Smart Grid Investment
Grant Project

Presenter
Jim McNierney, Technical Architect
jmcniernye@nyiso.com
New York Independent System Operator
NASPI Working Group Meeting
October, 22-24, 2013
Chicago, IL
Acknowledgment & Disclaimer

- **Acknowledgment**: This material is based upon work supported by the Department of Energy under Award Number(s) DE-OE0000368

- **Disclaimer**: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.
Project Participants

- NYISO – Lead Agency
  - Project Manager – PMO link
- Engineering Lead
  - Quanta Technologies
- Grant Administration
  - Crowe Horwath
Project Participants

- Central Hudson Electric & Gas
  - 1 Substation, 1 PDC
- Consolidated Edison
  - 14 Substations, 2 PDCs
- Long Island Power Authority
  - 3 Substations, 1 PDC
- National Grid
  - 12 Substations, 1 PDC
- New York Power Authority
  - 4 Substations, 2 PDCs
- New York State Electric & Gas
  - 6 Substations, 1 PDC
- Rochester Gas & Electric
  - 1 Substation, 1 PDC
Project Map

NEW YORK STATE ELECTRIC SYSTEM MAP
- DOE SGIG
- PMU via NYSERDA
- Existing PMU
Project Timeline

- Completed Implementation Phase
  June 30, 2013
  - 41 New Locations/Substations in service within NYISO territory – 48 Total
  - Exchanging data with MISO
  - 938 MVArS installed across 336 locations
  - Completed two studies
    - Calibration of system model study – EPRI
    - Controlled System Separation – EnerNex
PMU Installations

- Transmission Elements Monitored by PMUs
  - PMU Placement study by Quanta at onset of the project
  - Substation – based PDC (one location)
- Exchanging Data with MISO – (PJM soon)
  - Engaged Grid Operations for selection of PMUs in visualization applications
PDCs and Communications

♦ PDCs
  ▪ 8 TO control centers with PDCs
  ▪ 1 field PDC

♦ Communications System
  ▪ Communication links to TOs – Virtual Private LAN service (VPLS) Network
  ▪ Centralized Design (Topology - Hub and Spoke)
Communications and Data

- **Data Flows and Speeds**
  - *PMUs installed support 60 samples per second*
    - Grandfathered 8 PMUs from previous installation

- **Data Storage**
  - *Retention Planned for 90 Days Real Time Database, 2 years (full resolution) Historical Archive*
    - Anticipated 12-15 TB of data per year
Data Quality and Availability

- Challenges
  - *Project transition – project points of contact replaced by operational SMEs*
  - *Incorporation of new assets in Network Operation Center (NOC) monitoring*
  - *Incorporation of new assets in NOC monitoring process*
  - *Calibration of PMU measurements was done collaboratively with TO partners*
    - Organizational differences (CT polarity, Phase sequence) identified and accounted for in software
Project Priorities From Here

- Continue to add data streams from other regions
  - MISO and PJM (Soon)
- Roadmap Planning
  - Use of Gateways
  - Planning for common private network in East: EIDSN (Eastern Interconnection Data Sharing Network)
  - 5 year plan is being formulated
Applications Being Used

- **Wide-Area Situational Awareness Visualization**
  - *Software/vendor used – Electric Power Group suite of applications*
  - *Integrated into other control room applications? Alerts / Alarms to be passed to EMS*

- **State Estimation**
  - *Software/vendor used – ABB*

- **Voltage Stability Monitoring**
  - *Software/vendor used – ABB*
Post Event Analysis

- Before system went “live,” Grid Operations was using the data to research system disturbances “seen” after shift.
- Internal Disturbance Reports make use of Synchrophasor Data
Operator’s Dashboards

- Development of Operators Dashboard
  - Done with Grid Operations
  - Contains both data within NY Control Area and outside of NY Control Area
Operator Training

- Control Room Operators have received 9 hours of formal “phasor” classroom training to date
- Several Control room operators participated in the product test / acceptance process
- Users and support staff received vendor training for specific tools
- Additional training will occur for both NYISO and TO dispatchers
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.