

# NIST Smart Grid Interoperability Panel as a Paradigm for “Smart” Water Standards

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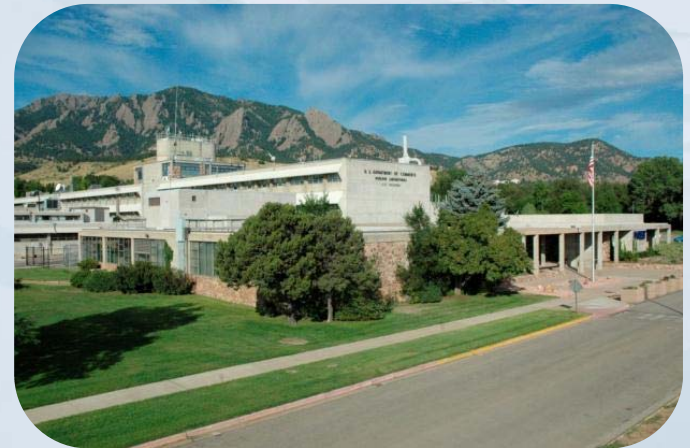
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# National Institute of Standards and Technology

- Non-regulatory agency in the U.S. Department of Commerce
  - Originally National Bureau of Standards (established 1901)
  - NIST Laboratories measurement science research activities at two main campuses in Gaithersburg, Maryland and Boulder, Colorado



Courtesy HDR Architecture, Inc./Steve Hall © Hedrich Blessing



G. Wheeler

- \$567M (USD) for Laboratories; ~3000 employees (3 Nobel Prizes), 2800 associates, U.S. National Metrology Institute **4 as of Oct2012!**
- Strong partnerships with industry, academia, government
- Research, calibrations, standard reference materials, data ...
- Engineering, IT, Physical Measurement, Material Measurement Labs



# Smart Grid Success Factors

- **Champions:** identification of smart grid as national priority by Congress and Administration
- **Active Coordination:** within Federal Government and with private sector, standards developing organizations, and regulatory community
- **Leadership and Visibility:** NIST Three-Phase Plan with White House kickoff
- **Planning, Organization and Governance:** NIST standards process including NIST Framework and Smart Grid Interoperability Panel
- **Funding:** ARRA plus appropriations (including DOE)
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- **Expertise:** leverage existing expertise, build new, address longer-term measurement science/R&D needs

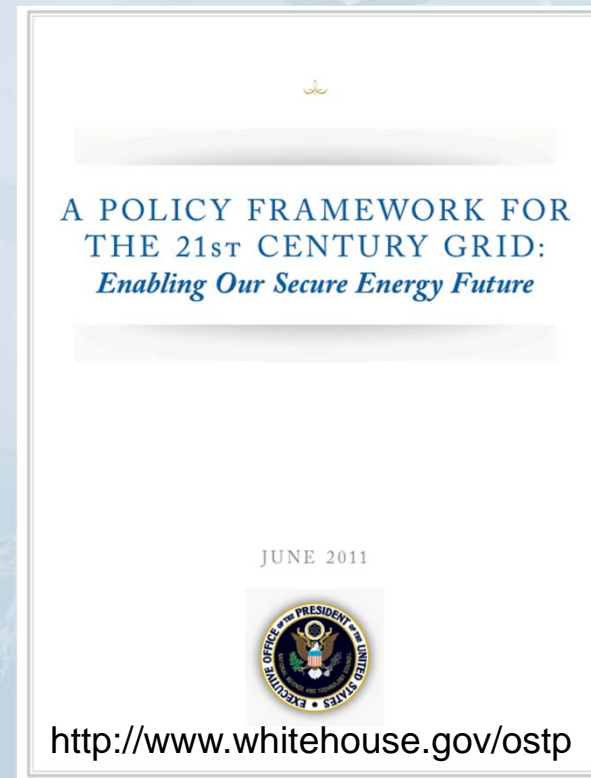


# Smart Grid – A U.S. National Policy



“We’ll fund a better, smarter electricity grid and train workers to build it...”  
President Barack Obama

- “It is the policy of the United States to support the modernization of the Nation's electricity [system]... to achieve...a Smart Grid.”
- *Congress, Energy Independence and Security Act of 2007*

