

## **ECONOMIC TRENDS OF ITALIAN ELECTRICITY SECTOR – SHORT TERMS STATISTICS**

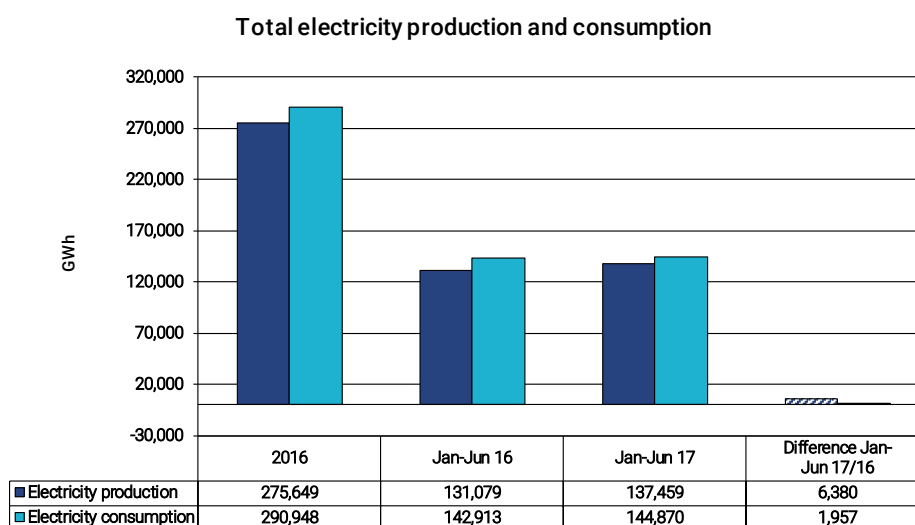
In the first six months of 2017 data of national electricity sector has shown an increase in electricity consumption of 1.4% and in electricity production of 4.9%. The latter increase is mostly linked to largest demand of January (caused by stop for maintenance of numerous French nuclear groups, resulting in a reduction in the net electricity import, and by the extraordinary cold wave that affected Europe) and of June (for the heat wave).

A comparison by sectors shows that in the first six months of 2017, compared to the same period of last year, production from renewable sources failed by 6%, while production from fossil fuels rose by 13%. The decline in production by renewable sources is mainly due to the reduction of hydro and wind generation, while the increase of production by fossil fuels is due to the growth of natural gas production. Compared to the first six months of 2016, the production from renewable has continued the downward trend, while the production from fossil has started an upward trend.

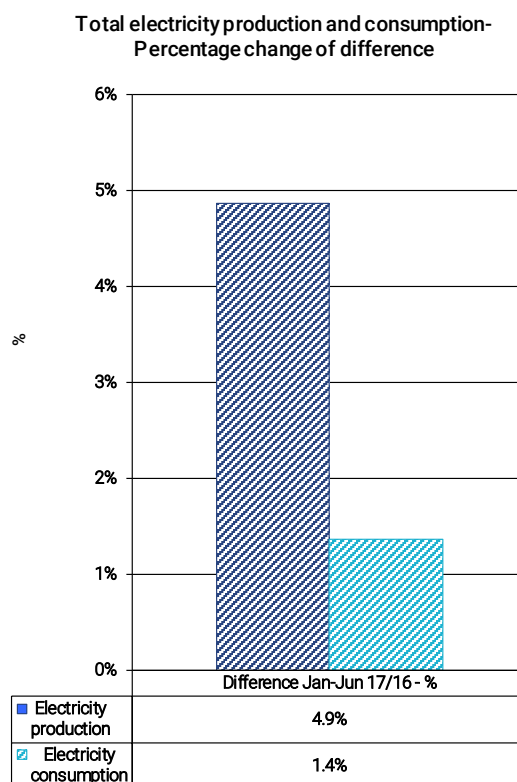
With regard to incentive policies to renewable sources, in the period January-June 2017, the incentives amounted to 5.7 billion euro, with a decrease of 1.4 billion euro compared to the period January-June 2016.

In terms of performance, the average price fixed on the power exchange in the first six months of 2017 considerably increased to 52.8 €/MWh, compared to 38.1 €/MWh of the same period of 2016, pushed up by the high demand for electricity of January. The final prices of electricity for the typical domestic consumer have been partially affected by this increase, with the consequent rise of the component "Energy cost".

The increase in production from fossil fuels has resulted in a rise in total greenhouse gas emissions. Finally, it should be noted a slight decrease of electricity penetration and of consumption of electricity used per unit of GDP. Instead the consumption of primary energy used per unit of GDP is increased.

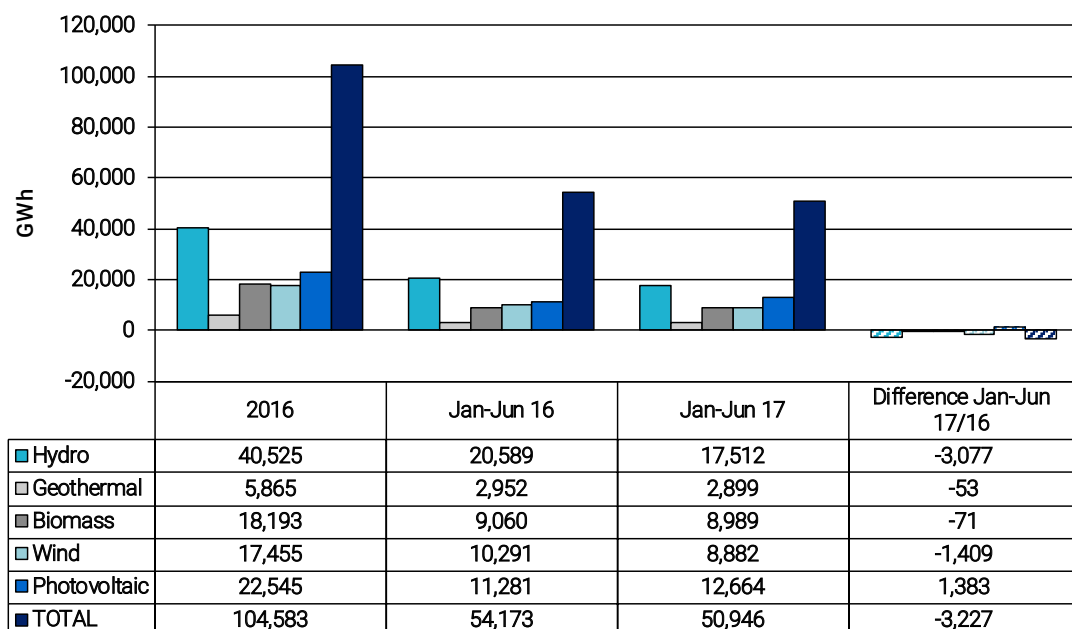


In the first six months of the year, compared to the same period of 2016, an increase in electricity production (+6.4 TWh, equal to +4.9%) occurred. This growth is only partly due to the increase in consumption (+1.9 TWh, equal to +1.4%). This is reflected in the electricity balance by a reduction of net electricity import (-4.3 TWh, equal to -18.8%). The growing trend of production and consumption is in contrast to decrease trend of the same period of the last year.



