

POWER PLANTS

Maximum capacity of electric power plants in Italy at 31 December 2016

By energy source

Figure 5

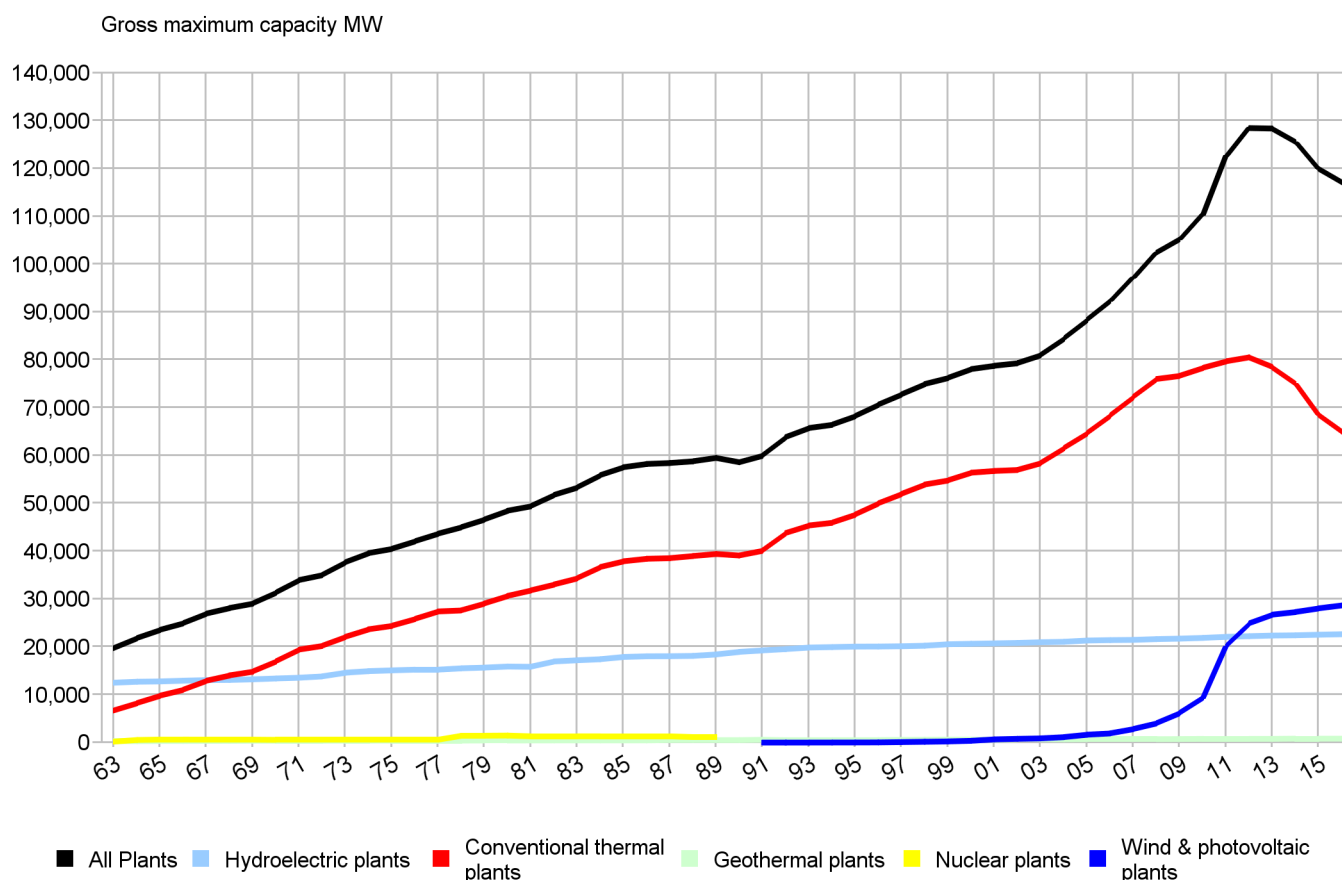


Table 5 (*)

	Gross			Net		
	Producers	Autoproducers	Total	Producers	Autoproducers	Total
MW						
2016						
hydroelectric	22,536.4	121.6	22,658.0	22,181.1	117.1	22,298.2
thermal	60,831.3	4,898.5	65,729.7	58,479.5	4,716.6	63,196.1
<i>conventional</i>	60,016.7	4,898.5	64,915.2	57,712.3	4,716.6	62,428.9
<i>geothermal</i>	814.6	-	814.6	767.2	-	767.2
wind	9,409.9	..	9,409.9	9,383.9	..	9,383.9
photovoltaic	19,283.2	-	19,283.2	19,283.2	-	19,283.2
total	112,060.7	5,020.1	117,080.8	109,327.6	4,833.7	114,161.3

The "maximum capacity" of a power plant is the maximum electrical capacity that could be produced continuously throughout a prolonged period of operation on the assumption that all parts of the plant are entirely efficient and in optimal condition (flow and heat in the case of hydroelectric plants, availability of fuel and of cooling-water in the case of thermoelectric plants).

