), for a figure of 281,432 GWh (+1.4% compared to 2018), net of consumption of auxiliary services and pumping.
The remaining part of this demand (12%) was covered by net imports from other countries, amounting to 38,165 GWh, a decrease of -13.1% over the previous year.
35% of the energy demand on the grid was met by means of renewable energy source production (renewable hydroelectric, wind, photovoltaic, geothermal and biomass), coming to a value of 112,891 GWh (+1.3% compared to the previous year).

[GWh]	TURIN	MILAN	VENICE	FLORENCE	ROME	NAPLES	PALERMO	CAGLIARI	2019	2018	Var. %
Hydroelectric production	11,013	10,368	15,670	1,857	4,745	2,467	445	394	46,959	49,928	-5.9
Thermoelectric production	23,823	38,867	17,055	25,371	18,690	42,956	10,594	9,455	186,811	184,338	1.3
Geothermal production	0	0	0	5,687	0	0	0	0	5,687	5,756	-1.2
Wind power production	30	0	0	328	1,355	12,960	3,369	2,021	20,063	17,557	14.3
Photovoltaic production	1,728	2,487	2,986	3,548	5,319	5,748	1,754	756	24,326	22,266	9.3
Total net production *	**36,594**	**51,722**	**35,711**	**36,791**	**30,109**	**64,131**	**16,162**	**12,626**	283,846	279,845	1.4
Energy for pumping	704	597	78	37	21	468	361	148	2,414	2,313	4.4
Net production used for consumption	**35,890**	**51,125**	**35,633**	**36,754**	**30,088**	**63,663**	**15,801**	**12,478**	281,432	277,532	1.4
Importation	*16,827*	*20,615*	*6,421*	*0*	*37*	*57*	*17*	*13*	*43,987*	*47,170*	*-6.7*
Exportation	*1,026*	*191*	*246*	*299*	*34*	*2,966*	*656*	*404*	*5,822*	*3,271*	*78.0*
Foreign balance	**15,801**	**20,424**	**6,175**	**- 299**	**3**	**- 2,909**	**- 639**	**- 391**	38,165	43,899	-13.1
Territorial area balance	- 19,414	- 2,696	7,664	13,082	14,653	- 13,972	3,760	- 3,077			
Energy required on the grid	**32,277**	**68,853**	**49,472**	**49,537**	**44,744**	**46,782**	**18,922**	**9,010**	319,597	321,431	-0.6
Year 2018	33,345	70,276	49,855	49,946	44,041	45,813	19,051	9,104			
% change	**-3.2**	**-2.0**	**-0.8**	**-0.8**	**1.6**	**2.1**	**-0.7**	**-1.0**			

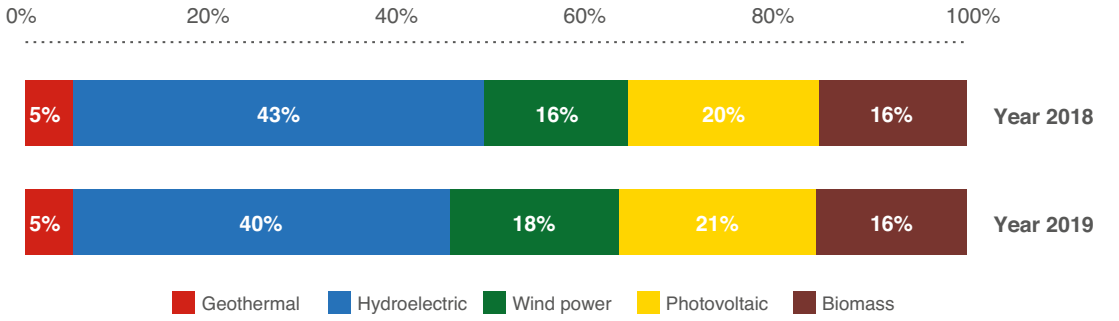
N.B. Foreign balance excluding the Republic of S. Marino and the Vatican City.

* *Some of the thermoelectric production is made up of Biomass (17,546 GWh), which contribute to part of the production from Renewable sources*

BREAKDOWN OF DEMAND



DETAILS OF RENEWABLE ENERGY SOURCES



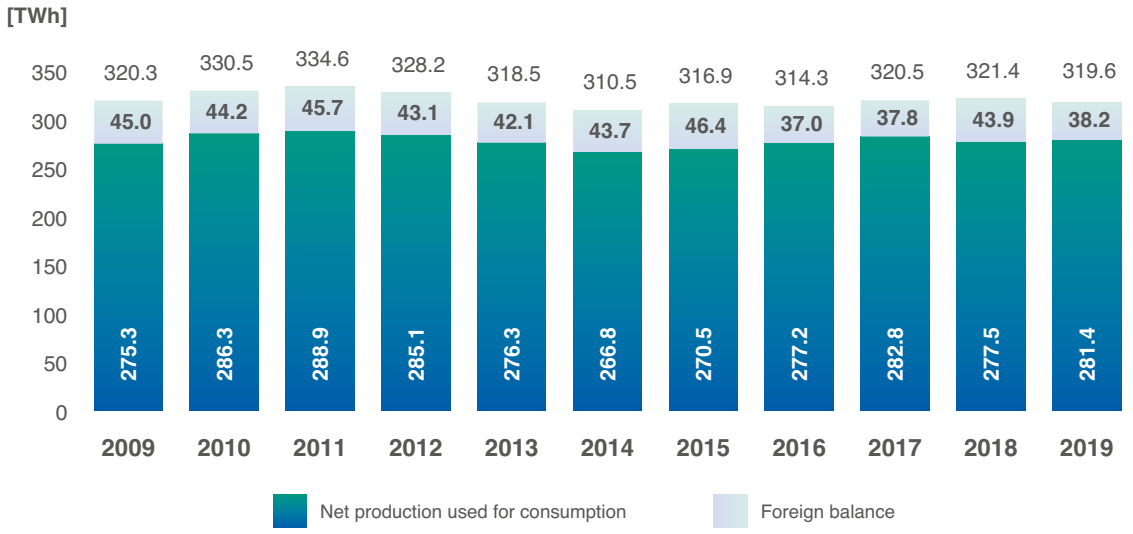
In 2019, annual production from Renewable Energy Sources was higher than in 2018 (+1.3%). The details by source show an increase in wind production (+14.3%), in photovoltaic production (+9.3%) and a decrease in hydroelectric production (-5.9%) and geothermal production (-1.2%).

[GWh]	Year 2019	Year 2018	Var % 19/18
Hydroelectric	46,959	49,928	-5.9%
of which Pumping in production [2]	1,690	1,619	4.4%
Biomass**	17,546	17,601	-0.3%
Geothermal	5,687	5,756	-1.2%
Wind power	20,063	17,557	14.3%
Photovoltaic	24,326	22,266	9.3%
Total Production, Renewable Energy Sources [3]	**112,891**	**111,489**	**1.3%**
Thermoelectric*	169,265	166,737	1.5%
Total Net Production	**283,846**	**279,845**	**1.4%**
Imports	43,987	47,170	-6.7%
Exports	5,822	3,271	78.0%
Foreign Balance	**38,165**	**43,899**	**-13.1%**
Pumping	**2,414**	**2,313**	**4.4%**
Electricity Demand [1]	**319,597**	**321,431**	**-0.6%**

