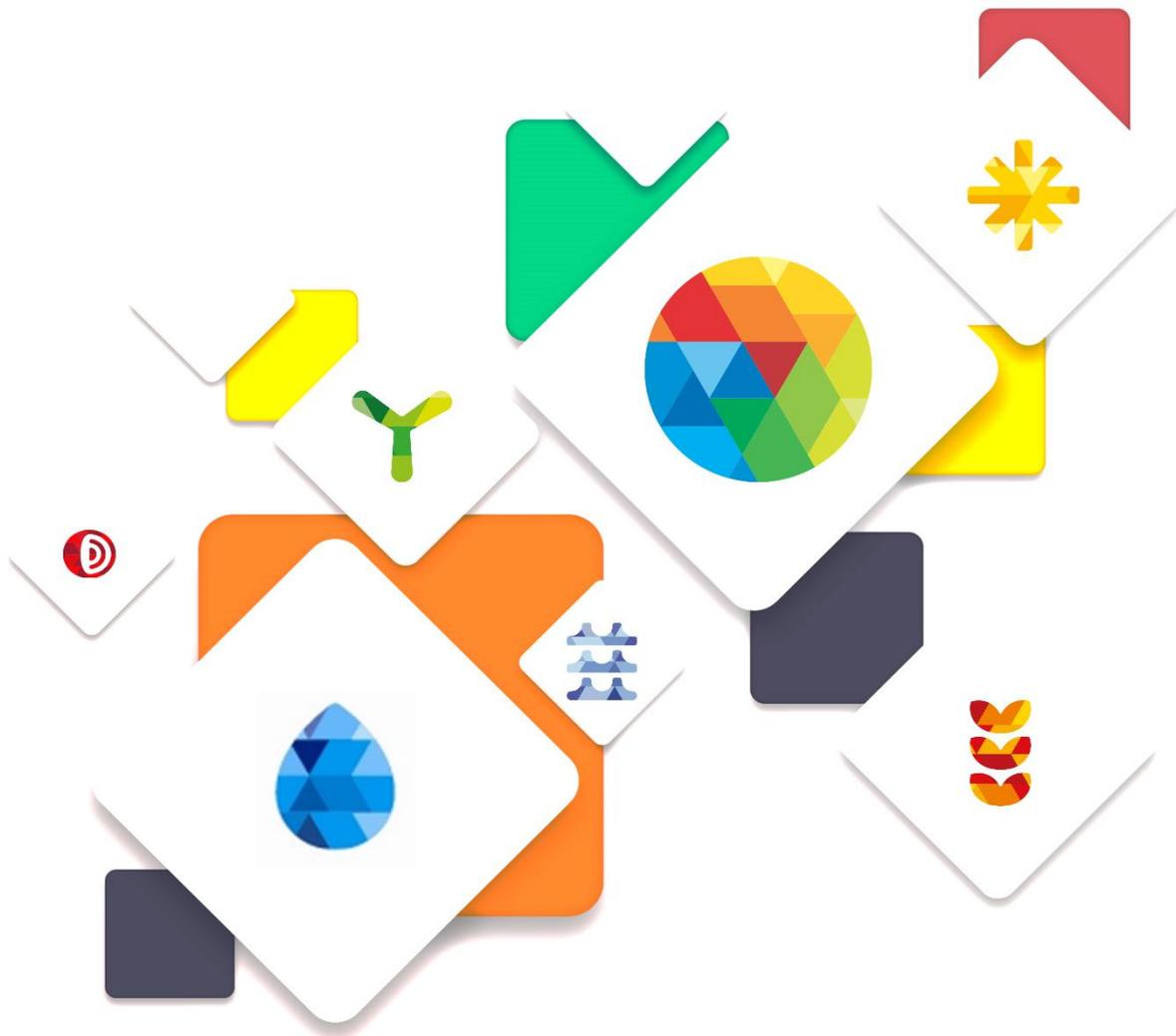




APREN Associação
de Energias
Renováveis



REPORT RENEWABLE ELECTRICITY IN PORTUGAL

Monthly Edition
1st Quarter of 2017



RENEWABLE ELECTRICITY IN THE PORTUGUESE MAINLAND

The first quarter of 2017 was characterized by low precipitation levels and an average wind resource, which contributed to a hydroelectric producibility index of 0.64 and a wind index of 1.0.

Thanks to these meteorological conditions in the first months of the year the renewable energy sources had a smaller representativeness at the electricity consumption of Mainland Portugal, when compared to the same period of the last year. Until the end of March, the electricity generated by renewable energy sources accounted for 57.4 %, 7,774 GWh, of the

electricity consumption of Mainland Portugal, 13,539 GWh, as it is shown in figure 1.

