



Working to Perfect the Flow of Energy

PJM Manual 14A

Generation and Transmission Interconnection Process

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Prepared by

Planning Division

Generation [Integration](#)
[Interconnection](#) Department

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Approval

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Current Revision

Revision ~~0708~~: (~~1/15/2009~~5/1/2009)

~~Revision 08 incorporates (1) corrections and clarifications to items entered under revisions 06 and 07, (2) changes to the deposit requirements for the System Impact Study and Facilities Study phases of interconnection project development, and (3) modifies references to the PJM web site following the PJM web site redesign. Revision 07 changes incorporate a description of the requirements associated with the submittal of site control in conjunction with the submission of an Interconnection Request for wind generation to be studied for interconnection in PJM. This change was produced as a result of recommendations from the Regional Planning Process Working Group.~~

~~Additional revisions incorporate editorial corrections.~~



These Manuals offer a set of guidelines that ensure successful interconnection and operations within PJM.

The accompanying **Attachment A - Interconnection Process Flow Diagram** - portrays in more detail the pertinent planning steps from the initial request up to the request for facility construction. This includes market and operational steps necessary for participation, as appropriate, in the PJM energy and capacity markets, including the process for acquiring any related or necessary transmission rights.

The PJM Manual 14A content is consistent with and elaborates on the terms and conditions found in the source PJM documents. The primary source documents for Manual 14A are the PJM Open Access Transmission Tariff (OATT) and the PJM Operating Agreement. Other applicable source documents may include the PJM Transmission Owners Agreement and the PJM Reliability Assurance Agreement. The source documents remain the final authoritative documents and these documents control with regard to any inconsistencies between them and the PJM Manuals

Merchant Transmission Interconnection Facilities

As specified in the PJM OATT and Schedule 6 of the PJM Operating Agreement, the developers of Merchant Transmission Facilities that interconnect with the PJM Transmission System may be entitled, subject to certain restrictions, to elect certain transmission rights that are created by the addition of such facilities. Discussions of these rights and specific design, construction, operational and maintenance aspects of merchant transmission interconnection facilities can be found by referring to Manual 14.

Initiating the Generation and Transmission Interconnection Planning Process

In order to initiate the Interconnection Planning Process, a Developer must contact PJM through PJM's hotline or through PJM's web site at <http://www.pjm.com/home.aspx>. The Developer must submit a completed Interconnection Request. This is accomplished via the execution of a Feasibility Study Agreement, per OATT Attachment N for generation interconnection requests and OATT Attachment S for merchant transmission interconnection requests. Both Attachment N and Attachment S can be found in Documents/Agreements section of <http://www.pjm.com/home.aspx>. A completed Attachment N or S, including the submittal of all required data, must be accompanied by the appropriate fees as detailed in following sections of this Manual in order to reserve a place in PJM's interconnection queue.

Project Management and Client Management

After contacting PJM for the first time, PJM assigns a Project Manager. The Project Manager will be responsible for working with each Developer and their respective staff to complete the necessary steps related to interconnection planning. Additional Project



Managers will be assigned for subsequent facility construction and operational phases of the project. Refer to Manual 14 for additional references.

After contacting PJM for the first time through PJM's hotline or through PJM's web site at <http://www.pjm.com/home.aspx>, the Developer will be assigned a Client Manager. Client Managers coordinate PJM activities that facilitate each Developer's membership and market participation, bridging any concerns or coordination issues with appropriate PJM staff including the respective PJM Project Managers who oversee the interconnection process.

Electing Capacity Resource Status versus Energy Resource Status

A Developer must elect the status type for the generating capability associated with each interconnection request: Capacity Resource Status or Energy Resource Status. A Capacity Resource status designation permits the generator to be utilized by PJM Load Serving Entities to meet capacity obligations under the terms of the PJM Reliability Assurance Agreement (RAA), available in the Documents/Agreements section of <http://www.pjm.com/home.aspx>.

- *Capacity Resource Status:* Units must meet certain interconnection requirements for being granted this status including requirements for deliverability. Capacity Resource status is granted based on the availability of sufficient transmission capability to ensure the deliverability of generator output to network load and to satisfy the regional reliability requirements of the NERC region in which the generator is located - ReliabilityFirst or SERC. Specific analytical tests performed during the Generation Interconnection Feasibility Study and System Impact Study reveal the specific transmission system upgrades required to meet these reliability criteria. Capacity Resource Status conveys specific capacity interconnection rights enabling a unit to participate in PJM capacity markets. Through these markets, LSEs may procure capacity rights to meet their respective capacity obligations under the terms of the PJM Reliability Assurance Agreement.
- *Energy Resource Status:* The planning studies for generating units seeking this status do not include the deliverability analyses required of those units seeking Capacity Resource status. As such, Energy Resource units are only permitted to participate in the energy market. Such units do not receive capacity interconnection rights and may not participate in PJM capacity markets.

