



APREN Associação  
de Energias  
Renováveis

30  
ANOS APREN  
1988-2018



# MERCADO E RENOVÁVEIS

PORTUGAL RENEWABLE  
SUMMIT 2018

Energias  
em Movimento



# Berto Martins

Director Adjunto de Mercados de Energia

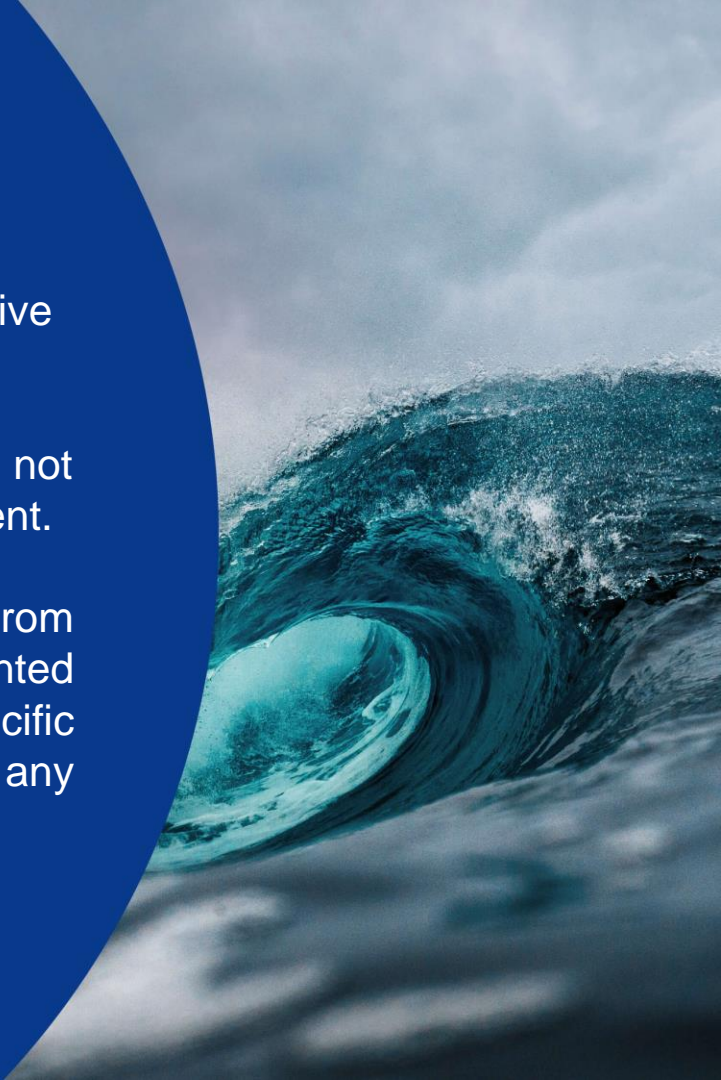
**Renewable Energy and  
Ancillary Services  
Markets**

## > TERMS OF USE

The information's contained in this communication is confidential, may be privileged and is intended for the exclusive use of EDP in the Portugal Renewable Summit 2018.

The accompanying materials were prepared by EDP and are not to be distributed or reused in any manner without prior consent.

Some information supplied by EDP may be obtained from sources that are considered reliable, but are no way warranted by EDP as to accuracy or completeness. Absent a specific agreement to the contrary, EDP has no obligation to update any content or information provided in this document.



- *EDP at a glance*
- *Energy Markets and Renewable Energy*
- *Ancillary Services*
- *Energy Systems for the Future*



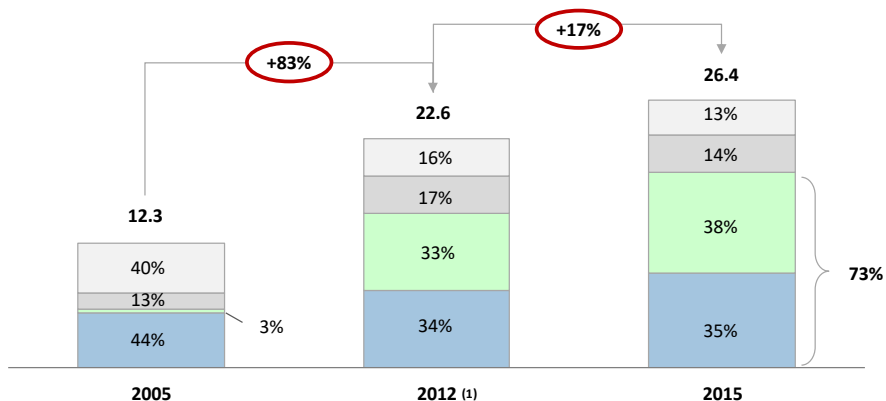




## > EDP's STRATEGIC GROWTH + 83% in the last years driven by greenfield investments

(GW; %)