Thus, in the first three months of 2017 the renewable energy sources registered a total of 100.5 hours, more than 4 days, during which renewable power plants generation overcame the Portuguese electricity demand.

In March the renewable electricity production was enough to supply the Mainland demand for 53.75 hours (fig. 1). The longest consecutive period is the timeframe occurred between 12th and 14th of March, due to high wind resource.

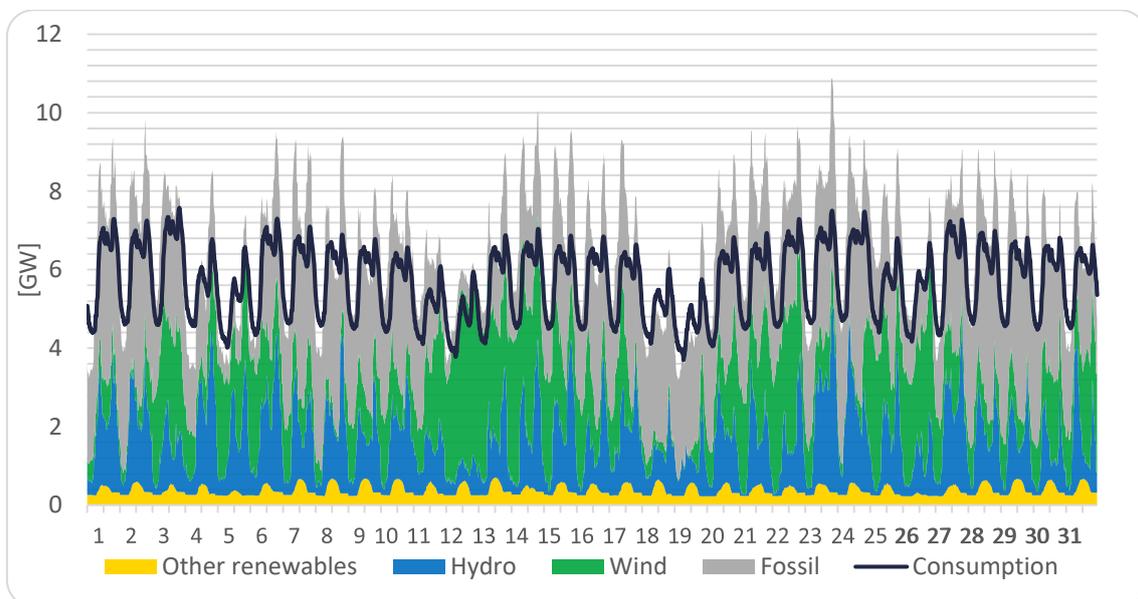
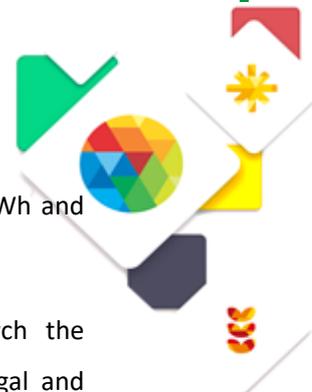


Figure 1: Load Diagram of Portugal Mainland (March of 2017)

Source: REN; APREN's Analysis



In cumulative terms, in the first three months of the year, the leading renewable resource was wind (3,746 GWh), followed by water (3,140 GWh). The remaining renewable electricity was due to biomass (733 GWh) and sun (155 GWh).

By its turn, the fossil power generation provided 6,961 GWh. Inside this group coal power plants provided 3,093 GWh, natural

gas power plants generated 2,731 GWh and fossil cogeneration 1,137 GWh.

In addition, until the end of March the electricity exchanges between Portugal and Spain allowed a net export balance of 1,196 GWh (imports = 714 GWh and exports = 1,910 GWh). The average price of the electricity exported was 47.7 thousand €/GWh.

