



*Working to Perfect the Flow of Energy*

PJM Manual 14

## Introduction to the PJM Manual 14 Series

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Prepared by

PJM Planning Division

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## PJM Manual 14

# Introduction to the PJM Manual 14 Series

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**Approval**

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**Current Revision**

***Revision 00 (xx/XX/2008)***

This is the initial version of Manual 14, which is a new Introduction to the PJM Manual 14 series. This Manual 14, replaces the previous “Introduction” material of Manual 14A. Manual 14 A, with revision 6. relocates its “introduction” material to this new Manual 14 and updates the introduction in the process.

## Introduction

### About This Manual

This PJM Manual 14 is an introduction to the Manual 14 series, consisting of Manuals 14A through 14E. The Manual 14 series covers the various aspects of the PJM Planning process that culminates in the annual PJM Regional Transmission Expansion Plan (RTEP) and the actual construction and interconnection of the various projects that comprise the RTEP. The transparent and participatory process that produces this plan and results in the PJM system includes material related to:

- Requests to interconnect to the PJM system (14A)
- Reliability and economic efficiency analyses resulting in the baseline system (14B)
- Agreements and detailed requirements for the construction phase of generation and transmission interconnection projects (14C)
- Generator operational requirements under the PJM Operating Agreement and related market and operational requirements (14D)
- Description of various rights available and agreements required to interconnect Merchant Transmission projects (14E)

Cross references may be provided for the reader's convenience throughout the Manual 14 series as necessary.

### Intended Audience

The intended audience for the PJM Manual 14 series includes the following:

- All stakeholders in the RTEP process
- Developers of generation and merchant transmission facilities and their staffs interested in locating facilities within PJM.
- Existing Generation Owners planning increases of 1 MW or more to an existing generating resource.
- PJM Members and their staffs.
- PJM Staff.

**Section 1: The RTEP Process**

The PJM Regional Transmission Plan results from the comprehensive PJM transmission planning process. The RTEP cycle is completed annually during the processing of the comprehensive set of analyses that produce the baseline PJM Transmission System and that process the quarterly queues integrating all requests related to Transmission system interconnection, services, or rights. The RTEP process also includes analysis of operational issues that may result in upgrades; and supplemental projects that are initiated by Transmission Owners and are not otherwise required by reliability, market efficiency or operational criteria are included in the RTEP.

The PJM RTEP process and related functions described in the Manual 14 series is transparent and participatory and includes timely, substantive input from stakeholders. It also incorporates a wide range of inputs arising internal and external to the PJM market. RTEP wide-ranging assessments thus include responsive demand, market efficiency, generator interconnection, merchant transmission and evolving industry policy effects on PJM transmission development.

Throughout, the content of each PJM Manual is based on the terms and provisions of the PJM Open Access Transmission Tariff (OATT), the PJM Operating Agreement, the PJM Transmission Owners Agreement and the PJM Reliability Assurance Agreement. These remain the final authoritative documents.

**Section 2: Manual 14A**

Incremental responsibilities beyond the baseline system result from generator interconnection, merchant transmission, and transmission service requests. The request process, particularly the interconnection request process is described in the Manual 14A and related material.

The PJM Generation and Transmission Interconnection Process Flow Diagram, Exhibit 1, portrays, in more detail, an overview of the pertinent planning, facility construction and market and operational steps necessary for participation, as appropriate, in the PJM energy and capacity markets, including the process for acquiring the specific related transmission rights. This flow diagram, as well as other related Manual material portrays the process flow from point of first contact to actual PJM operation and market participation. Also, appropriate process references provide the Developer and staff with guidance throughout the entire interconnection process.

**Section 3: Manual 14B**

All individually assigned responsibilities related to the Transmission System flow from and are built on the baseline RTEP system. The baseline system is produced each year pursuant to the reliability and economic assessment practices described and referred to in Manual 14B. Manual 14B describes the multi-faceted process flow of the RTEP reliability and economic efficiency studies. It also covers details about the testing methods employed and cost allocation procedures. This Manual, in conjunction with the PJM Operating Agreement and Open Access Transmission Tariff fill in the business practices and roadmap for stakeholder interaction with the RTEP baseline development.

Manuals 14C, 14D and 14E cover follow-on requirements and practices for implementing the results of the processes of Manuals 14A and 14B.