■ Hydro ■ Wind ■ CCGT ■ Other

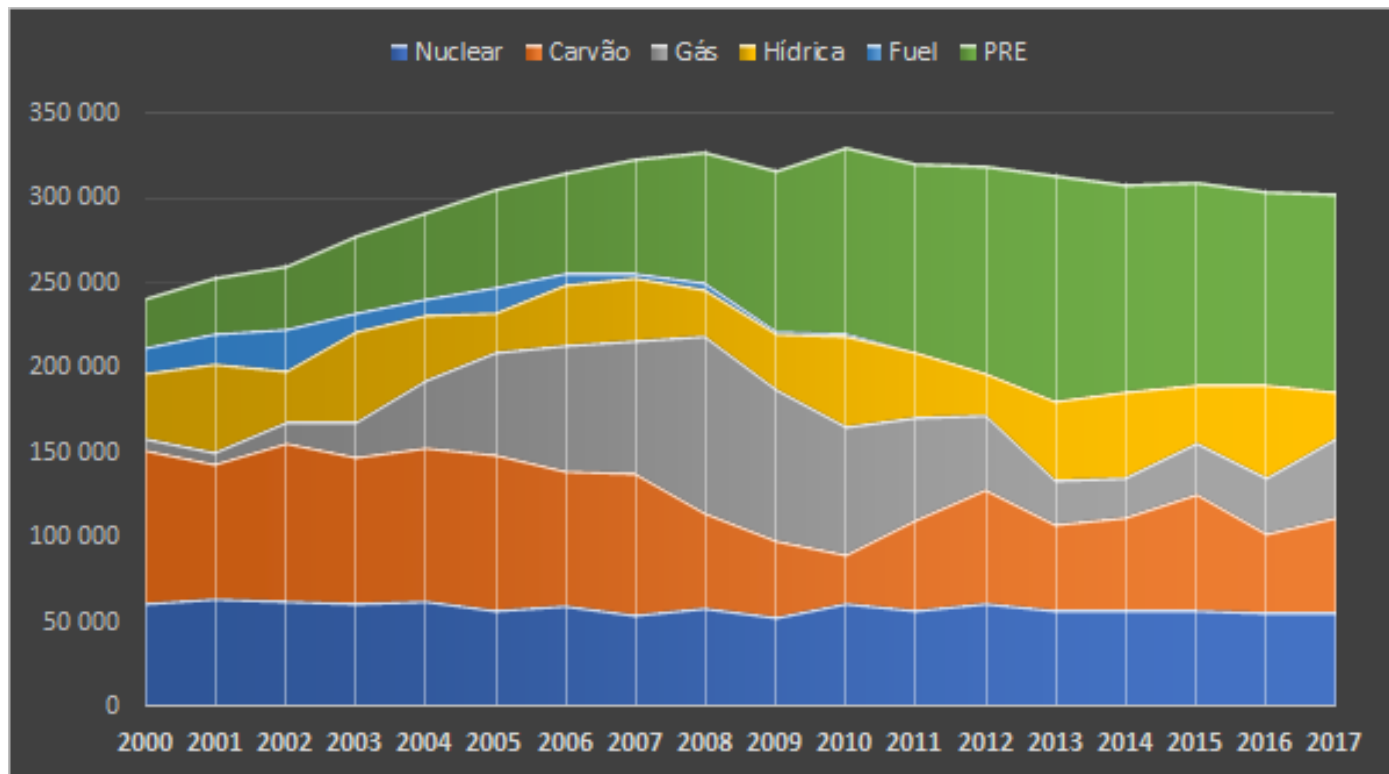


**Installed capacity growth driven mostly by greenfield wind power capacity additions**

**Investment in free CO<sub>2</sub> technologies: wind and hydro increases from 67% to 73%**

(1) Including Pecém 2<sup>nd</sup> group (180MW synchronized to the electric system in Feb-13); and excluding Setúbal (946MW of fuel oil capacity, decommissioned and which PPA ended Dec-12)

## > ENERGY BALANCE IN IBERIA



## > THE PORTUGUESE SYSTEM FOR RENEWABLE ENERGY - I

- In Portugal almost 100% of non-Hydro Renewable Energy has FITs, and also Dispatch priority.
- Curtailment is very low, due to this priority and because the Portuguese System has a diversified energy mix, with high storage capability on PS.
- EDP's Last Resource Retailer buys all Renewable Energy to the producers and sells it into the wholesale market.
- While there are FIT, the producers don't have any incentives to balance their schedules.
- Imbalances causes higher needs for Ancillary Services, with the immediate impact on costs.





