

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

In the first three months of 2017 data of national electricity sector has shown an increase in electricity consumption of 0.6% and in electricity production of 6.4%. The latter increase is mostly linked to largest production of January caused by stop for maintenance of numerous French nuclear groups. This led to a reduction of January net import and, consequently, to a reduction of net import/export balance of the first three months of the year.

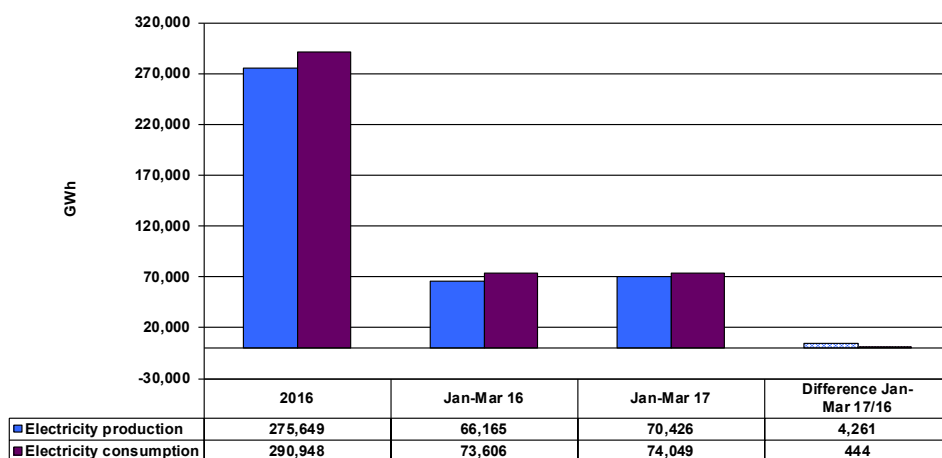
A comparison by sectors shows that in the first three months of 2017, compared to the same period of last year, production from renewable sources failed by 2% while production from fossil fuels rose by 11%. The decline in production by renewable sources is mainly due to the reduction of wind and hydro generation, while the increase of production by fossil fuels is due to the growth of natural gas production. Compared to the first three months of 2016, the production from renewable continuing the downward trend, although at lower rate, and the production from fossil continuing the upward trend, although at a more marked rate.

With regard to incentive policies to renewable sources, in the period January- March 2017, the incentives amounted to 2.6 billion euro, with a decrease of 0.4 billion compared to the period January-March 2016.

In terms of performance, the average price fixed on the power exchange in the first three months of 2017 considerably increased to 59.6 €/MWh, compared to 41.0 €/MWh of the same period of 2016, always because of stop of French nuclear groups and of the extraordinary cold wave that affected Europe in January 2017, which pushed the demand up. 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 both of consumption of electricity used per unit of GDP both of consumption of primary energy used per unit of GDP, consistent with the objectives of increase of energy efficiency. Even the electricity penetration is reduced.

**Total electricity production and consumption**

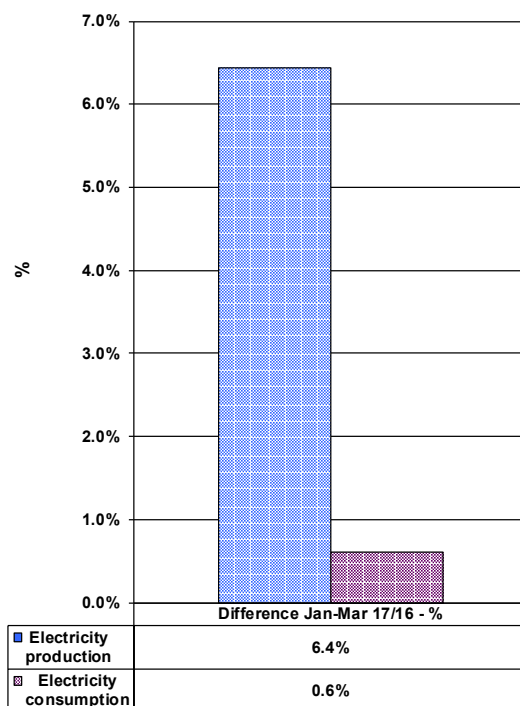


Source: Elettricità Futura elaborations on Terna data

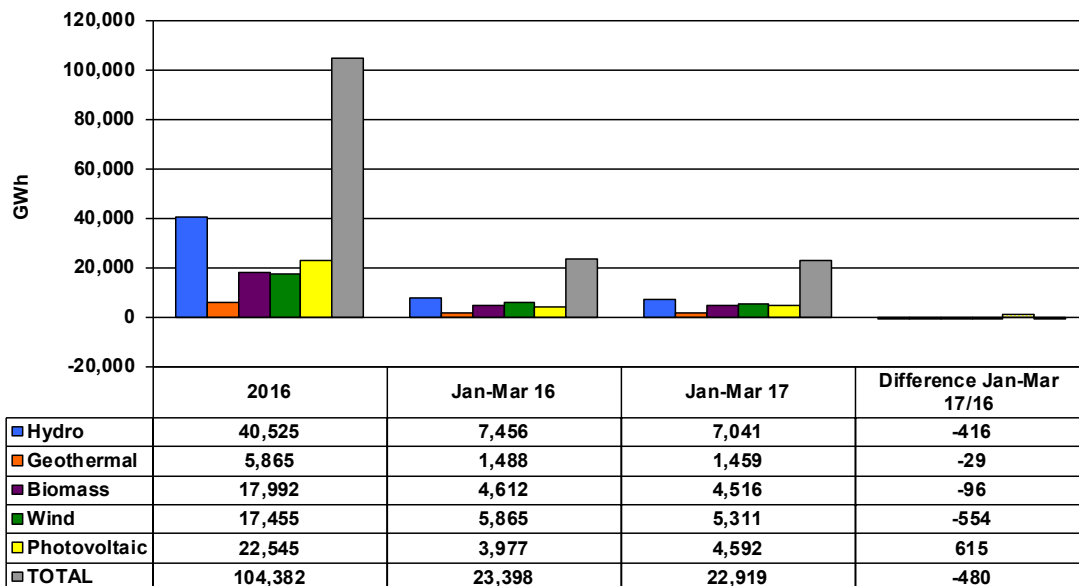
In the first three months of the year, compared to the same period of 2016, an increase in electricity production (+4.3 TWh, equal to +6.4%) occurred. At the same time, there was also a slight increase in electricity consumption (+0.4 TWh, equal to + 0.6%).

The growing trend of production and consumption is in contrast, respectively, to stable and decrease values of the same period of the last year.

