ELETTRICITÀ FUTURA
imprese elettriche italiane

Electrical Energy: the Italian and the international landscapes

2018

April 2019

Executive Summary

The electricity sector is experiencing profound changes linked to the **energy transition** and the **decarbonisation** themes, with Italy and Europe playing a central role. Globally, the **electrical energy production by Renewable Energy Sources (RES)** is showing an impressive growth. However, the production is still dominated by **traditional energy sources**. The objective of this report is to provide a summary of the electrical energy situation in Italy in 2018 as well as to compare it with the European and international scenarios.

- The electrical energy production in Italy in 2018 was **280,234 GWh,** with a reduction of 1.8% compared to 2017.
- The production of electricity by RES was **112,847 GWh** in 2018 in Italy (equal to the **40.3%** of the total) and with an increase of **4.2%** compared to 2017.
- At European level, Italy is among the Countries with the highest share of renewables in its electricity generation mix (**37% in 2017**).
- Globally, the electricity production in 2018 was equal to **26,673,000 GWh** (with Italy representing about **1.1%** of the total).
- The global electricity production by coal was the main contributor with 38% of the total, followed by gas (23%) and hydro (16%) in 2018. Photovoltaics (PV) and wind represented a small portion, 2% and 5% respectively.
- In 2018, the electricity production by RES grew faster compared to the other energy sources. In particular, PV was in the first place (**+31%** vs 2017), followed by wind (**+12%**) and bioenergy (**+7%**).
- The production of electrical energy by RES in 2018 was **6,800,000 GWh** globally (with Italy representing about **1.7%**).
- China plays a key role, with the biggest share of the overall electricity production by RES in 2018 (27%), followed by Europe (22%) and USA (11%). China was also the country with the biggest growth compared to 2017 (**+10.9%**), followed by India (**+10.6%**) and Europe (**+8.5%**).

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The electrical energy in Italy and the comparison with Europe

The electrical energy production in Italy reached 280,234 GWh in 2018, featuring a reduction of 1.8% compared to 2017. Figure 1 shows the distribution of the electrical energy production by energy sources. The production by RES was 112,847 GWh, equal to 40.3% of the of the overall production: this represented an increase of 4.2% compared to 2017. Among the RES, hydro had the biggest percentage increase (+31.2% compared to 2017). The electrical energy demand was equal to 321,910 GWh, with an increase of 0.4% with respect to 2017. Such increment was also due to the significant increase in the net import of electricity from abroad compared to the previous year (+16.3%), equal to 43,909 GWh [1].

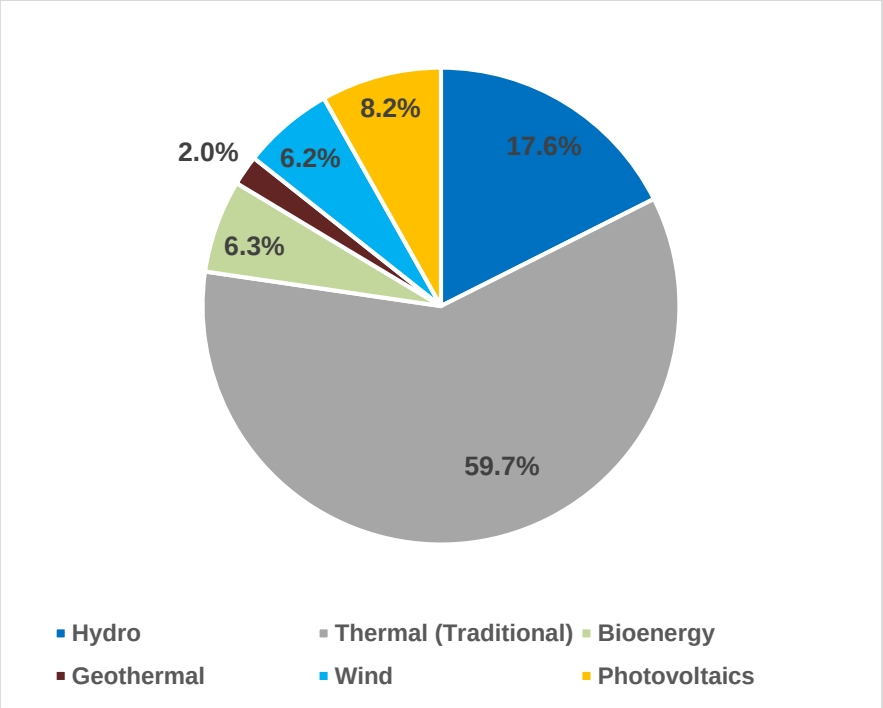

Figure 1 – Distribution of the electrical energy production by source in Italy (2018)

With regards to the renewable energy sources, the overall installed capacity at the end of 2018 in Italy was 56.7 GW. Hydro had the biggest installed capacity with a share of 38.7%, followed by PV with 35.5% (Figure 2).