# > THE PORTUGUESE SYSTEM FOR RENEWABLE ENERGY - II

Data para análise

11-03-2018

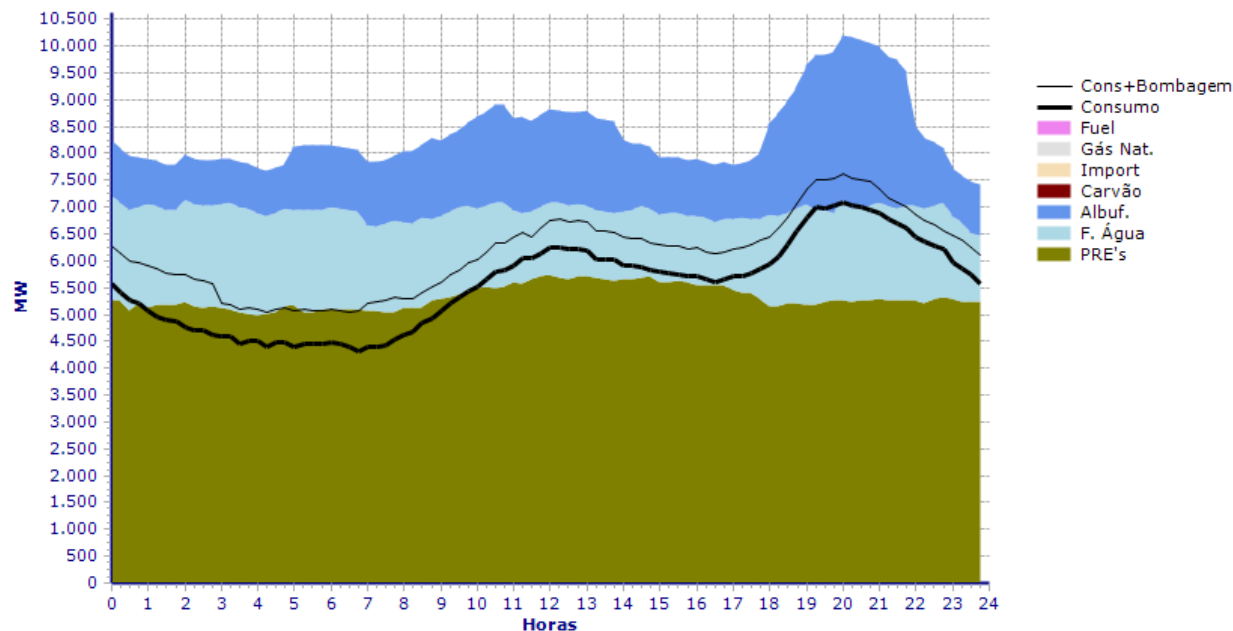


Executar »



Download

Diagrama de Consumo Total



# > THE PORTUGUESE SYSTEM FOR RENEWABLE ENERGY - III

## Portugal runs for four days straight on renewable energy alone

Zero emission milestone reached as country is powered by just wind, solar and hydro-generated electricity for 107 hours

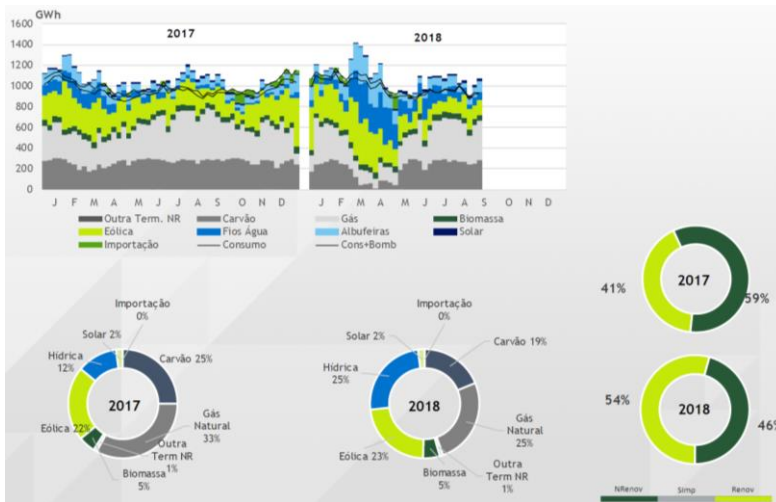


▲ As recently as 2013, renewables provided only about 23% of Portugal's electricity. By 2015 that figure had risen to 48%. Photograph: Pete Titmuss/Alamy Stock Photo

