ISO New England
Smart Grid Investment Grant Update

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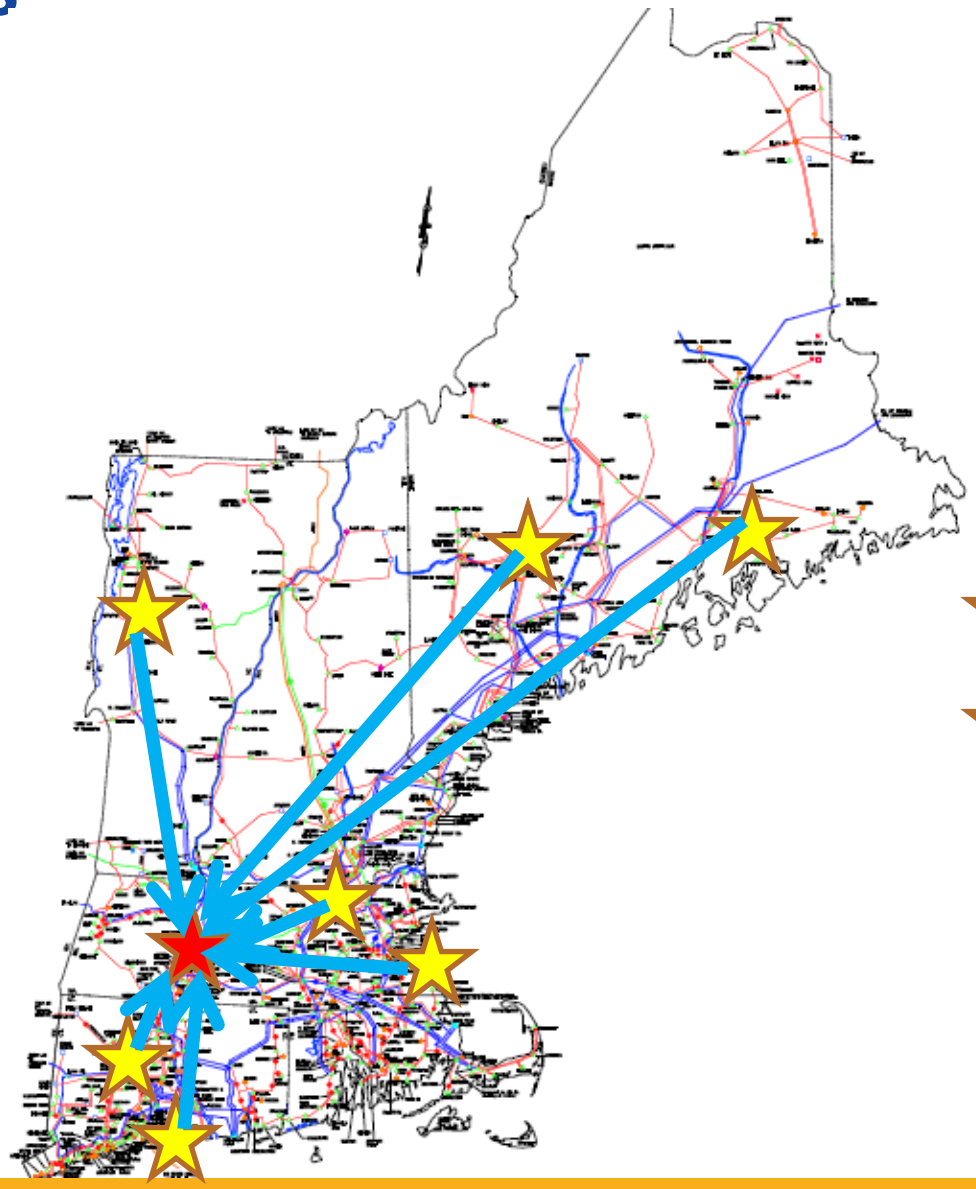
NASPI Working Group Meeting
October 12-13, 2011

