



# Proposed Reactive Deficiency Business Rules and Charges

PJM Reactive Power Focus Group  
PJM Planning Committee Meeting  
May 13, 2010

- Mark Sims (PJM)
- John Snyder (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 Laquardia (NRG)
- Mike Tartibi (NRG)
- Jack Grant (NRG)
- Dave Scarp (ODEC)
- Ron Chu (PECO)
- Esam Khadr (PS)
- Robert Mechler (RRI)
- John Simpson (RRI)

- Reactive Deficiency exists when an existing synchronous generator submits a capacity or energy increase to the Generator Interconnection Queue and such increase results in the generator not meeting the PJM Power Factor requirements.
- It is not the intention of the Focus Group to change the existing tariff requirements.
- Proposed Reactive Deficiency business rules will not be applied retroactively to existing generators.

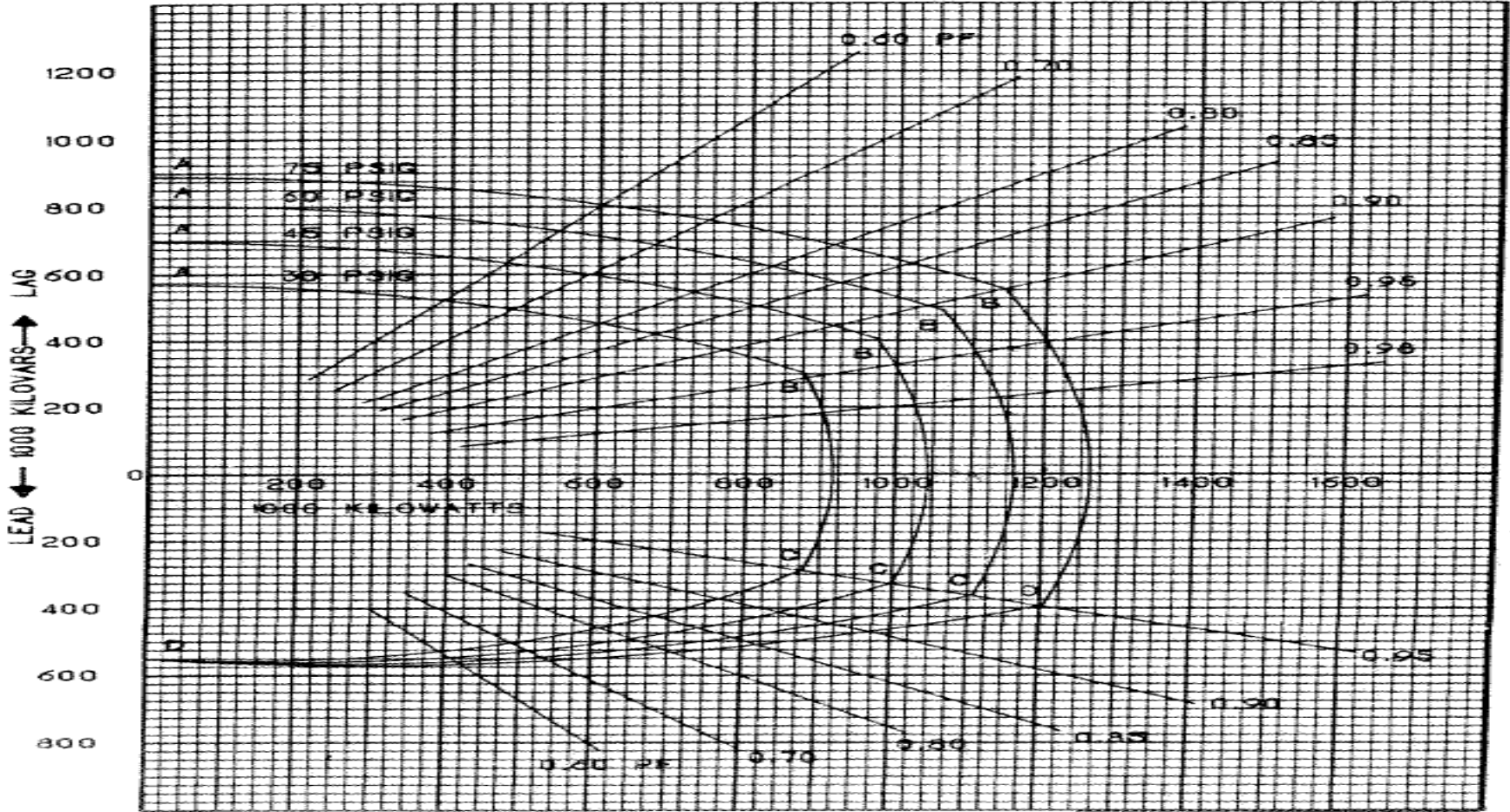
- Reactive Deficiency will be replaced, if all possible, by generator spinning Vars or, if infeasible or cost prohibited, by dynamic Vars (e.g. SVC or similar reactive devices).
- Shunt Capacitor application could be considered and will be reviewed by PJM on a case by case basis.
- Reactive Deficiency is defined as the difference between the MVar to meet the PJM requirements and the MVar capability after the upgrade.
- Reactive Deficiency Charge is equal to the reactive deficiency (in MVar) times the most recent average cost estimates (in \$/MVar) for installing SVCs on the PJM systems.

