EEM23 19th International Conference on the EUROPEAN ENERGY MARKET
6.–8. June 2023 | Lappeenranta, Finland

TradeRES
New Markets Design & Models for 100% Renewable Power Systems

RES Support Schemes in the Iberian Power Systems

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8th June 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864276

The Iberian (Portugal and Spain) Power Systems

Motivation:

- Verify the economic viability of new power plant investments in energy-only markets:
  - without considering renewable support schemes or additional incentives
  - using the power plants capacity, energy consumption, electricity market designs, and prices recorded in 2019 → the year considered as the "starting point" in TradeRES project.

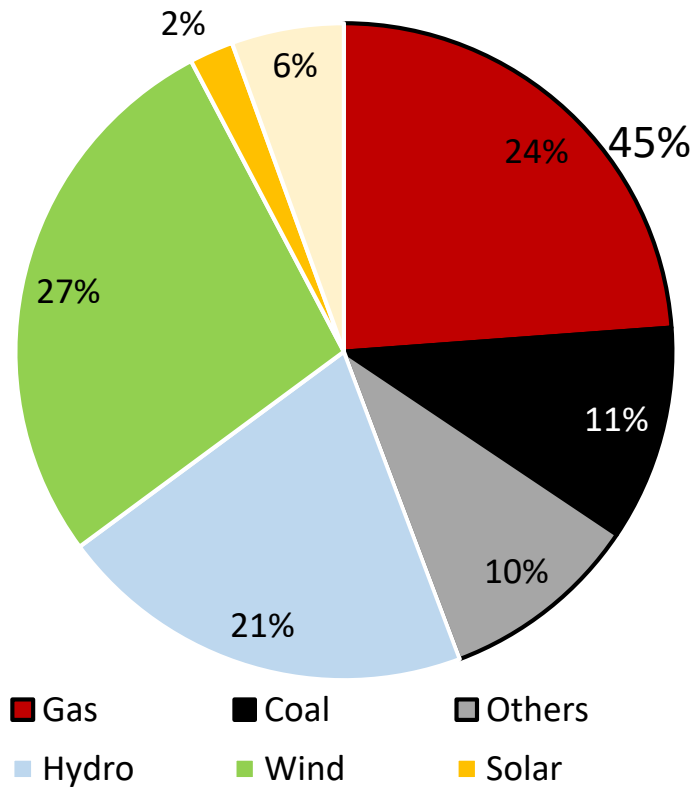
Can energy-only marginal markets remunerate power plants?

The Iberian Power Systems in 2019

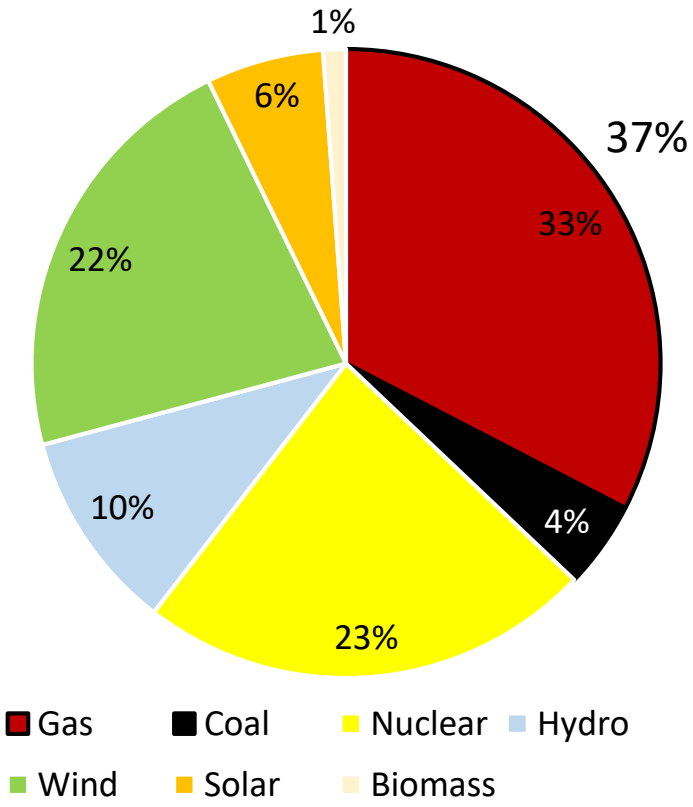
2019 Capacity (MW)	Portugal	Spain
Coal	1 800	9535
Fuel oil	400	0
Natural gas	3 800	24 945
Nuclear	0	7 400
Hydro	7 000	14 796
Wind	5 400	23 507
Solar	2 000	7 018
Biomass	400	0
Other	430	1 038
Total Generation	21 230	88 239
Pumps	2 700	3 418
Interconnection	3 200	2 200