**Total electricity production and consumption-  
Percentage change of difference**



### Electricity production by renewable energy sources

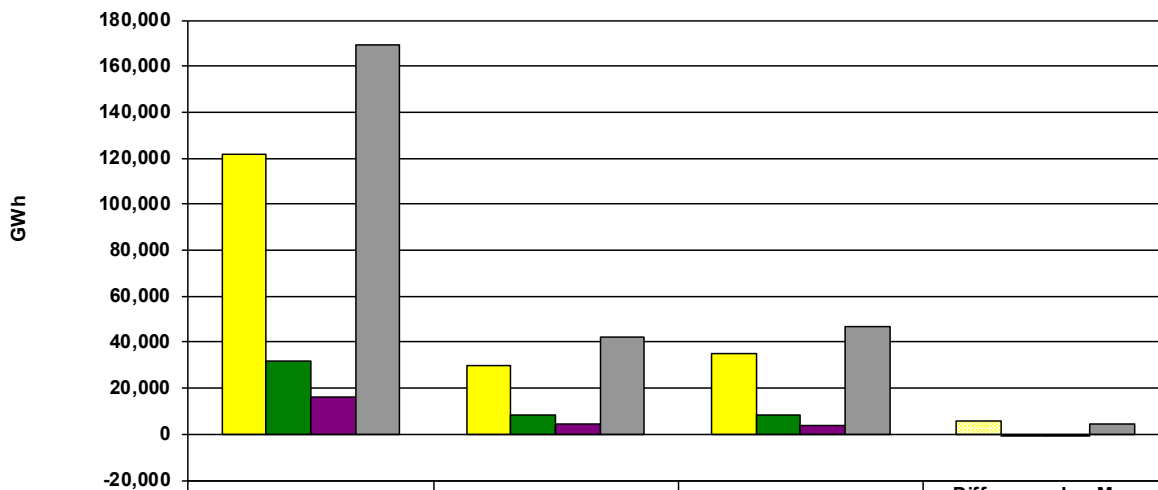


Source: Elettricità Futura elaborations on Terna data

Between January-March 2017 compared to January-March 2016, the electricity production by renewable has registered a contraction of 480 GWh, continuing the downward trend of the same period of last year, although at lower rate.

This decrease is mainly due to the contraction of wind (-554 GWh) and hydro (-416 GWh) productions, followed also by slight decrease of biomass and geothermal productions. The photovoltaic production (+615 GWh), however, is growing.

### Electricity production by fossil fuels



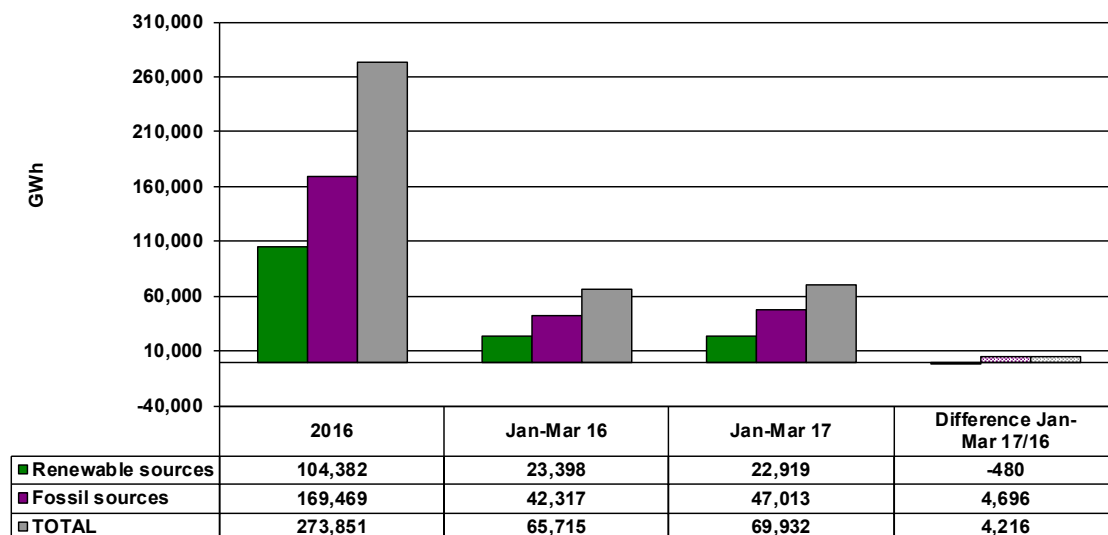
	2016	Jan-Mar 16	Jan-Mar 17	Difference Jan-Mar 17/16
■ Natural gas	121,743	29,740	35,357	5,617
■ Coal	31,664	8,465	8,015	-450
■ Oil products and other fossil fuels	16,062	4,112	3,642	-470
■ TOTAL	169,469	42,317	47,013	4,696

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

Between January-March 2017 compared to January-March 2016, the electricity production by fossil fuels registered a growth of 4,696 GWh, confirming the growing trend recorded in the same period of last year, although at a more marked rate.

This increase is linked to the raise of production by natural gas (+5,617 GWh). By contrast, solid fuels and Oil products decreased by 450 and 470 GWh, respectively.

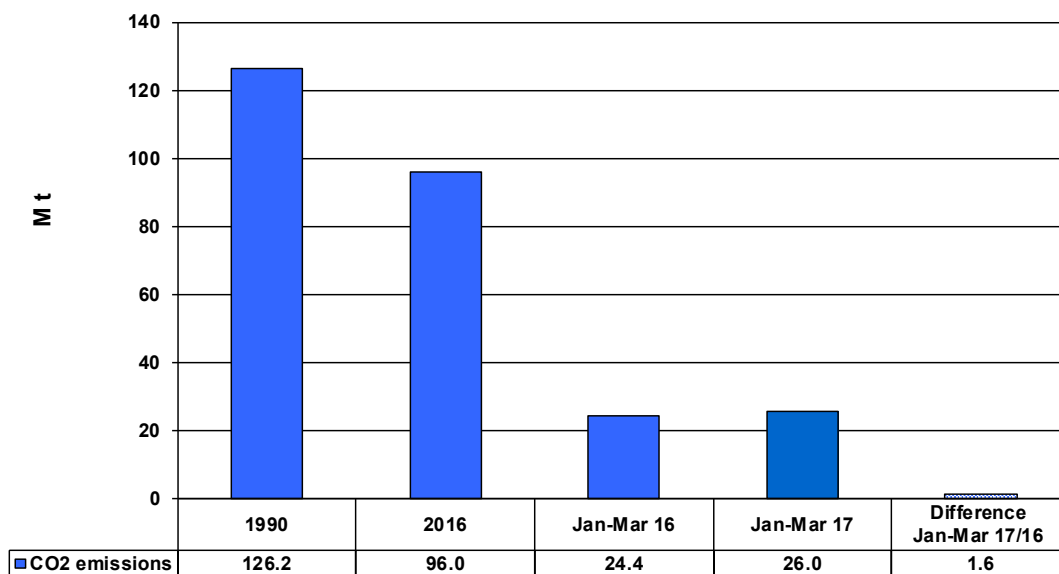
### Electricity production by fossil fuels and renewable sources



Source: Elettricità Futura elaborations on Terna data

Between January-March 2017 compared to January-March 2016, the weight of production from fossil fuels on total production has risen from 64% to 67%. Instead, the weight of renewable generation on total production has fallen from 36% to 33%.

