

### 3.3.3 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 in writing voltage schedules and a low and high bandwidth or the PJM default voltage schedule as noted in the above table to all Generation Owners/Operators and PJM in the zone meeting the following criteria:

- individual generating units greater than 20 MVA
- generators that aggregate to 75 MVA or greater that are connected to a common bus
- black start generators
- any other Generation Owners/Operators that request a voltage schedule

PJM Transmission Owners have the authority to direct the Generator Owners/Operators to comply with the voltage schedule in automatic voltage control mode (AVR in service and controlling voltage). Generator Owners/Operators 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 Generator Owners/Operators. 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. Transmission Owners provide the Generator Owners/Operators with notification requirements for deviations from the specified voltage schedule, and the Transmission Owner will coordinate any deviations with PJM for resolution (see note 2 & 3 below). Generation Owners/Operators 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. Any Transmission Owner or Generation Owner/Operator wishing to exempt a generator from following a voltage schedule must provide a written request to the PJM System Operations Subcommittee Chair, to include the engineering basis for such exemption and the type of schedule (reactive or power factor) that will be communicated to the generator.

Transmission Owner will provide the criteria used to develop the voltage schedule or reactive power schedule to the Generator Owner/Operator within 30 days of receiving a request. The Transmission Owner will notify PJM if unable to provide the criteria to the Generator Owner/Operator within 30 days of receiving the request.

PJM Transmission Owners have the authority to direct ~~g~~Generators Owners/Operators to adjust voltage schedules after coordinating with PJM Dispatch. PJM also has the responsibility and authority to direct ~~g~~Generators Owners/Operators 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 Generator Owners/Operators through the Transmission Owners. Transmission Owners have the authority to instruct a Generator Owner/Operator 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 ~~g~~Generator Owners/Operators to adjust MVAR output/voltage schedules 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 owning company, only PJM has the authority to order the generator to remain on line in the condensing or generating mode to provide voltage/MVAR support.

Generator ~~on~~ Owners/Operators must coordinate any real-time voltage schedule issues with PJM ~~through and~~ the ~~PJM~~ 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 Generator Owners/Operators GO/GOPs to monitor their unit's performance relative to the designated voltage schedule. PJM's expectation is that the Generator Owners/Operators 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.

**Note 2:** -If ~~the~~ generator is unable to maintain its voltage schedule within defined bandwidths, and there is additional calculated leading or lagging MVAR reserves based on submitted Facility Reactive Capability Curves (D-Curves), the ~~g~~Generator Owner/Operator is required to take the following actions within 30 minutes:

- 1) Notify PJM and the TO that they cannot maintain their assigned voltage schedule
- 2) and provide updated Facility Reactive Capability Curves (D-Curves) via eDart.

**Note 3:** -If ~~the~~ ~~G~~generator is unable to maintain voltage schedules within bandwidth, 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, and the generator is operating at full lead or full lag MVAR based on submitted Facility Reactive Capability Curves (D-Curves), notifications to PJM and the TO are not required. the generator is required to notify PJM and the TO that they cannot maintain their assigned voltage schedules and PJM will determine if MW reduction is required in order for unit to adjust MVAR output to maintain voltage schedule.

**Note 4:** PJM requires PJM Transmission Owners to notify ~~g~~Generators Owners/Operators (that meet the criteria documented in 3.3.3 above) within their transmission zone in writing 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 notify the generator Owner/Operator in writing of PJM default voltage schedule.