The Iberian Power Systems

Portuguese Generation



Spanish Generation



Iberian Simulation

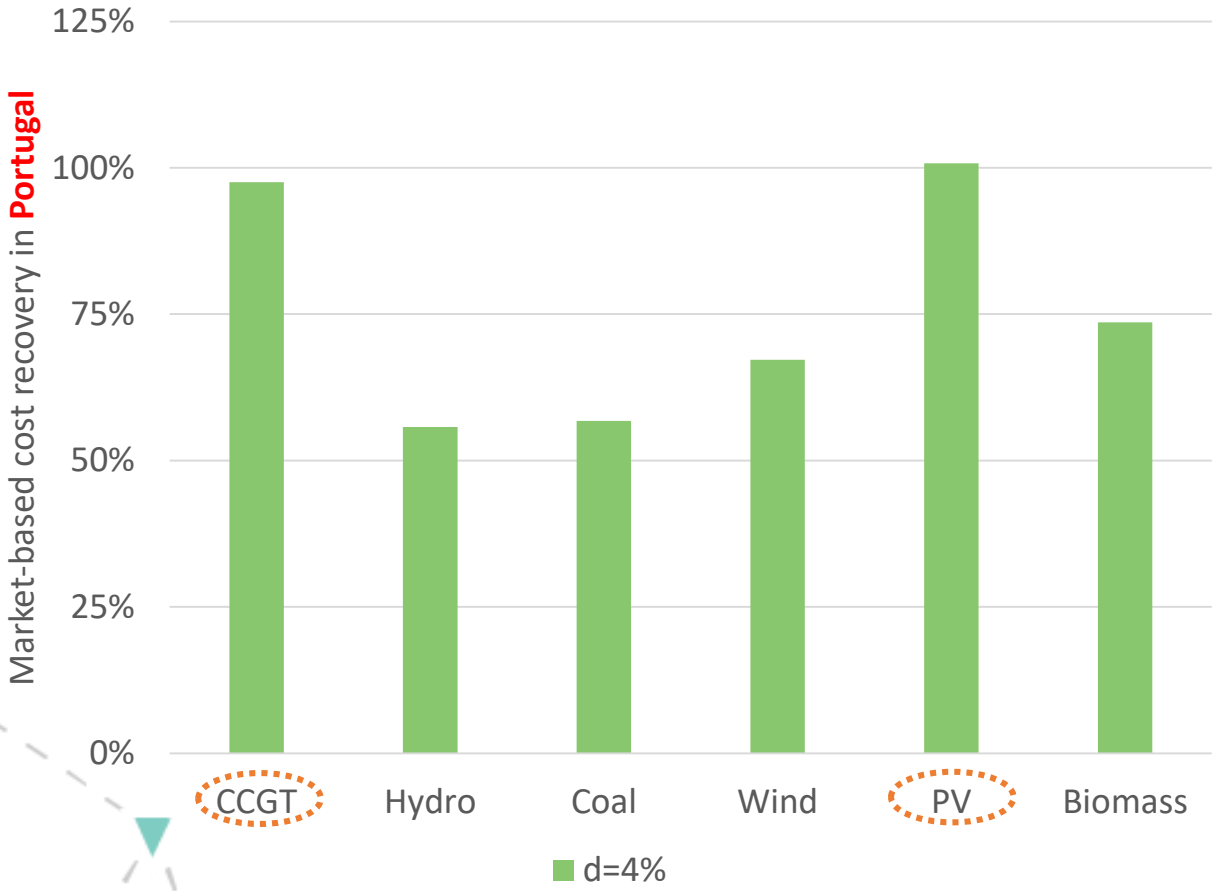
- Agent-based MATREM and RESTrade simulators:
  - Day-ahead, balancing and imbalance settlement markets were simulated using bids of agent-based market players