Maximum capacity in "gross" if measured at the terminals of the plant's generators, or "net" if measured at the plant's busbars, that is, less the power absorbed by the plant auxiliary services and less the losses in the transformers that are considered integral parts of the plant.

(*) For the definition of "Autoproducer" or "Self-Producer" see Introduction of the volume, on page 3.

Hydro plants

Nominal and maximum capacity and average annual energy capability of hydro plants in Italy at 31 December

Table 6

	Plants		Nominal capacity			
	no.	no.	Prime movers		Generators	
			MW	MW	MVA	MVA
	2015	2016	2015	2016	2015	2016
Producers	3,621	3,842	24,375.1	24,455.1	27,903.2	27,998.2
<i>variation 2016/2015</i>		6.1%		0.3%		0.3%
Autoproducers	79	85	140.7	136.2	177.2	171.3
<i>variation 2016/2015</i>		7.6%		-3.2%		-3.3%
Total	3,700	3,927	24,515.8	24,591.3	28,080.4	28,169.5
<i>variation 2016/2015</i>		6.1%		0.3%		0.3%

(*) Including energy capability from pumping inflows.

A "hydro plant" is a complex of hydraulic works, machinery, equipment, buildings and services for the conversion of hydraulic energy into electric energy. The "power station" is the plant comprising the building, the hydroelectric sets, the relative equipment and facilities such as the "station transformers". Two hydro plants with different heads, but having in common the power-station building, the discharge installations and part of the services, are considered as separate plants, each classified in its specific category (see definition on page 33).

In "pumped-storage plants", the pumps and the turbines are always connected to the same upper reservoir. The following two types of pumped-storage plants are distinguished according to the manner in which they are connected to the lower reservoir or reservoirs:

- "plants with contributory pumping", in which the pumps are connected to a lower reservoir separated from that into which the turbines are discharged. In this case it is not possible to provide for pumping cycles, and the function of the pumps, which may be installed in the powerhouse building or in a different

building, is solely to raise the water collected by the reservoir which supplies the pumps to the upper reservoir. Pumping with these plants is defined as "contributory pumping";

- plants in which the pumps and turbines are connected to the same lower reservoir: in this case the pumping cycle is repeatable a larger number of times, if required. These plants are considered respectively as "pure pumped-storage plants" or "mixed pumped-storage plants" when the natural inflows which supply the upper reservoir are, on average, above or below 5% the average volume of water feeding the turbines in a year. The pumping of these plants is defined as "voluntary pumping".

The "nominal capacity" of a hydraulic prime mover (turbine) or of an electrical generator is the maximum capacity obtainable, in continuous operation according to the accepted standards; the nominal capacity is a gross capacity. In a hydroelectric plant (or in a group of plants), nominal capacity is the sum of the nominal capacities of the machines (main and auxiliary) installed in the power plant.

Maximum capacity				Average annual energy capability (*)			
Gross		Net		Gross		Net	
MW	MW	MW	MW	GWh	GWh	GWh	GWh
2015	2016	2015	2016	2015	2016	2015	2016
22,434.4	22,536.4 0.5%	22,098.6	22,181.1 0.4%	56,103.2	54,591.1 -2.7%	55,261.7	53,772.2 -2.7%
125.9	121.6 -3.4%	121.4	117.1 -3.6%	632.8	613.0 -3.1%	623.3	603.8 -3.1%
22,560.3	22,658.0 0.4%	22,220.0	22,298.2 0.4%	56,736.0	55,204.1 -2.7%	55,885.0	54,376.0 -2.7%

The "energy capability from natural inflows" of a hydroelectric plant in a given period is the maximum quantity of electric energy that it could possibly produce or store with said inflows in the period considered, on the assumption of complete utilisation of the inflows and that all parts of the plant are efficient. Energy capability may be gross or net and is calculated in a manner analogous to that defined for production (see page 25).

The "average energy capability from natural inflows" of a hydro plant in a given period is the arithmetic mean of the related energy capabilities during the largest possible number of consecutive years.

The "average energy capability from contributory-pumping inflows" of a hydro plant in a given period is defined in a manner analogous to energy capability from natural inflows, but with reference to a net head height equivalent to the difference between the level of the upper reservoir of the plant and that of the reservoir which supplies the pumps.