Portugal kept its lights on with renewable energy alone for four consecutive days last week in a clean energy milestone revealed by data analysis of national energy network figures.

Electricity consumption in the country was fully covered by solar, wind and hydro power in an extraordinary 107-hour run that lasted from 6.45am on Saturday 7 May until 5.45pm the following Wednesday, says the analysis by the Sustainable Terrestrial System Association and the Portuguese Association of Renewable Energies (Apren).

Source : The Guardian (May 2016)



Home » News » Portugal runs on renewable energy alone for almost three days

## Portugal runs on renewable energy alone for almost three days

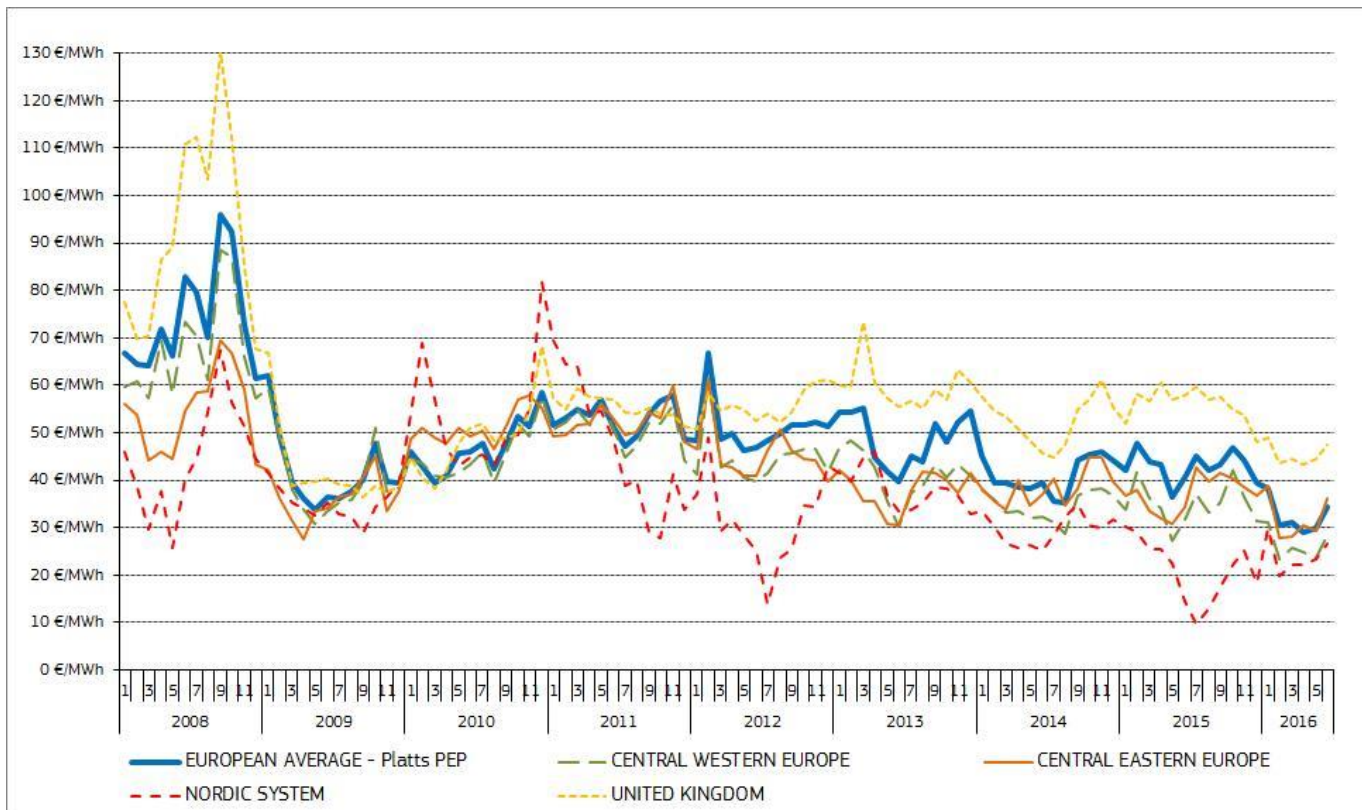
IN NEWS · 15-03-2018 14:01:00 · 0 COMMENTS