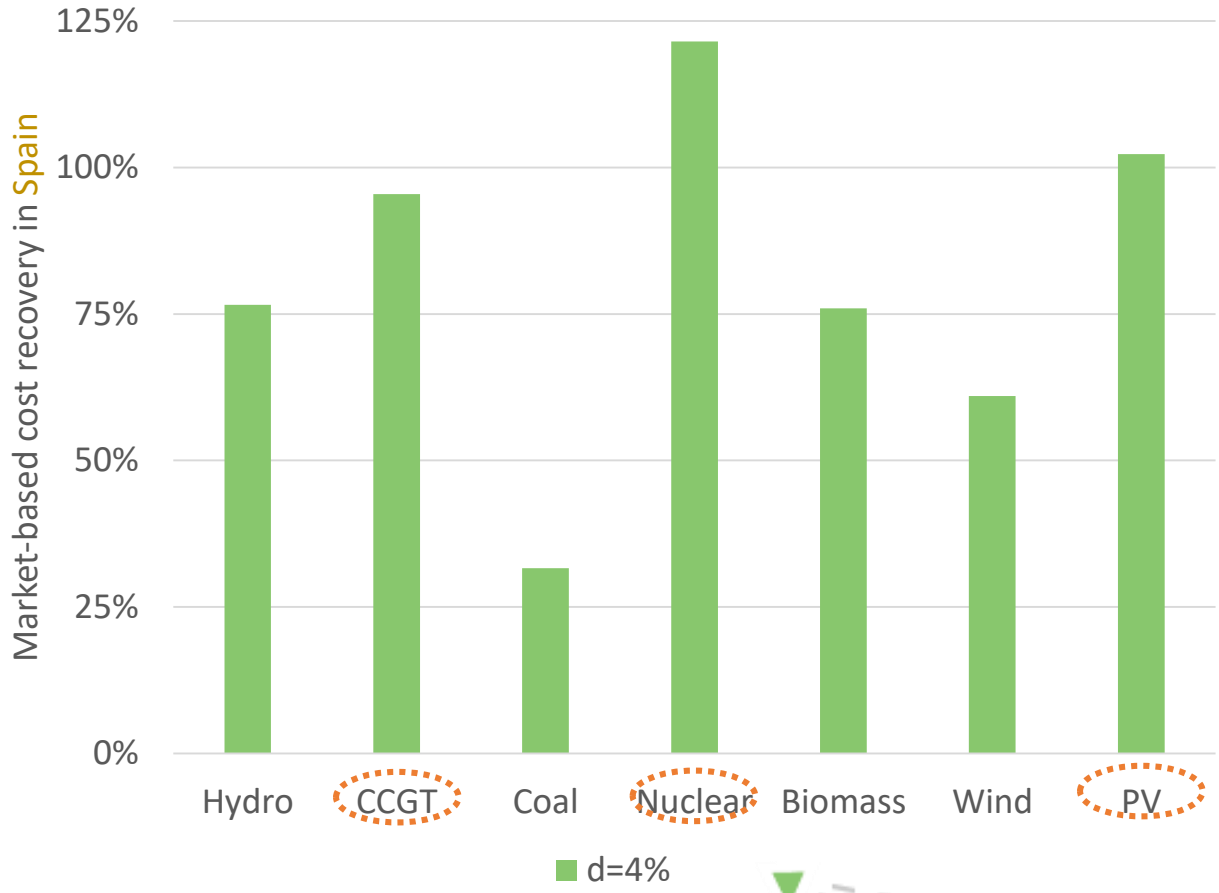
- Input conditions:
  - 2019 power plants capacity, consumption, market designs and commodity prices

