Update on Smart Grid Program

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Update on Smart Grid Program

Topics

- Accomplishments To Date
- White House Meeting
- NIST plan and Deliverables
- Phase 1 Progress
- Phase 2 Status
- Phase 3 Plans

Smart Grid Is A Major Undertaking

	Telecom Next Generation Network	Smart Grid
Real-world examples	Verizon FiOS, AT&T Uverse	Xcel Boulder, Colorado
First trials	2004	2008
Standards coordination started	2003	2008
# key standards bodies	3	12
Release 1 standards issued	2005	2009
Release 2 issued	2008	Will be issued on rolling basis
# standards documents	~600 so far	Will be hundreds
Nature of standards	Mostly mix & match of existing standards	Mix & match of existing standards and many new

NIST is moving aggressively…

- March 18 – Full time senior executive appointed
- Consultations with industry, standards developers, DOE and FERC to develop action plan
- April 2 –Contract awarded to EPRI to augment NIST staff
- April 13 – Action plan announced
- April 17 – Webcast with 260 stakeholders; positive response
- April 20 – *Smart Grid Today* article reports: "NIST unveils first steps of unnaturally paced standards effort"
- April 28-29 – First Standards Workshop; 430 participants
- May 8 – NIST announces recognition of first 16 standards
- May 13 – Webcast with 220 state public utility commissioners
- May 18 – Leadership Meeting with 60 CEOs and business leaders
- May 19-20 Second Standards Workshop; over 600 participants
- Identified standards needed to realize six priority smart grid applications (including four identified by FERC)
- June 18 – EPRI "Report to NIST on the Smart Grid Interoperability Standards Roadmap" released for public comment

Leadership Meeting May 18

- Participants
  - Chaired by Secretaries Locke and Chu
  - ~ 35 CEOs and senior executives from utilities, manufacturers, IT providers
  - ~ 12 CEOs of standards bodies and associations
  - ~ 5 state public utility commissioners
  - FERC and FCC
- Objectives
  - Convey Administration expectations
  - Describe NIST program and announce initial results
  - Engage CEOs in dialog to elicit industry views
  - Secure CEO commitment

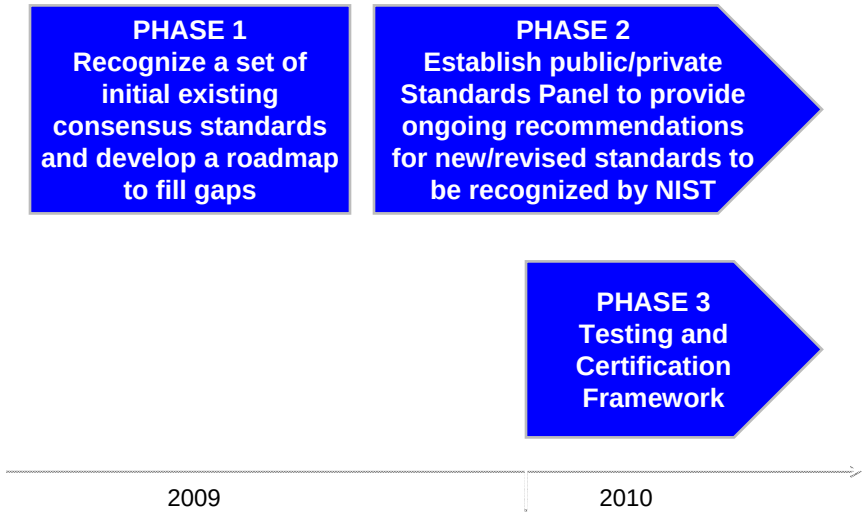
Leadership Perspectives

- We need to move faster – it can be done!
  - There is a lot more low-hanging fruit to be picked
  - Where new standards are needed
    - Set aggressive timetables
    - Dedicate resources to get the job done
    - Think months, not years to develop standards
    - The internet process is a model
- Consensus does not mean unanimity
  - Not every view can be accommodated
  - At some point a decision has to be made and we move on
- SG investments being made now cannot be ignored
  - Standards are just catching up to deployment