**Portugal ran on renewable energy alone for 69 consecutive hours.**

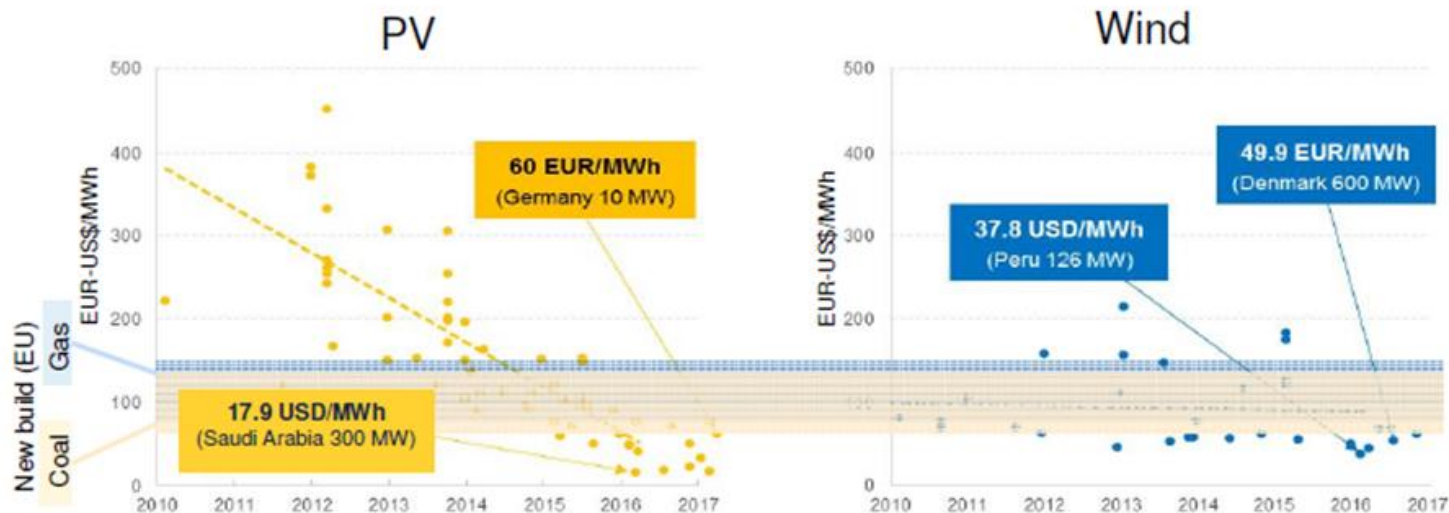
According to grid operator REN, most of the energy was generated from wind turbines, setting a renewable energy record between last Friday and this Monday. Green energy currently supplies just over half of Portugal's annual electricity needs, saving the country around 750 million euros in fossil fuel imports.

Source [www.theportugalnews.com](http://www.theportugalnews.com) (March 2018)

## > TRENDS IN EU WHOLESALE ELECTRICITY PRICES



## > RENEWABLE GENERATION COSTS (AUCTIONS FOR SOLAR & WIND)





## > ANCILLARY SERVICES

- Ancillary Services are needed to support the Power System or Grid operation to ensure reliable delivery of power at a stable Frequency and Voltage, along with the security of the Transmission Grid.
- There are different type of Ancillary Services :
  - Frequency Control – Balancing load and generation in real time;
  - Network Control – Power Flow control at some interconnectors, Voltage control within de desired range and System Restart, helping the system to restart at a blackout situation.
- Depending on the market, some of these Ancillary Services are remunerated, other are mandatory and for free.

