PJM Manual 14A:

New Services Request Process

Revision: 27

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Prepared by
Interconnection Projects Department

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Approval

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Jason Connell, Manager

Interconnection Projects

Current Revision

Revision 27 (07/01/2020):

The following administrative changes were made as part of the periodic manual review:

- Section 1.1 – updated the references to PJM manuals to align with their current titles
- Section 1.3 - updated New Services Queue Swim Lane diagram
- Section 2.2.1 - added table to clarify queue study timelines
- Section 2.3.1 – added diagram to illustrate New Service Request deficiency review timeline
- Section 4.1 - updated section header
- Section 4.2. 4.3.1, 4.6.1, 4.6.2 - added tables to clarify interconnection study milestone dates
- 4.5.1, 4.5.3, 5.4.4 – renumbered existing exhibits
- Section 5.5.2 - clarified Specific Process Flow and Timeline

Introduction

Welcome to the New Services Request Process Manual. In this Manual you will find:

- A table of contents
- An approval page that lists the required approvals and the revision history
- This Introduction
- Sections summarizing the application process, study process, and agreements tendered for any New Services Customer.
- Attachments that include additional supporting documents and tables.

About This Manual

This PJM Manual, ***New Services Requests Study Process*** is one of the PJM Manual 14 series family. This manual guides New Services Requests customers through the planning and study phase of their proposed project up to the request for facility construction.

Intended Audience

The intended audience for this PJM Manual includes the following:

- Any New Services Customers who propose to :
  - Interconnect new or upgrade existing generation on the PJM system
  - Build new or upgrade existing transmission facilities to obtain rights
  - Upgrade rating of existing transmission facilities to acquire additional financial rights or customers seeking Incremental Auction Revenue Rights.
- PJM Transmission Owners and other PJM Members and their staffs.
- PJM staff.

References

The entire PJM Manual 14 series addresses issues that may be related to or of interest to the New Services Customer. The reader of this manual is urged to review the other manuals for additional material of interest. All PJM manuals can be found in the library section on PJM's website. In addition, the reader is urged to also check PJM committee postings for possible draft revisions that may be awaiting posting under the Library/Manuals section of PJM.com.

Section 1: New Services Requests Study Process Overview and Determining Customer Type

Welcome to the Overview and Determining your Customer Type section of the PJM Manual for **New Services Requests Study Process**. In this section you will find the following information.

- A description of PJM's interconnection process as outlined in the PJM Manual 14 series.
- A description of the purpose of the manuals included in the PJM Manual 14 series.
- The types of New Services Requests received by PJM and customer classifications.
- Guidance for the New Service Customer on their customer type, which PJM manuals to reference, and applicable Tariff attachments, studies, and agreements based on their customer type.

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

Manual **14A, Attachment A– Interconnection Process Flow Diagram - portrays in more detail the pertinent planning steps from the initial New Service Request up to the request for facility construction.**

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 (Tariff) 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.

1.1 PJM Interconnection Process Overview

The PJM Regional Transmission Organization (RTO) has the responsibility for planning the expansion and enhancement of the PJM Transmission System on a regional basis. As the RTO, PJM administers the connection of generators, interconnection of Merchant Facilities, requests for Transmission Service and upgrades to existing Transmission Owner facilities in the PJM Transmission System through the New Services Requests process. In this role, PJM coordinates the planning process, performs reliability studies, and oversees the construction of the required Interconnection Facilities, Merchant Transmission facilities, and any associated network upgrades.

PJM Manual 14A describes the New Services Requests process which outlines how entities request the interconnection of a Generating Facility (including increases to the capacity of an existing generating unit or decommissioning of a generating unit), the interconnection of a merchant transmission facility (including upgrades to existing merchant transmission facilities), requests for Transmission Service, or upgrades to existing Transmission Owner facilities within the PJM RTO. This process ensures the successful, timely completion of PJM's planning, facility construction, and operational and market infrastructure requirements. For the purposes of this Manual, the term "Developer" is used to encompass any entity which bears responsibility

for bulk power system upgrades, whether a third party seeking interconnection or an existing Transmission Owner with responsibility for Baseline Upgrades or self-identified enhancements.

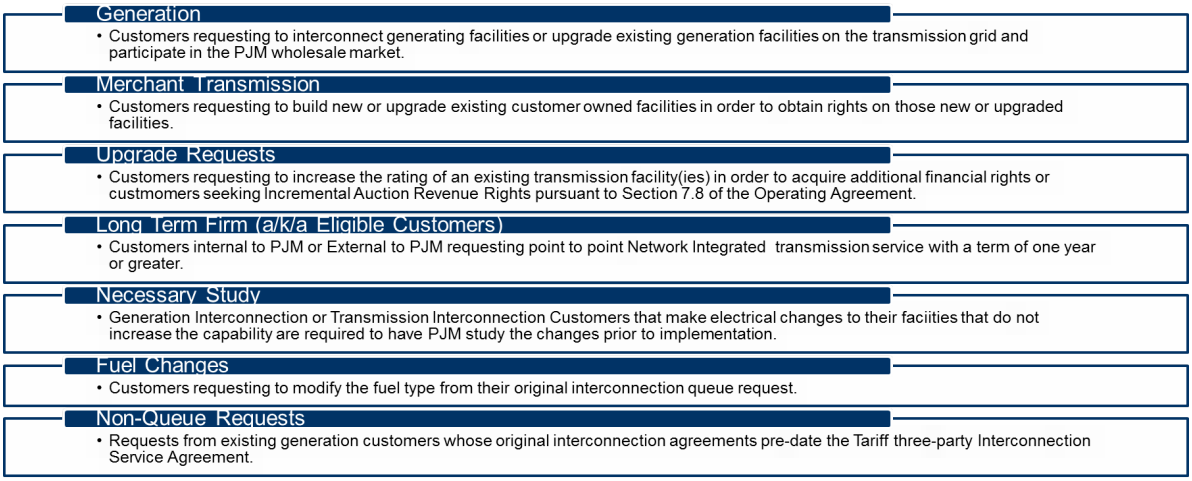
Manual 14A is first in a series of PJM Planning Manuals which cover all aspects of Transmission Planning including customer interconnections and transmission expansion:

Manual	Title	Description
14A	New Services Requests Process	Guides New Service Customers through the general application, study and agreement process
14B	PJM Region Transmission Planning Process	Describes the process of planning baseline expansion facilities and base case development
14C	Generation and Transmission Interconnection Facility Construction	Covers the lifecycle of a project from agreement execution to commercial operation and also describes the process of tracking RTEP projects.
14D	Generator Operational Requirements	Identifies the markets and operations requirements for generators to connect to the PJM system.
14E	Upgrade and Transmission Interconnection Requests	Identifies the specific requirements, study/agreement overview, and rights for Upgrade Requests and Merchant Transmission Interconnection projects proposed on the PJM system.
14F	Competitive Planning Process	Outlines the process to conduct competitive proposal windows consistent with Order No. 1000.
14G	Generation Interconnection Requests	Identifies interconnection requirements, upgrade requirements, study/agreement overview, and rights for any generator customer.

PJM recommends the New Service Customers first review Manual 14A for study and agreement guidance. After reviewing the study process, a Transmission Interconnection Customer or Upgrade Customer should then review Manual 14E for specific requirements. After reviewing the study process, Generator Interconnection Customers should reference Manual 14G for their specific requirements.

1.2 New Service Customer Request Types Proposed

PJM receives different types of New Services Requests from customers as identified below:



1.3 New Service Customer Classifications

1.3.1 Generation Interconnection Customer

The PJM Tariff classifies a party wishing to perform the following on the PJM Transmission System as a **Generation Interconnection Customer**:

- Interconnect a new generation facility to the Transmission System in the PJM region
- Increase the capacity of an existing generation facility interconnected with the Transmission System in the PJM region
- Modify the fuel type of an existing facility or generation interconnection request or
- Interconnect a generating unit to distribution facilities located in the PJM Region that are used to make wholesale sales using the output of the generating unit.

1.3.2 Transmission Interconnection Customer

The PJM Tariff classifies a party wishing to perform the following on the PJM Transmission System as a **Transmission Interconnection Customer**:

- Interconnect or add new Merchant Transmission Facilities to the Transmission System
- Increase the capability of existing Merchant Transmission Facilities interconnected with the Transmission System
- Propose to increase the capability of existing Transmission Owner Facilities, or
- Advance the construction of any transmission enhancement or expansion other than Merchant Transmission Facilities that is included in the Regional Transmission Expansion Plan prepared pursuant to Schedule 6 of the Operating Agreement.

1.3.3 Upgrade Customer

The PJM Tariff classifies a party wishing to perform the following on the PJM Transmission System be considered an **Upgrade Customer**:

- Request Incremental Auction Revenue Rights pursuant to Section 7.8 of the Operating Agreement.

1.3.4 Eligible Customer

The PJM Tariff classifies the following as an **Eligible Customer**:

- Any electric utility (including any Transmission Owner and any power marketer), Federal power marketing agency, or any person generating electric energy for sale for resale is an eligible customer.
- Any retail customer taking unbundled transmission service pursuant to a state requirement that PJM or a Transmission Owner offer the transmission service, or pursuant to a voluntary offer of such service by a Transmission Owner, is an eligible customer.

According to the Tariff, there are different agreements required to request service depending on the customer's type. The requester must submit the proper agreement based on the type of service being requested. The following chart depicts the various types of service, the associated customer types, the applicable PJM Manual references, and the study process flow through final agreements.

Project Type Requested	Customer Owned Generation Request (20 MW or less)	Customer Owned Generation Request (Over 20 MW)	Customer owned Merchant Transmission Facilities Request	Customer Funded Upgrade to Transmission Facilities Request	Incremental Auction Revenue Rights Request	Transmission Service into, out of or through PJM
Customer Type	Generation Interconnection Customer	Generation Interconnection Customer	Transmission Interconnection Customer	Transmission Interconnection Customer	Upgrade Customer	Eligible Customer
Applicable Manual Reference	Manual 14G	Manual 14G	Manual 14E	Manual 14E	Manual 14E	Manual 2
Interconnection Queue Entry	OATT Attachment N, Y, BB	OATT Attachment N	OATT Attachment S	OATT Attachment EE	OATT Attachment EE	OATT Attachment FF
Interconnection Studies	Feasibility, System Impact, Facilities or Combined Feasibility/System Impact	Feasibility, System Impact, Facilities	Feasibility, System Impact, Facilities	System Impact, Facilities	Market Requirements, Feasibility, System Impact, Facilities	Feasibility, System Impact, Facilities
Agreements	ISA IISA ICSA WMPA	ISA IISA ICSA WMPA	ISA, ICSA, UCSA	UCSA	UCSA	UCSA (for construction), TSA (for point-to-point), NITSA (for Network Integrated)

Agreement	Description
ISA	Interconnection Service Agreement
IISA	Interim Interconnection Service Agreement
ICSA	Interconnection Construction Service Agreement
NITSA	Network Integration Transmission Service Agreement
TSA	Transmission Service Agreement
WMPA	Wholesale Market Participation Agreement

New Services Requests Swim Lane Diagram

1.3.5 Tariff Rights

As specified in the PJM Tariff and Schedule 6 of the PJM Operating Agreement, the Developers of Merchant Transmission Facilities, Merchant Network Upgrades, and Generation

Interconnection Requests 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 the PJM Tariff, Sections 230 through 236. Merchant Transmission rights are also discussed in Manual 14E.

Section 2: Initiating a New Service Request

Section 2 outlines the process of how to submit a New Services Request to PJM. Depending on your customer type, your attachment type will vary. This section will also describe what PJM deems to be a valid New Services Request.

2.1 Queue Point Application Process

In order to initiate the New Services Requests Process, the customer must submit a completed New Services Request via the Queue Point tool which is available on the PJM Website along with a User Guide at the following link, a view of which can be seen in Exhibit 1 below:

http://pjm.com/planning/rtep-development/expansion-plan-process.aspx

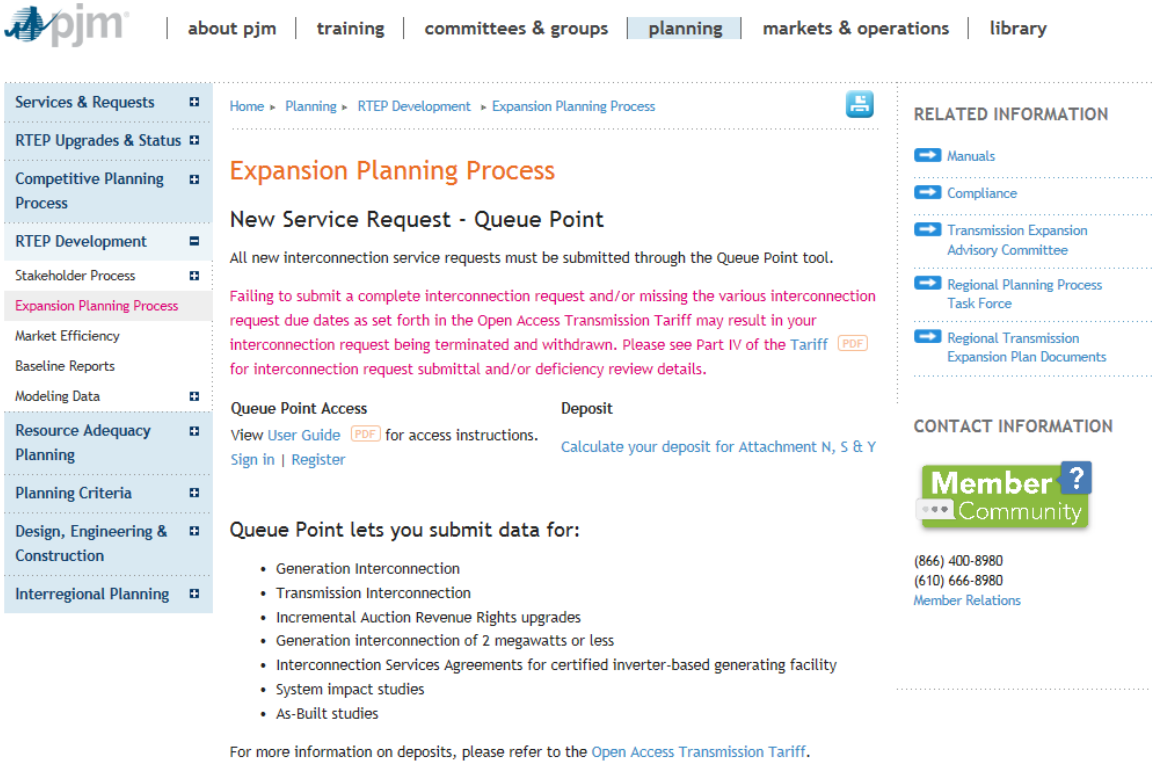


Exhibit 1: pjm.com New Services Request - Queue Point page

Queue Point is a module within PJM's Planning Center tool which allows you to enter data which is used to conduct various studies in order to identify any enhancements to the transmission system that are needed to maintain grid reliability while accommodating the new service request. The tool consolidates Attachment N, Attachment BB, Attachment EE, Attachment S, Attachment Y Feasibility Study data, System Impact Study data, and As-is Study data. It is able to handle the deficiency process, including automated notifications, integration with PJM calendars, and role-based functionality.

The Queue Point wizard will help guide to determining the proper Attachment form for your New Services Request. You can also reference the Decision Tree in Exhibit 2 below. In order to use

Queue Point, you must have an active CAM (customer Account Manager) account. Reference the Queue Point User Guide for direction.

Completed Attachments, 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 New Services Queue.

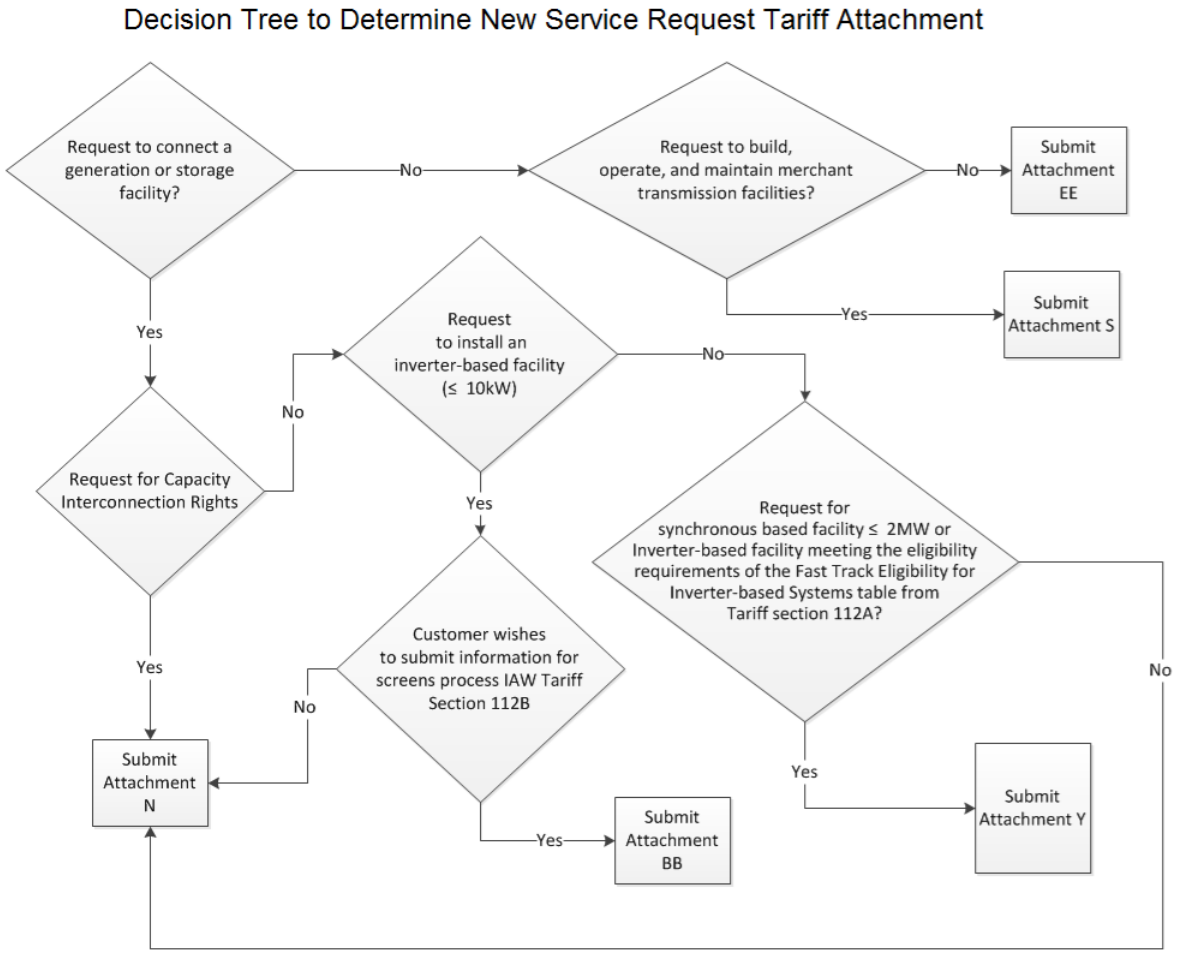


Exhibit 2: Decision Tree to Determine New Service Request Tariff Attachment

2.2 New Services Requests and PJM Queue Position

2.2.1 New Services Requests and PJM Queue Position

There are two New Service Queue windows per year according to the PJM Open Access Transmission Tariff for PJM to accept New Service Requests. Each window is open for six months:

Queue Window	Queue Opens	Queue Closes
First	October 1, 12:00 a.m. EST	March 31, 11:59 p.m. EST
Second	April 1, 12:00 a.m. EST	September 30, 11:59 p.m. EST

The queue deposit structure found in Manual 14A and Manual 14G was designed to incentivize early queue submittals. Earlier queue submittals provide time for data reviews, scoping meetings, planning model development and analysis of all valid New Service Requests.

