

Generator Voltage Schedules

Currently at PJM voltage schedules are handled through the eDART application. Please refer to PJM Manual 3 Section 3.11 Generator Voltage Schedules (extracted below). If there are any questions about this process please reach out to voltageschedules@pjm.com.

Voltage Schedules via ICCP

PJM is able to pass voltage schedule points (KVSCHED) over ICCP where available. While eDART is the data of record for voltage schedules, please reach out to PJMTelemetrySupport@pjm.com if you would like to receive voltage schedule points over ICCP and we can begin the discussion with the Transmission Owner about making these points available.

PJM Manual 3 Section 3.11 Generator Voltage Schedules

PJM defines default Generator Voltage Schedules as follows:

	PJM Default Generator Voltage Schedules								
Voltage Level (kV)	765	500	345	230	161	138	115	69	66
Schedule (kV)	760.0	525.0	350.0	235.0	164.0	139.5	117.0	70.0	67.0
Bandwidth (+/- kV)	+/- 10.0	+/- 8.0	+/- 7.0	+/- 4.0	+/- 4.0	+/- 3.5	+/- 3.0	+/- 2.0	+/- 1.5

PJM Transmission Owners must supply and communicate voltage schedules and a low and high bandwidth or the PJM default voltage schedule as noted in the above table to all Generation Owners and PJM in the zone for applicable generators meeting the following criteria:

- Individual generating units greater than 20 MVA.
- Generators that aggregate to 75 MVA or greater connected to a common bus.
- Black start generators.
- Any other Generation Owner that request a voltage schedule

The eDART Voltage Schedule application is used to ensure consistent tracking and reporting protocols for communication of generator voltage schedules between Transmission Owners, Generation Owners, and PJM. Effective June 1, 2020, it is the required method for voltage schedule communication for PJM generators. On an annual basis, PJM shall initiate a voltage schedule review, in which applicable generator voltage schedules shall be reviewed and updated as needed by Transmission Owners, for acknowledgement by Generation Owners through the eDART Voltage Schedule application or by email. The eDART Voltage Schedule

application allows Transmission Owners to specify voltage schedules for each applicable generator in the form of a Voltage Schedule ticket containing:

- A target voltage schedule,
- Upper and lower bandwidths,
- The regulated transmission bus

The specified schedule shall be based on either the PJM default voltage schedule, or the Transmission Owner's specifications, which may be any one of following schedule types:

- Voltage
- Reactive Power
- Power Factor

The eDART Voltage Schedule application is used to ensure that all applicable generators have either a specified voltage schedule or an approved exemption (based on a Transmission Owner exemption request). Each generator voltage schedule will be submitted by the Transmission Owner into the application, followed by PJM's technical review, and then by the Generation Owner's acknowledgement. Generation Owners shall communicate concerns regarding the assignment of the Transmission Owner voltage schedule/bandwidth or PJM Default Voltage Schedule/Bandwidth to PJM and the TO for resolution. This communication shall be made via the eDART Voltage Schedule application by using the GO Comment functionality. A Transmission Owner wishing to exempt an applicable generator from following a voltage schedule shall submit an exemption request via the eDART Voltage Schedule application, including the engineering basis such as, but not limited to, stability limitations, generator connected to radial circuits or to a tap changer voltage controlled bus, customer voltage quality limitations etc., for such exemption. PJM, in coordination with the affected Transmission Owner, must review the request and provide approval (or denial) based on their analysis, before the change can go into effect. PJM Transmission Owners have the authority to direct the Generation Owners to comply with the voltage schedule in automatic voltage control mode (AVR in service and controlling voltage). Generation Owners are required to maintain the same voltage schedule when AVR is out of service unless directed otherwise.