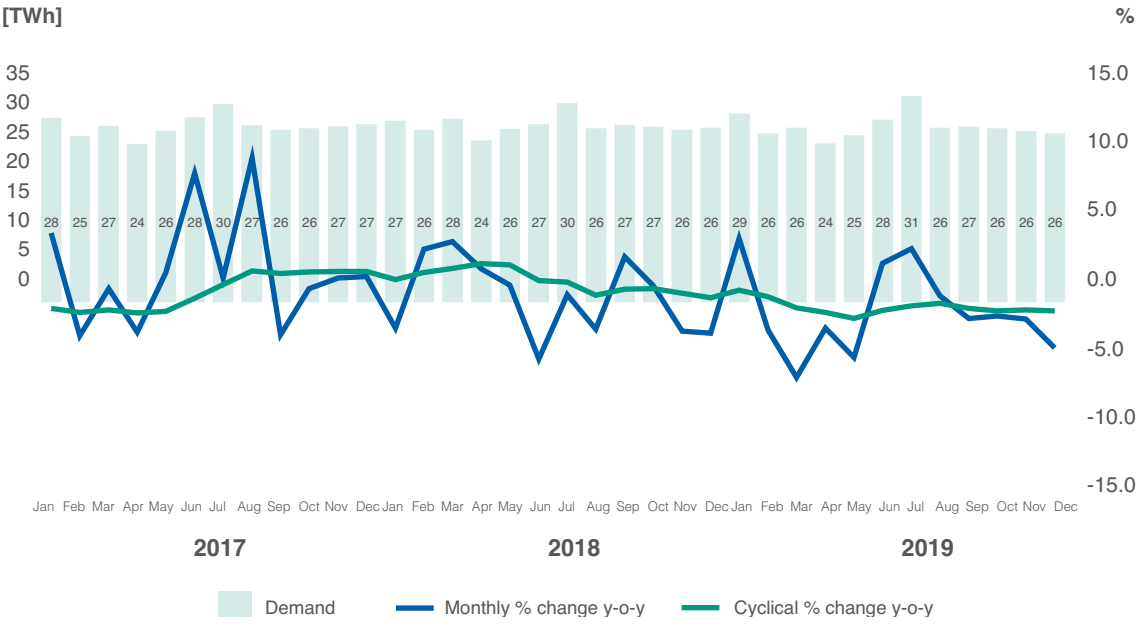
(1) Electricity Demand = Production + Foreign Balance - Pumping Consumption.
(2) Production rate by pumping, calculated with the theoretical average yield from absorption
(3) RES Production = Hydroelectric-Pumping in Production + Biomass + Geothermal + Wind + Photovoltaic
** Thermoelectric production is shown net of Biomass (17,546 GWh), which contributes to part of the production from Renewable sources.*
*** A further component of production from renewable sources was thermoelectric production from biomass."*