A New Service Request will not be assigned a queue position until all Tariff requisite information, data, agreements, and deposits are submitted. A New Service Request that does not contain all the required elements is deemed an insufficient request. When submitting an Attachment N, a Generation Interconnection Customer must certify that it has provided all information.

Upon receipt of an executed New Service Request and the required deposit, PJM will open a chargeable account and begin reviewing the New Service Request submittal. Whether the request is insufficient, lacking required elements or deficient, provided all required elements but with incorrect, missing or underprovided elements, PJM will commence a review of the submittal. The costs associated with the time required to review the submittal will be deducted from the deposit.

Note:
Effective November 1, 2016, PJM will perform a deficiency review as long as a Developer provides all information other than site control. While PJM will perform the deficiency review, the project will not be assigned a queue position until site control is received. The customer must provide site control by the earlier of the end of the deficiency period or the close of the queue window. Providing site control after a deficiency window has already started does not establish new deficiency window period. Site control must be cleared within the original deficiency window period.

2.2.2 Generation Interconnection Customer – Attachment N, Y or BB.
Developers of generation interconnection projects will complete an Attachment N, Y or BB as specified in Exhibit 2 above.

2.2.3 Transmission Interconnection Customers – Attachment S or EE
Customers who request a customer-owned Merchant Transmission Facility or a customer-funded upgrade to a transmission facility are considered to be Transmission Interconnection Customers. These customers will either complete an Attachment S or EE as specified below per Manual 14E.

2.2.3.1 Merchant Transmission Facilities Requests – Attachment S
Customers requesting to build, own, and operate Merchant Transmission Facilities interconnected to the PJM system must complete Attachment S.

2.2.3.2 Upgrade to Transmission Facilities Requests – Attachment EE
Customers requesting an upgrade to a transmission facility interconnected to the PJM system or who seek to accelerate a PJM board approved RTEP upgrade project must complete Attachment EE.

2.2.4 Upgrade Customers – Attachment EE

Customers that seek Incremental Auction Revenue Rights per Tariff Attachment K, Appendix Section 7.8 must submit Attachment EE.

2.3 Deficiency Reviews

2.3.1 New Service Request deficiency reviews

As identified in section 2.2, a Queue Position is assigned once all the requisite information and deposit is provided to PJM. Assignment of the Queue Position assures the Developer queue priority, but does not mean that the request is valid.

New Services Request validity is determined by a deficiency review. If the Interconnection Request is missing information, is deficient, or if the Developer owes money from prior New Service Requests, PJM will issue a deficiency notification to the Developer within five business days from receipt of the initial New Services Request. In addition to site control, data, and deposits, PJM will consider the reasonableness of the planned in-service date stated in the Attachment N request. Any request for an in-service date in advance of the Tariff prescribed study period is unreasonable. For any generation interconnection request, the in-service date must be after the Tariff due date for the System Impact Study report plus the credible construction schedule. Note that the proposed in-service date will be modified during the study phase as required to accommodate network upgrades. Upon PJM issuing the deficiency notification, the Developer has 10 business days to provide the missing/ deficient information and/or money. If any required information, including site control, required for a Queue Position to be assigned is missing from the initial Interconnection Request submittal, a Queue Position will not be assigned until that information is received.

The Transmission Provider is afforded an additional five (5) business days to review each Interconnection Customer's deficiency notification response. If PJM identifies remaining unsatisfied deficiencies, the Interconnection Request shall be terminated and withdrawn.

The following examples are provided to illustrate how the Transmission Provider's additional five (5) business day review period may run concurrently with the Interconnection Customer's ten (10) business day deficiency response period:

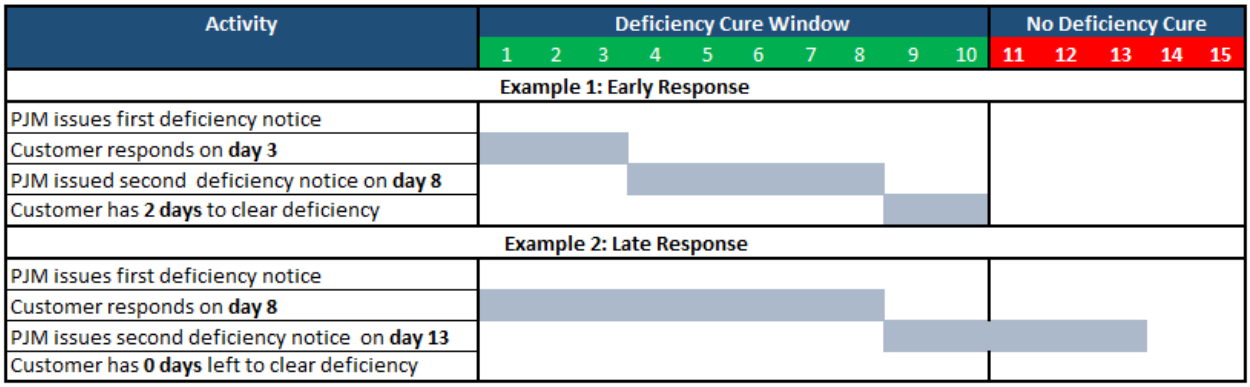


Exhibit 3: New Service Request Deficiency Reviews

Based on the examples above, PJM recommends that the New Service Customer responds to a deficiency notice latest by day 4, in order to have at least one day to correct any additional deficiencies identified during the Transmission Provider review.

Section 3: PJM Support for New Service Customers

Section 3 describes the support a New Service Customer will receive upon submitting a valid New Services Request. It also defines membership privileges.

3.1 Project Management and Client Management

After submitting a PJM New Service Request, 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.

After contacting PJM for the first time through PJM's hotline or through PJM's web site, 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.

3.2 PJM Membership

Membership in PJM is granted under the terms of the PJM Operating Agreement. The Client Manager assigned to each New Services Request will guide each customer 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, Membership will be required in order to integrate operational and market infrastructure with PJM. PJM Membership entails certain data requirements, operational and market coordination, committee support and financial obligations.

3.3 Membership in NERC Regional Councils

PJM operates within the geographic boundaries of several regions of the North American Electric Reliability Corporation (NERC), including applicable areas of the Reliability*First* and the SERC Reliability Corporation. Any new signatory to the PJM Operating Agreement is obligated to be in compliance with the respective planning, operating and membership requirements of the respective NERC Council in which their facilities are located.

PJM is the registered Balancing Authority (BA), Reliability Coordinator (RC), Transmission Planner (TP), Transmission Service Provider (TSP), Resource Planner (RP), and the Planning Authority (PA) for its footprint. PJM is also the registered Transmission Operator (TOP) for its footprint except for transmission facilities owned and operated by ITC Interconnection LLC (ITCI) and facilities at or below 138 kV that are owned and operated by American Electric Power (AEP).

Section 4: New Services Request Study Process

Section 4 identifies the phases of study for a New Services Request and the reports what will be delivered to the customer upon completion.

4.1 New Services Requests Study Overview

The PJM Operating Agreement, Schedule 6, and the Tariff, Parts IV and VI, describe the procedures used to process New Services Requests for the PJM transmission system. The Operating Agreement and Tariff establish the statutory basis for the business rules, described in detail in this Manual M14A, for the interconnection request process. These business rules include three analytical steps:

1. Feasibility Study
2. System Impact Study
3. Interconnection Facilities Study.

Each step imposes its own financial obligations and establishes milestone responsibilities.

Projects within each time-based queue are evaluated against a baseline benchmark set of studies in order to establish project-specific responsibility for system enhancements, separate from general network upgrades suggested by the results of baseline analyses. Each Developer is encouraged to participate in the activities of the Transmission Expansion Advisory Committee (TEAC) and its Sub regional RTEP Committee. PJM consults with the TEAC and Sub regional RTEP Committees as part of the larger Regional Transmission Planning Process through which a coordinated regional expansion plan – including expansions necessitated by generation and merchant transmission interconnection - is reviewed.

Important PJM interconnection process steps established to implement provisions of the PJM Tariff:

- The interconnection queuing process including the procedures used to initialize the interconnection evaluation process based on the timing of the receipt of all requests
- The cost responsibility for transmission upgrades required for interconnection;
- The rights accorded to a generator after it has satisfied Tariff requirements;
- The required Interconnection Service Agreement (ISA) and Construction Service Agreement (CSA). Each of these two agreements is executed by and among three parties: the Developer, the Transmission Owner and the Transmission Provider (PJM).

4.2 Feasibility Study

After a valid New Services Request is received, PJM assigns a System Planning Project Manager as the Team Leader to initiate and direct the implementation of the Study phases of the Generator and/or Transmission Interconnection Process (see Attachment C of this Manual for PJM Generation and Transmission Planning Team Role Clarity Diagram). Under the direction of the Team Leader, PJM staff, in coordination with any affected Interconnected Transmission

Owner(s), will establish a time to hold a Scoping Meeting as described in Section 36.1.5 of the Tariff.

Following the Scoping Meeting, PJM and the Interconnected Transmission Owner will conduct the Generation or Transmission Interconnection Feasibility Study when no deficiencies exist for an individual Interconnection Request. In general, the study will be completed within 90 days during the next Feasibility Study Cycle. If this is not possible, PJM must so notify the Developer and provide an anticipated completion date. PJM, in coordination with any affected Interconnection Transmission Owner(s), shall conduct Generation and Transmission Interconnection Feasibility Studies two times each year **(Tariff at Part VI, Subpart A, Section 36.2 - formerly 36.2** and **41.2, in Part IV)**. Feasibility study completion dates are summarized below:

Queue Request Submitted	Feasibility Study Completed
April 1 – September 30	January 31
October 1 – March 31	July 31

The 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. 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. For the purposes of determining the necessary Interconnection Facilities and Network Upgrades, the Feasibility Study shall consider the level of service requested by the Interconnection Customer, unless a study of the full electrical generating capability of the Generating Facility is required due to safety or reliability concerns.

Results of the study for the requested interconnection service (Capacity Resource or Energy Resource) are provided to the Developer and the affected Interconnection Transmission Owners, and are published on the PJM web site. Confidentiality of the Developer 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 Developer must decide whether or not to pursue completion of the System Impact Study.

Each New Service Request is studied on a summer peak RTEP base case with the case year dependent on the New Services Queue under study. PJM will identify the base case year to be used in the study of a specific queue on its website. Both load flow and short circuit cases will use the same base case year. In some cases, depending upon the age of the study, versions of the models to study the New Service Request may no longer be available to use for certain vintage cases. As this occurs, PJM may need to evaluate the New Service Request on a different year case in order to maintain the ability to properly represent the proposed customer facilities.

Generation Interconnection Requests that are 20 MWs or less, or for increases in capability of 20 MW or less for existing generation, are governed by Subpart G of Part IV of the Tariff and Manual 14G, Section 5.

4.2.1 Point of Interconnection

The Interconnection Customer is required to choose a primary Point of Interconnection and also has the option to specify a secondary Point of Interconnection to be studied during the Generation or Transmission Interconnection Feasibility Study phase of the Interconnection Request, and also must identify one Point of Interconnection as the primary and the second as the secondary choice. The primary and secondary Points of Interconnection will be studied as follows:

The primary Point of Interconnection will be studied and the Generation or Transmission Interconnection Feasibility Study will follow the requirements as set forth in the Tariff, Section 36.2 and this manual.

The secondary Point of Interconnection will receive a sensitivity analysis and this will be included in the Generation or Transmission Interconnection Feasibility Study. This sensitivity analysis will include definition of the overloads and no estimated costs.

The decision as to the designation of the primary and secondary Point(s) of Interconnection must be communicated to PJM and the Interconnected Transmission Owner(s) prior to completing the Scoping Meeting. If the Interconnection Customer fails to provide these designated options (primary or primary and secondary Point of Interconnection) prior to completion of the Scoping Meeting, PJM shall consider the Interconnection Request as deficient, as described for other cases of deficiency of an Interconnection Request in the Tariff, Section 36.1.4, and will process the Interconnection Request in accordance with the Tariff, Section 36.1.4.

4.2.2 Load Flow Analysis

All active New Service Requests, are modeled in the load flow case as appropriate.

Generally, Network Upgrades identified for previously completed studies are not modeled in the load flow case so that later queued projects can receive cost allocation, assuming they meet the cost allocation thresholds (see Attachment B of this Manual). The exception to this is that if a Network Upgrade changes the topology of the system which then requires utilization of the Network Upgrade to ensure new flow patterns are addressed. These topology changes require that a study be conducted with and without the individual upgrade which causes a change in the topology. For short circuit studies, all upgrades which modify topology and any upgrades with impedance changes to the equipment are modeled in the original study case.

The load flow feasibility study is a DC contingency analysis, NERC P0, P1, P2, P4, P5 & P7 contingencies are tested (see Generator Deliverability section of Manual 14B). Each New Service Request in the Feasibility Study phase will be assigned a commercial probability, currently 53%, based on historical data. All projects in the New Services Queue will be studied as a group.

4.2.3 Short Circuit Analysis

The short circuit Feasibility Study is a breaker duty analysis during which each New Service Request is studied sequentially. No cost allocation for any identified Network Upgrade will be performed during the Feasibility Study for load flow and short circuit analyses.

Any newly identified facility or breaker will be reported; for contributions to previously identified thermal overloads or over-dutied breakers, the project must meet cost allocation rules specified in Attachment B of this manual.

4.2.4 Affected System Coordination

The Transmission Provider will coordinate with Affected System Operators the conduct of any study required to determine the impact of a New Service Request on any Affected System as set forth in Sections 202 and 218 of the Tariff. During the Feasibility Study process, an Affected System will be notified of a potential impact for any individual interconnection request, generation or merchant transmission, under study that has ≥3% distribution factor (absolute value), ≥10% distribution factor (absolute value) for 500 kV and above facilities. The Affected System will also be notified for any Long Term Firm Transmission Service Request under study that has ≥3% distribution factor (absolute value) for all facilities. The Notification includes the potential impact, base case year, size in MWs, fuel, Point of Interconnection and study phase.

4.2.5 Interconnection Requests associated with Phase Angle

Phase angle regulators (PAR), also called phase shifting transformers, create a phase shift between primary (source) & secondary (load) side of the device to control the amount of flow through the facility. These devices may be proposed to serve as Controllable A.C. Merchant Transmission Facilities under the Tariff. Inherent to these devices are certain operational characteristics which must be addressed to confirm acceptability of the design and incorporation of the proposed facility in the PJM system.

In order to ensure that the facility does not cause excessive upset to the system in the area of the proposed facility, it is recommended that the initial step size of the facility's output not exceed a quantity of 20MWs, when initially transitioning from zero flow to some specified MW value. Initial output quantities in excess of 20 MWs are studied to determine the impacts to the other facilities near the proposed facility to determine if the initial MW quantity, in excess of 20 MWs, would cause a problem to occur. The study of the impacts associated with this initial step size will begin during the System Impact Study phase of the projects development. If any issues are identified, associated with a step size in excess of 20 MWs, which cannot be resolved, then the customers Interconnection Request will be withdrawn from the New Services Queue.

The controls associated with a PAR must be capable of providing automatic control so that the scheduled MW quantity for the facility is maintained for all contingency conditions which are required to be tested dependent on the type of service requested whether it be capacity or energy injection or firm or non-firm withdrawal rights. Deviations from the scheduled MW quantity can result in charges to the facility as governed by PJM market rules. Beyond automatic control of the facility, the proposed facility controls must allow for a manual mode of operation to hold the angle of the PAR as opposed to maintaining the MW flow in the event this mode of operation is requested by PJM Operations during periods of system upset or emergency. Additionally, the proposed customer facility must be capable of achieving zero flow through the design of the facility by the customer.

4.3 System Impact Study

4.3.1 System Impact Study Analysis and Schedule

The System Impact Study is a comprehensive regional analysis of the impact of adding the new generation and/or transmission facility to the system and an evaluation of their impact on deliverability to PJM load in the particular PJM region where the generator and/or new transmission facility is located. This Study identifies the system constraints relating to the project and the necessary Attachment Facilities, Local Upgrades, and Network Upgrades. The Study refines and more comprehensively estimates cost responsibility and construction lead times for

facilities and upgrades. For purposes of determining the necessary Interconnection Facilities and Network Upgrades, the System Impact Study shall consider the level of Interconnection Service requested by the Interconnection Customer unless otherwise required to study the full electrical generating capability of the Generating Facility due to safety or reliability concerns.

Relationships are studied between the new generator or the new transmission facility, other planned new generators in the queue, and the existing system as a whole. This study also encompasses an analysis of existing firm and non-firm Transmission Service requests. PJM, in coordination with any affected Interconnection Transmission Owner(s), shall conduct System Impact Studies two times each year **(Tariff at Part VI, Section 205.2 - formerly 36.4.1** and **41.4.1, in Part IV)** commencing on the dates below:

Queue Request Submitted	System Impact Study Begins
April 1 – September 30	May 1 of the following year
October 1 – March 31	November 1 of the same year

PJM may decide to group two or more interconnection requests within one System Impact Study if the proposed projects are in electrical proximity. In situations where more than one generation project violates reliability criteria, cost responsibility for network upgrades to mitigate such violations will be allocated among the projects in the course of the System Impact Study.