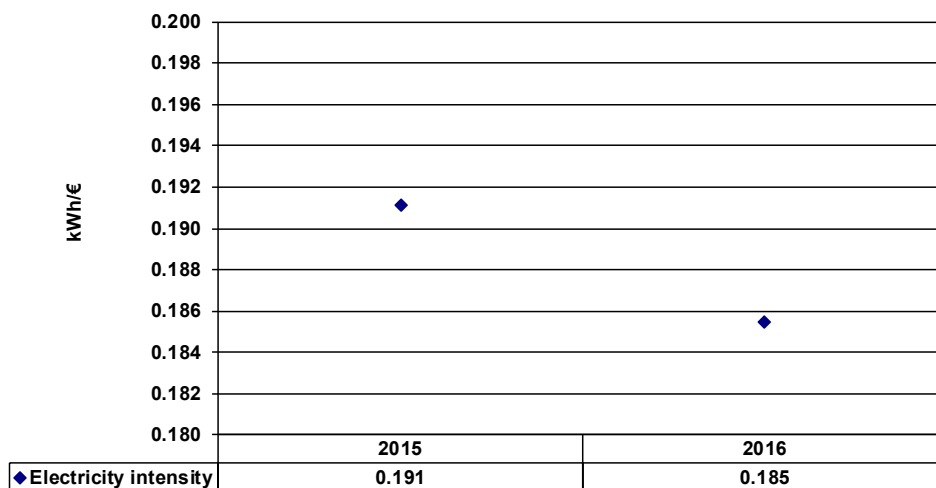
### CO2 emissions from thermoelectric production



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

In the first three months of the year, compared to the same period of 2016, CO<sub>2</sub> emissions from thermoelectric production increased by 1.6 million of tonnes, due to more emissions resulting from the wide growth of power generation from natural gas. This trend is in line to increase values of first three months of 2016, compared to the same period of 2015 (+0.9 million of tonnes).

### Electricity intensity

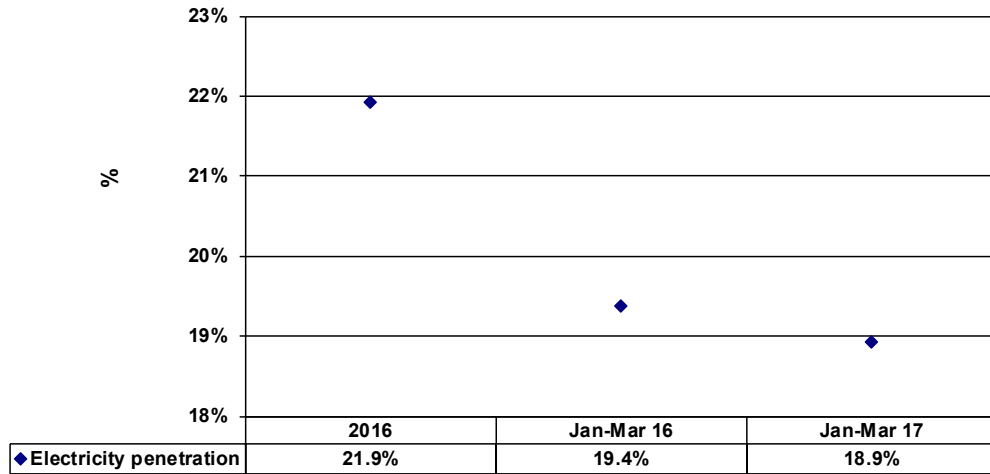


Source: Elettricità Futura elaborations on Terna and Eurostat data

Electricity intensity of 2016 is slightly decreased, compared to 2015, due to the reduction of electricity consumption and the simultaneous increase 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

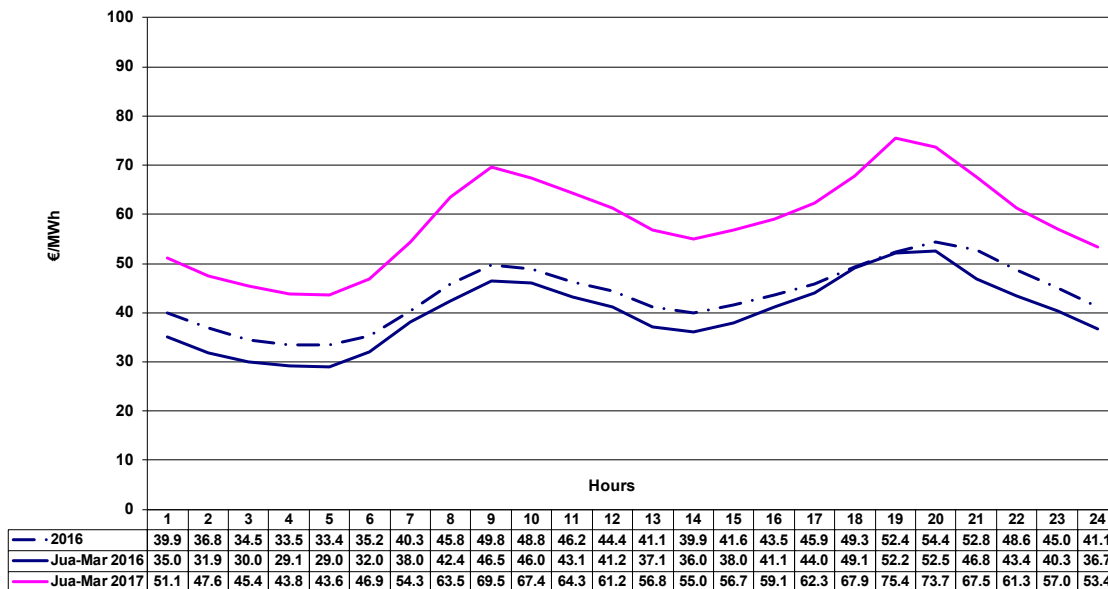


Source: Elettricità Futura elaborations on Terna, Eurostat, Snam Rete Gas and MISE data

Between January-March 2017, electricity penetration stood at 18.9%, slightly down compared to 19.4% 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 of the period was smaller than the percentage growth of the total final energy consumption.