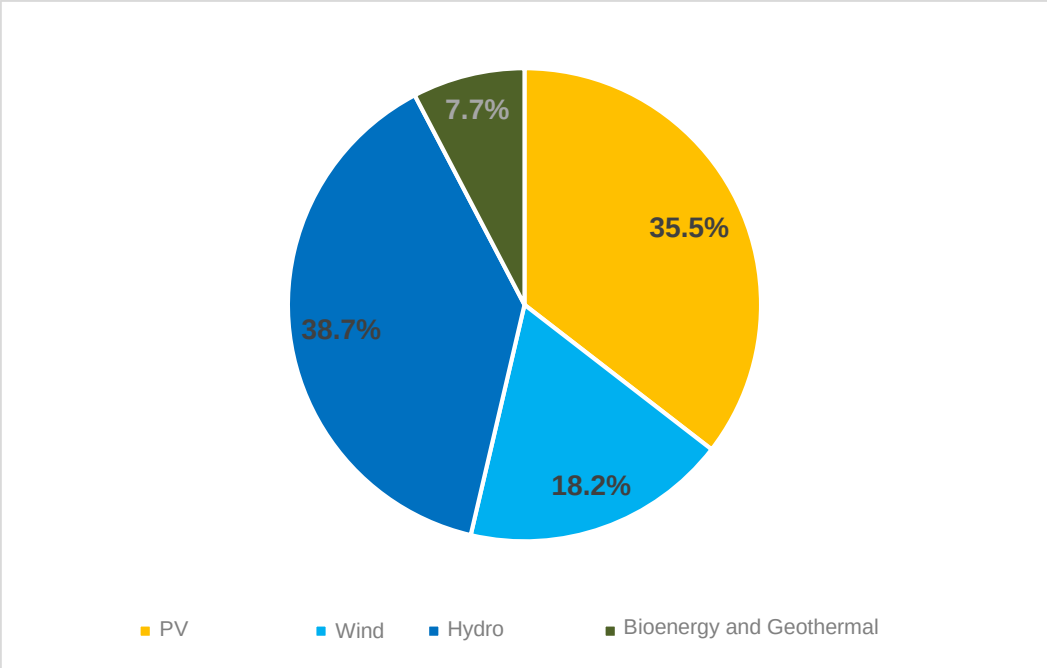

Figure 2 – Distribution of the electrical capacity by renewable source in Italy (2018)

The details of the installed capacity by RES and the number of plants at the end of 2018 is included in Table 1. PV accounts for the vast majority of the number of plants i.e. 822,161 and 84% of them has a nominal power <12 kW.

Table 1 – Installed power by RES and number of plants in Italy (2018)

RES	Installed Power [GW]	Number of Plants
PV	20.1	822,161
Wind	10.3	5661
Hydro	21.9	4330
Bioenergy and Geothermal	4.4	2948
Total	**56.7**	**835,100**

PV saw a strong increase in Italy in the past years (Figure 3). The total number of plants went from about 75,000 in 2009 to 822,161 in 2018, meaning about an eleven-fold increase. In 2018, 435 MW additional capacity was installed. Puglia is the first Italian Region by installed PV capacity with 2.655 GW (13.2% of the total) at the end of 2018, followed by Lombardia with 2.303 GW (11.4% of the total) and Emilia-Romagna with 2.034 GW (10.1% of the total). A map with the regional distribution of the PV capacity is shown in Figure 4.