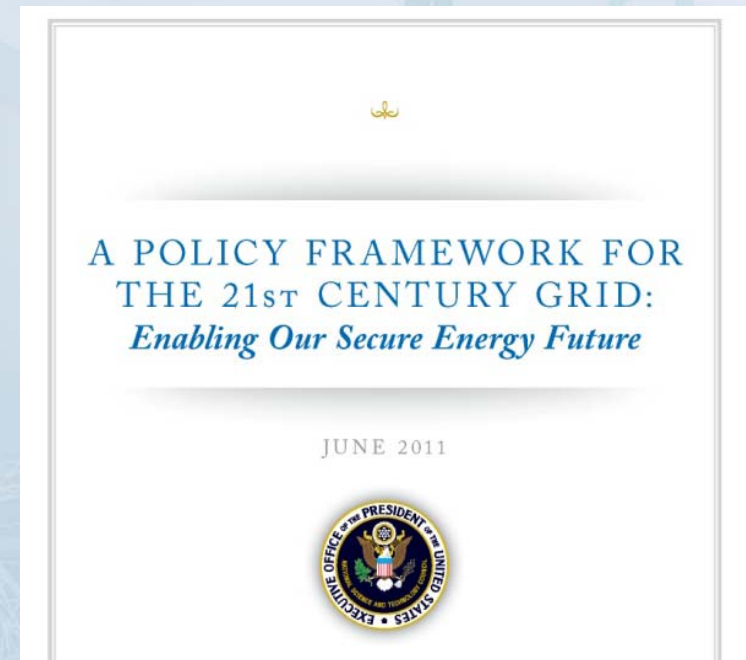


# Standards – Key Aspect of US Smart Grid Policy

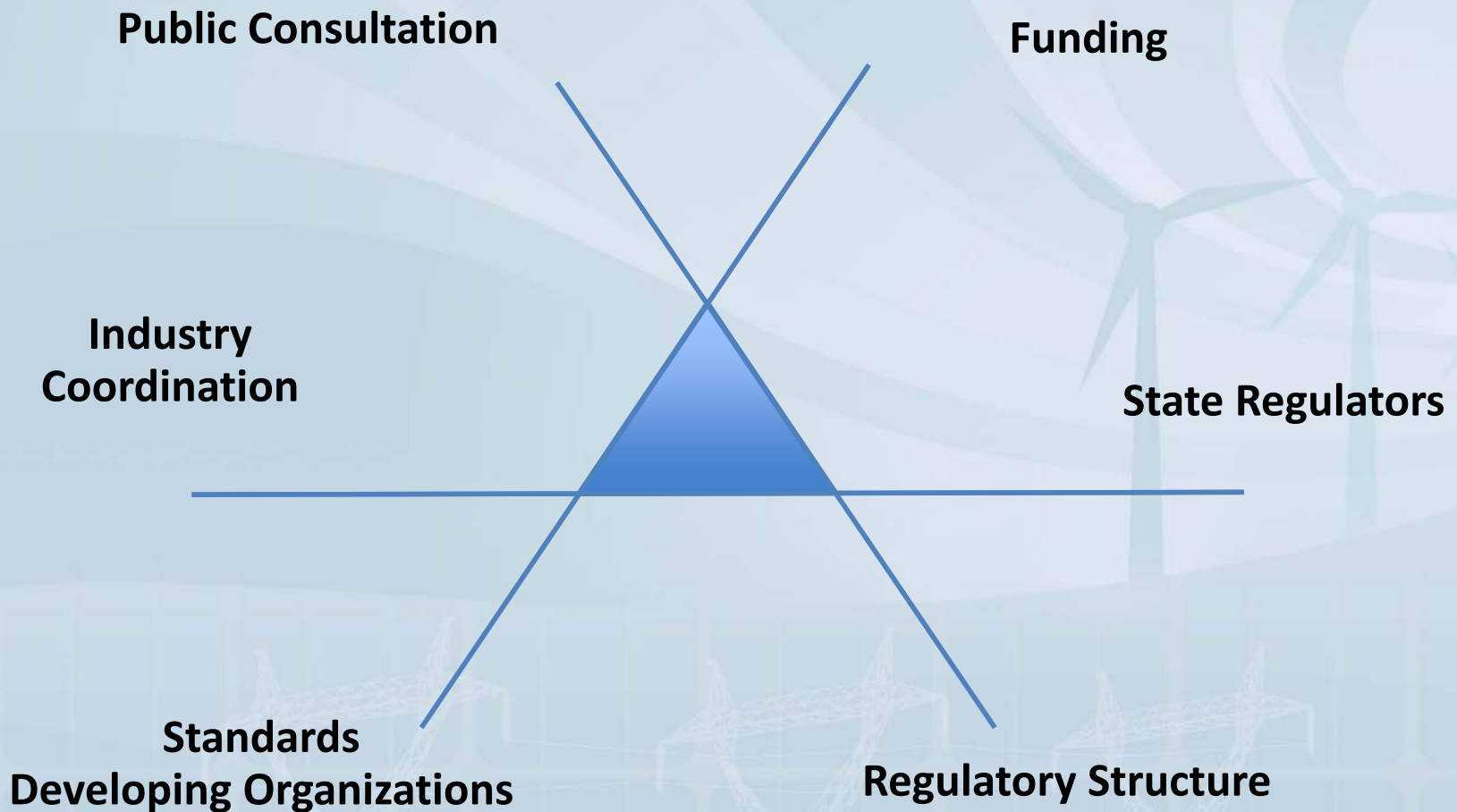


White House June 2011 Policy Framework includes 4 key Federal policy recommendations:  
enable cost-effective smart grid investments, unlock innovation, empower and inform consumers, and secure the grid