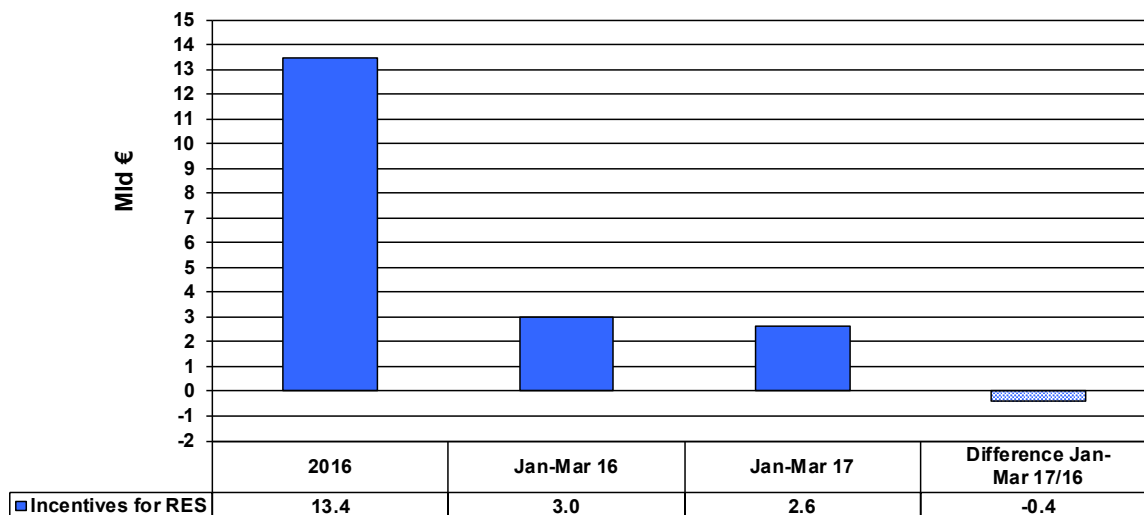
### National Single Price (PUN)



Source: Elettricità Futura elaborations on GME data

Between January-March 2017 compared to January-March 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-March 2016 compared to January-March 2015.

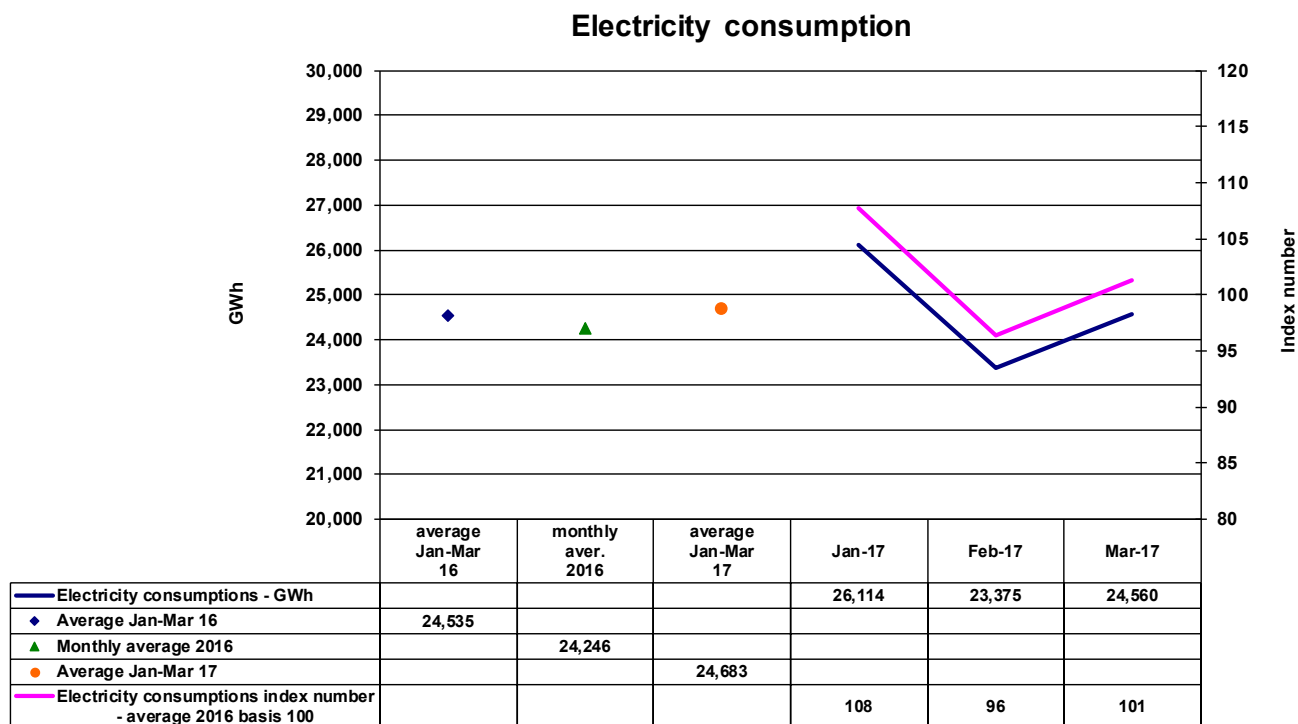
### Incentives for electricity production from RES



Source: Elettricità Futura elaborations on AEEGSI and Terna data

In the first three months of the year, compared to the same period of 2016, the incentives for electricity production from RES decreased of 0.4 billion of euro, reaching 2.6 billion of euro.

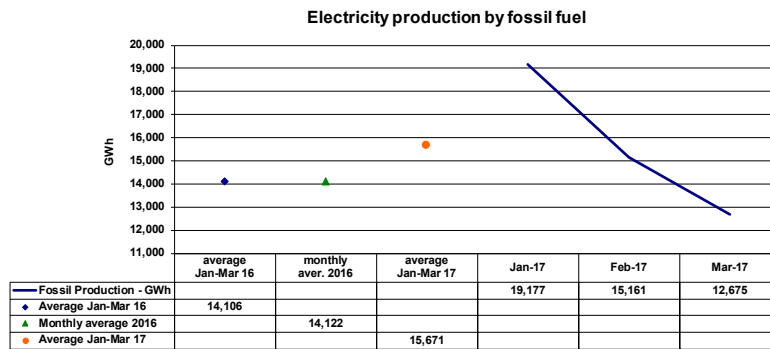
In the first three months of 2016, compared to the same period of 2015, the incentives were slightly increased (+0.1 billion of euro).