Source: Elettricità Futura elaborations on Terna data

## Electricity production by renewable energy sources

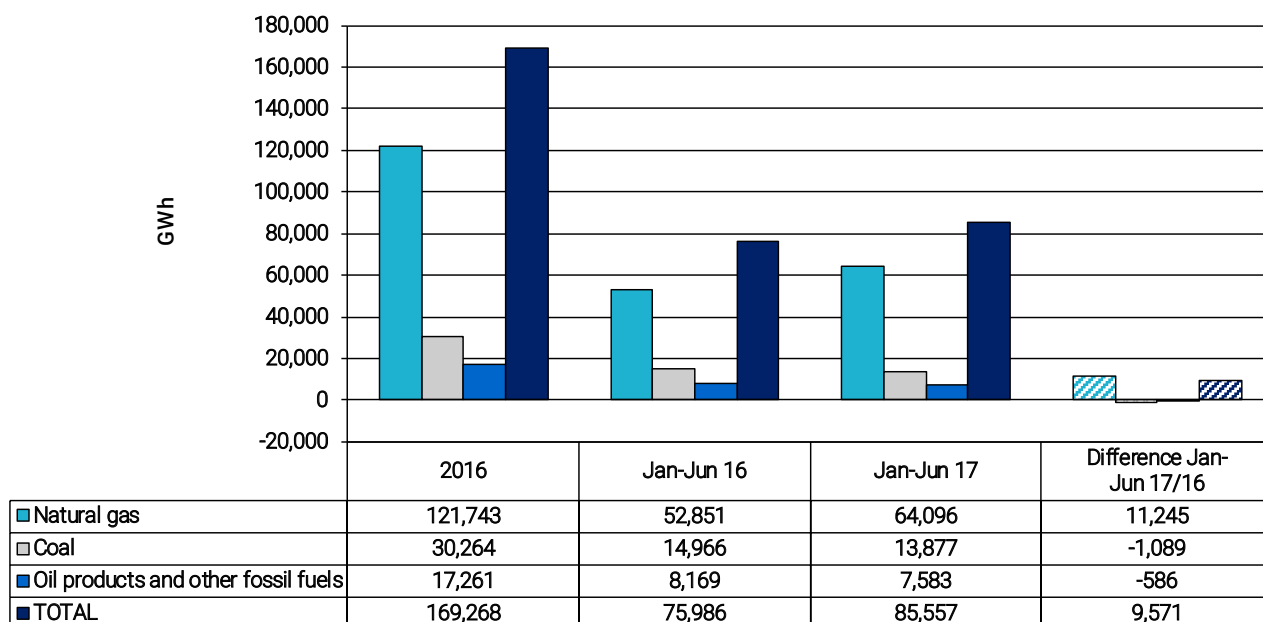


Source: Elettricità Futura elaborations on Terna data

Between January-June 2017, compared to January-June 2016, the electricity production by renewable has registered a contraction of 3,227 GWh, continuing the downward trend of the same period of last year, at a higher rate.

This decrease is mainly due to the contraction of hydro production (-3,077 GWh), for the strong drought, followed by wind production (-1,409 GWh). Instead, the photovoltaic production (+1,383 GWh) has grown, while geothermal production and production from biomass have remained at nearly constant values.

## Electricity production by fossil fuels

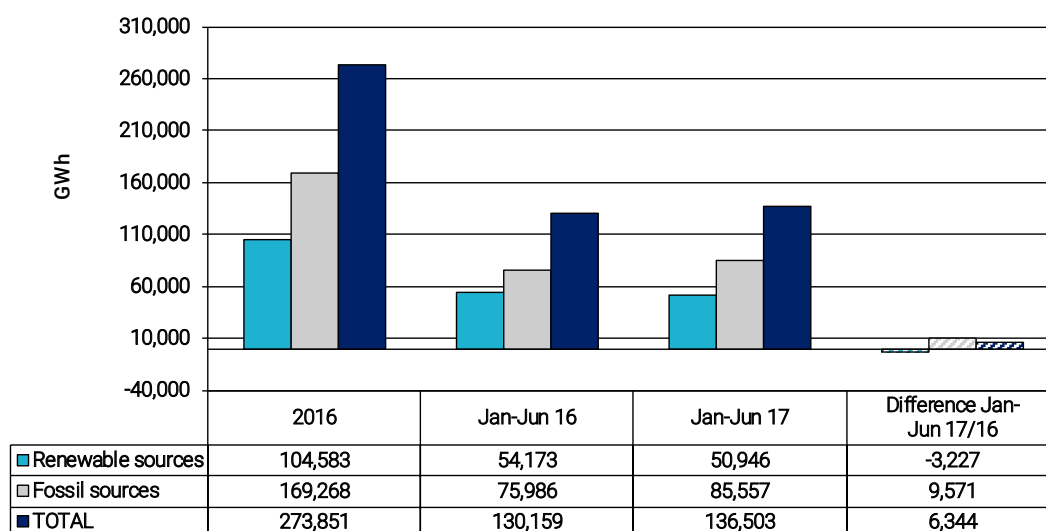


Source: Elettricità Futura elaborations on Terna, Eurostat, Snam Rete Gas and MiSE data

Between January-June 2017, compared to January-June 2016, the electricity production by fossil fuels registered a growth of 9,571 GWh, in contrast to almost stable values of the same period of the last year.

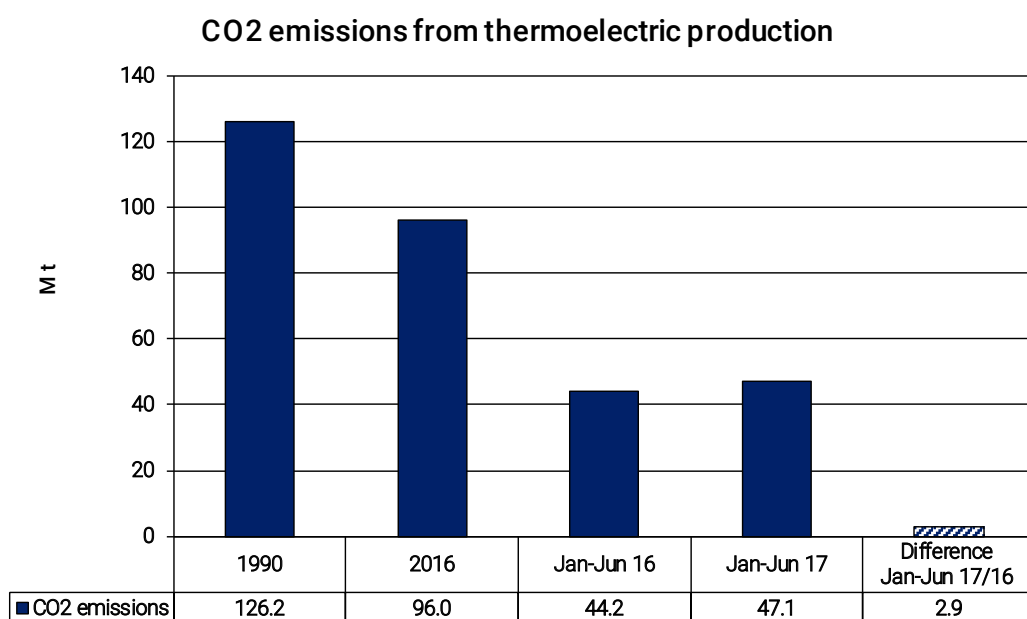
This increase is linked to the raise of production by natural gas (+11,245 GWh). By contrast, solid fuels and oil products productions decreased by 1,089 and 586 GWh, respectively.

## Electricity production by fossil fuels and renewable sources



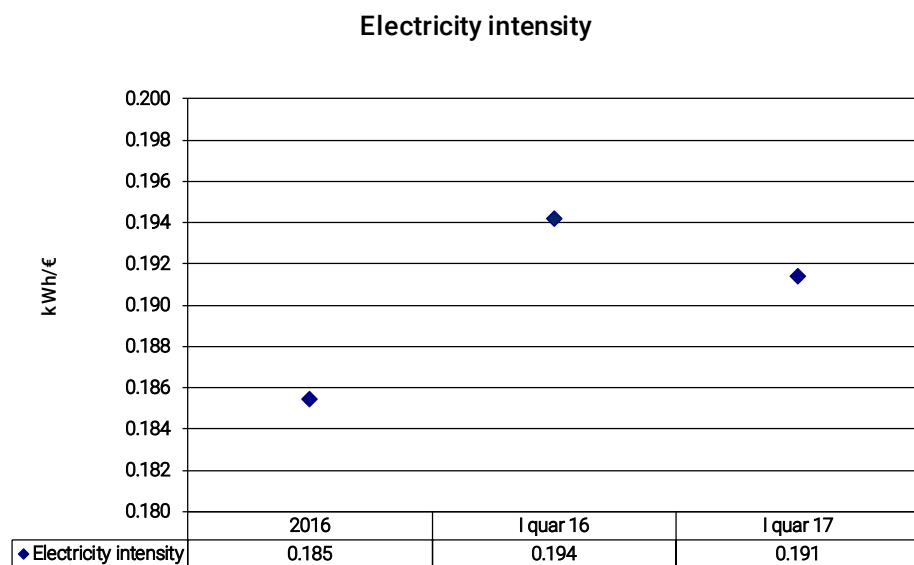
Source: Elettricità Futura elaborations on Terna data

Between January-June 2017, compared to January-June 2016, the weight of production from fossil fuels on total production has risen from 58% to 63%. Instead, the weight of renewable generation on total production has fallen from 42% to 37%.



