



ETN Webinar Series
FLEXIBLE POWER GENERATION
March 2nd, 2021, 12am-1pm CET

User's Perspective

Juan Carlos Garcia, Naturgy

"TURBO-REFLEX. TURBOmachinery RETrofit enabling FLEXible back-up capacity for the transition of the European energy system"

User's Perspective

Future Energy System - Spain

Spain aims to add **60 GW of RES** capacity up to **2030** in its National Energy and Climate Plan (NECP).



Solar PV

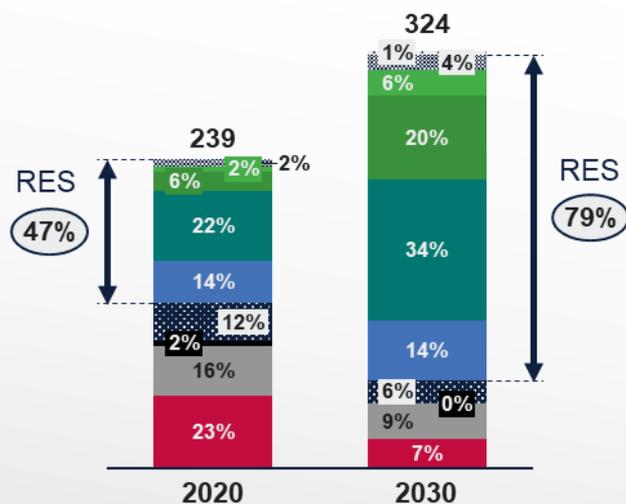


Wind



Storage (Pumped hydro, Solar Thermal & Batteries)

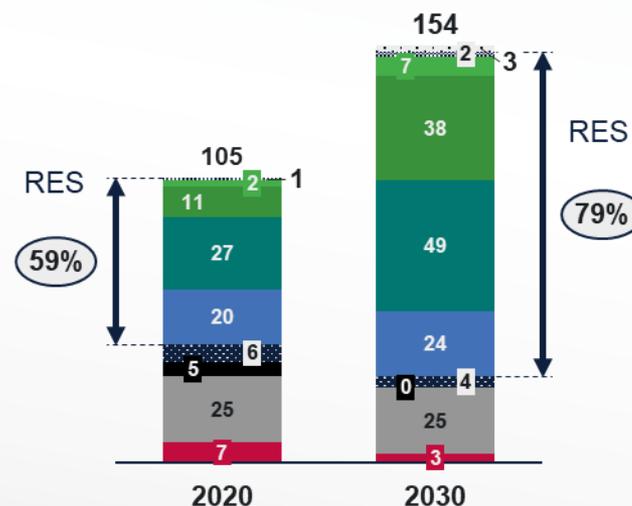
Generation (TWh/yr)



Source: Spain's NECP



Installed Capacity (GW)

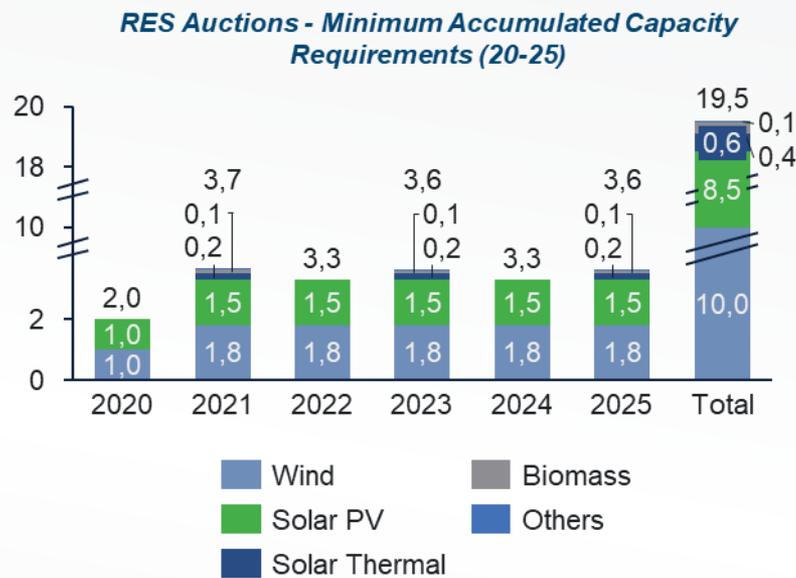


User's Perspective

Future Energy System - Spain

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- RES Auction Calendar with Minimum Capacity Requirements already in place up to 2025 to match NECP intermediate objectives.
- In addition to RES auctions, there are multiple RES projects being developed via corporate PPA's and merchant projects.
- On track to meet NECP Objectives.**



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- In addition to RES auctions, there are multiple RES projects being developed via corporate PPA's and merchant projects.
- **On track to meet NECP Objectives.**

➤ **Combined Cycle's** capacity factors, already low, will decrease further. **Without capacity payments** in place, an already **challenging financial situation** will worsen.

