



Reactive Deficiency due to an Increase in capacity or energy to an existing Generator – A Focus Group Update

PJM Reactive Power
Focus Group
PJM Planning Committee
Meeting
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- Mark Sims (PJM)
- John Syner (APS)
- Terry Clingan (APS)
- Charlie Matassa (BGE)
- Al Engelman (ComEd)
- Tom Kay (ComEd)
- Ronnie Bailey (Dominion)
- Steve Huntoon (FPL)
- Jeff Mackauer (FE)
- Patti Esposito (NRG)
- Alex Laguardia (NRG)
- Mike Tartibi (NRG)
- Jack Grant (NRG)
- Dave Scarp (ODEC)
- Ron Chu (PECO)
- Esam Khadr (PS)
- Robert Mechler (RRI)
- John Simpson (RRI)
- Larry Anderson (AEP)
- Thomas Fecho (AEP)

- The Objective of the Focus Group is to determine the best way to address a reactive deficiency of an existing synchronous generator caused by a capacity upgrade that results in the generator reactive capability not meeting the existing PJM Power Factor (PF) requirements as stated in the PJM Tariff.
- It is **not** the Objective of the Focus Group to change the existing tariff requirements or propose Reactive Deficiency business rules on existing generators or previous capacity upgrades.

- Currently, a Generation Owner can install PF correction or other equipment at the plant to meet the PJM voltage and/or reactive power schedule.
- PJM can require the installation of PF correction equipment, at the GO's expense, in the system to correct an identified reactive deficiency problem.
- Theoretically, a GO could upgrade its unit to the maximum rated output including running the unit at unity PF as long as the power factor requirements are met through a supplemental reactive source, for example an SVC.
- The requirements in the new 3-party ISA for the generator upgrade supersedes the requirements in the original ISA or IA.

- The standard requires that:
 - “**R2.** Each Transmission Operator” (PJM) “shall acquire sufficient reactive resources within its area to protect the voltage levels under normal and Contingency conditions.”
 - “**R3.** The Transmission Operator shall specify criteria that exempts generators from compliance with the requirements.”
- This implies that PJM can exempt a generator from following the voltage and/or reactive power schedule as long as PJM has acquired sufficient reactive resources to run the system reliably.

- Almost all technical, reliability and legal issues regarding the use of SVCs to compensate for the reactive deficiency of a generator due to an upgrade have been discussed and addressed.
- Two questions remained to be answered by PJM
 - “What is the original intent with respect to the Tariff on the PF requirements?”
 - "Will PJM be comfortable with the proposed changes" (business rule)?
- The FG also is researching the differences in the performance of spinning and dynamic Vars when the system is failing or is nearing voltage collapse.

A Reactive Deficiency is the difference between the Mvar capability of a generator required to meet the PJM Tariff requirements and the actual MVar capability of a generator.

- A Reactive Deficiency created by a capacity upgrade of an existing generator will be replaced by either generator spinning Vars or by dynamic Vars from an SVC or similar reactive device. The FG strongly favors the addition of spinning Vars but recognizes that other options are permitted by the Tariff.
- A Shunt Capacitor application could be considered but will require PJM review on a case by case basis.
- A Reactive Deficiency Charge will be assessed against a generator upgrade project not meeting PF requirements. This charge is equal to the reactive deficiency (in MVar) multiplied by the most recent average cost estimates (in \$/MVar) for installing SVCs on the PJM system.

- There will be two SVC cost estimates developed by PJM – one for installations at or above 230kV and one for installations below 230kV
- The applicable generator charge is based on the generator's interconnection voltage (POI)
- Reactive Deficiency Charges will be used to fund reactive projects in the Transmission Owner's zone in which the Interconnection Customer's generator is located
- Transmission Owners shall be responsible to construct, own and maintain these reactive projects

- PJM will continue to assess the reactive capability of the system and serve as the backstop to recommend modifications to the proposed business policy when and if there are insufficient spinning Vars on the system to maintain system reliability.
- PJM will study and quantify the amount of spinning Vars from generators, dynamic Vars from SVCs and Static Vars from shunt capacitors needed to run the PJM system reliably.

- **Minority Opinions:**
 - Use of an average cost estimate could lead to a TO undercollecting the cost for constructing the reactive project
- **Unresolved Items:**
 - When (which Queue) should this rule be first applied?
 - What would be the approach for handling a reactive deficiency for generator upgrade requests already in the Interconnection queue?
 - When should the reactive deficiency charges be collected?
 - Should there be time requirements on PJM to develop a reactive project that is funded by the reactive deficiency charges?

- Work to resolve unresolved items.
- Research on the difference in spinning and dynamic VARs when the system is nearing voltage collapse
- Draft up the proposal and the revised Focus Group white paper for review and comment
- Request for permission to work on the necessary Manual changes for endorsement
- Request for endorsement at the PC, MRC and MC
- Assist in the implementation of the proposal



Feedback

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