Demand in power and in energy

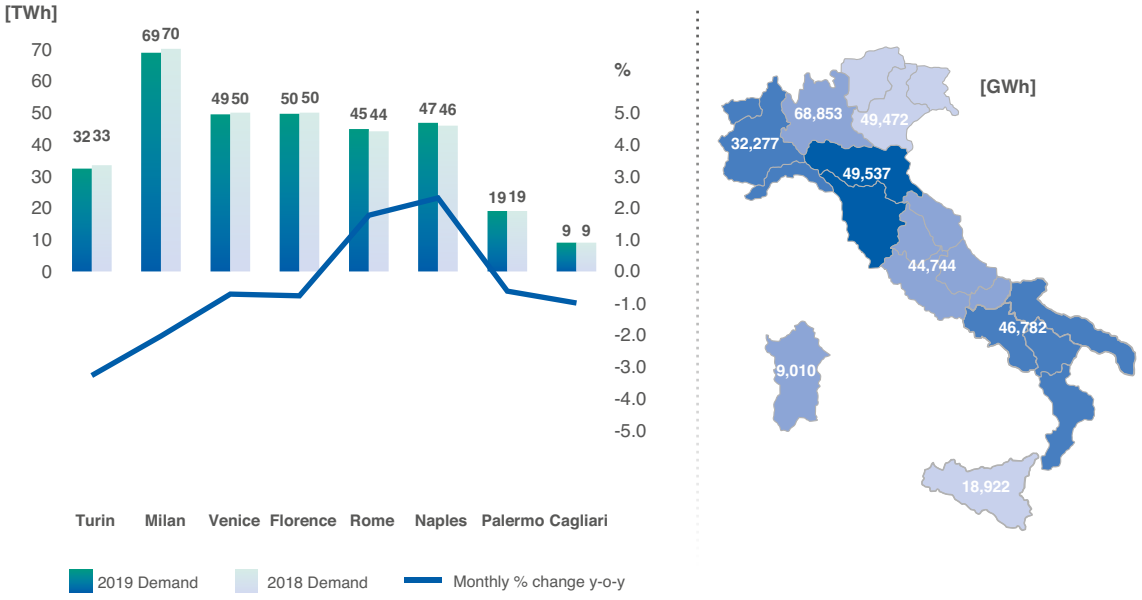
EVOLUTION AND MEETING OF DEMAND



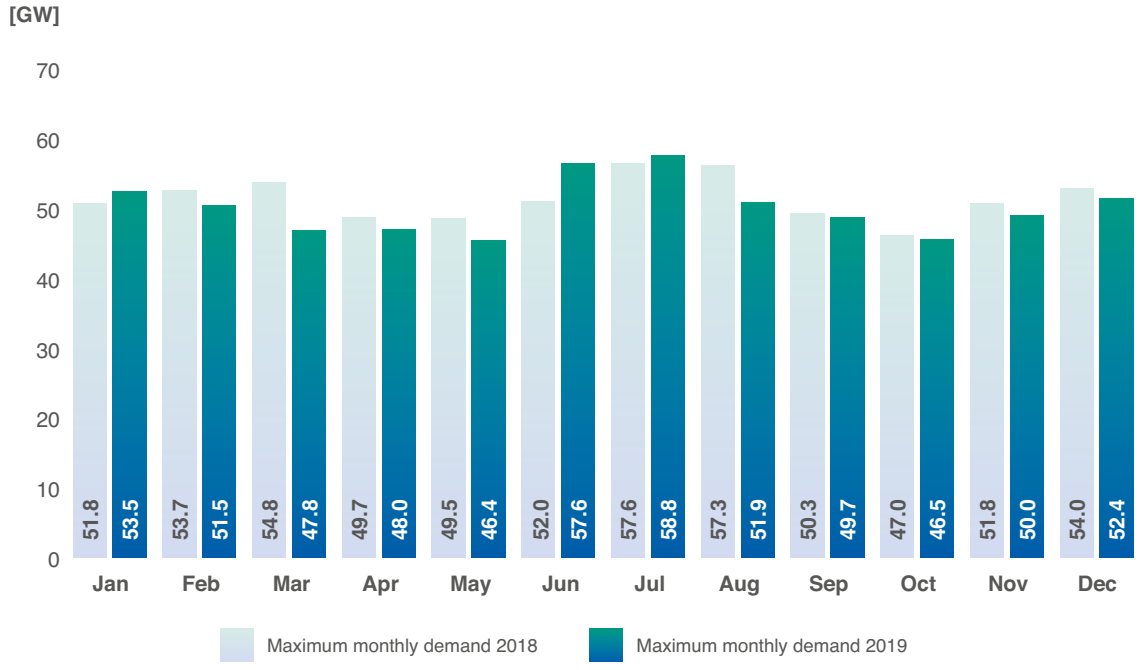
MONTHLY AND CYCLICAL PERCENTAGE VARIATIONS



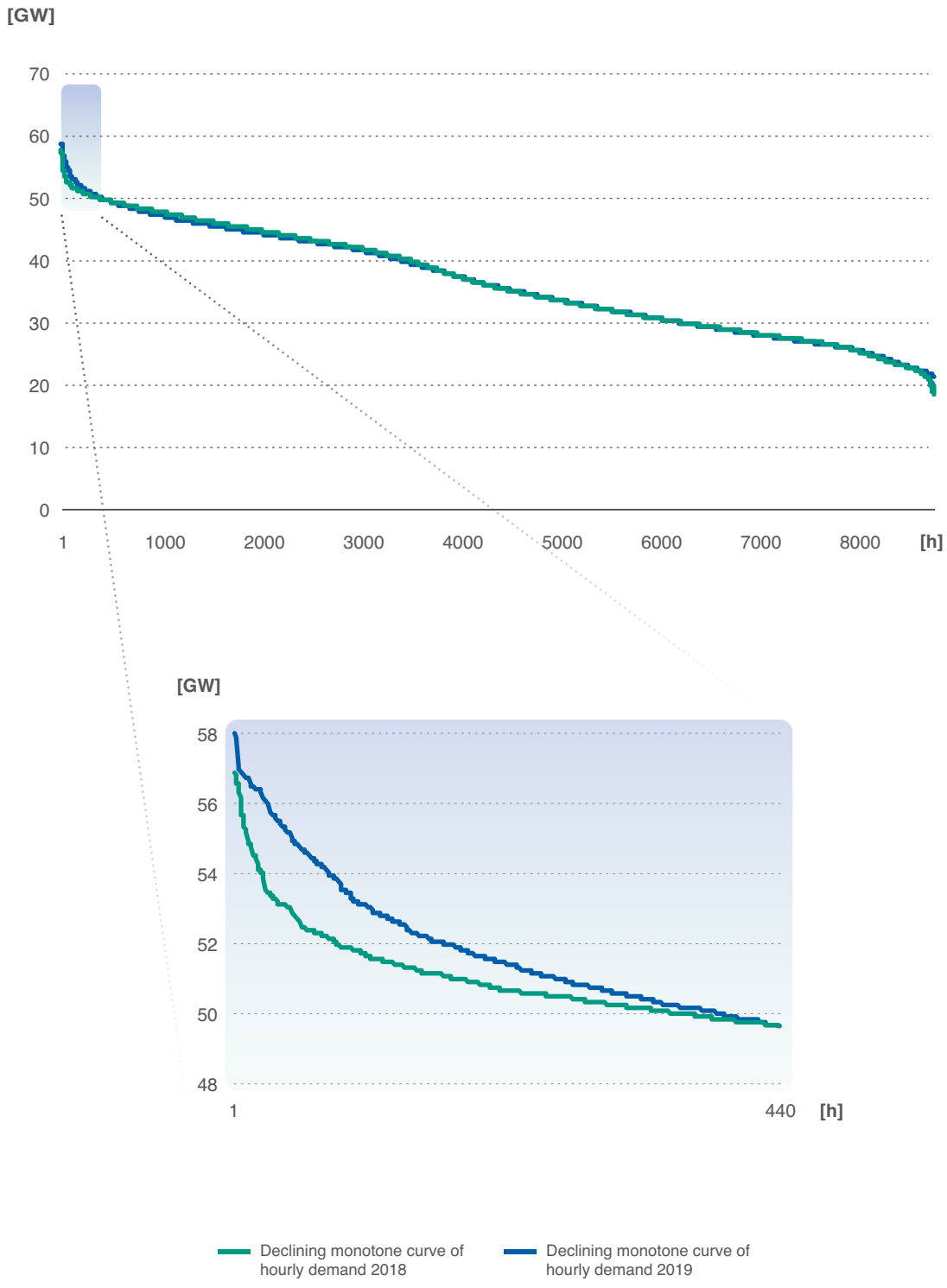
PERCENTAGE VARIATIONS BY TERRITORIAL AREA



MAXIMUM HOURLY DEMAND IN POWER



MONOTONE CURVE OF HOURLY DEMAND

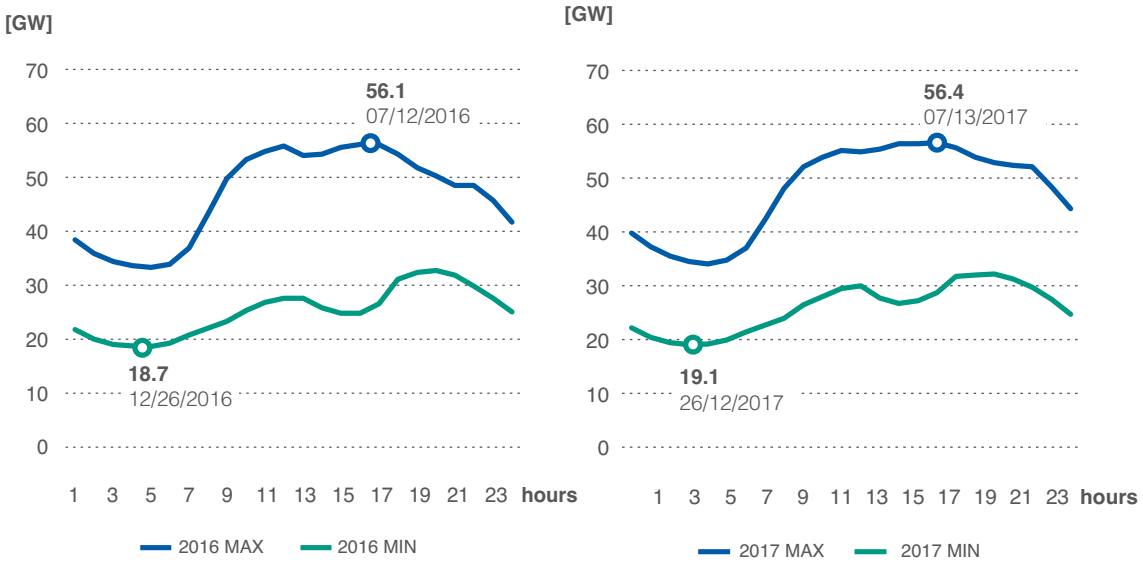


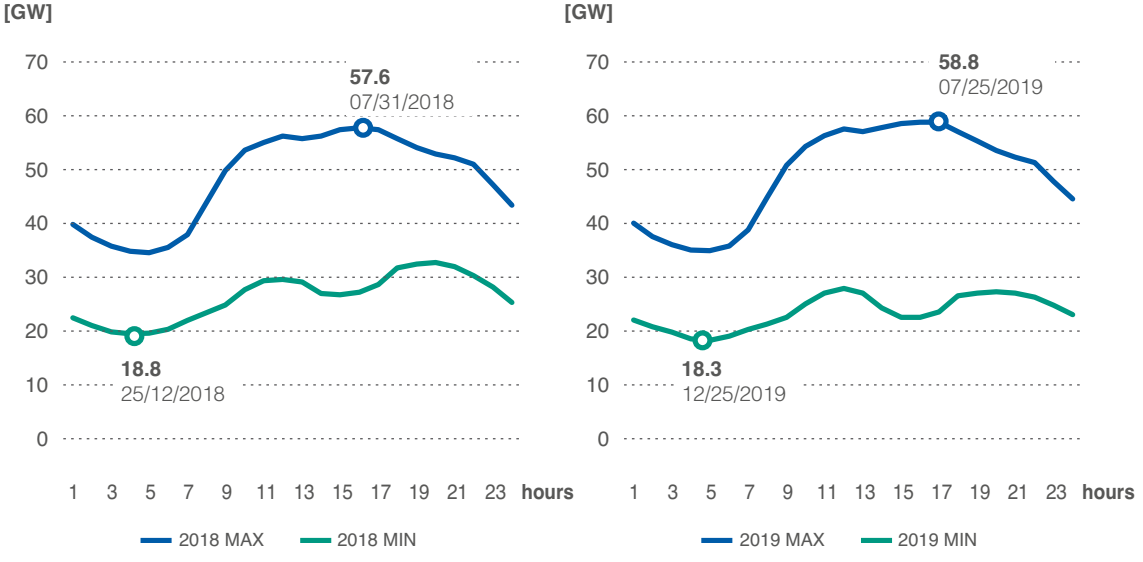
NB: Data net of absorption for auxiliary services and pumping.