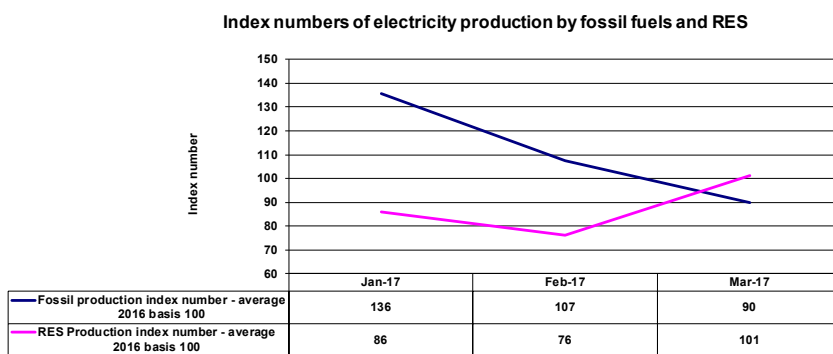
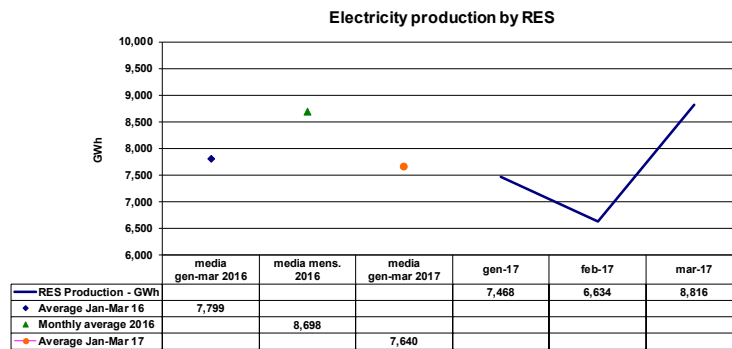
Source: Elettricità Futura elaborations on Terna data

The graphic illustrates the evolution, in each of the three 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-March 2016, year 2016 and January-March 2017 (left scale).

In the first three months of the year, the average consumption amounted to 24,683 GWh, with a increase of 148 GWh compared to the same period of last year.



In January-March 2017 compared to the same period of last year, the average electricity production from renewable sources decreased by 160 GWh, while the average electricity production from fossil fuels increased by 1.565 GWh.

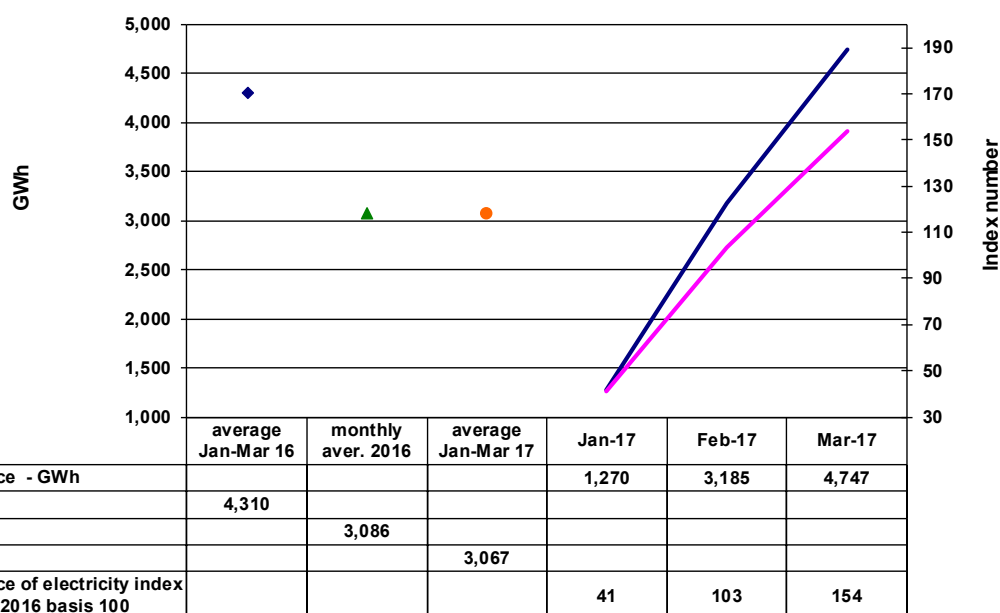


Source: Elettricità Futura elaborations on Terna data

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 three months of the 2017 and monthly average productions in January-March 2016, year 2016 and January-March 2017.

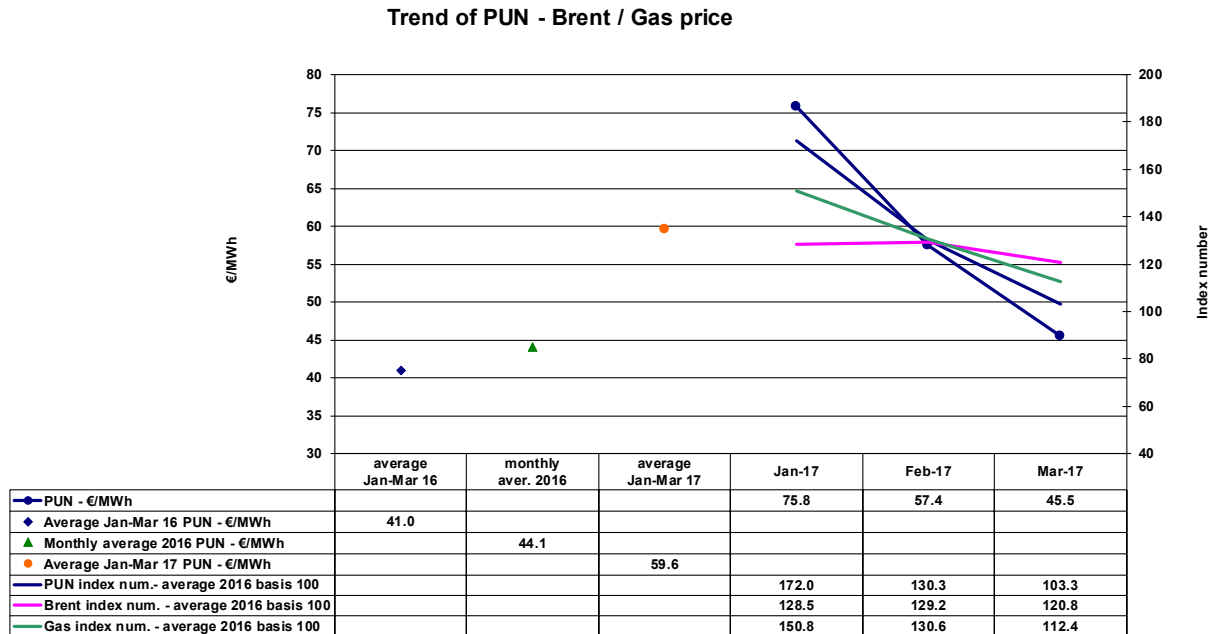
Instead, the latest graphic below describes the trend, between January and March 2017, of fossil fuels and renewable production's index numbers, that take as basis the 2016 average production of fossil fuels and renewable production respectively.

Net import/export balance of electricity



Source: Elettricità Futura elaborations on Terna data

The graph illustrates the evolution, in each of the three 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-March 2016, year 2016 and January-March 2017 (left scale). Between January-March 2017 compared to January-March 2016, the monthly average of Italian net electricity import from foreign countries has fallen of 1.243 GWh.