- There will be 2 SVC cost estimates – one for installation at and above 230kV and one below 230kV.
- Applicable charge is based on the generator's interconnection voltage.
- For reactive deficiency greater than or equal to 50MVar, TO provides actual SVC cost estimate.
- 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 Owner shall be responsible to construct, own and maintain these reactive projects.

| <b>Generator X – Unit 1</b>   |                | <b>MW</b>   | <b>MVar requirement (with ISA)</b> | <b>MVar requirement (without ISA)</b> |
|---|----------------|-------------|------------------------------------|---------------------------------------|
| <b>Requested <math>\Delta</math>MW Increase</b>                                       | <b>[A]</b>     | <b>20</b>   | -----                              | -----                                 |
| <b>MVar requirement w.r.t. <math>\Delta</math>MW<br/>= [A x tan (arc cosine 0.9)]</b> | <b>[B]</b>     | -----       | <b>9.7</b>                         | <b>9.7</b>                            |
| <b>Max Facility Output (Winter rating)</b>  | <b>[C]</b>     | <b>1225</b> | -----                              | -----                                 |
| <b>Existing MVar requirement<br/>=[C x tan (arc cosine 0.9)]</b>                      | <b>[D]</b>     | -----       | <b>593.3</b>                       | -----                                 |
| <b>Grandfathered MVar Capability</b>  | <b>[E]</b>     | -----       | -----                              | <b>381</b>                            |
| <b>MVar Requirement</b>   | <b>[F=B+D]</b> | -----       | <b>603</b>                         | -----                                 |
| <b>MVar Requirement</b>   | <b>[G=B+E]</b> | -----       | -----                              | <b>390.7</b>                          |
| <b>Actual MVar Capability After Upgrade</b>   | <b>[H]</b>     | <b>1245</b> | <b>175</b>                         | <b>175</b>                            |
| <b>Reactive Deficiency</b>  | <b>[I=F-H]</b> | -----       | <b>428</b>                         | -----                                 |
| <b>Reactive Deficiency</b>  | <b>[J=G-H]</b> | -----       | -----                              | <b>215.7</b>                          |

# Generator X – Unit 1 Reactive Capability Curve

ATB 4 POLE, 1.264.970 KVA. 1800 RPM. 22000 VOLTS  
 .90 PF. .58 SCR. 75 PSIG HYDROGEN PRESSURE. 545VOLTS EXCITATION



CURVE AB LIMITED BY FIELD HEATING  
 CURVE BC LIMITED BY ARMATURE HEATING  
 CURVE CD LIMITED BY ARMATURE CORE END HEATING

- **Implementation Issues:**
  - When or which Queue should this rule be applied?
  - What would be the approach to handling reactive deficiency for generator upgrade request already in the Interconnection queue?
  - When should the reactive deficiency charges be collected?
  - How should the collected charges be handled?
  - How long should PJM have for coming up with the reactive project funded by this reactive deficiency charges?
  - Others?

- Contact Mark Sims
  - [simsm@pjm.com](mailto:simsm@pjm.com)
  - 610.666.4678