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

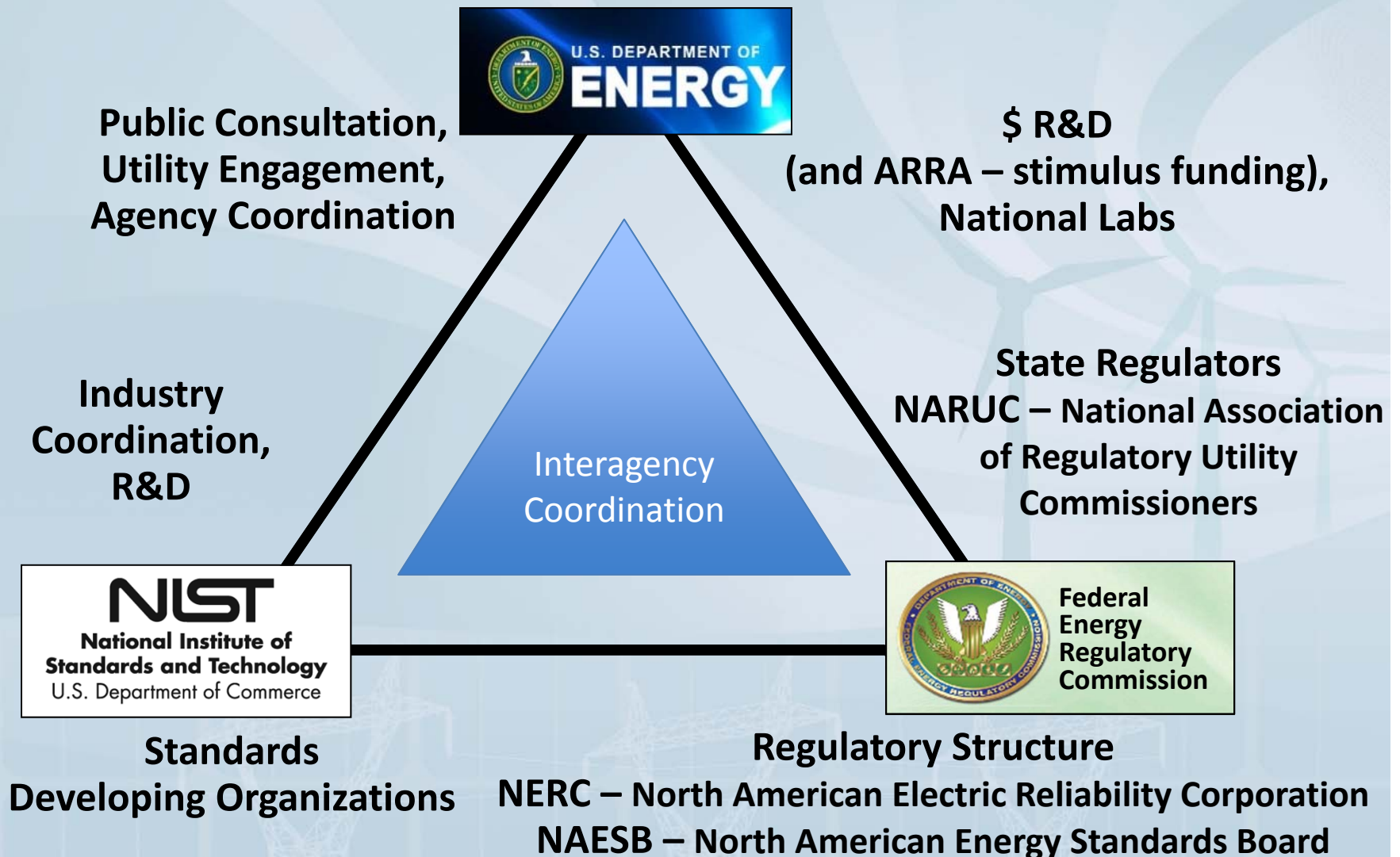


# US Government Roles in Smart Grid





# US Government Roles in Smart Grid





# Federal Smart Grid Task Force

## EISA Title XIII, Section 1303

*Responsible for ensuring awareness, coordination, and integration of the diverse smart grid activities in the US Federal Government*

### Purpose

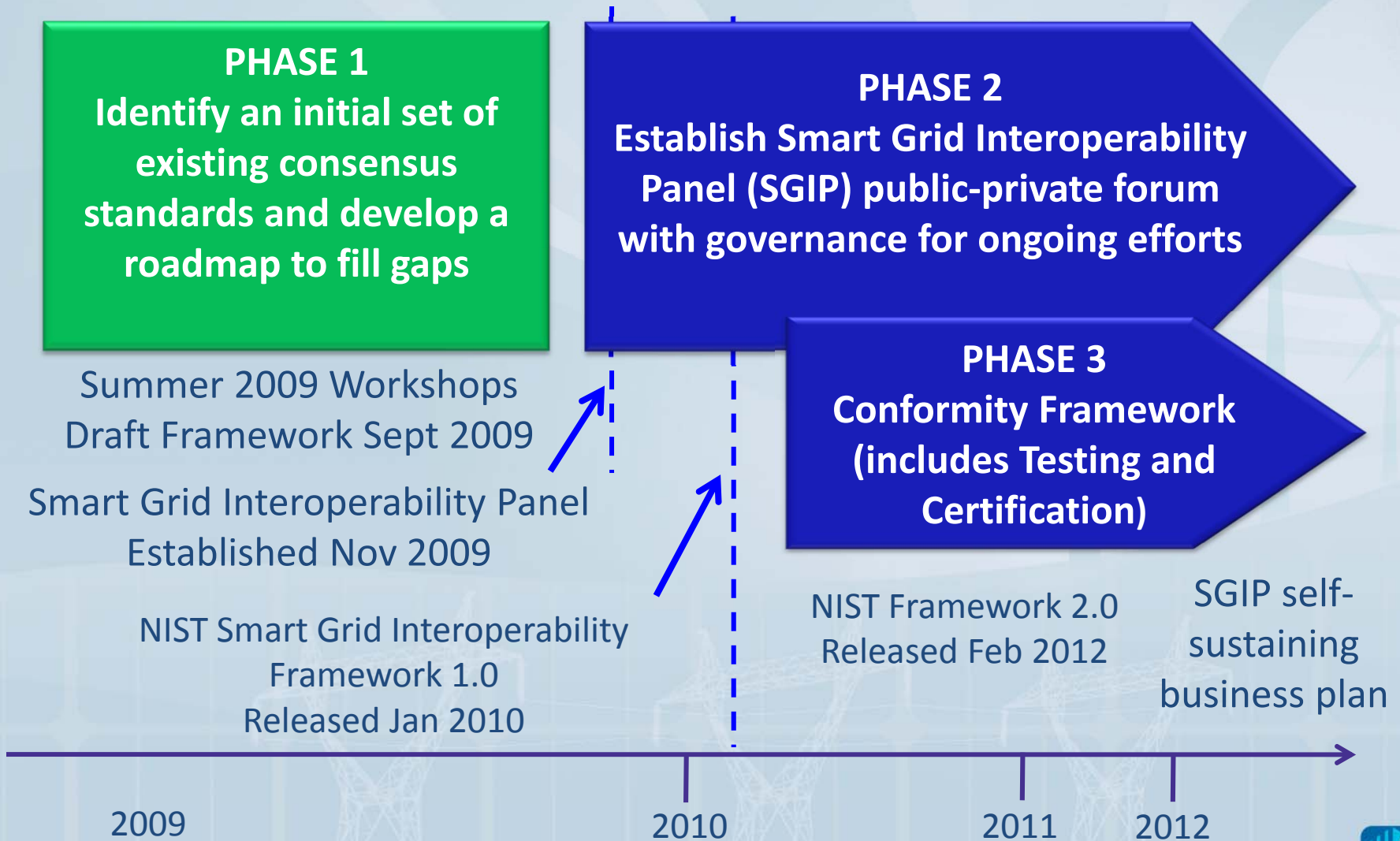
- ✓ **Coordinate inter-governmental smart grid activities**
- ✓ **Collaborate on interoperability framework**
- ✓ **Review biannual smart grid system report mandated by US Congress**
- ✓ **Ensure awareness of Federal smart grid activities**
- ✓ **Support the National Science and Technology Council / Interagency Working Group on Smart Grid**