The "average energy capability from voluntary-pumping inflows" of a pure or mixed pumped-storage hydro plant in a given period is calculated conventionally on the basis of considerations that take into account the duty that this type of plant is called to perform in the generating system.

Situation of hydro plants in Italy in 2016

Table 7

	Plants		Nominal capacity	
	no.	Category	Prime movers kW	Generators kVA
Situation at 31/12/2015	3,700		24,515,845	28,080,404
Plants commissioned in 2016	242		85,808	104,759
Piemonte	63	Run of river	19,633	24,039
Piemonte	1	Reservoir	1	1
Valle d'Aosta	14	Run of river	10,285	13,213
Lombardia	49	Run of river	19,103	22,356
Lombardia	2	Reservoir	64	65
Trentino Alto Adige	31	Run of river	9,753	12,141
Trentino Alto Adige	1	Reservoir	18	20
Veneto	18	Run of river	4,894	6,226
Friuli Venezia Giulia	10	Run of river	5,752	6,999
Friuli Venezia Giulia	2	Reservoir	92	107
Liguria	7	Run of river	1,111	1,235
Emilia Romagna	12	Run of river	4,584	5,565
Toscana	16	Run of river	7,162	8,758
Marche	5	Run of river	336	393
Lazio	1	Run of river	900	1,000
Abruzzi	2	Run of river	344	454
Molise	1	Run of river	4	9
Campania	2	Run of river	362	464
Puglia	1	Run of river	560	659
Sicilia	3	Run of river	839	1,044
Sicilia	1	Reservoir	11	12
Existing modified or decommissioned plants in 2016	-15		-10,402	-15,672
Situation at 31/12/2016	3,927		24,591,251	28,169,491

The **categories** in which hydro plants are classified are defined on page 33.

The electrical capacity of a set of reservoirs is the amount of electricity that their downstream hydro plants could generate through the complete emptying of the reservoirs' "water operating capacity", lacking natural flows and water losses.

Gross maximum capacity	Average annual gross energy capability				Total
	from natural inflows	from pumping inflows			
		contributory	voluntary		
		kW	GWh		
					GWh

22,560,258	50,735.9	183.7	5,816.4	56,736.0
83,610	394.0	0.0	0.0	394.0
18,613	81.3	-	-	81.3
1	0.0	-	-	0.0
10,141	50.2	-	-	50.2
18,746	92.8	-	-	92.8
53	0.3	-	-	0.3
9,582	43.6	-	-	43.6
18	0.1	-	-	0.1
4,715	21.8	-	-	21.8
5,627	28.3	-	-	28.3
85	0.5	-	-	0.5
1,111	5.3	-	-	5.3
4,538	20.2	-	-	20.2
7,027	33.5	-	-	33.5
333	1.3	-	-	1.3
900	4.5	-	-	4.5
344	1.7	-	-	1.7
4	0.0	-	-	0.0
362	1.8	-	-	1.8
560	1.6	-	-	1.6
839	5.2	-	-	5.2
11	0.1	-	-	0.1
14,111	-511.5	-89.0	-1,325.5	-1,926.0
22,657,980	50,618.5	94.7	4,490.8	55,204.1

Nominal and maximum capacity and average annual gross energy capability of hydro plants in Italy at 31 December 2016