The System Impact Study includes AC powerflow analysis, short circuit analysis, and stability analysis. The powerflow analysis can include different sets of analyses at various load levels such as summer peak, light load, and winter peak. All powerflow analysis is performed consistent with PJM Reliability Planning Criteria as described in PJM Manual 14B Attachment D. Similarly, the stability analysis can include different sets of analyses at various load levels such as summer peak, light load, and winter peak.

During the System Impact Study phase of a project, PJM will consider Affected Systems as set forth in Sections 202 and 218 of the Tariff. PJM will again contact Affected Systems, previously identified as having potential for impacts from the PJM projects under study during the Feasibility Study phase, to determine if the Affected System has determined that any impacts to the Affected System need to be identified in the System Impact Study to the PJM customer and any need for Affected System reinforcements. The process for next steps associated with these reinforcements vary depending upon the Affected System's provisions and will be discussed with the New Service Customer to determine any requirements which must be adhered to in the Affected System study process. Failure to adhere to the requirements of the Affected System study process will result in the PJM customer being withdrawn from the PJM queue.

Various types of thermal analysis will be performed based on the type of project and its anticipated potential to affect the system. A brief discussion of these studies follows.

4.3.1.1 Summer Peak Analysis

The PJM Generation Deliverability test is a test performed in accordance with PJM Manual 14B, sections 2.3.10 and Attachments C.6 and C.7. New Service Requests are subject to the PJM Generation Deliverability Test as applicable.

The PJM Load Deliverability test is a test performed in accordance with PJM Manual 14B, sections 2.3.9 and Attachments C.3 and C.4 and C.5. The following New Service Requests are subject to the PJM Load Deliverability test: 1) Storage type Generation Interconnection Requests, depending on size and input of an affected Transmission Owner, 2) Transmission

Interconnection Requests requesting Firm Transmission Withdrawal Rights, and 3) requests for Incremental Capacity Transfer Rights arising from a New Service Request as set forth in Attachment F of Manual 14E.

NERC P3 and P6 “N-1-1” analysis is performed in accordance with PJM Manual 14B, section 2.3.8. New Service Requests are subject to “N-1-1” analysis as applicable. Such applicable examples can include but are not limited to a Generation Interconnection Request that would change system topology, a Transmission Interconnection Request requesting Firm Transmission Withdrawal Rights or Firm Transmission Injection Rights, a Firm Point-to-Point Transmission Service Request, or any New Service Request which changes the system topology due to its required Network Upgrades.

Voltage analysis is performed in accordance with PJM Manual 14B, section 2.3.7. New Service Requests are subject to steady-state voltage analysis as applicable.

4.3.1.2 Light Load Analysis

The light load reliability analysis tests the ability of an electric area to export generation resources to the remainder of PJM during light load conditions. The initial target dispatch is identified as the light load base case initial target dispatch in Manual 14B, Attachment D-2. It should be noted that the initial dispatch must meet the current load requirement of the case and therefore additional resources may need to be dispatched, e.g. natural gas facilities, if the other facilities in an area cannot meet the scheduled load. Due to the nature of the potential to change the initial dispatch assumptions, in the event that a certain type of facility is dispatched in the initial target dispatch, PJM shall dispatch all New Service Requests, with the same fuel type and same TO area as in the original dispatch, during the ramping portion of the studies to determine any new violations. Transmission Interconnection Requests (Firm Transmission Rights only) and Long Term Firm Point-to-Point Transmission Service requests are also included in the light load reliability analysis for New Service Request studies. The contingencies used for light load reliability analysis include NERC TPL category P1, P2, P4, P5, and P7. NERC TPL P0, normal system conditions is also studied. The Generation Deliverability Test performed during light load reliability analysis is performed in accordance with PJM Manual 14B, section 2.3.10 and Attachments C.6 and C.7, except the ramping limits in Attachment D-2 of Manual 14B are enforced.

4.3.1.3 Light Load Common Mode Outage Procedure

This portion of the test is similar to the Generator Deliverability test listed in Addendum 2 of section C.7.3 of PJM manual 14B, except the ramping limits in Attachment D-2 of PJM manual 14B are enforced.

Any new overload caused by a New Service Request under study is reported. A New Service Request that contributes to the loading of an existing overload is reported if that New Service Request increases the loading by at least 1% and contributes at least 5MWs or has at least a 5% distribution factor.

The procedure to determine cost allocation for Light Load Analysis associated with New Service Requests is similar to the methods used for Summer Peak Load Flow Analysis set forth in Attachment B of this PJM manual 14A.

4.3.1.4 Winter Peak Analysis

The winter peak reliability analysis tests the ability of an electric area to export generation resources to the remainder of PJM during winter peak conditions. The winter peak analysis is

performed during the System Impact Study phase of the PJM Interconnection Process. The facility ratings used in the winter peak analysis are different than the summer peak analysis. Further details about the facility ratings can be found in section 2.3.13 of the PJM Manual 14B. The contingencies used during this analysis include, NERC category P1, P2, P3, P4, P5, P6, and P7. NERC category P0, normal system conditions will also be studied. The winter peak study initial target dispatch and ramping limits are listed in Attachment D-3 of PJM manual 14B.

The different types of tests performed during the winter peak analysis include Generation Deliverability Test, Load Deliverability test, Normal System (NERC P0) and N-1 (NERC P1) Events, and N-1-1 (NERC P3 and P6) Events. Further information about these tests can be found in sections D-3.2.4 to D-3.2.7 of Attachment D-3 to PJM manual 14B.

4.3.1.5 Short Circuit Analysis

All New Service Requests are subject to evaluation as to the need for short circuit analysis. Certain types of New Service Requests may not require analysis for short circuit impacts as the impacts were already captured in the studies associated with the introduction of the generation, e.g. Transmission Service Request studies. The case year used for the study of the fault contributions associated with a New Service Request shall be consistent with the case used in the thermal analysis studies, e.g. summer, peak, light load, etc. Short circuit analysis shall be performed consistent with the requirements of section G.7 of Attachment G to PJM manual 14B.

4.3.1.6 Stability Analysis

All New Service Requests are subject to evaluations as the need for stability analysis and/or review which will be performed during the System Impact Study phase. For Generation Interconnection Requests a threshold of 20 MW is considered when determining if a stability analysis is required on a generic basis, though in areas with known stability concerns, generation with lower total capability may also be tested. Stability analysis is performed as described in PJM Manual 14B Attachment G.

4.3.2 System Impact Study Results

Results of the study are provided to all Developers who had projects evaluated in the study and to affected Interconnected Transmission Owners and are posted on the PJM web site. While confidentiality obligations will be honored, the identity of the Developers will not be considered confidential in these reports.

The identity of all Developers, 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 Developer must decide whether or not to proceed with either the PJM proposed (i) a Generation or Transmission Interconnection Facilities Study or (ii) an Interconnection Service Agreement or Upgrade Construction Service Agreement, whichever is furnished by PJM. If the Developer 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.

4.4 Facilities Study

4.4.1 Generation and Transmission Interconnection Facilities Study Results

During the Facilities Study phase, the System Impact Study results are retooled as necessary to reflect changes in the New Services Queue such as but not limited to New Service Customers

withdrawing from the queue, reducing the size of their projects, choosing different types of equipment, and providing updated equipment parameters, etc. For purposes of determining necessary Interconnection Facilities and Network Upgrades, the Facilities Study shall consider the level of Interconnection Service requested by the Interconnection Customer unless otherwise required to study the full electrical power generating capability of the Generating Facility due to safety or reliability concerns. The Facilities Study will also identify all control equipment necessary to accommodate such requests for Interconnection Service that are lower than the full electrical power generating capability of the Generating Facility and cost estimates associated with such equipment.

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 Developer 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.

Refer to Attachment D of this Manual for details on the Facilities Study Procedure.

4.5 Types of Network and Local Upgrades

Network Upgrades are modifications or additions to Tariff facilities that are identified during the study process which are required to accommodate an interconnection project. Local Upgrades are modifications or additions to non-Tariff facilities identified during the study process which are required to accommodate an interconnection project. In addition to Network and Local Upgrades, there is a category called Attachment Facilities, which are facilities required to physically interconnect the Interconnection Customer facilities to the system.

In an Interconnection Study Report, Interconnection Service Agreement, and Interconnection Construction Service Agreement, work to accommodate an interconnection is separated into these three categories which are further defined below:

1. Direct Connection Local and Direct Connection Network Upgrades
2. Non-Direct Connection Local and Non-Direct Connection Network Upgrades
3. Attachment Facilities

These classifications are important in order for PJM to determine how much Security should be held for an Interconnection Customer. As explained in Section 5.4.3 of this Manual, Security is held in order to protect the Transmission Owner and other New Service Customers should the Interconnection Customer decide to terminate the new service request after signing the Interconnection Service Agreement or fail to pay invoices for upgrade work.

4.5.1 Direct Connection Local and Direct Connection Network Upgrades

Direct Connection Local Upgrades are greenfield upgrades on the distribution system which have no impact or potential impact on the transmission system until the final tie-in is complete. Direct Connection Network Upgrades are greenfield upgrades to the transmission system that are not part of an Affected System, only serve the customer Interconnection Facility, and have no impact or potential impact to the Transmission System until the final tie-in is complete. Direct Connection upgrades includes new facilities that are required to interconnect

the Interconnection Customer facilities to the existing transmission system which will carry network flows once completed and energized. These upgrades can be constructed without requiring outages of existing, operating transmission facilities. An interconnection switchyard (as shown in Exhibit 5 below) would be considered a Direct Connection Upgrade. Once energized, this switchyard will carry network flows.

4.5.2 Non-Direct Connection Local or Non-Direct Connection Network Upgrades

Non-Direct Connection Local or Non-Direct Connection Network Upgrades are **rebuilds, replacements, or upgrades to existing system facilities**. These upgrades require a facility outage to be constructed. Upgrades to terminal equipment, rebuilding a line, or replacing a breaker are considered to be Non-Direct Connection work. PJM will hold full security for the cost of all Non-Direct Connection work in order to protect the Transmission Owner and other New Service Customers should the Interconnection Customer terminate their project.

4.5.3 Attachment Facilities

Attachment Facilities are facilities required to physically interconnect the Interconnection Customer facilities to the system. Attachment Facilities **do not carry network flows**. A generator lead line is an Attachment Facility as it only carries power flow from the generator (see Exhibit 3 below). Attachment Facilities work can be completed without impacting the affected Transmission Owner's facilities. Generally, a small portion of an Attachment Facility is owned by a Transmission Owner. All Transmission Owner owned Attachment Facilities are subject to Schedule E charges in an ISA (see M14A Section 5.4).

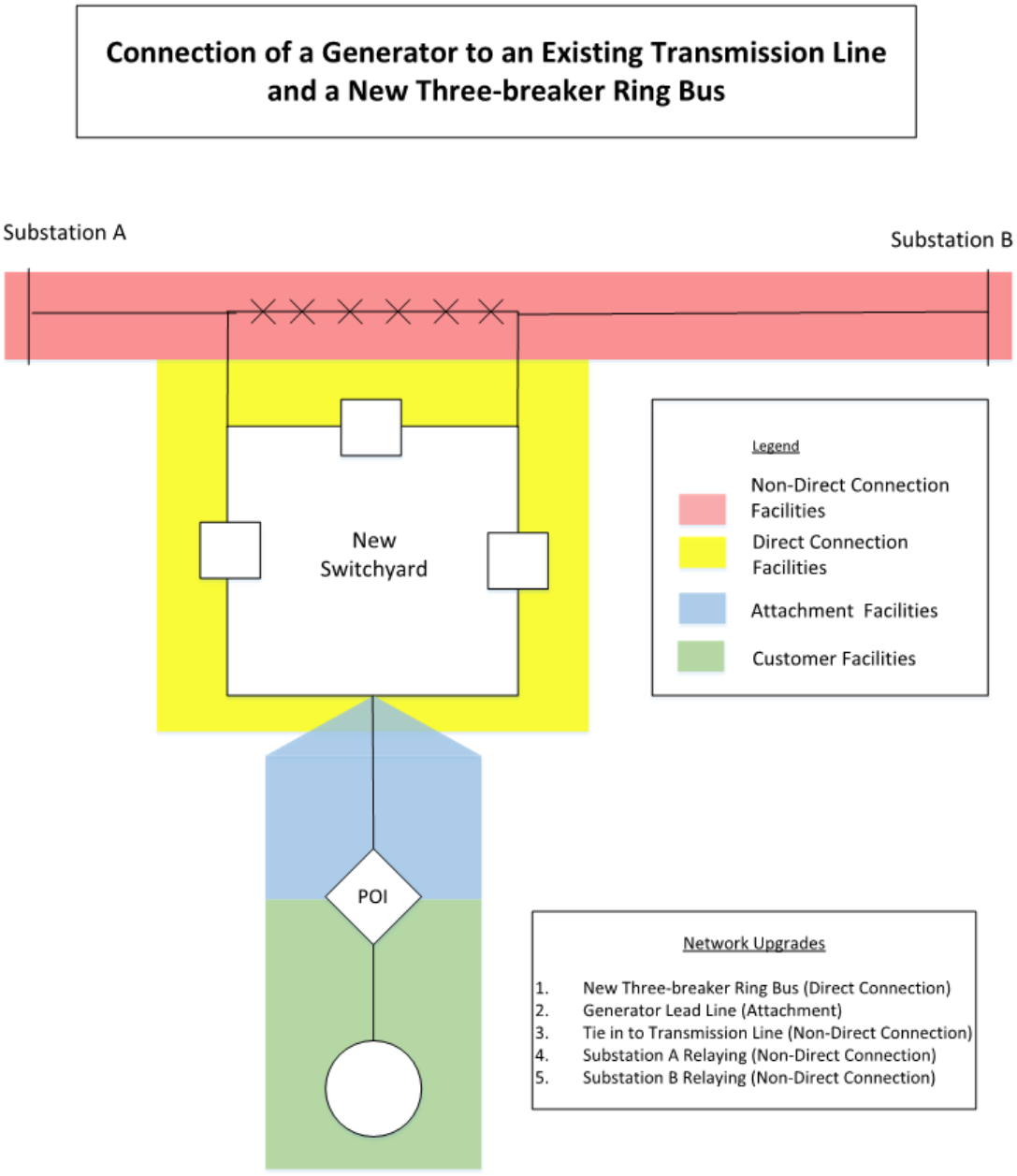


Exhibit 4: Types of Network and Local Upgrades

4.6 Coordination Studies between PJM and Affected Transmission Owners

MISO and PJM shall conduct Interconnection Studies, as necessary, to determine the impacts of Interconnection Requests on each other's transmission system which will be treated as an affected system. This joint coordination of Interconnection Studies will be in addition to the

existing Interconnection Studies that MISO and PJM already perform to evaluate the impacts of their respective queues on their own transmission system.

The Transmission reinforcement and the study criteria used in the coordinated interconnection studies will honor and incorporate provisions as outlined in the PJM and MISO Business Practices Manuals and their respective Tariffs.

Example:

- PJM and PJM Transmission Owner study and reinforcement criteria will apply to PJM transmission when PJM evaluates the impact of MISO generation on PJM transmission.
- MISO and MISO transmission owner study and reinforcement criteria will apply to MISO transmission when MISO evaluates the impact of PJM generation on MISO transmission.

4.6.1 Study of PJM Interconnection Request impacts on MISO transmission

During the course of PJM Interconnection studies, PJM shall monitor the MISO transmission system and provide the draft results of the potential impacts to MISO. These potential impacts shall be included in the PJM System Impact study report along with any information regarding the validity of these impacts and possible mitigation received from MISO and the MISO transmission owners.

Following the completion of the PJM Feasibility Study and after the customers execute the PJM System Impact Study Agreement, PJM shall forward to MISO, at a minimum of twice per year (April 15 and October 15), information necessary for MISO and the MISO transmission owners to study the impact of the PJM interconnection request(s) on the MISO transmission.

MISO and the MISO transmission owners shall study the impact of the PJM interconnection request(s) on MISO transmission and provide draft results to PJM by the dates below:

Requests Provided to MISO	MISO Provides Draft Results
On or before October 15 of previous year	March 1
On or before April 15 of the same year	September 1

hese impacts shall include a description of the required system reinforcement(s), an estimated planning level cost and construction schedule estimates of the system reinforcement(s). At times PJM may identify to MISO the need to perform studies associated with an interconnection request other than the times identified above. MISO shall endeavor to study these requests at the earliest time which is feasible, but not later than the times as specified above (commencing after April 15 and October 15).

In the event of project withdrawals in the PJM queue, MISO may perform additional reliability analysis during the Facilities Studies phase and revise the affected system study results provided during the PJM System Impact Study phase. If MISO identifies required Network Upgrades, on the MISO transmission system, due a PJM interconnection request, then the PJM Interconnection Customer(s) shall be required to follow all provisions, delineated under Attachment X of the MISO tariff, related to Facility Study funding and appropriate Network Upgrade Facility Construction Agreement.

Cost allocation for required Network Upgrades on the MISO transmission, for PJM interconnection requests, shall be governed by and subject to MISO Tariff and Manuals.

MISO shall determine the curtailment necessary associated with the request for service (e.g.: transmission service, generation interconnection, etc.) which was identified as impacting a MISO constraint.

4.6.1.1 Use of system reinforcements outside of MISO for MISO constraints

During the determination of reinforcements, required for MISO constraint mitigation, PJM and MISO may identify other planned non-MISO reinforcement(s) that may alleviate a constraint inside of MISO's boundaries. Under such circumstances any PJM project relaying on those reinforcement(s) shall have limited injection rights until those reinforcement(s)are put in place. MISO shall determine the necessary injection limits, associated with the PJM New Service Request, that will be implemented in Real Time until the necessary upgrades identified through MISO's affected system analysis are in-service.

4.6.2 Study of MISO Interconnection Request impact on PJM Transmission

During the course of MISO Interconnection studies, MISO shall monitor the PJM transmission system and provide the draft results of the potential impacts to PJM. These potential impacts shall be included in the MISO System Impact study report along with any information regarding the validity of these impacts and possible mitigation received from PJM and the PJM transmission owners.

