PSERC Research Project M31

Title: Markets for Ancillary Services with Stochastic Resources

Duration: June 2014 – June 2016

Sponsor: Power Systems Engineering Research Center (PSERC), Research Project M31

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Description:

The integration of non-dispatchable resources –such as wind and solar generation– to modern energy systems has brought about new challenges in system operations in order to maintain adequate reliability standards by providing ancillary services. This project focuses on designing new tools for ancillary services markets, dynamic reserve policies and reliability criteria to take into consideration the impacts of stochastic resources. The objective is to improve reliability and operational efficiency by developing improved reserve policies and new market and pricing mechanisms for ancillary services.

EESG is developing new methods to participate in reserves markets through complex bid functions that internalize generating unit characteristics and constraints. The bids can be cleared using security constrained economic dispatch (SCED), greatly simplifying the computational effort relative to centralized ramp-rate limited unit scheduling. Additionally, clearing prices will directly reflect system constraints to market participants. This approach will be generalized using SCED based on AC Optimal Power Flow (AC OPF), to show how optimizing voltage profiles would increase feasibility of less expensive reserves compared to traditional solutions relying on DC OPF formulations. In addition, appropriate pricing mechanisms will be proposed for voltage services.