By major geographical area and category of plant

Table 8

	Plants	Nominal capacity		Maximum capacity		Average annual gross energy capability			
		Prime movers	Generators	Gross	Net	from natural inflows	from pumpings		Total
	no.	MW	MVA	MW	MW	GWh	contributory GWh	voluntary GWh	GWh
reservoir plants	129	8,934.7	10,050.9	8,504.2	8,404.5	9,972.3	42.1	2,637.5	12,651.8
<i>of which pure and mixed pumped-storage</i>	15	5,087.9	5,785.8	4,856.6	4,806.6	2,213.9	1.0	2,637.5	4,852.4
pondage plants	135	4,003.4	4,434.9	3,603.3	3,551.8	11,386.1	22.7	-	11,408.8
run-of-river plants	2,911	4,853.8	5,803.5	4,490.4	4,370.9	19,826.9	10.8	-	19,837.7
Northern Italy	3,175	17,791.9	20,289.3	16,598.0	16,327.3	41,185.3	75.5	2,637.5	43,898.3
reservoir plants	9	302.6	372.7	256.4	252.9	460.9	-	-	460.9
pondage plants	43	919.1	1,102.2	760.6	743.8	2,004.9	5.2	-	2,010.1
run-of-river plants	433	562.9	691.8	516.0	501.8	1,943.2	-	-	1,943.2
Central Italy	485	1,784.5	2,166.7	1,533.0	1,498.4	4,409.0	5.2	-	4,414.2
reservoir plants	47	3,698.6	4,173.9	3,336.5	3,303.9	1,872.8	14.0	1,853.3	3,740.1
<i>of which pure and mixed pumped-storage</i>	7	2,777.1	3,134.3	2,522.0	2,500.3	427.9	1.0	1,853.3	2,282.2
pondage plants	28	860.1	975.9	767.0	754.7	1,531.5	-	-	1,531.5
run-of-river plants	192	456.1	563.6	423.5	413.9	1,619.9	-	-	1,619.9
Southern mainland & island	267	5,014.8	5,713.5	4,527.0	4,472.5	5,024.2	14.0	1,853.3	6,891.6
reservoir plants	185	12,935.9	14,597.5	12,097.1	11,961.3	12,305.9	56.1	4,490.8	16,852.9
<i>of which pure and mixed pumped-storage</i>	22	7,865.0	8,920.0	7,378.6	7,306.9	2,641.8	2.0	4,490.8	7,134.6
pondage plants	206	5,782.6	6,513.0	5,131.0	5,050.3	14,922.5	27.9	-	14,950.4
run-of-river plants	3,536	5,872.8	7,058.9	5,430.0	5,286.6	23,390.1	10.8	-	23,400.8
ITALY	3,927	24,591.3	28,169.5	22,658.0	22,298.2	50,618.5	94.7	4,490.8	55,204.1

Nominal and gross maximum capacity and average annual gross energy capability of hydro plants in Italy at 31 December 2016

By gross maximum capacity class of plant

Table 9

	Plants	Nominal capacity		Gross maximum capacity		Average annual gross energy capability GWh
		Prime movers	Generators	Of each Class	Cumulated	
		no.	MW	MVA	MW	
gross maximum capacity class						
over 200 MW	18	8,821.0	9,913.8	8,249.3	8,249.3	9,454.4
from over 100 to 200	25	3,824.9	4,133.8	3,440.7	11,689.9	7,550.2
" 50 " 100	30	2,254.8	2,615.5	2,018.7	13,708.6	6,205.6
" 30 " 50	63	2,686.1	3,114.4	2,467.6	16,176.2	8,055.6
" 20 " 30	54	1,505.2	1,768.9	1,364.9	17,541.1	4,815.8
" 10 " 20	120	1,866.2	2,220.4	1,722.2	19,263.3	5,980.7
" 5 " 10	146	1,136.4	1,358.4	1,050.9	20,314.2	3,786.8
" 1 " 5	726	1,680.7	2,054.9	1,575.2	21,889.4	6,047.3
up to 1	2,745	816.0	989.6	768.6	22,658.0	3,307.8
Total	3,927	24,591.3	28,169.5	22,658.0		55,204.1

The "hydro plants" are classified, according to the filling period of the reservoir, in three categories: reservoir plants, pondage plants and run-of-river plants.

The "filling period" of a reservoir is the time necessary for providing the reservoir with a volume of water equivalent to its useful capacity (see definition on page 30), with the average annual flow of the water course(s) which runs into it, excluding possible pumping flows.

On the basis of the respective "filling periods", the reservoirs are classified as follows:

- seasonal "regulation reservoirs": those with a filling period of or exceeding 400 hours;
- weekly or daily "modulation pondage reservoirs": those with a filling period of less than 400 hours and more than 2 hours.

The three categories of plants are therefore defined as follows:

- reservoir plants: those with a reservoir classified as "seasonal regulation reservoir";
 - pondage plants: those with a reservoir classified as "modulation pondage reservoir";
 - run-of-river plants: those with no reservoir or a reservoir with a filling period of 2 hours or less.
- When two or more plants, linked in series and situated at a short distance from one another and without appreciable intermediate inflows, are connected to the same reservoirs, they are classified in the category defined by the filling period of these reservoirs.

Thermal plants

Nominal and maximum capacity of thermal plants in Italy at 31 December (1)

Table 10

	Plants		Units	
	no.	no.	no.	no.
	2015	2016	2015	2016
producers	3,951	4,335	5,010	5,442
<i>of which: geothermal</i>	34	34	36	36
<i>variation 2016/2015</i>		9.7%		8.6%
autoproducers	991	984	1,351	1,314
<i>variation 2016/2015</i>		-0.7%		-2.7%
ITALY	4,942	5,319	6,361	6,756
<i>variation 2016/2015</i>		7.6%		6.2%

(1) Capacity of thermal plants stoked with renewable sources (Bioenergy) is included. For the detail on plants from renewable sources, see Table 13.

