

PJM Manual 14D:

Generator Operational Requirements

Revision: ~~5354~~

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Prepared by
Operations Planning Division

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Current Revision**Revision 54 (01/21/2021):**

- Added new Appendix B: Public Distribution Microgrid Business Rules
- Added new Appendix C: Voluntary Guideline on Public Distribution Microgrid Operations
- Section 4.2.4: Added telemetry requirement for Public Distribution Microgrid Generators

Revision 53 (11/19/2020):**Periodic Review****Section 7.1.2 Voltage and Reactive Control**

- Clarified requirement that following an AVR replacement, if new AVR has PSS functionality, PSS should also be commissioned and placed in service
- Removed reference to email as alternative for voltage schedule communications. Sync up with latest revision of M-3.

Section 7.3 Critical Information and Reporting Requirements

- Clarified that change of state includes changing output of self-scheduled units.

Section 7.5.1 Generation Resource Operational Exercise

- Cold Weather Exercise – Reduce to recommendation for GOs to self-schedule in advance of winter
- Replaced entire section with statement that GOs should consider self-schedule units for test prior to cold weather operations

Section 7.5.2 Generation Resource Cold Weather Checklist

- Added clarification on timing based on latest NERC guidance

Section 8.2.3 Real Time Meteorological Tower

- Corrected typo ‘through’ versus ‘though’

Section 10.1.2.H Implementation of Black Start Solutions

- Clarified language regarding Black start terminations

Section 12.2.3 Real Time Meteorological Station

- Corrected typo ‘through’ versus ‘though’

Attachment E: PJM Generator and Synchronous Condenser Reactive Capability Testing

- **Section E-2 General Requirements**
 - Reworded to improve readability
 - Adding additional clarification regarding the intent of the testing

- **Section E.3 Testing Requirements**

- Clarified testing requirements that apply to units testing for the purpose of filing with FERC for OATT Schedule 2 reactive credits

- **Section E.8 Post-Test Evaluation**

- Clarified the fact that PJM may update D-curve for due to reliability concerns if GO fails to do so.

Attachment N: Cold Weather Preparation Guideline and Checklist

- Added link to NERC Lessons Learned
- Updated to reflect changes suggested in latest NERC Guideline

Appendix 'A' Behind the Meter Generation Business Rules

- Administrative changes throughout to align with current business practices

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It is required that data be sent to PJM automatically. In the event that the data is not automatically received by PJM, the Generation Owner shall call PJM with the required data at intervals specified by PJM. The Generation Owner must correct any problems associated with the failure of data-transmission equipment within a reasonable time.

The Generator and Transmission Owner shall promptly exchange all information relating to all conditions which affect (or could affect) the operations of any facility reporting data.

The Generator shall communicate the outage of any data communication equipment connecting the facility to the PJM system in accordance with the following requirements:

- Each facility will be assigned to one of the PJM Transmission Owners as its primary contact, unless arrangements are made to communicate information directly to PJM. The assignment is based upon the voltage level of the connection to the Transmission System and the geographic location of the facility.
- All planned and maintenance outages of data communications equipment requiring the involvement of PJM personnel must be requested by the Generator. All information must be in a format defined by PJM. Refer to Section 3: Data Exchange Requirements of manual M-01, Control Center and Data Exchange Requirements, specifically Section 3.8 Planning, Coordination, and Notification of System Changes and Events.
- Advance notification of planned and maintenance outages must meet the requirements defined in the PJM Manual for Pre-Scheduling Operations (M-10).

Additional specific data requirements are defined in other sections of this manual. All records must be retained in accordance with NERC, FERC and PJM data retention requirements. All back-up voice and data communication plans and test procedures must be documented and provided to PJM.

4.2.2 Metering Plan

In order to establish a metering plan for new generation, a PJM Client manager is assigned. A kick-off meeting between the PJM Member Relations and the generation owner will be held to discuss the following issues:

- Project schedule including testing/commercial dates
- Options for providing real-time and revenue data
- Business plan for the unit(s) - The new participant is required to apply for the necessary PJM Tools accounts based on the individual business plan.
- PJM metering requirements - To satisfy these requirements, all generators connecting to the PJM system are required to install and operate metering and related equipment capable of recording and transmitting all voice and data communications. Specific data metering requirements depend on the size and business plan of the generator connecting to the PJM system.

