Smart Grid Investment Grant Update

NASPI Working Group Meeting

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Acknowledgement & Disclaimer

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Project participants

• ISO New England (RC for the region)

• Project Transmission Owners (# PMU-substations)
  – Bangor Hydro (2)
  – Central Maine Power (5)
  – National Grid (7)
  – Northeast Utilities (16)
  – NSTAR (4)
  – United Illuminating (4)
  – Vermont Electric (2)

• Project Manager
  – Jim Graham, ISO-NE

• Other Partners
  – Mehta Tech Inc.
  – Alstom Grid
  – V&R Energy Systems Research
PDC Sites
PMU Sites
Project Schedule

• PDC Installations:
  – openPDC developed by GPA, installed & supported by Alstom Grid
    o SEL PDC used by one TO: renames signals according to naming convention then forwards to ISO-NE openPDC
  – 8 openPDC sites: one at ISO, one each at 7 TOs
    o All in-service by Q1 2012

• PMU Installations (substations, not devices)
  – 36 of 40 substations streaming as of of 10/1/12
Project Schedule (continued)

• Applications (none will be used by operators)
  – Alstom PhasorPoint - Q3 2012 installed version 6.1
  – V&R ROSE – Q3 2012 installed beta version
  – Mehta Tech – Q2 2012 installed Master Station beta version
  – EPRI WASAT - Q3 2012 installed beta version
    o Not part of SGIG project

➢ Applications hosted at ISO – TOs do not have access
PMU Data

• PMU Coverage (substations, not devices)
  – 345 kV substations – 44% (35 of 79)
  – 115 kV substations – less than 1% (4 of 688)

• Communications (PDCs)
  – Point to point circuits from ISO to each TO from teleco
  – Routers at both ends managed by ISO-NE
  – Firewalls at each end (TOs manage their own Firewalls)

• Communications (PMUs)
  – Corporate WAN to PDC – mostly fiber, some teleco
  ➢ Performance during lightning activity is a concern
PMU Data (continued)

• Data flows and speeds – all at 30 per second
  – Up to 1 Mbps from the TO with 16 PMUs
  – All data flowing to the ISO archive in real time
    o No batch data
  – ISO only receives one phase or positive sequence
    o Multiple phases not allowed
    o Some TOs create all phases but only forward one

• Data storage
  – Data access query process is mature and workable
  – Preparing for 3 years of data readily accessible
    o Approximately 13 Tera-bytes
  – PMUs that are also DDRs – data storage in substation
    ➢ New England requirement
PMU Data (continued)

• Data quality and availability
  – 34 of 35 PMUs delivering good quality data
  – All PMUs delivering data within latency limits – 3 sec.
  – Occasional telco failures interrupt data for 1-2 min.
  ➢ Common setup errors addressed before PMU allowed to stream

• Data requests from researchers:
  – No real-time data sharing outside of New England
  – Several universities interested: UTK, NEU, RPI, WSU, UMASS...
Challenges, lessons learned, next steps

• Next steps
  – Will complete implementation phase in 2013, observation till 2015
  – Utilize data to evaluate system performance, pre & post disturbance, assist in tuning system models
  – Introduce concepts into Operating training
  – Monitor the development of Operator Tools

• Biggest technical challenges to date
  – PMU algorithmic issue

• Research needs
  – Data analysis: Identify interconnection phenomenon & data features
Questions