DAILY LOAD CURVE FOR PEAKS AND LOW POINTS

In 2019 , the maximum electricity demand on the Italian national electricity system was 58,816 MW, recorded on 25 July between 16:00 and 17:00, up +2.1% compared to the 2018 peak.

In 2019, the monthly peak values were generally lower than those for the same months of the previous year, with the exception of January, June and July.



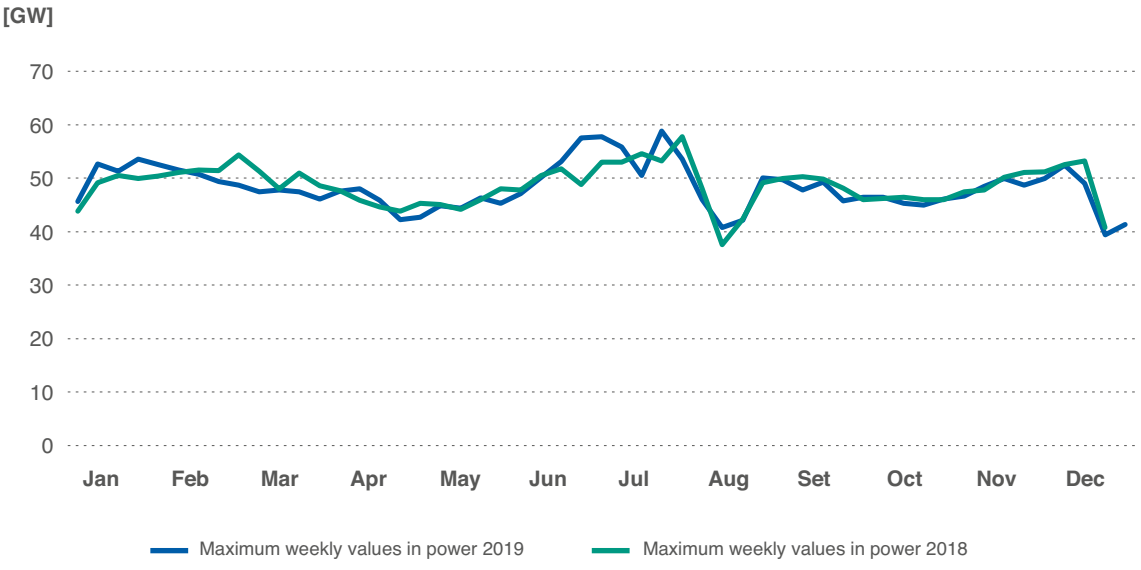


N.B.: Data net of absorption for auxiliary services and pumping.

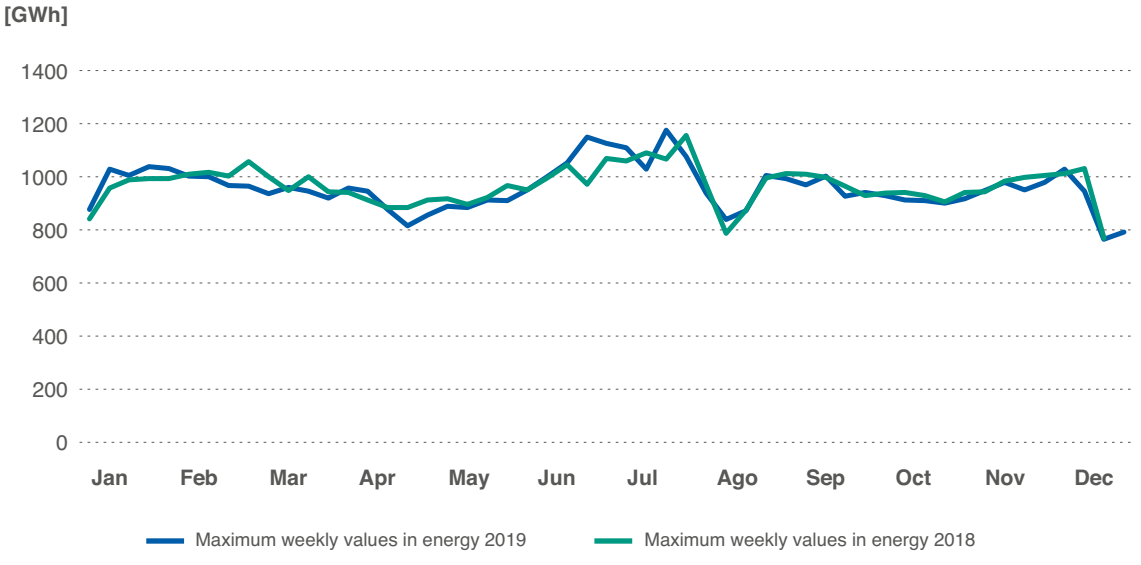
MAXIMUM WEEKLY VALUES IN POWER

The weekly load curve shows the maximum values of load and energy recorded on the Italian electricity grid in every week of 2019.

The diagrams clearly show low demand values during the Easter holidays, the second half of August and year-end holidays.