PJM Transmission Owners are required to coordinate voltage schedules, as well as adjustments to voltage schedules, with PJM Dispatch and the Generation Owners. PJM Dispatch will approve/deny adjustments based on PJM EMS Security Analysis results. PJM may elect to deviate from voltage schedules based on load levels, transfer patterns, transmission or generation outages, or as required to honor pre/post-contingency voltage limits or to maximize transfer capability based on PJM Security Analysis. The Transmission Owner will provide the Generation Owner with notification requirements for deviations from the specified voltage schedule, and the Transmission Owner will coordinate any deviations with PJM for resolution (see Notes 2 and 3 below). Transmission Owners shall provide the criteria used to develop the voltage schedule or reactive power schedule via eDART to PJM within 30 days of receiving a request from PJM. PJM will use the eDART tool to provide the criteria received from the Transmission Owner to the Generation Owner. Transmission Owners have

the ability to submit criteria into eDART at any time and shall update the criteria whenever a change has been made. The Transmission Owner shall notify PJM if unable to provide the criteria within 30 days of receiving a request. PJM Transmission Owners have the authority to direct Generation Owners to adjust voltage schedules after coordinating with PJM Dispatch. PJM also has the responsibility and authority to direct Generation Owner to increase or decrease MVAR output as well as direct the switching of reactive control devices to maintain voltages as system conditions dictate. PJM will communicate these instructions to the Generation Owner through the Transmission Owners. Transmission Owners have the authority to instruct a

Generation Owner to increase or decrease voltage/MVAR output to remain within the Transmission Owner voltage or

PJM Default Voltage schedule/bandwidth. Only PJM has the authority to request a Generation Owner to adjust MVAR output if such a direction adversely impacts the unit's MW output. In addition, only PJM has the authority to order a generator on line in the condensing or generating mode to provide voltage support. Also, if a generator is scheduled to come off line either by PJM or the Generation Owner, only PJM has the authority to order the generator to remain on line in the condensing or generating mode to provide voltage/MVAR support. Generation Owners must coordinate any real-time voltage schedule issues with PJM and the Transmission Owner.

Note:

1: PJM monitors system and generator bus voltage via its EMS. In addition, PJM makes available to generators via ICCP and/or DNP protocols their designated voltage schedules and real-time bus voltages to allow the Generation Owners to monitor their unit's performance relative to the designated voltage schedule. PJM's expectation is that the Generation Owners maintain their assigned voltage schedule within the prescribed bandwidth and notify PJM and the TO when a generator is outside of its bandwidth continuously for 30 minutes unless otherwise specified by the Transmission Owner or exempted in Note 3. When the generator is again able to maintain its voltage schedule continuously for 30 minutes, notification to PJM and the TO that the generator is back on its voltage schedule is also required.

2: If a generator is unable to maintain its voltage schedule within defined bandwidths continuously for 30 minutes, and there is additional calculated leading or lagging MVAR reserves based on submitted Facility Reactive Capability Curves (D-Curves), the Generation Owner is required to notify PJM and the TO within 30 minutes and provide updated Facility Reactive Capability Curves (D-Curves) via eDART by the end of the next business day.

3: If a generator is unable to maintain voltage schedules within bandwidth continuously for 30 minutes, and it is operating at full lead MVARs in an attempt to stay within its voltage schedule maximum limit or at full lag MVARs in an attempt to stay within its voltage schedule minimum

limit, based on submitted Facility Reactive Capability Curves (D-Curves), notifications to PJM and the TO are not required.

4: PJM requires PJM Transmission Owners to notify Generation Owners of applicable generators (that meet the criteria documented in 3.11 above) within their transmission zone of Transmission Owner voltage schedules or PJM default schedules. This notification shall include generators connected to systems owned by entities that are not PJM Transmission Owners such as municipalities or electric cooperatives. If the TO is not able to provide a TO voltage schedule to generators (municipalities, electric cooperatives etc.), the TO must notify PJM; and PJM will communicate the PJM default voltage schedule to the Generation Owner via the eDART Voltage Schedule application.