Several factors determine the real-time telemetry to PJM requirements for a generator. The following table shows the criteria for which a generator may be required to provide real-time telemetry to PJM. If one or more of the criteria are true for that generator, then telemetry is required.

| Criteria | Real-Time Telemetry Requirements |
|---|--|
| Generators participating in the PJM market as capacity resources | Real and reactive power |
| Generators 10 MW (Maximum Facility Output) or larger | Real and reactive power |
| Generators greater than 1 MW (Maximum Facility Output) and connected at a bus operating at 50 kV or greater | Real and reactive power |
| Solar parks 3 MW (Maximum Facility Output) or greater | Real and reactive power (see Section 12.2 for additional requirements) |
| Distributed generators (such as, the treatment of many units dispersed over a wide area as one aggregated unit) modeled less than 10 MW (Maximum Facility Output) | Real and reactive data at the BES injection point of accuracy within 10% of hourly MWh settlements data (revenue meter or accumulator data) |
| Public Distribution Microgrid Generators | Real and reactive power Status of Public Distribution Microgrid (connected to or disconnected from grid) |
| Generators that will also participate as PJM demand response resources when they will reduce load and have PJM-approved interconnection rights to inject power. | Real and reactive data, based on the Generator criteria in this table, at the point of interconnection and real and reactive power for the generators. |

Generators not meeting any of the criteria above are generally not required to supply real-time telemetry to PJM. However, PJM may require real-time telemetry from any generator based on specific topology, network security, operations or market needs. Generators that are not required to supply real-time (two-second scan) metering will not be eligible to set real-time LMP. Revenue-related information is necessary for very small units. This information can be obtained from the local utility or manually read by the customer and supplied to PJM via Power Meter. If desired, a direct connection to PJM can be established.

Generators that are required to supply real-time and revenue information can supply this through the local utility's connection to PJM, or if desired, via a direct connection from the generator to PJM. Real-time information will be collected at a two- ten second data rate, and revenue information will be collected hourly. The revenue information represents the accumulated energy for the previous hour.

The required revenue information is necessary to satisfy the needs of PJM's Market Settlements program. The real-time information is required for PJM's Energy Management Applications (State Estimator, Security Analysis, etc.).

4.2.3 Metering for Individual Generators

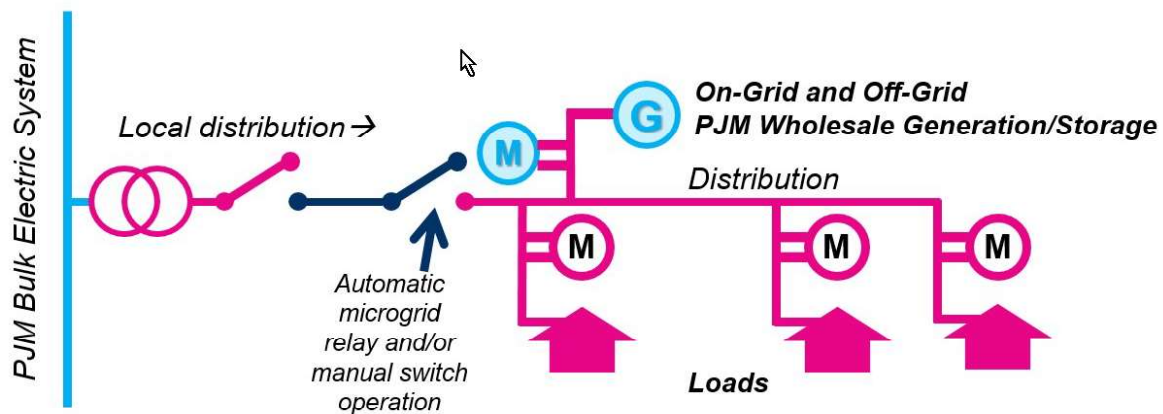
PJM does not require Generation Owners to directly connect to PJM, but leaves this as an option if it enhances the owner's ability to participate in PJM markets and functions.

Appendix B: Public Distribution Microgrid Business Rules

Definitions

A Microgrid is a pre-determined set of Generating Facilities and load that can operate both while connected to and while islanded (i.e., isolated) from the broader grid. A microgrid must include load, one or more Generating Facilities, one or more switches for isolating and connecting to the broader grid, and a microgrid controller. A microgrid could include public utility distribution facilities.

Public Distribution Microgrid (“PDM”) shall mean a Microgrid that includes a PJM Generating Facility that is capable of generating while both connected to and while islanded from the broader grid, and which also includes dual use utility distribution facilities. A Public Distribution Microgrid shall not include any NERC Bulk Electric System facilities nor any Transmission Facilities, and is operated by an Electric Distributor or third party operator designated by the Electric Distributor.



Public Distribution Microgrid Operator shall mean: (1) an Electric Distributor that controls a Public Distribution Microgrid, (2) a Member that an Electric Distributor has designated to control a Public Distribution Microgrid on an Electric Distributor’s behalf, or (3) a generation and transmission cooperative or a joint municipal agency that is an Electric Distributor and that has a member that controls a Public Distribution Microgrid. Control of a Public Distribution Microgrid means control of switchgear, relays, microgrid controller and other equipment required to island generation and load in a Public Distribution Microgrid.