Additional details regarding unit status and the associated interconnection requirements and related analyses can be found by referring to Manual 14.

PJM Membership

Membership in PJM is granted under the terms of the PJM Operating Agreement. The Client Manager assigned to each Interconnection Request will guide each Developer through this process. While PJM membership is not required for the initial planning and construction phases of a given generation or merchant transmission interconnection project, Membership will be required prior to commercial operation. And, in many cases,



Distributed Generation

Developers who are considering construction of generating facilities within PJM which are smaller than 20 MW may follow the Small Generator Interconnection process described above. If a plant operator seeks operation as part of a load management arrangement, the operator is directed to PJM's load management program, found on PJM's web site at <http://www.pjm.com/home.aspx>~~http://www.pjm.com~~.

Behind the Meter Generation

Any Behind the Meter Generation which seeks to be designated in whole or in part as a capacity resource must submit a Generation Interconnection Request. Further, sites with 10 MW or more must abide by PJM metering requirements as well as market, operational and settlement requirements. Manual 14B describes the treatment of Behind the Meter generation, provisions for which are captured in PJM's Open Access Transmission Tariff, Subpart A, Section 36.1.A.

As with any other Interconnection Request, The Developer will be assigned a Project Manager for each process phase captured in Exhibit 2. The Project Manager will be responsible for working with each Developer and staff to complete the respective steps for that particular phase. Attachment B: Interconnection Process Team Role Clarity Diagram captures Implementation Team roles for each interconnection process phase (including a PJM Project Manager for each phase) and shows how each Manual aligns with each phase.

Generating resources operating "behind the meter," in isolation from the PJM bulk power transmission system and which do not intend to participate in the PJM wholesale energy market, need only coordinate planning, construction and/or operation with the host Transmission Owner.



Interconnection Requests and PJM Queue Position

The Interconnection Request must include descriptions of the project location, size, equipment configuration, anticipated in-service date, data as required to complete Attachment F of this Manual 14A, as well as proof of right to control the site for the proposed project. The in-service date must be no more than 7 years from the date the Interconnection Request is received by the Transmission Provider, unless it is demonstrated that engineering, permitting and construction of the project will exceed this period. Upon receipt of the completed Interconnection Request, the project is placed in a PJM Interconnection queue, in which queue positions are determined by the date of submission of the completed Interconnection Request.

The Interconnection Customer must provide either of the following [in order to satisfy the site control requirements](#) associated with a proposed wind facility (The requirements listed below are in addition to the requirements contained in Section 36.1.01 of the PJM Tariff [and do not replace the requirement for the Interconnection Customer to provide legal documentation demonstrating rights to the site land](#)):

1. a site plan indicating the layout of all turbines associated with the proposed project including: 1) number of turbines proposed for the site, 2) size, in megawatts (MW), of each turbine, 3) size, in acres, of the proposed site, 4) distance between the hub(s) of all adjacent turbines on the site and, 5) length of blades on the turbine which is proposed for installation.
- or
2. a minimum of 3 acres per MW of wind units in a single line or 10 acres per MW for a site consisting of wind units distributed over an area

Generation and Transmission Interconnection Feasibility Study Cost Responsibility

As specified in Part IV, Subparts A and G of the PJM Tariff, a party wishing to connect a new generation resource or a new transmission facility to the PJM system must submit an Interconnection Request in the form of an executed Generation or Transmission Interconnection Feasibility Study Agreement (**OATT at Part VI, Attachment N or Attachment S, respectively**) and a study deposit as specified in the table below (Table 1-1). The amount of the deposit is specified in accordance with the size, in MW, as well as the timing of receipt of the Interconnection Request. Refer to Section 3 of this Manual 14A for further details regarding the interconnection process for small resources of 20 MW or less.

The applicant is obligated to pay the actual costs of studies conducted by PJM on its behalf, and the non-refundable deposit is applied to those costs as work is completed. If the cost of the Generation or Transmission Interconnection Feasibility study is reasonably foreseen to exceed the standard deposit listed below for the Interconnection Request before the study begins, PJM will so advise the applicant.



