Utilization of Enhanced Inverter Capabilities

Problem / Opportunity Statement

The magnitude and frequency of voltage swings has become difficult to manage as the aggregate number of asynchronous generating resources increases and inverters used to interconnect these resources provide little or no reactive support to the system. PJM anticipates that this may create a planning and operational issue within the eastern interconnection and is interested to act proactively by exploring the issue and developing solutions. To mitigate voltage swings and manage voltage within the allowed operating range, inverters with enhanced functionalities like dynamic power control could be deployed. Enhanced functionalities such as improved fault ride-through capability could also improve system stability during system disturbances when the grid frequency may go outside the normal operating ranges.

To protect the generators, the existing trip setting requirements prescribed in IEEE 1547 include both under and over voltage and under and over frequency limits. However, these limits pose a risk to grid reliability as they prevent generators from staying online during a temporary system disturbance and effectively worsen the impact of the disturbance. New standards may need to be developed to take advantage of the enhanced inverter functionalities to expand the ride-through capability without damaging to generators and to increase reactive support to the system during and after a disturbance.

Issue Source

PJM and discussions on changes to IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems

Stakeholder Group Assignment

Planning Committee (PC) reporting to the Markets and Reliability Committee.

Key Work Activities

1. Review the current inverter technologies, functionalities and standards.
2. Investigate the difference and document the findings between the operation of interconnecting synchronous generators and inverter-based asynchronous generators.
3. Identify enhanced functionalities and potential applications of new inverters.
4. Identify changes of the existing standards and requirements applied to inverters used for generator interconnections.

Expected Deliverables

1. Enhanced functionalities of and, if feasible, proposed technical standards and requirements on new inverters used to interconnect all generating resources for the following:
   - Reactive power support
   - Expanded frequency trip point
   - Low voltage ride through
2. Proposed Tariff, Operating Agreement, and Manual revisions to implement such standards.

Expected Overall Duration of Work

August 1, 2014 is the targeted date for reaching a group recommendation.

Decision-Making Method

Stakeholders will seek Tier 1, consensus (unanimity) on a single proposal (preferred default option), or if not able to reach consensus, Tier 2, multiple alternatives.