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Responses to 13 & 16 revised.

FAQs – Generator Interconnections in the PJM Regions

1. What is a PJM Generation Interconnection Request?

A. The PJM Transmission Grid provides the means for delivering the output of interconnected generators to the load centers of the PJM energy and capacity markets. As the Regional Transmission Organization (RTO), PJM administers the connection of generators to the PJM Transmission Grid. In this role, PJM coordinates the planning process for connection of new generation, coordinates the reliability studies for operation of new generation and oversees the construction of the required Interconnection Facilities. As specified in Part IV, Subpart A of the PJM Open Access Transmission Tariff (OATT), a party wishing to connect a new generation resource to the PJM system must submit an Interconnection Request.

2. Who is required to request Interconnection with PJM?

A. All new generation that plans to interconnect and operate in parallel with the PJM Transmission Grid and participate in the PJM capacity and/or energy markets (new generation, any existing generation that is increasing output capability by more than 1 MW above that specified in its existing ISA, or any Energy Only resources requesting Capacity Interconnection Rights) must submit an Interconnection Request to PJM. Generation resources that are smaller than 1 MW and will not participate in the PJM capacity and/or energy markets need only coordinate planning, construction and/or interconnection operation with the host Transmission Owner.

3. How is an Interconnection Request submitted to PJM?

A. To initiate an interconnection request, the project developer/owner must submit an Interconnection Request to PJM in the form of a completed, executed Generation Interconnection Feasibility Study Agreement (OATT Attachment N) and a non-refundable $10,000 study fee. Refer to PJM Manuals M-14-A & B for further details about the Interconnection Request process.

4. Why must developers of new generation and owners that are upgrading existing generation submit an Interconnection Request to PJM?

A. The PJM RTO has the responsibility for planning the expansion and enhancement of the PJM Transmission Grid on a regional basis. To ensure that the PJM Transmission Grid is adequate to serve the PJM System load under all levels of load-serving conditions requires planning for necessary and timely expansion of the PJM Transmission Grid. The planned interconnection of new generating units and any changes (increases or decreases) in the output capability of existing generating units are among the critical inputs to expansion planning for the PJM Transmission Grid. Based on all of the requirements for firm transmission service on the PJM Transmission Grid, PJM annually develops a Regional Transmission Expansion Plan (RTEPlan) to meet those requirements. Thus, any entity that proposes to interconnect a generating unit within any PJM region or

proposes to change the capacity of an existing generating unit must request interconnection rights from PJM.

5. What is the purpose of the Regional Transmission Expansion Plan (RTEPlan)?

A. The continuing evolution and growth of PJM's robust and competitive regional market rests on a foundation of bulk power delivery system reliability, ensuring PJM's ongoing ability to meet all of the control area load-serving obligations. PJM's FERC-approved Regional Transmission Expansion Planning Process ("RTEPProcess") preserves this foundation through independent analysis and recommendation, supported by broad stakeholder input and approval by an independent RTO Board in order to produce a single Regional Transmission Expansion Plan ("RTEPlan"). Refer to PJM Manual M-14-B for further details about the RTEPProcess.

6. How long is the process to obtain PJM Interconnection approval?

A. Part IV of the PJM OATT describes the procedures used to process all requests for interconnections with the PJM Transmission system. Part IV, Subpart A describes the specific procedures used to process requests for generator interconnections with the PJM bulk power transmission system. The OATT establishes the business rules for the generation interconnection process. These business rules include three analytical steps – Generation Interconnection Feasibility Study, System Impact Study and Generation Interconnection Facilities Study. Each step imposes its own financial obligations on the requesting party and establishes PJM milestone responsibilities. Refer to PJM Manual M-14-B and its Attachment A flow diagram for details and timeline of the study stages described below.

As the Transmission Provider, PJM, in coordination with any affected Transmission Owner(s), conducts **first stage** Generation Interconnection Feasibility Studies twice each year (OATT at 36.2) for completion by:

- March 31, for requests received during the six-month period ending January 31, and
- September 30, for requests received during the six-month period ending July 31.