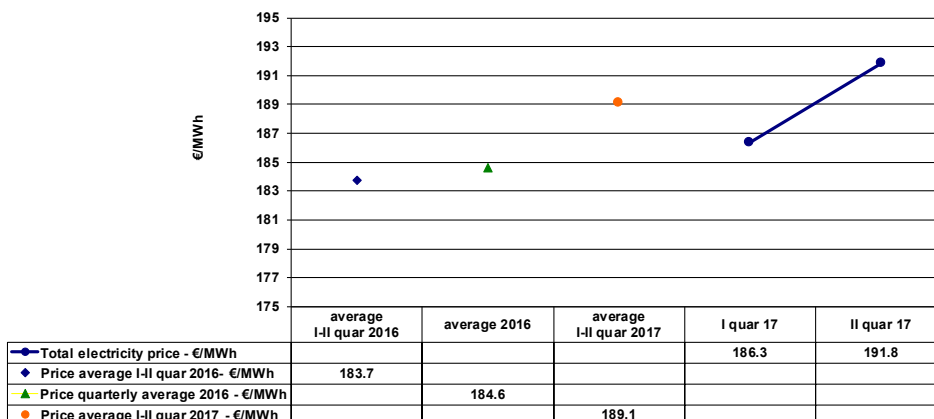
Source: Elettricità Futura elaborations on GME and CONFINDUSTRIA data

The graphic illustrates the evolution, in each of three 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-March 2016, year 2016 and January-March 2017 (left scale).

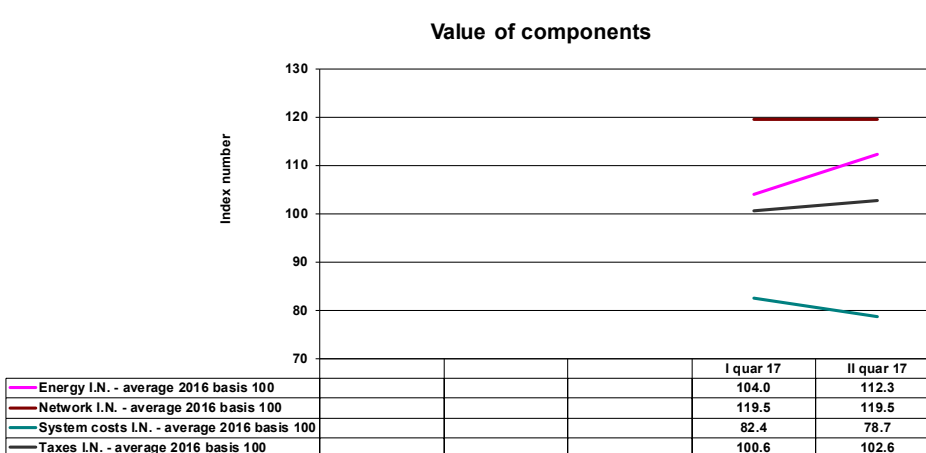
Between January-March 2017, the PUN monthly average value increased reaching 59.6 €/MWh, compared to 41.0 €/MWh of the same period of 2016. The PUN monthly average of January-March 2017 is even higher compared to the average price of first three months of 2015 (53.5 €/MWh).

The graphic shows how the trend of PUN reflects mostly Natural Gas price, while it is decoupled from the price of Brent.

Price of typical domestic consumer



Value of components



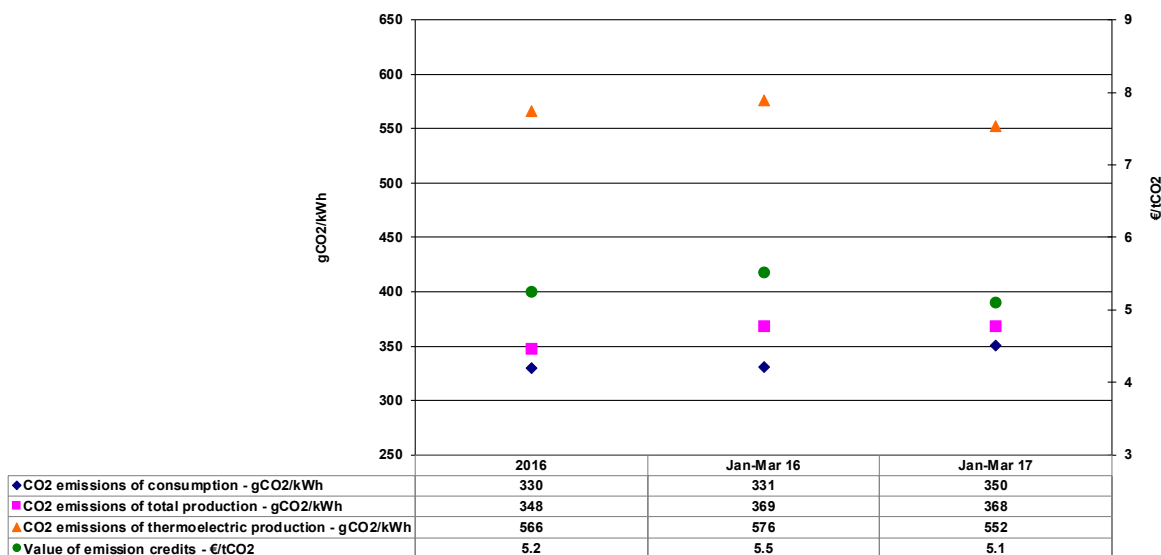
Source: Elettricità Futura elaborations on AEEGSI data

The upper graph illustrates the trend of total electricity price for typical domestic consumer in the first two quarters of 2017 and quarterly average of this price of the first two quarters of 2016, entire 2016 and first two 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 two quarters of 2017 increased to 189.1 €/MWh, compared to 183.7 €/MWh of the same period of 2016, in contrast to downward trend recorded in the same period of last year (in the first two quarters of 2015 the average price was 186.2).

Focusing on first two quarters of 2017, we can see how the electricity price trend mainly reflects the trend of electricity cost and partly also the trend of Taxes. We may also see that, in the first two quarters of 2017, System costs and Network Costs registered respectively a contraction and a stability, because of the start in 2017 of the second phase of tariff reform for domestic electricity customers, which was launched in 2016. The reform will be fully operational in 2018 when the full non-progressive structure will be applied not only to Network Costs, but also to System costs.