Leadership Perspectives (cont'd)

- Standards need to allow for innovation
  - Foundational standards that would be costly to change are most urgently needed
  - Performance-based rather than design specifications
  - Do not over-specify; allow for new applications and technology change
- Open standards are essential
- Today's regulatory assumptions may have to evolve
  - Like telecom
  - Standards need to allow for rapid technology change

NIST Three Phase Plan



NIST Plan was developed after listening to key industry concerns

- Open, participative process – 80% of electric grid is owned and operated by private sector
- Utilities recognize need for speed, but want a systematic, not ad hoc process
- Standards should be developed by private sector standards bodies, with NIST coordination
- Standards are necessary but not sufficient – testing and certification regime is essential

Update on Smart Grid Standards

Phase 1 Progress

- Workshop Results
- Cyber Security Efforts

May 19-20 Workshop Structure

- Nearly 700 participants
- Industry, federal and state government
- Six parallel tracks (one per priority application)
- Breakout sessions within each track
- Individual participants assigned to sessions based on expertise and stakeholder category
- Special sessions on cybersecurity and networking

3 day workshop of industry experts hosted by SCE provided a Smart Grid Conceptual Model that was used as a foundation for the NIST Workshop

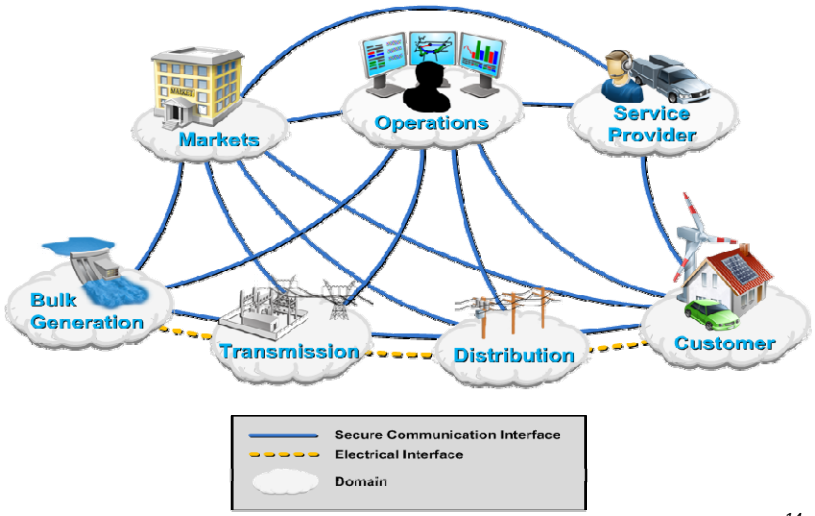
May 19-20 Workshop refined what standards need to be developed to support:

- FERC-identified priority applications:
  - Demand Response
  - Wide-Area Situational Awareness
  - Electric Storage
  - Electric Transportation
- Additional priority applications:
  - Advanced Metering Infrastructure
  - Distribution Grid, including Distributed Energy Resource Integration
- Cross-cutting priorities
  - Cybersecurity
  - Data networking

Work Shop Objectives: EPRI Report to NIST on Smart Grid Interoperability Standards Roadmap:

