ISO-New England

Synchrophasor Infrastructure and Data Utilization (SIDU) in the ISO New England Transmission Region

Abstract

ISO-New England (ISO-NE) and seven of its transmission owners are installing synchrophasor and phasor data concentrator (PDC) devices across the six states in the New England control area. These devices, in conjunction with a set of new applications, enable further improvements of the reliability of the transmission grid and prevent the spread of local disturbances to the neighboring regions through enhanced monitoring capabilities and increased situational awareness. This project deploys phasor measurement units (PMUs), PDCs, and communication infrastructure in New England. Advanced transmission software determines real-time grid stability margins. This technology increases grid operators' visibility of bulk power market conditions in near-real time, enables earlier detection of disturbances that could result in instabilities or outages, and facilitates sharing of information with neighboring regional control areas. Access to better system operating information allows ISO-NE engineers to improve power system models and analytical techniques, enhancing the overall reliability of the ISO-NE system.

At-A-Glance

Recipient: ISO-New England

States: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont

NERC Region: Northeast Power Coordinating Council

Total Budget: $18,087,427

Federal Share: $7,993,714

Transmission Owners: Bangor-Hydro, Central Maine Power, Northeast Utilities, National Grid, NSTAR, United Illuminating, and VELCO

Project Type: Electric Transmission Systems

Equipment

- **Synchrophasor Communications Network**
- **40 Phasor Measurement Units**
- **Phasor Data Concentrators**

Advanced Applications

- **Angle and Frequency Monitoring**
- **Post-Mortem Analysis**
- **Voltage Stability Monitoring**
- **Disturbance Detection**

Targeted Benefits

- **Reduced Wide-Scale Blackouts**
- **Increased Electric Service Reliability**

Smart Grid Features

Communications infrastructure includes systems to gather data from PMUs and deliver it to PDCs at the transmission owners' facilities and to the regional PDC at ISO-NE. Each transmission owner provides and implements the communications link from PMUs to their PDCs, while ISO-NE provides the communication links between the transmission owners' PDCs to the regional PDC and implements encryption for the overall data network links.

Wide-area monitoring and visualization systems enable a more expansive view of the bulk transmission system. Observing the nature of grid disturbances earlier enhances grid reliability and prevents local events from cascading into regional events. The investment into the PMU infrastructure creates a foundation for future smart grid applications, thereby increasing system resilience and flexibility.

Advanced transmission applications for the synchrophasor system include:

- **Angle and frequency monitoring** provide grid operators and engineers with detailed information about grid conditions and power flows.
- **Post-mortem analysis** enables power system engineers and grid operators to analyze disturbances and large-scale system events to better understand their causes and to improve future system models and operations.

ISO-New England *(continued)*

- **Voltage stability monitoring** provides grid operators and engineers with detailed information about grid conditions and system stability.
- **Disturbance detection** notifies grid operators of disturbances to system conditions that may affect grid reliability.

Timeline

Key Milestones	Target Dates
PMU/PDC deployment begins	Q1 2011
Communications system deployment begins	Q1 2011
Communications system deployment completed	Q3 2011
PMU/PDC deployment completed	Q4 2012

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