A "thermal power unit" consists of: a steam generator, a thermal prime mover, an electrical generator, thermal-cycle equipment, main and auxiliary services. In the present publication, the term "unit" has, for reasons of simplicity, been adopted to indicate also thermal power sets, consisting only of: a thermal prime mover and an electrical generator (for example, internal-combustion engines, gas turbines, geothermal power sets).

The "nominal capacity" of the prime movers or of the electrical generators of a set, of a unit, of a power plant or of a group of power plants, is the sum of the maximum capacities in continuous-operating conditions, according to the accepted standards, of each of the machines considered of the same category. The nominal capacity is a gross value.

Nominal capacity				Maximum capacity			
Prime movers		Generators		Gross		Net	
MW	MW	MVA	MVA	MW	MW	MW	MW
2015	2016	2015	2016	2015	2016	2015	2016
65,316.1	61,855.7	80,267.3	76,400.8	64,085.2	60,831.3	61,569.8	58,479.5
918.1	916.8	1,075.1	1,073.1	821.0	814.6	768.0	767.2
	-5.3%		-4.8%		-5.1%		-5.0%
5,470.6	5,018.0	6,654.2	6,077.5	5,332.4	4,898.5	5,136.3	4,716.6
	-8.3%		-8.7%		-8.1%		-8.2%
70,786.7	66,873.7	86,921.4	82,478.3	69,417.6	65,729.7	66,706.1	63,196.1
	-5.5%		-5.1%		-5.3%		-5.3%

The "maximum capacity" of a set, of a unit, of a power plant or of a group of thermal power plants is the maximum power which could be produced continuously throughout a prolonged period of operation, on the assumption that all the parts of the plant are entirely in efficient condition and that there is adequate availability of fuel and of cooling water. The value for maximum capacity is gross if measured at the terminals of the electrical generators of the plants; it is net if measured at the plant busbars.

Situation of thermal plants in Italy in 2016

Table 11

	Plants	Units	Type of unit
	no.	no.	
Situation at 31/12/2015	4,942	6,361	
Plants commissioned in 2016	493	557	
Piemonte	36	35	Power and heat generation
		6	Power generation only
Valle d'Aosta	2	3	Power and heat generation
Lombardia	103	104	Power and heat generation
		17	Power generation only
Trentino Alto Adige	29	24	Power and heat generation
		7	Power generation only
Veneto	59	57	Power and heat generation
		8	Power generation only
Friuli Venezia Giulia	22	21	Power and heat generation
		6	Power generation only
Liguria	5	3	Power and heat generation
		3	Power generation only
Emilia Romagna	84	82	Power and heat generation
		18	Power generation only
Toscana	36	29	Power and heat generation
		9	Power generation only
Umbria	5	5	Power and heat generation
Marche	10	10	Power and heat generation
		2	Power generation only
Lazio	20	20	Power and heat generation
		1	Power generation only
Abruzzi	7	6	Power and heat generation
		2	Power generation only
Molise	2	1	Power and heat generation
		1	Power generation only
Campania	32	27	Power and heat generation
		6	Power generation only
Puglia	7	8	Power and heat generation
Basilicata	9	5	Power and heat generation
		4	Power generation only
Calabria	10	6	Power and heat generation
		4	Power generation only
Sicilia	12	9	Power and heat generation
		5	Power generation only
Sardegna	3	3	Power and heat generation
Existing modified or decommissioned plants in 2016	-116	-162	
Situation at 31/12/2016	5,319	6,756	

Nominal capacity		Maximum capacity	
Prime movers kW	Generators kVA	Gross kW	Net kW
70,786,694	86,921,442	69,417,601	66,706,079
388,700	479,128	382,895	365,811
31,649	38,362	30,901	29,758
9,765	11,463	9,685	9,364
815	987	805	780
45,548	53,766	44,735	42,887
3,122	4,213	3,081	2,904
8,892	11,287	8,813	8,273
431	619	363	338
57,528	69,515	56,405	54,562
879	1,020	815	771
6,565	7,823	6,356	5,856
1,094	1,290	1,065	987
346	387	323	315
1,244	1,488	1,214	1,099
34,706	43,715	33,838	32,754
16,186	18,490	16,183	14,623
21,311	25,825	21,058	20,497
18,076	23,949	17,864	17,480
6,326	8,129	6,180	6,023
3,431	4,154	3,327	3,130
80	94	75	71
14,203	16,589	14,078	13,400
249	277	249	239
5,603	6,812	5,520	5,131
66	75	60	58
25	25	20	19
360	450	360	346
7,173	8,785	7,072	6,695
1,166	1,403	1,125	1,081
38,661	48,324	38,659	35,624
1,425	1,599	1,397	1,355
382	421	337	312
641	771	624	593
652	806	645	630
47,684	63,191	47,265	45,547
2,259	2,832	2,249	2,165
157	192	149	144
-4,301,676	-4,922,296	-4,070,746	-3,875,834
66,873,718	82,478,275	65,729,750	63,196,055