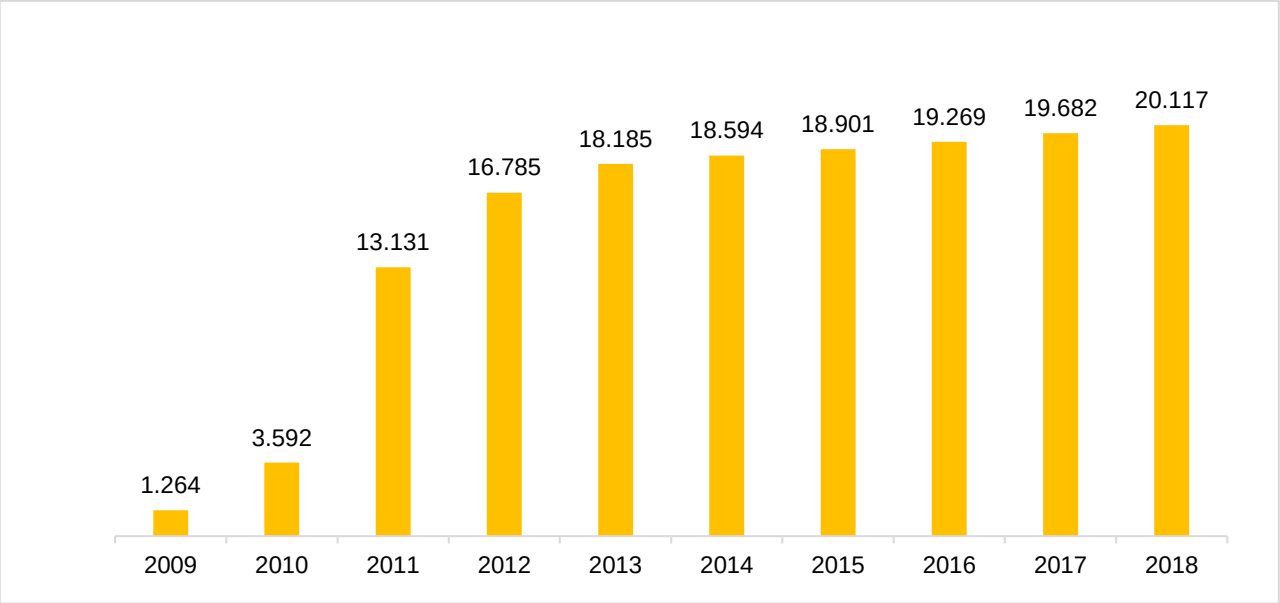

Figure 3 – Evolution of the PV installed capacity in Italy 2009-2018 [GW]

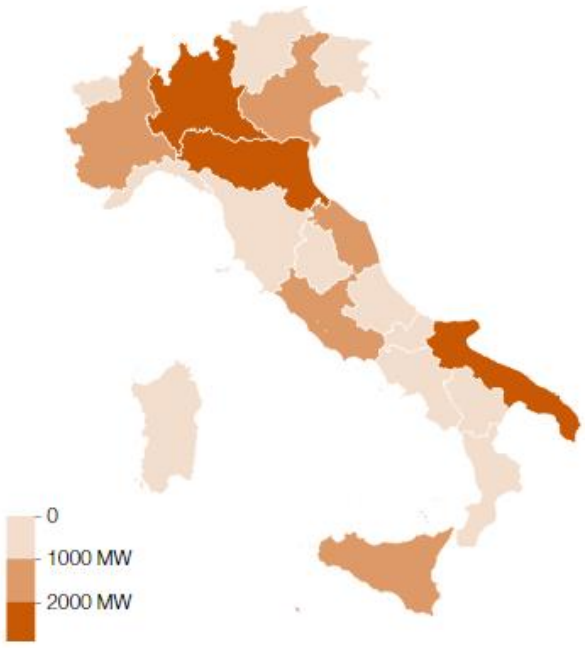

Figure 4 – Qualitative regional distribution of the PV installed capacity in Italy at the end of 2018 [2]

Equally, wind energy has experienced a strong increase in the past years (Figure 5). The overall installed capacity at the end of 2018 was 10.311 GW and the number of plants went from about 500 in 2009 to 5661 in 2018, with about an eleven-fold increase. In 2018, 574 MW were installed nationwide. Puglia is again the first Region in Italy with an installed wind capacity equal to 2.523 GW (24.5% of the total) at the end of 2018, followed by Sicily with 1.887 GW (18.3% of the total) and Campania with 1.459 GW (14.2% of the total). With respect to PV, wind energy is mostly localised in the Centre-South e Island geographical areas of Italy, as illustrated in Figure 6.