Public Distribution Microgrid Generator is any share of a generator in a Public Distribution Microgrid that is a Generating Facility and that is capable of generating while both connected to and while islanded from the broader grid.

Telemetry

A Public Distribution Microgrid Operator shall provide to Public Distribution Microgrid Generator the real-time status of any switching and/or relay that indicates the islanded status of the Public Distribution Microgrid.

A Public Distribution Microgrid Generator shall meet existing telemetry requirements for all PJM generators as specified in Manual 1: Control Center Requirements and Section 4.2.2 of Manual 14-D, Generator Operational Requirements. In addition, in order for PJM to know whether the Public Distribution Microgrid Generator is islanded or not, it shall provide that status to PJM as well.

Operations

The Public Distribution Microgrid Operator shall, in accordance with PJM Operating Agreement Section 11.3.3, provide PJM, the Transmission Owner, and the distribution utility (if applicable) with the relevant details of the operation of the mechanism(s) that are part of the microgrid control scheme that island and reconnect the Public Distribution Microgrid, such as criteria for relay disconnection and reconnection.

A Public Distribution Microgrid Generator shall notify PJM of the start and end of planned and actual islanded conditions as soon as practicable. To facilitate this notification, the Public Distribution Microgrid Operator shall provide all necessary information to the Public Distribution Microgrid Generator operator on an ongoing basis.

Reporting

When islanded, the Public Distribution Microgrid Generator should report a full outage in eDART. In GADS, if a Public Distribution Microgrid Generator's full ICAP MW is physically available and is only constrained because it is in island mode, no unplanned outage needs to be reported and the Microgrid Generator can be listed as fully available.

If the islanded Public Distribution Microgrid Generator is limited to less than its committed ICAP MW while serving load, due to reasons other than being constrained by the total load in the island, an unplanned outage should be reported in GADS.

If the Electric Distribution Company (EDC) determines a PDM is wholesale when islanded (that is, the islanded load is reported to PJM as wholesale load), then the EDC should expect the PDM Generators to submit their islanded output as PJM supply. In this case, the islanded PDM Generators serve PJM load when islanded.

To the extent the islanded PDM Generator is constrained in its output due to the islanded state, PJM will use reporting on islanding status to calculate a corresponding EFORD impact based on any reductions relative to committed ICAP MW due to reasons other than PJM dispatch or constraints on Transmission Facilities.

If the EDC determines a PDM is not wholesale when islanded (that is, the islanded load is not reported to PJM as PJM load), then any islanded PDM Generators should also not report their output as PJM supply. In this case, the islanded PDM Generators do not serve PJM load when islanded. PJM will use reporting on islanding status to calculate an EFORD for such Public Distribution Microgrid Generators consistent with them being unavailable to serve PJM load when islanded.

Appendix C: Voluntary Guidelines on Public Distribution Microgrid Operations

A Public Distribution Microgrid Operator should not "economically island". The only reasons the Public Distribution Microgrid Operator should island include:

1. An emergency situation on the distribution and/or transmission system, or local or system-wide blackout;
2. An emergency situation on the transmission system, as defined by PJM Manual 13: Emergency Procedures, in which load shedding action is directed by PJM
3. Emergency declaration by appropriate local, state, or federal authority
4. Testing
5. Distribution facility maintenance

After islanding, a Public Distribution Microgrid Operator should reconnect the Public Distribution Microgrid as soon as reasonably possible.

Revision History

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Periodic Review

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Appendix 'A' Behind the Meter Generation Business Rules

Administrative changes throughout to align with current business practices

Revision 52 (08/31/2020):

- Appendix A: Behind the Meter Generation Business Rules
 - o Change deadline date in business rules #14 and #15 for a request to update an LSE's network service peak load or obligation peak load as a result of a Capacity Resource changing status to BTMG or a new BTMG from December 1 to October 31. For new BTMG that is scheduled to be in service in the month of November, documentation of the scheduled in-service date needs to be provided to PJM by October 31.

Revision 51 (12/19/2019):

- Definitions and Applicability
 - o Generating Facility defined for use in M-14D – removed reference to OATT
- Section 7.1.1 – Generator Real Power Control
 - o Added guidance for frequency ride-through for DER
 - o Applied the term Generating Facility where appropriate

Revision 50 (12/03/2019):

- Periodic Review
- Throughout
 - o Replaced references to Client Manager with Member Relations where applicable
 - o Corrected typos and capitalized terms where appropriate
- About this Manual
 - o Added subsection covering “Definitions and Applicability”
- Section 1.2 - Generator Commercial Naming Convention
 - o Replaced Performance Compliance with Operations Analysis and Compliance
- Section 3.2.4 - Control Center Staffing Requirements
 - o Remove reference to Section 6 as it relates to training and certification requirements
- Section 4.1.7 – SCADA—Supervisory Control and Data Acquisition