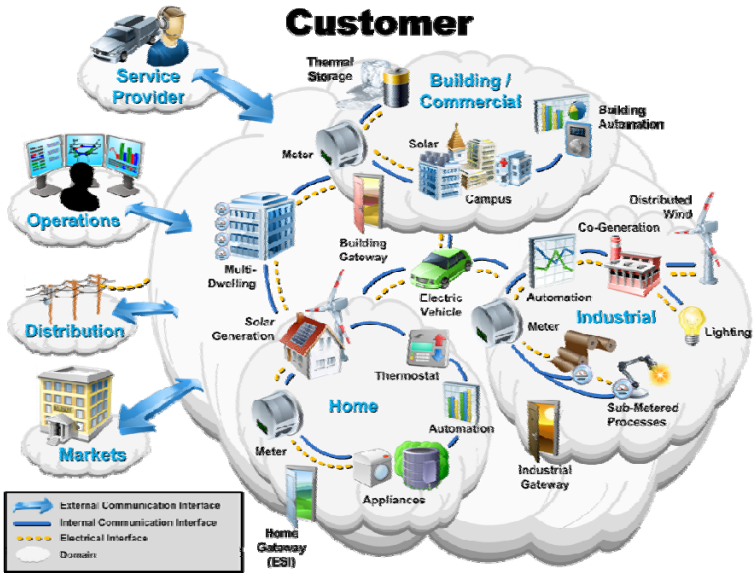
- Purpose & scope
- Smart Grid vision
- High-level architecture
- Applications & requirements
- Cybersecurity considerations
- Priority actions
- Definitions
- References
- Appendices
  - Identified standards
  - Gaps and issues

Smart Grid Conceptual Model

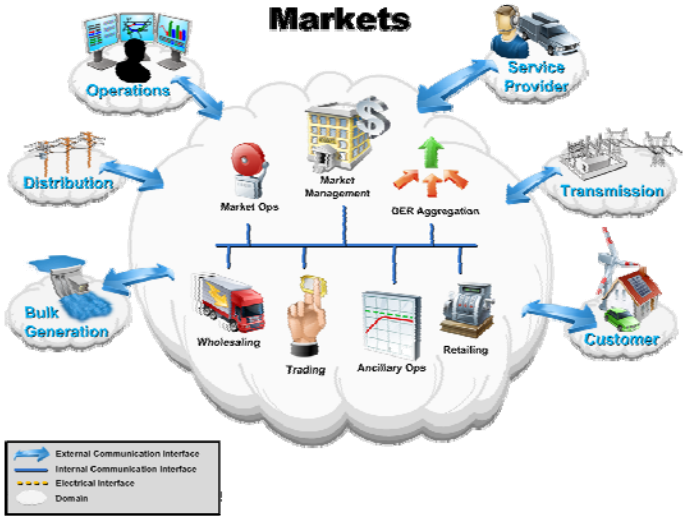


Source: NIST/EPRI Architecture Task Group

Smart Grid Conceptual Model – Customer Domain



Smart Grid Conceptual Model – Markets Domain



EPRI Report Key Gaps and Issues

- Over 80 candidate existing standards identified
- 70 Standards gaps and issues identified
- Some key items:
  - Need for smart meter software upgradeability standard
  - Understanding RF interference issues for unlicensed band communications
  - Pricing information model
  - Open access protocol for energy usage information
  - Interface to grid for energy storage (in IEEE 1547)
  - Standard demand response signals
  - …

EPRI Report Priority Actions

•Developing a common semantic model - work with the appropriate standards development organizations (SDOs) to form a common representation of information models for the smart grid

•Developing a common pricing model standard - work with the relevant standards development organizations to develop an approach for developing a common pricing model to traverse the entire value chain.

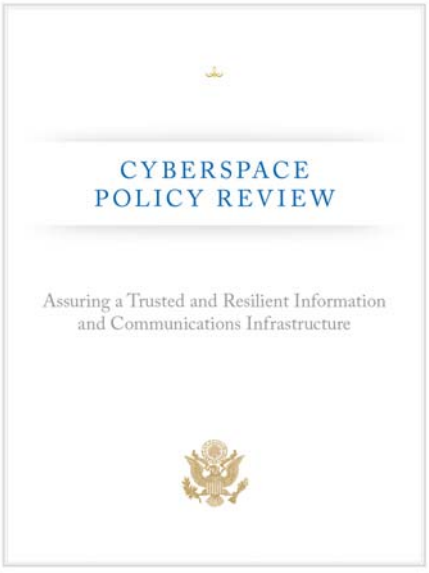
•Developing a common semantic model for advanced metering, demand response and electric transportation –coordinate the various industry activities to accelerate the development and adoption of a unified semantic model for these high-priority applications.