Prior to commencing the MISO DPP study MISO shall forward to PJM, at a minimum of twice per year (January 1 and July 1), information necessary for PJM and the PJM Transmission Owners to study the impact of the MISO interconnection requests on the PJM territory. For the prescribed times when MISO provides this information to PJM, January 1 and July 1, PJM and the PJM Transmission Owners shall study the impact of the MISO interconnection requests and provide draft results on the PJM transmission by the dates below:

Requests Provided to MISO	MISO Provides Draft Results
On or before Jan 7 of the same year	March 31
On or before July 7 of the same year	September 29

These impacts shall include a description of the required system reinforcement(s), an estimated planning level cost and construction schedule estimates of the system reinforcement(s). At times MISO may identify to PJM the need to perform studies associated with an interconnection request other than the times identified above. PJM shall endeavor to study these requests at the earliest time which is feasible, but not later than the times as specified above (commencing after January 7 and July 7).

If PJM identifies required Network Upgrades, on the PJM transmission system, due a MISO interconnection request, then the MISO Interconnection Customer(s) shall be required to follow all provisions, delineated under Tariff, related to Facility Study funding and appropriate Network Upgrade Facility Construction Agreement obligations.

Cost allocation for required Network Upgrades on the PJM transmission, for MISO Interconnection projects, shall be governed by and subject to Tariff and Manuals.

PJM shall determine the curtailment necessary associated with the request for service (e.g.: transmission service, generation interconnection, etc.) which was identified as impacting a PJM constraint.

4.6.2.1 Use of system reinforcements outside of PJM for PJM constraints

During the determination of reinforcements, required for PJM constraint mitigation, PJM and MISO may identify other planned non-PJM reinforcement(s) that may alleviate a constraint inside of PJM's boundaries. Under such circumstances, any MISO project relying on those reinforcement(s) shall have limited injection rights until those reinforcement(s) are put in place. PJM shall determine the necessary injection limits, associated with the MISO Interconnection Request, that will be implemented in Real Time until the necessary upgrades identified through PJM's affected system analysis are in-service.

4.6.3 Study of PJM Transmission Service Request impacts on MISO transmission

MISO and PJM shall coordinate on new Transmission Service Request (TSR) Studies to determine impacts on each other's transmission system which will be treated as an affected system. The coordination and completion of these studies will follow the same basic procedures described in in this Manual relating to interconnection request studies.

4.6.4 Affected system studies for PJM New Service Requests

PJM New Service Requests which intend to come into service prior to the completion of any required upgrades associated with affected system constraints or in years prior to the year of the case used in their studies will be subject to limitations based on PJM studies for interim deliverability as well as any limitations which result from affected system[1] studies.

PJM Generation Interconnection Projects that come into service prior to completion of required Network Upgrades associated with constraints on the MISO transmission system will be subject to the MISO Quarterly Operating Limit process, as outlined in the MISO Tariff in Attachment X Section 11.5 and in the MISO Transmission Access Planning Provisional Interconnection Agreement Limit Methodology whitepaper, until required Network Upgrades associated with constraints on the MISO transmission system have been completed. MISO will coordinate project output limitations with PJM on a quarterly basis, and MISO will provide PJM the list of conditions that will be added to PJM Interconnection Customer's Interconnection Service Agreement.

4.7 Interim Deliverability Studies

PJM's process for the conduct of studies associated with projects which have requested service or evaluation in the New Services Queue, or projects which are under study considering PJM as an Affected System, require that all studies be performed on a case for each study which is independent of the requested service dates associated with the proposed project/service. The use of the same case for one projects evaluation, which is consistent with the same case as the case used for other projects under study, allows for development of required upgrades while preserving the rights associated with the individual Queue Position for the project(s) under study in that queue study. As a result of the use of a case which may not coincide with the requested year of service for any individual project, the ability of any individual project to come

[1] Refer to the Tariff definition for "affected systems".

into service in a year before the year of the case used for the study of the project is dependent on the availability of system capability in any earlier year as can be determined during interim deliverability studies.

Projects which rely on reinforcements which have not been constructed at the time the project comes into service will also require evaluation on a case which is needed to determine the capability of the existing system to allow the projects output or flow to be granted through the conduct of interim deliverability studies.

- Example: A project was evaluated and it was found to require construction of a network reinforcement which has not been constructed when the project desires to come into service. An interim deliverability study will be conducted to determine what output, or flow, can be accommodated on the system prior to completion of the required upgrade.

Interim Deliverability studies will be conducted on a periodic basis, and as required, in support of RPM auctions and preparation of documents for service (e.g.: Interconnection Service Agreement, Upgrade Construction Service Agreement, Interconnection Agreements in areas outside of PJM, etc.). These studies will be conducted to evaluate the available system capability based on when a project requesting service executes the applicable service agreement as well as the projects Queue Position. For projects outside of PJM, the Queue Position is determined based on the timing of the studies for that project and when they are identified to PJM by the external entity which is responsible for the study of that projects requested service (e.g.: MISO, NYISO, etc.). The availability of service will be determined during interim deliverability studies which shall provide the customer(s) with the availability of service on an annual basis from June 1 of the first year to May 31 of the following year, the planning year (e.g.: 2016 interim deliverability study is applicable to the time period of June 1, 2016 to May 31, 2017). Interim deliverability studies will use the same criteria as is used for the evaluation of the need for reinforcements associated with a project under study.

Interim deliverability studies will incorporate those projects which are anticipated to be in service during the year under study and inclusion of projects in these studies will be based on requests by customers as well as information PJM may have as to those projects which will be in service.

4.7.1 Interim Deliverability Studies associated with projects using reinforcements outside of PJM for PJM constraints

Similar to the requirements as outlined in this Section 4.7 above, the projects evaluated for impacts on PJM facilities which use reinforcements completed on system outside of PJM to alleviate constraints in PJM must have interim deliverability studies conducted.

In circumstances when a project is waiting for the completion of a reinforcement for which they are not responsible for funding, they will receive lower priority for system capability, in relation to the constraint which will be relieved by the reinforcement when it is built, in comparison to those project(s) which are not waiting for the completion of an upgrade associated with that same constraint but have instead proceeded to building a reinforcement.

- Example: Project 1 is identified as impacting a constraint and intends to wait for completion of a system reinforcement they are not funding. Project 2 does not wait for completion of a system reinforcement but instead builds another reinforcement which can be put into service. In this case, regardless of the original position of the two projects in relation to each other, Project 2 will receive higher priority as compared to Project

1 in determining the availability of the current systems capability to allow the project to operate or flow energy while awaiting the completion of the reinforcement under construction and being funded by Project 2.

4.8 Long Term Firm Transmission Service Studies

Transmission Service Requests are received through the PJM OASIS and, in the case of Long Term Firm Transmission Service, must be evaluated along with the other requests for service which are studied in the PJM New Services Queue when those requests for Long Term Firm Transmission Service are requests outside of the Available Transfer Capability ("ATC", horizon of 18 months. The ATC horizon extends for 18 months from the date of the Oasis request Additional details regarding the ATC horizon are located in PJM Manual 2: Transmission Service Request.

The first step in the evaluation of Long Term Firm Transmission Service associated with the inclusion of the request in the New Services Queue is to perform a Feasibility Study. During the Feasibility Study PJM will conduct a screening of the requested service with the remaining New Service Requests in the Feasibility Studies discussed later in this manual for generation and transmission requests.

If the customer proceeds forward after the Feasibility Study they must execute the System Impact Study Agreement, PJM shall conduct a study of the requested service with the remaining New Service Requests in the System Impact Study. Following the completion of this study, the transmission service customer will receive a System Impact Study and will be required to move forward into the Facilities Study phase based on the results of this study.

4.9 Work Papers

The Tariff requires PJM to provide New Service Customers access to the applicable PJM base case data. Base case data is defined in Tariff 36.1.7 to only include upgrades and New Service Requests that are included in the RTEP. The customer requesting the PJM base case data must first complete all necessary Critical Energy Infrastructure Information, Non-Disclosure Agreements and other requirements necessary to obtain the modeling information.

Upon completion of a study report, the Tariff provides that PJM will provide New Service Customers work papers upon request. Work papers are documents, data, and other information developed by PJM based on confidential documents, data or information from PJM Members or New Service Customers that were used in the development of each phase study and that PJM can make public upon completion of a study under the requirements of Operating Agreement 18.17. Generally, work papers include all files necessary for a customer to modify the base case and duplicate the results obtained by PJM in the queue studies. Other examples of work papers would be the initial and final limiting element and associated ratings used in a study. Since a new service customer is paying for upgrades, they are entitled to the rating of the limiting element as rating information is important to determining the financial rights that may be awarded. Work papers also can include information used to develop an upgrade cost. However, if an upgrade cost was developed using a deskside estimate, no additional detail is required to be generated. For example, if a reconductor was required for a five mile line and was estimated based on past experience to cost about $1M/mile, no further cost detail is

required to be created. Work papers do not include documents, data or information desired by an entity that were not created by PJM or were not used in the production of a study.

Section 5: Summary of Agreements

Section 5 summarizes the types of agreements that PJM tenders to a New Services Customer. The agreement will vary depending on the type of request received.

5.1 Feasibility Study Agreement

5.1.1 Purpose of the New Services Request Feasibility Study Agreement

As a FERC accepted Regional Transmission Organization (RTO), PJM administers the process for the interconnection of all new generators and new transmission facilities to the PJM Transmission Grid. New generation Developers may request either of two forms of interconnection service, Capacity Resource or Energy Resource service. Capacity Resource interconnections receive the right to schedule both Capacity and energy deliveries at a Point of Interconnection – Energy Resource interconnections receive the right to schedule only energy deliveries at a specified point on the PJM Transmission System. Capacity allows the generator to be utilized by PJM load-serving entities to meet Capacity obligations imposed under the Reliability Assurance Agreement. Capacity resources may participate in PJM Capacity Credit markets and in Ancillary Service Markets. Energy Resource status allows the generator to participate in energy markets based on locational prices.

Capacity Resource status is based on providing sufficient transmission capability to ensure deliverability of generator output to aggregate network load and to satisfy various contingency criteria established by the particular regional reliability council (e.g. ReliabilityFirst or SERC) in which the generator is located. See PJM Manual 14B, Attachment C for details of the PJM Deliverability Testing Methods. Specific tests performed during the Generation Interconnection Feasibility Study and later System Impact Study will identify those upgrades required to satisfy the contingency criteria applicable at the generator's location.

5.1.2 New Services Request Feasibility Study Cost Responsibility

As specified in Part IV, Subparts A and G of the 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 **(Tariff at Part VI, Attachment N or Attachment S, respectively)** and a study deposit as specified in the table below (Table 5.1.2-1). 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 5.1 of Manual 14G for further details regarding the interconnection process for small resources of 20 MW or less.

PJM will hold 10% of every deposit as non-refundable. The non-refundable portion is held to offset restudy costs associated with a Developers decision to withdraw a project from the queue. If an Interconnection Customer does not withdraw its project, the non-refundable deposit will become refundable after commencement of commercial operations. 90% of the deposit is used to fund the Interconnection Request processing, deficiency review, study costs. 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 require the Developer to pay the additional deposit (see Table 5.1.2-2 below for expected additional costs by Transmission Owner zone). The additional deposit will be added towards the refundable portion. The refundable portion shall be transferable to subsequent studies or

construction phases associated with the individual Interconnection Request. The Developer is obligated to pay the actual costs of studies conducted by PJM on its behalf.

Table 5.1.2-1: Large New Services Request Process deposit requirements

Month of New Services Queue	Deposit Requirement		Portion held as non-refundable	Maximum deposit
	fixed deposit	Per MW portion of deposit		
1st - 4th	$10,000	$100	10%	$110,000
5th	$20,000	$150	10%	$120,000
6th	$30,000	$200	10%	$130,000

Note:

The per MW value is the maximum of the Capacity or Maximum Facility Output requested.

If a Developer submits an Attachment N or S in any of the zones listed above, if the standard Tariff deposit is less than the amount shown in the table, the Developer shall provide PJM the difference between the value in Table 5.1.2-2 below and the standard Tariff deposit. If a Transmission Owner zone is not on the table, then PJM expects the standard Tariff deposit will cover the Feasibility Study costs. Note however, that a Developer is responsible for actual costs of the study and actual costs may exceed the expected amount.

Table 5.1.2-2: Large New Services Request Process expected costs

Transmission Owner Zone	Expected Costs
AEP	26K
BGE	15K
ComEd	15K
Dayton	13K
Dominion	12K
Duquesne	19K
FirstEnergy	23K
AEC/DPL/Pepco	12K
PPL	20K
PSEG	17K

The remaining refundable portion of a deposit shall be transferable to subsequent studies associated with the individual Interconnection Request or refunded to the Developer. 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 Feasibility Study deposit, example cost, and available money to refund or transfer would be as follows:

- Fixed deposit: $10,000
- Per MW deposit: $4,000
- Total deposit: $14,000 (To be submitted as a single payment)
- 10% portion held as non-refundable deposit: $1,400
- Refundable portion: $12,600
- Actual Deficiency Review and Study costs: $5,451
- Amount available for refund or transfer to subsequent study: $7,149

5.2 System Impact Study Agreement

5.2.1 Impact Study Agreement and Cost

After receipt of the Generation or Transmission Interconnection Feasibility Study results, if the Developer decides to proceed, an executed System Impact Study Agreement must be submitted to PJM with the required deposit as specified in Section 204.3A of the Tariff. If the cost of the System Impact study is reasonably expected to exceed the deposit received before the study begins, PJM will require the Developer to submit the additional deposit.

For an Interconnection Request to maintain its assigned priority, the Developer must execute and return the System Impact Study Agreement (and the required deposit), as well as complete the System Impact Study data form located on PJM's web site. See Attachment B of manual 14G 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 so notify the Developer, providing an anticipated completion date and an explanation of why additional time is needed.

For generation projects, proof is required at this point of initial application for required air permits, if any, and the Developer must declare whether a generation project is to be connected as a Capacity or Energy Resource.

For Merchant Transmission Facilities, site control must be provided with the System Impact Study Agreement.

The System Impact Study is a comprehensive regional analysis of the impact of adding the new generation and/or transmission facility to the system and an evaluation of their impact on deliverability to PJM load in the particular PJM region where the generator and/or new transmission facility is located. This Study identifies the system constraints relating to the project and the necessary Attachment Facilities, Local Upgrades, and Network Upgrades. The Study

refines and more comprehensively estimates cost responsibility and construction lead times for facilities and upgrades.

Table 5.2.1-1: System Impact Study costs

Project size	Required deposit		Portion of deposit that is non-refundable	Maximum deposit
	Fixed portion	Per MW Portion		
>20MW	None	$500/MW	10%	$300,000
>2MW and ≤20MW	$10,000	None	10%	$10,000
≤2MW	$5000	None	10%	$5,000

If a Developer submits an Attachment N-1 in any of the zones listed in Table 5.2.1-2 below and the standard Tariff deposit is less than the amount shown in the table, the Developer shall provide PJM the difference between the value in Table 5.2.1-2 and the standard Tariff deposit. If a Transmission Owner zone is not on the table or the value indicates bounded, then PJM expects the standard Tariff deposit will cover the System Impact Study costs. Note however, that a Developer is responsible for actual costs of the study and actual costs may exceed the expected amount.

Table 5.2.1-2 System Impact Study PJM Expected Costs

TO Zone	Expected Cost ($)Requests > 20 MW	Expected Cost ($)Requests≤ 20 MW
AEP	46K	16K
BGE	50K	Bounded
ComEd	99K	32K
Dayton	25K	Bounded
DL	23K	Bounded
Dominion	26K	15K
FE	42K	16K
PECO	17K	Bounded
PHI	28K	15K
PPL	31K	Bounded
PSEG	38K	Bounded

5.2.1.1 Dynamic Model for stability studies

PJM utilizes machine dynamic models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. PJM will only accept machine dynamic models that are listed on the NERC Acceptable Model List, on the NERC website.

For approved exceptions, PJM needs adequate time to evaluate the new machine dynamic models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a machine dynamic model that is not listed on the NERC Acceptable Model List must supply that model to PJM, along with a $10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed Dynamic Model Study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

The NERC Acceptable Model List is found at the following site:

https://www.nerc.com/comm/PC/Pages/System-Analysis-and-Modeling-Subcommittee-(SAMS)-2013.aspx

The submission of the relevant technical data for a Dynamic Model Study does not relieve the Interconnection Customer of the obligation to provide electrical data with the execution of the System Impact Study Agreement. If an Interconnection Customer provides the relevant technical data for required for a Dynamic Model Study, the Interconnection Customer must, in addition, submit, via Queue Point, the electrical data required with the execution of the System Impact Study Agreement.

5.3 Facilities Study Agreement

5.3.1 Queue Priority and final agreement issuance and determination of security requirements for moving out of sequence

The Tariff establishes due dates for PJM to issue Feasibility and System Impact Studies. However, upon completion of a Facilities Study, queue priority becomes important for issuing of final agreements to New Service Customers. New Service Customers that are first to cause the need for network upgrades will receive their service agreements before those customer(s) that receive cost allocations. To prevent a lower ordered queue request (or any queue request with cost allocation) from having to commit to agreements and potential unexpected costs without the knowledge of the higher ordered queues decision, PJM will delay the issuing of final agreements for affected projects by approximately one week. This allows time to rescind and restudy the affected lower ordered queue projects if the higher ordered project is withdrawn from the queue.

If a lower ordered queue wishes to proceed ahead of a higher ordered queue for which it shares cost responsibility or may become responsible for an upgrade, then the lower ordered queue must provide Security and/or advance construction for all shared or required upgrades.

5.3.2 Generation and Transmission Interconnection Facilities Study Agreement

Upon completion of the System Impact Study, PJM will furnish either (i) a Generation and/or Transmission Interconnection Facilities Study Agreement to the Developer, along with estimated cost of the study and the estimated time of completion or (ii) an Interconnection Service Agreement or Upgrade Construction Service Agreement. For an Interconnection Request to maintain its assigned priority, the Developer must execute and return the Generation and/or Transmission Interconnection Facilities Study Agreement (and the required deposit) within 30 days of receiving it. If a Developer fails to meet this deadline, the Interconnection Request will be deemed terminated and withdrawn. If the Developer has received an Interconnection Service Agreement or Upgrade Construction Service Agreement, please see discussion in Section 5 of this manual for additional information.

