PJM PMU Placement Strategy

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To date PJM utilizes synchrophasor data and calculations sourced from Phasor Measurement Units [PMU] both Operationally and within the Planning environment.

- PJM’s PMU infrastructure stems largely from 85 Transmission Owner [TO] substation installations as part of the 2009 Smart Grid Investment Grant. [301 PMUs @ 85 substations]
- PJM TOs continue to expand the substation installations to more than 125 transmission substations in 2015. [386 PMUs @ 123 substations]
- PMU installations on the Generation Owner low-side of the generator step-up transformer [GSU] have begun to expand the PMU-network beyond the transmission system. [1st PMU anticipated by eoy.]
PJM is looking to provide a PMU placement strategy across the PJM RTO to address gaps & provide redundancy with respect to:

- Model validation;
- Linear State Estimator [LSE] measurement & observability;
- Areas of known stability concern;
- Enhance overall situation awareness;
- Restoration efforts &/or Event Analysis around Eastern Interconnection events.
**Current Practice/Strategy:**

- GO/TO voluntary expansion;
- GO mandatory requirement for new units/stations $\geq 100\text{MW}$.
Proposed PJM PMU Strategy:

• GO/TO guided expansion where company evaluates PMU placement for the following criteria:
  – New BES substation;
  – Relay modifications at an existing BES substation;
  – PJM Proposed PMU Installation Sites:
    ➢ Area of known Stability concern;
    ➢ Substation included in, or as a proxy to, IROL Measurement;
    ➢ EHV substation which significantly expands PJM’s LSE;
    ➢ System / Generator / Load Model Validation*

• GO mandatory requirement for new units/stations >= 100MW.

* Large load, dynamic VAR resource, HVDC resource, automatic control resource including RAS/SPS.
Initial list of *PJM Proposed PMU Locations* being developed:

- Approximately 60 substations identified;
- Includes 12 substations which already have PMU’s in place, but not on the low side of the Generator Step-Up Transformer;
- CEII information. Not for public consumption.

*NOTE:* PJM is engaged in the NERC Synchronized Measurement Subcommittee, operating under the NERC Planning Committee, efforts to develop an overall PMU Placement Guideline. PJM will adjust its PMU Placement Strategy as warranted based upon this NERC initiative.
Any questions or concerns?

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