Energy storage for demand response ville neuss

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The Role of Storage and Demand Response. English (PDF).

Demand response and storage are tools that enhance power system flexibility by better aligning variable renewable energy (RE) supply with electricity demand patterns:

Examples of storage technologies include fly wheels, compressed air energy storage, batteries, and pumped-hydro storage, among others. Demand response typically involves a voluntary and compensated programs that enable a power system to encourage or directly control load reduction as needed to maintain grid stability.

Power system operators can weigh the benefits of demand response and storage against implementation costs. Many storage technologies are still costly and somewhat inefficient--only 70-85% of stored energy is recoverable. Demand response programs do not incur such an efficiency penalty. However, demand response programs do have significant implementation costs, for example, to attract participants and manage their electricity demand. In many cases, demand response is most effective when combined with advanced metering Infrastructure (AMI), which can provide detailed end-use load information and continuous remote communications.

Due to the challenges in quantifying the point at which storage or demand response becomes the least-cost flexibility option, evaluating the role of these interventions in a power system with high variable RE requires continued analysis, improved data, and new techniques.

The following are potential mechanisms to encourage demand response and storage.

Energy Storage Requirements for Achieving 50% Solar Photovoltaic Energy Penetration in California

National Renewable Energy Laboratory, 2016

This report estimates the storage required to enable PV penetration up to 50% in California (with renewable penetration over 66%), and quantifies the complex relationships among storage, PV penetration, grid flexibility, and PV costs due to increased curtailment. The authors find that storage needs depend strongly on the amount of other flexibility resources deployed. With very low-cost PV (three cents per kilowatt-hour) and a highly flexible electric power system, about 19 gigawatts of energy storage could enable 50% PV penetration with a marginal net PV levelized cost of energy (LCOE) comparable to the variable costs of future

combined-cycle gas generators under carbon constraints.

Federal Energy Regulatory Commission, October 2013

Market and Policy Barriers to Energy Storage Deployment

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