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 D for a General Description of the Facilities Study Procedure.

5.3.3 Generation and Transmission Interconnection Facilities Study Cost

As specified in Part IV, Subparts A and B of the Tariff, if the Developer 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 Tariff, and also listed in Table 5.3.3-1 below.

Table 5.3.3-1: Facilities Study costs

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

5.4 Interconnection Service Agreement (ISA)

After the Generation or Transmission Interconnection Facilities Study is completed (or, if no Interconnection Facilities Study is required, upon completion of the System Impact Study), the Transmission Provider (“PJM”) will furnish an Interconnection Service Agreement (in the form included in Part VI, Attachment O to the Tariff) to be executed by the Developer and any affected Interconnected Transmission Owner(s). The Interconnection Service Agreement (“ISA”) defines the obligation of the generation or transmission Developer regarding cost responsibility for any required system upgrades. The ISA also confers the rights associated with

the interconnection of a generator as a capacity resource and any operational restrictions or other limitations on which those rights depend. For transmission interconnection customers, the ISA confers transmission injection and withdrawal rights (Merchant D.C. and/or Fully Controllable A.C. transmission projects) and applicable incremental delivery, available transfer capability revenue and auction revenue rights. The ISA further identifies any changes in construction responsibility from the Standard Option for Transmission Owner Interconnection Facilities due to the Interconnection Customer/Developer exercising the Negotiated Contract Option or Option to Build.

Upon issuance of the ISA, PJM team leadership for the project is transferred from the study phase System Planning Senior Consultant to an Interconnection Coordination Senior Consultant for the project Interconnection and Construction phases (see Attachment C for PJM Generation and Interconnection Planning Team Role Clarity Diagram). For leadership continuity, the study phase team leader continues active participation in the project as a member of the Interconnection and Construction team.

For an Interconnection Request to maintain its assigned priority, the Developer must respond within 60 days of receiving the ISA. To proceed with the project, the Developer must provide PJM with a Letter of Credit or other acceptable form of security in the amount equal to the estimated costs of new facilities or upgrades for which the Developer is responsible. The Developer must also respond by:

- Executing and returning the Interconnection Service Agreement, or
- 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 Tariff, available from FERC or on the PJM web site at http://www.pjm.com/home.aspx.

Additionally, within the same 60-day period, the Developer 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 under-frequency load shedding schemes
- Voltage control and reactive output requirements (Tariff 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 Tariff, PJM makes documents containing Applicable Technical Requirements and Standards for each Interconnected Transmission Owner available through its internet site at http://pjm.com/planning/design-engineering/to-tech-standards.aspx .

PJM will file the Interconnection Service Agreement in compliance with applicable Commission guidelines. If the Developer 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 Developer and the affected Interconnected Transmission Owner(s).

5.4.1 Interim Interconnection Service Agreements (ISA)

Under certain circumstances, a Developer 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 Developer may request execution of an Interim Interconnection Service Agreement (Tariff at Part VI, Attachment O-1) for those construction activities being advanced.

The Interim ISA would bind the Developer for all costs incurred for the construction activities being advanced pursuant to the terms of the Tariff. While PJM agrees to provide the Developer 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 Developer 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.

5.4.2 Interim ISA vs. ISA with Interim Rights

The Tariff, in section 211, allows for projects under study to advance ordering long lead items and advance construction by the Transmission Owner.

Advanced construction for New Facilities

Tariff Attachment O-1, the Interim ISA, is available to accomplish advanced ordering of long lead items. If advanced construction is requested, Tariff Attachment O-1, the Interim ISA, must be used in conjunction with Tariff Attachment P, the Construction Services Agreement. Interim ISAs

do not permit operations to occur as they do not include provisions and appendices required for operations.

Advanced construction for generators with fully executed final agreements

FERC requires only one final agreement can persist at any one time. If advanced construction or long lead item ordering is required, a Tariff Attachment O, an ISA will be developed for execution and will supersede the existing agreement in place for that facility. The ISA will collect necessary Security, identify the work or long lead items to be purchased. If advanced construction is required, Tariff Attachment P, a CSA will accompany the ISA. See below if advanced construction and operations are requested.

Requesting operations in advance of the study year

As identified previously, Interim ISAs do not permit operations. In order to allow rights to be exercised in advance of the base case year, an ISA with interim rights is required. An ISA with interim rights allows a generator to operate prior to the base case year(s), pending results of annually performed interim deliverability studies. It is incumbent upon a Developer wishing to exercise rights in the PJM Market prior to their base case year to request interim studies through their assigned PJM project manager.

Note:
Further information on all required studies and the Interconnection Service Agreement may be found in Part VI, of the PJM Tariff (Tariff at Part VI, Section 212 - formerly Subpart A at 36.8, in Part IV for Generation Interconnections, Tariff at Part VI, Section 212 – formerly Subpart B at 41.7 for Transmission Interconnections, Tariff 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 in the library section of PJM's web site.

5.4.3 Security Requirements

In accordance with Section 212.4 of the Tariff, at the time the Interconnection Customer executes the Interconnection Service Agreement (ISA), Interim ISA, Wholesale Market Participation Agreement (WMPA), or Upgrade Construction Service Agreement (UCSA), they must provide Security (cash, letter of credit, or other reasonable form of Security) that names PJM as the beneficiary for any work required and specified in the agreement to be performed on behalf of the customer or for Network Upgrades (work that may be relied on by other New Service Customers to be completed) or for cost allocations towards Network Upgrades.

PJM requires Security to be held in order to:

- Protect Transmission Owner(s) and ratepayers in the event the Interconnection Customer fails to pay for any construction work performed by the Transmission Owner(s) and terminates their project. The Security will allow the Transmission Owner(s) to restore their system to a reliable state.
- Protect other New Service Customers in the event the Interconnection Customer terminates the project after executing an ISA, Interim ISA, WMPA, or UCSA when another New Service Customer is relying on those facilities. The Security would cover the cost of the Transmission Owner(s) to complete the required Network Upgrades that other New Service Customers need.

The Security amount is determined by PJM and is estimated to be the sum of the cost of:

- Required Non-Direct Connection Local Upgrades and Non-Direct Connection Network Upgrades[2]
- Any Network Upgrades[3] that Transmission Owner(s) will be responsible for constructing that the customer has cost allocations towards
- Required Attachment Facilities, Direct Connection Local Upgrades and Direct Connection Network Upgrades[4] work that the Interconnected Transmission Owner expects to complete during the first three months of construction work in earnest.

For Non-Direct Connection Network and Local Upgrades, as the construction is completed and paid, Security will be reduced appropriately. If Security is paid in cash, an Interconnection Customer can elect to allow Security to be worked down during construction, as long as adequate Security remains after the payment. For Direct Connection Network and Local Upgrades and Attachment Facilities, Security is not reduced until all work is completed. Thus, if a project is completed, all Security will be returned to the Interconnection Customer upon initial operation.

If an Interconnection Customer fails to timely execute the Interconnection Service Agreement, meet the applicable Tariff 212.5 milestones identified in the ISA, or provide the required Security, the Interconnection Request will be deemed terminated and withdrawn.

Deferred Security:

The Interconnection Customer may request to defer providing their Security for up to 120 days after the Interconnection Customer executes the Interconnection Service Agreement. Any Network Upgrades that are being relied upon or could be relied upon within the year by another New Service Customer that have a completed System Impact Study are not available for this Deferred Security option.

The Interconnection Customer can request the Transmission Owner to commence procurement and / or engineering design of Transmission Owner work during the deferred Security period. The Interconnection Customer must pay a deposit of $200,000 or 125% of the estimated costs that will be incurred during the 120 day period, whichever is greater, to fund the continued design and procurement activities for the upgrades. $100,000 is non-refundable. The Deferred Security deposit is separate and additional to the Security required for the ISA and cannot be used to offset the requirement for final Security. If there are any remaining non-refundable deposit monies, they will be returned to the Interconnection Customer upon initial operation. If the project terminates before initial operation, the non-refundable money is forfeited.

5.4.4 Agreement Milestones

Project specific milestones are included in the agreement. The purpose of ISA milestones is to ensure the Interconnection Customer is performing their due diligence and making progress with the installation and completion of their generator facilities. PJM may add or remove milestones to an ISA as required, but at a minimum new generation projects' ISAs include the following:

- Substantial Site work completed

[2] Refer to Section 4.5 for Network Transmission Upgrades
[3] Refer to Section 4.5 for Network Transmission Upgrades
[4] Refer to Section 4.5 for Network Transmission Upgrades

- Delivery of major electrical equipment
- Commercial Operation

All milestones contain the phrase “on or before” the milestone date. The “on or before” allows a customer to identify a most likely schedule while accounting and allowing for potential schedule delays. Refer to Exhibit 6 below. If the milestone date in the ISA allows for unforeseen delays and the project actually is completed on the aggressive timeline, then the on or before agreement language allows for them to commence operations ahead of the milestone (this is a positive outcome and accounts for the greatest in-service probability). However, if PJM includes the most aggressive schedule date as the milestone, then PJM must breach the customer if they miss the milestone date (a very likely breach event since the left-most arrow, based on the area under the bell curve is the least probable and there is great potential for in-service to occur later). Even the most likely schedule date has a 50/50 chance as to whether PJM may have to breach the customer for missing a milestone date.

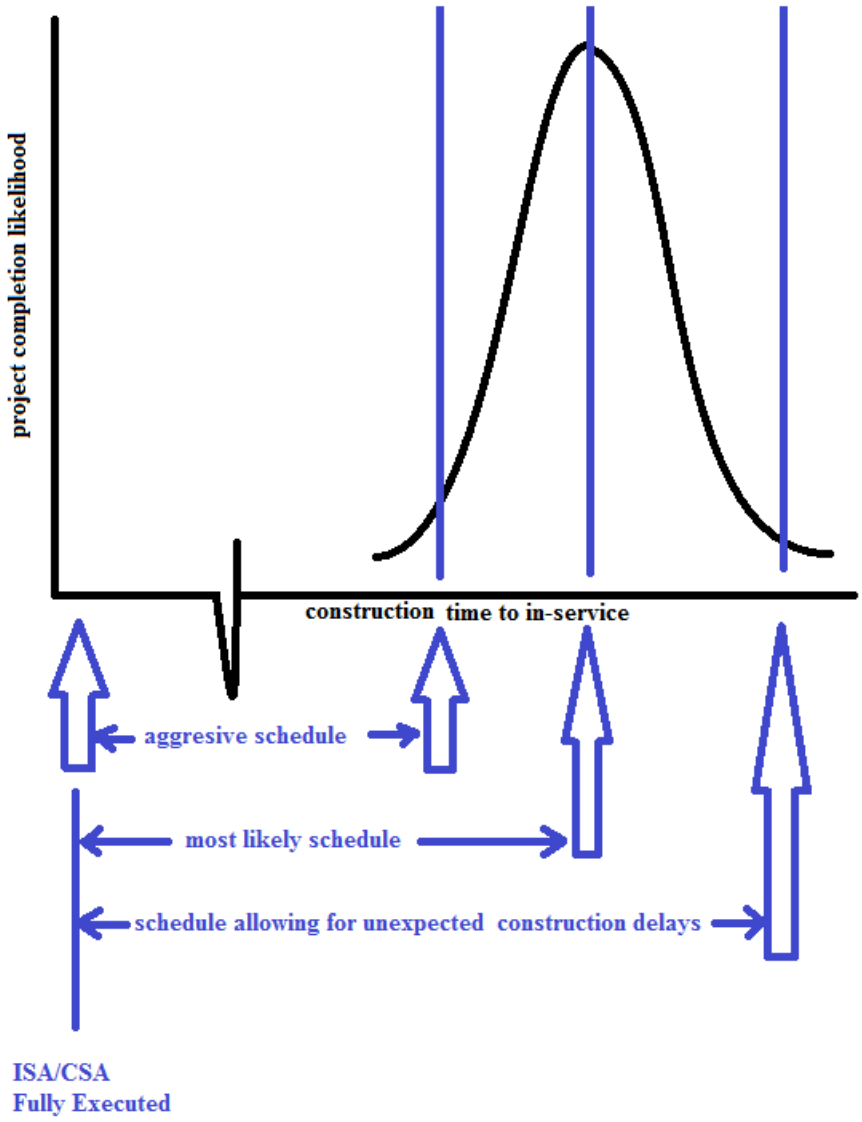


Exhibit 5: Milestones v. Construction Probability

5.4.5 Non-Queue Interconnection Service Agreements

PJM's New Services Request process for generation interconnection applies to all new generation and uprates to existing generators. For existing generators already interconnected to PJM that are currently operating under a two-party Interconnection Agreement and / or a power purchase agreement, or both, and seek to convert to a PJM three-party ISA due to a transfer of ownership or the power purchase agreement is reaching term, a New Service Request is not required. For purposes of tracking the project identifying the generator in PJM's processes and in FERC filings, and ensuring all costs associated with the conversion are paid by the

Generation Owner, PJM developed an agreement and procedures to accomplish the request, referred to as the “Non-Queue Process.”

1. In general, a two-party interconnection agreement or power purchase agreement will likely be converted directly to a Tariff Interconnection Service Agreement. However, it is possible that an interconnection arrangement historically permitted may have provisions unacceptable under the Tariff. The following are examples:
2. a generator’s attachment facilities arrangement does not conform to PJM’s Tariff and requires rearrangement of the Attachment Facilities; or
3. existing metering does not meet PJM requirements, metering modifications may be required.

The list above is not exhaustive nor do the examples portray all potential scenarios and issues that may need to be addressed during the non-queue process; rather, it demonstrates that in addition to drafting an Interconnection Service Agreement, a Construction Service Agreement may be required. PJM has developed a Cost Responsibility Agreement to cover PJM and Transmission Owner costs associated with the agreement(s) development. A deposit of $10,000 is required with the agreement and any unspent money associated with the deposit are refundable once the agreements are executed or if the customer changes their mind regarding receiving an agreement. The cost agreement must be filed with the FERC. If modifications requiring Transmission Owner construction are required, an associated Interconnection Construction Service Agreement may be required.

Execution of the Interconnection Service Agreement under this process follows the same procedures identified in section 212 of the Tariff. The generator owner will have the same timing requirements to execute necessary agreements as identified in this section of the Tariff. If construction is required by the Transmission Owner, associated Security and requirements identified in the agreement will also apply. Upon execution, PJM will file the agreement(s) with or, if conforming, report them to the FERC. Attorney review and filing durations must be considered by the Generation Owner when requesting PJM to implement these three-party agreements. If the legacy agreements contain terms and conditions not normally captured by the ISA, time for negotiations may also be required. Because of this potential, PJM requests a minimum of a six month notice prior to the termination of a Power Purchase Agreement or an ownership change, which requires conversion to a three-party ISA. Generators seeking a Non-Queue ISA should contact PJM Customer Service. Customer Service contact information can be found on the PJM Web Page under the “Contact Us” link.

5.5 Interconnection Construction Service Agreement (ICSA)

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 Developer 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 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 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 in the Library section of PJM's web site.

5.5.1 Option to Build

The Interconnection Customer shall have the option to assume the responsibility for the design, procurement and construction of Transmission Owner Attachment Facilities and Direct Connection Network Upgrades ("Option to Build"). PJM and the Interconnection Customer must agree as to what constitutes Direct Connection Network Upgrades and identify such Direct Connection Network Upgrades in the Schedule D (Option to Build) of the ICSA of the applicable queue project. If PJM and the Interconnection Customer disagree about whether a particular Network Upgrade is a Direct Connection Network Upgrade, then PJM shall provide the Interconnection Customer a written technical explanation outlining why it does not consider the upgrade to be a Direct Connection Network Upgrade.

To exercise this Option to Build, the Interconnection Customer must provide PJM and the Interconnected Transmission Owner written notice of its election to exercise the option by no later than thirty (30) days from the date the Interconnection Customer receives the results of the Facilities Study (or if no Facilities Study was required, completion of the System Impact Study). The Interconnection Customer may not elect the Option to Build after such date. The Interconnection Customer must request the Option to Build per the terms of the Interconnection Construction Service Agreement.

If exercising the Option to Build, the Interconnection Customer must select contractors to perform such work from the Transmission Owner's "List of Approved Contractors". Each Transmission Owner's "List of Approved Contractors" is available on the PJM website. If a contractor desired to be used by the Interconnection Customer is not on the "List of Approved Contractors," the customer can request the Transmission Owner evaluate the contractor for acceptability.

The Interconnection Customer is responsible for obtaining all necessary permits, authorizations, and land rights for the construction and installation of the Transmission Owner Interconnection Facilities that it is building. The Interconnection Transmission Owner shall assist the Interconnection Customer in acquiring such necessary permits, authorizations, and land rights if requested by the Interconnection Customer.

If the Interconnection Customer selects the Option to Build for design, procurement and construction of any Transmission Owner Attachment Facilities and Direct Connection Network Upgrades that are to be located on land or in right-of-way owned or controlled by the Interconnected Transmission Owner, the following conditions apply:

- All work must be performed by contractors listed on the Interconnected Transmission Owner's "List of Approved Contractors".

- The Transmission Owner must have full site control of and reasonable access to its property at all times.
- The Transmission Owner has the right to have representatives to supervise work done on its property/facilities and stop or order corrective measures to any work that reasonably could be expected to have an adverse effect on reliability, safety, or security.
- The Interconnection Customer and its contractors must comply with the Interconnected Transmission Owner's safety, security and work rules, and environmental guidelines applicable to the area of construction activity.

Upon completion of the construction and installation of the Option to Build facilities, and prior to energization, the Interconnection Customer must have the constructed facilities inspected and tested by an authorized electric inspection agency or qualified third party acceptable to the Interconnected Transmission Owner. The Interconnected Transmission Owner and PJM have the right to attend, observe, and obtain written results of such tests.