- **Support/market remunerations schemes studies:**
  1. Variable premium
  2. One-way CfDs
  3. Two-way CfDs
  4. Capped premium
  5. Fixed premium

2019 Market-based cost recovery

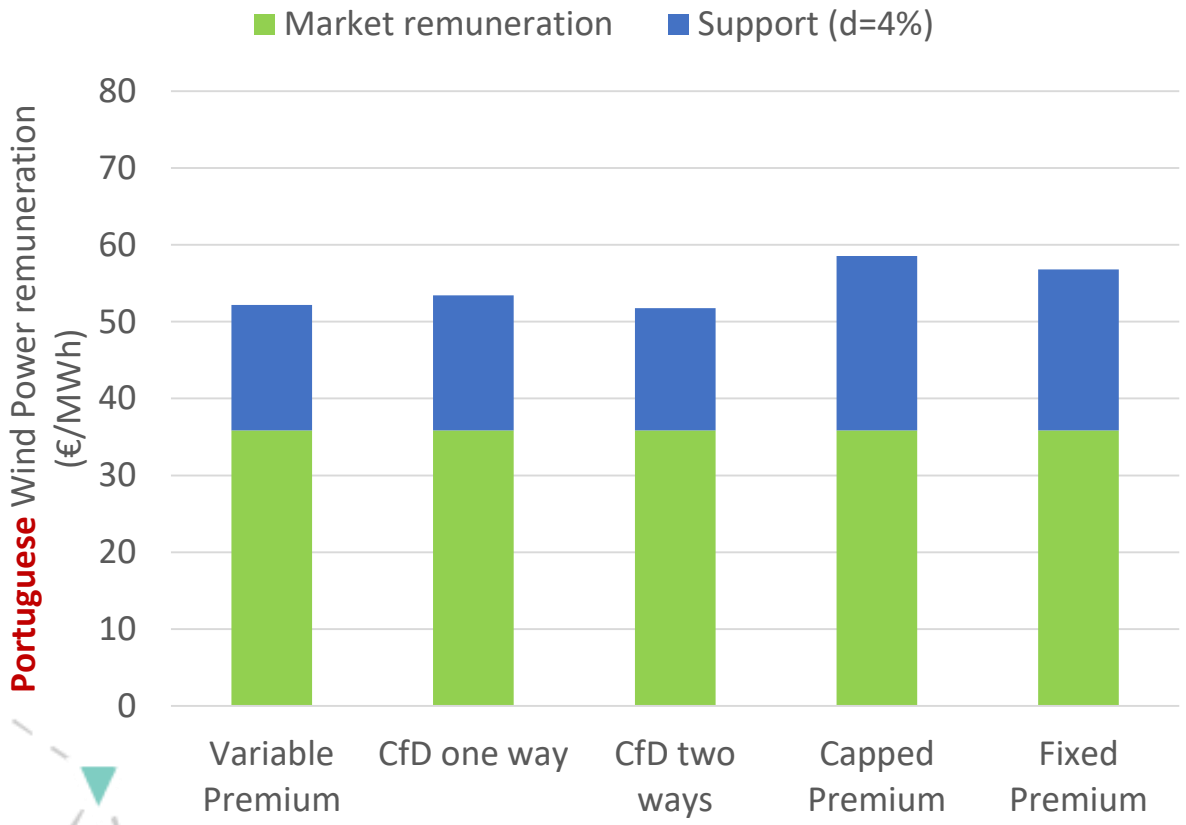
- *Considering a discount rate (d) of 4%:*

