A New Era of Mandatory Standards?

Need to Know Now?

Action Needed?

Guidelines or Standards?

Key Players?

Real-World Trials
Introductions

• Klaus Bender - UTC

• Jon Stitzel – Burns & McDonnell

• Matthew Olson – Burns & McDonnell
Klaus Bender – Standards Update
Why NIST Standards?

- Energy Act of 2007
- Smart Grid Stimulus Funding
- Potential for Malicious Access?
The Smart Grid Wave

• Administration and industry identify electric infrastructure upgrades as key to:
  – Consistent reliable power
  – Demand reduction
  – Distribution automation
  – Reduced dependence on foreign energy products
  – Integration of renewable energy sources

• Congress acts to enact legislation
The NIST Role

Energy Independence and Security Act (EISA) of 2007
Title XIII, Section 1305.
Smart Grid Interoperability Framework

“In cooperation with the DoE, NEMA, IEEE, GWAC, and other stakeholders, NIST has “primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems…”

George Arnold, NIST senior level executive
National Coordinator for Smart Grid Interoperability
NIST Standards for Interoperability

Three Phase Process

1. Releasing Roadmap as living document
2. Create smart grid interoperability panel (SGIP) and governing board
3. Create testing and certification process - in progress
Roadmap Focus Areas

- 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 (i.e. Telecommunications)
The “Roadmap”

- Excellent Reference Document
- Breaks Down Smart Grid Into Manageable Pieces
- Identifies Gaps In Standards Through PAP’s And Subtasks
- Identifies Contributors To Complete Tasks
- Resulting Requirements Mapped To Standards

From PAP Project Lifecycle Process

- Technical Champion creates PAPWG Standards Recommendation
- 2 week comment period for standards recommendation
- The PAP team may recommend for or against including the standard in the Catalog.

Notify PMO

- Coordinate with Technical Champion to complete paperwork
- Complete PMO Checklist for completion of all PAP work items
- Coordinating with Administrator, introduce standard(s) to Governing Board
- Notify PAP leadership, SSO, SGIP leadership. Provide instructions to PAP team to address issues if necessary.

Is PAP Done?

- Yes
- GB affirms PAP closure
- Add synopsis of work on PAP page & move to Archive area on IKB. PAP CLOSED

No

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No

Ensure Standard is available on SGIP/ANSI Portal or TWiki

- GB Recommendation
- The Governing Board may recommend for or against including the standard in the Catalog.

Establish membership vote. Include GB recommendation and comments to SGIP members.

Tally votes, 75% in favor

Always

Yes

Add to SGIP Catalog of Standards

Notify SGIP members

No

Revise PAP/PMO Standards Recommendation document

Vote on recommending addition to SGIP Catalog. Any comments captured will be included on the member ballot for that standard.

GB Recommendation

No

The SGIP Valuing Member Reps

- Add to SGIP and SGAC Checklists

The Governing Board may recommend for or against including the standard in the Catalog.
Smart Grid Cyber Security

- SGIP Cyber Security Working Group
  - NIST Sponsored
  - NISTIR 7628: Guidelines for Smart Grid Cyber Security

- UCA International OpenSG Working Group
  - AMI System Security Requirements
  - Also Collaborating with SGIP
• NISTIR 7628
  – Version 1.0 released in Q4 2010
  – Over 300 participants from industry, vendors, & cyber security
  – Includes Large Section Outlining Privacy Assessment
Volume 1 Provides Guidance for Cyber Security Strategies

- Outlines Tasks
- Risk Assessments
- High Level Architecture
- Outlines Privacy Concerns and Assessments
NISTIR 7628

Volume 2 Details Specific Security Controls

- Organized by Impacted Logical Interfaces
- Focus on C.I.A. Model

Volume 3 Provides Additional Research Information

- References and Analysis Used to Create NISTIR
OpenSG Working Group

- AMI System Security Requirements
  - Foundational Smart Grid Cyber Security Document
- Newest version is 2.0

- Working with many Organizations, including SGIP CSWG
- Conformity
- Testing and Certification
- Vulnerabilities
Matthew Olson – A Real World Example
“Real-World” Validation

- DOE Funded Smart Grid Demonstration Project
- Committed To Following The Standards
  - Exploring Application of Guidelines
- Piloting Lots Of Innovative Ideas & Systems
  - Operating It Like Separate District With Slightly Different Procedures Based On New Systems
- Documenting “Real-World” Best Practices & Lessons Learned
  - Shared Learning Nationally
• Smart Grid Demonstration Project
  – Distribution Management System
    • Real-Time Electric Model Based On GIS Data
  – Meter Data Management System
    • Integrates AMI, AMR, & Manual Systems
  – Home Area Network
    • Load Control Via Thermostats & Switches
5 Standards Approved as Foundational

- IEC 61970: API for EMS communication
- IEC 61968: API for Distribution Automation
- IEC 61850: Information description and protocol for substation automation
- IEC 60870-6: Information exchange between control centers, formally ICCP.
- IEC 62351: Cyber security
What's In The Standards

- Not Just Protocols
- Use Cases
- Define Actors
- Common Information Model (CIM)
- Communications Protocol
Developing Use Cases

1. Start With Published Use Cases
2. Easy To Identify Differences
3. Faster Than Developing From Scratch
4. Migrate Toward Industry Standards
Use Case Development

- Labor Intensive
- Clarifies Communication
- Incompatibilities Identified – Accountable Parties for Solutions Defined.
- Invaluable In Communicating & Evaluating Project Deliverables.
- Establishes “Best Practices” — Post Project “+’s” and “-’s”
Smart Grid Modernization Challenges

- **Procurement Challenges**
  - Must Vendors Follow Standards?
  - Standards Are Not Approved

- **ARRA Wants You To Stimulate Economy**
  - Spending $ Prior to Use Case Results

- Proven Smart Grid Business Case

- Long-Term Costs of Grid Complexity & Automation Unknown
Incorporate Standards From Project Start.
Mandate Standards Compliance in Procurement Documents.
Can Reduce Procurement Risks.
Encourages Standards Adoption by Vendors.
Go-Forward Strategy

- Standards Committee Participation
- Stay Current — Draft Standards, Proposed Changes, Final Approval Dates
- Company & Organizational “Champion”
- Procurement Process Inclusion
- Provide What You Have Today With A Promise To Upgrade In Future
Discussion
FERC Technical Conference

- FERC open meeting 1/31/2011 to discuss “sufficient consensus”
- IEC standards not part NIST PAP process
- Thought to be a “slam dunk”
- Panelist point to flaws in NIST process
- Panel says utilities seek clarity
- What is mandatory?
Discussion
FERC Technical Conference

• George Arnold, NIST
• This question of what “adoption” means is really critical.
  • If it means they are mandatory, and everyone assumes that to be the case, my prediction is that there will be no standards in the catalog. If that is the course we take, we will stop progress.
• In looking at EISA language, “as may be necessary”, I would recommend that FERC looks at where it is really necessary to adopt standards.
  • I would suggest that requesting information about how the utilities plan to use the standards (as suggested by Kevin Kelly) would be helpful.
Discussion
FERC Technical Conference

• NIST standards roadmap is at a crossroads
• Looking ahead, it is clear that the process will be delayed
• It is still unclear how FERC intends to use the standards.
• There is no clear answer or direction coming out of the FERC Technical Conference
Questions?
Appendix
Additional Reference Sources

**NISTIR 7628**

**Security Profile for AMI**

**Use Cases Repositories**
http://www.sgiclearninghouse.org/UseCases