Source: Elettricità Futura elaborations on Terna, Eurostat, Snam Rete Gas, MiSE and ISPRA data

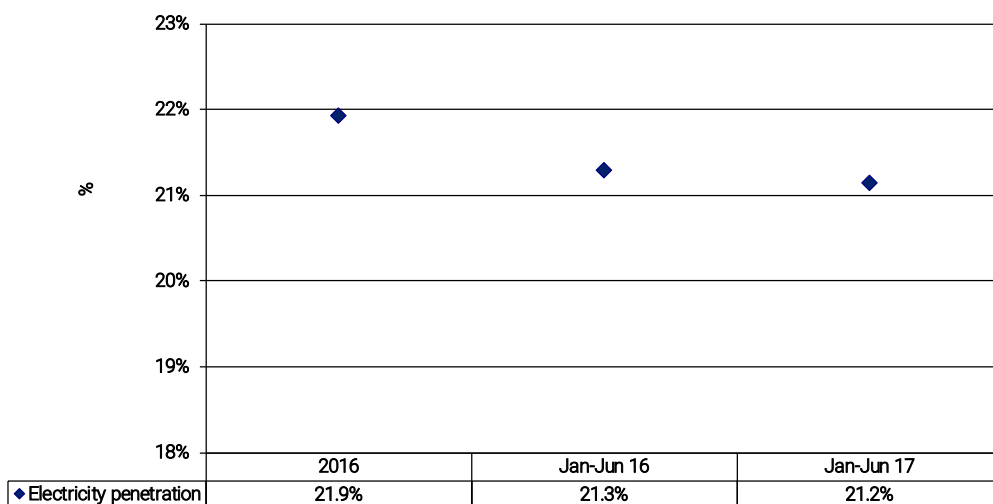
In the first six months of the year, compared to the same period of 2016, CO2 emissions from thermoelectric production increased by 2.9 million of tonnes, due to more emissions resulting from the wide growth of power generation from natural gas.



Source: Elettricità Futura elaborations on Terna and Eurostat data

Electricity intensity of first quarter of 2017 is slightly decreased, compared to first quarter of 2016, since the percentage growth of electricity consumption was lower than the percentage growth of GDP. This fall reflects a reduction in the amount of electricity used to produce wealth, consistent with the objectives of increase of energy efficiency.

## Electricity penetration

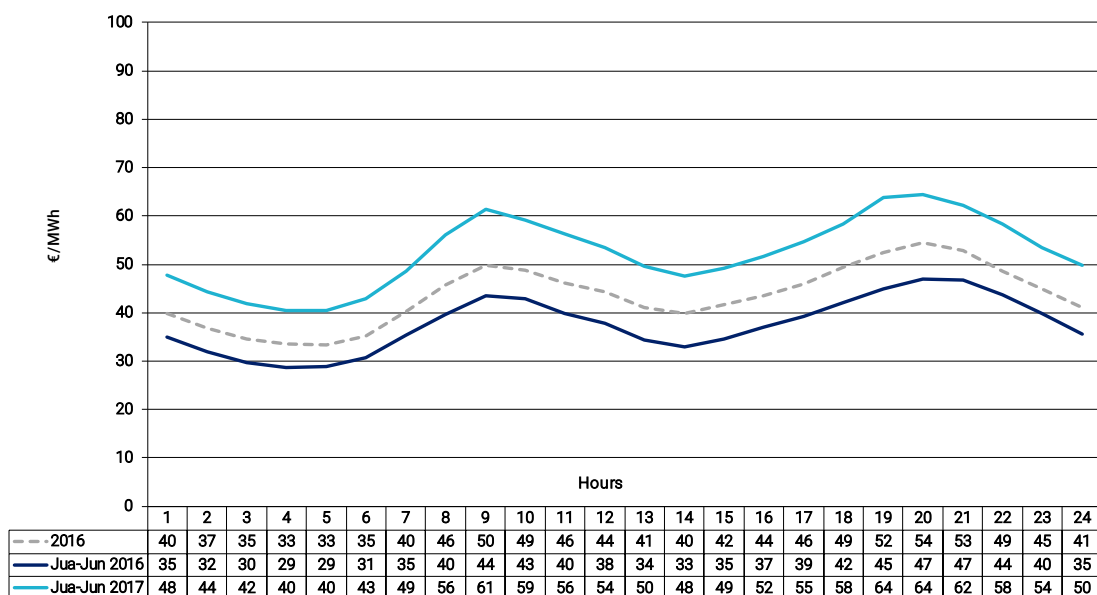


Source: Elettricità Futura elaborations on Terna, Eurostat, Snam Rete Gas and MiSE data

Between January-June 2017 electricity penetration stood at 21.2%, slightly down compared to 21.3% of the same period of last year. This drop indicates a decrease in electricity use in final energy consumption, since the percentage growth of electricity consumption was lower than the percentage growth of the total final energy consumption.



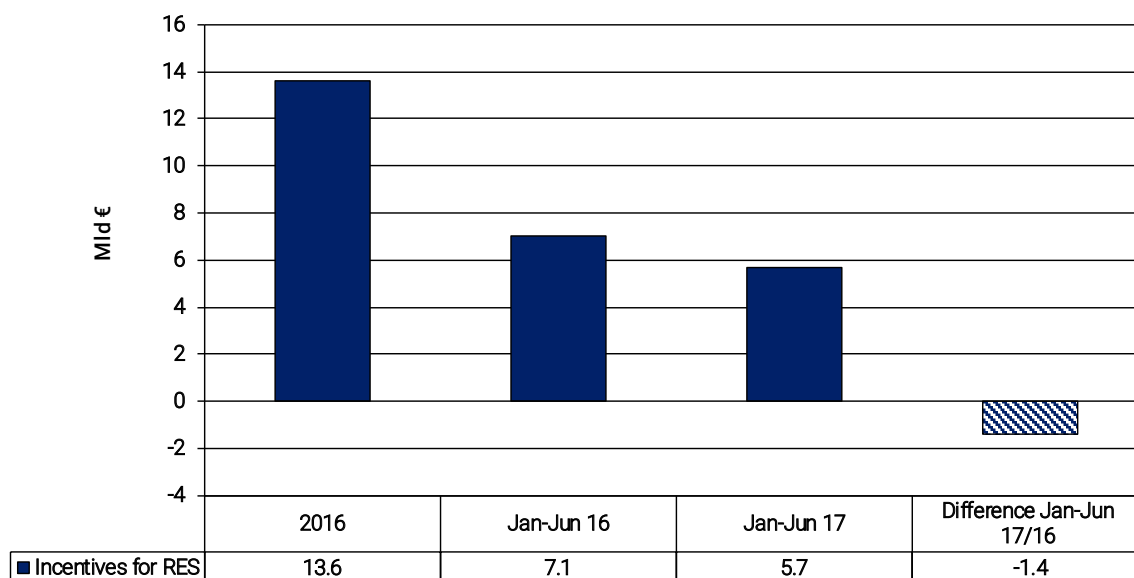
### National Single Price (PUN)



Source: Elettricità Futura elaborations on GME data

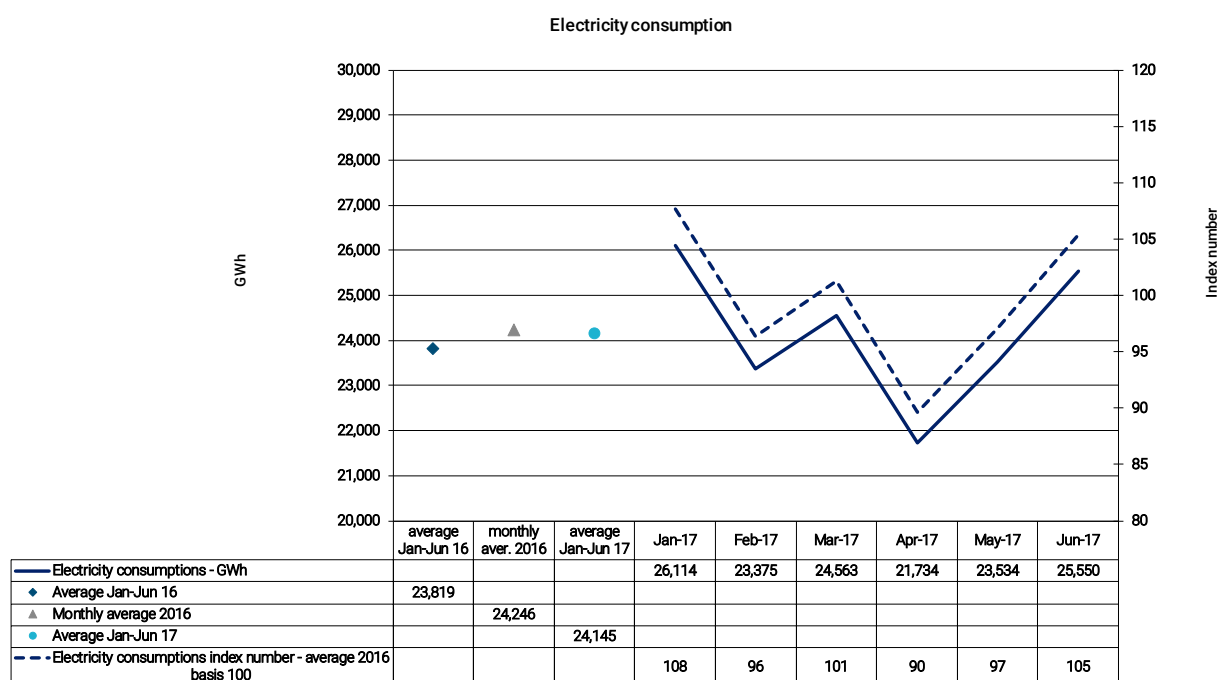
Between January-June 2017, compared to January-June 2016, the curve of PUN hourly average for each of the 24 hours of the day has shifted markedly upwards. This trend is in contrast to the downward trend recorded between January-June 2016 compared to January-June 2015.