•Develop a smart meter upgradeability standard - coordinate with the relevant SDOs to "future-proof" smart meter deployments by developing a smart meter standard that support firmware updates

EPRI Report Priority Actions (cont'd)

- Conducting an analysis to select Internet Protocol Suite profiles for smart grid applications - commission a group to perform a comprehensive mapping of smart grid application requirements to the capabilities of protocols and technologies in the Internet Protocol Suite to identify Internet protocol Suite subsets as important for various applications in the various smart grid domains.
- Investigating Communications Interference in Unlicensed Radio Spectrums - commission a group of experts to study the issue of communications interference in unlicensed radio spectrums for smart grid applications.
- Developing common time synchronization and management - work with the appropriate SDOs to develop or adopt application or role based time synchronization guidelines
- Coordinating efforts across Standards Development Organizations – coordinate cross-SDO efforts for harmonizing and extending their standards and addressing new standards requirements.

President's Cyberspace Policy Review



…as the United States deploys new Smart Grid technology, the Federal government must ensure that security standards are developed and adopted to avoid creating unexpected opportunities for adversaries to penetrate these systems or conduct large-scale attacks.

Smart Grid Cyber Security Strategy

- Cyber security coordination task group (CSCTG)
  - Over 130 participants
  - Have established several sub-working groups
    - Vulnerability Class analysis
    - Bottom-Up assessment
    - Use Case analysis
    - Standards/requirements assessment
  - Weekly telecon
  - Separate page on the Smart Grid Twiki

Smart Grid Cyber Security Strategy (2)

- The strategy…
  - Selection of use cases with cyber security considerations
  - Performance of a risk assessment of the Smart Grid, including assessing vulnerabilities, threats and impacts
  - Development of a security architecture linked to the Smart Grid conceptual architecture
  - Identification of cyber security requirements and risk mitigation measures to provide adequate protection
- The final product
  - A set of recommended cyber security requirements

Phase I Next Steps

- NIST Release 1 Interoperability Standards posted for public comment (June 9 Federal Register Notice)
  - http://www.nist.gov/smartgrid/standards.html
- Address comments and incorporate in next Release
- EPRI report to NIST posted for public comment (June 18)
  - http://www.nist.gov/smartgrid
- Address comments and include in Draft NIST Roadmap
- Third workshop early August – will focus on SDO roles/responsibilities to fill gaps
- NIST Roadmap to be published mid-September
  - Leads into Phase II

Phase 2 - Standards Panel

- Launch Smart Grid Interoperability Standards Panel by Year End 2009
- Representation from all stakeholder groups
- Administered by private sector organization
- RFP in June 2009
- Functions:
  - Evolve Roadmap
  - Recommend new/revised standards for inclusion in NIST interoperability framework
  - Monitor implementation

Phase 3 - Creating the Smart Grid Conformance Testing Framework

- Standards Needed but Work Can Begin
- Conformance Testing Framework
  - NIST to assist in organizing the framework
  - Members of eco-system are the ones who will be running this
    - Cyber security may be more government lead
- Umbrella Organization to Coordinate Conformance Testing
  - May be part of the Smart Grid Standards Panel or a new group
  - Almost 20 initial standards
  - Many other identified after second smart grid workshop
  - 15 SDOs identified thus far
  - May need to prioritize test cases and develop a phased plan
  - Does Industry Want a Product Certification Program
  - Framework Organization may provide certification coordination

Creating the Smart Grid Conformance Testing Framework

- Leverage Standards Testing Programs
  - Will not duplicate
- Need to Identify Existing Gaps
  - Some SDOs do not write test cases
  - Many SDOs do not define overall test programs
- What Type of Testing
  - Validation Process to Confirm Test Cases
  - Protocol Testing
  - Inter-Op Testing
  - Self Testing Eventually?

A Once In A Lifetime Opportunity!