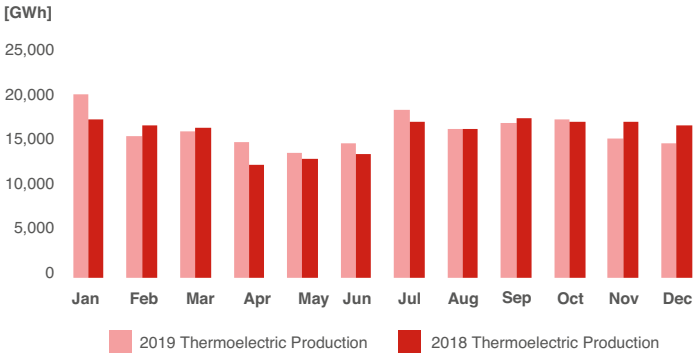


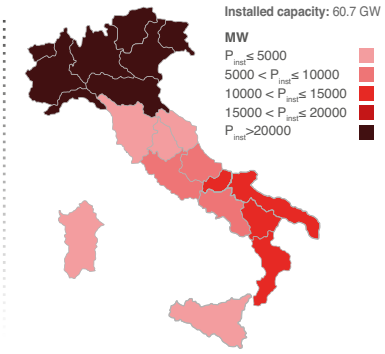
MAXIMUM WEEKLY VALUES IN ENERGY



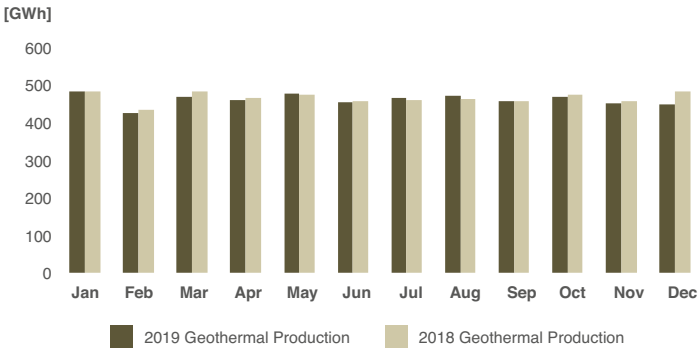
Production and capacities

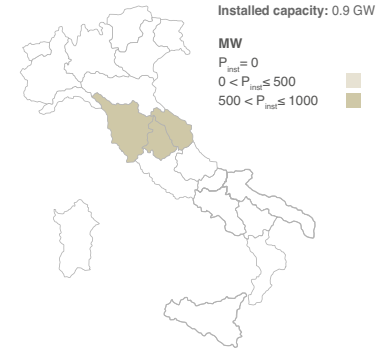
THERMOELECTRIC PRODUCTION AND CAPACITY



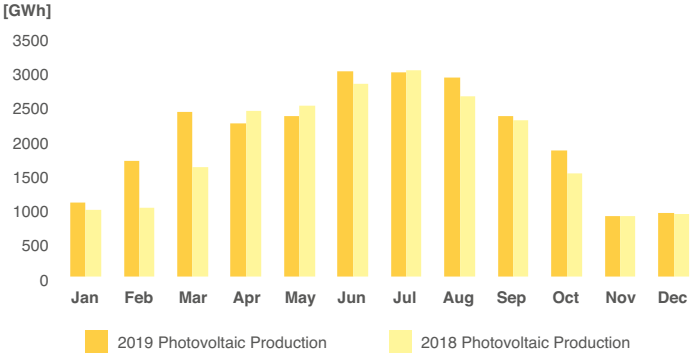


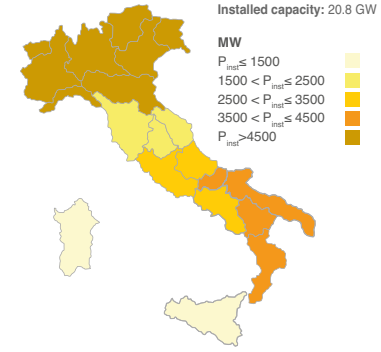
GEOTHERMAL PRODUCTION AND CAPACITY



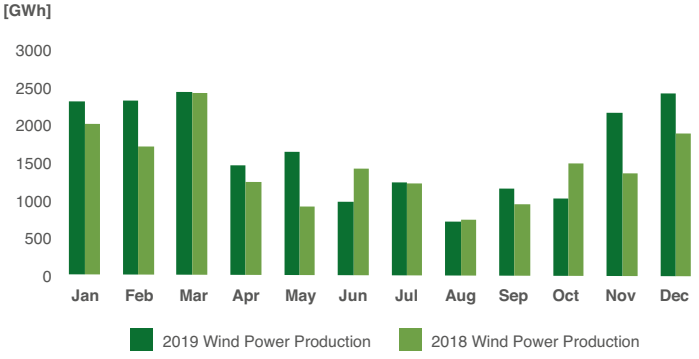


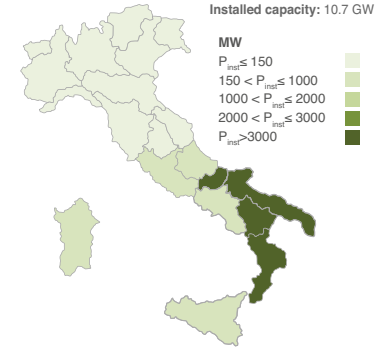
PHOTOVOLTAIC PRODUCTION AND CAPACITY



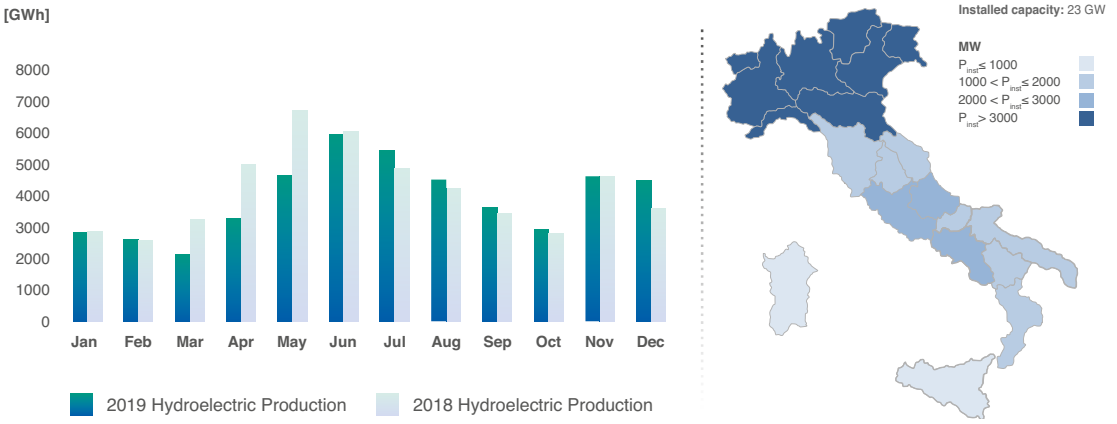


WIND PRODUCTION AND CAPACITY

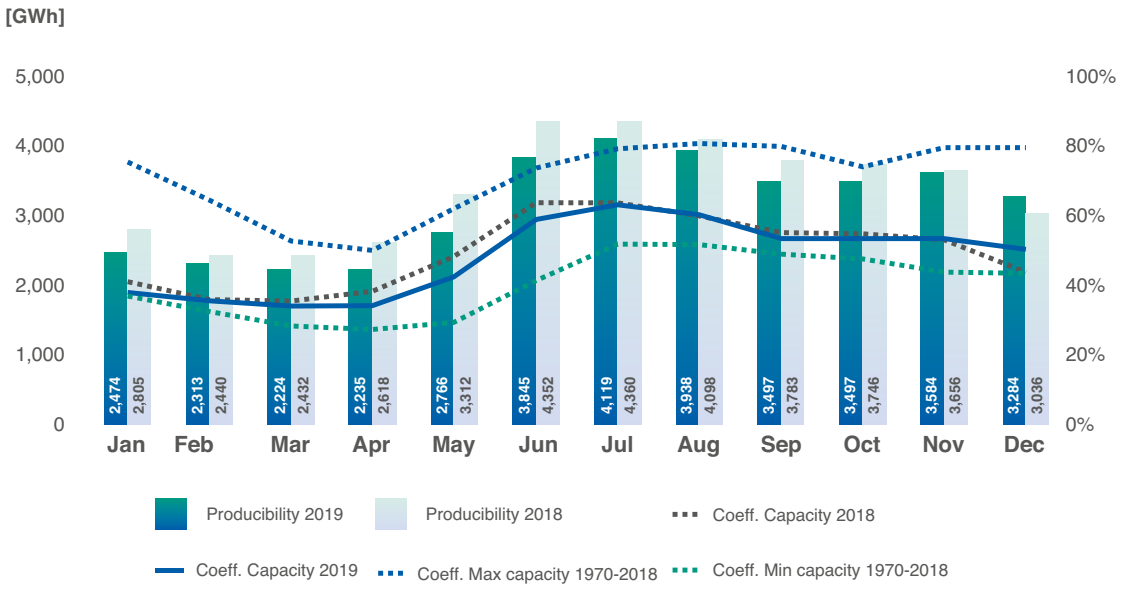




HYDROELECTRIC PRODUCTION AND CAPACITY



HYDROELECTRIC PRODUCIBILITY



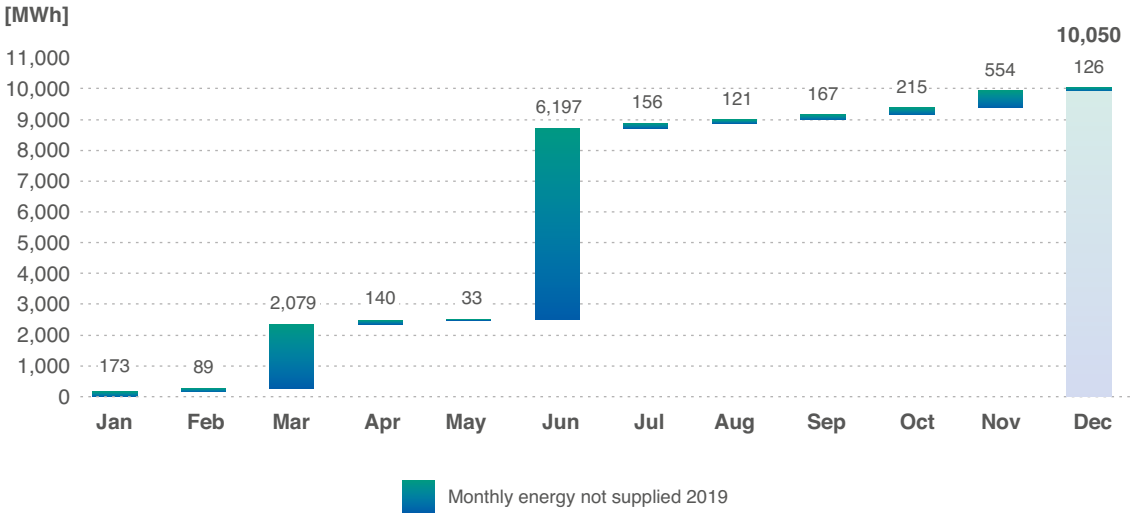
	Tank capacity	NORTH	CENTRE and SOUTH	ISLANDS	TOTAL
2019	*[GWh]*	2,169	840	274	**3,284**
	% (*Capacity/Max Capacity*)	50.2%	46.3%	72.1%	**50.4%**
2018	*[GWh]*	2,103	700	234	**3,036**
	% (*Capacity/Max Capacity*)	45.3%	38.6%	61.3%	**44.4%**