Table 42-1: Large Generation Interconnection Process deposit requirements

Month of New Services Queue	Non-refundable deposit	Cost per MW of Interconnection Request	Maximum deposit
1 st	\$10,000	\$100	\$110 100,000
2 nd	\$20,000	\$150	\$120 100,000
3 rd	\$30,000	\$200	\$130 100,000

Note: The cost per MW of Interconnection Request costs shall be transferable to subsequent studies associated with the individual Interconnection Request. See below for an example of the cost for an Interconnection Request:

Example:

An Interconnection Customer submits a request for interconnection of a 40 MW facility during the first month of the queue period. The deposit costs would be as follows:

Non-refundable deposit:	\$10,000
Cost per MW:	\$4,000
Total deposit:	\$14,000 (To be submitted as a single payment)

Changes to Existing Generators and Transmission Facilities

New owners of existing generators and transmission facilities must execute an Interconnection Service Agreement (ISA) with PJM. Transfer of ownership of existing generating units and transmission facilities is not subject to the interconnection queuing process unless pre-existing capacity injection rights for the unit are not transferred with the change in ownership.

Owners of existing generating plants that plan increases in a plant's output capability by more than 1 MW above that specified in the generating plant's existing ISA must follow the same procedure as new generation specified in the PJM Tariff and the PJM Manuals. These projects will be placed into the interconnection queue and will be evaluated under the same study procedure as new generation.

Some changes, such as improvements to same-site units injecting at a common point, may be aggregated or combined. Such requests are determined on a case-by-case basis.

Owners of existing generating plants that plan to retire or reduce the plant's output capability must notify PJM in order to address capacity credit issues and any potential PJM System economic and/or reliability concerns. After a generator officially notifies PJM of retirement, system upgrades will be identified to resolve any reliability problems associated with the



OATT at Part VI, Subpart A, Section 36.2 - formerly 36.2 and 41.2, in Part IV) for completion by:

- April 30, for requests received during the three month period ending January 31.
- July 31, for requests received during the three month period ending April 30.
- October 31, for requests received during the three month period ending July 31.
- January 31, for requests received during the three month period ending October 31 of the preceding year.

The Generation or Transmission Interconnection Feasibility Study assesses the practicality and cost of incorporating the generating unit or increased generating or transmission capacity into the PJM system. The analysis is limited to short-circuit studies and load-flow analysis of probable contingencies. This study does not include stability analysis. The study also focuses on determining preliminary estimates of the type, scope, cost and lead time for construction of facilities required to interconnect the project.

Results of the study for the requested interconnection service (Capacity Resource or Energy Resource) are provided to the applicant and the affected Interconnection Transmission Owners, and are published on the PJM web site. Confidentiality of the applicant is maintained in these reports, but the location of the project and size (in megawatts) is identified. After reviewing the results of the Generation or Transmission Interconnection Feasibility Study, the applicant must decide whether or not to pursue completion of the System Impact Study.

Generation or Transmission Interconnection System Impact Study Agreement Execution and Analysis

Impact Study Agreement and Cost

After receipt of the Generation or Transmission Interconnection Feasibility Study results, if the applicant decides to proceed, an executed System Impact Study Agreement must be submitted to PJM with ~~a \$50,000~~the required deposit as specified in Section 204.3A of the PJM Tariff. If the cost of the System Impact study is reasonably ~~foreseen-expected~~ to exceed ~~\$50,000~~the deposit received before the study begins, PJM will so advise the applicant.

For an Interconnection Request to maintain its assigned priority, the applicant must execute and return the System Impact Study Agreement (and the required deposit), as well as complete the System Impact Study data form located at (<http://www.pjm.com/planning/rtep-development/expansion-plan-process/form-impact-study-data.aspx> ~~<http://www.pjm.com/planning/form-impact-study-data.html>~~ - See Attachment G for a list of the data required to complete this form) within 30 days of receiving the System Impact Study Agreement. If a New Service Customer fails to meet this deadline, the Interconnection Request will be deemed terminated and withdrawn. In general, the study will be completed within 120 days of the date the study begins. If this is not possible, PJM must



The identity of all applicants, the size and the location of projects for which System Impact Studies have been completed are published on the PJM web site.

After reviewing the results of the study, the applicant must decide whether or not to proceed with a Generation or Transmission Interconnection Facilities Study. If the applicant decides to proceed with the project, the results of the System Impact Study are also rolled into the RTEP Process for development of the RTEP to be submitted to PJM's Board of Managers for approval.

Generation or Transmission Interconnection Facilities Study Agreement Execution and Analysis

Generation or Transmission Interconnection Facilities Study Agreement

Upon completion of the System Impact Study, PJM will furnish a Generation and/or Transmission Interconnection Facilities Study Agreement to the applicant, along with estimated cost of the study and the estimated time of completion. For an Interconnection Request to maintain its assigned priority, the applicant must execute and return the Generation and/or Transmission Interconnection Facilities Study Agreement (and the required deposit) within 30 days of receiving it. If an applicant fails to meet this deadline, the Interconnection Request will be deemed terminated and withdrawn.