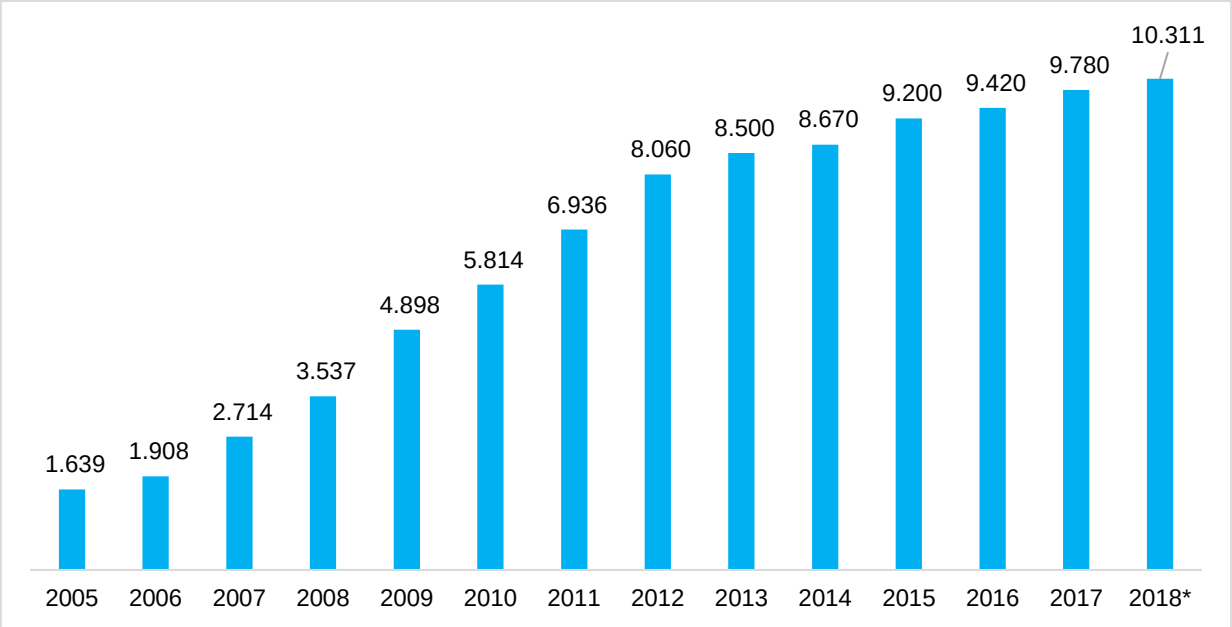

Figure 5 – Evolution of the wind installed capacity in Italy 2005-2018 [GW]

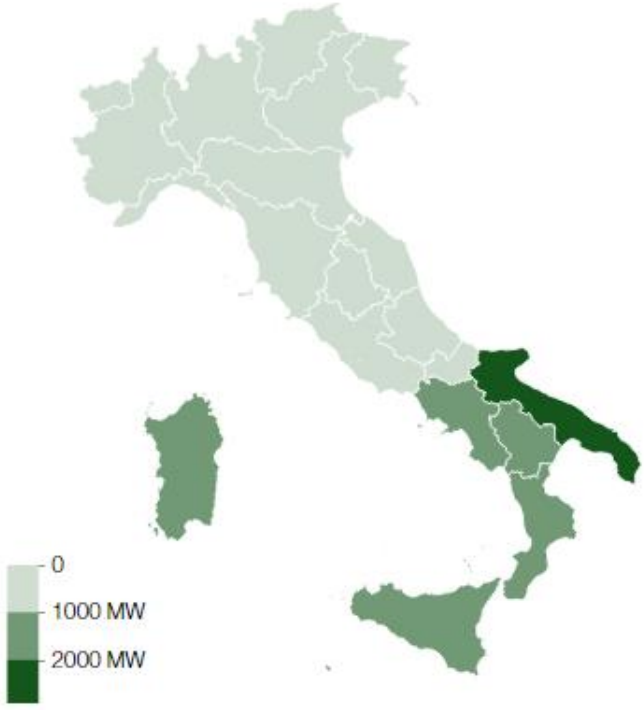

Figure 6 – Qualitative regional distribution of the wind installed capacity in Italy at the end of 2018 [2]

At European level, Italy is among the Countries with the highest percentage of RES in the installed capacity mix. This is described in the infographics included in Figure 7 (2017 data) [3].

