

Title: Multi-Timescale Control of Energy Storage Enabling the Integration of Variable Generation

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Sponsor: ICES, NETL, RenewElec

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Description: This project proposes a two-level control approach consisting of advanced frequency control and stochastic optimal dispatch to deal with the real power balancing control problem introduced by variable generation resources in the electric power systems. The advanced frequency control which is based on the robust control theory and the decentralized static output feedback design is responsible for the system frequency stabilization and restoration, whereas the stochastic optimal dispatch which is based on stochastic model predictive control determines the optimal dispatch of generation resources and energy storage under uncertainties introduced by variable generators as well as demand. Simulation results on both a modified 9-bus test system and a modified 39-bus test system verify the feasibility and effectiveness of the proposed approach.