Nominal and maximum capacity of thermal plants in Italy at 31 December 2016

By type of plant and gross maximum capacity
class of units

Table 12

	Producers				
	Units	Nominal capacity		Maximum capacity	
		Prime movers	Generators	Gross	Net
	no.	MW	MVA	MW	MW
A) Plants for power generation only					
internal combustion	1,580	1,078.3	1,334.7	1,048.6	1,005.7
-up to 25	1,580	1,078.3	1,334.7	1,048.6	1,005.7
-over 25 up to 50	-	-	-	-	-
gas turbine	58	2,666.4	3,177.7	2,658.3	2,606.8
-up to 25	38	136.8	154.8	128.8	127.5
-over 25 up to 50	1	44.4	52.5	44.3	43.1
-over 50 up to 100	7	607.2	730.4	607.2	576.0
-over 100 up to 200	8	938.0	1,120.0	938.0	930.2
-over 200 up to 500	4	940.0	1,120.0	940.0	930.0
steam condensing	104	12,637.4	14,570.8	12,555.0	11,470.1
-up to 25	64	519.4	625.3	492.5	440.3
-over 25 up to 50	3	100.0	155.8	100.0	85.8
-over 50 up to 100	4	271.0	320.8	271.0	245.0
-over 100 up to 200	9	1,427.0	1,599.0	1,414.5	1,325.7
-over 200 up to 500	16	5,100.0	5,880.0	5,057.0	4,533.5
-over 500	8	5,220.0	5,990.0	5,220.0	4,839.8
combined cycle	58	22,300.5	29,133.8	21,821.2	21,376.1
-up to 25	7	39.7	48.5	38.0	36.1
-over 25 up to 50	6	244.3	315.4	243.7	237.7
-over 50 up to 100	2	116.0	152.1	116.0	110.8
-over 100 up to 200	1	115.5	144.6	115.5	113.0
-over 200 up to 500	30	12,121.7	16,819.3	11,767.5	11,522.2
-over 500	12	9,663.3	11,653.8	9,540.4	9,356.2
turbo expander sets	57	118.3	147.2	117.4	113.7
-up to 25	57	118.3	147.2	117.4	113.7
plants not classified elsewhere	10	170.1	207.7	168.0	160.8
-up to 25	8	56.1	67.7	54.0	52.5
-over 25 up to 50	1	42.0	50.0	42.0	39.9
-over 50 up to 100	1	72.0	90.0	72.0	68.4
Total A	1,867	38,971.1	48,571.9	38,368.4	36,733.3

Autoproducers

Units	Nominal capacity		Maximum capacity	
	Prime movers	Generators	Gross	Net
no.	MW	MVA	MW	MW

ITALY

Units	Nominal capacity		Maximum capacity	
	Prime movers	Generators	Gross	Net
no.	MW	MVA	MW	MW

98	192.8	234.0	188.0	181.6	1,678	1,271.0	1,568.7	1,236.5	1,187.4
97	157.8	191.3	153.8	147.9	1,677	1,236.0	1,526.0	1,202.4	1,153.6
1	35.0	42.7	34.2	33.8	1	35.0	42.7	34.2	33.8
6	60.9	84.8	60.7	58.9	64	2,727.4	3,262.6	2,719.0	2,665.7
5	28.9	37.3	28.7	27.7	43	165.7	192.2	157.5	155.2
1	32.0	47.5	32.0	31.2	2	76.4	100.0	76.3	74.3
-	-	-	-	-	7	607.2	730.4	607.2	576.0
-	-	-	-	-	8	938.0	1,120.0	938.0	930.2
-	-	-	-	-	4	940.0	1,120.0	940.0	930.0
4	10.8	12.9	9.8	8.1	108	12,648.2	14,583.7	12,564.8	11,478.2
4	10.8	12.9	9.8	8.1	68	530.2	638.2	502.3	448.3
-	-	-	-	-	3	100.0	155.8	100.0	85.8
-	-	-	-	-	4	271.0	320.8	271.0	245.0
-	-	-	-	-	9	1,427.0	1,599.0	1,414.5	1,325.7
-	-	-	-	-	16	5,100.0	5,880.0	5,057.0	4,533.5
-	-	-	-	-	8	5,220.0	5,990.0	5,220.0	4,839.8
-	-	-	-	-	58	22,300.5	29,133.8	21,821.2	21,376.1
-	-	-	-	-	7	39.7	48.5	38.0	36.1
-	-	-	-	-	6	244.3	315.4	243.7	237.7
-	-	-	-	-	2	116.0	152.1	116.0	110.8
-	-	-	-	-	1	115.5	144.6	115.5	113.0
-	-	-	-	-	30	12,121.7	16,819.3	11,767.5	11,522.2
-	-	-	-	-	12	9,663.3	11,653.8	9,540.4	9,356.2
15	56.1	79.3	47.3	46.0	72	174.4	226.5	164.7	159.7
15	56.1	79.3	47.3	46.0	72	174.4	226.5	164.7	159.7
3	16.1	16.2	13.3	12.8	13	186.2	223.9	181.2	173.7
3	16.1	16.2	13.3	12.8	11	72.2	83.9	67.2	65.4
-	-	-	-	-	1	42.0	50.0	42.0	39.9
-	-	-	-	-	1	72.0	90.0	72.0	68.4
126	336.6	427.3	319.0	307.5	1,993	39,307.6	48,999.1	38,687.4	37,040.7