Thus, the initial Generator Interconnection Feasibility Study stage could have a total duration of as long as **8 months** for requests submitted at the beginning of a particular interconnection request cycle.

After reviewing the results of the Generation Interconnection Feasibility Study, the applicant must decide whether or not to pursue the **second stage** study, the System Impact Study. To maintain its assigned priority, the applicant must execute and return the System Impact Study Agreement within 30 days of receiving it. The System Impact Studies are also conducted by the Transmission Provider twice each year (OATT at 36.4.1), commencing on:

- May 1, for requests received during the six-month period ending January 31, and
- November 1, for requests received during the six-month period ending July 31.

In general, System Impact Studies will be completed within 120 days of the date the study begins. Thus, completion of the System Impact Studies could have a total duration

of as long as **5 months** beyond the issue of the Generation Interconnection Feasibility Study results.

Upon completion of the System Impact Study, the Transmission Provider will furnish a Generation Interconnection Facilities Study Agreement to the applicant, along with the estimated cost of the study and the estimated time of completion. After reviewing the results of the System Impact Study, the applicant must decide whether or not to pursue the **third and final stage** study, the Generation Interconnection Facilities Study. For an interconnection request to maintain its assigned priority, the applicant must execute and return the Generation Interconnection Facilities Study Agreement within **30 days** of receiving it. Thus, the total duration for completing the PJM Interconnection approval process could be as long as **14 months plus the time required to complete the Generation Interconnection Facilities Study.**

7. What information is developed and provided in the results of a Generation Interconnection Feasibility Study?

A. The Generation Interconnection Feasibility Study assesses the potential reliability impacts for new generation connecting to the PJM system as a capacity resource. The study results provide a description of the exposures for network upgrade requirements, define the general scope and duration of work needed to complete any identified system upgrade projects and provide magnitude cost estimates for the identified system upgrade projects.

8. What information is developed and provided in the results of a System Impact Study?

A. The System Impact Study provides a thorough evaluation of the reliability impacts for new generation connecting to the PJM system as a capacity resource. The study reviews both direct connection requirements and network impacts for interconnection of the new generation. The potential impacts of interconnecting the new generation with the PJM system are evaluated for compliance with various reliability criteria including operation during Normal System, Single Contingency and Second Contingency conditions; System Stability Analysis; Short Circuit Analysis; Generator Deliverabilty Analysis and CETO/CETL Criteria Analysis. The study results include a project description and the estimated cost for both the direct connection facilities and the network upgrade facilities required for interconnection of the new generation with the PJM system. When appropriate, the System Impact Study Report also defines the cost allocation for the network upgrade work.

9. Is thirty days sufficient time to have all developers respond to the System Impact Study results?

A. The timing of the studies and the decision windows were chosen as a compromise to allow for information to be provided to the developer in a timely fashion, to proceed to the design of facilities and the execution of Interconnection Service Agreements as quickly as possible, and to develop the best possible regional plan that will meet the

needs that have been identified. The decisions that are made at the end of a System Impact Study cycle will affect the start of the design phase for that cycle as well as the start of the System Impact Study phase for the subsequent queue. If the decision window is extended, the entire process must be stretched out to accommodate the additional time. By receiving the Generator Interconnection Feasibility Study results, the developer should be in a position to begin to evaluate the viability of a project before the completion of the System Impact Study. The thirty day window is a compromise that is necessary to meet the varied objectives of the process.

10. What information is developed and provided in the results of a Generation Interconnection Facilities Study?

A. The Generation Interconnection Facilities Study provides complete details of the requirements for interconnecting a new generation project to the PJM system. The study includes a general description of the new generation interconnection project, indicates any changes from the System Impact Study Report, describes the scope of both Direct Connection work and Network Upgrade work and sets a schedule of major project milestone dates. The Facilities Study Report also provides Design Descriptions of the facilities to be installed and a detailed cost estimate of the work.

