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Development of a Novel EMS Controller for Managing Distributed Batteries

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A number of renewable energy resources (RESs) are introduced in power system as part of the solution to the world-wide energy problems. However, the large penetration of RESs are causing various problems such as frequency stability. Hence, it is necessary to install storage batteries for maintaining the supply and demand balance in real-time. In this paper, we develop a novel EMS controller for managing storage batteries, which can efficiently deal with uncertainty such as unpredictable DERs outputs. The functions of the proposed controller consist of RESs forecast using neural networks, day-ahead unit commitment based on loads and RESs forecast, dynamic economic load dispatch (DED) in the feasible operation regions, and frequency simulator. Advantage of the proposed method is to specify confidence intervals (CIs) of uncertain parameters to guarantee the power system security. Installed distributed storage batteries are operated effectively with controllable generators base on the specified CIs.

In this presentation, we have developed a novel EMS controller for microgrid, which can compute the optimal outputs of controllable generations and distributed batteries dispatch taking into account upper and lower bounds and ramp rate of generators. We perform the DED calculation using the feasible operation region to avoid the supply and demand mismatch in real-time.

Please send the Abstract to dsobajic@gridengineering.com by April 12