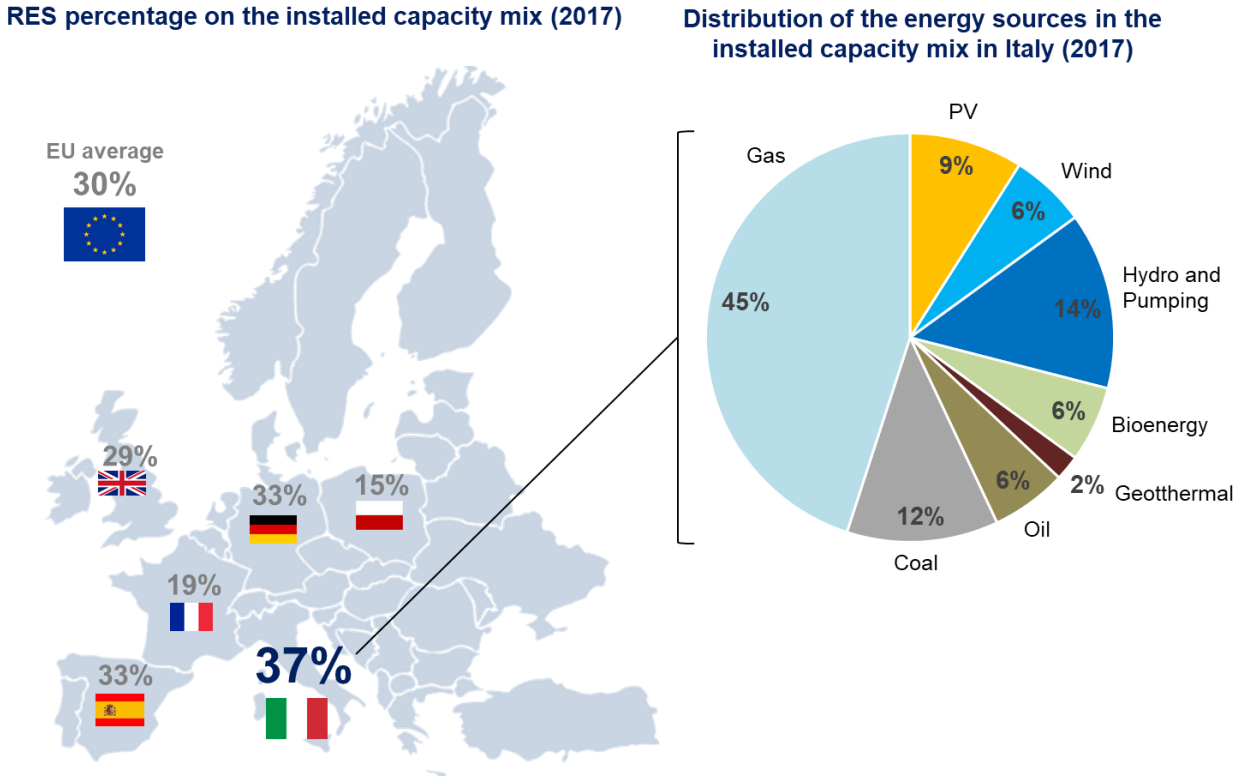

Figure 7 – Infographics – comparison of the RES capacity mix at European level (2017 data)

The global electrical energy scenario

The global energy demand increased by 4% (equal to about +900,000 GWh) in 2018 compared to the previous year: this was the highest growth rate since 2010. RES has the biggest growth compared to the other sources. However, the electricity production by coal and gas increased as well, inducing a 2.5% increase of the CO_2 emissions in the electricity sector worldwide. The CO_2 emissions in the electrical energy generation were about 13 Gt, equivalent to about 38% of the overall CO_2 emissions in the energy sector [4].

The global electrical energy production was 26,673,000 GWh in 2018 (Italy represented about 1.1%). The distribution of the energy sources is included in Figure 8. The electricity production by coal represents the biggest share with 38% of the total, followed by gas (23%) and hydro (16%). Globally, RES represented about 26% of the total production in 2018 compared to about 18% in 2000. Looking at the comparison between the energy production mix in 2018 and 2000 it is evident that coal is stable, whereas gas went from 18% to 23% in 2018. Wind and PV were almost non-existent in 2000 and they grew to 5% and 2% of the total electricity production respectively in 2018. Electricity production by oil showed a significant decrease, going from 8% to 3% (see Figure 9).

The percentage variation of the electricity production in 2018 vs 2017 is included in Figure 10. PV showed the biggest percent increase (31%), followed by wind (12%) and bioenergy (7%). However, coal also had a significant increase, equal to 3%. The only energy source experiencing a decrease in 2018 was oil with -4% compared to 2017.