11. What are the criteria for generator reactive design?

A. As specified in Part IV, Subpart E at 54.7.1 of the PJM OATT, a Generation Interconnection Customer shall design its Customer Facility to maintain a composite power delivery at continuous rated power output at the generator's terminals at a power factor of at least 0.95 leading to 0.90 lagging.

PJM will examine exceptions to this rule on a case by case basis. Exceptions may be granted in situations where the typical design of a particular class of generator would not support such a power factor requirement. The only exception to this rule to date is for Customer Facilities that involve induction-type wind turbine generators.

Customer Facilities that involve induction-type wind turbine generators shall be designed to be capable of maintaining unity power factor at the point of interconnection with the Transmission System when operating at any level within the Facility's approved operating range.

Without exception, all Customer Facilities will be subject to the provisions of the PJM OATT at 54.7.2 and 54.7.3 that describe real-time obligations to supply reactive power and the consequences of deviations from voltage schedules and/or reactive power schedules.

12. How are the increases and decreases in MW values for projects handled?

A. Any increase to the MW size of a project will not be accepted within the scope of the existing queue position. Such changes must be submitted with a new Generation Interconnection Feasibility Study request.

Decreases in MW size for projects can be accepted in response to the results of either the Generation Interconnection Feasibility Study or the System Impact Study. Decreases identified during the performance of either study will be accepted at the discretion of the PJM OI based on the impact to the work in progress.

13. When (time frame) will a generator no longer be allowed to reduce the size of its project?

A. Currently, we allow limited project reductions at all phases of the interconnection process. A total reduction of up to 50% of the original project size is allowed after the Feasibility Study is issued but before the Impact Study Agreement is executed. A total reduction of up to the greater of 20% of the project size considered in the impact study or 50 MW will be allowed after the Impact Study is issued but before tendering of the ISA.

14. Is there a limit on the amount of MW increase that a project in the queue may request?

A. Any increase to the MW size of a project will not be accepted within the scope of the existing queue position. Such changes must be submitted with a new Generation Interconnection Feasibility Study request.

15. When will a complete dollar estimate for connection of each project be determined?

A. At the end of the System Impact Study, each of the projects in an equivalent queue will know their cost responsibility (estimates) for interconnection to the transmission system. These estimates will be based on the projects recommended by the RTEPP and the cost allocations for each project. However, each project is ultimately responsible for costs actually incurred to construct the necessary transmission upgrades.

16. For cost allocation, is money reimbursed to the first project by later projects in the queue when they both impact the same facility? After a network facility is built for a previous generator, can a new generator jump on the excess transmission capability with out expenditure?

A. When multiple projects in the same queue impact a facility, the cost allocation will assign a portion of the upgrade responsibility to each project. This would not involve reimbursement, per se. If a project in a later queue impacts a facility already identified as requiring an upgrade, cost responsibility may be assigned to the later project. Refer to PJM Manual M-14-B, Attachment B, for details about PJM Generation and Transmission Interconnection Cost Allocation Methodologies.

17. How will the cancellation of projects that occur during the Generator Interconnection Facilities Study or even during construction of facilities be handled as far as cost allocation and moving ahead with construction?

A. It is expected that some projects will drop from the queue during or after the Generation Interconnection Facilities Study phase. Depending on the progress of construction of regional plan upgrades, significant costs may remain that must be assigned to some party. Prior to construction, needs and cost responsibility will be redetermined, per section

36.8.4 (c) of the PJM Tariff. After the start of construction, PJM will evaluate each situation, on a case by case basis, and make a determination as to the most appropriate course of action.

18. How are generation retirements and their effect on transmission requirements handled?

A. Retirements of generation or removals of transmission facilities from service will be evaluated through MAAC, ECAR, MAIN, SERC/VACAR and/or other regional Reliability Council annual assessments as appropriate. Problems that are identified will be included in the RTEPP analyses in order to develop appropriate solutions.

19. Can a project be connected to more than one voltage at a substation or more than one substation allowing the developer to decide which bus to sell energy and capacity?