## Incentives for electricity production from RES



Source: Elettricità Futura elaborations on GSE, AEEGSI and Terna data

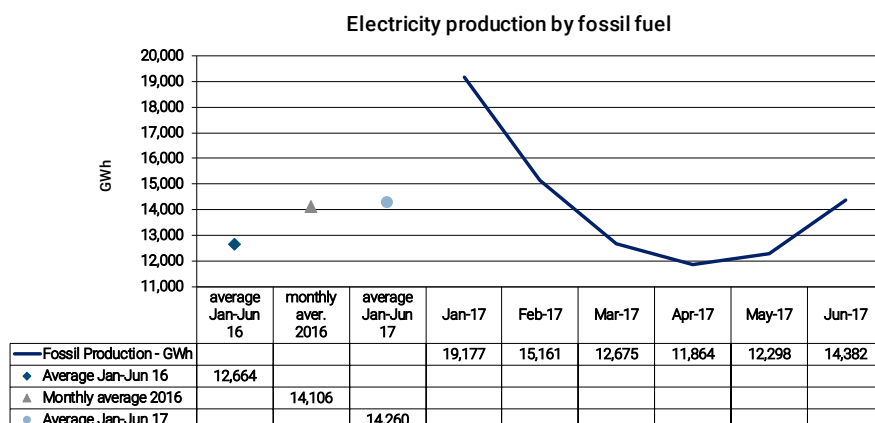
In the first six months of the year, compared to the same period of 2016, the incentives for electricity production from RES decreased of 1.4 billion of euro, reaching 5.7 billion of euro.  
 In the first six months of 2016, compared to the same period of 2015, the incentives were increased (+0.4 billion of euro).



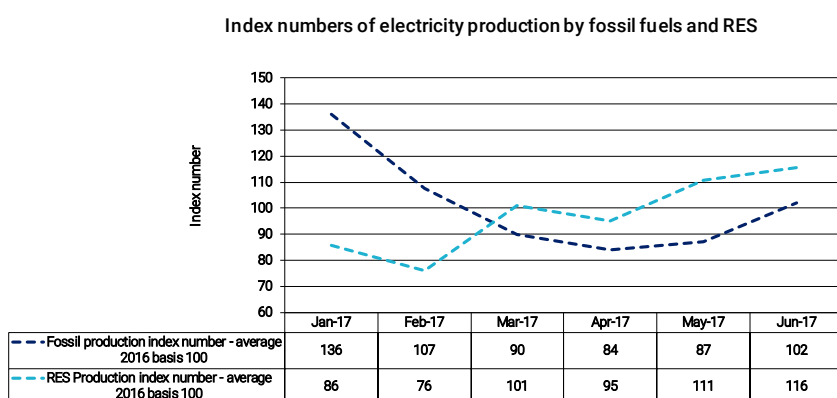
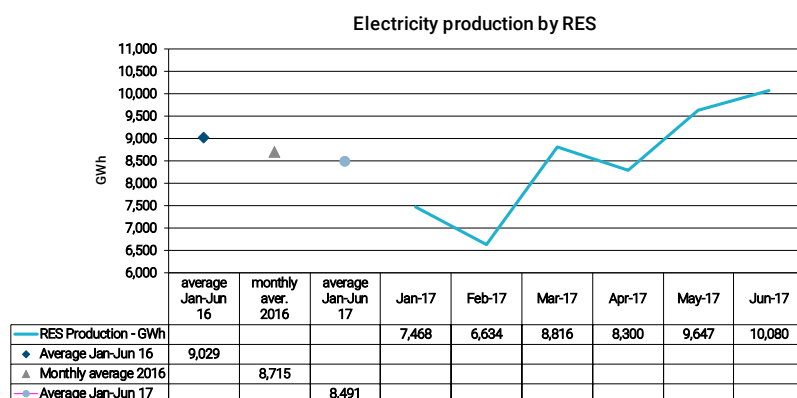
Source: Elettricità Futura elaborations on Terna data

The graphic illustrates the evolution, in each of the six months of the 2017, of electricity consumption (left scale) and electricity consumption index number, made up on the basis of the average monthly value of 2016 (right scale). Moreover, the graphic draws monthly average electricity consumption in January-June 2016, year 2016 and January- June 2017 (left scale).

In the first six months of the year, the average consumption amounted to 24,145 GWh, with a increase of 326 GWh compared to the same period of last year.



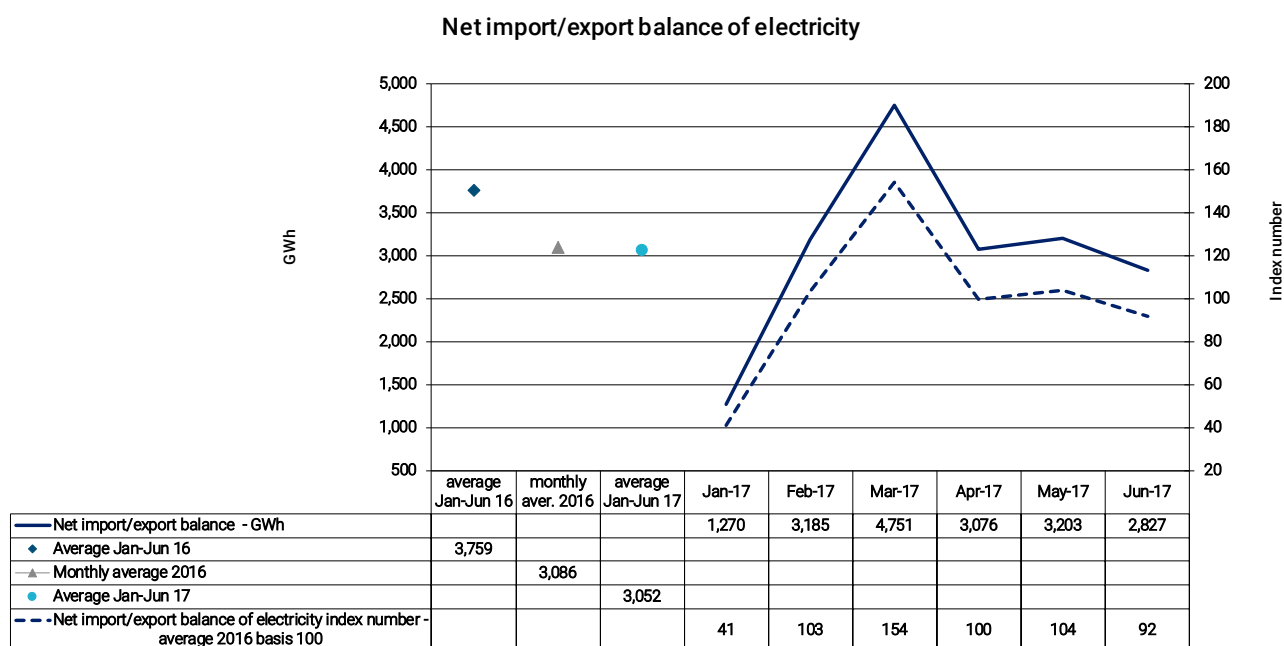
In January-June 2017, compared to the same period of last year, the average electricity production from renewable sources decreased by 538 GWh, while the average electricity production from fossil fuels increased by 1.596 GWh.