5.5.1.1 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 **thirty (30) days** from the date the Interconnection Customer receives the results of the Facilities Study (or if no Facilities Study is required, completion of the System Impact Study).
- Within **10 days** after notifying PJM of its election to exercise the 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 Build. After consulting with the Interconnected Transmission Owner, PJM shall provide comments on such drawings to the Interconnection Customer within **60 days** after its receipt thereof, after which time any drawings not subject to comment shall be deemed to be approved.
- Each Constructing Entity shall issue reports to each other Construction Party on a **monthly basis** regarding the status of the construction and installation of the Interconnection Facilities. Each Construction Party shall promptly identify, and shall notify each other Construction Party of, any event that may delay completion or may significantly increase the cost of the Interconnection Facilities. Within **15 days** of such notification, PJM shall convene a technical meeting of the Construction Parties to evaluate schedule alternatives.
- Interconnection Customer and the Interconnected Transmission Owner shall coordinate the timing and schedule of all inspection and testing of the Interconnection Facilities. If inspection or testing identifies any defects or failures to comply with Applicable Standards of (i) Interconnection Facilities constructed by the Interconnection Customer, Interconnected Transmission Owner shall notify the Interconnection Customer and PJM of such defects or failures within **20 days** after receipt of the results of such inspection or testing, or (ii) Interconnection Facilities constructed by the Interconnected Transmission

Owner, Interconnected Transmission Owner shall take appropriate action to correct any such defects or failures within **20 days** after it learns thereof.

- Within **10 days** after satisfactory inspection and/or testing of Interconnection Facilities built by the Interconnection Customer/Developer, the Interconnected Transmission Owner shall confirm in writing to the Interconnection Customer and PJM that the successfully inspected and tested facilities are acceptable for energization.
- Within **5 days** after determining that Interconnection Facilities have been successfully energized, the Interconnected Transmission Owner shall issue a written notice to the Interconnection Customer accepting the Interconnection Facilities built by the Interconnection Customer that were successfully energized.
- Within **30 days** after the Interconnection Customer's receipt of notice of acceptance of the Interconnection Facilities, the Interconnection Customer shall deliver to the Interconnected Transmission Owner, for the Interconnected Transmission Owner's review and approval, all of the documents and filings necessary to transfer to the Interconnected Transmission Owner title to any Transmission Owner Interconnection Facilities constructed by the Interconnection Customer, and to convey to the Interconnected Transmission Owner any easements and other land rights to be granted by the Interconnected Customer that have not by then already been conveyed. The Interconnected Transmission Owner shall review and approve such documentation, such approval not to be unreasonably withheld, delayed or conditioned.
- Within **30 days** after its receipt of the Interconnected Transmission Owner's written notice of approval of the documentation, the Interconnection Customer, in coordination and consultation with the Interconnected Transmission Owner, shall make any necessary filings at the FERC or other governmental agencies for regulatory approval of the transfer of title.
- Within **20 days** after the issuance of the last order granting a necessary regulatory approval becomes final, the Interconnection Customer shall execute all necessary documentation and shall make all necessary filings to record and perfect the Interconnected Transmission Owner's title in such facilities and in the easements and other land rights to be conveyed to the Interconnected Transmission Owner.

5.5.1.2 Summary of General Conditions

In addition to the other terms and conditions applicable to the construction of facilities under the Option to Build, the Generation and/or Transmission Interconnection Customer must also:

- Obtain all necessary permits and authorizations
- Obtain all necessary land rights
- Accept the exclusive right and obligation of the Interconnected Transmission Owner to perform line tie-in work and to calibrate remote terminal units and relay settings
- Follow accepted procedures to have those facilities that it builds successfully inspected, tested and energized
- Arrange for all work to be performed by contractors, and using equipment manufacturers or vendors that are listed on the Interconnected Transmission Owner's List of Approved Contractors

- Allow the Interconnected Transmission Owner full site control and reasonable access to its property at all times
- Allow the Interconnected Transmission Owner to have a reasonable number of appropriate representatives present for all work done on its property/facilities and the right to stop work or order corrective measures for any work with an adverse effect on reliability, safety or security of persons or of property
- Comply with the Interconnected Transmission Owner's safety, security and work rules, environmental guidelines and training requirements applicable to the area(s) where construction activity is occurring, and
- 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/Developer arranges to build under the Option to Build.

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 Tariff, available in the library section of PJM's web site.

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

Activity	Activity Duration	Cumulative Duration
Interconnection Customer (IC) submits interconnection request.		Up to 182 days
PJM Conducts Feasibility Study.	Up to 92 day window, after 30 day modeling period	Up to 304 days
PJM issues Feasibility Study results and System Impact Study Agreement.		
IC responds to Feasibility Study results.	Up to 30 days	Up to 334 days
IC executes System Impact Study agreement and provides requisite deposit and data.		
PJM conducts the System Impact Study.	Up to 120 days for study, after 60 day modeling period	Up to 514 days
PJM issues System Impact Study results and Facilities Study Agreement.		

Activity	Activity Duration	Cumulative Duration
IC responds to System Impact Study results.	Up to 30 days	Up to 544 days
IC executes the Facilities Study Agreement and provides required deposit.		
PJM conducts Facilities Study.	Based on estimate of the time needed	Up to 544 days + time for Facilities Studies (F.S.)
PJM issues the Facilities Study results accompanied by the applicable Interconnection Services Agreement and Construction Services Agreement.		
IC responds to the Facilities Study results.		
IC elects the Option to Build.	Within 30 days following the receipt of the results of the Facilities Study (or, if no Facilities Study was required, completion of the System Impact Study).	Up to 574 days + F.S.
IC executes and returns tendered Interconnection Service Agreement or Upgrade Construction Service Agreement	Within 60 days	Up to 604 days + F.S.
IC executes the Interconnection Construction Service Agreement	Within 90 days	Up to 634 days + F.S.
If the Generation and/or Transmission Interconnection Customer (IC) selects the Option to Build, the following timeline for various independent activities must be adhered to:		
IC solicits bids from Approved Contractors within 10 days after electing the Option to Build	Within 10 days	Up to 584 days + F.S.
IC submits initial drawings to the Interconnection Transmission Owner (ITO) and PJM - PJM responds within 60 days	Within 60 days	
Constructing entity submits monthly reports	Monthly	
Constructing entity notifies of delays or cost increases – PJM convenes a technical meeting within 15 days	Within 15 days	

Activity	Activity Duration	Cumulative Duration
Inspection or testing identifies defects – Corrective action is required within 20 days	Within 20 days	
Written notification by ITO is to be provided within 10 days of satisfactory inspection and/or testing and acceptance for energization	Within 10 days	
After successful energization, ITO provides written notice accepting the Interconnection Facilities built by the IC within 5 days	Within 5 days	
IC delivers all documents and filings to the ITO within 30 days of receipt of notice of acceptance	Within 30 days	
After written notice of approval by ITO, the IC makes filings to FERC or other governmental agencies within 30 days	Within 30 days	
After receipt of all regulatory approvals, the IC makes filings to record easements and land rights to be conveyed to the ITO within 20 days	Within 20 days	
Other Timeline requirements:		
Security for Payment - IC shall provide PJM with Security in the amount that is equal to the estimated cost of the ITO Interconnection Facilities that the ITO is responsible for constructing	Within 60 days after the date of IC's receipt of Facilities Study	
Submit Invoices		
ITO to PJM	Monthly	
PJM to IC	Monthly	
IC payment to PJM	Within 15 days	
Submit Final Invoice		
ITO to PJM	Within 120 days of project completion	

Cross-References to Other Supporting PJM Documents

5.5.3 PJM Manuals

- PJM Manual for Control Center Requirements (M-1)
- PJM Manual for Transmission Service Request (M-2)

- PJM Manual for Transmission Operations (M-3)
- PJM Manual for Rules and Procedures for Determination of Generating Capability (M-21)

5.5.4 PJM Tariff – Part VI (Interconnections with the Transmission System)

- Subpart A – Generation Interconnection Procedures
- Subpart B – Transmission Interconnection Procedures (Consolidated with Subpart A)
- Subpart C – (Reserved)
- Subpart D – Interconnection Rights (Moved to Subpart C in Part VI)
- Subpart E – Standard Terms and Conditions for Interconnection (Tariff at Part VI, title moved to App. 2 of Att. O. Subpart E – deleted.)
- Subpart F – Standard Construction Terms and Conditions (Tariff at Part VI, title moved to Att. P, App. 2. Subpart F – deleted.)
- Subpart G – Small Generation Interconnection Procedure
- Attachment N-3 – Form of Optional Interconnection Study Agreement
- Attachment O – Form of Interconnection Service Agreement
- Attachment O-1 – Form of Interim Interconnection Service Agreement
- Attachment P – Form of Construction Service Agreement
- Attachment S – Form of Transmission Interconnection Feasibility Study Agreement

5.5.5 PJM Operating Agreement

- Schedule 6 – Regional Transmission Expansion Planning Protocol

5.6 Upgrade Construction Service Agreement (USCA)

A New Service Customer who proposes to make an upgrade to an existing transmission facility or who seeks Incremental Auction Revenue Rights (IARRs) will receive an Upgrade Construction Service Agreement after their study process is completed. Refer to Manual 14E for additional study procedures applicable to customers seeking Merchant Transmission Upgrades and IARR requests.

5.7 Wholesale Market Participation Agreement (WMPA

Developers interconnecting to non-FERC jurisdictional facilities who intend on participating in the PJM wholesale market will receive a three party agreement known as a WMPA. The WMPA is a non-Tariff agreement which must be filed with the FERC. The WMPA is essentially an ISA without interconnection provisions.

5.8 Other

5.8.1 Cost Responsibility Agreement

Customers who own and operate existing generation resources within the PJM Region and are currently party to an existing agreement with their Interconnected Transmission Owner that is not a three-party Interconnection Service Agreement (ISA) including PJM may request PJM to perform modeling, studies or analysis to verify and ensure that the interconnection of the Customer Facility meets necessary system interconnection requirements specified in the PJM Tariff and associated PJM Manuals, as appropriate. In order to make such a request, a Cost Responsibility Agreement must be fully executed between PJM and the customer and a deposit of $10,000 must be received. The customer will be responsible for the actual costs incurred by PJM and the Interconnected Transmission Owner to perform such studies.

Once the studies are completed and it is confirmed that the interconnection of the Customer Facility meets necessary system interconnection requirements, PJM will issue a new three-party ISA with the customer and Interconnected Transmission Owner.

The Cost Responsibility Agreement is also a pre-requisite to PJM performing any customer-requested changes to an existing three-party ISA.

5.8.2 Consent to Assignments

Prior to transferring ownership of a project or company, a Developer, Generation Owner or Transmission Owner must complete an applicable “consent to assignment agreement.” The PJM Law Department has established templates for consent to assignment at the following stages of development and operation:

5.8.2.1 Assignment prior to the final agreement

Prior to the ISA, WMPA or UCSA being executed, a customer should work with their assigned Interconnection Projects Department project manager to complete the agreements located on pjm.com. Two methods for assignment prior to the final agreement have been developed: 1) a combined buyer / seller agreement or 2) the buyer and seller each separately completing respective agreements.

5.8.2.2 Assignment after the final agreement and prior to commercial operation

During the construction phase, which commences upon execution of the final agreement(s) and prior to commercial operation, if a Developer or lender elects to assign a project, they need to work with the Infrastructure Coordination Department project manager to complete the agreements located on pjm.com. Three agreements are available for the initiating party: 1) a lender agreement, 2) Interconnection Customer agreements, and 3) Transmission Owner agreements.

5.8.2.3 Assignment after commercial operation

The following applies to any generation, transmission or transmission owner facility participating in the PJM Market. Generator owners or merchant transmission facility owners that wish to assign their facility to another entity or to perform a lender transfer after commercial operation shall follow the following instructions:

- Notify your intent to your PJM client manager a minimum of 90 days prior to the financial transfer to assure adequate time to make necessary agreement modifications and filings with the Federal Energy Regulatory Commission.
- Identify to PJM all existing underlying affected agreements, such as Power Purchase Agreements, two-party interconnection agreements, PJM Interconnection service agreements; and
- Identify any changes to the facility that have occurred since the current effective agreement was executed that are not currently documented in the existing agreement, such as scope change documents from construction, retirements of units depictured or described in the agreement, modifications to the facility that would be reflected on a one-line diagram.

PJM will review the proposed assignment and existing agreements to determine the proper documentation and filings necessary to effectuate the requested asset transfer or lender change.

5.8.3 Agreement to Amend

Existing customers with ISAs may at times need to modify the agreement to reflect changes to their facility or changes in ownership. An Agreement to Amend is used to memorialize such changes. The Agreement to Amend is executed by all parties to the ISA. A Cost Responsibility Agreement is required prior to commencing any work related to the Agreement to Amend.

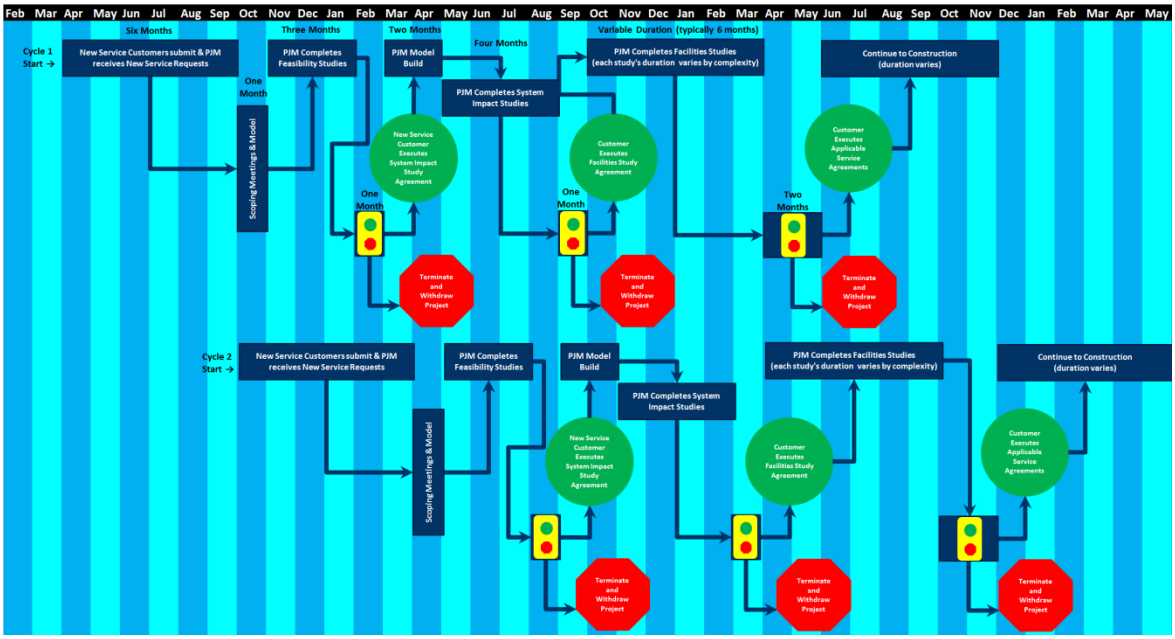
5.8.4 Optional Interconnection Study Agreement

Within 30 days from the date when the New Services Customer receives the results of the System Impact Study, the New Services Customer may request up to two Optional Interconnection Studies per Tariff Section 209.1. The Interconnection Customer shall execute and deliver the Optional Interconnection Study Agreement, along with the required technical data, and the greater of a $10,000 deposit or the estimated study cost to the Transmission Provider within ten (10) business days of the Interconnection Customer's receipt of the agreement.

Per Tariff Section 209.2, the Optional Interconnection Study will consist of a sensitivity analysis based on the assumptions specified by the New Services Customer in the Optional Interconnection Study Agreement. Upon completion of the Optional Interconnection Study, the New Services Customer will receive the scope and cost of the Network Upgrades required to provide Interconnection Service based on the results of the study.

Attachment A: PJM Generation and Transmission Interconnection Planning Process Flow Diagram

Valid: April 1, 2017 forward



Attachment B: Cost Allocation Procedures

B.1 Purpose

One of the responsibilities of PJM as an RTO is to allocate the cost responsibility for all system reinforcement projects including projects required for Customer New Service Requests, baseline transmission reliability upgrades and market efficiency upgrades. The cost allocation procedures used by PJM to allocate costs due to requests are described below. Manual 14B addresses baseline-driven upgrade cost allocation procedures.

B.2 Scope

The RTEP encompasses two types of enhancements: Network Upgrades and Direct Connection Attachment Facilities. Network Upgrades can be required in order to accommodate the interconnection of a merchant project (generation or transmission) or to eliminate a Baseline problem as a result of system changes such as load growth, known transmission owner facility additions, etc. The PJM Cost Allocation Procedures are presented in two parts: “PJM Generation and Transmission Interconnection Cost Allocation Methodologies” discusses the cost allocation methodology for projects required for generator and transmission interconnections, below and: “Schedule 12 Cost Allocation Process for Baseline Transmission Reliability and Market Efficiency Upgrades” discusses the cost allocation process for baseline transmission reliability and market efficiency upgrade project requirements in Manual 14B. New Service Customers, other than those proposing Merchant Network Upgrades, may participate in Multi-Driver Approach projects identified by PJM. Further information is provided in Manual 14B.

The results of the System Impact Studies reveal Direct Connection Attachment Facilities required for new generation to “get to the bus”, Local and Network Upgrades to mitigate any “network impact” effects which the addition of such new generation or new transmission facilities may have on the power system itself.

- Each respective generator or transmission project bears the cost responsibility for Direct Connection Attachment facilities required for interconnection.
- The cost responsibility for Local and Network Upgrades identified through System Impact Study analysis is allocated among parties according to the following:
- For Local and Network Upgrades which are required due to the overloads associated with the System Impact Studies of an individual New Services Queue, the cost of the Local and Network Upgrades will be allocated according to the order of the New Service Requests in the New Services Queue and the MW contribution of each individual New Service Request for those projects which cause or contribute to the need for the Local or Network Upgrades. The Load Flow Cost Allocation methods discussed in this manual, including cutoffs, still apply to the individual projects.

B.2.1 Definitions

- New Service Queue Close Date – The date on which a New Service Queue ends. Currently, in the PJM Tariff, the New Service Queue Close Dates are March 31st and September 30th.

- New Service Customer – The responsible party for a generator, merchant transmission, or other transmission upgrade project that is in the PJM New Service Queue.
- Queue Date – The date on which PJM receives a valid New Service Request from a New Service Customer.

B.3 PJM Generation and Transmission Interconnection Cost Allocation Methodologies

The cost allocation procedure will continue to be evaluated and modified, if required, as the interconnection process proceeds.

B.3.1 Load Flow Cost Allocation Method

New Service Customer requests are studied as a single study for all active projects in an individual New Services Queue. Network Upgrades are identified to maintain system reliability.