### Member Organizations

- Department of Energy
- Federal Energy Regulatory Commission
- Department of Commerce
  - International Trade Administration
  - National Institute of Standards and Technology
  - National Telecommunications and Information Administration
- Environmental Protection Agency
- Department of Homeland Security
- Department of Agriculture
- Department of Defense
- Federal Communications Commission
- Department of State
- National Aeronautics and Space Administration
- National Oceanic and Atmospheric Administration
- United States Trade Representative
- U.S. Trade and Development Agency
- General Services Administration
- Council of Environmental Quality
- Office of Science and Technology Policy
- Federal Trade Commission



# Coordination and Acceleration of Smart Grid Standardization: NIST Three Phase Plan



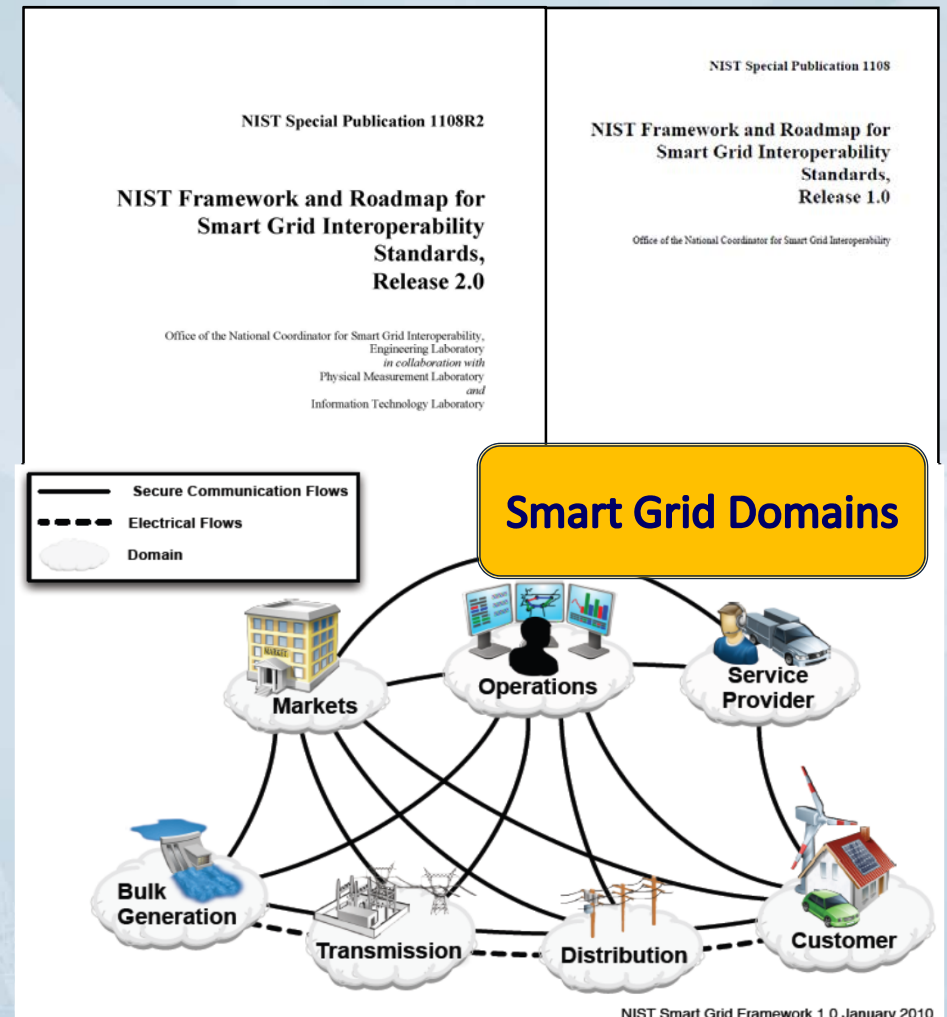
# White House kickoff meeting

- Hosted by Secretaries of Energy and Commerce
- Many industry CEOs including utilities, federal officials, standards developing organizations, ...
- Commitment to support NIST standards process, including industry staff participation in workshops, standards acceleration, ...