Source: Elettricità Futura elaborations on Terna data

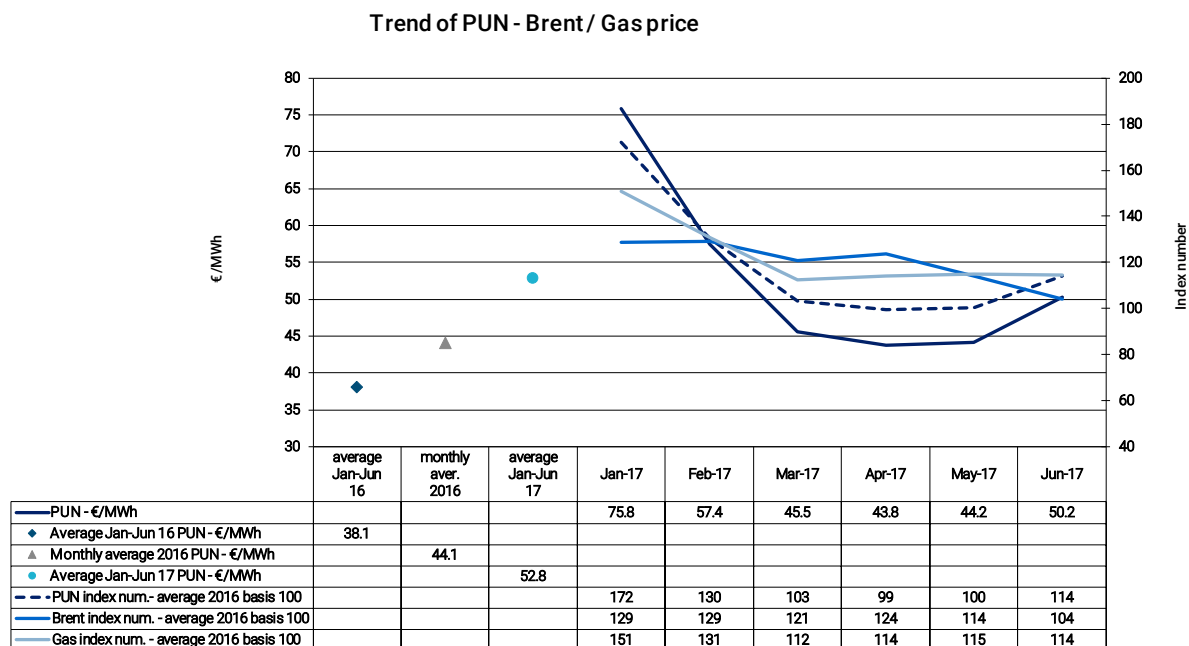
The first two graphics illustrate fossil fuels production (graphic at the top) and RES production (graphic in the centre). Each of two graphics describes the trend of production (from fossil fuels or renewable, depending on the graphic) in each of six months of the 2017 and monthly average productions in January-June 2016, year 2016 and January- June 2017.

Instead, the latest graphic below describes the trend, between January and June 2017, of fossil fuels and renewable production's index numbers, that take as basis the 2016 average production of fossil fuels and renewable production respectively.



Source: Elettricità Futura elaborations on Terna data

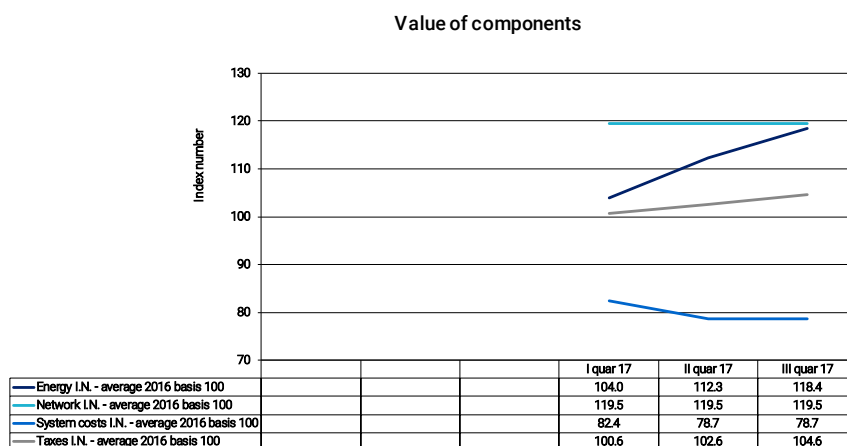
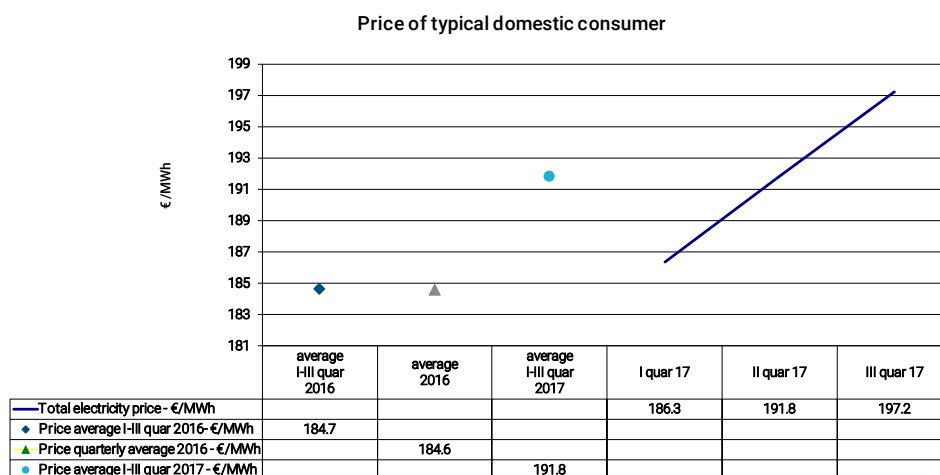
The graph illustrates the evolution, in each of the six months of 2017, of net import/export balance of electricity (left scale) and index number of net import/export balance, made up on the basis of the average monthly value of 2016 (right scale). Moreover, it describes monthly average of net import/export balance of electricity in January-June 2016, year 2016 and January-June 2017 (left scale). Between January-June 2017, compared to January-June 2016, the monthly average of Italian net electricity import from foreign countries has fallen of 707 GWh.



Source: Elettricità Futura elaborations on GME and CONFINDUSTRIA data

The graphic illustrates the evolution, in each of six months of 2017, of PUN (left scale) and index numbers of PUN, Brent and Gas Natural, made up on the basis of 2016 average value of PUN, Brent and Natural gas, respectively (right scale). Moreover, it describes PUN monthly average in January-June 2016, year 2016 and January-June 2017 (left scale).

Between January-June 2017, the PUN monthly average value increased reaching 52.8 €/MWh, compared to 38.1 €/MWh of the same period of 2016. The PUN monthly average of January-June 2017 is even slightly higher compared to the average price of first six months of 2015 (51.2 €/MWh). The graphic shows how the trend of PUN reflects mostly Natural Gas price, while it is decoupled from the price of Brent.

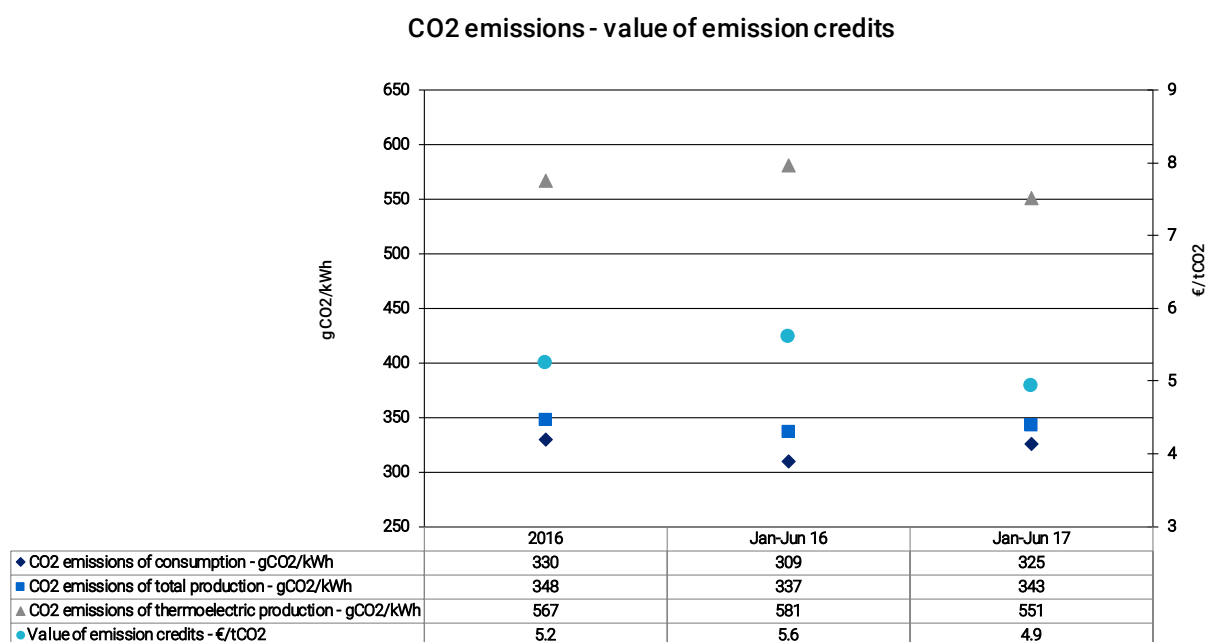


Source: Elettricità Futura elaborations on AEEGSI data

The upper graph illustrates the trend of total electricity price for typical domestic consumer in the first three quarters of 2017 and quarterly average of this price of the first three quarters of 2016, entire 2016 and first three quarters of 2017. The lower graphic represents index numbers of four main cost components which are remunerated by electricity price paid from typical domestic consumer, that is Energy cost, Network costs, System costs and Taxes. Each of this index number uses the 2016 average of relative components as a basis.

