

Overview of NIST Coordination of Smart Grid Standards Development

Future of Voting Systems Symposium

February 27, 2013

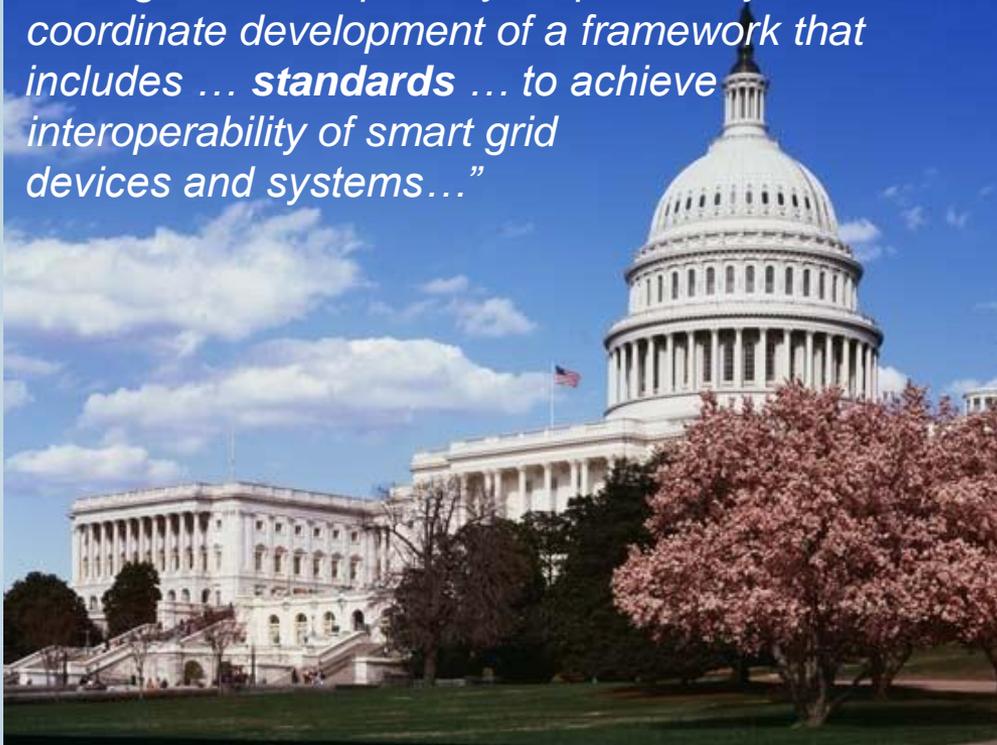
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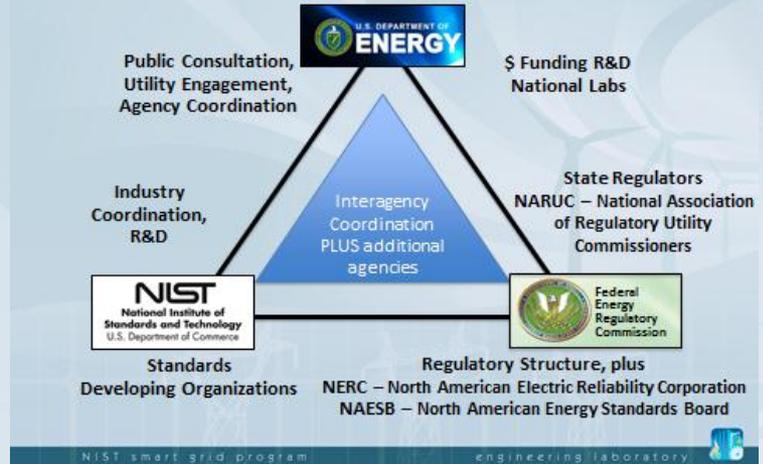
NIST Role in Smart Grid (“National Priority”)

- NIST – nonregulatory agency
- Standards coordination
- Measurement science research

The U.S. Energy Independence and Security Act of 2007 gave NIST “primary responsibility to coordinate development of a framework that includes ... **standards** ... to achieve interoperability of smart grid devices and systems...”