### CO2 emissions - value of emission credits



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

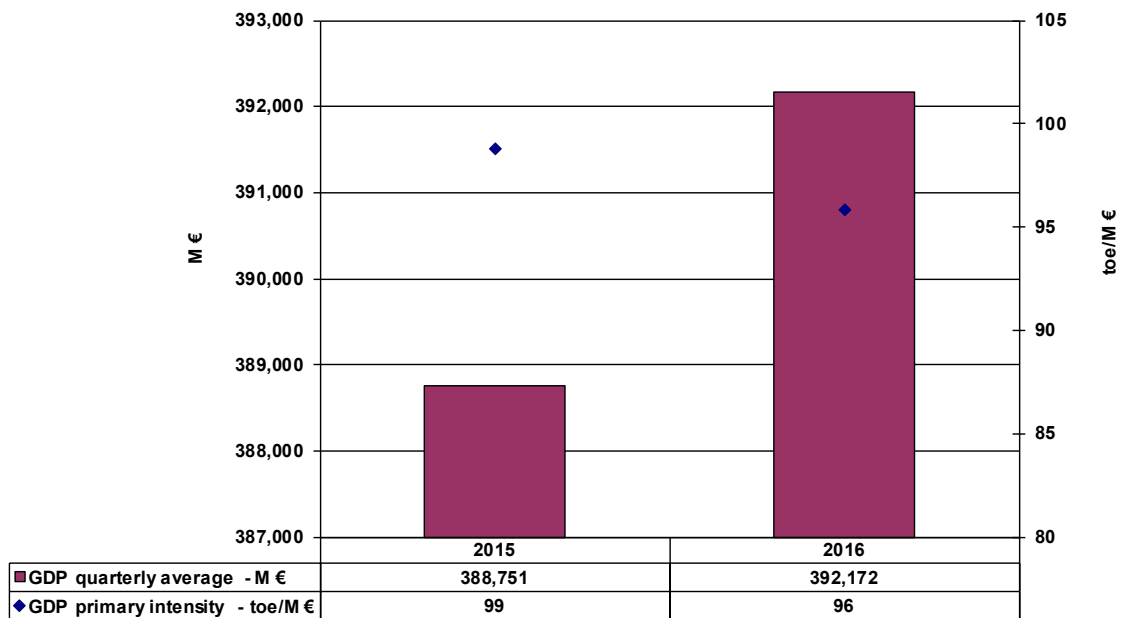
The graphic illustrates CO<sub>2</sub> emissions in relation to consumption, gross production and thermoelectric production (left scale) and the value of emission credits (right scale).

Between January-March 2017 compared to January-March 2016, CO<sub>2</sub> emissions on consumption have increased of 19 gCO<sub>2</sub>/kWh, CO<sub>2</sub> emissions on total production remained almost stable, while CO<sub>2</sub> emissions in relation to thermoelectric production have decreased of 24 gCO<sub>2</sub>/kWh.

In the first three months of 2017 compared to the same period of 2016, the value of emission credits decreased from 5.5 to 5.1 €/tCO<sub>2</sub>, continuing the downward trend of the same period of last year, although at lower rate (in the first three months of 2015 the value of emission credits was at 7.0 €/tCO<sub>2</sub>).



**GDP - Primay energy intensity of GDP**



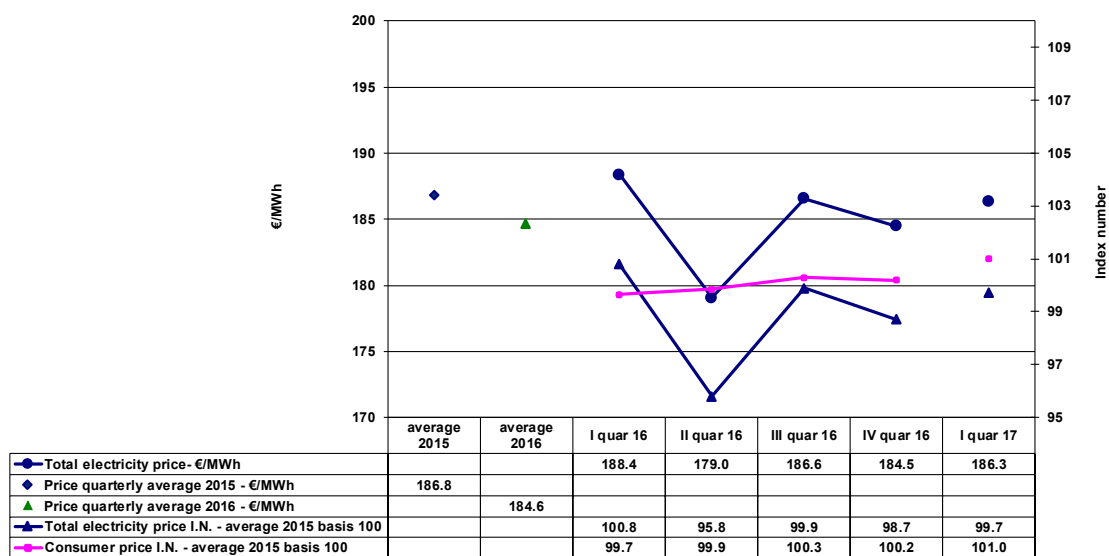
Source: Elettricità Futura elaborations on Terna, Eurostat, Snam Rete Gas and MISE data

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

In line with the electricity intensity, also the primary energy intensity of 2016, compared to 2015, decreased from 99 toe/M€ to 96 toe/M€, due to the reduction of primary energy consumption and the simultaneous increase of GDP in the period.

This fall reflects a reduction in the amount of primary energy consumption used to produce wealth, consistent with the objectives of increase of energy efficiency.