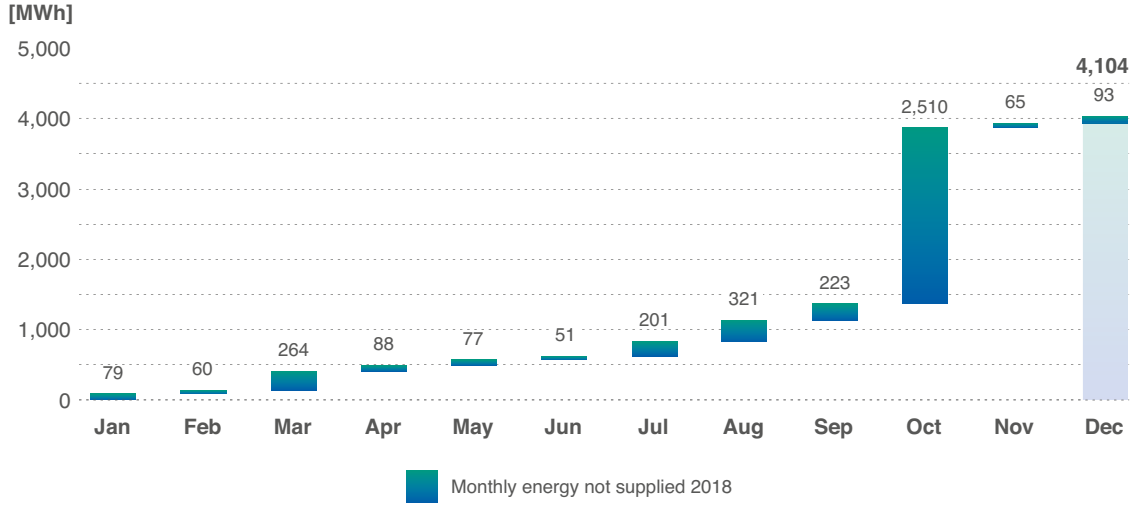
Energy not supplied

Energy not supplied is the energy not provided to customers connected to EHV/HV/MV grids following an interruption, even with customer disconnection. The following table and graphs show the values divided by territorial area, in relation to the events that occurred on the relevant grid with no distinction of cause and origin.

[MWh]

Territorial Area	Year 2019	Year 2018
Turin	2,160	93
Milan	3,801	245
Padua	370	2,510
Florence	361	62
Rome	171	633
Naples	2,987	420
Palermo	148	49
Cagliari	52	20
Total	**10,050**	**4,033**





Physical exchanges of energy, internal and with other countries

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

In 2019, the 380 kV connection between Sicily and Calabria ensured a significant capacity for exportation from the Continent towards Sicily for a total of 3.8 TWh.

[TWh]

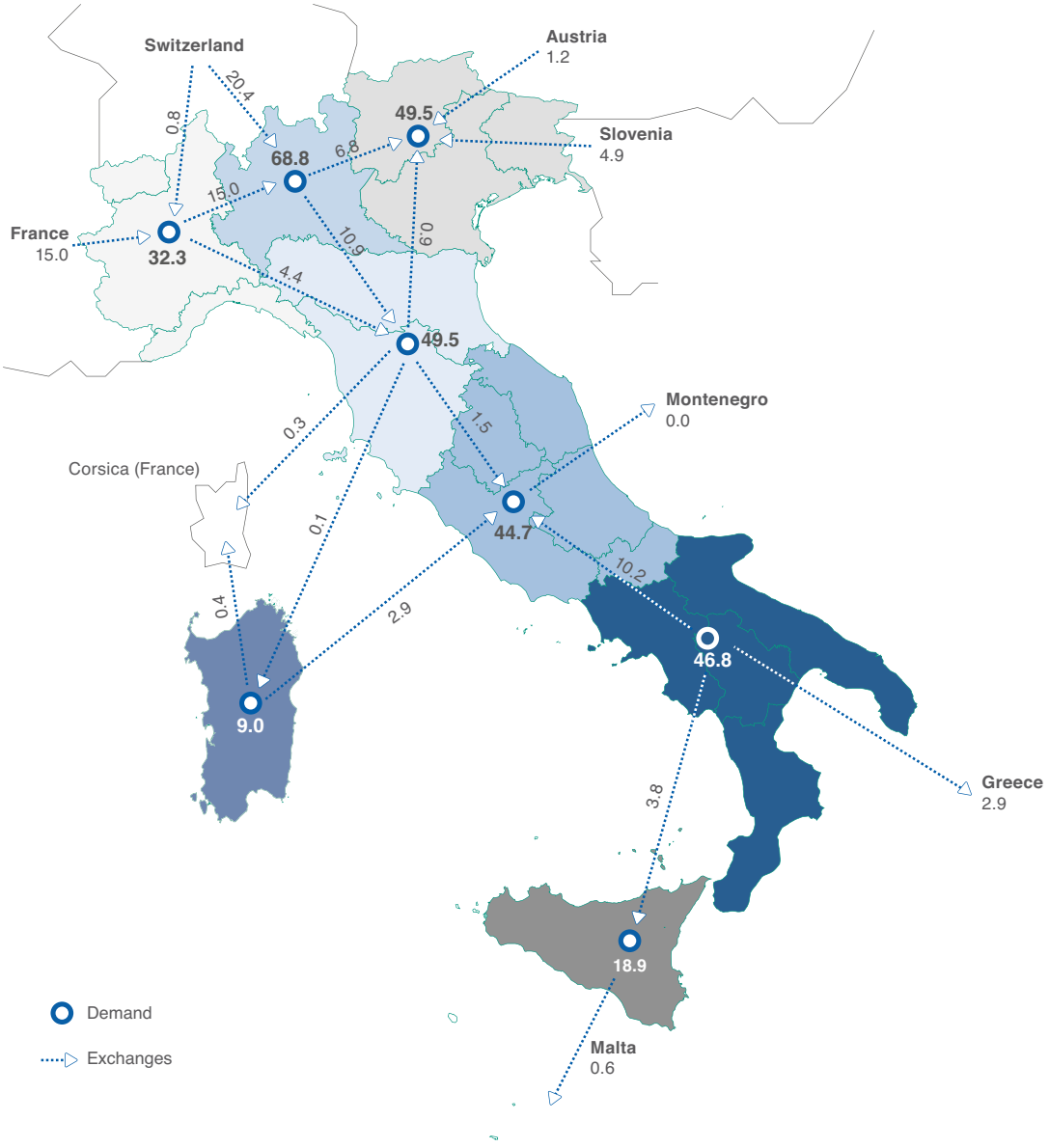
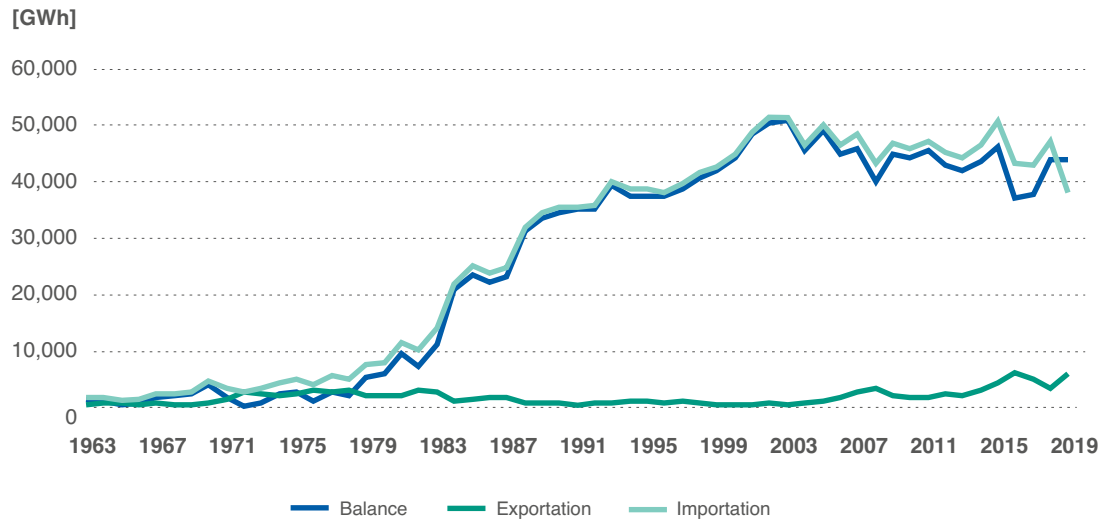


