



# REPORT

## RENEWABLE ELECTRICITY IN PORTUGAL

Monthly Edition

## RENEWABLE ELECTRICITY IN PORTUGAL MAINLAND

The year of 2017 started with a reduction in the availability of wind and hydro resources, which led to a low hydro producibility monthly index (0.36) and a slightly below average wind index (0.92). Therefore, the renewable energy sources had a lower share in the electricity consumption<sup>1</sup> mix of Portugal Mainland. In the electricity produced by January, renewable energy sources, 2,430 GWh, accounted for 51 % of the electricity consumption of Portugal Mainland, 4,721 GWh.

Despite the non-favourable hydrological conditions, the electricity produced due to renewable sources overcame the Portuguese electricity demand on January 2<sup>nd</sup> between 7:45 am and 8:15 am.

In addition, at 9:00 am on January 2<sup>nd</sup>, the wind electricity generation hit a record high. At this timeframe, the wind power reached 4,532 MW, corresponding to a load factor of 87 % of the Portuguese Mainland wind farms.



#### Figure 1: Load Diagram of Portugal Mainland (January of 2017)

#### Source: REN; APREN's Analysis

The fossil power generation was 2,724 GWh. The division was as follows: coal (1,270 GWh), natural gas (1,058 GWh) and fossil CHP power plants (396 GWh). These values highlight a high capacity utilisation rate of non-

<sup>&</sup>lt;sup>1</sup> This consumption value refers to the power plant's electricity generation for final consumption (grid losses and pumped hydroelectric energy storage consumptions are added up to this value.)

renewable power plants, accounting to more than 55 %.

The renewable electricity production (2,430 GWh) received the contribution of wind farms (1,155 GWh), hydro (970 GWh), biomass (649 GWh) and solar power plants (50 GWh). Despite a dry hydrological period till the end of January, the electricity exports (578 GWh) widely exceeded the imports (329 GWh), which means that Portugal had a positive export net balance of 249 GWh, as shown in figure 2.





Source: REN; APREN's Analysis

The analysis of the renewable electricity generation of January (fig. 3), within the context of the last two years, displays the disruption of hydroelectricity compared to the homologue period of 2016 and denotes a sharp rise of the fossil sources, mainly coal and natural gas.

The figure also emphasises the importance of taking advantage of the complementarity between renewable sources, in the sense of reducing the natural variations of the technologies correlated with the seasonal and annual availability of the resources.

Moreover, the variability of renewable energy generation intensifies both the need of electricity storage and the necessity of reinforcing the interconnection capacity with neighbouring countries. This will allow a better management of the complementarities between renewable energy sources.



### Figure 3: Distribution of the electricity generation by source (2015, 2016 and January of 2017) Source: REN; APREN's Analysis

In this regard, the commissioning of the new reversible hydro power plants, such as Venda Nova III, Salamonde II and Foz Tua, will allow a more efficient management of the Portuguese electricity generating stations and the endogenous resources.

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

This is particularly marked between January and May of 2016, period when the renewable energy sources accounted for 91 % of the electricity consumption of Portugal Mainland and the wholesale electricity market price was around 28  $\in$ /MWh, in contrast with 2016's average price of 39.4  $\in$ /MWh.

In January of 2017, due to the lower renewable electricity share, the electricity spot price in the Iberian Market was  $71.52 \notin MWh$ , a value much higher than the same period of last years.





#### Source: REN; APREN's Analysis

The lower wind resource availability in Central Europe combined with the operation and maintenance procedures in the French nuclear power plants (20 nuclear reactors were stopped between October and December of 2016) also contributed to the increase of electricity prices.

In some periods of past month, the French electricity sector was in a state of emergency and it needed to adopt load-shedding strategies (to balance electricity consumption and production) to raise the energy imports from neighbouring markets, mainly MIBEL. The electricity imports from France led to a higher capacity utilisation rate of the Iberian fossil power plants, and consequently to an increase in the electricity price.

This, together with the growth of the electricity consumption due to the wave of cold weather that affected Europe, resulted in atypical prices in the EPEX SPOT (French Electricity Market) of  $200 \notin$ /MWh and in the MIBEL of  $102 \notin$ /MWh ( $25^{th}$  of January).

According recent information from the French Nuclear Safety Authority more operation and maintenance procedures will occur during 2017 in nuclear reactors.

### SUMMARY

January of 2017 had a lower hydro resource availability, therefore the renewable energy technologies accounted for a below average representation in the electricity consumption (51 % of the consumption). The lower renewable electricity share led to a higher electricity price in the wholesale market.

In addition, the Portuguese electricity system had an export net balance of 249 GWh, which translates into almost 24 M€. The electricity export prices increased due to the emergency of the French Electricity sector and to the adverse weather conditions in Central Europe.

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