**Section 4: Manual 14C****Generation and Transmission Interconnection Facility Construction****Manual 14C Overview**

As the **Exhibit 1 Process Flow Diagram** portrays, the execution of the ISA and CSA by the Developer, Transmission Owner and PJM at the completion of the Facilities Study triggers the beginning of the Facility Construction Process, discussed in greater detail in Manual 14C. Geared toward engineering and construction staff, Manual 14C describes the milestones and obligations of each ISA party and each CSA party, based on the contractual provisions codified in the PJM OATT, Part IV, incorporated by reference into the ISA and CSA themselves.

**Overseeing Facility Construction**

PJM's goal is to achieve timely and efficient interconnection of generation and merchant transmission facilities while providing each Developer with assurances of non-discriminatory treatment throughout the interconnection process. The structure of the ISA and CSA places PJM in a position to oversee the Facility Construction process with the contractual authority to ensure that interconnection-related construction is completed and that interconnection service commences in a timely manner. This includes PJM's contractual responsibility to facilitate issue resolution. Manual 14C explains PJM's interpretation of the most effective methods for achieving project goals in accordance with ISA and CSA terms and conditions. Construction oversight of Baseline Upgrades, Transmission Owner identified facilities and economic planning upgrades are also governed by Manual 14C.

**Transmission Owner Technical Requirements**

Manual M14C also addresses Transmission Owner's technical requirements applicable to interconnections. Developers will thus understand from the outset PJM's approach regarding the technical requirements for the interconnection of their facilities. PJM will facilitate any compliance issues.

**Section 5: Manual 14D****Generator Operational Requirements****Generator Activities within PJM**

PJM's Locational Marginal Pricing (LMP) mechanism sends price signals to enable a transparent energy market and, thus also providing a means for addressing congestion management. Generating units which operate within PJM have the opportunity to participate in PJM's regional power markets, including those for energy, regulation and spinning reserve. Further, to the extent that Capacity Resource status is granted, generating units may also participate in PJM's capacity market as well. Generators within PJM may commit their resources through bilateral arrangements or through PJM's energy markets.

Coordinated on a daily, hourly and minute-to-minute basis, PJM provides the operational oversight necessary to ensure that sufficient generating resources are scheduled and dispatched to meet the aggregate energy and ancillary service needs of all PJM Load Serving Entities (LSEs). In order to take full advantage of the business opportunities within PJM, each generator must complete certain specific operational and market infrastructure requirements and institute certain process requirements in coordination with the PJM Control Center as described further in Manual 14D.

**Market and Operational Requirements**

After the ISA and CSA are executed and Generation Interconnection Facility Construction has begun, new generation owners - through their respective plant staff and local control center staff - must take steps to integrate any new resources with PJM's Control Center market and operational infrastructure. This includes the necessary hardware, software and processes for integrating voice communication, data exchange (including that for Energy Management Systems) and metering. Further, generating plant managers and operators are also expected to implement the necessary procedures to participate in PJM energy market bidding, dispatch and settlement activities as well as comply with PJM reliability standards and procedures including those for unit commitment/scheduling, standard operations and emergency operations.

PJM offers training and documentation to facilitate these integration and implementation activities and to promote ongoing reliable operation. PJM offers regularly scheduled training courses and a system operator certification program. These activities are also described in more detail in PJM Manual 14D.

**Generator Deactivation Requests**

Any generator owner or designated agent who seeks to retire or reduce the capability of a generating unit from PJM operations must initiate a deactivation request in writing to PJM System Operations no less than 90 days in advance of the planned deactivation date. Black

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**Section 2: Interconnection Process First Steps**

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start resources require up to 2 years advanced notice in order to maintain the rolling 2 year commitment to the PJM OATT. Notice will include, at a minimum, the following information:

- Indication of whether the unit is being retired or mothballed
- The desired date of deactivation
- A good faith estimate of the amount of the project investment and time period the generator would be required to be out of service for repairs, if any, in order to keep the unit in-service or return the unit to operation.

PJM System Operations will notify PJM Planning, Markets and Marketing Monitoring to initiate preliminary analysis of the request. Manual 14D discusses these procedures in detail.