TABLE OF PHYSICAL EXCHANGES OF ENERGY BETWEEN ITALY AND BORDERING COUNTRIES

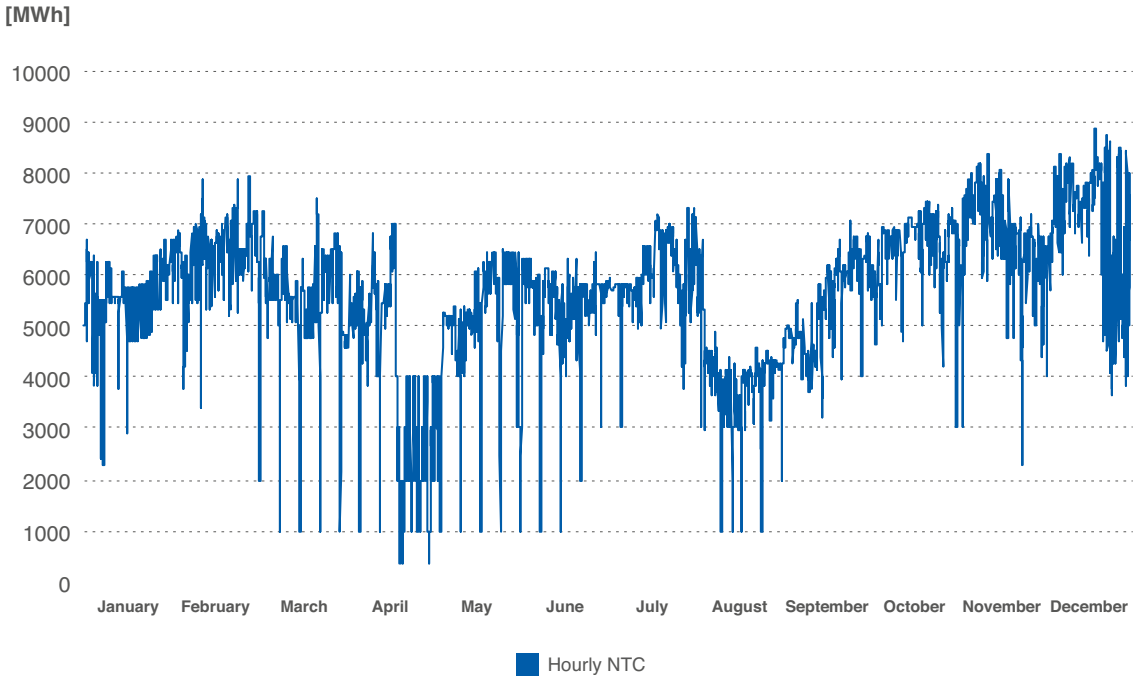
[GWh]	Electricity imported to Italy from								Electricity exported from Italy to								
2019	France	Switzerland	Austria	Slovenia	Greece	Malta	Montenegro	TOTAL	France	Switzerland	Austria	Slovenia	Greece	Malta	Montenegro	TOTAL	2019 exchange balance
January	922	1,863	106	457	3	0		3,352	128	85	0	10	261	47	0	531	2,821
February	1,474	2,019	108	550	4	0		4,154	73.00	12	0	1	177	61	0	324	3,830
March	1,478	2,029	82	603	10	0		4,202	83	42	0	3	232	59	0	418	3,784
April	1,035	1,350	119	529	4	3		3,040	72	134	0	15	243	45	0	509	2,531
May	1,472	1,428	111	539	0	8	1	3,559	40	110	0	5	209	34	1	399	3,160
June	1,443	1,635	113	499	1	1	3	3,694	62	148	0	4	142	46	8	410	3,284
July	1,621	2,006	114	372	3	0	4	4,120	61	131	0	18	289	82	7	588	3,532
August	1,031	1,579	78	82	11	0	0	2,783	64	83	1	58	284	70	0	559	2,223
September	1,239	1,831	93	179	0	0	1	3,343	52	43	0	100	316	69	1	581	2,762
October	1,234	2,494	116	320	0	5	14	4,183	55	22	0	18	333	56	11	495	3,688
November	1,003	1,959	75	547	18	0	1	3,602	156	76	0	5	160	56	1	452	3,150
December	1,306	2,002	113	516	3	1	13	3,955	90	97	0	8	318	34	7	555	3,400
YEAR	15,257	22,194	1,229	5,194	57	20	37	43,987	936	981	2	245	2,966	657	35	5,822	38,165

[GWh]	Electricity imported to Italy from							Electricity exported from Italy to							
2018	France	Switzerland	Austria	Slovenia	Greece	Malta	TOTAL	France	Switzerland	Austria	Slovenia	Greece	Malta	TOTAL	2018 exchange balance
January	1,676	2,392	130	650	51	0	4,898	80	17	5	4	130	89	326	4,572
February	1,332	2,415	128	607	127	1	4,609	79	11	1	1	72	37	200	4,410
March	1,576	2,076	126	670	284	0	4,732	52	36	5	0	8	77	178	4,554
April	1,328	1,758	111	648	158	0	4,003	40	155	8	4	52	80	338	3,665
May	1,395	1,510	147	570	47	1	3,670	31	226	5	6	67	36	370	3,300
June	1,346	1,604	116	534	11	1	3,612	41	168		10	1	56	275	3,337
July	1,419	2,327	132	657	149	1	4,685	63	155		2	61	46	327	4,358
August	858	1,432	94	368	239	2	2,992	87	109	0	10	26	53	285	2,707
September	1,304	1,316	116	430	1	1	3,167	52	38	0	5	0	54	149	3,018
October	1,161	2,224	102	577	0	0	4,065	56	16		2	0	39	112	3,952
November	740	1,429	97	503	1	1	2,770	124	143		8	1	26	300	2,470
December	1,252	2,057	118	526	10	4	3,966	102	66		7	193	43	411	3,556
YEAR	15,386	22,540	1,417	6,739	1,078	11	47,170	806	1,139	24	60	611	632	3,271	43,899