Partnerships – U.S. Gov’t Roles in Smart Grid

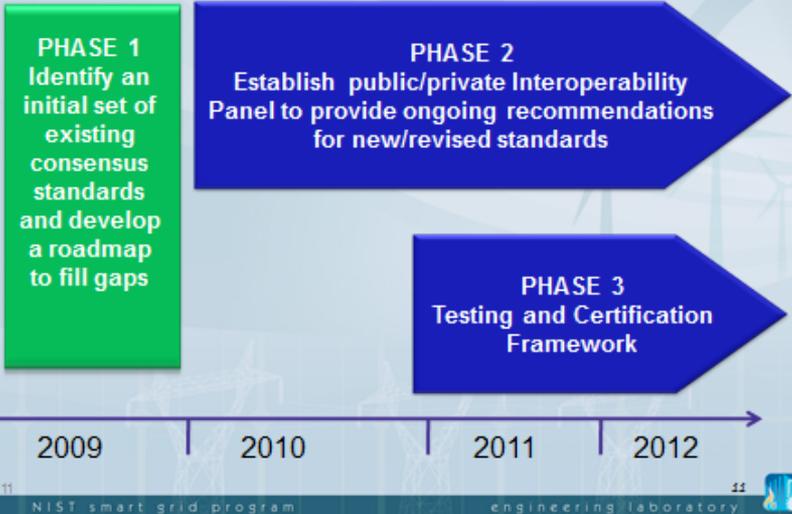


Partnerships – Standards Development



Smart Grid Interoperability Standards Coordination

NIST Three Phase Plan



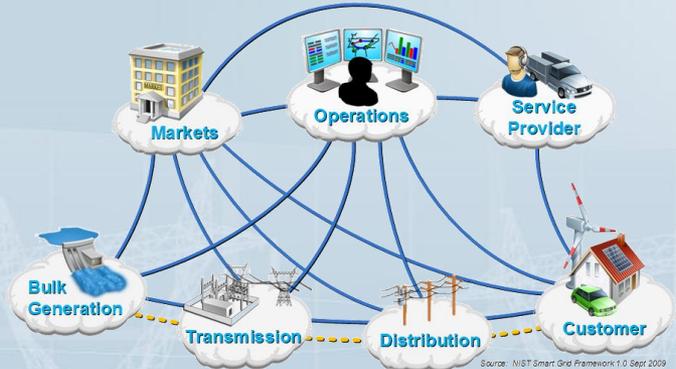
NIST Smart Grid Framework and Roadmap

- Release 2 (Feb 2012) and Release 1 (Jan 2010)
- Smart Grid vision & architectural reference model
- Identifies 100+ key standards; cybersecurity guidelines, testing and certification framework
- Provided a foundation for IEC, IEEE, ITU, and other national and regional standardization efforts

NIST Smart Grid Interoperability Panel

- Over 800 organizations, 1900 participants, many int'l
- Governing Board and committees, priority action plans
- Coordination of standards development by SDOs
- New SGIP 2.0, Inc. legal entity established

White House kickoff and NIST stakeholder meetings



NIST Smart Grid Domains

<http://www.nist.gov/smartgrid/>

A collage of NIST publications and reports:

- NIST Special Publication 1108:** NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0
- NIST Special Publication 1108R2:** NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 2.0
- NISTIR 7628:** Guidelines for Smart Grid Cyber Security: Vol. 1, Smart Grid Cyber Security Strategy, Architecture, and High-Level Requirements



Priority Use Cases

- Demand Response and Consumer Energy Efficiency
- Wide Area Situational Awareness
- Electric Storage
- Electric Transportation
- Advanced Metering Infrastructure
- Distribution Grid Management
- Cyber Security
- Network Communications



