

Section 5: Additional Generator Requirements In this section you will find:

- The definition of Behind the Meter Generation and requirements related to such projects,
- Generator power factor requirements, and
- Wind generator requirements.

Behind the Meter Generation Projects

Behind the Meter Generation refers to one or more generating units that are located with load at a single electrical location such that no transmission or distribution facilities owned or operated by any Transmission Owner or Electric Distributor are used to deliver energy from the generating unit(s) to the load; provided, however, that Behind the Meter Generation does not include (i) at any time, any portion of such generating unit(s)' capacity that is designated as a Capacity Resource; or (ii) in any hour, any portion of the output of the generating unit(s) that is sold to another entity for consumption at another electrical location or into the PJM Interchange Energy Market. Behind the Meter Generation rules permit load serving entities in PJM to net operating Behind the Meter Generation against load in the calculation of charges for energy, capacity, transmission service, ancillary services and PJM administrative fees. This total netting approach is intended to encourage the use of Behind the Meter Generation during times of scarcity and high prices, thus increasing the opportunity for load to compete in PJM markets.

Behind the Meter Generation Interconnection Requests

Any Behind the Meter Generation that desires to be designated, in whole or in part, as a Capacity Resource or Energy Resource must submit a Generation Interconnection Request. **(OATT at Part VI, in Section 36.1.01 – formerly Subpart A at 36.1A, in Part IV)**

Metering of Behind the Meter Generation

Behind the meter generation consisting of one or more generating units individually rated at ten megawatts or greater or that otherwise have been identified by PJM as requiring metering for operational security reasons must have both revenue quality metering and telemetry equipment for operational security purposes. Behind the meter generation consisting of multiple generating units that are individually rated less than ten megawatts but together total more than ten megawatts at a single site and are identified by PJM as requiring revenue quality metering and telemetry equipment may meet these metering requirements by being metered as a single unit. **(Operating Agreement, Section 14.5)**

Behind the Meter Generation Effects on Market Operations

Market Buyers shall be charged for all load and associated ancillary services based on the Market Buyer's total load (net of operating Behind the Meter Generation, but not to be less than zero.) **(Operating Agreement, Schedule 1)**

Prior to the commencement of the Planning Period, Parties may elect to place ALM associated with Behind the Meter Generation under the direction of PJM. This election shall remain in effect for the entire Planning Period. In the event such an election is made, such Behind the Meter generation will not be netted from load for the purposes of calculating Accounted-For Obligations under the appropriate PJM Regional Reliability Assurance Agreement.

Generator Power Factor Requirements

Except as PJM may determine otherwise for small generation resources of less than 20 MW, all generators interconnected with the PJM System shall be designed to maintain a composite power delivery at the generator's terminal, at continuous rated power output and reactive capability corresponding to the power factor requirements stated in the PJM Tariff at the generator's terminals at a power factor of at least 0.95 leading to 0.90 lagging. (OATT at Part VI, in Section 4.7.1 in Att. O, App. 2 – formerly 54.7.1 in Part IV)

Application of Power Factor Requirements to Increases of Capacity or Energy to Existing Generation

~~Existing~~ PJM Tariff provisions require existing generators to be designed to operate at a specified leading and lagging power factor ~~range of 0.95 leading to 0.90 lagging~~ as measured at the generator terminals.

- A similar Power Factor ~~The above~~ requirement also applies to capacity or energy increases to existing generation. (OATT at Part VI, in Section 4.7.1.2 in Att. O, App.2)

~~PJM will provide for certain exceptions to existing generators that apply for increases of less than 20 MW.~~

- For an increase of more than 20 MW to an existing generator, the generator must be designed to meet the Section 4.7.1 ~~maintain the original power factor capability~~ power factor requirement for the grandfathered MWs and the Section 4.7.1.2 power factor requirement ~~a power factor range of at least 1.0 (unity) to 0.90 lagging~~ for the ~~all~~ incremental MW increases.

Attachment H to this Manual 14A details a process, in adherence to the PJM OATT, to mitigate the reactive deficiency that arises when an increase of capacity or energy to an existing generator results in the generator not meeting the PJM power factor requirements for the grandfathered and/or incremental MW.