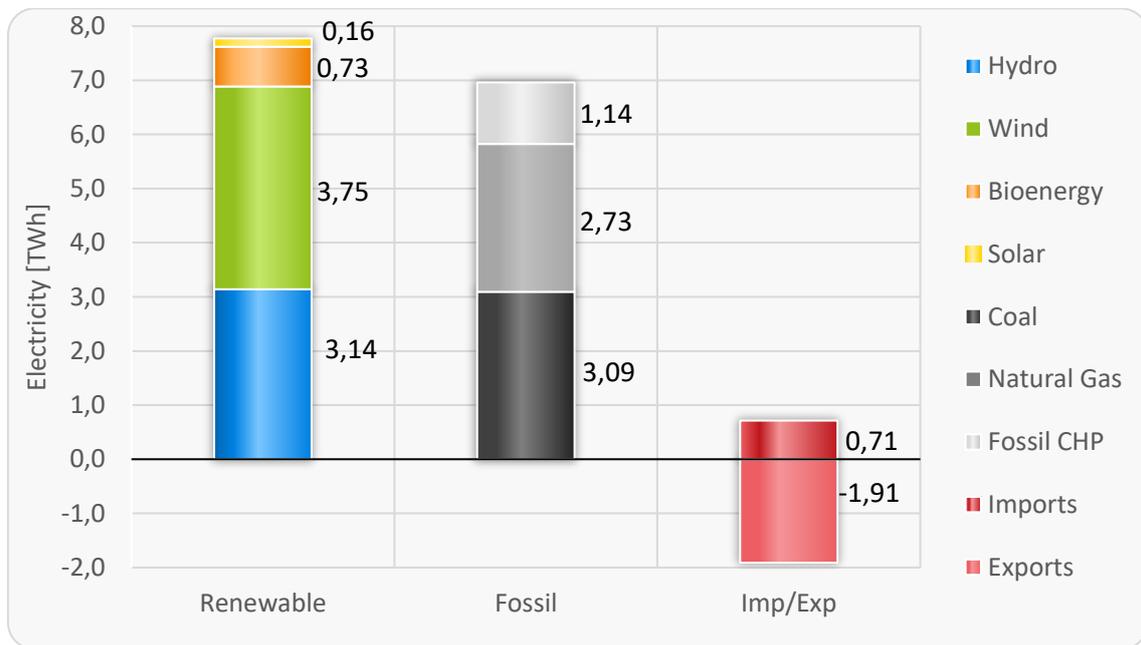


Figure 2: Electricity generation sources and international exchanges in Portugal Mainland (January to March of 2017)

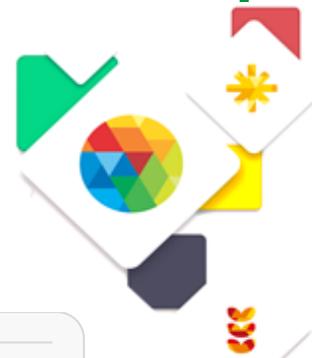
Source: REN; APREN's Analysis

The analysis of the renewable electricity generation from January until March (fig. 3), within the context of the last two years displays that generally the hydroelectricity production reaches its maximum in the first quarter of the year.

This production contrasts with the summer months (July, August and September) when

the electricity generation is almost four times lower.

By its turn, in the years illustrated in the figure the wind generation is much more constant but with a pattern similar to the hydroelectricity generation (more production in the winter and less in the summer). The production variability is similar between hydro and wind since the wind velocity and



water inflows have a high degree of correlation.

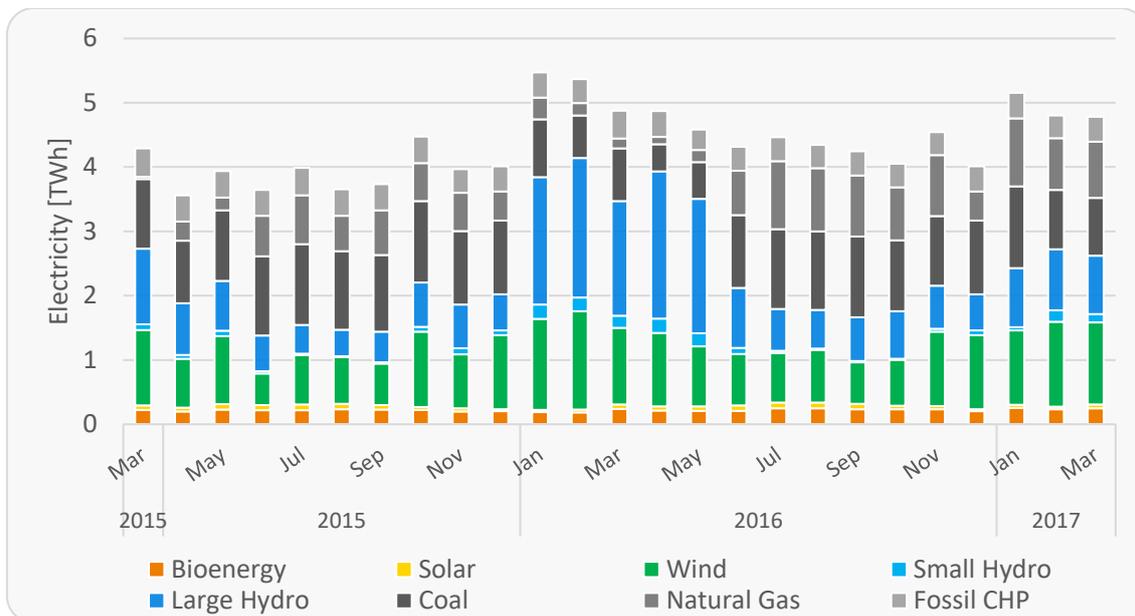


Figure 3: Distribution of the electricity generation by source (March of 2015 until March of 2017)

Source: REN; APREN's Analysis

Conversely, the electricity produced by PV power plants is higher during the summer, which makes it quite adaptable to the Portuguese load diagram. However, PV generation is still relatively small and in the figure it is difficult to identify this correlation.