Nominal and maximum capacity of thermal plants in Italy at 31 December 2016

By type of plant and gross maximum capacity
class of units

Cont. Table 12

	Producers				
	Units	Nominal capacity		Maximum capacity	
		Prime movers	Generators	Gross	Net
B) Power and heat generating plants					
internal combustion	3,238	2,164.2	2,653.8	2,104.0	2,016.7
-up to 25	3,236	2,093.4	2,567.7	2,034.2	1,950.0
-over 25 up to 50	2	70.8	86.1	69.8	66.8
gas turbine	72	406.8	493.9	386.9	377.6
-up to 25	68	161.1	197.1	155.1	150.3
-over 25 up to 50	3	118.7	144.3	104.9	102.3
-over 100 up to 200	1	127.0	152.5	127.0	125.0
combined cycle	116	17,942.2	21,830.2	17,737.0	17,277.1
-up to 25	45	236.9	285.1	229.2	220.0
-over 25 up to 50	12	534.7	670.7	507.1	490.7
-over 50 up to 100	12	856.6	1,092.1	825.8	797.4
-over 100 up to 200	16	2,531.7	3,038.3	2,504.3	2,436.1
-over 200 up to 500	25	9,113.6	11,148.2	9,085.3	8,860.1
-over 500	6	4,668.6	5,595.8	4,585.4	4,472.9
back-pressure steam	32	473.0	575.4	463.4	438.4
-up to 25	26	131.4	159.1	128.4	122.8
-over 25 up to 50	3	128.9	156.3	125.8	118.7
-over 50 up to 100	3	212.7	260.0	209.3	196.8
steam condensing with bleeding	81	981.6	1,202.5	956.9	869.3
-up to 25	72	587.6	730.9	567.2	515.8
-over 25 up to 50	5	144.5	179.6	140.2	125.3
-over 50 up to 100	4	249.5	292.0	249.5	228.1
-over 100 up to 200	-	-	-	-	-
Total B	3,539	21,967.8	26,755.9	21,648.3	20,979.0
Total plants (A + B)	5,406	60,938.9	75,327.7	60,016.7	57,712.3
geothermal plants	36	916.8	1,073.1	814.6	767.2
Overall plants	5,442	61,855.7	76,400.8	60,831.3	58,479.5

Autoproducers

Units	Nominal capacity		Maximum capacity	
	Prime movers	Generators	Gross	Net
n.	MW	MVA	MW	MW

ITALY

Units	Nominal capacity		Maximum capacity	
	Prime movers	Generators	Gross	Net
n.	MW	MVA	MW	MW