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## Section 6: Manual 14E

### Merchant Transmission Specific Requirements

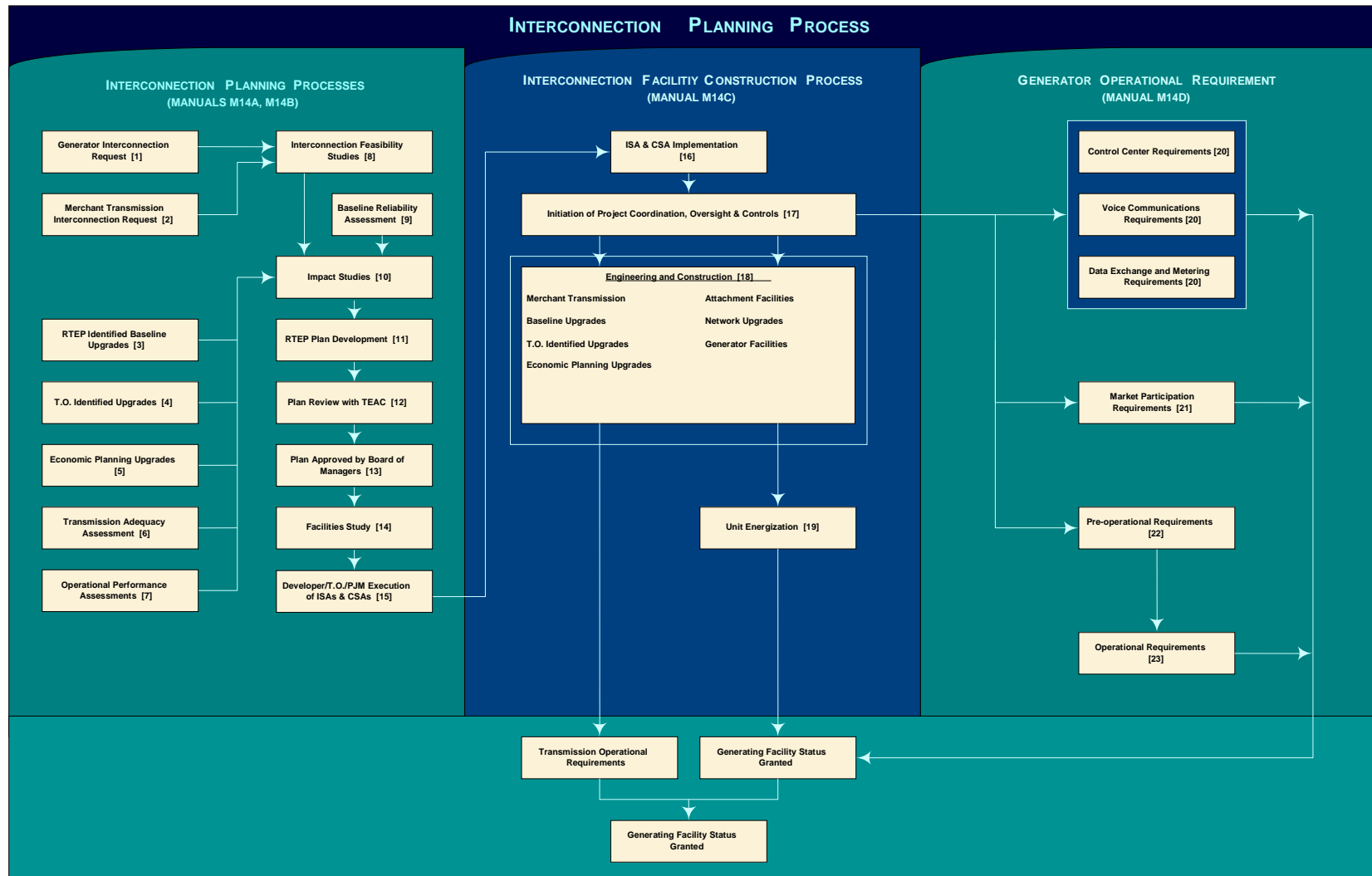
#### Acquiring Transmission Rights

The interconnection planning process for Merchant Transmission facilities is much like that for generation interconnection and as described in PJM Manuals 14A, 14B and 14C. In addition, Manual 14E provides developers a detailed description of the transmission rights created by the addition of such facilities based on the Alternating Current (A.C.) or Direct Current (D.C.) operating technology of the facilities. If the facilities are Merchant D.C. or fully controllable A.C., transmission facilities may receive Transmission Injection Rights and Transmission Withdrawal Rights in lieu of Incremental Deliverability Rights, Incremental Auction Revenue Rights and Incremental Available Transfer Capability Revenue Rights, in accordance with the PJM Tariff and subject to the outcome of required interconnection studies.

#### Design and Construction Criteria

Manual 14E also describes specific design, construction, operational and maintenance aspects of merchant transmission interconnection facilities. As part of design considerations, reactive power design criteria and related voltage operating criteria are also specifically addressed. The Manual also describes the cost responsibility, contractual requirements, project controls and required technical standards associated with project construction. The implementation of merchant transmission facilities also encompasses various operational and maintenance requirements which are summarized in Manual 14E as well.