# NIST Smart Grid Framework and Roadmap

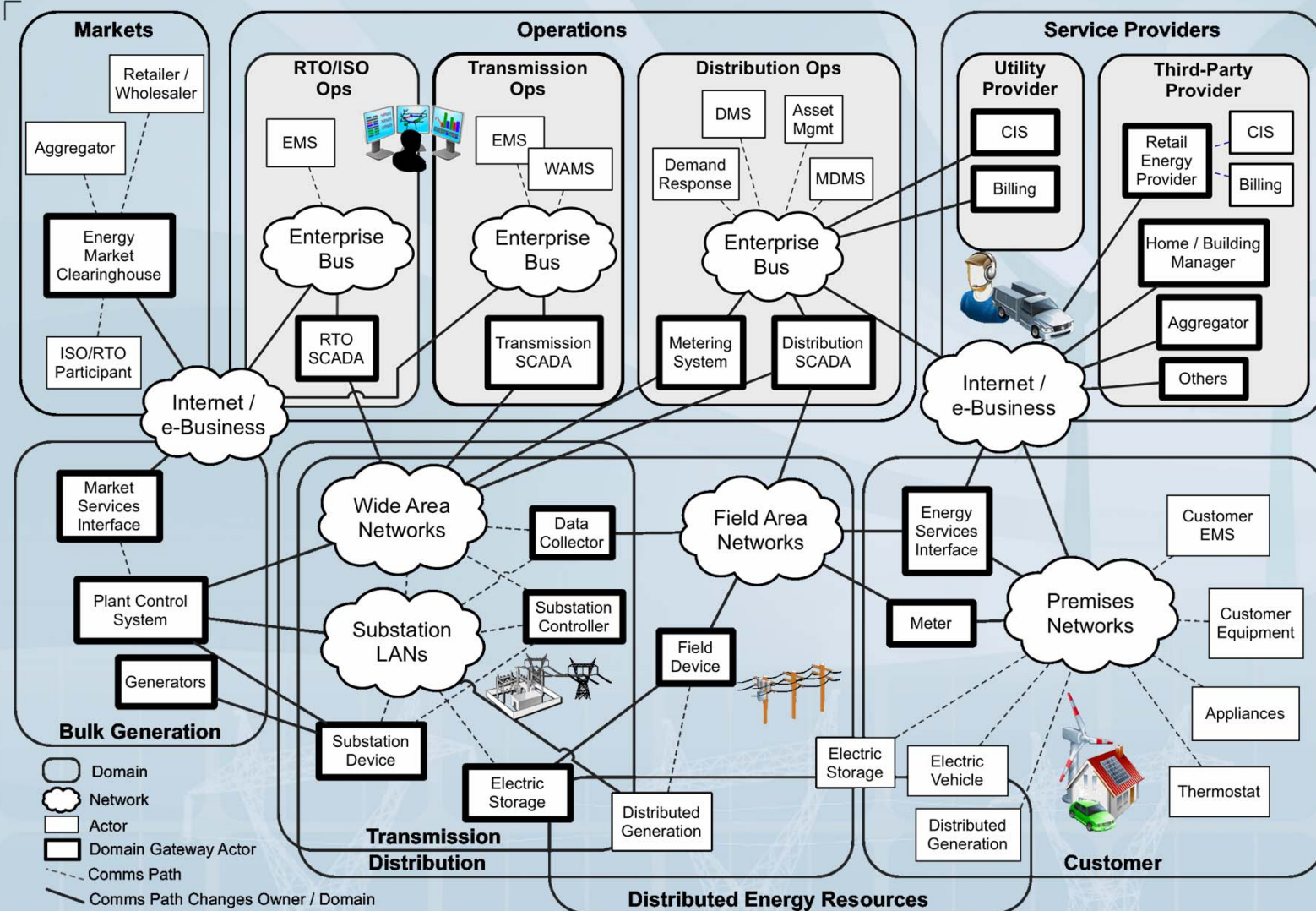
- Release 1 published January 2010
  - Extensive public input and review
  - Completed in less than 1 year
  - Smart Grid Vision and Reference Model
  - Identified existing standards
  - Priority Action Plan Projects
  - Companion Cyber Security Strategy NISTIR 7628
- Release 2 published February 2012
  - Extensive involvement of Smart Grid Interoperability Panel plus public input and review
  - Improvements include revised architecture, Interoperability Process Reference Manual, additional identified standards, completed and new Priority Action Plans, SGIP structure ...



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

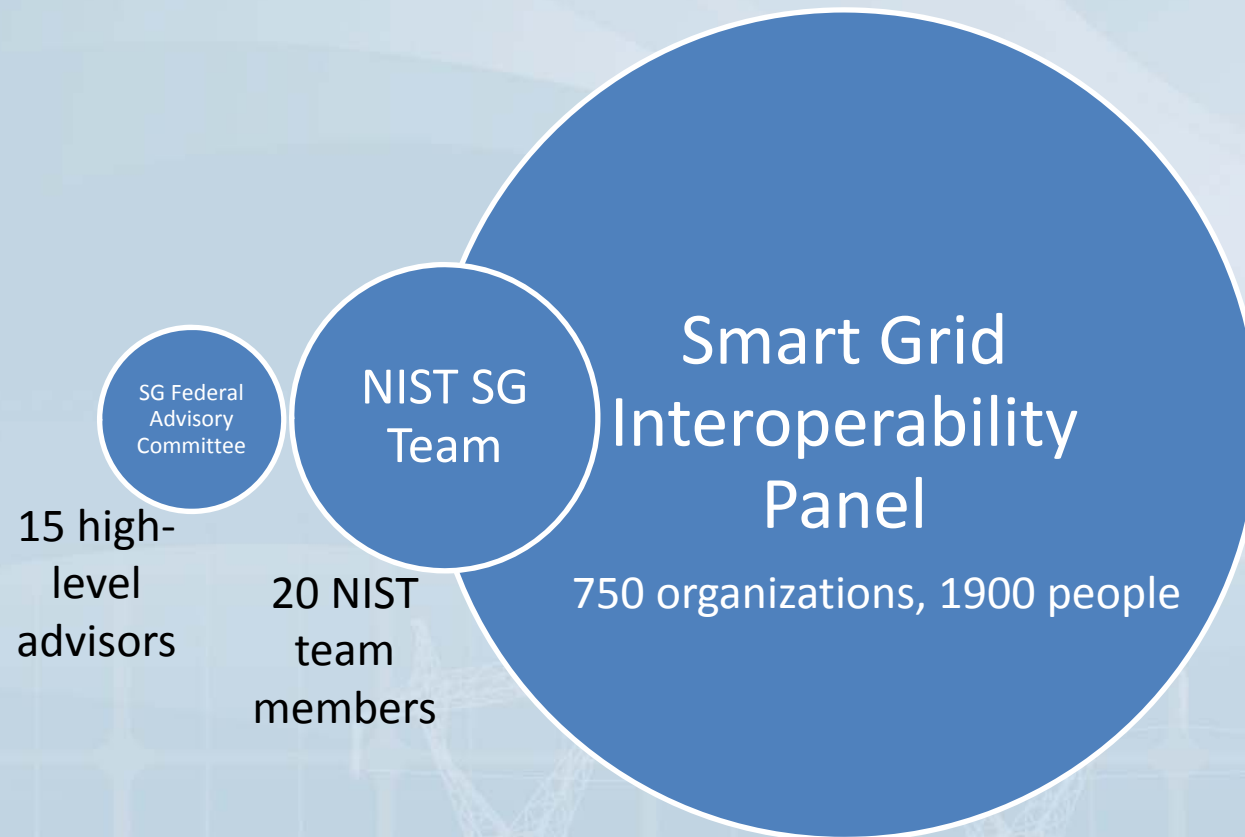


# NIST Smart Grid Reference Model (Release 2.0)



# (Extended) Organization

“[NIST] shall seek input and cooperation of other relevant federal and state agencies...and private sector entities” – EISA 2007



- SGIP: Public-private partnership created in Nov. 2009
- Open, public process with international participation
- Coordinates standards development
- Web-based participation
- Transitioning to legal entity private-public partnership