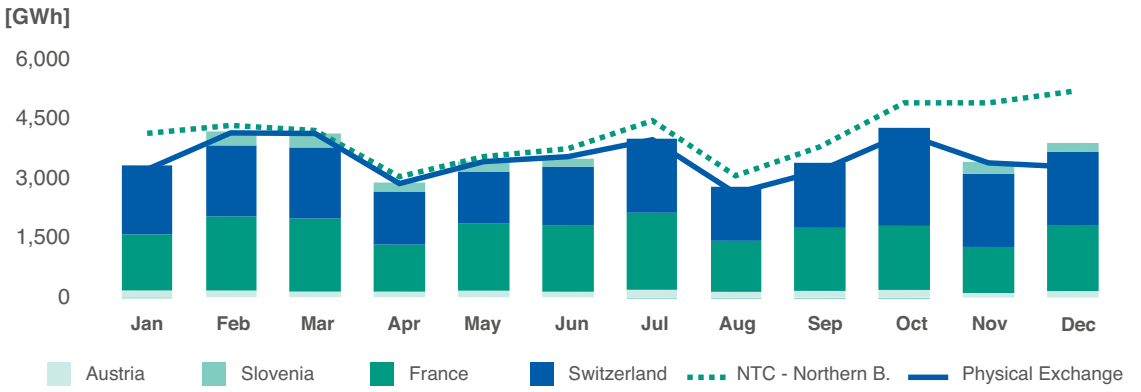
NET PHYSICAL EXCHANGES WITH NEIGHBOURING COUNTRIES



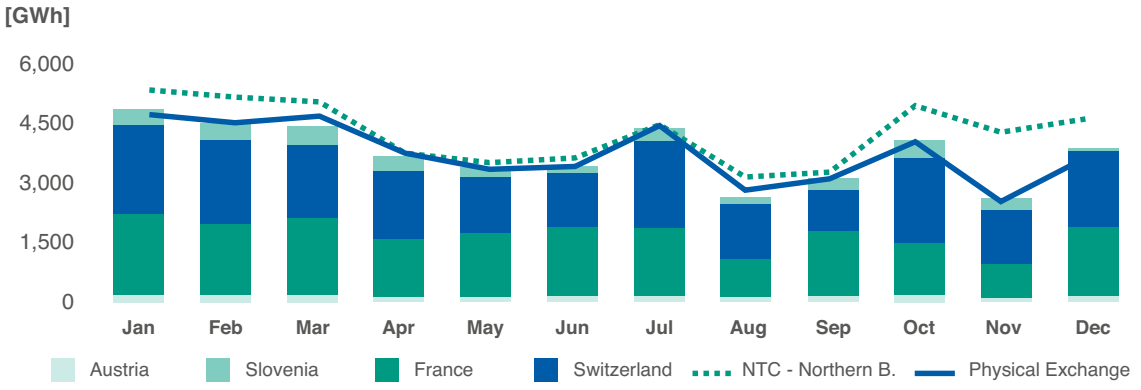
HOURLY NTC CHRONOLOGY - NORTHERN BORDER



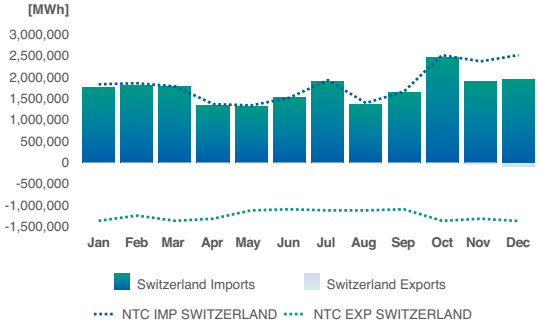
NET FOREIGN EXCHANGE BALANCE ON THE NORTHERN BORDER - 2019 DAM PROGRAMME

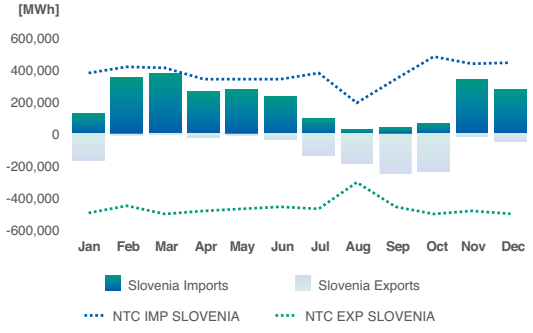


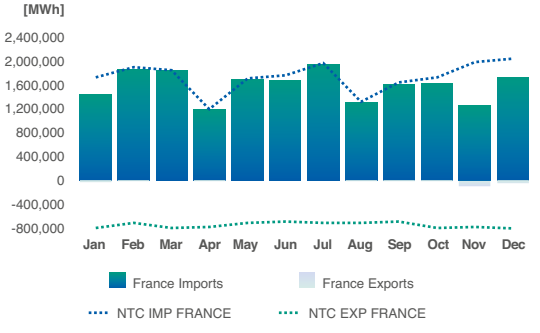
NET FOREIGN EXCHANGE BALANCE ON THE NORTHERN BORDER - 2018 DAM PROGRAMME

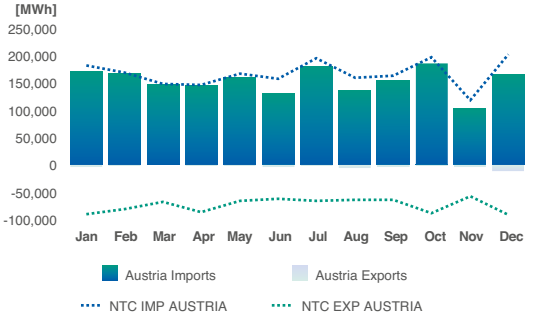


DETAILS BY BORDER









The Italian 380 kV electricity grid

THE ITALIAN 380 KV ELECTRICITY GRID AT 31 DECEMBER 2019

Key

The energy required on the grid is the energy that must be provided to meet net domestic consumption. In the case of a national grid it is equal to the sum of net electricity produced and electricity imported from abroad, less the electricity absorbed for pumping and electricity exported abroad.

- **The net production** of electricity of a set of generation plants in a certain period is the sum of the quantities of electricity introduced into the grid.

- **Consumption for pumping** is the electricity used for lifting water by pumps, for the sole purpose of using it subsequently for electricity production.

- **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

- **Energy not supplied** is the energy not provided to customers connected to EHV/HV/MV grids following an interruption, even with customer disconnection.

Disclaimer

1. The monthly electricity reports of the year 2018 are definitive.
2. The monthly electricity reports of the year 2019 are provisional.
3. The data presented in the document are provisional and subject to recalculation.
4. In particular, the monthly electricity reports of the year 2019 – prepared at the end of each month using the operating archives – are subject to further and precise verification or recalculation in the following months on the basis of additional information. This calculation to fine tune the monthly value guarantees that the data has a greater degree of reliability.

RESPONSIBILITY IS OUR ENERGY

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