A. A project can be connected to more than one voltage level or to more than one substation. However, if a parallel path is created for the system, that path must be under the control of the Transmission Provider. The generation developer cannot be in a position to create congestion on the system by opening facilities under its control and then benefiting from that congestion through sales into the energy market.

20. Will an energy only unit affect the cost of interconnection allocation to a later capacity project?

A. Energy-only projects can affect interconnection costs for capacity projects later in the queue. This could result from the increased fault duty or from stability concerns associated with the energy-only project. Reinforcements required for energy-only projects are based on a different set of tests than those applied to capacity resources. However, these reinforcements must be treated in queue order and can impact later queued capacity or energy-only projects.

21. Can an existing energy-only project change to a capacity project? How is such a request handled?

A. Requests in progress cannot be changed from energy-only to capacity status. A new request must be submitted to effectively change from energy-only to capacity status.

22. Can an existing capacity project change to energy-only status?

A. PJM allows existing and queued capacity resources to change wholly or in part to energy-only status. A new interconnection request must be submitted in order to reestablish capacity interconnection rights once such a change has transpired. If the conversion from capacity to energy-only resource status involves the transfer of capacity interconnection rights, a new interconnection request will be required to determine whether any network upgrades are required to reliably support the transfer of these rights.

23. How are capacity injection rights defined as they move from an existing project to a new project?

A. Injection rights are based on equivalent system behavior. An evaluation has to be completed to exactly define the injection rights to be transferred.

24. Can projects be in more than one cluster?

A. Yes, it is possible that a project can have impacts on two clusters based on a single interconnection option while it does not make sense to combine all of the related generators into one large cluster.

25. What is the definition of minimal upgrade costs?

A. A minimal upgrade is the next logical upgrade for a specific facility that would satisfy the appropriate criteria tests imposed under the process.

26. What is an Interconnection Service Agreement?

A. After the Generation Interconnection Facilities Study is completed, the Transmission Provider (PJM) will furnish an Interconnection Service Agreement (ISA) to be executed by the applicant and any affected Interconnection Transmission Owner(s). The ISA defines the obligation of the generation developer regarding cost responsibility and the expected dollar flows for required transmission system upgrades. These dollar flows may be related to cost responsibility for facilities constructed for the generation project or lower voltage transmission charges for projects connected below the voltage level of the facilities recovered through the PJM Tariff. The ISA also identifies the rights associated with the interconnection of the generator as either a capacity or energy-only resource and any operational responsibilities, restrictions or other limitations on which those rights depend. Capacity Injection Rights of the project and quantifies the dollar flows related to interconnection service. The ISA also defines the physical interconnection between the generator and the transmission system and the operational responsibilities associated with the interconnection. The ISA further identifies any changes in construction responsibility from the Standard Option for Transmission Owner Interconnection Facilities due to the Interconnection Customer exercising the Negotiated Contract Option or the Option to Build. . Further information on all terms and conditions to be incorporated and made part of an ISA may be found in Part IV of the PJM Open Access transmission Tariff (Subpart A at 36.8, Subpart E and Attachment O) available on the PJM website http://www.pjm.com/.

27. What is a Construction Service Agreement?

A. A Construction Service Agreement specifies the Terms and Conditions for the construction of any Interconnection Facilities required to interconnect a generator with the PJM Transmission Grid. The Construction Service Agreement is executed among the applicant for Transmission Service (Generation Interconnection Customer), the Transmission Provider and the affected Interconnection Transmission Owner(s). The form of a Construction Service Agreement may be found in the PJM Open Access Transmission Tariff as Attachment P. Further information on all terms and conditions to

be incorporated and made part of a Construction Service Agreement may be found in Part IV of the PJM Open Access transmission Tariff (Subpart F and Attachment P) available on the PJM website http://www.pjm.com/.

28. When will realistic time frames be developed for construction schedules?

A. During the System Impact Study, construction schedules will be evaluated considering the scope of the regional plan. The schedules included in the System Impact Study results should provide a more realistic view of the construction requirements for the entire regional plan. The schedules will be more accurately defined in the Generation Interconnection Facilities Study.