Average price of domestic consumer in the first three quarters of 2017 increased to 191.8 €/MWh, compared to 184.7 €/MWh of the same period of 2016, in contrast to downward trend recorded in the same period of last year (in the first three quarters of 2015 the average price was 185.6).

Focusing on first three quarters of 2017, we can see how the electricity price trend mainly reflects the trend of Energy cost and partly also the trend of Taxes. We may also see that, in the first three quarters of 2017, System costs and Network Costs registered respectively a contraction and a stability.



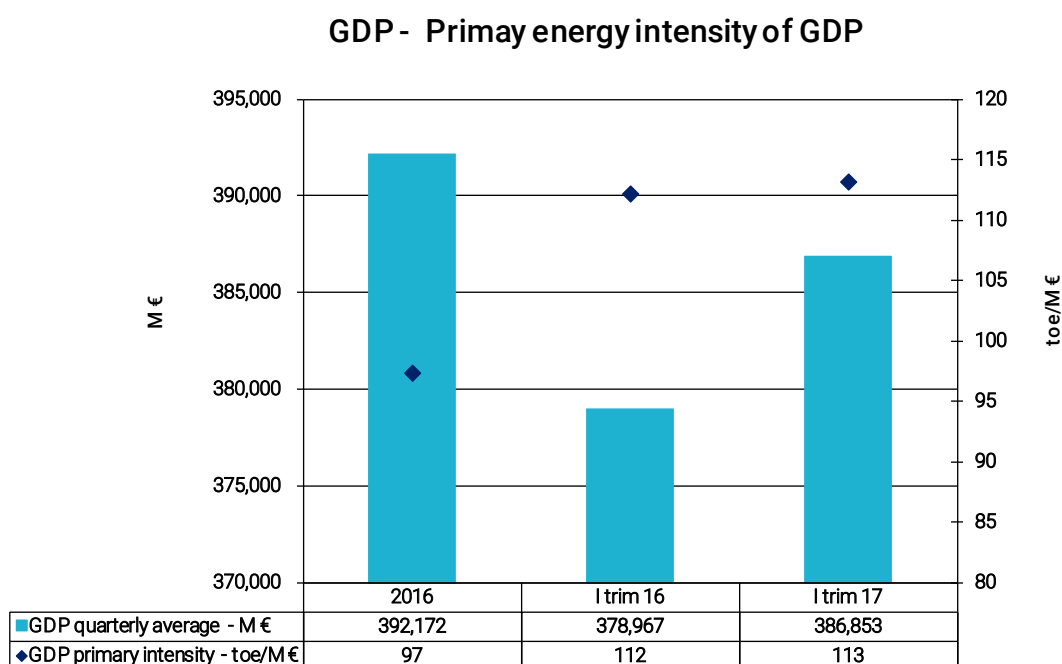
Source: Elettricità Futura elaborations on Terna, Eurostat, Snam Rete Gas, MiSE, ISPRA and EEX data

The graphic illustrates CO2 emissions in relation to consumption, gross production and thermoelectric production (left scale) and the value of emission credits (right scale).

Between January-June 2017, compared to January-June 2016, CO2 emissions on consumption have increased of 16 gCO2/kWh, CO2 emissions on total production have increased of 6 gCO2/kWh, while CO2 emissions in relation to thermoelectric production have decreased of 31 gCO2/kWh.

In the first six months of 2017, compared to the same period of 2016, the value of emission credits decreased from 5.6 to 4.9 €/tCO2, continuing the downward trend of the same period of last year, although at lower rate (in the first six months of 2015 the value of emission credits was at 7.1 €/tCO2).



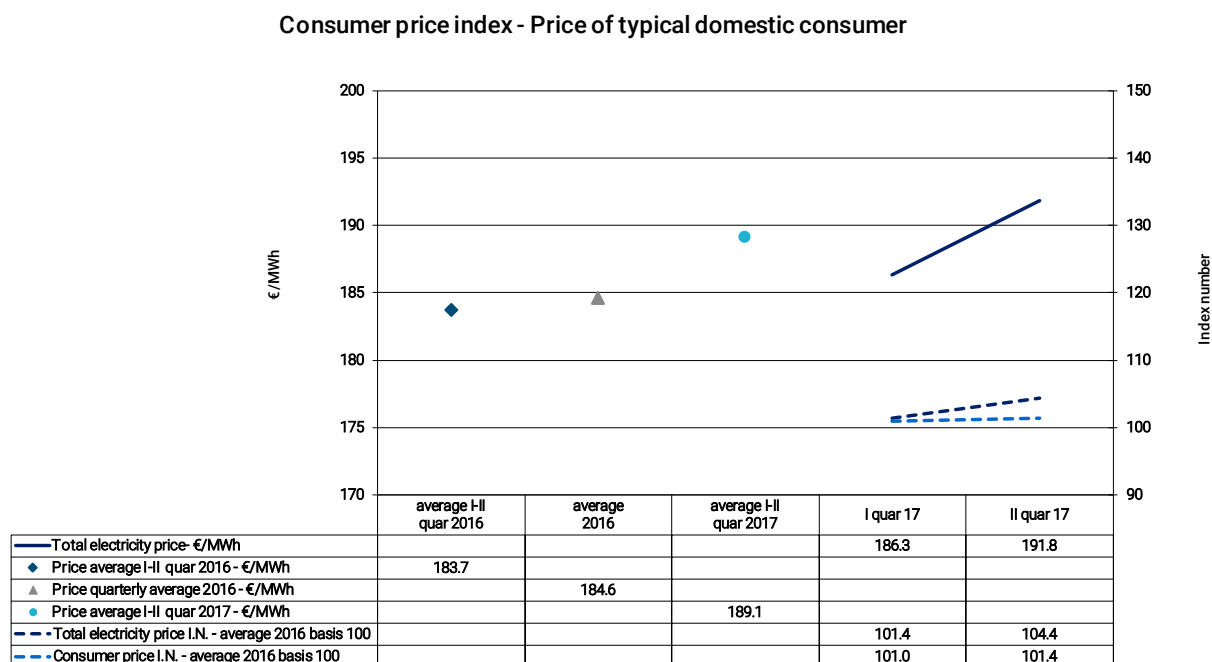


Source: Elettricità Futura elaborations on Terna, Eurostat, Snam Rete Gas and MiSE data

The graphic illustrates the quarterly average GDP of 2016, the GDP of first quarter of 2016, the GDP of first quarter of 2017 (left scale) and the primary energy intensity of GDP, for the same periods of time (right scale).

Contrary to the electricity intensity, the primary energy intensity of first quarter of 2017, compared to first quarter of 2016, slightly increased from 112 toe/M€ to 113 toe/M€, since the percentage growth of primary energy consumption was higher than the percentage growth of GDP.

This increase reflects a growth of primary energy consumption used in order to produce wealth, shifting away with respect to objectives of energy efficiency increase.