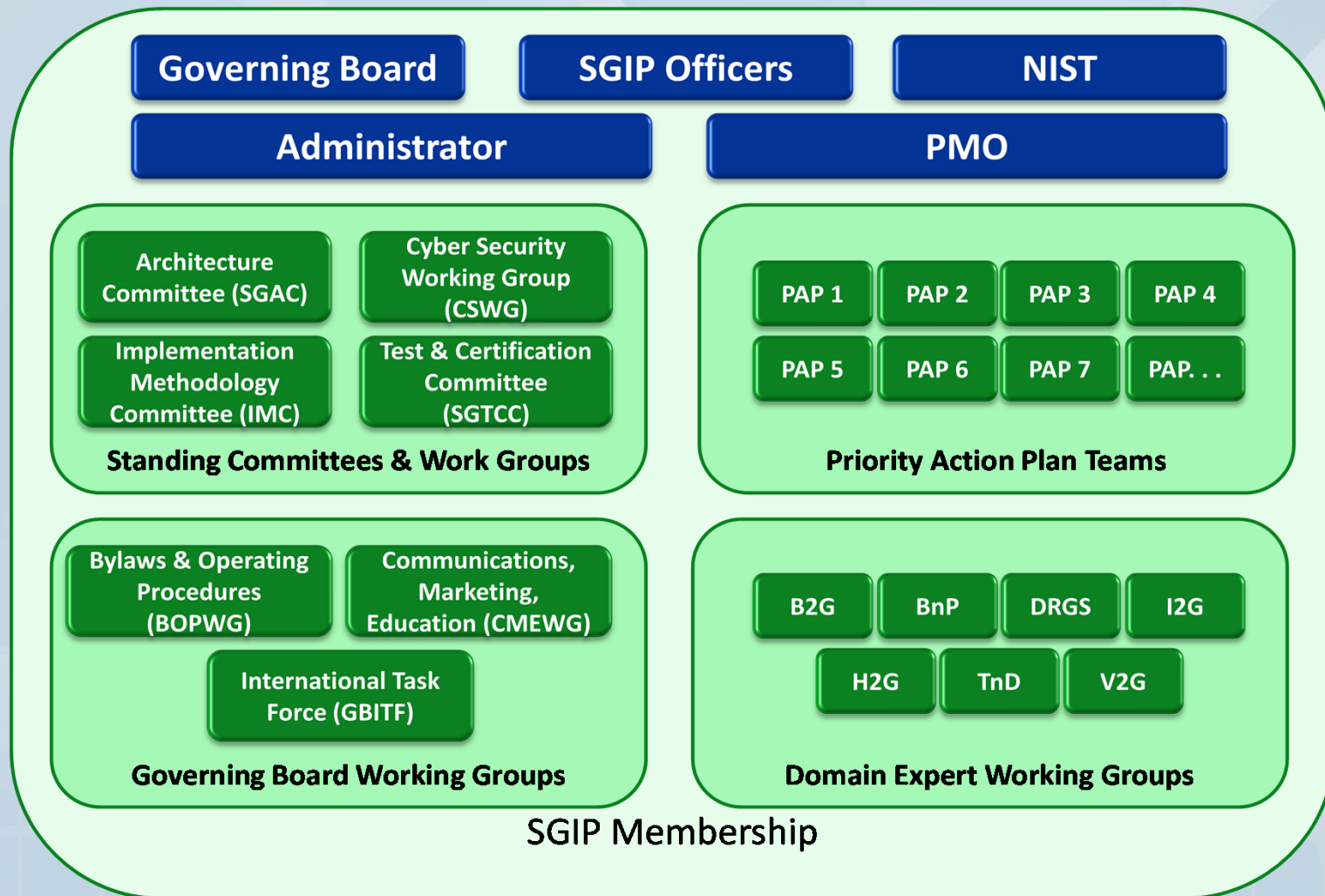


# Stakeholders in the Process

1	Appliance and consumer electronics providers	12	Power equipment manufacturers and vendors
2	Commercial and industrial equipment manufacturers and automation vendors	13	Professional societies, users groups, and industry consortia
3	Consumers – Residential, commercial, and industrial	14	R&D organizations and academia
4	Electric transportation industry Stakeholders	15	Relevant Government Agencies
5	Electric utility companies – Investor Owned Utilities (IOU)	16	Renewable Power Producers
6	Electric utility companies - Municipal (MUNI)	17	Retail Service Providers
7	Electric utility companies - Rural Electric Association (REA)	18	Standard and specification development organizations (SDOs)
8	Electricity and financial market traders (includes aggregators)	19	State and local regulators
9	Independent power producers	20	Testing and Certification Vendors
10	Information and communication technologies (ICT) Infrastructure and Service Providers	21	Transmission Operators and Independent System Operators
11	Information technology (IT) application developers and integrators	22	Venture Capital