29. How is a Schedule of Work developed to meet the in service date specified by the Generation Interconnection Customer?

A. The Party(ies) responsible for installing the Generator Interconnection Facilities and/or Network Upgrade Facilities shall use reasonable efforts to install those facilities in accordance with an agreed Schedule of Work. In the event that the responsible Parties are unable to agree upon the terms of a Construction Service Agreement, the Generation Interconnection Customer shall have the right, but not the obligation ("Option to Build"), to design, procure, construct and install all or any portion of the Transmission Owner Interconnection Facilities.

30. What is the Option to Build?

A. The Generation Interconnection Customer may choose to design and install all or any portion of the Transmission Owner Interconnection Facilities if the Generation Interconnection Customer and the Interconnected transmission Owner are unable to agree upon the terms of a Construction Service Agreement. If the Generation Interconnection Customer chooses to exercise the Option to Build, the Interconnection Parties must adhere to a timeline for various activities that require coordination among the Interconnection Parties.

31. How does a Generation Interconnection Customer exercise the Option to Build?

A. In order to exercise the Option to Build, the Generation Interconnection Customer must provide the Transmission Provider and the Interconnected Transmission Owner with written notice of its election to exercise the option by no later than seven days after the date that is 30 days after Generation Interconnection Customer's execution of the Interconnection Service Agreement, provided, however, that the Generation Interconnection Customer and the Interconnected Transmission Owner may by mutual agreement extend the time period for exercise of the option. Refer to Part IV, Subpart F, Section 83.2.3 of the PJM OATT for further details about the manner and conditions associated with the Option to Build.

32. At what point are dollars for system reinforcements due? How will the mechanism for payment be established in the Interconnection Service Agreement?

A. After construction of system reinforcements begin, invoices are issued by the Transmission Provider and payments are due on a monthly "pay as you go" basis. However, alternative arrangements may be negotiated between the generation developer and the transmission owner(s) responsible for the construction and such arrangements are included in the Interconnection Service Agreement.

33. If projects further back in the queue are ready to come on line ahead of projects sooner in the queue, when will it be determined whether those earlier queued projects will stay on course or not be built?

A. Milestones will be included in Generation Interconnection Facilities Study Agreements and Interconnection Service Agreements to ensure that projects continue to demonstrate progress toward their ultimate completion. There are no guarantees that any project will ultimately be completed, regardless of how far they have proceeded in the process.

34. Will some units be restricted to energy-only if they come on line prior to network reinforcements being completed?

A. Yes.

35. What if a project is delayed? What are the obligations of the project?

A. Milestones will be negotiated in both the Generation Interconnection Facilities Study Agreement and the Interconnection Service Agreement. If a project is delayed, the tariff allows the transmission Provider to extend milestone dates in the event of delays not caused by the Interconnection Customer. Other failures to meet milestone dates will result in the removal of the associated project from the interconnection queue. Any project so removed from the queue is still responsible, under the tariff, for costs incurred prior to removal from the queue.

36. Will evaluations be done to define congestion that may restrict plant output?

A. Not as part of the analyses that comprise the generation interconnection process in the PJM Tariff.

37. Who will schedule outages for construction?

A. Scheduling of transmission outages for construction will be coordinated through PJM.

38. Is there a generator MW size below which PJM does not require real time data?

A. All generators that participate in the PJM market as a Capacity Resource must provide PJM with instantaneous real power and reactive power flow data, regardless of MW size.

Generators that do not participate as Capacity Resources must provide instantaneous real power and reactive power flow data only if:

- they are 10 MW or larger, or

- they are greater than 1 MW and connected at a bus operating at 34 kV and above.

Refer to PJM Manuals M-01 (“Control Center Requirements”, Sections 4 and 5) and M-14-D (“Generation Operational Requirements”, Sections 1, 2 and 4) for further details about PJM data requirements.