



True Grid: A look at New York's Smart Grid Initiative

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Providing grid operators a true picture of system conditions with technology that enhances visibility and situational awareness will strengthen the reliability, security and efficiency of the electric system. The New York Independent System Operator's Smart Grid Investment Grant project and its new state-of-the-art power control center integrate phasor measurement units and capacitor banks with grid operations.

It has become a truism of modern management that "if you don't measure it, you can't manage it." Managing the modern electric grid requires tools that can effectively measure system conditions across wide areas and in real time. Among the lessons learned from the massive Northeast blackout of August 2003 is the need to "adopt better real-time tools for operators and reliability coordinators," as recommended by the U.S.-Canada Power System Outage Task Force. Specifically, the task force pointed to the value of Phasor Measurement Units (PMUs).

Under provisions of the American Reinvestment and Recovery Act of 2009, the U.S. Department of Energy (DOE) Smart Grid Investment Grant (SGIG) program provided funding to the New York Independent System Operator (NYISO), other system operators, transmission companies and utilities across the United States to install more than 800 networked phasor measurement units (PMUs) to help the country avoid future disturbances like the 2003 blackout.

In New York, the NYISO and New York's eight transmission-owning utilities are working together to complete power grid upgrades that are part of a statewide \$75 million smart grid initiative, supported by \$37.8 million in SGIG funds from DOE.

New York's smart grid initiative is designed to improve the efficiency of the state's bulk electric system, which consists of hundreds of generating units and thousands of miles of high-voltage transmission lines. The upgrades will enable NYISO to better fulfill its core mission of maintaining reliability of the state's bulk power system and operating economically efficient wholesale markets. Final equipment installation work is scheduled to be completed in June 2013.

In addition to NYISO, New York transmission owners participating in the statewide smart grid initiative include: Con Edison; National Grid; Orange and Rockland; Rochester Gas & Electric; Central Hudson Gas & Electric; New York State Electric & Gas; the New York Power Authority; and the Long Island Power Authority.

The project will deploy 39 PMUs in the utilities' respective operating regions to relay system conditions at a rate of 60 times per second—360 times faster than previously available. As a result, the PMU network will improve grid operators' ability to more quickly detect irregularities, predict problems, and take corrective action to maintain reliability.

Phasor data concentrators (PDCs) will receive and synchronize phasor data from multiple PMUs to produce a real-time, time-aligned output data stream. PDCs can exchange phasor data with PDCs at other locations. Through the use of multiple PDCs, multiple layers of concentration can be implemented within an individual synchrophasor data system.

The New York PMU network will eventually connect with networks in New England, the mid-Atlantic and the Midwest. This will provide grid operators with broader situational awareness of grid conditions throughout the eastern United States.

New York's SGIG program also supports the deployment of new capacitor banks. The capacitor banks are being installed at 234 locations across New York State to improve the control and coordination of voltage on the New York power grid. These capacitors will improve the efficiency of the bulk transmission system by reducing the amount of electricity that is lost when carried over long distances, thus reducing electricity costs in New York by approximately \$7.6 million per year.

The SGIG project is being completed concurrently with the development of NYISO's new state-of-the-art control center. The new facility will replace a power control center originally built in 1969 by NYISO's predecessor, the New York Power Pool, in Albany County. As part of the NYISO's master infrastructure plans, the older facility is being upgraded to enable it to serve as a fully redundant, alternate control center.

Construction of the new control center began in the fall of 2011 and is scheduled for completion by the end of 2013. It will be housed in a 64,000-square-foot addition to the NYISO's existing administration building in Rensselaer County. The facility will feature a significantly larger control room to accommodate expanding functions such as windpower integration and the NYISO's Broader Regional Markets initiatives involving enhanced coordination with neighboring grid operators.

The new control facility is designed to meet 21st century grid reliability requirements through the use of the latest control technologies and advanced visual displays to enhance the NYISO's ability to receive, process and monitor changing conditions throughout the region.

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