923	1,182.3	1,439.6	1,150.8	1,111.1	4,161	3,346.5	4,093.5	3,254.8	3,127.8
923	1,182.3	1,439.6	1,150.8	1,111.1	4,159	3,275.7	4,007.3	3,185.1	3,061.1
-	-	-	-	-	2	70.8	86.1	69.8	66.8
134	674.8	845.0	661.8	647.0	206	1,081.6	1,338.9	1,048.7	1,024.5
131	553.8	685.8	541.8	529.5	199	714.9	882.9	696.8	679.8
3	121.0	159.2	120.0	117.5	6	239.7	303.4	224.9	219.7
-	-	-	-	-	1	127.0	152.5	127.0	125.0
40	1,298.1	1,508.8	1,280.8	1,247.2	156	19,240.3	23,339.0	19,017.8	18,524.3
28	276.7	355.5	271.1	264.2	73	513.6	640.5	500.3	484.2
7	264.7	345.9	256.8	252.1	19	799.4	1,016.5	763.9	742.7
1	65.0	81.3	61.2	59.2	13	921.6	1,173.4	886.9	856.5
4	691.7	726.2	691.7	671.8	20	3,223.4	3,764.5	3,196.0	3,107.9
-	-	-	-	-	25	9,113.6	11,148.2	9,085.3	8,860.1
-	-	-	-	-	6	4,668.6	5,595.8	4,585.4	4,472.9
61	273.1	342.6	263.6	249.7	93	746.1	918.1	727.0	688.1
61	273.1	342.6	263.6	249.7	87	404.6	501.8	392.0	372.5
-	-	-	-	-	3	128.9	156.3	125.8	118.7
-	-	-	-	-	3	212.7	260.0	209.3	196.8
30	1,253.2	1,514.2	1,222.6	1,154.1	111	2,234.8	2,716.7	2,179.5	2,023.4
16	134.5	166.6	130.7	123.5	88	722.1	897.5	697.9	639.3
5	236.7	262.9	209.9	195.1	10	381.2	442.5	350.1	320.4
6	402.0	522.2	402.0	373.5	10	651.5	814.2	651.5	601.6
3	480.0	562.5	480.0	462.0	3	480.0	562.5	480.0	462.0
1,188	4,681.5	5,650.2	4,579.5	4,409.1	4,727	26,649.3	32,406.1	26,227.8	25,388.1
1,314	5,018.0	6,077.5	4,898.5	4,716.6	6,720	65,956.9	81,405.2	64,915.2	62,428.9
-	-	-	-	-	36	916.8	1,073.1	814.6	767.2
1,314	5,018.0	6,077.5	4,898.5	4,716.6	6,756	66,873.7	82,478.3	65,729.7	63,196.1

Renewable energy sources

Gross maximum capacity of plants from renewable sources in Italy at 31 December

By source

Table 13

	Plants	Gross maximum capacity	Plants	Gross maximum capacity	Gross maximum capacity
	n.	kW	n.	kW	%
	2015		2016		2016/2015
Hydro	3.693	18.543.258	3.920	18.640.980	0,5%
0 - 1 MW	2.536	722.846	2.745	773.777	7,0%
1 - 10 MW	854	2.575.285	872	2.620.901	1,8%
> 10 MW	303	15.245.127	303	15.246.302	0,0%
Wind	2.734	9.161.944	3.598	9.409.934	2,7%
Photovoltaic (1)	687.759	18.900.790	732.053	19.283.173	2,0%
Geothermal	34	820.990	34	814.590	-0,8%
Bioenergy (2)	2.647	4.056.537	2.735	4.124.080	1,7%
Electricity production only	1.063	2.016.695	1.067	2.021.306	0,2%
Solid	134	807.759	138	825.713	2,2%
- municipal solid waste	38	459.214	36	443.364	-3,5%
- solid biomass	99	348.545	105	382.349	9,7%
Biogas	735	574.685	745	572.110	-0,4%
- from landfills	246	283.973	239	279.666	-1,5%
- from sludge	20	6.741	21	7.101	5,3%
- from manure	186	66.028	198	67.077	1,6%
- from crops and agricultural waste	304	217.944	308	218.267	0,1%
Bioliquids	200	634.250	190	623.482	-1,7%
- raw vegetable oils	169	536.068	160	526.194	-1,8%
- other bioliquids	34	98.182	33	97.288	-0,9%
Cogeneration	1.595	2.039.842	1.680	2.102.774	3,1%
Solid	229	804.438	263	844.981	5,0%
- municipal solid waste	31	494.056	32	494.579	0,1%
- solid biomass	201	310.382	234	350.402	12,9%
Biogas	1.066	831.265	1.121	851.432	2,4%
- from landfills	134	115.014	150	121.644	5,8%
- from sludge	58	37.651	56	37.124	-1,4%
- from manure	307	150.943	341	162.587	7,7%
- from crops and agricultural waste	669	527.657	682	530.077	0,5%
Bioliquids	317	404.139	312	406.361	0,5%
- raw vegetable oils	267	356.357	257	351.205	-1,4%
- other bioliquids	55	47.782	60	55.156	15,4%
Totale	696.867	51.483.519	742.340	52.272.756	1,5%

Further thermal plants mostly using conventional fuels, stoked with bioenergy too (see Table 19)

	2015		2016		2016/2015
Bioenergy (2)	4	1.749.500	4	1.749.500	0,0%

(1) 2015 figure corrected following integration and alignment of the data relative to the photovoltaic sector present in TERNA's GAUDI system and in the GSE archives.

(2) Capacity of bioenergy plants is given for fuels which can be used.

Gross maximum capacity of plants from renewable sources in Italy at 31 December 2016

By source

Figure 6