The Generation and/or Transmission Interconnection Facilities Study Agreement will provide the estimated cost responsibility and estimated completion date for the study. It may also define reasonable milestone dates that the proposed project must meet to retain its Queue Position while PJM is completing the Generation or Transmission Interconnection Facilities Study. See Attachment F for a General Description of the Facilities Study Procedure.

Generation or Transmission Interconnection Facilities Study Cost

As specified in Part IV, Subparts A and B of the PJM Tariff, if the applicant decides to proceed, the executed Generation and/or Transmission Interconnection Facilities Study Agreement must be returned accompanied by the required deposit [as specified in Section 206.3 of the PJM Tariff, and also listed in Table 2-2.](#)



Table 2-2: Facilities Study costs

<u>Project size</u>	<u>Required deposit</u>
<u>>20MW</u>	<u>The greater of:</u> <u>1. \$100,000</u> <u>OR</u> <u>2. estimated amount of Facilities Study cost for the first three months</u>
<u>>2MW and <20MW</u>	<u>\$50,000</u>
<u><2MW</u>	<u>\$15,000</u>

~~The deposit will be either \$100,000 or the estimated amount of the applicant's cost responsibility for the first three months of work on the Generation and/or Transmission Interconnection Facilities Study, whichever amount is greater (OATT at Part VI, Sections 206.2, 206.3 and 206.4 — formerly 36.6.2 and 41.5.2, in Part IV).~~

Generation or Transmission Interconnection Facilities Study Results

When completed, the Generation or Transmission Interconnection Facilities Study will document the engineering design work necessary to begin construction of any required transmission facilities. The Generation or Transmission Interconnection Facilities Study will also provide a good-faith estimate of the cost to be charged to the applicant for Attachment Facilities, Local Upgrades and Network Upgrades necessary to accommodate the project and an estimate of the time required to complete detailed design and construction of the facilities and upgrades.



Section 3: Small Resource Interconnection Process

In this section you will find the following:

- A description of the small resource interconnection process (see “*Small Resources (20 MW or less)*”).
- Specific provisions applicable to resources of 10 MW and below (see “*Specific Provisions for Resources of 10 MW and below*”).
- Specific provisions applicable to resources greater than 10 MW up to 20 MW (see “*Specific Provisions for Resources above 10 MW to 20 MW*”).

Small Resources (20 MW or less)

Requests for the interconnection of new resources which are 20 MW or less, or increases of 20 MW or less to existing generation (over a 24 month period) may be processed through expedited procedures. (Refer to Part IV, Subpart G of the PJM Tariff.) Expedited procedures are defined in the PJM Tariff for five categories of these “very small resource” additions; permanent Capacity Resource additions of 20MW or less, permanent Energy Resource additions of 20 MW or less, temporary Energy Resource additions of 20 MW or less but greater than 2MW, permanent and temporary Energy Resource additions of 2MW or less, and certified small inverter-based facility additions no larger than 10 kW.

Study Requirements and Cost

In all cases, with the exception of requests for interconnection falling under the process defined in the PJM Tariff applicable to permanent and temporary Energy Resource additions of 2MW or less, an Interconnection Customer must submit an Interconnection Request in the form of an executed Generation Interconnection Feasibility Study Agreement (**OATT at Part VI, Attachment N**) and provide the same information required for larger resources.

Deposit requirements are listed in the table below (Table 23-1) (**OATT at Part IV, Section 112**). Further:

- For resources of 2 MW or less, an interconnection customer must submit a completed Form of Screens Process Interconnection Request (**OATT at Part IV, Section 112A, Attachment Y**). See table 23-2 below for deposit requirements.
- For Certified Inverter-Based resources no larger than 10 kW, an interconnection customer must submit a completed Form of Interconnection Service Agreement for Certified Inverter-Based Facility (**OATT at Part IV, Section 112B, Attachment BB**) and a non-refundable processing fee of \$100.