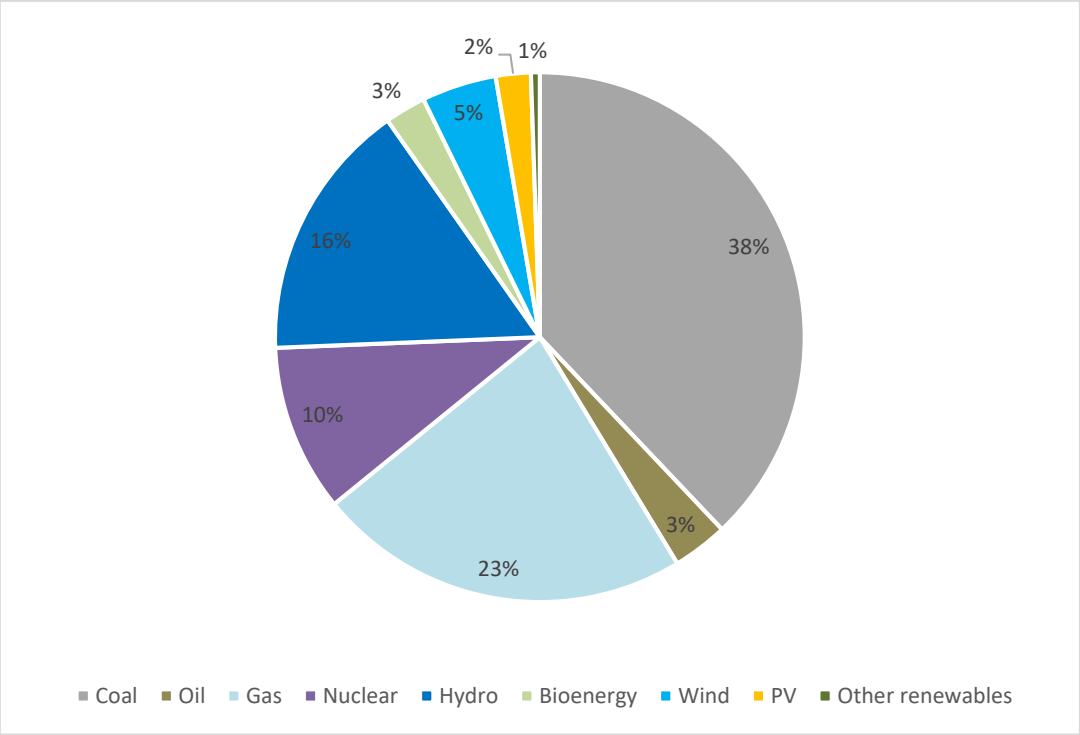

Figure 8 – Distribution of the electrical energy production by energy source at global level (2018)

