



U.S. Department of Energy

Office of Electricity Delivery and Energy Reliability

North American SynchroPhasor Initiative

DOE Update

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on behalf of

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Advanced SynchroPhasor Research Projects

- The National Energy Technology Laboratory (NETL) Funding Opportunity Announcement (FOA) entitled “Advanced SynchroPhasor Research” closed May 27, 2009
- The FOA provides financial assistance for innovative applied research and development on the use of synchrophasor data for improving the reliability of electricity delivery
- Each project is a multi-year program using a phased approach –
 - Phase 1 - analytical (theoretical) studies,
 - Phase 2 - pilot or prototype studies
 - Phase 3 - large-scale demonstration with a utility partner
- Applications must propose analysis studies and demonstration of technologies that would improve electricity reliability and market efficiency using data exchange among utilities



Regents of University of California (Project team includes: Pacific Gas, Electric Co; Southern California Edison; Mississippi State University; California Energy Commission and Quanta Technology)

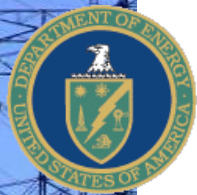
\$1.1M DOE cost-share

Project Objectives

- Security-Dependability Adaptive Voting System
- Alarms for Power Swing Encroachment on Relay Characteristics
- Visualization

Description

- Reduce the likelihood of false triggering by protective relays
- Data from key stations combined in a “voting” scheme to alter relay trigger conditions when “hidden failures,”
- Monitor the impedance by distance relay , raise alarm if impedance level begins to encroach on the predefined zone
- Development and demonstration of an interactive protection information tool



Virginia Polytechnic Institute and State University
(Project team includes: Dominion Virginia Power and
Quanta Technology)

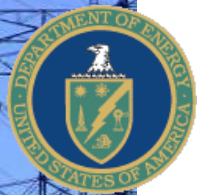
\$1.5M DOE cost-share

Project Objectives

- Develop and Implement synchrophasor-based state estimator
- Develop Transducer Calibration Techniques
- Develop Tools for the characterization and analysis of unbalanced conditions
- Develop tools determining optimum islanding strategies during catastrophic system events.
- Develop visualization tools for the 3-phase tracking state estimator

Description

- Estimate the state of each of the three phases of the power system in order to monitor the flow of unbalanced currents on the EHV power grid.
- Tools and procedures for calibrating current and voltage instrument transformers
- Tools for the detection, tracking and analysis of unbalanced system conditions.
- Tools for the detection, monitoring, and tracking of catastrophic events
- Visualization tools of the network unbalance flow information



Georgia Tech Research Corp (Project team includes: New York Power Authority and Virgin Islands Water and Power Authority)

\$0.9 M DOE cost-share

Project Objectives

- Real-time implementation of the distributed Dynamic State Estimation and Wide-Area transient stability monitoring
- If successful, may apply on-line generator parameter identification method to the remaining generators in NYPA's system
- Implement transient stability monitoring at the other plants/substations of its system

Description

- Proposed site is NYPA's BG pumped-storage plant.



Electric Power Research Institute (Project team includes: Tennessee Valley Authority and Virginia Polytechnic Institute and State University)

\$0.8 M DOE cost-share

Project Objectives

- Develop and demonstrate situational awareness system for control centers
- Near, real-time security monitoring, event replay and post event analysis
 - Wide-area real-time visualization of frequency, voltage and phase angle contours for security monitoring;
 - Online identification of a major event (location, time, size and type, e.g. generator outage and transmission line outage);
 - Online event replay immediately (in seconds) after a major event occurs;
 - Early warning of potential instability or grid problems.

Description

- Phase-I - analytical/theoretical studies for early detection of potential grid problems, and efficiently handling and transferring of large volumes of real-time synchrophasor data.
- Phase-II - prototype studies aimed at functional specification of the proposed situational awareness system, software development, system integration, and a pilot demonstration.
- Phase-III large-scale demonstration of the developed situational awareness system at TVA using both historical and real-time NASPI synchrophasor data.



American Recovery and Reinvestment Act

- Smart Grid Investment Grants
- Smart Grid Demonstration Projects
- Workforce Development FOA
 - Funding for university curricula development
- Smart Grid Interoperability Standards (NIST)
- Federal smart grid task force
 - Clearinghouse
- Small Business Innovation Research (SBIR)
 - includes smart sensors