**Consumer price index - Price of typical domestic consumer**

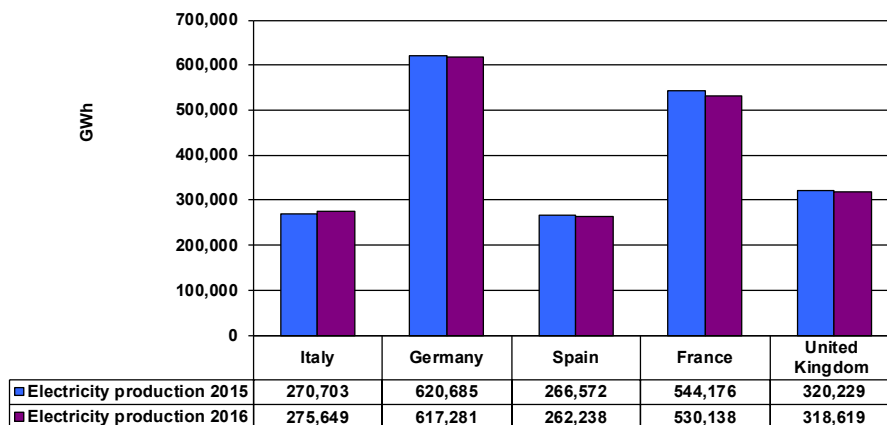


Source: Elettricità Futura elaborations on Istat and AEEGSI data

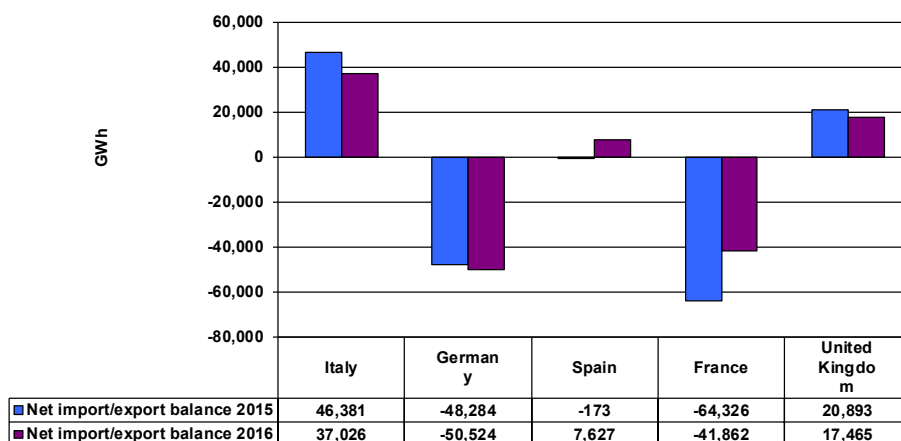
On the left scale, the graphic illustrates the trend of electricity price for typical domestic consumer between the first quarter of 2016 and the first quarter of 2017 and the quarterly average of this price in 2015 and 2016. The right scale describes the trends of index number of electricity price for typical consumer and the index number of consumer price index, calculated on the basis of the 2015 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 quarter of 2016 and the first quarter of 2017 decreased by 1.1%, against a rise of index number of consumer price index equal to 1.3%.

### Electricity production



### Net import/export balance of electricity



Source: Elettricità Futura elaborations on Eurostat data

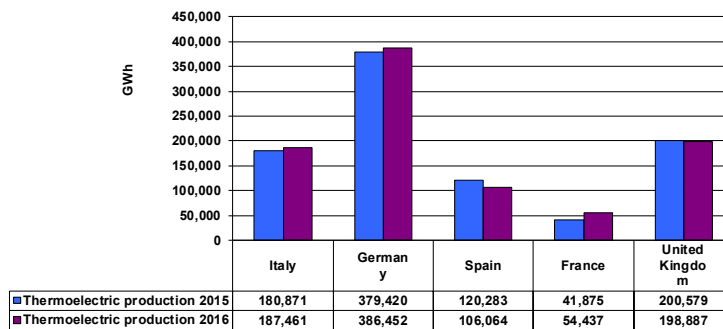
Compared to the main European countries, it is evident that Italy, despite its surplus of installed production capacity, imports a significant amount of electricity compared to internal production.

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.

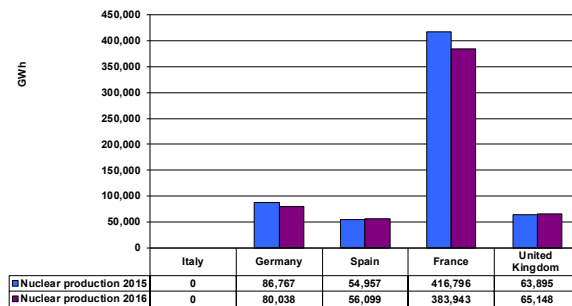
Focusing only on the production, in 2016 compared to 2015, all countries considered in the analysis, except Italy, experienced a reduction in production, with France which registered the largest decrease (-14,038 GWh).

## Section 4 – European comparison

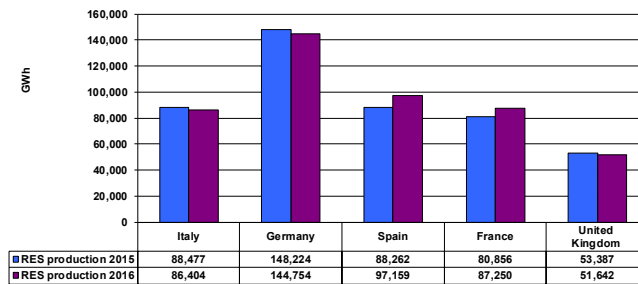
**Thermoelectric production**



**Thermoelectric nuclear production**



**RES production**



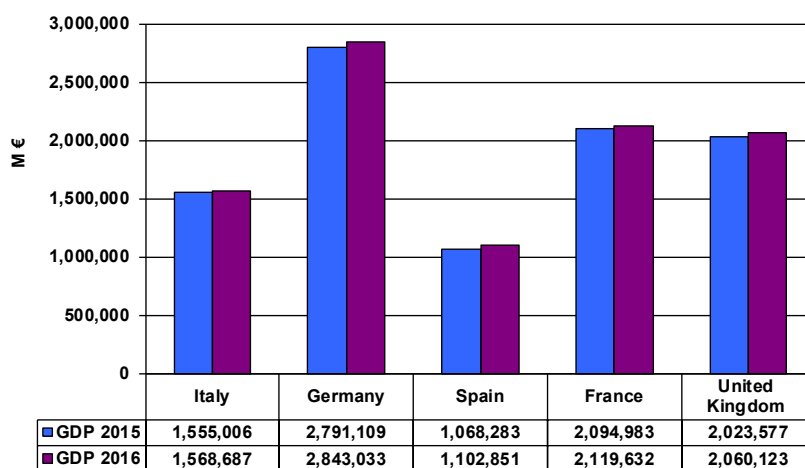
Source: Elettricità Futura elaborations on Eurostat data

Note: biomass production is included in thermoelectric production

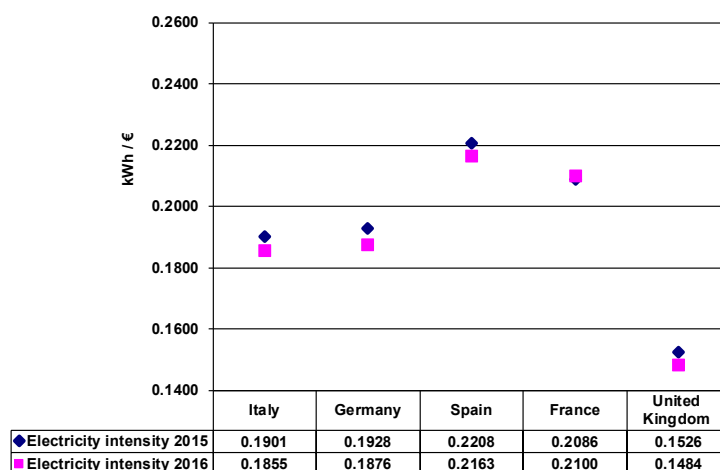
In 2016, compared to 2015, France and Germany have experienced a decrease of nuclear production and a growth of thermoelectric production. Instead about renewable production, while France has registered a growth, Germany have experienced a decline.

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.

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 (+51,924 million €), followed at a distance by UK (+36,546 million €), by Spain (+34,568 million €), by France (+24,649 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).

# 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 build 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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