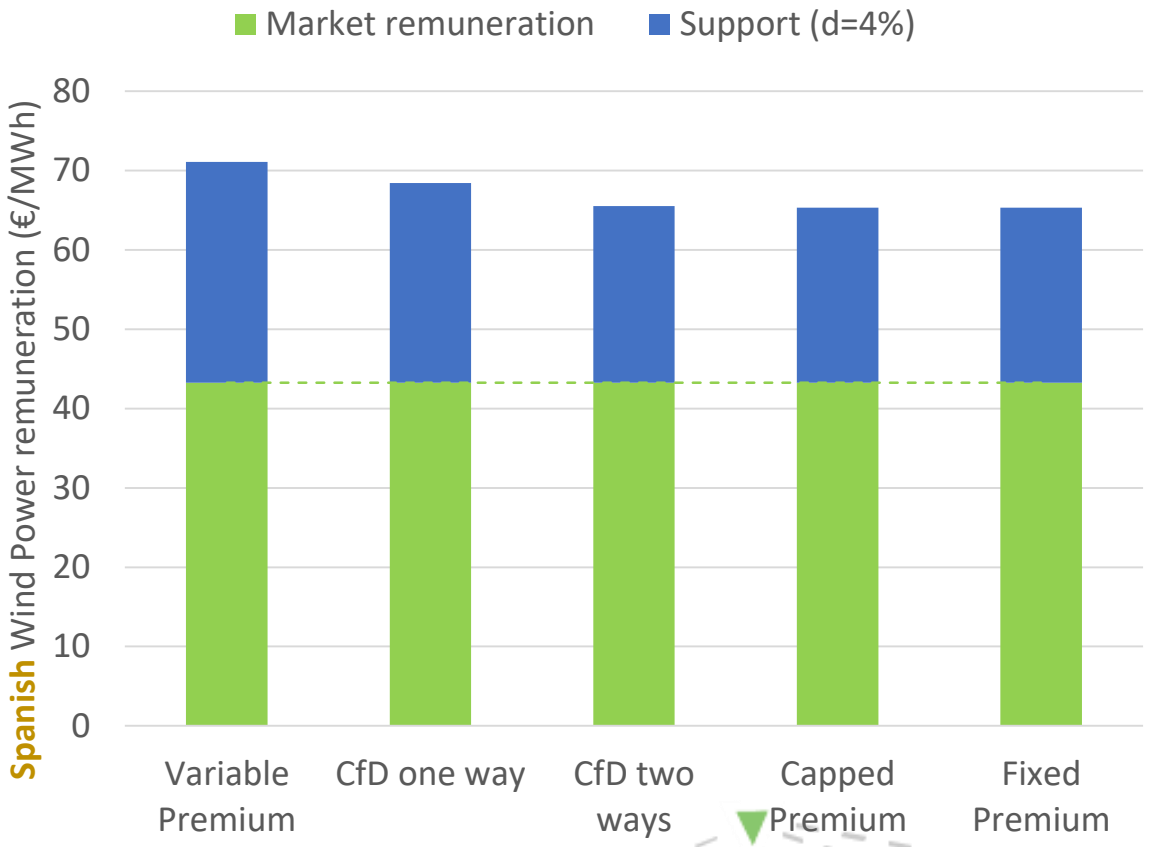




2019 support schemes

- *The specific case of the wind power producers:*





Conclusions

- Portugal and Spain had 55% and 63% shares of non-fossil generation in 2019, respectively.

- *Can energy-only marginal markets remunerate power plants*?
  - High shares of renewable power plants with near zero marginal costs decrease the market prices of marginal markets
  - Furthermore, the transition to a nearly 100% renewable share will reduce the working hours of fossil fuel power plants
  - Support schemes and other incentives are needed to guarantee investments

- New market designs shall guarantee the financing viability of new assets with practically only CapEx costs.

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Thank you for your attention. Questions?

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