Individual Local & Network Upgrades which cost less than $5,000,000

All New Service Customers with active New Service Requests in an individual New Services Queue will be allocated a cost for these Network Upgrades based upon the following criteria:

- The first New Service Customer to cause the facility identified in the study which exceeds 100% loading of the applicable rating and develops the need for the Network Upgrade will in all cases have some cost allocation.
- Contingent to the individual New Service Request contributing MW impact being greater than 5 MW AND greater than 1% of the applicable line rating OR (if its Distribution Factor (DFAX) on the facility is greater than 5% AND its MW impact on the facility's rating is greater than 3%), the contribution of a New Service Customer is determined by the voltage level of the facility that it impacts:
- For a transmission facility whose rated voltage level is below 500 kV, a New Service Customer will have some cost allocation if its Distribution Factor (DFAX) on the facility is greater than 5% OR if its MW impact on the facility's rating is greater than 5%.
- For a transmission facility whose rated voltage level is 500 kV or above, a New Service Customer will have some cost allocation if its DFAX on the facility is greater than 10% OR if its MW impact on the facility's rating is greater than 5%.
- For New Service Requests involving studies for Long Term Firm Transmission Service seeking to import power to PJM, or which otherwise have their source of power outside PJM, the New Service Customer will have some cost allocation towards upgrades associated with all PJM facilities, if its Distribution Factor (DFAX) on the facility is greater than 3% OR if its MW impact on the facility's rating is greater than 3%.
- Allocation of costs to New Service Customers for a Network Upgrade which has a cost of less than $5,000,000 will not occur outside of the New Services Queue in which the need for the Network Upgrade was identified
- Allocation of costs to New Service Customers for a Network Upgrade which has a cost of less than $5,000,000 will be based on the total MW impact on the facility requiring a Network Upgrade as determined in the System Impact Study

Individual Local & Network Upgrades which cost $5,000,000 or greater

All New Service Customers after and including the New Service Customer under study, that contribute to the need for the Network Upgrade are identified and their MW impact on the need for the Network Upgrade is determined. The MW impact will be based on the condition that causes the need for a Network Upgrade.

- The first New Service Customer to cause the need for the Network Upgrade will in all cases have some cost allocation. The cost allocation for this New Service Customer will only consider the loading above the facility's capability.
- Contingent to the contributing MW impact being greater than 5 MW AND greater than 1% of the applicable line rating, the contribution of an New Service Customer following the first New Service Customer to cause the need for the Network Upgrade is determined by the voltage level of the facility that it impacts:
- For a transmission facility whose rated voltage level is below 500 kV, a New Service Customer will have some cost allocation if its Distribution Factor (DFAX) on the facility is greater than 5% OR if its MW impact on the facility's rating is greater than 5%.
- For a transmission facility whose rated voltage level is 500 kV or above, a New Service Customer will have some cost allocation if its DFAX on the facility is greater than 10% OR if its MW impact on the facility's rating is greater than 5%.
- For New Service Requests involving studies for Long Term Firm Transmission Service seeking to import power to PJM, or which otherwise have their source of power outside PJM, the New Service Customer will have some cost allocation towards upgrades associated with all PJM facilities, if its Distribution Factor (DFAX) on the facility is greater than 3% OR if its MW impact on the facility's rating is greater than 3%.
- New Service Customers will be assigned costs in proportion to their contributing MW impacts.

For purposes of allocation of Network Upgrade costs to future Queue, a New Service Customer will be responsible for allocated costs, within previously stated cost allocation guidelines, if their New Service Queue Close Date occurs less than 5 years following the execution of the first Interconnection Service Agreement or Upgrade Construction Service Agreement which identifies the need for this Network Upgrade.

No depreciation of the "as-built" Network Upgrade cost will be used when allocating costs between New Service Customers.

Cost allocation for the engineering design of Network Upgrades will terminate based on the completion of the applicable Facilities Study.

A complete list of Distribution Factors for all PJM modeled substations will be developed during System Impact Studies for each identified Network Upgrade. This Distribution Factor list will be used for all cost allocation pertaining to the identified Network Upgrade.

B.3.2 Short Circuit Cost Allocation Method

All New Service Customer projects are studied in queue order.

A New Service Customer will have some cost allocation if the customer's contributing fault current impact on the circuit breaker's applicable interrupting rating is greater than 3% or if it results in a greater than 3% increase in fault current at the substation. The firstNew

Service Customer to cause the need for the Network Upgrade will in all cases have some cost allocation.

A New Service Customer will be assigned costs in proportion to its fault level contribution or the fault level increase as a result of the inclusion of a new Network Upgrade required by that New Service Customer.

For Queue D and thereafter, the first New Service Customer to cause the need for a Network Upgrade due to increased fault current will in all cases have some cost allocation. The cost allocation for this New Service Customer will only consider the loading above the equipment's capability.

For purposes of allocation of Network Upgrade costs to future Queue, a New Service Customer will be responsible for allocated costs, within previously stated cost allocation guidelines, if their New Service Queue Close Date occurs less than 5 years following the execution of the first Interconnection Service Agreement, or Upgrade Construction Service Agreement which identifies the need for this Network Upgrade.

If during the course of a short circuit study it is determined that a load flow (or stability) reinforcement subsequently causes breaker(s) to exceed their applicable rating, the cost of breakers identified in this case will be allocated based on the load flow (or stability) cost allocation rules associated with the load flow (or stability) reinforcement as these breaker(s) are considered a part of the load flow (or stability) reinforcement. The contributing fault current from the modeling of the reinforcement is recorded in the event that another queue request does not require the load flow reinforcement, but instead, adds fault current in excess of the normal short circuit threshold of 3% to a breaker. See below for an example of cost allocation for load flow (or stability) driven circuit breaker replacements.

Example of cost allocation for circuit breaker replacement with thermal (or stability) upgrade driver (or contributor) to the fault current:

Queue Position	MW Contribution	Thermal upgrade cost allocation
XX-001	50	50%
XX-002	30	30%
XX-003	20	20%

Modeling of the Thermal upgrade in the short circuit study case results in the contribution of 10kA to a breaker and causes the breaker to be overstressed.

Driver	Fault contribution (kA)	Short Circuit + Thermal Cost Allocation impacts (kA)	Total Cost allocation for Short Circuit contribution (kA)
Thermal upgrade	10	N/A	N/A
XX-001	2	2+10*0.5 (2 is fault contribution from project generator(s), 10 is fault contribution from	2+5=7

		reinforcement, 0.5 = 50% cost allocation per thermal analysis)	
XX-002	4	4+10*0.3 (4 is fault contribution from project generator(s), 10 is fault contribution from reinforcement, 0.3 = 30% cost allocation per thermal analysis)	4+3=7
XX-003	1	1+10*0.2(1 is fault contribution from project generator(s), 10 is fault contribution from reinforcement, 0.2 = 20% cost allocation per thermal analysis)	1+2=3
XX-004 (does not require thermal upgrade)	3	3+0	3

The total cost allocation for short circuit contribution is the basis for the determination of the cost allocation towards the breaker upgrade costs. If a breaker replacement cost $1M, and based on the contributions listed above, the cost allocation for the breaker upgrade is below.

Driver	Total Cost Allocation for Short Circuit contribution (kA)	Cost Allocation
XX-001	2+5=7	(7/(7+7+3+3))*$1M=$350K
XX-002	4+3=7	(7/(7+7+3+3))*$1M=$350K
XX-003	1+2=3	(3/(7+7+3+3))*$1M=$150K
XX-004 (does not require thermal upgrade)	3	(3/(7+7+3+3))*$1M=$150K

No depreciation of the “as-built” Network Upgrade cost will be used when allocating costs between New Service Customers.

Cost allocation for the engineering design of Network Upgrades will terminate based on the completion of the applicable Facilities Study.

PJM will consider application of an individual component cost vs. an aggregate cost when determining the cost allocation window.

B.3.3 Cost Allocation Method for Generator and/or Generator Step Up (GSU) Changes

The generator and generator step up transformer (GSU) characteristics provided by the Developer prior to the initiation of the System Impact Studies for a given queue will be used for all cost allocation during the System Impact Study phase. If a Developer changes the generator or GSU characteristics after initiation of the System Impact Studies, any additional system problems and any resulting reinforcements will be assigned completely to the Generation Interconnection project that made the changes. Future queued generation may share some cost allocation based on when the generator or GSU changes were provided to PJM.

- Example 1: Impact studies for Queue Z started on May 10, 2010. Five 230 kV breakers at substation Alpha were required to be replaced due to several projects in Queue Z. Project Z2 which had some cost allocation for the five 230 kV breakers provided new GSU data on May 25, 2010. The new GSU has higher impedance. If all five breakers are determined to still be needed with the new GSU impedance, the original cost allocation will not change. If only four breakers are now required, the cost allocation for the four breakers that are still required will not change.
- Example 2: Impact studies for Queue Z started on May 10, 2010. Five 230 kV breakers at substation Alpha were identified to be replaced due to several projects in Queue Z. Project Z2 which had some cost allocation for the five 230 kV breakers provided new GSU data on May 25, 2010. The new GSU has a lower impedance. Now six 230 kV breakers at substation Alpha need to be replaced. Project Z2 will be assigned 100% of the cost for the sixth breaker and the cost allocation for the original five 230 kV breakers will not change.
- The rules concerning generator and GSU changes will be applied to generators in Queue B and thereafter.

B.3.4 Generation Project Excess MW Capabilities

The machine data provided by generation projects often contain MW capabilities that exceed the queued Capacity Interconnection Rights for that project. These additional MWs may result in a system that does not meet ReliabilityFirst Criteria for certain contingencies not “observed” in operations such as bus faults, and ReliabilityFirst Standard IIC contingencies (tower line, line fault with stuck breaker, faulted breaker). Consequently, after all generation projects in a given queue have executed a Generation Interconnection Facility Study Agreement, the PJM system will be evaluated using the MW capabilities provided by the Developers to determine whether there are any bus fault or ReliabilityFirst Standard IIC violations. Any additional system problems will need to be rectified through either limiting the generator capability via hardware or upgrade of the Transmission System to eliminate the violation.

- The rules concerning excess project MW capabilities will be applied to generators in Queue B and thereafter.

B.3.5 Stability Cost Allocation Method

All New Service Customer projects will be studied in queue order as established under the PJM Tariff.

If a stability constraint is identified during the study of a New Service Request, the New Service Customer(s) which contributes to the need for that reinforcement will be allocated a portion of the costs for the required Network Upgrade to eliminate the stability constraint.

A New Service Customer will be assigned costs in proportion to the MW contribution towards the need for the Network Upgrade.

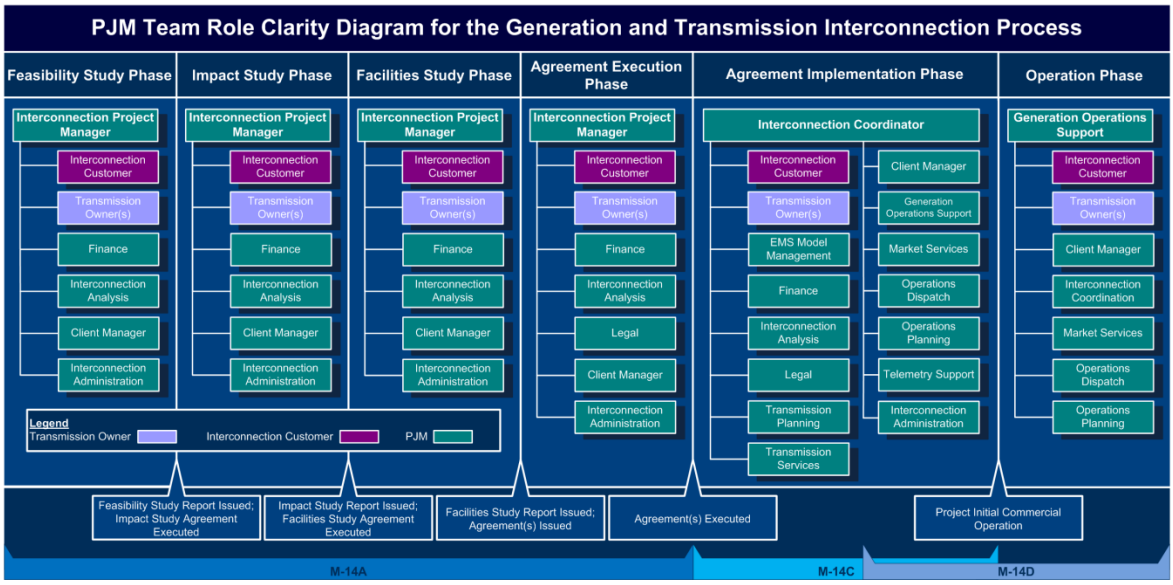
The determination of the MW contribution for each New Service Customer is the margin between its MFO, or total capabilities, and the MW quantity at which the impact from the request ceases to cause the need for the Network Upgrade. A New Service Request with any impact which would cause system instability without a necessary Network Upgrade, will have its requested MW quantity reduced in steps to estimate the stability limit where the disturbances in the stability study would not cause any need for system reinforcement through the implementation of a Network Upgrade. In each step of the MW reduction, the New Service Request's MW quantity is reduced by 50MW or 10% of its MFO, or total capability, whichever is larger, to examine if system stability is maintained at this reduced MW value. The MW contribution for stability cost allocation for the individual New Service Customer is the difference between the MFO, or total capability, and the MW quantity at which the system stability is restored without the need for the Network Upgrade.

A New Service Customer will be responsible for allocated costs, within previously stated cost allocation guidelines, if their New Service Queue Closing Date occurs less than 5 years following the execution of the first Interconnection Service Agreement, or Upgrade Construction Service Agreement, which identifies the need for this Network Upgrade.

No depreciation of the "as-built" Network Upgrade cost will be used when allocating costs between New Service Customers.

Cost allocation for the engineering design of Network Upgrades will terminate based on the completion of the applicable Facilities Study.

Attachment C: PJM Generation and Transmission Interconnection Planning Team Role Clarity Diagram



Attachment D: Facilities Study Procedure

Introduction

A Facilities Study is an engineering study conducted by the Transmission Provider to describe the modifications required to the Transmission Provider's (PJM's) Transmission System to provide the requested Generator and/or Transmission Interconnection Service. PJM may contract with consultants, including the Interconnected Transmission Owner (ITO) and any other affected Transmission Owners (TO), to obtain services or expertise.

The purpose of the Facilities Study is to provide*, commensurate with any mutually agreed parameters regarding the scope and degree of specificity described in Schedule A of the Facilities Study Agreement, conceptual (or preliminary) design, and, as appropriate, detailed design, plus cost estimates and project schedules,* to implement the conclusions of the System Impact Study regarding the Attachment Facilities, Network Upgrades and Local Upgrades (i.e. upgrades related to non-Tariff designated facilities) necessary to accommodate the Interconnection Customer's Interconnection Request(s).

Examples of typical Facilities Study deliverables are preliminary single line diagrams and general arrangement drawings for substation work, and delineation of proposed study area and proposed conductor and structure designs for transmission line work. Remaining detailed design activities would be completed during the construction phase of the project.

The Facilities Study Agreement (FSA) between the Interconnection Customer/Developer ("the Customer") and PJM will identify the scope of facility additions and upgrades to be included in this study. The FSA may also include milestones for completion of the Customer's facility study, where such work completion is critical to PJM's Facilities Study schedule.

General Guidelines

Facilities Study work will be initiated by a Kickoff meeting attended by the ITO, affected TO(s), the Customer, and PJM. The following types of information will be communicated at the Kickoff meeting:

The Customer shall provide a schedule for construction and anticipated commercial operation of the Customer's facilities. The Customer's schedule shall include the date when backfeed power is required, and the dates for anticipated test and commercial operation of each generating unit or transmission facility.

Interconnection specific information, including but not limited to:

- a one-line diagram showing the location of the Point of Interconnection,
- a customer facility location/site plan,
- a list of Interconnection Facilities and Ownership,
- if applicable, a list and ownership of Merchant Network Upgrades,
- a one-line diagram showing location and ownership of Metering Equipment,
- the Applicable Technical standards that apply to the Customer Facility and the Interconnection Facilities, and
- the Maximum Facility Output and/or the Nominal Rated Capability of the Customer Facility.

The scope of the Customer's, PJM's, ITO's and other affected TO's facilities study work will be delineated, and a schedule for completion of Facilities Study elements will be established. The scheduled completion of the Facilities Study shall not extend beyond the time estimate provided by the FSA.

A tentative schedule for Status meetings will be established. Status meetings may be necessary in those instances where information about one or more completed elements of the Facilities Study may be critical to the Customer's decision to continue the Facilities Study.

Results of PJM's Facilities Study shall be reported to the Customer in the form of a Facilities Study Report ("the Report"). The Report must contain a good-faith estimate of costs and construction schedules for each new or upgraded facility. In addition, the Report must contain sufficient detail about the engineering design of each facility. This will provide the Customer with information necessary to perform due diligence on the work to be performed by PJM, the ITO and other affected TO(s). The Report, less confidential or sensitive material, will be integrated with other Reports from other Transmission Owners (if applicable), and will also be posted on PJM's Web site.

All Report materials must be capable of being included in an MS Word document, formatted for 8 ½ in. by 11 in. printing. The Report shall identify the Customer's project by the queue number assigned to the project on PJM's web site. For example: "Project A57".

Facilities Study reports submitted to PJM shall consist of two primary sections:

Transmission Owner Facilities Study Summary

Transmission Owner Facilities Study Results

Transmission Owner Facilities Study Summary

Description of Project

Provide a general description of the Customer's project that resulted in the need for the addition and/or upgrade of facilities. The information under the General paragraph of the System Impact Study Report shall be used as the basis for the Project description. Changes to the information provided in the System Impact Study shall be noted and recorded.

Amendments to the System Impact Study data or System Impact Study Results

In general, significant changes to a Customer's project will not be allowed within the existing queue position for the Customer's interconnection request. However, changes to generator data or generator step-up transformer data, withdrawal of an interconnection Request with a lower queue number, or other changes allowed by PJM's business rules can cause the need to re-evaluate the Customer's System Impact Study and amend the results.

Interconnection Customer's Submitted Milestone Schedule

The Customer's submitted project schedule will be documented in this portion of the Report. This schedule will be used as the basis for developing the schedules for the purchase of equipment and the construction of facilities upgrades and additions contained in PJM's scope of Facilities Study work.

Scope of Customer's Work

In general, the scope of the Customer's facility study work will be limited to the direct connection facilities up to, but not including, the point of interconnection to a TO's facilities. The Customer's

facilities study results will be included in the Report to the extent required to adequately support PJM's Facility Study results.

