

# PJM WMPA

## Construction Information

12/1/2014



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## PJM WMPA Construction Information Sheet

For projects interconnecting to PJM through a Wholesale Market Participant Agreement (WMPA), primary responsibility for interconnection activities will be handled through the Transmission Owner. However, there are several areas that PJM does require involvement, such as modeling, metering, markets, and initial synchronization/initial operation.

The purpose of this document is to highlight the points where developers need the involvement of PJM to ensure that the project is accurately modeled, that successful grid synchronization occurs, and all PJM market setup is in place.

This is not intended to be a complete list, but a high-level document for key areas of project development. If at any time a project developer has questions or concerns related to WMPA project development they should contact their assigned PJM Interconnection Coordinator (PJMIC). If a developer is not aware who their PJMIC is, they should contact the PJM Planner who assisted in the writing of the WMPA.

### WMPA Milestone Dates

As of 2011, most WMPA documents contain a list of key milestones that are required to be met in order to keep the project in good standing. The milestone list can be found in Article 3 of the WMPA. If a project feels that the dates cannot be met, then immediate contact must be made to their PJMIC. Furthermore, generation developers of WMPA projects should provide timely and regular (monthly) project updates to their PJMIC.

### PJM Manual Requirements

It is strongly recommended that project developers read and understand, at a minimum, PJM's Manuals M14D and M01. Specific focus should be given to the 24 Hour Desk and Telemetry/SCADA requirements. In addition, if a project has requested Capacity Injection Rights, additional requirements may apply.

These manuals and others can be found on PJM's website under "documents" or clicking this [link](#).

### Modeling

All projects that participate in PJM wholesale markets are required to be modeled in PJM's Energy Management System (EMS). The modeling of generating facilities serves multiple roles, including the transmission system monitoring and generator payment. Therefore, reliable operational models are paramount. To this end, it is the responsibility of the WMPA project to ensure that PJM is provided with the most accurate modeling information.

PJM requires up to a six (6) month lead time to model a new facility. Therefore, project developers must submit single line drawings to their PJMIC in a timely manner to allow the facility to be modeled in PJM's EMS.

A calendar displaying the modeling cycle can be found on PJM's website at [PJM.com](#) and clicking Calendar in the upper left of the page and then choosing "System Changes".

Typically a single line or relay sketch with operational designations is acceptable. Equipment names should be finalized and approved by their respective Transmission Owners if applicable. Please remember, that equipment and facility names will be eternalized once committed to PJM's EMS. Therefore, please ensure careful consideration is made when determining names, as this is how both PJM and the Transmission Owner will refer to station equipment when making dispatch orders. Refer to PJM's Manual 14D which contains information regarding naming conventions.

Transmission Owners may be required to provide additional drawings from the point of interconnection to the nearest modeled transmission level bus, especially if the point of interconnection is some distance from a transmission level substation. It is the responsibility of the project to ensure that PJM receives this information.

### Equipment Modifications

It has been recognized that projects may install different equipment than what PJM and the respective Transmission Owner studied. Changes to project topology and/or configuration may also occur from the time a project was studied until the start of construction. If either of these applies to a project, immediate contact must be made to the PJMIC as a restudy may be necessary to determine if a material modification has occurred. Failure to report project changes, as

appropriate, could result in significant delay in initial operation and/or breach of the WMPA, and possibly lead to termination and/or withdraw from the interconnection queue.

Some examples of these types of changes are:

- The change in turbine model or type. This includes Photo Voltaic Panels and inverters.
- Changes to the location of the Point of Interconnection.
- Changing from a single Generator Step-Up Transformer, to multiple Generator Step-Up Transformers or any change that impacts transformer impedance.

### Telemetry /Metering

In addition to PJM's [manuals](#), on PJM's website, under [eTools](#), information can be found to assist developers in meeting their metering and telemetry requirements.

Specifically, be sure to review the telemetry information below:

- [PJM's Manual 01](#)
- [PJM's Manual 14D](#)
- [Jetstream](#)

### Marketing

All processes related to power marketing and PJM eSuite accounts will be handled through the PJM Client Manager Team. Client Managers are assigned based on the organization that will do the power marketing for a facility. The assigned PJMIC can provide assistance in determining the identity of a Client Manager. Therefore, the PJMIC and Client Manager will need understanding with respect to the following questions:

- What is your marketing strategy?
  - Energy Markets (Day Ahead/Real-Time)
  - Capacity (RPM; Ref: PJM Manual M18). Capacity resources have different telemetry obligations.
  - Other Markets (such as SRECs – [www.pjm-eis.com](http://www.pjm-eis.com) tracking of green energy credits)
- Will multiple units sold (multiple owners and/or off-takers) with separate billing requirements?
- Who will own the facility upon operation?
- Who will operate the facility upon operation?
- Who will have the responsibility to send PJM operational and revenue data once operational?
- Who will be the marketing entity (i.e. PJM member) in PJM's markets once operational?

### Initial Start-up/Synchronization Procedures

Before a project synchronizes to the transmission system for the first time, coordination with PJM needs to be made. As the new facility does not appear in any PJM market, PJM has no formal indication of when and how much energy to expect on the system from the new facility. Therefore, in order for PJM to accurately account for initial injection energy, the developer is required to supply PJM with a test energy schedule no later than one (1) week prior to initial synchronization. This can be a simple spreadsheet indicating maximum projected MW output to the transmission system for each generator for each hour of planned operation (or collective output for aggregated generation, such as wind or solar).

After initial synchronization, and once the generator(s) is/are stable, the developer should contact either their PJMIC, PJM Telemetry Support or PJM's Reliability Engineer to validate real time (operational) data, MW and MVAR flows and direction. If there are any discrepancies, it is the developer's responsibility to coordinate troubleshooting efforts. Failure to correct telemetry in a timely manner can affect the generators ability to be paid. Note: Please reference PJM's Manual M14D regarding specific points that require telemetry based on the size and type of interconnection project.

The day after successful telemetry validation, the developer should send PJM Market Settlement Ops ([mrkt\\_settlement\\_ops@pjm.com](mailto:mrkt_settlement_ops@pjm.com)), and copy their PJMIC, a spreadsheet listing the actual revenue meter data (MWh, MVARh) output for any hours the facility ran for at least the first 24 hours of operation.

**Note:** Please ensure that all standard operating procedures are followed for generation start-up and shut down. The above procedure is an additional procedure for the first time meter verification only. Any and all other standard operating procedures still apply.

**As-Built Drawings**

After a facility is completed, it is required that PJM receive the final drawings (typically one-lines only) for the installed equipment. Electronic copies of stamped drawings should be sent to your PJMIC.