Table 23-1: Small Generation Interconnection Process deposit requirements
(Interconnection requests of 2 – 20MW)

Month of New Services Queue	Non-refundable deposit	Cost per MW of Interconnection Request	Maximum deposit
1 st	\$1,000	\$100	\$3,000
2 nd	\$2,000	\$150	\$45,000
3 rd	\$3,000	\$200	\$57,000

Note: The cost per MW of Interconnection Request costs shall be transferable to subsequent studies associated with the individual Interconnection Request. See below for an example of the cost for an Interconnection Request:

Example:

An Interconnection Customer submits a request for interconnection of a 10 MW facility during the first month of the queue period. The deposit costs would be as follows:

Non-refundable deposit: \$1,000
Cost per MW : \$1000
Total deposit: \$2,000 (To be submitted as a single payment)

Table 23-2: Small Generation Interconnection Process deposit requirements
(Interconnection Requests of 2MW or less)

Month of New Services Queue	Non-refundable deposit	Cost per MW of Interconnection Request	Maximum deposit
1 st	\$500	\$100	\$700
2 nd	\$1,000	\$150	\$1,300
3 rd	\$1,500	\$200	\$1,900

Note: The cost per MW of Interconnection Request costs shall be transferable to subsequent studies associated with the individual Interconnection Request. See below for an example of the cost for an Interconnection Request:



Example:

An Interconnection Customer submits a request for interconnection of a 1 MW facility during the first month of the queue period. The deposit costs would be as follows:

Non-refundable deposit:	\$500
Cost per MW :	\$100
Total deposit:	\$600 (To be submitted as a single payment)

The deposit associated with the submission of the executed System Impact Study Agreement ~~is the estimated cost of the System Impact Study. (OATT at Part VI, Section 110 and Attachment N-1 – formerly Section 110, in Part IV)~~ shall be in accordance with the requirements of Section 204.3A of the PJM Tariff, which is also listed below in Table 3-3.

Table 3-3: System Impact Study Deposit

Project size	Required deposit
>2MW and <20MW	\$10,000
<2	\$5,000

The Generation Interconnection Facilities Study deposit amount shall be in accordance with the requirements of Section 206.3 of the PJM Tariff, which is also listed in Table 2-2.

~~is the estimated cost of that study, rather than the greater of that amount or \$100,000. (OATT at Part VI, Section 110.3 – formerly Section 110.3, in Part IV)~~

Study Analysis

Analysis conducted during the Generation Interconnection Feasibility and System Impact Studies will be expedited (to the degree possible) for new permanent Capacity Resources of 20 MW or less, or permanent Energy Resources of 20 MW or less, or increases of 20 MW or less to existing resources over any consecutive 24 month period (OATT at Part VI, Section 36.1.02 - formerly Section 36.12, in Part IV).

Power flow analysis will be performed based on a limited contingency set to identify the impact of the resource on the local system and any known violations in the area. Deliverability tests will only be performed for small capacity resources in areas where margins are known to be limited. Similarly, stability analysis will only be performed for small resources where existing stability margins are limited. Generation Interconnection Facilities Studies for small resources can only be expedited consistent with the scope of the required transmission facility additions and upgrades.

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- requesting dispute resolution, or
- requesting, under certain circumstances, that the Interconnection Service Agreement be filed unexecuted.

Further details regarding each of the three response actions may be found in Part VI of the PJM Open Access Transmission Tariff, available from FERC or on the PJM web site at <http://www.pjm.com/home.aspx>~~http://www.pjm.com~~.

Additionally, within the same 60-day period, the applicant must demonstrate:

- Completion of a fuel delivery agreement and water agreement, if necessary.
- Control of any necessary rights-of-way for fuel and water interconnections, if necessary.
- Acquisition of any necessary local, county, and state site permits.
- A signed memorandum of understanding for the acquisition of major equipment.

PJM may also include other reasonable milestone dates for events such as permitting, regulatory certifications, or third-party financial arrangements. Milestone dates may be extended by the PJM in the event of delays not caused by the Interconnection Customer, such as unforeseen regulatory or construction delays.

Additionally, PJM will again ensure that the Generation and/or Transmission Interconnection Customer has access to the Applicable Technical Requirements and Standards of the Interconnected Transmission Owner(s) for parallel operation of generators with the Interconnected Transmission Owner(s) systems and other matters generally included in good utility practice. Technical requirements for generator and transmission interconnections include but are not limited to:

- Engineering design requirements and standards
- Interconnection protection requirements
- Generator under frequency trip settings to coordinate with automatic underfrequency load shedding schemes
- Voltage control and reactive output requirements (OATT at Part VI, Section 4.7 in Att. O, App. 2 - formerly Section 54.7, in Part IV)
- Data and control requirements for transmission system operation
- Equipment specifications and suppliers
- Construction requirements and standards
- Engineering, procurement and construction process requirements and standards



Pursuant to section 1.2C of the PJM Tariff, PJM makes documents containing Applicable Technical Requirements and Standards for each Interconnected Transmission Owner available through its internet site at <http://www.pjm.com/planning/design-engineering/maac-to-guidelines.aspx><http://www.pjm.com/planning/trans-standard.html>. Directions to complete a form for a user ID and password for access to the Applicable Technical Requirements and Standards are included on the internet site.

