Enhanced Inverter Capabilities

Problem / Opportunity Statement

The magnitude and frequency of voltage swings has become difficult to manage using traditional electromechanical equipment in Europe and parts of the US as the aggregate number of asynchronous generating resources increases. PJM anticipates that this may become a problem within the eastern interconnection and is interested in acting proactively rather than retroactively. To mitigate voltage swings and manage voltage within the allowed operating range, inverters with enhanced functionality like dynamic power control can be deployed.

Enhanced functionality to achieve fault ride-through capability would also contribute to grid stability during system disturbances where the grid voltage or frequency may go outside the normal operating ranges. The existing trip settings prescribed in IEEE 1547 include under and over voltage and frequency protection settings. However, these limits pose a risk to grid stability as they prevent a generator from staying online during a temporary system disturbance, effectively worsening the impact of the disturbance. New standards should be developed to provide broader limits for inverters to facilitate ride-through capability for asynchronous generators.

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 standards
2. Investigate and document reasons for the difference between synchronous and asynchronous generators
3. PJM and stakeholders to identify potential solutions for new inverters
4. Determination of rule changes required to implement potential solutions, as necessary

Expected Deliverables

1. Technical standards for new inverters to have the following functions applicable to all generating resources:
   - 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

This effort would conclude in time for an August 1, 2014 FERC filing.

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.