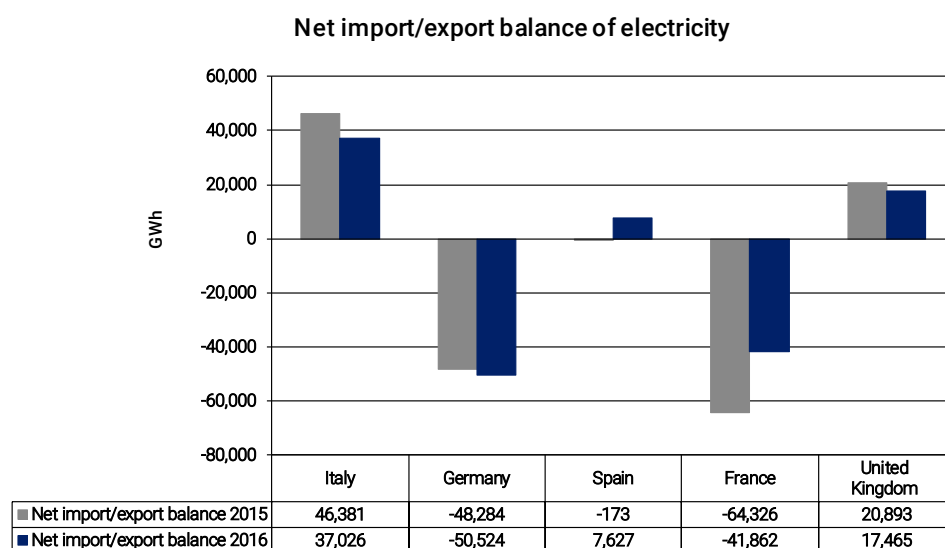
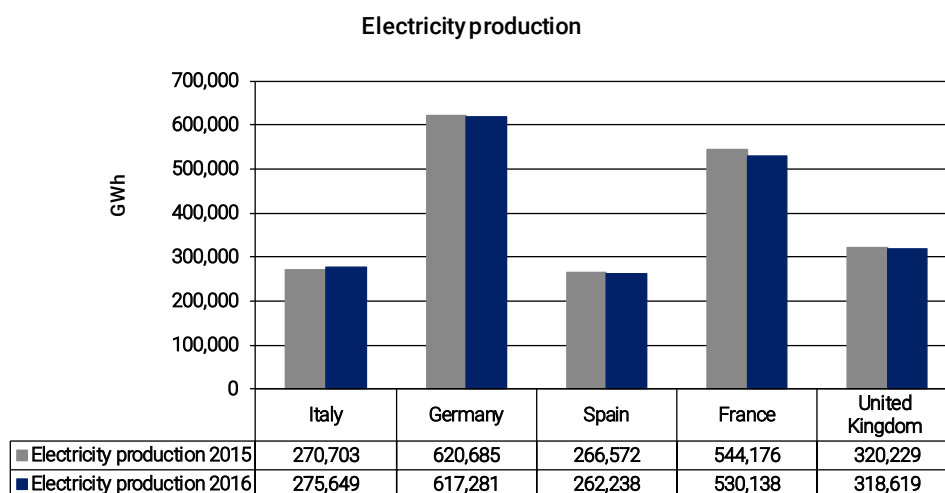
Source: Elettricità Futura elaborations on Istat and AEEGSI data

On the left scale, the graphic illustrates the trend of electricity price for typical domestic consumer in the first two quarters of 2017 and the quarterly average of this price of the first two quarters of 2016, entire 2016 and first two quarters of 2017.

The right scale describes the trends of index number of electricity price for typical domestic consumer and the index number of consumer price index, calculated on the basis of the 2016 average electricity price for typical consumer and consumer price index, respectively.

Index number of electricity price for typical domestic consumer, that is a nominal value, between the first and second quarter of 2017 increased by 3.0%, against a rise of index number of consumer price index equal to 0.4%.

## Section 4 – European comparison



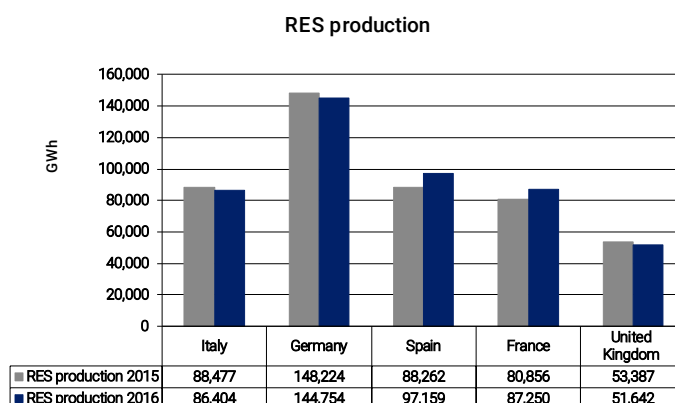
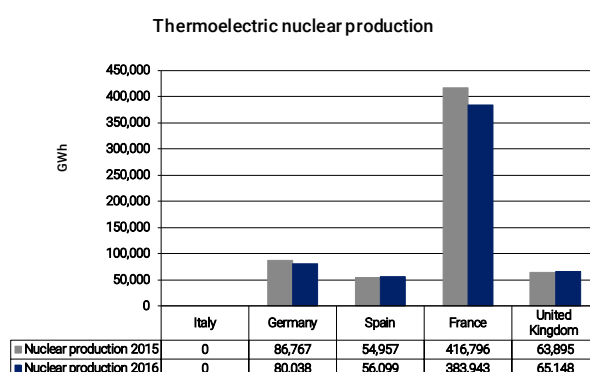
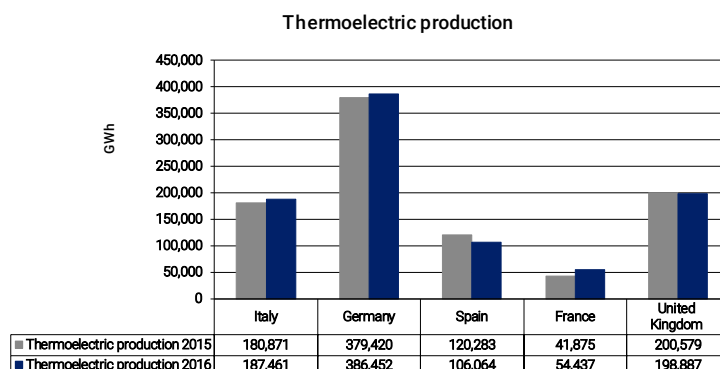
Source: Elettricità Futura elaborations on Eurostat data

Compared to the main European countries, it is evident that Italy, despite its surplus of installed production capacity, imports a significant amount of electricity compared to internal production.

We can also note that in 2016 Spain has registered a net import of 7,627 GWh, compared to net export of 173 GWh of 2015. Since 2012 (as you can see in the first Newsletter), Spain was a net exporter of electricity. Gradually, however, between 2012 and 2015, its net export declined until it became in 2016 a net importer.

Focusing only on the production, in 2016 compared to 2015, all countries considered in the analysis, except Italy, experienced a reduction in production, with France which registered the largest decrease (-14,038 GWh).

Note: on August 8, 2017, the historical series, published by Eurostat, for data of this section arrive until December 2016. Data for the first three months of 2017 has not yet been published. Therefore, the historical series of this section have the same time interval of those of the previous Newsletter



Note: biomass production is included in thermoelectric production

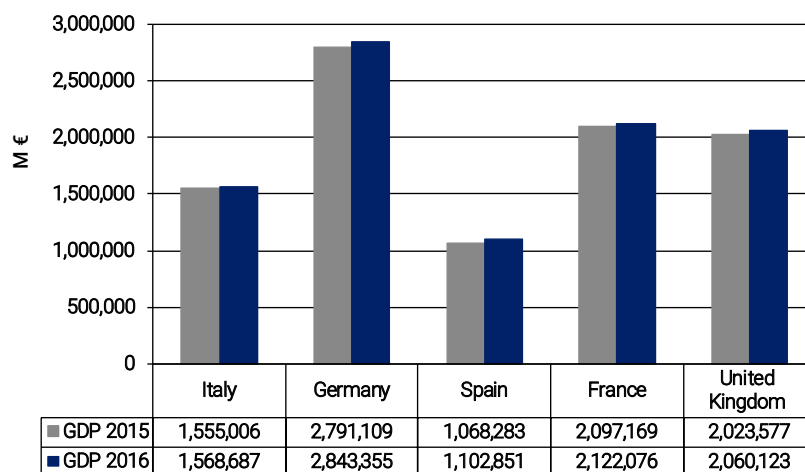
Source: Elettricità Futura elaborations on Eurostat data

In 2016, compared to 2015, France and Germany have experienced a decrease of nuclear production and a growth of thermoelectric production. Instead about renewable production, while France has registered a growth, Germany have experienced a decline.

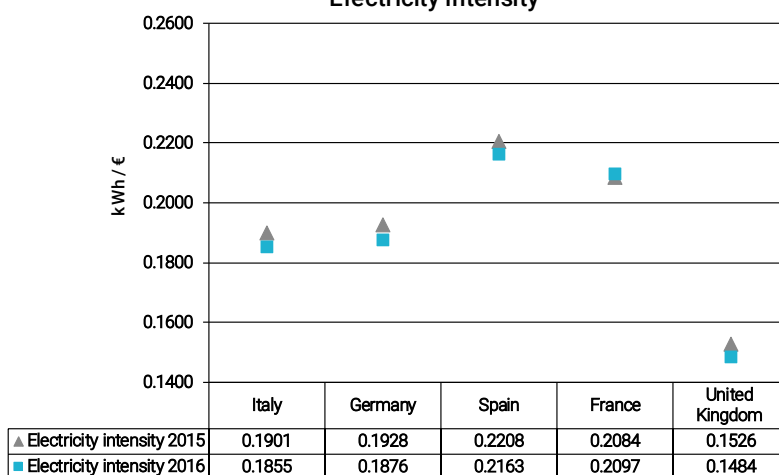
Finally, we note that Spain has experienced the largest contraction in thermoelectric production (-14,219 GWh) and the largest increase in renewable production (+8,898 GWh). United Kingdom has registered only an increase in nuclear production.