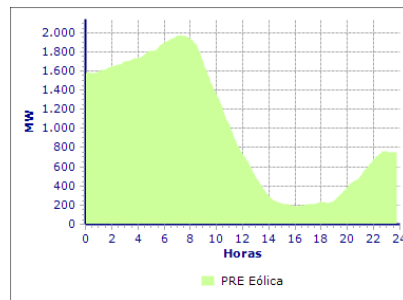




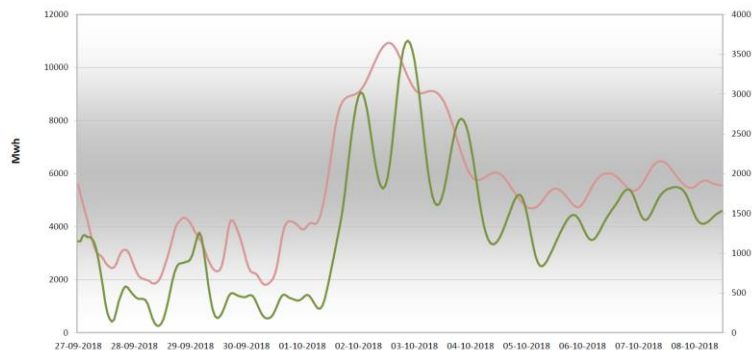
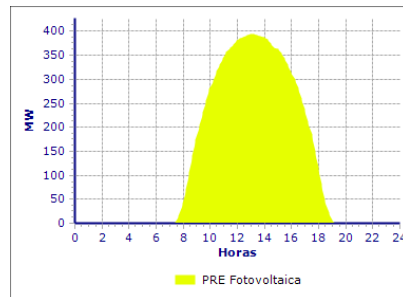
## > ANCILLARY SERVICES (MIBEL MARKET DESIGN)



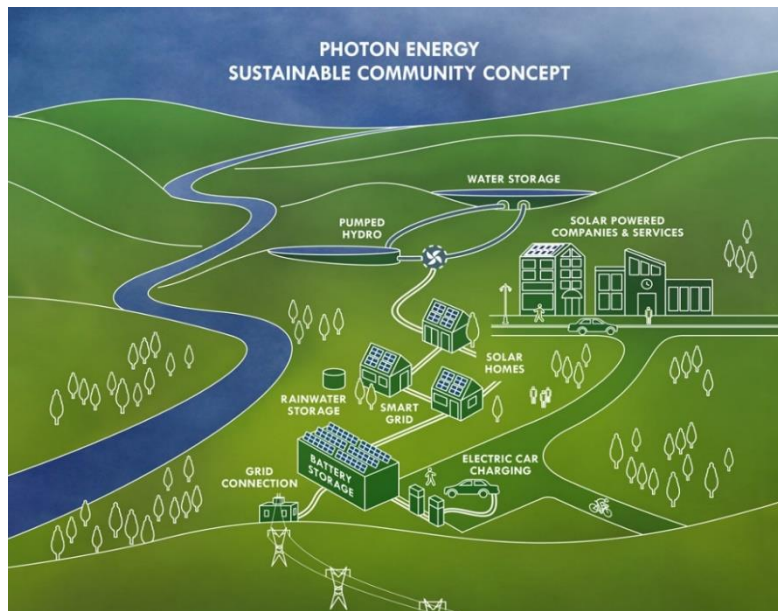
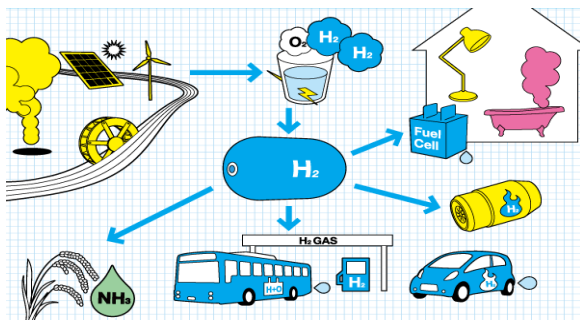
**WIND**



**SOLAR**



## > ENERGY SYSTEMS FOR THE FUTURE (NEW ANCILLARY SERVICES AND MARKET DESIGN)



## > SUMMARY

- The future Energy Systems will be driven by more “smartness” at the grid level, considering the optimization of the existing assets and also new ancillary/balancing services.
- New Market designs have to be adapted for this new environment, to foster new investments in Renewable Generation.
- The 100% Renewable Energy System, with zero CO<sub>2</sub> emissions, will only be possible considering the net balancing of the CCS for synthetic fuels to allow backup Powerplants to operate and consider also other coupled sectors.
- These targets will only be possible to meet with the adequate Policy's and more Regulatory Stability.





Thank you!



[berto.martins@edp.pt](mailto:berto.martins@edp.pt)



+351 938 897 077

Av. 24 de Julho, N° 12  
Torre Nascente – Piso 1  
1249-300 Lisboa