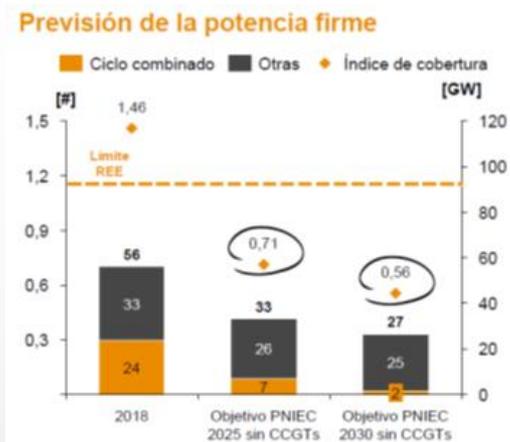
➤ The **CC Fleet**, or a good portion of it, will be needed to guarantee **system adequacy**.

Combined Cycle Capacity Factor (%)



Source: REE, Spain's NEPC

Reserve Margin Estimates with reduced CC Capacity

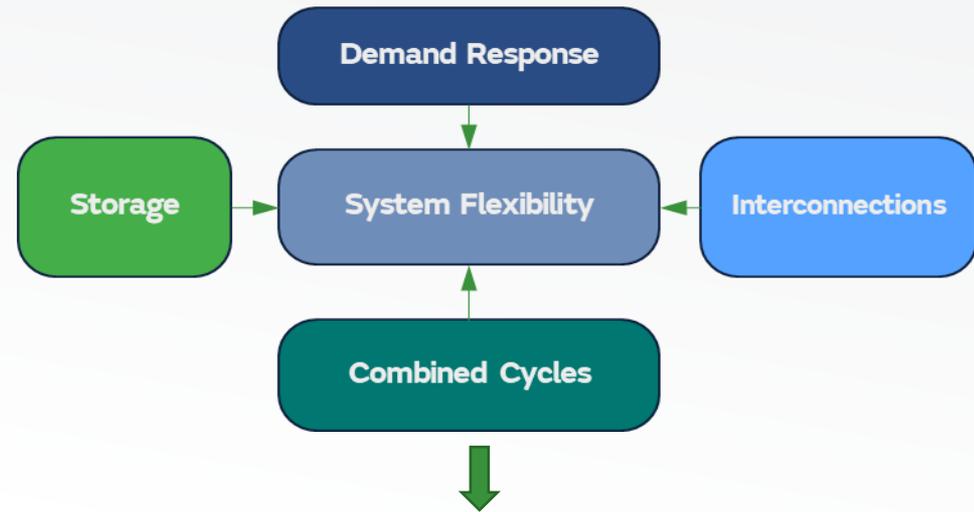


Source: Analysis by PwC

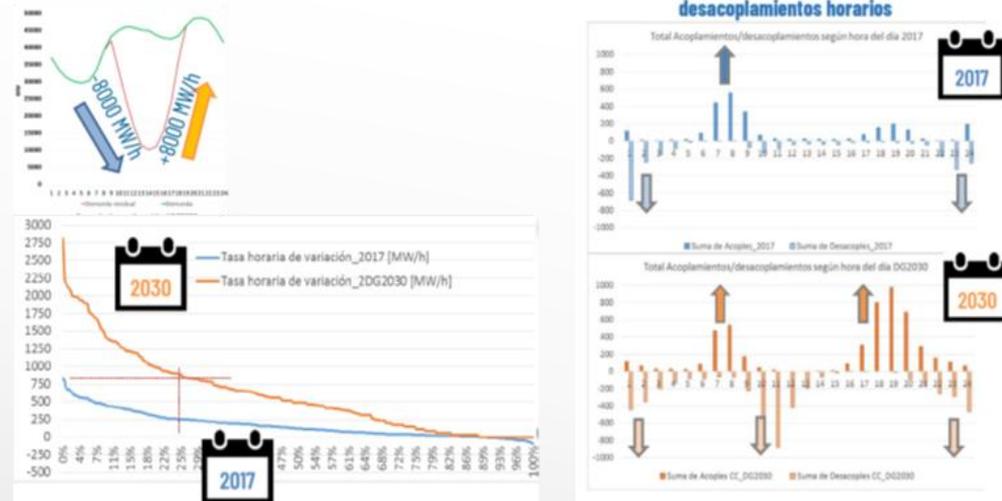
User's Perspective RES Integration and Flexibility

- The required system flexibility for high RES integration will have to be provided from different resources

 - Combined Cycle Fleet – Desired new “features”
 - Lower minimum loads, shorter start-up times, increased ramps, improved part load efficiency, life management tools
- ➔ **Turboreflex**
- Storage (BESS, thermal, compressed air...)
 - Hybrid projects with RES



Análisis REE Funcionamiento Ciclos 2030



Source: REE

- Additional flexibility required for high levels of RES integration (on the Generation “front”) will have to be provided by **current Combined Cycle fleet**.
- **In the case of Spain, without capacity mechanisms**, the current combined cycle capacity will be reduced in the future, posing a **risk both to system adequacy and RES integration**.
- Utilities are concentrating their capital investment in RES growth, **limiting investment in conventional assets**.
- **Value of flexibility** products is **not yet clear** in current market conditions, though some **initial signs of value** are appearing (for instance, upward reserve requirements are beginning to grow)
- **New market rules/products** are needed to **value “flexibility”** (on a technology/resource neutral basis) in order to have viable business cases for flexibility products.



An OEM Consortium of
25 partners in 9 countries



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