Description of Facilities Included in the Facilities Study

A general description of transmission lines, substations, protection systems, etc. that are included in the Facilities Study Report.

Total Costs of Transmission Owner Facilities included in Facilities Study

A summary level statement indicating the total estimated costs for both Attachment Facilities and Network Upgrades included in the Facilities Study.

Summary of Milestone Schedules for Completion of Work Included in Facilities Study:

Summary level schedule for detailed design, material & equipment procurement, and construction & testing for Attachment Facilities and Network Upgrades included in Facilities Study. This section should include a statement of comparison (i.e. alignment or misalignment) with Interconnection Customer's milestone schedule.

Transmission Owner Facilities Study Results

Transmission Lines – New

The Report shall include a "purpose and necessity" statement as well as a general description of alternative routes, terminal points, geographic description of terrain traversed by the new line, right-of-way width by segment, potential use of common corridors where such use exists, and a description of the permits required.

The following information must also be described; design criteria (may be summarized and reference published documents), nominal voltage rating, physical characteristics (overhead, underground, single circuit, double circuit, AC, DC, etc), line MVA normal and emergency rating, BIL, line impedance (positive and zero sequence), line and shield conductor type and size, type of support structure, and grounding design.

Applicable Transmission Owner Technical Standards should be referenced in the Report.

A specific reference to "PJM Transmission and Substation Design Subcommittee Technical Requirements" (note: upon approval) must be made for new or upgraded facilities.

Material specifications and a materials list, if available, may be included in the report or referenced.

All permit requirements must be identified.

Attachments required: geographic map with Customer facility location/site plan, with proposed transmission line study area superimposed.

Attachments optional: drawings for typical structure types.

Transmission Line – Upgrades

As applicable, the same information, as listed above for "Transmission Lines – New", distinguishing between existing and new equipment.

Attachments: As applicable, same as above for "Transmission Lines – New".

New Substation/Switchyard Facilities

The Report shall include a “purpose and necessity” statement, a general description of the functional station design and layout, proposed location, and a description of the potential permits required.

Also included shall be a description of the structural design, the electrical design including rating specifications and rating for all major electrical equipment (e.g. power transformers, circuit breakers, switches, instrument transformers, capacitor voltage transformers, etc.), and the protective relaying, communications, metering, and instrumentation requirements.

Applicable Transmission Owner Technical Standards should be referenced in the Report.

A specific reference to “PJM Transmission and Substation Design Subcommittee Technical Requirements” (note: upon approval) must be made for new or upgraded facilities.

A Specific reference to the “PJM Relay Philosophy and Design Standards” (note: upon approval) must be made for new or upgraded protective relay equipment.

Material specifications and a materials list, if available, may be included in or referenced in the Report.

All permit requirements must be identified.

Attachments required: One-line diagram for each substation / switchyard where facilities are to be added or upgraded. General arrangement diagram showing the physical layout of the new substation facilities.

Optional Attachment: Relay, Instrumentation, and Control one-line diagram.

Upgrades to Substation / Switchyard Facilities

As applicable, the same information listed above for “New Substation / Switchyard Facilities”, distinguishing between existing and new equipment.

Attachments: As applicable, same as above for “New Substation / Switchyard Facilities”.

Metering & Communications

General requirements for revenue and telemetry metering, SCADA RTU, and telecommunications, coordinated with PJM requirements.

Environmental, Real Estate and Permitting Issues

Assessment of environmental impacts related to Attachment Facilities and/or Network Upgrades (i.e. Environmental Impact Study requirements, environmental permitting, sediment & erosion control issues), real estate ownership / easement issues, siting and Right-of Way issues for Transmission Owner side of Point of Interconnection.

Summary of Results of Study

Cost Estimates

A table listing construction cost estimates for each new or upgraded facility shall be provided. As applicable, identify and include all taxes and additional charges such as CIAC.

At a minimum, cost estimates shall be included with the following level of detail, along with the total costs (note: keep applicable CIAC tax gross-up amounts separate from total costs). Include both direct and indirect costs in each cost category:

Attachment Facilities:

Detailed Design Costs

Material and Equipment Costs

Construction and Testing Costs

Miscellaneous Costs (i.e., real estate fees, environmental studies, contingencies, project management/oversight – specify details)

CIAC Tax Gross-up (if applicable)

Each Network Upgrade:

Detailed Design Costs

Material and Equipment Costs

Construction and Testing Costs

Miscellaneous Costs (i.e., real estate fees, environmental studies, project management/oversight, contingencies – specify details)

CIAC Tax Gross-up (if applicable)

Additional level of detail for cost estimates shall be provided if indicated in Schedule A of the Facilities Study Agreement.

Schedules

A milestone schedule, including major milestones (e.g. completion of final design, prepare specifications, solicit bids, construction completion) shall be provided for all facilities within PJM's and the TO's scope of work.

A statement concerning the ability to meet the Customer's scheduled milestones must be included.

Additional level of detail for project scheduled shall be provided if indicated in the Facilities Study Agreement.

Assumptions

A list of assumptions, uncertainties and / or qualifiers that may adversely impact the estimated costs and/or schedules must be identified.

Some examples of items to be detailed in this section are environmental permitting, real estate/easement acquisition, public / customer opposition, equipment availability/system constraints/time of year limitations, scope definition with respect to accelerated schedule, contractor cost variability.

Information Required for Interconnection Service Agreement

A table with a cost breakdown for the FERC filing of the Interconnection Service Agreement must be provided. The table shall include the total cost for all facilities to be constructed by the TO. The costs must be itemized in the following categories:

Attachment Facilities:

Direct Charges Labor

Direct Charges Material

Indirect Charges Labor

Indirect Charges material

Carrying Charges*

Network Facilities:

Direct Charges Labor

Direct Charges Material

Indirect Charges Labor

Indirect Charges material

Carrying Charges*

* The Carrying Charge Rate must be specified.

The cost breakdown indicated above is for use in the ISA in accordance with FERC guidelines, and is in addition to the cost breakdown detailed in Section 7.

The following are definitions for the above cost types:

Direct Costs: These are costs directly associated with the project. These costs need to be separated into “Direct Labor” costs which include the cost of labor to design/build/install the upgrades or facilities, and “Direct Material” costs which include the cost of the physical upgrades and equipment.

Indirect Costs: These costs include A&G expenses such as the salary of the payroll clerk.

Carrying Charges: These costs are the time value of money associated with the project (i.e., AFUDC). The interest rate must be specified.

Revision History

Revision 26 (04/01/2020):

Manual 14A updates to incorporate FERC order 845 and 845-A Tariff changes:

The following sections were updated:

- Section 1.1 PJM Interconnection Process overview
- Section 4.2 Feasibility Study
- Section 4.3.1 System Impact Study
- Section 4.4 Facilities Study
- Section 4.5.1 Direct Connection Local and Direct Connection Network Upgrades
- Section 5.5.1 Option to Build
- Section 5.5.1.1 General Timeline
- Section 5.5.2 Specific Process Flow and Timeline

Manual 14A administrative changes:

- Corrected Exhibit 3: Type of Network and Local Upgrades Diagram
- Updated Section 5.2.1.1 Dynamic Model for stability studies to align with current PJM process

Revision 25 (07/31/2019):

- Updated manual ownership from David Egan to Jason Connell
- Removed language in Manual 14A section 2.3.1: New Service Request deficiency reviews

Revision 24 (07/26/2018):

- Divided Manual 14A Version 23 into two manuals:
  - Updated Manual 14A: New Services Requests Study Process
    - Maintained general application procedures, study process and agreements tendered for any New Services Customer type in the updated Manual 14A.
    - Added new Section 1 Overview
  - New Manual 14G: Generation Interconnection Requests
    - Moved requirements specific to generator interconnection requests from M14A to this new manual.
    - Added new Section 1 Overview
    - Added new Section 3 for Reports and Agreements
    - Added new Section 6 for Large Generation Interconnection Requests

  - Moved generator-specific Attachments from M14A to new M14G
- Corrected System Impact Study Cost Table: (Located in new M14A, Section 4.3)
- Updated queue window periods considering the completion of the “transitional queue” (Located in new M14A, Section 2.2)
- Updated language to more specifically define the conditions under which an accelerated analysis is not possible (Located in new M14G, Section 5.4)

Revision 23 (05/24/2018):

- Attachment F.1 Scope
  - Updated to reference Queue Point, link updated to Queue Point
- Attachment F-1 – Generation Interconnection Feasibility Study Data
  - Links updated to Queue Point, all screenshots of required data are now from Queue Point
- Attachment G.1 Scope
  - Updated to reference Queue Point, link updated to Queue Point
- Attachment G-2 – System Impact Study Data Form
  - Links updated to Queue Point, all screenshots of required data are now from Queue Point

Revision 22 (4/26/2018)

- Revised to add additional clarity concerning analyses performed during various stages of project studies
  - Section 2.1 of heading modified
  - Section 2.1.6 revised
  - Section 2.2 of heading modified
  - Section 2.2.2 revised
  - Section 2.3 of heading modified
  - Section 2.3.2 of heading modified
  - Section 2.3.3 of heading modified
  - Section 2.3.4 revised
  - Section B.3 of Attachment B revised to add clarity

Revision 21 (4/02/2018)

- Section 1.18: Updated to incorporate recent changes to the Tariff to requiring a Feasibility Study for Long Term Firm Transmission Service Requests

- Administrative Change: Updated Dave Egan's department from Generation Interconnection to Interconnection Projects.

Revision 20 (10/01/2017):

- Biennial Cover to Cover Review
- Updated name of manual from "Generation and Transmission Interconnection Process" to "New Services Request Process"
- Section 1 - Labeled image as new Exhibit 1
- Section 1.1 - Requirements for Generating Units
  - Provides clarification of Generating Units and participation in the PJM Markets
- Section 1.2 - Interconnections with municipalities, co-operatives, or non-PJM member electric distribution companies (EDC)
  - Provides clarification of generator requirements for participation in the wholesale market
- Section 1.3 - Interconnection Procedures for FERC Jurisdictional and Non- FERC Jurisdictional Facilities
  - Provides clarification on generators that wish to participate in the Wholesale market, but are connected to an EDC
- Section 1.12 - Consent to Assignments
  - This is a new section that clarifies transfer of ownership processes before and after commercial operation of a Generator
- Section 1.20 - Non-Queue Interconnection Service Agreements
  - This is a new section which provides guidance for existing Generators which require an ISA
- Section 1.21 - Serving Load as a Generator
  - Unless allowed under applicable state or local law, an entity is not permitted to serve another entity's load. Station Power loads can be served between generators in a single portfolio.
- Section 2.1.2.1 - Site Control
  - Provides additional clarification on the requirements for site control
- Section 2.1.2.2 - Generation Interconnection Requests
  - Multiple requests behind the same Point of Interconnection
  - Fuel Change
  - Attachment Y applications
  - Attachment BB applications
- Section 2.1.4 - New Service Request deficiency reviews

- Requires a reasonable on-service date based on Study(ies) timeline and construction schedule

- Table 2-2-1: System Impact Study costs
  - Corrected tables
- Section 2.3.1 - Queue Priority and final agreement issuance and determination of security requirements for moving out of sequence
  - Added a discussion regarding cost allocation for network upgrades and the prioritization among queue positions with allocations to a shared network upgrade.
- Section 2.4 - Types of Network and Local Upgrades
  - Provides clarification for the various types of Network Upgrades
  - Labeled image as new Exhibit 2
- Section 2.5 - Transfer of Capacity Interconnection Rights
  - Describes the process for transferring existing CIRs
- Section 2.6 - Work Papers
  - This section defines Work Papers and how they relate to the RTEP base case used for modelling New Services Requests
- Section 3.1.4 - Expedited and/or Combined Study Analysis
  - This section provides clarification for the combined study process and how it applies to small Generators
  - Labeled image as new Exhibit 3
- Section 4.1.2 - Interim ISA vs. ISA with Interim Rights
  - This section describes the difference between advancing construction with an Interim ISA, and advancing the in service date of the Generator coming into service ahead of the base case study year.
- Section 4.1.3 - Security Requirements
  - Provides clarification on the security requirements for an ISA, WMPA, or UCSA
- Section 4.1.4 – Agreement Milestones
  - Provide clarification on the required Agreement Milestones
  - Labeled image as new Exhibit 4
- Section 4.2.1 - Option to Build
  - Provides clarification on “Option to Build”
- Section 4.3 - Wholesale Market Participation Agreement (WMPA)
  - Defines what a WMPA is
- Section 5.1- Behind the Meter Generation Projects

  - This section provides additional clarification of Behind the Meter Generation (BtMG) interconnections
- Removed reference to Alternate Queue in Sections 1.9 and 3.1.2
- Made changes to language to remove separate procedures for Network Upgrades with costs <$5 Million in Attachment B, Sections B.2, B.3.1 and B.3.2

Revision 19 (11/01/2016):

- Revision 19 incorporates language changes associated with the Early Queue Submittal Task Force (EQSTF) recommendations.
- Updated Exhibit 1 and added Exhibit 2. Process Flow, and Process Flow and Timeline respectively.
- Attachment A was modified to reflect the changes to the Planning Flow Diagram. Attachment A-1, and A-2 were included to reflect an interim transition Queue, and final Queue as depicted in the Planning Flow Diagram. The final Process Flow Diagram A-2 will be effective April 1, 2017.
- Additional language was added to Section 1 describing the changes to the Queue Process.
- Major changes were made to sections 2.1.2 and 2.1.3 to reflect the Earlier Queue Submittal Task Force's (EQSTF) recommendations.
- Tables 2-1-1, 2-2-1, 3-1-1, 3-1-3 and 3-1-4 were renumbered and changed to reflect the new study deposit requirements per the EQSTF's recommendations
- Added Tables 2-2-2 – System Impact Study Expected Costs and 3.1.2 – Feasibility Study Expected Costs for Attachment N submitted Small Generation Interconnection Requests.
- Section 2.1.4 was updated to reflect the changes to the New Service Request deficiency reviews per the EQSTF's recommendations
- Section 4.2.4 was changed to reflect the updated timeline as shown in revised Attachment A, A-1, and A-2.

Revision 18 (01/28/2016):

- Added Section 2.1.5.1 to reflect the inclusion of Phase Angle Regulators in Transmission Interconnection Requests
- Updated Section 2 of Attachment B to include a reference to Multi Driver Approach projects
- Updated Section 3.1 of Attachment B to address changes associated with the study methodologies for Long Term Firm Transmission Service in the New Services Queue

Revision 17 (01/22/2015):

- Update Section 1.12.1 to move coordination of PJM impacts on MISO facilities from the facilities study phase to the impact study phase of study

- Update Section 5.3 – 5.3.2 to address changes which include specific requirements contained in the Tariff for to wind and non-synchronous generation facilities
- Update Attachment F and inserted Attachment F-1 to incorporate data requirements for a Generation Interconnection Feasibility Study that is consistent with current online forms
- Updated Attachment G and inserted Attachment G-2 to incorporate data requirements that must be submitted to ensure proper modeling of Interconnection Requests in the System Impact Study phase that is consistent with current online forms

Revision 16 (11/01/2014):

- Update Sections 1.12.1 and 1.12.2 to incorporate provisions for interim deliverability studies.
- Add Sections 1.12.1.1, 1.12.2.1, 1.14, 1.14.1, 1.14.2 to incorporate provisions for interim deliverability studies.
- Update Section 3 by adding Sections 3.1.1, 3.1.2 and updating Section 3.1.3 to incorporate provisions in accordance with FERC Order 792 for the pre-application process.

Revision 15 (04/17/2014):

- Insert Sections 1.12 and 1.13 to document provisions for the study of cross border impacts between MISO and PJM associated with Interconnection Requests and Transmission Service Requests
- Update Attachment B to be consistent with current practices and Tariff defined terms
- Update Attachments F & G with current list of dynamic models which PJM has utilized in studies

Revision 14 (02/01/2013):

- Insert Section 2.2.1.1 and Attachment G-1 to incorporate requirements for the study of new dynamic model prior to their use in the System Impact Study for a Generation Interconnection Request
- Update Attachment C

Revision 13 (8/23/2012):

- Made changes to Attachment H: Generator Reactive Deficiency Mitigation Process to include generation increases of 20 MW or less.

Revision 12 (05/22/2012):

- Made changes to Table 3-1: Small Generation Interconnection Process deposit requirements (Interconnection requests of 2 – 20MW) and Table 3-2: Small Generation Interconnection Process deposit requirements (Interconnection Requests of 2MW or less).

Revision 11 (05/22/2012):

- Revision 11 incorporates (1) language changes associated with the Interconnection Process Senior Task Force recommendations (2) language describing the calculation of Capacity Interconnection Rights being transferred to a new facility, and (3) minor language cleanup to provide additional clarity on existing process elements.

Revision 10 (04/05/2012):

- Revision 10 incorporates (1) increased detail regarding section 1.8 Changes to Existing or Proposed Generation and (2) minor language cleanup to promote consistency throughout Manual 14A.

Revision 09 (04/12/2011):

- Revision 09 incorporates (1) increased detail regarding Generator Power Factor Requirements, (2) a new Attachment H: Generator Reactive Deficiency Mitigation Process, and (3) a clarification to the interconnection cost allocation process.

Revision 08 (05/01/2009):

- 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 (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.

Revision 02 (12/01/03):

- Revision 02 includes changes to include the Merchant Transmission Interconnection process description; also, the role clarity diagram in Attachment B has been revised.
- Changed all references from “*PJM Interconnection, L.L.C.*” to “*PJM*.”
- Reformatted to new PJM formatting standard; Renumbered pages to consecutive numbering; Renumbered Exhibit numbers.

Revision 01 (02/26/03):

- Change manual title from “PJM Manual for Generation Interconnection Process Overview” (M14A) to “PJM Manual for New Services Request Process Overview” (M14A); also, text changes throughout to conform to new Manuals M-14C and M-14D.

Revision 00 (12/18/02):

- This document is the initial release of the PJM Manual for ***Generation Interconnection Process Overview (M14A)***.
- Manual M14, Revision 01 (03/03/01) has been restructured to create four new manuals:
- M14A: “Generation Interconnection Process Overview”
- M14B: “Generation Interconnection Transmission Planning”
- M14C: “Generation Interconnection Facility Construction”
- M14D: “Generation Operational Requirements”