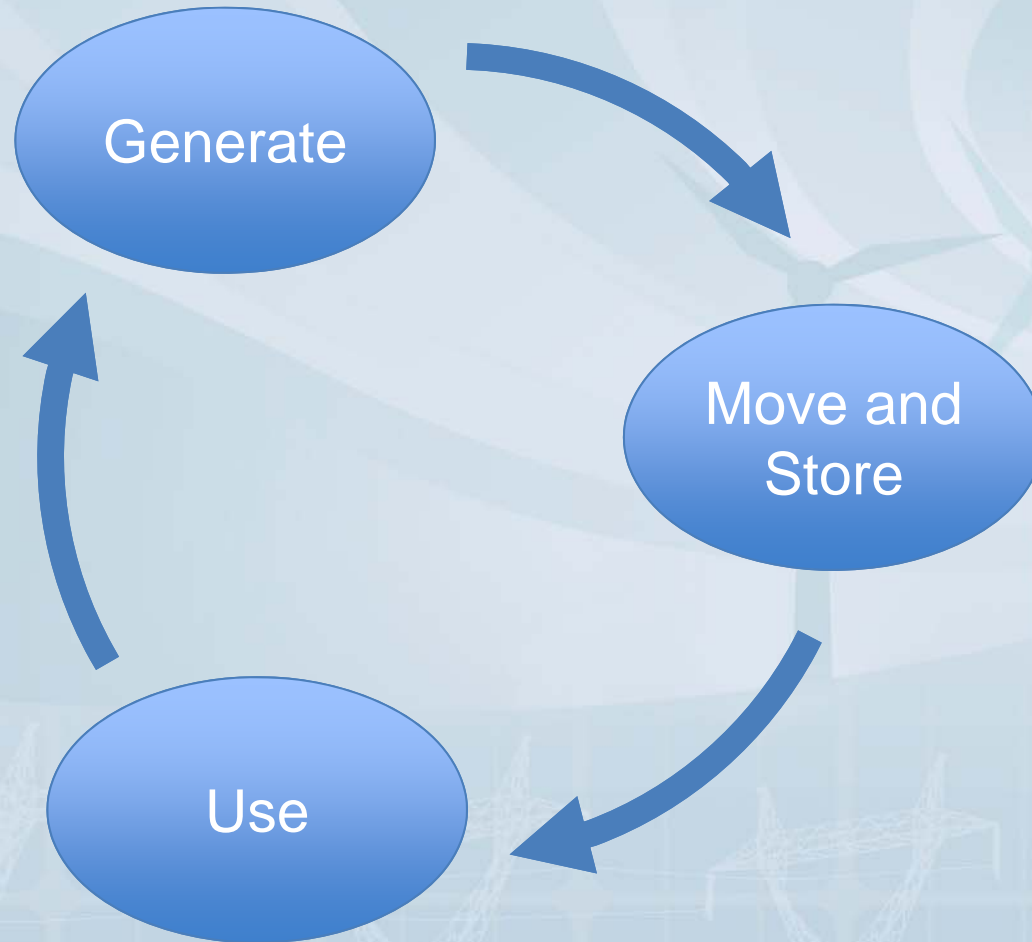


# SGIP Structure Diagram

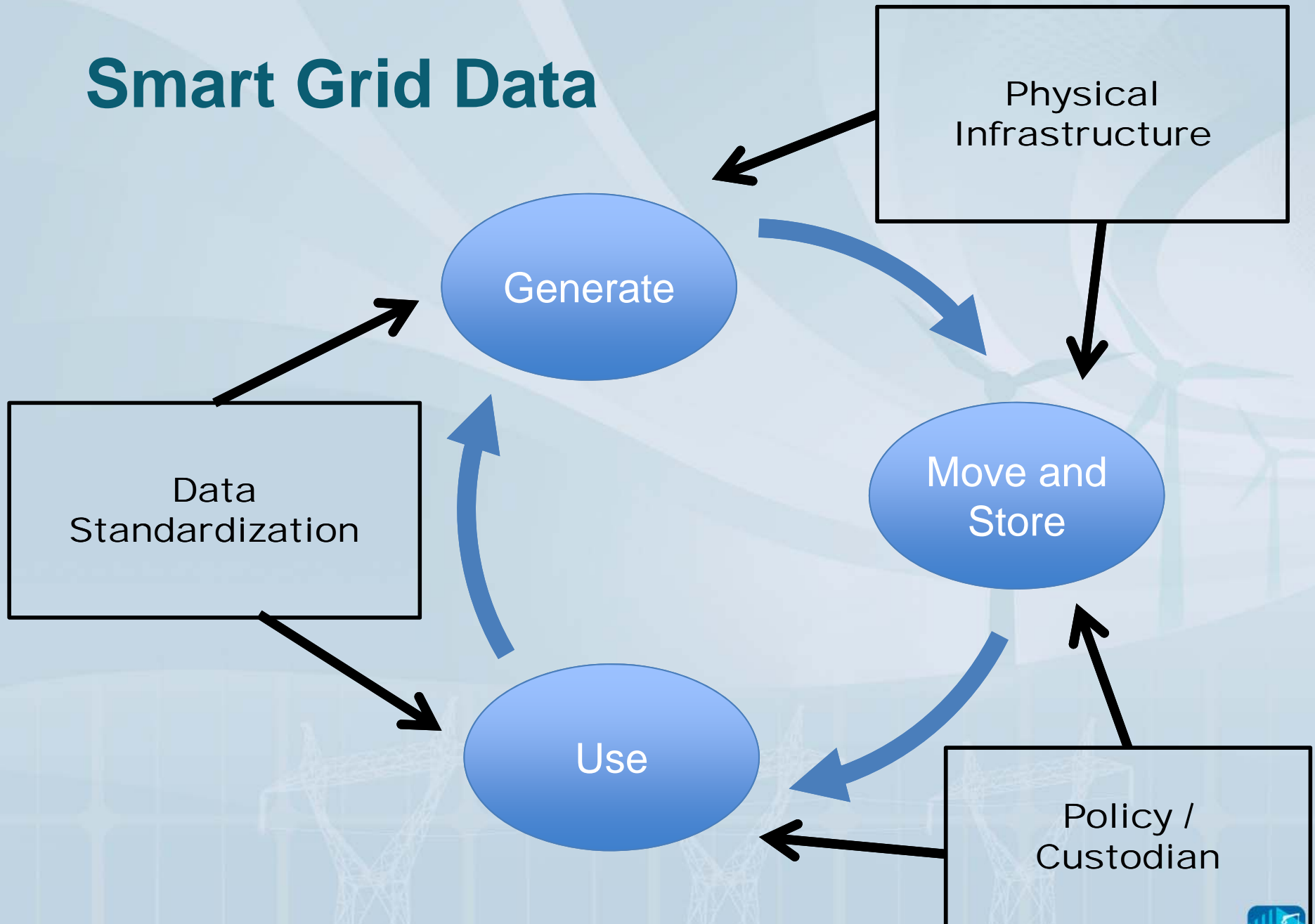




# Smart Grid Data – Example of Innovation



# Smart Grid Data



# Smart Grid Data – Energy Usage Information

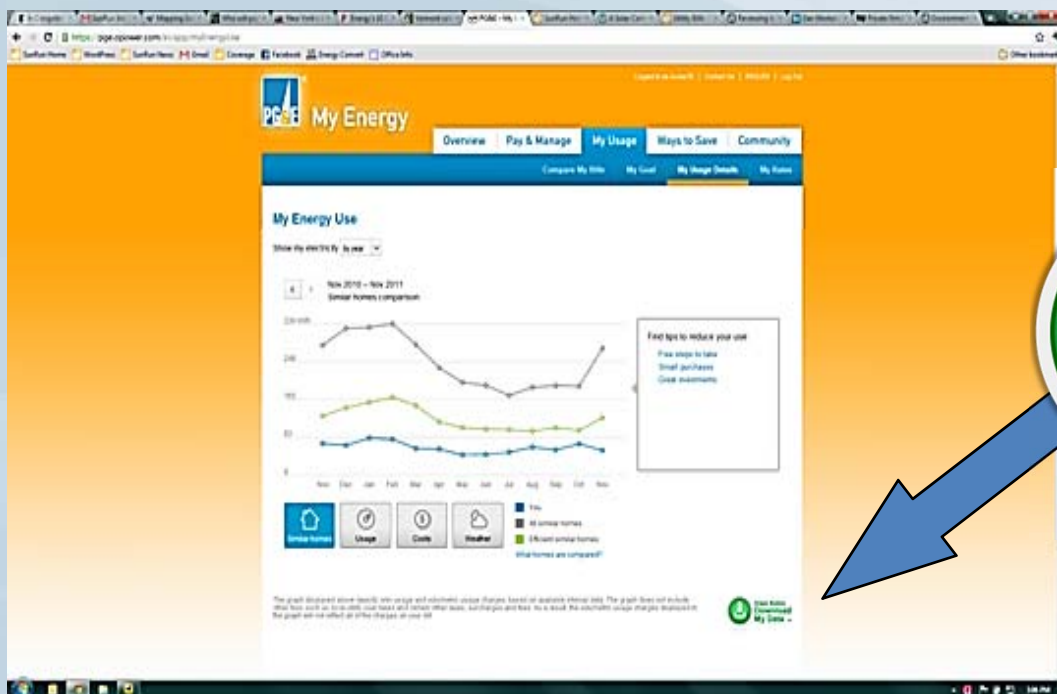
- Physical Infrastructure
  - Smart Meters
  - Meter Communications and Utility Back-end Systems
- Privacy / Custodian
  - US privacy blueprint and privacy efforts, state efforts
  - DOE-led smart grid privacy (with Smart Grid Task Force)
  - Third Party data access authorization by consumers
    - SGIP Cyber Security Working Group (CSWG)
- Standardization
  - Energy Usage Information (SGIP Priority Action Plan 10)
  - Green Button Initiative (SGIP Priority Action Plan 20)

Goal: Ecosystem of innovative smart grid products and services based on energy usage information



# Green Button Initiative (OSTP CEQ DOE NIST)

- *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.*
- *A common experience, from provider to provider, setting clear expectations that consumers' information is theirs to have – and share.*



**15+ as of Oct2012**

**10 million US consumers have access to Green Button data NOW, and 31+ million will by 2013**

**36+ as of Oct2012**

**Green Button  
Download  