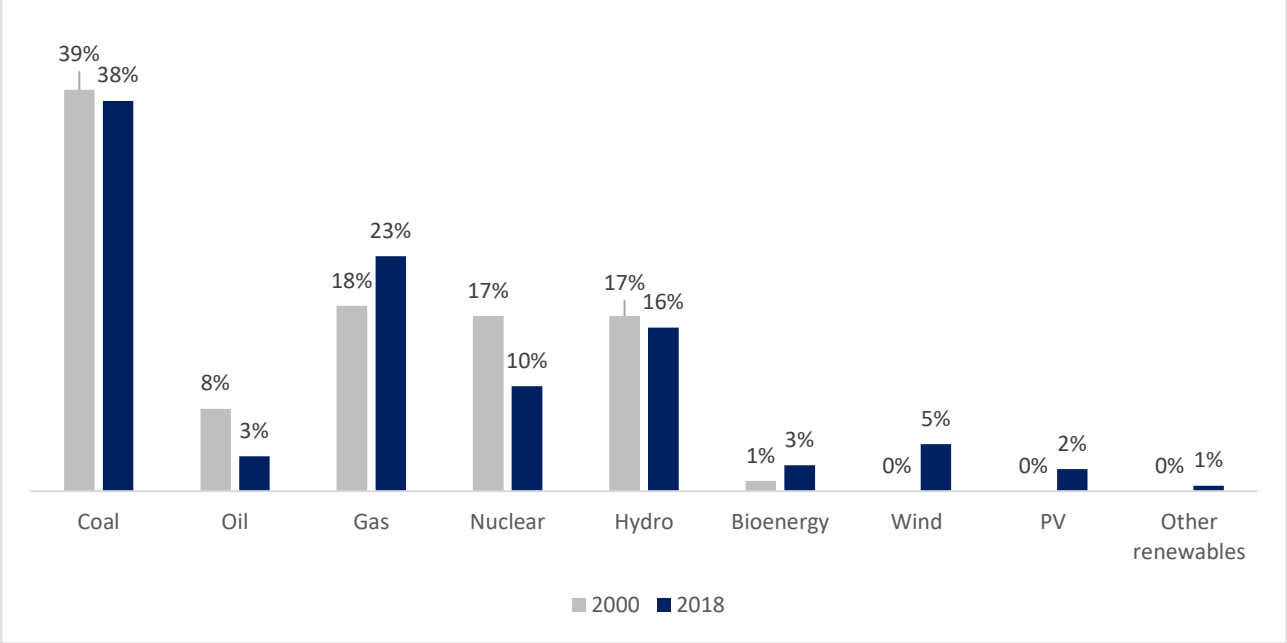

Figure 9 – Comparison of the electricity production generation by energy source globally (2018 vs 2000)

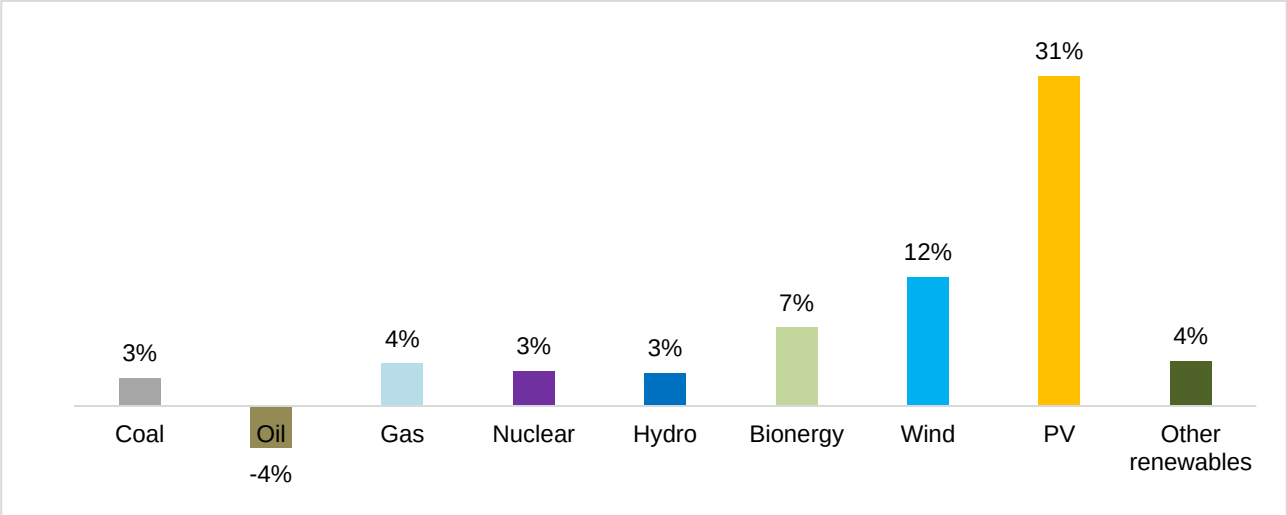

Figure 10 – Percentage variation of the electricity production by energy source globally (2018 vs 2017)

Globally, the electricity production by RES in 2018 was 6,800,000 GWh. China plays a central role with 27% of the overall production, followed by Europe with 22% and United States with 11% in 2018. Concerning, the 2018 vs 2017 percentage variation, China showed the biggest increase with +10.9%, followed by India with +10.6% and Europe with +8.5%. Globally, there was an average increase of +7.1% (2018 vs 2017). Italy represented about 1.7% of the global electricity production by RES in 2018.

