PJM Interconnection is working with its members and leading industry organizations to support research and deployment of synchrophasor technology, which is providing system operators with new insights into the dynamics of the grid.

Synchrophasor technology starts with phasor measurement units, which are monitoring devices that take high-speed measurements of voltage, current phase angles and frequency at a location on the electric transmission system. The measurements, typically taken 30 times a second, are time-stamped with clocks precision-aligned from GPS satellite signals, enabling data from different locations and utilities to be time-synchronized and combined to create a detailed, comprehensive view of the broader system.

The synchrophasor system can provide system operators with information on the state of the power system with much higher detail and granularity than the conventional Supervisory Control and Data Acquisition systems used in the industry, which typically take measurements every two to ten seconds. The high-speed sampling of synchrophasor measurements can reveal dynamic system changes undetectable through SCADA data.

Because it provides higher-speed, synchronized phase data, the synchrophasor system allows a deeper analysis of power flows on the grid and a detailed validation of equipment modeling. It will enable operators to observe and evaluate grid conditions such as oscillations and wide area network disturbances in real time.

The technology is being combined with advanced analytical software to support wide-area monitoring, power system planning and the analysis of grid disturbances. The technology is expected to offer significant benefits especially as renewable and intermittent resources introduce unique challenges to grid operations. Its capabilities include automating controls for transmission and demand response, managing transmission congestion and improving system modeling. All these capabilities will produce both reliability and economic benefits.

The Department of Energy continues to fund synchrophasor-based grid solutions and technology research through 2017 in addition to the past grants PJM has received for synchrophasor deployment.

PJM transmission owners continue expanding the number of devices installed and the number of substations covered. As of 2016, transmission owners are providing PJM with data on nearly 400 synchrophasor devices in more than 125 substations across the PJM region. The synchrophasor system also includes data concentrators, secure telecommunication infrastructure and visualization and data-analysis software.

Facilitated by federally approved updates to the PJM Tariff, all new generating facilities of 100 megawatts or greater must have phasor measurement unites installed. The first new generators with the units are expected to come online in early 2017.

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