My Data**

**[www.greenbuttondata.org](http://www.greenbuttondata.org) &  
[www.nist.gov/smartgrid/greenbutton.cfm](http://www.nist.gov/smartgrid/greenbutton.cfm)**



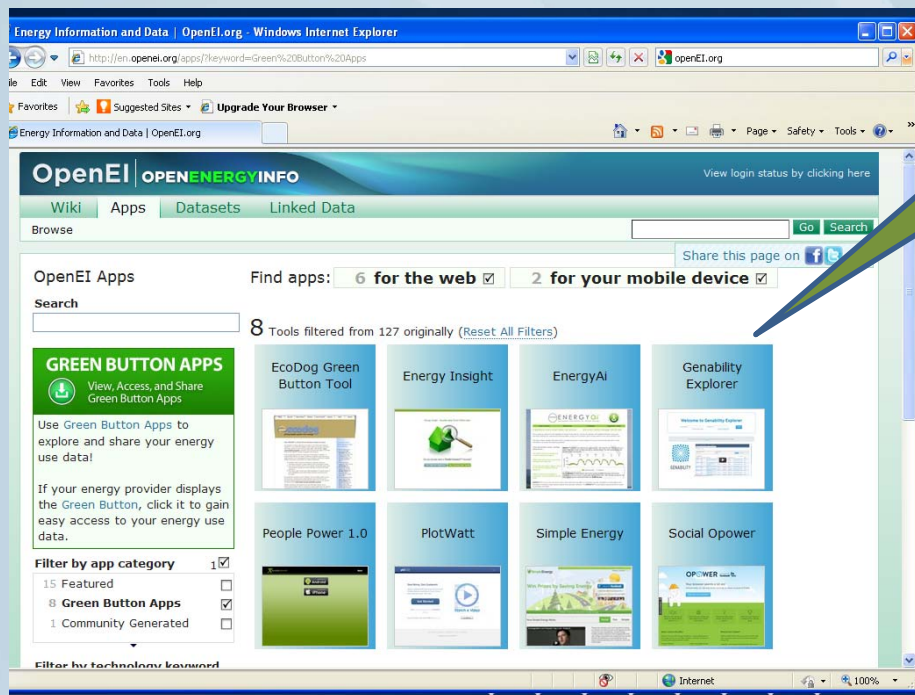
# The ecosystem of companies and organizations supporting and using Green Button data...

- Utilities
- Utility software vendors
- Apps developers
- Device manufacturers
- Standards organizations



# Green Button Apps and Competitions – DOE

Green Button  
Apps!



<http://openei.org>

APPS FOR  
**ENERGY**

Are you a software developer?  
**Build the best energy app**  
and you could win part of a  
**\$100,000 prize.**



**Winning entries were  
announced May 22, 2012**

<http://appsforenergy.challenge.gov/>

**DOE Smart Grid Data Access Funding Opportunity Announcement –  
DOE announced 7 winners on May 22, 2012**

Source:

NIST smart grid program

engineering laboratory



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# Further information

- NIST smart grid program information: [www.nist.gov/smartgrid/](http://www.nist.gov/smartgrid/)
- NIST SGIP information: <http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/FactSheets>
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