PJM will file the Interconnection Service Agreement in compliance with applicable Commission guidelines. If the applicant has requested dispute resolution or unexecuted filing, construction of facilities and upgrades shall be deferred until any disputes are resolved, unless otherwise agreed by the applicant and the affected Interconnected Transmission Owner(s).

Interim Interconnection Service Agreements

Under certain circumstances, an applicant for an Interconnection Service Agreement may wish to initiate project construction activities on an expedited basis prior to completion of the Generation or Transmission Interconnection Facilities Study. One example of such a circumstance is to request that orders be placed for equipment or materials that have a long lead time for delivery. To initiate such an advance of construction activities, the applicant may request execution of an Interim Interconnection Service Agreement (**OATT at Part VI, Attachment O-1**) for those construction activities being advanced.

The Interim ISA would bind the applicant for all costs incurred for the construction activities being advanced pursuant to the terms of the PJM Tariff. While PJM agrees to provide the applicant with the best estimate (determined in coordination with the affected Transmission Owner(s) of the new facility costs and other charges that may be incurred for the work being advanced, such estimate shall not be binding and the applicant must agree through execution of the Interim ISA to compensate PJM and the affected Transmission Owner(s) for all costs incurred due to those activities that were advanced.

NOTE: Further information on all required studies and the Interconnection Service Agreement may be found in Part VI, of the PJM Open Access Transmission Tariff (**OATT at Part VI, Section 212 - formerly Subpart A at 36.8, in Part IV** for Generation Interconnections, **OATT at Part VI, Section 212 – formerly Subpart B at 41.7** for Transmission Interconnections, **OATT at App. 2 of Att. O – formerly Subpart E** for Standard Terms and Conditions and **Attachment O** for the form of Interconnection Service Agreement in Part VI – formerly Part IV) available on the PJM Web site, <http://www.pjm.com/documents/agreements/pjm-agreements.aspx><http://www.pjm.com/documents/agreements.html>.



Interconnection Construction Service Agreement

The construction of any Interconnection Facilities required to interconnect a generator or transmission project with the PJM Transmission Grid shall be performed in accordance with the Standard Terms and Conditions as specified in an Interconnection Construction Service Agreement to be executed among the applicant for Transmission Service (Generation or Transmission Interconnection Customer), PJM and the affected Interconnected Transmission Owner(s). The form of an Interconnection Construction Service Agreement may be found in the PJM Open Access Transmission Tariff as Attachment P.

The party(ies) responsible for installing the Generator and/or Transmission Interconnection Facilities and/or Network Upgrade Facilities shall use Reasonable Efforts to install those facilities in accordance with an agreed Schedule of Work.

NOTE: Further information on all terms and conditions to be incorporated and made part of an Interconnection Construction Service Agreement may be found in **Part VI, Att. P, App. 2 of the PJM Open Access Transmission Tariff** (formerly **Subpart F** for Standard Construction Terms and Conditions and **Attachment P** for the form of an Interconnection Construction Service Agreement in Part VI) available on the PJM Web site, www.pjm.com/documents/agreements.html.

Option to Build

In the event that the Generation and/or Transmission Interconnection Customer and the Interconnected Transmission Owner are unable to agree upon the terms of an Interconnection Construction Service Agreement, the Interconnection Customer shall have the right, but not the obligation ("Option to Build"), to design and install all or any portion of the Transmission Owner Interconnection Facilities.

General Timeline

If the Interconnection Customer chooses to exercise the Option to Build, the Interconnection Parties must adhere to the following timeline:

- The Interconnection Customer must provide PJM and the Interconnected Transmission Owner with written notice of its election to exercise the option by no later than **7 days** after the date that is **30 days** after the Interconnection Customer's execution of the Interconnection Service Agreement.
- Within **10 days** after notifying PJM of its election to exercise Option to Build, Interconnection Customer shall solicit bids from one or more Approved Contractors.
- Prior to commencing construction, the Interconnection Customer shall submit to the Interconnected Transmission Owner and PJM initial drawings, certified by a registered professional engineer, of the Transmission Owner Interconnection Facilities that the Interconnection Customer arranges to build under the Option to



NOTE: Further information on all terms and conditions to be incorporated under the Option to Build may be found in **Part VI, Section 3.2.3 in App. P, App. 2 – formerly Part IV, Subpart F at 83.2.3** of the PJM Open Access Transmission Tariff, available on the PJM Web site at <http://www.pjm.com/documents/agreements/pjm-agreements.aspx><http://www.pjm.com/documents/agreements.html>.