Note: on August 8, 2017, the historical series, published by Eurostat, for data of this section arrive until December 2016. Data for the first three months of 2017 has not yet been published. Therefore, the historical series of this section have the same time interval of those of the previous Newsletter.

**GDP in chain-linked volumes**



**Electricity intensity**



Source: Elettricità Futura elaborations on Eurostat data

All five countries considered in the analysis, in 2016 compared to 2015, have experienced an increase in GDP. Germany leads the group (+52,246 million €), followed at a distance by UK (+36,546 million €), by Spain (+34,568 million €), by France (+24,907 million €) and queued Italy (+13,681 million €). About electricity intensity, Italy and Germany are halfway between United Kingdom, which is the best-performing country, and countries less-performing (Spain and France).

Note: On August 8, 2017, the historical series, published by Eurostat, for data of this section arrive until the fourth quarter of 2016. Data for the first quarter of 2017 has not yet been published. Therefore, the historical series of this section have the same time interval of those of the previous Newsletter.

# GLOSSARY

## **Biomass**

When the distinction isn't useful, in general reference is made to biomass (solid), biogas, bio liquid and biodegradable waste.

## **Brent price**

It is the Brent spot price in \$ per barrel.

## **CO<sub>2</sub> emissions**

Carbon dioxide emissions, following to combustion of fossil fuels and non-biodegradable wastes, in order to produce electricity.

## **CO<sub>2</sub> emission allowances and credits**

Emission allowances of European Emission Trading Scheme (EU ETS) are CO<sub>2</sub> emission rights, in order to comply with EU ETS compensation obligations. Each allowance is equal to 1 ton of CO<sub>2</sub>, namely it can be used to compensate the equivalent of 1 metric ton of CO<sub>2</sub> emission. Allowances are tradable and, according to the scheme in force since 2013, they are partly allocated through public auctions, where they are also called "emission credits". Since 2013, the credit value is the auction awarding price of 3rd phase (2013 – 2020), on the European Transitional Common Auction Platform (EU T-CAP). The emission credits price of a given period is calculated as average of awarding prices of auctions carried out during that period, weighted by the exchanged volumes.

## **Components of the price of electricity for customers of enhanced protection**

These are the main four components paid through the price of electricity bill paid by customers of enhanced protection and fixed by AEEGSI (Italian Regulatory Authority for Electricity Gas and Water).

These components are:

- The energy cost, given by cost of purchasing electricity;
- The network costs, to cover the infrastructures costs necessary to transmission, distribution and metering services and costs related to the provision of such services;
- The system costs, to cover different costs, mostly addressed to support electricity production from RES;
- Taxes on electricity supply, as excise tax and value added tax (VAT).

## **Consumer price index**

For the purpose of this analysis, the national consumer price index (NIC) with tobaccos has been used. ISTAT (Italian National Institute of Statistics) supplies this index with 2015 as basis. This index is a measure of inflation trend in the country, since it is built as weighed average of prices of goods and services of a specific basket taken as a reference.

## **Electricity consumption**

They are equal to the demand for electricity on the grid, net of grid losses.

## **Electricity intensity**

In this newsletter, it is the ratio between electricity consumption and raw GDP in chain-linked volumes, with 2010 as reference year.

It represents the amount of electricity used per unit of wealth produced, so it is an indicator of the level of efficiency. Any increase of this indicator, however, could be linked to a reduction of GDP.

It was decided to take the raw GDP for consistency of comparison between the GDP and electricity consumption, whose monthly time series is not seasonally adjusted.

## **Electricity penetration**

In this newsletter, it is the ratio between electricity consumptions and the total final energy consumption. It is an indicator of how much of the final energy consumption is met through electricity vector (so called electrification of consumptions).

## **Electricity production**

Total electricity production. In this newsletter electricity production is considered, net of auxiliary services.

## **Electricity production by fossil fuels**

Electricity production by solid fuels, natural gas, derived gases, crude oil and its derivatives (fuel oil, diesel oil, etc...)

## **Electricity production by renewable energy sources**

The electricity production by renewable hydro (without pumping), geothermal, wind, solar and photovoltaic and biomass, biogas, bio liquid and biodegradable wastes. Exception is the production of electricity from renewable energy sources used for European comparison that does not include biomass.

## **Enhanced protection service**

It is the service of electricity supply in economic and contractual conditions laid down by AEEGSI (Italian Regulatory Authority for Electricity, Gas and Water).

## **European comparison**

In order to carry out the quarterly comparison between the main four European countries, monthly Eurostat data are taken as reference. Yearly monthly values sum, regularly published by European statistical office, not necessarily corresponds to final annual data.

## **Fossil fuels**

In this newsletter fossil fuels are solid fuels, natural gas, derived gases, crude oil and his derivatives (fuel oil, diesel oil, etc...).

## **Gas Price**

In this newsletter, the price at the point of virtual exchange (PSV) is considered. Prices refers to Day-Ahead products, namely related to the day-after delivery.

## **GDP and GDP in chain-linked volumes with reference year 2010**

In general term, GDP is the total value of goods and services produced within a country in a specific time interval (usually quarterly and yearly), both by residents and not residents and addressed to final uses (final consumption, investments, net exports). Therefore, it is not counted in the production for intermediate consumptions, which represents the value of goods and services used and converted in the production process for new goods and services. The gross domestic product used in this analysis is the raw GDP in chain-linked volumes with reference year 2010.

The GDP is defined raw when it is not adjusted for calendar effects and seasonal fluctuations. Instead the GDP in chain-linked volumes with reference year 2010 is a measure of real GDP as it provides a measure of GDP over time in terms of volume, that is, excluding underlying prices dynamic, through a system of chain index. From September 2014 Eurostat and the individual statistical offices in Europe, have begun to calculate the GDP with the new European system of national and regional accounts, European System of Accounts 2010 (Sec2010), in place of Sec95 and introduced the series of raw GDP in chain-linked volumes with reference year 2010.

## **Incentives for RES**

In general, the amounts of money used to support the production of electricity from renewable energy sources.

Incentive for RES have been estimated by using data from AEEGSI (Italian Regulatory Authority for Electricity, Gas and Water) and/or from “Counter of Renewable costs” and “Counter of Photovoltaic costs”, which are available on GSE website.

## **National Single Price (PUN)**

In this newsletter, it is the hourly average - for each of the 24 hours of the day - of the purchase price of electricity, weighted with hourly purchases, net purchases of pumping hydro and areas abroad.

The monthly PUN is calculated as an average of PUN for each hour of the month weighted to the quantities purchased.

## **Net import/export balance**

In this newsletter, it represents the difference between national electricity imports from foreign countries and national electricity exports to foreign countries.

## **Primary energy intensity of GDP**

In this newsletter, it is the ratio between total gross inland consumption of energy and raw GDP in chain-linked volumes with reference year 2010. It express the amount of primary energy per unit of wealth produced.

It was decided to take the raw GDP for consistency of comparison between GDP and the gross inland consumption of energy, which time series are not seasonally adjusted.

## **Renewable energy sources (RES)**

In this newsletter, renewable energy sources are renewable hydroelectric (without pumping), geothermal, wind, solar and photovoltaic and biomass, biogas, bio liquid and biodegradable wastes.

## **Thermoelectric production**

Electricity production by combustion processes. In this Newsletter it includes not only the energy produced from fossil fuels, but also from biomass, biogas, bio liquids, non-biodegradable wastes and nuclear. In the section on European comparisons, it is preferred to separate thermoelectric production from nuclear from the remaining thermoelectric production.

## **Thermoelectric sources**

In general, fossil fuels, biomass, biogas, bio liquid, non-biodegradable wastes, geothermal and nuclear to produce electricity.

## **Typical domestic consumer**

As a part of enhanced protection service, “Typical domestic consumer” is the residential domestic customer, typically a family, with a connection capacity up to 3 kW and 2,700 kWh of annual consumption.

## **Typical domestic consumer price**

It is the price of electricity paid by residential domestic customer, typically a family, with a connection capacity up to 3 kW and 2,700 kWh of annual consumption.





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