Project participants

- Project Transmission Owners (# substations)
  - Bangor Hydro (2)
  - Central Maine Power (5)
  - National Grid (6)
  - Northeast Utilities (16)
  - NSTAR (4)
  - United Illuminating (4)
  - Vermont Electric (2)
- Project Manager
  - KEMA Consulting
- Other Partners
  - Mehta Tech Inc.
  - Alstom Grid
  - V&R Energy Systems Research

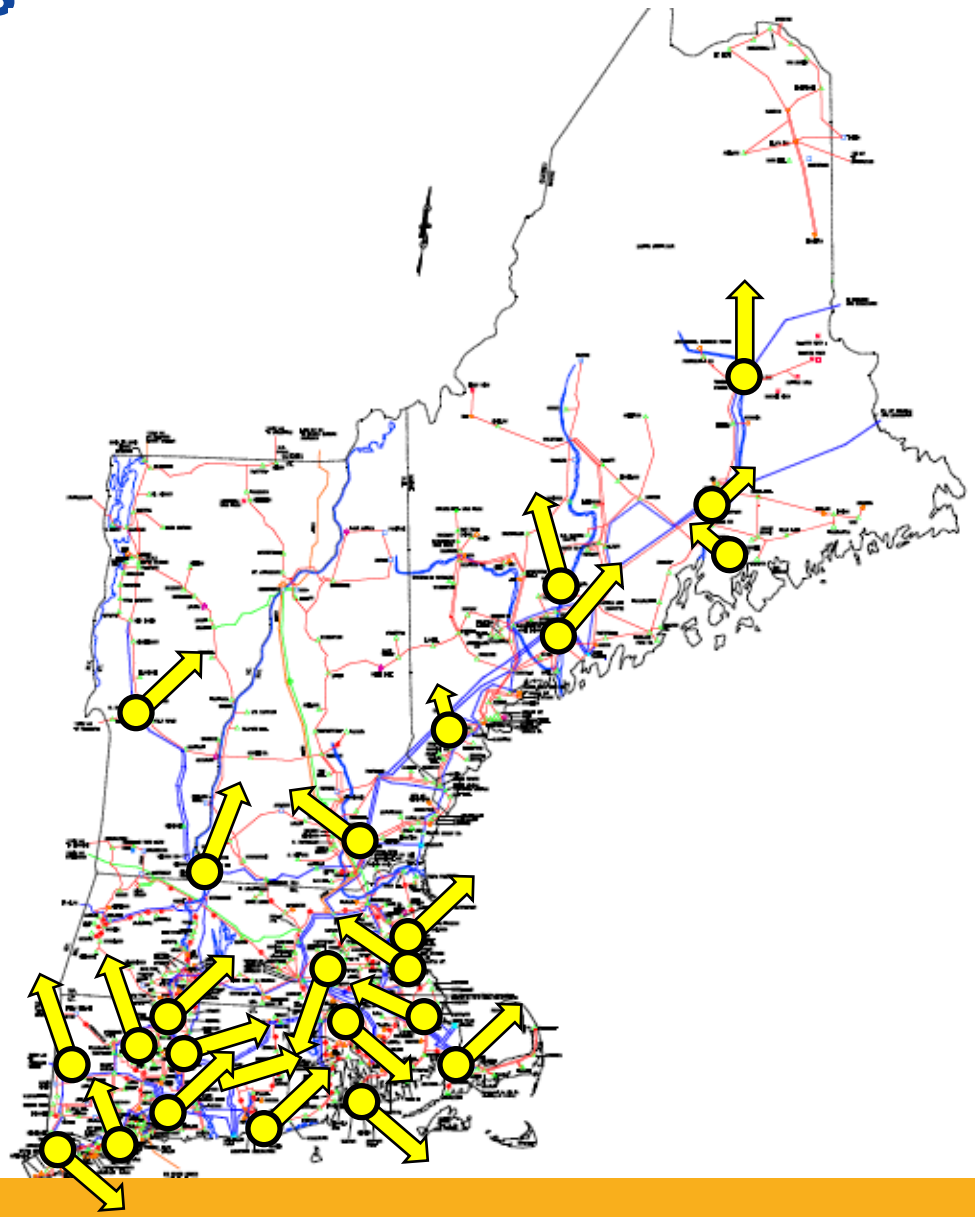
PDC Sites



TO PDC

ISO PDC

PMU Sites



Project Schedule

- Communications (PDCs)
  - Point to point circuits from ISO to each TO
  - Circuits procured through 3rd party (American Telesys)
  - Routers at both ends managed by ISO
  - Firewalls at each end (TOs manage their own Firewalls)
  - All circuits established by March 2011
  - One MPLS circuit from ISO to TVA planned
    - Replacing two existing MPLS circuits from two PMUs to TVA

Project Schedule (continued)

- PDC Installations:
  - openPDC developed by GPA, installed and supported by Alstom Grid
    - SEL PDC used by Central Maine Power – data filter to their openPDC then forwarded to ISO-NE openPDC
  - 8 openPDC sites: one at ISO, one each at 7 TOs
    - ISO installed Q1 2011
    - 2 TOs installed in Q1 2011
    - 1 TOs installed in Q2 2011
    - 1 TOs installed in Q3 2011
    - 2 TOs scheduled by Q4 2011
    - 1 TO scheduled by Q1 2012
  - TO openPDC installation coordinated with PMU
    - TO must have at least one PMU providing at least one Voltage
    - Data must have reasonable reliability & quality

Project Schedule (continued)

- PMU Installations (substations, not devices)
  - 345 kV substations – 44% (35 of 80)
  - 115 kV substations – less than 1% (4 of 688)
  - Substations providing synchrophasors according to ISO requirements (reliability and quality)
    - At least 50% of PMUs installed by end of 2011
    - Working with TOs to schedule all 40 PMUs in place by 6/30/12.

