

## **EUR24\_XX - Electrical Control Strategies for Integration of High Variable Wind Farm**

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### **Abstract:**

In this contribution, it is proposed a distribution control system solution for the achievement of the electrical stability and optimized energy management for an isolated microgrid powered by gas turbine generators, Battery Energy Storage (BESS) System based on Lithium-ion batteries and renewable power from a wind farm, in a location that presents high-speed resources and large wind speed variability. The system operation is attached to specific load demand conditions from process (scheduled everyday), wind power resource forecasting (daily and intraday), BESS lifetime degradation and operative constraints of the distribution system. The proposed methodology was validated with simulation models, which were fed with field data, achieving to verify a significative reduction of the power generation-related CO<sub>2</sub> emissions, due to gas combustion, as well as the verification of the advantages of flexible management of the energy storage assets. The proposed methodology is indeed applicable to similar decarbonization projects around the world.