The negative correlation between the electricity spot market price and the renewable production in the past two years is shown in figure 4.

In the first quarter of 2017 the average electricity spot market price was

55.77 €/MWh, a value far greater than the same period of last year (30.47 €/MWh) when the RES share had an 85 % share of the electricity consumption.

In the same figure, it is also possible to see a slightly increase in the consumption, despite all the energy efficiency gains, that can evidence that the country's economy may be taking steps toward recovery and mark the electrification of the energy consumptions.

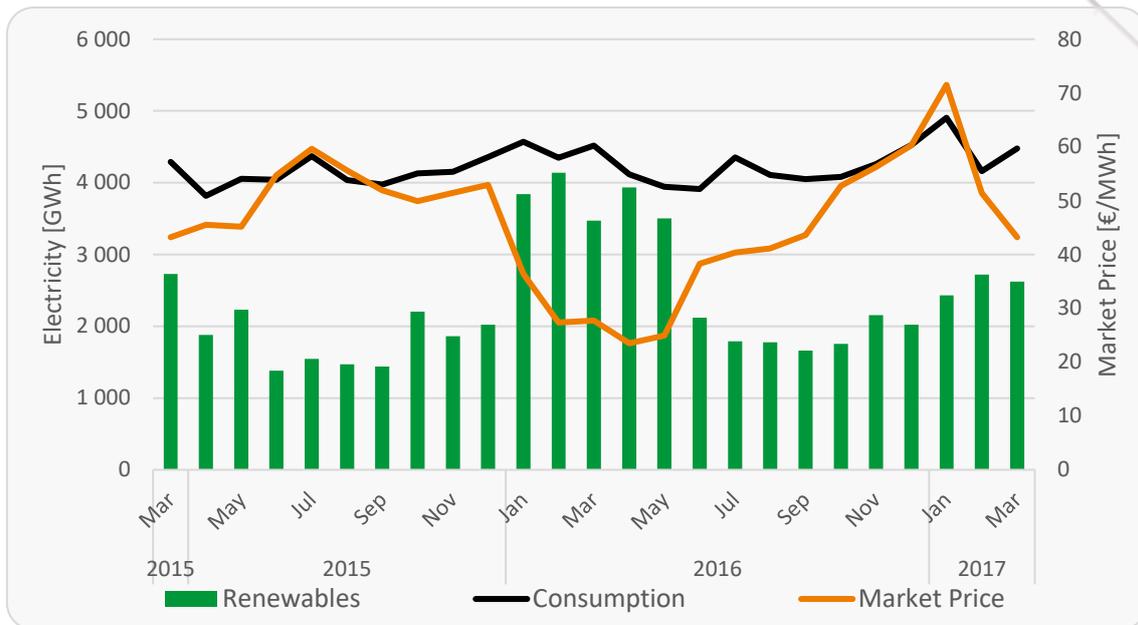


Figure 4: Correlation between the renewable electricity production and the wholesale electricity price (March of 2015 until March of 2017)

Source: REN; APREN's Analysis

It is also highlighted, that even during periods of worse meteorological periods, as it happened during the first months of 2017, the renewable electricity production was enough to supply the Portuguese demand in significant periods of the month. In the analysed two years, the worst renewable share occurred in July of 2015 (34 %) and in September of 2016 (41 %).

These data strengthen once more the importance and potential of renewable sources to supply the Portuguese electricity demand.

It is also important to mention that the renewable technologies are today the more

appropriate ones to foster the self-consumption of electricity. Moreover, in Portugal the self-consumption renewable production totalizes more than 60 MW.

The use of self-consumption equipment is a key driver to developing the renewable technologies and to promote a more proactive role of the electricity consumer in the operation of the energy system. This role is eased by the design of smart household appliances that allow the dynamic adaptation of the electricity consumption.

SUMMARY

The first three months of the year were characterized by low rain and an average wind resource which contributed to achieve a renewable electricity share of 57.4 % in the Portuguese electricity demand.

In addition, it was noticed an increase in the electricity demand, when compared to the value of previous years, and an average spot market price of 55.77 €/MWh, a value higher than the first quarter of 2016 (30.47 €/MWh).

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