Stochastic Unit Commitment Considering Uncertain Wind Production in an Isolated System

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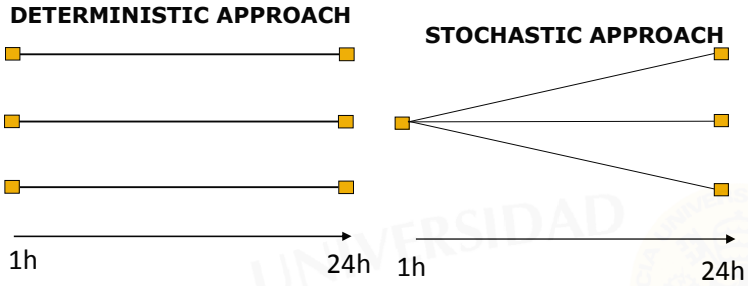
Motivation

Source: REE

Need to deal with intermittency of required wind generation

Reduces CO2 emissions and energy dependency

Dealing with uncertainty in wind output



1st stage decision: Unit Commitment

2nd stage decision: Production, Non-served Energy

Measuring the impact of uncertainty

Expected Value of Perfect Information: EVPP

Value of the Stochastic Solution: VSS

$$EVPP = WS - RP$$

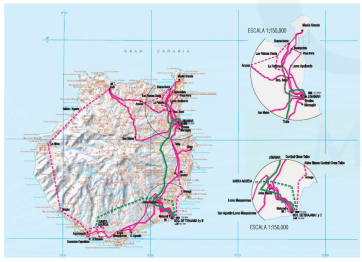
$$VSS = RP - EEV$$

where:

$$RP = \min_x z(x,\xi) \qquad WS = E_\xi[\min_{x,\xi} z(x,\xi)]$$

$$EEV = E_\xi[z(\bar{x},\xi)]$$

Case study: Gran Canaria

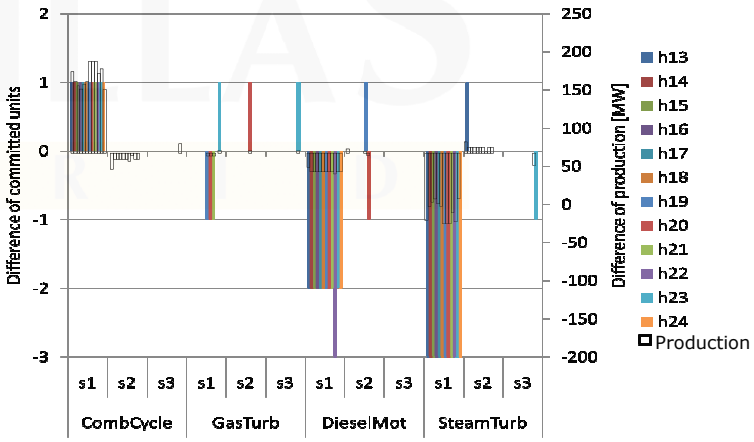


Must cover demand on its own

Generation units:

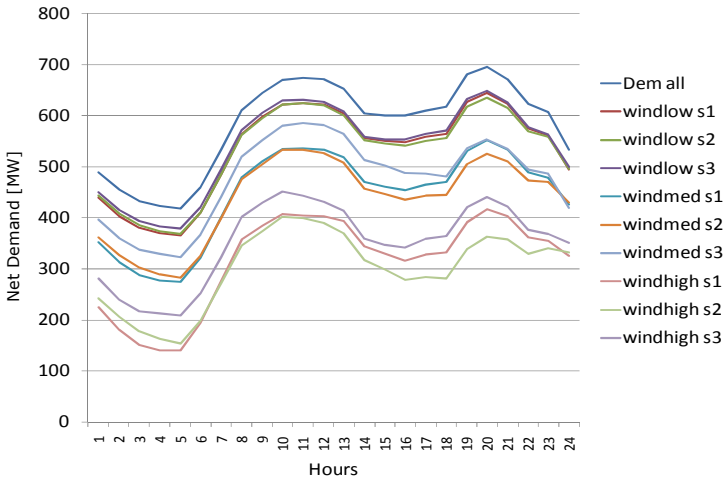
Only CCGT, GT, Fueloil, Gasoil: ~930 MW

Assessing the value of perfect information



EVPP=13 200€ **VSS=5 420€**

3 wind prediction errors and wind generation capacities



Assessing sensitivities to installed wind capacity