Specific Process Flow and Timeline (See Timeline in Attachment A)

Activity	Activity Duration	Cumulative Duration
Generation and/or Transmission Interconnection Customer (IC) submits an initial Interconnection Request in the form of an executed Generation and/or Transmission Interconnection Feasibility Study Agreement to PJM with all required information including evidence of ownership interest and a deposit to be used for the Interconnection Studies. PJM informs the affected Interconnected Transmission Owner(s) (ITOs) upon receipt of each Generation and/or Transmission Interconnection Request.	Requests received in 4 cycles per year ending on January 31, April 30, July 31, and October 31.	Up to 91 days (may be accelerated for small resource projects of 20 MW or less)
PJM conducts Generation and/or Transmission Interconnection Feasibility Study in coordination with each affected ITO. Complete studies in 4 cycles per year (complete by April 30, July 31, October 31, and January 31)	Up to 92 day window	Up to 183 days
PJM responds to the IC with the Generation and/or Transmission Interconnection Feasibility Study Agreement results, tenders a System Impact Study Agreement to the IC, provides notification to the affected ITOs and posts the results of the Generation and/or Transmission Interconnection Feasibility Study on the PJM web site.		
IC determines response to the Generation and/or Transmission Interconnection Feasibility Study results.	Up to 30 days	Up to 213 days
IC submits an executed System Impact Study Agreement (with proof of application for an air permit if required for a generator installation) and a \$50,000 deposit (the \$50,000 minimum deposit amount is waived for small resources of 20 MW or less).		
PJM conducts the System Impact Study, in coordination with any affected ITOs, during the next designated cycle and completes the Study within 120 days of commencement. Commence studies in 4 cycles per year (commence by June 1, September 1, December 1, and March 1)	Up to 120 days for study	Up to 333 days
PJM advises the IC of the System Impact Study Agreement results, tenders a Facilities Study Agreement to the IC/D, provides notification to the affected ITOs and posts the results of the System Impact Study on the PJM web site.		



4. 4.1.4.1 Distribution Secondary Grid Networks.

IEEE 1547 presently does not address the requirements for Secondary Grid Networks. These interconnection requests will be evaluated on a case by case basis.

5. 4.1.6 Monitoring.

“Each DR unit of 250 kVA or more or DR aggregate of 250 kVA or more at a single PCC shall have provisions for monitoring its connection status, real power output, reactive power output, and voltage at the point of DR connection.” Local monitoring provisions, such as panel meters and indicating lights, may be acceptable to meet these requirements in certain cases.

- A. An Internet-based SCADA alternative (see Informative Annex #2) was developed as a reliable and economical alternative to direct SCADA communications with the TO. In addition to generally lower installed cost for the “Internet SCADA alternative,” the Internet ongoing communication costs may be more cost effective to other alternatives, especially those that require leased telephone circuits.

NOTE: Informative Annex #2 is available on the PJM Web site (<http://www.pjm.com/planning/rtep-development/expansion-plan-process.aspx>~~www.pjm.com~~) by following the site menu for Planning > Reliability Planning Process > Expansion Planning Process and then and selecting from among the 10 specific documents listed under the heading “Information Annex #2 References for Manual 14D, Attachment H.”

- B. When full-time dedicated SCADA communications are required (see Transmission Owner (“TO”) listing below and refer to the SCADA REQUIREMENTS spreadsheet - Informative Annex #1) the DG Owner, PJM or the TO will provide and/or install a suitable SCADA Remote Terminal Unit in accordance with the specifications provided in Informative Annex #2 or an alternative mutually suitable to the DG Owner, Transmission Owner and PJM.
- C. The PJM TOs agree to accept the “Internet SCADA alternative” (see Informative Annex #2), in lieu of direct SCADA communications with the TO, except in circumstances where the “Internet SCADA alternative” does not meet certain TO technical requirements specified and justified by the TO.
- D. If the TO, PJM and DR owner mutually agree, specifications for other suitable interfaces between the DG and TO SCADA can be acceptable. Where applicable, this approach would allow a DR owner to use a SCADA protocol of their choice and provide an interface closer to the Transmission Owner’s SCADA facility. Such an installation must provide adequate communication performance, suitable to PJM and the TO.



Attachment F: Generation Interconnection Feasibility Study data

Scope

This Generation Interconnection Feasibility Study data attachment to Manual 14A is intended to provide a listing of the data which is required so that an Interconnection Customer may complete the data form located on the PJM website (link given below). Completion of the form on the web site, and submission of the additional data as listed at the link provided below, is necessary for an Interconnection Request to be deemed a valid request.