Gaps and Priority Action Plans

- Initial NIST smart grid workshops (summer 2009)
 - Identification and review of relevant standards
 - Use cases to support gap analysis
 - Prioritization of gaps
 - 16 Priority Actions Plans – structured efforts to fill gaps
 - Requirements phase
 - Standards development organization handoff
 - Review of delivered standard against original requirements
 - Catalog of Standards review
 - Program Management Office tracking of progress, issues
- Ongoing review, new PAPs within Smart Grid Interoperability Panel (now 22 PAPs, 9 completed)

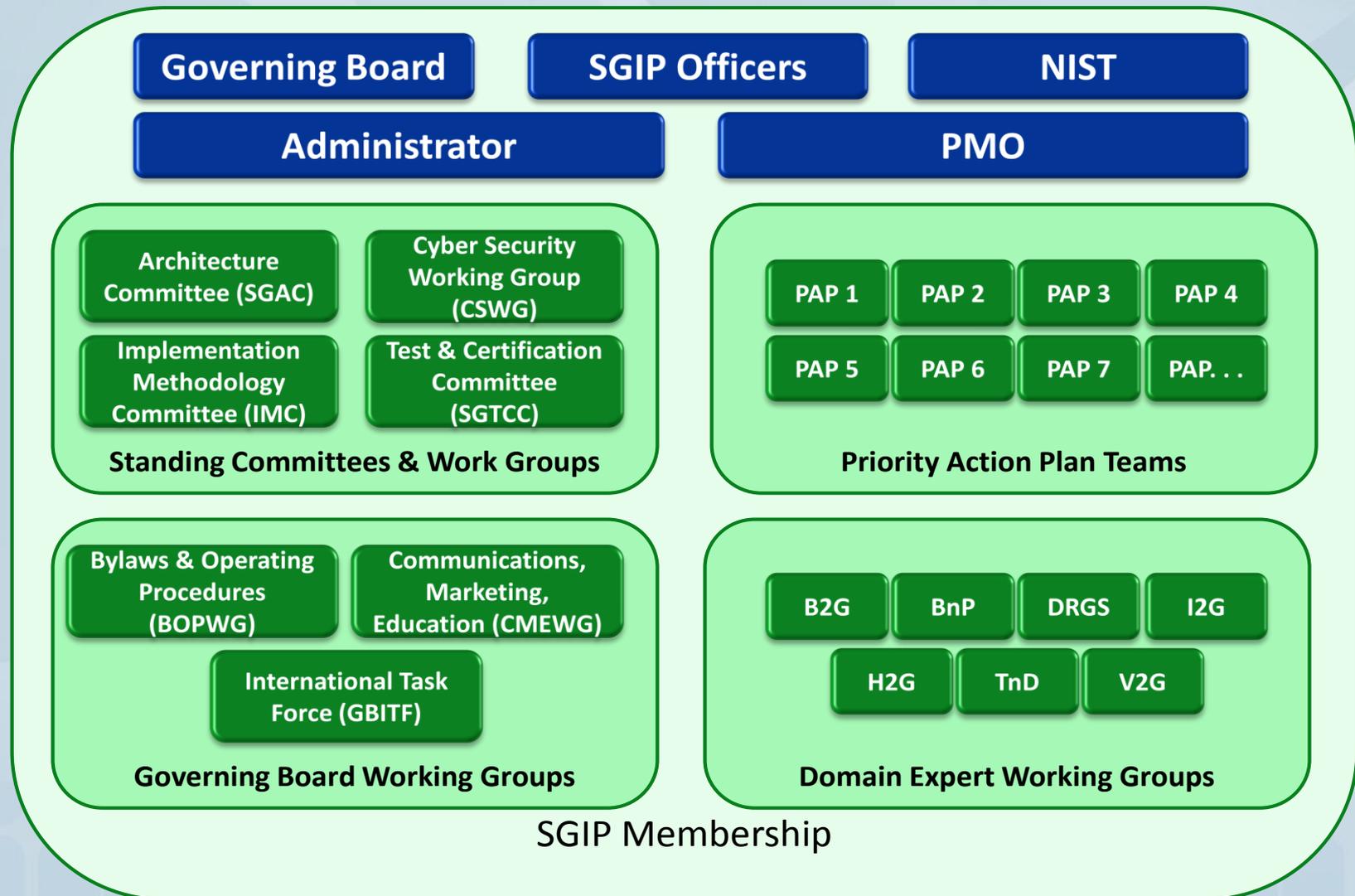


Smart Grid Standards “Lists”

- NIST Framework “Lists”
 - Attributes of identified standards & standards for further review in Framework
 - 98 standards in Release 2 (37 identified standards plus 61 for further review)
 - 75 standards in Release 1 (25 identified standards plus 50 for further review)
- SGIP Catalog of Standards
 - “Physician’s desk reference guide”
 - Review process based on standards information form, includes architecture, cybersecurity and (in future) testing/certification
 - SGIP Governing Board advisory vote before SGIP plenary vote
 - Inclusion based on 75% majority of SGIP plenary members voting (50% quorum required)
 - CoS now includes 56 standards
 - Last SGIP plenary vote: 31 January 2013, 13 of 14 new standards approved
 - CoS process moving to SGIP 2.0, Inc.
- Note of caution: differing opinions on benefits/problems of lists



SGIP Organization and Structure



The new non-profit “legal entity” SGIP 2.0, Inc. has modified organization/structure