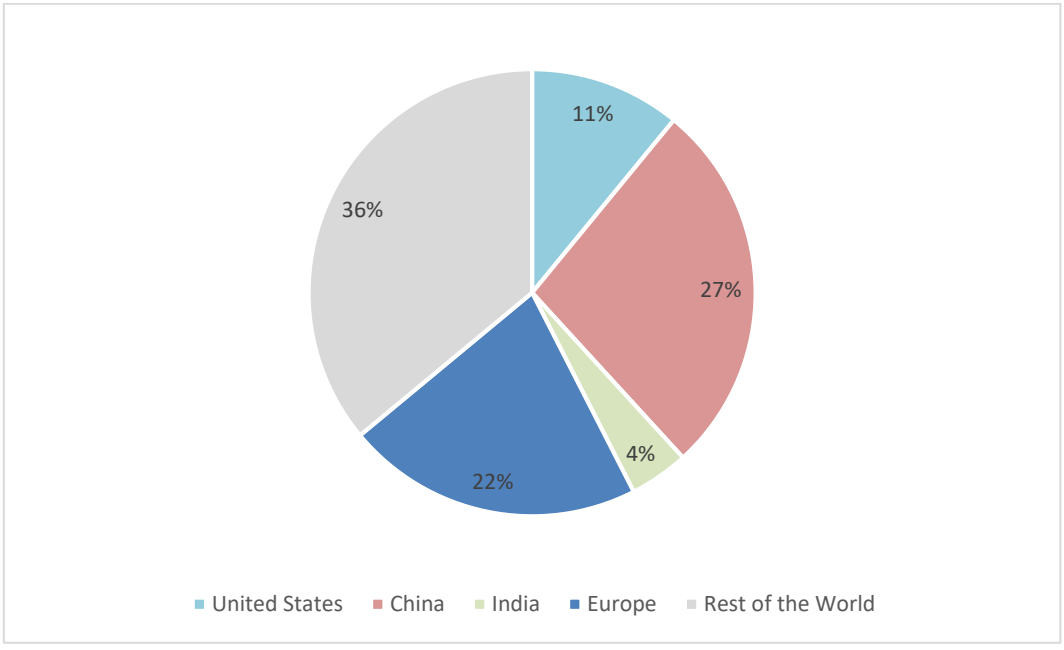

Figure 11 – Distribution of the RES energy production by geographic area (2018)

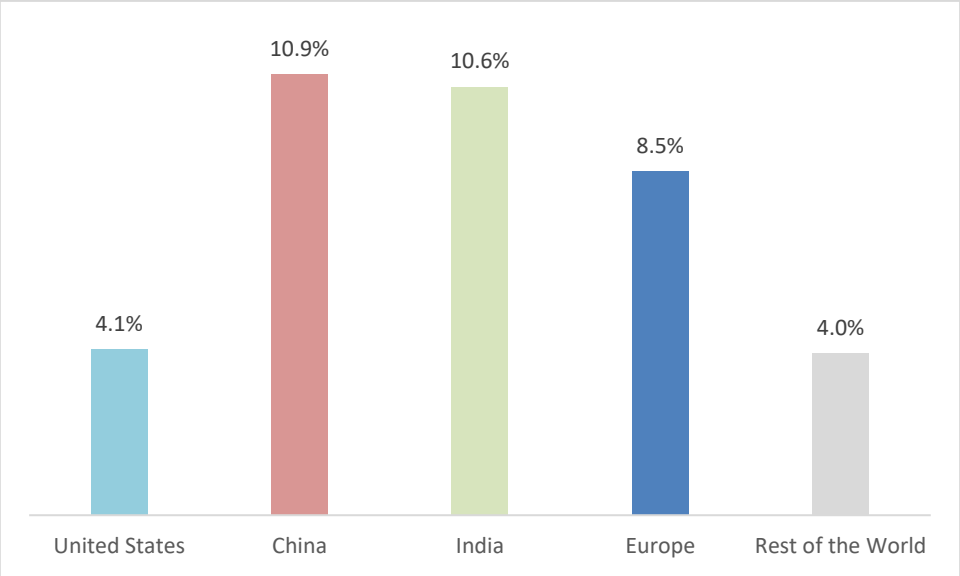

Figure 12 – Percentage variation of the RES energy production by geographic area (2018 vs 2017)

References

[1] “Market Monitoring Report - Q4 2018”, Elettricità Futura (based on Terna and GME data)

[2] Elettricità Futura elaborations based on data from Terna

[3] Elettricità Futura elaborations based on data from the “Renewable Energy Report 2018”, Energy&Strategy Group, Politecnico di Milano

[4] Elettricità Futura elaborations based on data from the “Global Energy & CO2 Status Report”, International Energy Agency, 2019

Elettricità Futura is the main Italian association representing the companies of the electricity sector, putting forward and protecting their interests in Italy and Europe.

It encompasses more than 650 operators with plants distributed all over Italy. Elettricità Futura is a point of reference for the overall electricity sector.

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