Project Schedule (continued)

- Applications:
  - **Alstom PhasorPoint (Trigger Event Application, Disturbance Event Management, Visualization, Historian**)
    - Q3 2011 delivery (Just installed)
    - Q2 2012 delivery meeting all ISO-NE project requirements
  - **V&R Region of Stability Existence (ROSE)**
    - Analytical analysis and benchmarking – Now till Q4 2012
    - Software enhancements based on analysis
    - Q4 2012 software delivery
  - **Mehta Tech**
    - Upgrades to existing DDRs(5) to support PMU functions (completed)
    - Performance enhancements to PMUs (Beta effort completed)
    - Master Station enhancements (ex. User Interface)
  - **Other applications being explored (internally developed)**
    - PMU data quality monitoring
    - PMU data reliability monitoring

PMUs – Data Quality

- **C37.118-2005, 30 samples per second**

- **Data stream must be reasonably reliable**
  - No systemic data delivery issues, wiring issues at substation, etc.

- **Data must be of reasonably good quality**
  - Proper time – start at top of second, progress in .033s increments, STAT codes not 2000, a000, etc.
  - Properly scaled ~ 200,000 Volts, ~ 60.000 Hz, etc.
  - Calculated flows close to SCADA & state estimator

PMUs – Type

- All PMUs will be new or upgraded multi function devices DFR/DDR/PMU
- TOs free to chose PMU manufactures
- Four PMU Vendors (# substations):
  - Mehta Tech (10) – DDR/PMU & dedicated PMU
  - ERL Phase (10) – DFR/PMU & dedicated PMU
  - Qualitrol (2) – DFR/PMU
  - SEL (18) – Relay/PMU & dedicated PMU

Challenges/Lessons Learned

- Communication
  - JMUX Serial card latency issue with SEL
- PMU Vendor issues
  - Not currently supporting 16 character channel names
  - Not currently supporting 5 digit IDCODE
- DOE Concerns
  - Timely turnaround on information requests and required approvals