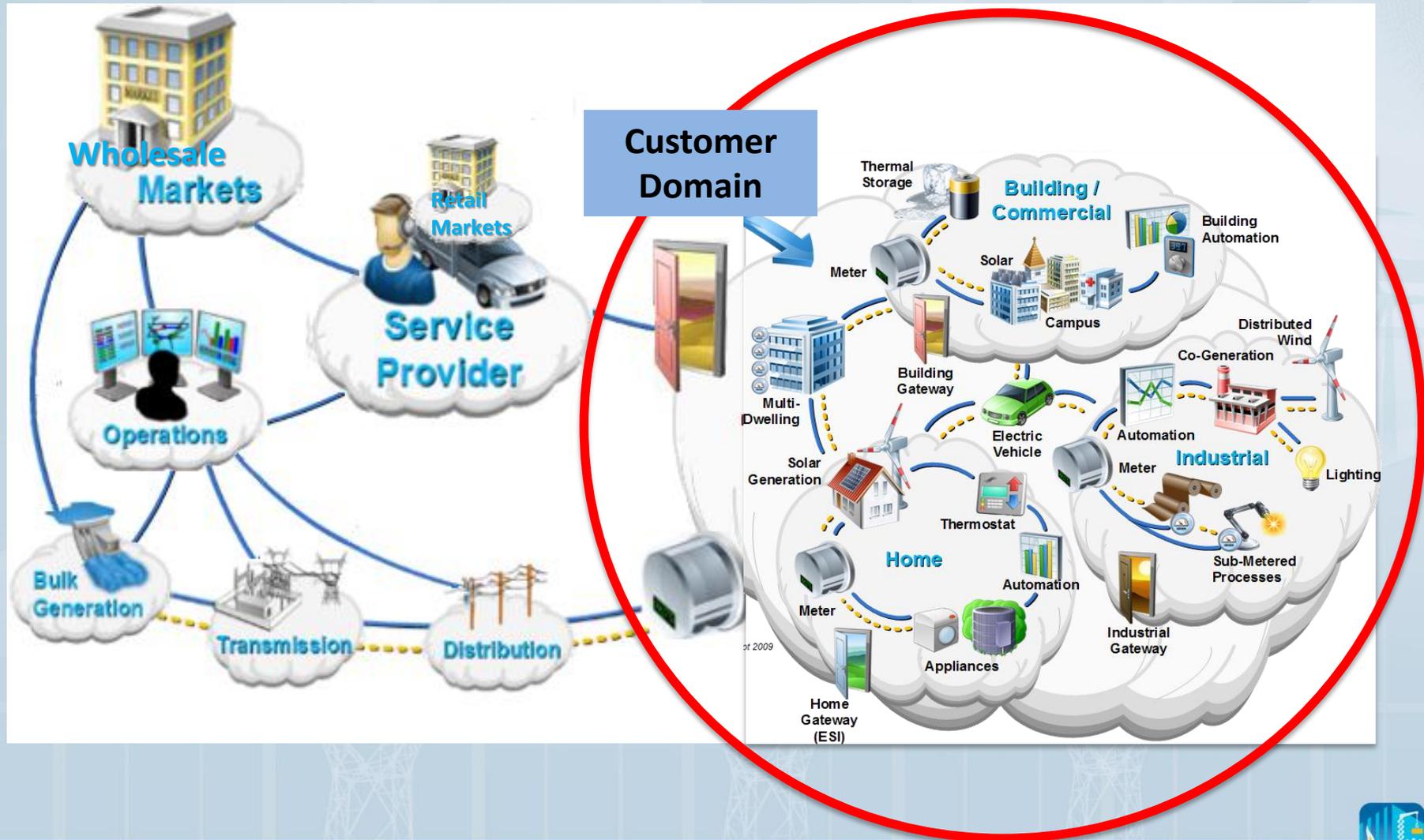


Cyber security and privacy

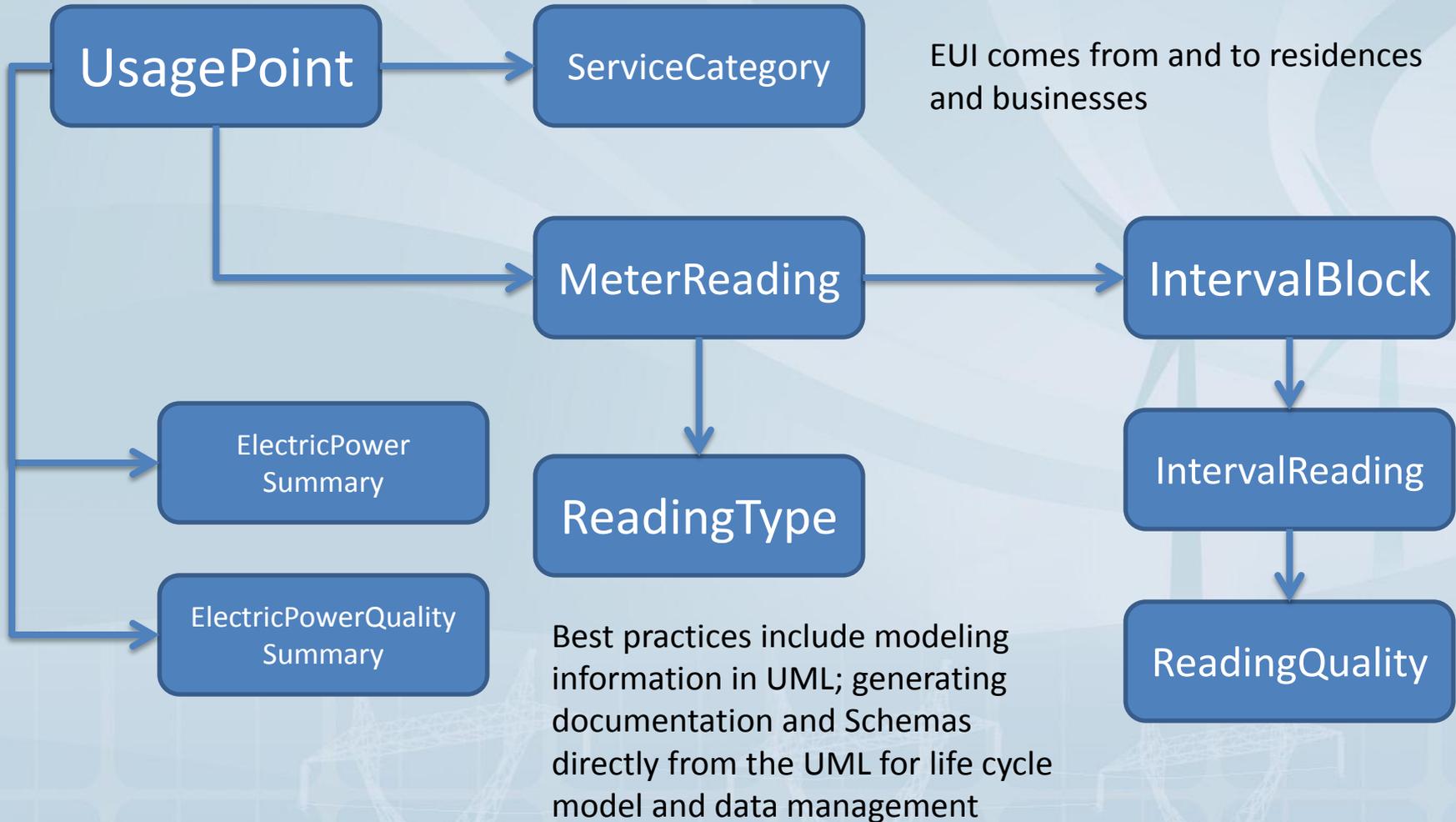
- SGIP Cyber Security Working Group (CSWG)
 - NIST chair, industry co-chairs
 - Over 800 industry participants, multiple subgroups, including privacy
 - NISTIR 7628 Guidelines for Smart Grid Cyber Security (3 volumes, V2 privacy)
 - Initial security architecture, analysis of standards for SGIP Catalog of Standards
 - Leverages NIST IT security expertise (IT security guidelines and standards for federal government systems, cryptography, identity management, industrial control systems security, ...)
- Coordination with other cyber security efforts
 - Department of Energy, National Electric Sector Cybersecurity Organization
 - Department of Homeland Security, Federal Energy Regulatory Commission
 - North American Electric Reliability Corporation Critical Infrastructure Protection standards (NERC CIPs), North American Energy Standards Board (privacy)
- **Common theme: coordination with stakeholders – NIST role: tech experts, neutral, conveners**



Example Priority Action Plan – Energy Usage Information (PAP10)



PAP10: Energy Usage Information (NAESB)



Note: This information is multidimensional. Many different reading types, summaries, and readings possible.



Green Button Initiative

- *Common-sense idea that electricity customers should be able to download their own energy usage information in a consumer- and computer-friendly electronic format from their utility's secure website*
- *Result of collaboration among White House, DOE, NIST, state regulators, utilities, vendors, SGIP, and North American Energy Standards Board*



