Envisioning a Smarter Grid

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People notice electricity only in its absence.

David E. Nye – *When the Lights Went Out: A History of Blackouts in America*
When Visibility is Lacking

August 14, 2003 Blackout

- Phase Angles Diverged Prior To Blackout
- Normal Phase Angle is approx. -25º

Notes:
- Angles are based on data from blackout investigation.
- Angles are calculated from a Powerflow Simulation.
- Angle reference is Browns Ferry.

NYISO SGIG Project

- Smart Grid Investment Grant (SGIG)
  - Three-Year project -- $74 Million (DOE SGIG funding of $37 Million to cover 50% of project cost)

- Project components
  - Creation of a statewide Phasor Measurement Network
  - Installation of Capacitor Banks throughout the state

- Enhanced reliability
  - PMU Installation one of key DOE recommendations from 2003 blackout study endorsed by FERC and NERC
SGIG Project Partners

- New York Transmission Owners
  - Central Hudson Electric & Gas
  - Consolidated Edison
  - Long Island Power Authority
  - National Grid
  - New York Power Authority
  - New York State Electric & Gas
  - Rochester Gas & Electric
NYISO/TO Synchrophasor Applications

**LEGEND**
- Research
- Pilot
- Implementation

**TODAY**
- Enhanced Static State Estimator
- GIC Monitoring
- Harmonics Monitoring
- Disturbance Recording

**2 yrs +**
- Controlled System Separation
- Dynamic Model Calibration
- Situation Awareness
- Enhanced Static State Estimator
- Voltage Stability Monitor
- Frequency Monitoring
- Oscillation Monitoring
- Stress Monitoring

**5 yrs +**
- Wide Area Control (Oscillations, contingencies)
- Dynamic State Estimation
- Fault Detection & Location
- Adaptive AGC w/Fast Frequency Regulation
- Enhanced Market Modeling (VSM/renewables)
- Renewables Integration
- Islanding Detection
- Training Simulator Enhancements

NYISO Infrastructure

- New state-of-the-art primary control center in a facility adjacent to existing corporate center
- Renovation of 42-year-old power control facility to serve as alternate control center
NYISO Smart Grid Vision

- Lower costs and expand consumers’ understanding and control of their electricity use

- Enhance the reliability and efficiency of the power system by improving grid operators’ situational awareness and control

- Assist the growth of renewable resources and complementary energy storage resources
The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state’s bulk electricity grid, administering New York’s competitive wholesale electricity markets, conducting comprehensive long-term planning for the state’s electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.

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