Link location for data submittal: <http://www.pjm.com/planning/rtep-development/expansion-plan-process/form-feas-study-data.aspx><http://www.pjm.com/planning/feas-study-data.html>

Data Requirements for PJM RTEPP Feasibility Studies

Feasibility Studies are conducted to identify transmission expansion needed to maintain the system reliability given your generation onto the network. The data submitted is required to perform the power flow, and short circuit analysis which are necessary for the Feasibility Study Phase.

PJM uses the following programs to perform the Feasibility Analysis:

1. PSS/E program from PTI, Inc. (power flow)
2. Aspen from Advanced Systems for Power Engineering, Inc. (short circuit)

All data must be provided on an individual unit basis.

For example, a combined cycle plant with two identical Combustion Turbines (CTs), and one Steam Turbine (ST), would have 2 submissions of the data request form. One submission for the CTs, and one submission for the ST.

If the final unit specifications are not certain an approximation must be made.

When more information is available, the Interconnection Customer must provide an update to PJM so that the typical model may be replaced with a detailed model based on the actual unit purchased.

Following is the information required to complete the data which is required for a Generation Interconnection Feasibility Study:

General and identifying information

- Interconnection Customer name *



Attachment G: System Impact Study data

Scope

This System Impact Study data attachment to Manual 14A is intended to provide a listing of the data which is required so that an Interconnection Customer may complete the data form located on the PJM website (link given below). Completion of the form on the web site, and submission of the additional data as listed at the link provided below, is necessary for an Interconnection Request to be deemed a valid request.

Link location for data submittal: <http://www.pjm.com/planning/rtep-development/expansion-plan-process/form-impact-study-data.aspx><http://www.pjm.com/planning/form-impact-study-data.html>

Data Requirements for PJM RTEPP System Impact Studies

The data listed below must be submitted to ensure proper modeling of Interconnection Requests in the System Impact Study phase. System Impact Studies are conducted to identify transmission expansion needed to maintain the system reliability given the addition of your generation on to the network. The data that is submitted is required to perform the power flow, short circuit and dynamic simulation analyses which are necessary for the Impact Study phase.

PJM uses the following programs to perform the System Impact Study Analysis:

1. PSS/E from PTI, Inc. (power flow and dynamic simulation)
2. Aspen from Advanced Systems for Power Engineering, Inc. (short circuit)

Minimum requirement fields are indicated by *

All data must be provided on an individual unit basis.

For example, a combined cycle plant with two identical Combustion Turbines (CT), and one Steam Turbine (ST), would have 2 submissions of the data request form. One submission for the CT, and one submission for the ST.

If the final unit specifications are not certain an approximation must be made. When more information is available, the Interconnection Customer must provide an update to PJM so that the typical model may be replaced with a detailed model based on the actual unit purchased.



Revision History

Revision 07: (1/15/2009)

Revision 07 changes incorporate a description of the requirements associated with the submittal of site control in conjunction with the submission of an Interconnection Request for wind generation to be studied for interconnection in PJM. This change was produced as a result of recommendations from the Regional Planning Process Working Group.

Additional revisions incorporate editorial corrections.

Revision 06: (08/08/2008)

Material related to the Interconnection process has been split from Manual 14B and located here. General material introducing the Manual 14 Series has been relocated to a new draft under construction which will be called Manual 14. Manual 14 will be devoted to introductory material for the entire PJM Manual 14 series.

The following Interconnection process material includes extensive revisions related to improvements to the Queue study processes and procedures pursuant to applicable FERC and stakeholder proceedings as well as an accumulation of ongoing "housekeeping" updates.

Revision 05 (06/07/06)

Revision 05 includes text revisions to state that PJM Transmission Expansion Planning 1) accommodates requests for new interconnections and 2) identifies the need for transmission system equipment replacements and/or upgrades through probability risk assessment (PRA) analysis of bulk power transformers as an input to the Regional Planning Process. Replaced references to "ECAR, MAAC and MAIN" with ReliabilityFirst,

Revisions were made on page 6, 7, 11 and 12.

Revision 04 (10/01/05)

Revision 04 includes text that has been amended to accommodate the following: (1) clarification of small generation procedures; (2) clarification of Project Manager and Client Manager roles; and (3) additional explanatory information on treatment of generator deactivations.

Revision 03 (10/01/04)

Revision 03 includes text revisions to accommodate the following: (1) changes necessitated by compliance with FERC Order 2003 on Standardized Generator Interconnection Agreements and Procedures; (2) changes necessitated by integration with AEP, Dayton, Dominion and Duquesne; (3) capacity and energy unit status text clarification; and (4) recent process changes to address behind-the-meter generation and economic planning.