**Exhibit 1: PJM Generation and Transmission Interconnection Process Flow Diagram**





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References

Process	Description	Documentation References
1	Generation Interconnection Request	Manual 14A, <i>Generation and Transmission Interconnection Planning</i> PJM OATT Part IV, Subpart A
2	Transmission Interconnection Request	Manual 14A, <i>Generation and Transmission Interconnection Planning</i> PJM OATT Part IV, Subpart A
3	RTEPP Identified Baseline Upgrades	Manual 14B, <i>PJM Region Transmission Planning Process</i> , and 14C, <i>Generation and Transmission Interconnection Facility Construction</i> PJM Operating Agreement, Schedule 6
4	Transmission Owner Identified Upgrades	Manual 14B, <i>PJM Region Transmission Planning Process</i> , and 14C, <i>Generation and Transmission Interconnection Facility Construction</i> PJM Operating Agreement, Schedule 6
5	Economic Planning Upgrades	Manual 14B, <i>PJM Region Transmission Planning Process</i> PJM Operating Agreement, Schedule 6
6	Transmission Adequacy Assessment	Manual 14B, <i>PJM Region Transmission Planning Process</i> PJM Operating Agreement, Schedule 6
7	Operational Performance Assessment	Manual 14A, <i>PJM Region Transmission Planning Process</i> PJM OATT Part IV, Subpart A
8	Interconnection Feasibility Study	Manual 14A, <i>Generation and Transmission Interconnection Planning</i> , Section 2. PJM OATT Part IV, Subpart A, Subpart G



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Process	Description	Documentation References
9.	Baseline Reliability Assessment	Manual 14B, <i>PJM Region Transmission Planning Process</i> , Section 2. PJM Operating Agreement, Schedule 6
10	System Impact Study	Manual 14A, <i>Generation and Transmission Interconnection Planning</i> , Section 2. PJM OATT Part IV, Subpart G; Part VI
11	RTEP Plan Development	Manual 14B, <i>PJM Region Transmission Planning Process</i> , Section 2. PJM Operating Agreement, Schedule 6
12	Plan Review with TEAC	Manual 14B, <i>PJM Region Transmission Planning Process</i> , Section 2. PJM Operating Agreement, Schedule 6
13	Plan approved by Board of Managers	Manual 14B, <i>PJM Region Transmission Planning Process</i> , Section 2. PJM Operating Agreement, Schedule 6
14	Interconnection Facilities Study	Manual 14A, <i>Generation and Transmission Interconnection Planning</i> , Section 2 & Attachment D. PJM OATT Part IV, Subpart G; Part VI
15	Interconnection Customer, T.O., PJM execution of ISA and CSA	Manual 14A, <i>Generation and Transmission Interconnection Planning</i> , Section 4. PJM OATT Part VI.
16	ISA and CSA Implementation	Manual 14C, <i>Generation and Transmission Interconnection Facility Construction</i> , Section 1. PJM OATT Part IV.



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Process	Description	Documentation References
17	Initiation of Project Management, Oversight and Controls	Manual 14C, <i>Generation and Transmission Interconnection Facility Construction</i> . PJM OATT Part VI.
18	Engineering and Construction	Manual 14C, <i>Generation and Transmission Interconnection Facility Construction</i> . PJM OATT Part VI
19	Stage 1 and Stage 2 Unit Energization	Manual 14C, <i>Generation and Transmission Interconnection Facility Construction</i> . PJM OATT, Attachment P
20	Control Center, Voice Communications, Data Exchange and Metering Requirements	Manual 14C, <i>Generation and Transmission Interconnection Facility Construction</i> , and 14D, <i>Generation Operational Requirements</i> . Manual 01, <i>Control Center Requirements</i> . PJM Operating Agreement
21	Market Participation Requirements	Manual 14D, <i>Generation Operational Requirements</i> . Manual 11, <i>Scheduling Operations</i> . Manual 28, <i>Operating Agreement Accounting</i> . Manual 29, <i>Billing</i> . PJM Operating Agreement
22	Pre-operational Requirements	Manual 14D <i>Generation Operational Requirements</i> . Manual 10, <i>Pre-Scheduling Operations</i> (M10). PJM Operating Agreement



References

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Process	Description	Documentation References
23	Operational Requirements	Manual 14D <i>Generation Operational Requirements</i> . Manual 12, <i>Dispatching Operations</i> . Manual 03 <i>Transmission Operations</i> . Manual 13, <i>Emergency Operations</i> . PJM Operating Agreement



**Revision History**