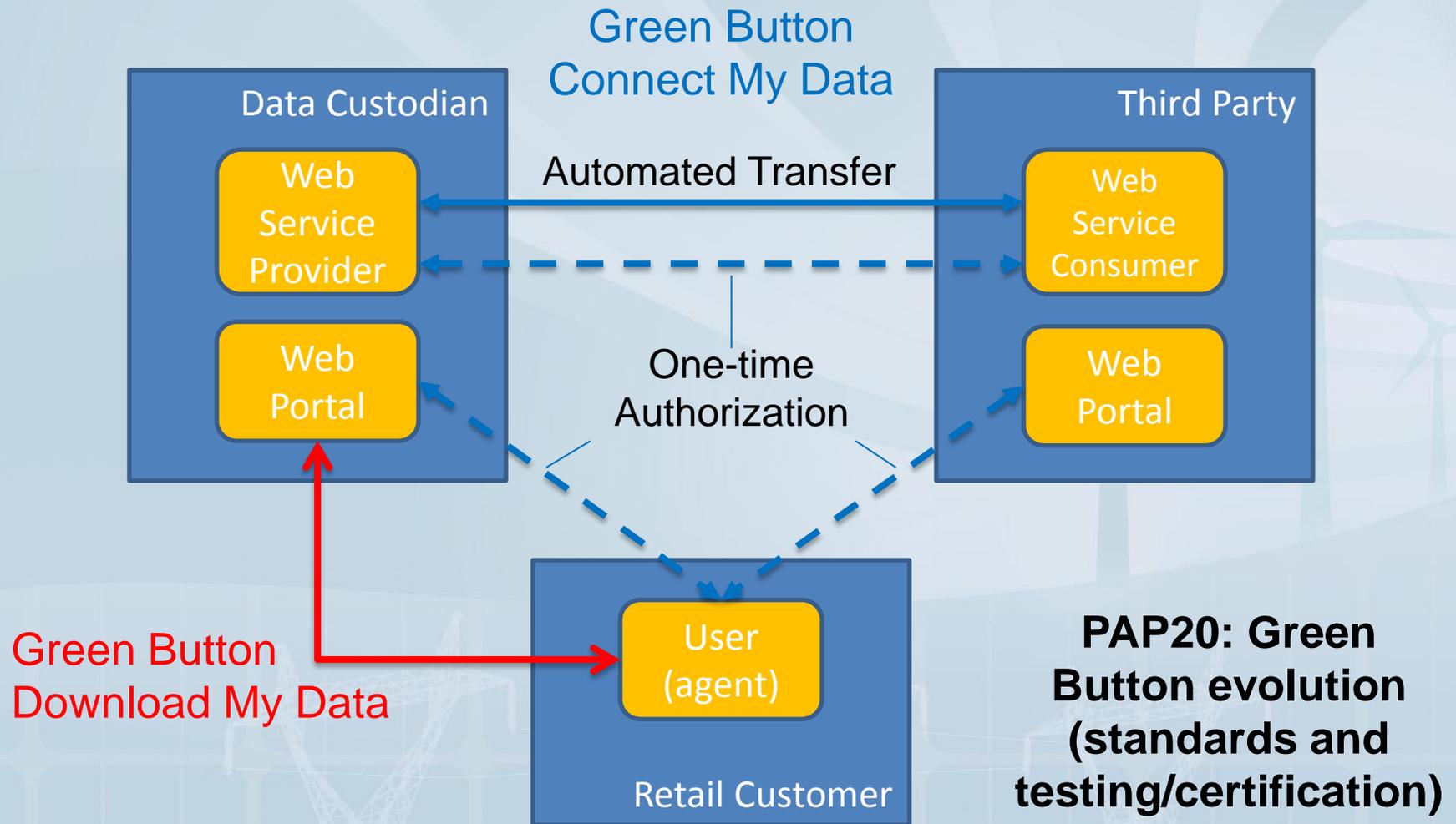
15+ million consumers have access to Green Button data NOW, and 36+ million will by 2013



**Green Button
Download
My Data**

www.greenbuttondata.org &
www.nist.gov/smartgrid/greenbutton.cfm

Green Button Data Exchange



NIST Smart Grid Program - \$9M

Smart Grid Coordination

- Secretariat; Smart Grid Interoperability Panel; Program Development

Smart Grid System Performance

- Cybersecurity; Timing; Communications Networks; EMC
- Smart Grid Testbed; Testing and Certification; Systems Modeling and Simulation (gap)

User-to-Grid

- Building Integration; Industrial Integration (gap)

Distributed Energy Resources and Microgrids

- Power conditioning; storage (gap)

Transmission and Distribution Operations

- Wide Area Modeling and Control (PMUs); Advanced Metering