Wind-Powered Generation Projects

Because of the intermittent nature of wind-power generation, a specific procedure is required to determine an appropriate capacity value for wind generator output. Further, the use of induction-type generators for wind-powered projects requires the application of specific reactive power requirements.

Wind Generation Capacity Credit Rules

PJM business rules allow for wind-powered generation projects to qualify for Capacity Resource status. Refer to PJM Manual M-21 "Rules and Procedures for Determination

of Generating Capability” for details of PJM procedures for calculating Capacity Credits for Wind Farms.

Wind Generation—Specific Technical Requirements

Without exception, all Customer Facilities will be subject to the provisions of the PJM OATT at Part VI, in Section 4.7.2 and Section 4.7.3 in Att. O, App. 2 – formerly 54.7.2 and 54.7.3 in Part IV, which describes real-time obligations to supply reactive power and the consequences of deviations from voltage schedules and/or reactive power schedules.

Wind projects connected to lower voltage systems must be designed to operate to a voltage schedule, reactive schedule or power factor schedule designed to meet local transmission owner criteria. When applicable, non-standard terms and conditions will be included in a project’s Interconnection Service Agreement to address individual power factor requirements.

ATTACHMENT H: GENERATOR REACTIVE DEFICIENCY MITIGATION PROCESS

Scope

The mitigation process is to address a reactive deficiency of an existing synchronous generator caused by an increase of its output resulting in the generator reactive capability not meeting the existing PJM power factor requirements as stated in the PJM Tariff. The mitigation process and the associated business rules, upon their approval, will be applied to all new generation interconnection requests for an increase of capacity or energy to an existing generator. They are not intended for wind or other non-synchronous generators, existing generators not requesting an increase, or previous requests for capacity or energy increases.

The process is not due to a change in the existing PJM tariff requirement. The associated business rules will not require a change in the existing PJM tariff.

Reactive Deficiency Definition

A Reactive Deficiency is defined as the difference between the MVar capability of a generator required to meet the PJM power factor requirements and the actual MVar capability of a generator after the increase.

For the original generator rated output, the power factor requirements are stated at Part VI Section 4.7.1 in Att. O, App. 2 of the Tariff. For the incremental increase, the requirements are stated at Part VI Section 4.7.1.2 in Att. O, App. 2 of the Tariff. The reactive deficiency, if any, is normally determined during the Feasibility and the System Impact Study phases of an interconnection request for an increase of capacity or energy to an existing generator. The Interconnection Customer will be notified of the deficiency and the proposed mitigation before the execution of the Construction or Interconnection Service Agreement.

Mitigation Process

Currently, the PJM Tariff allows the Interconnection Customer, at its expense, to install power factor correction or other equipment at the generation plant to mitigate the reactive deficiency and to enable the generator to meet the PJM voltage and/or reactive power schedule during operation. If the Interconnection Customer fails to mitigate the reactive deficiency, PJM can request the affected Transmission Owner to install Static Var Compensator (SVC) or similar dynamic reactive devices, at the Interconnection Customer's expense in the form of a Reactive Deficiency Charge, to mitigate the identified deficiency problem.

For reactive deficiency less than 50MVar, the Reactive Deficiency Charge will be 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 to be developed and subject to annual review 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 at its Point of Interconnection (POI).

The collected charges will be used to fund reactive projects in the Transmission Owner's zone in which the Interconnection Customer's generator is located. The Transmission Owners shall be responsible to construct, own and maintain these reactive projects.

For reactive deficiency greater than or equal to 50MVar, the affected Transmission Owner will be responsible to provide either the cost estimate (in \$/MVar) for installing a SVC in its system which will be used to calculate the Reactive Deficiency Charge or the cost estimate (in \$) of a specific SVC or SVCs determined by PJM and the affected Transmission Owner in the System Impact Study.

Review of and Modification to the Mitigation Process

NERC standards require that PJM, as the Transmission Operator, shall acquire sufficient reactive resources within its area to protect the voltage levels under normal and contingency conditions. PJM will continue to assess the reactive capability of the system and serve as the backstop to recommend modifications to the mitigation process and the associated business rules when and if there are insufficient spinning Vars on the system to maintain system reliability.