SGIP Overview

Patrick Gannon

20 October 2013

CIGRE/EPRI Grid of the Future

SGIP Overview - Agenda

- Interoperability and the Smart Grid
- SGIP 2.0 Overview
- SGIP Values & Strategic Goals
- Interoperability Mapping Tool
- SGIP ***Progress Through Collaboration*** conference

Interoperability and the Smart Grid

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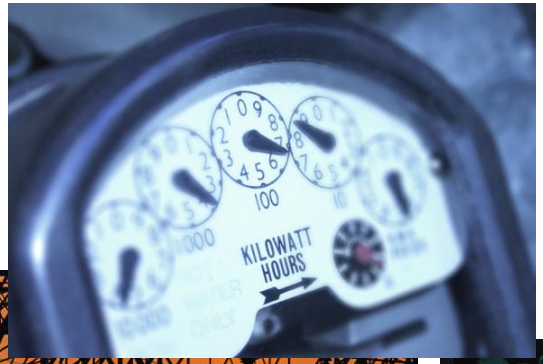
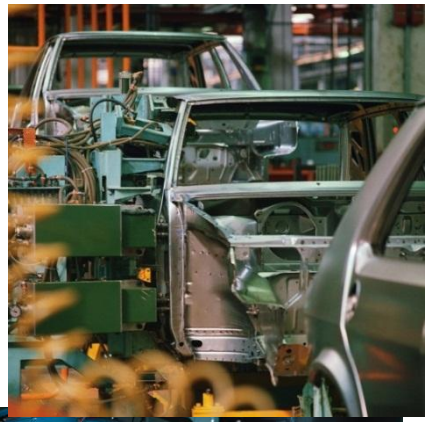
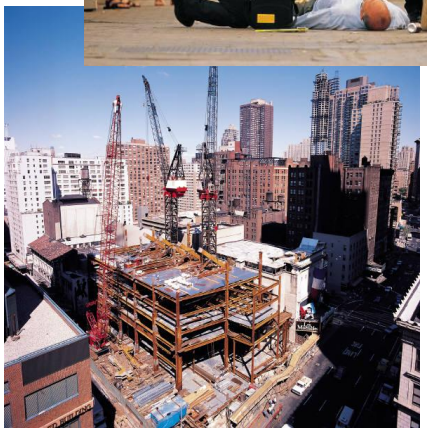
Smart Communities & Ecosystems

The application of information & communications technology (ICT) continues to transform our lives







Integration becomes the bottleneck
Interoperability becomes the mission

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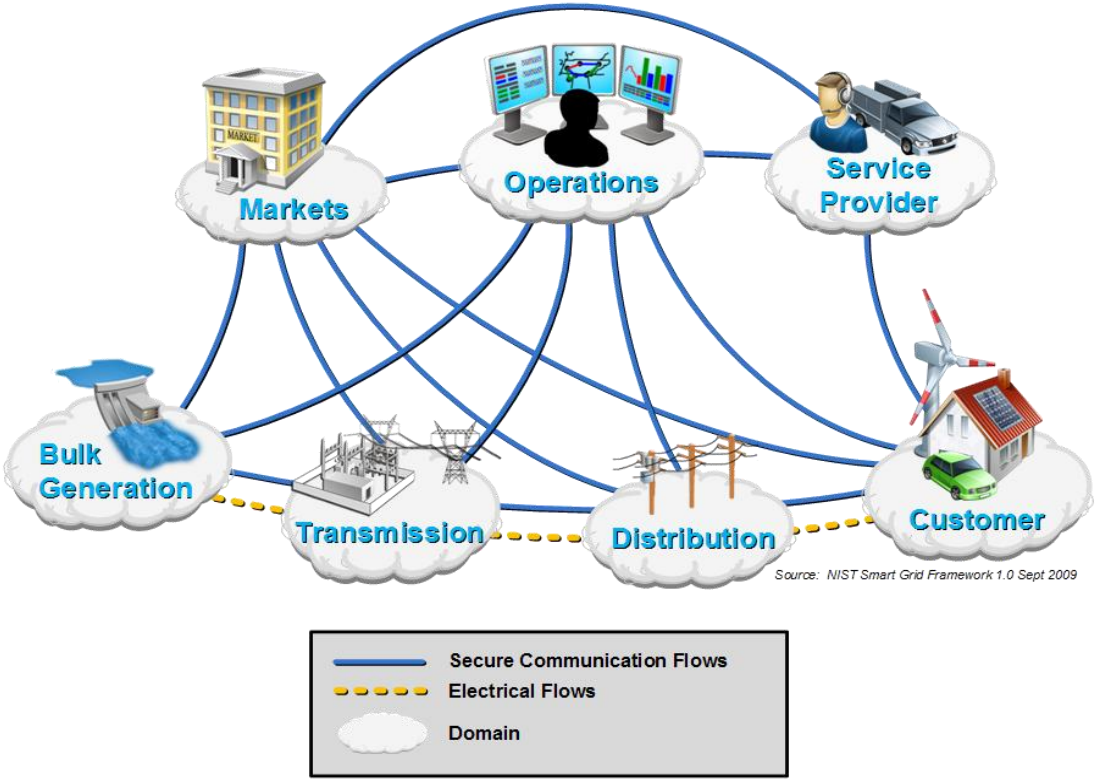
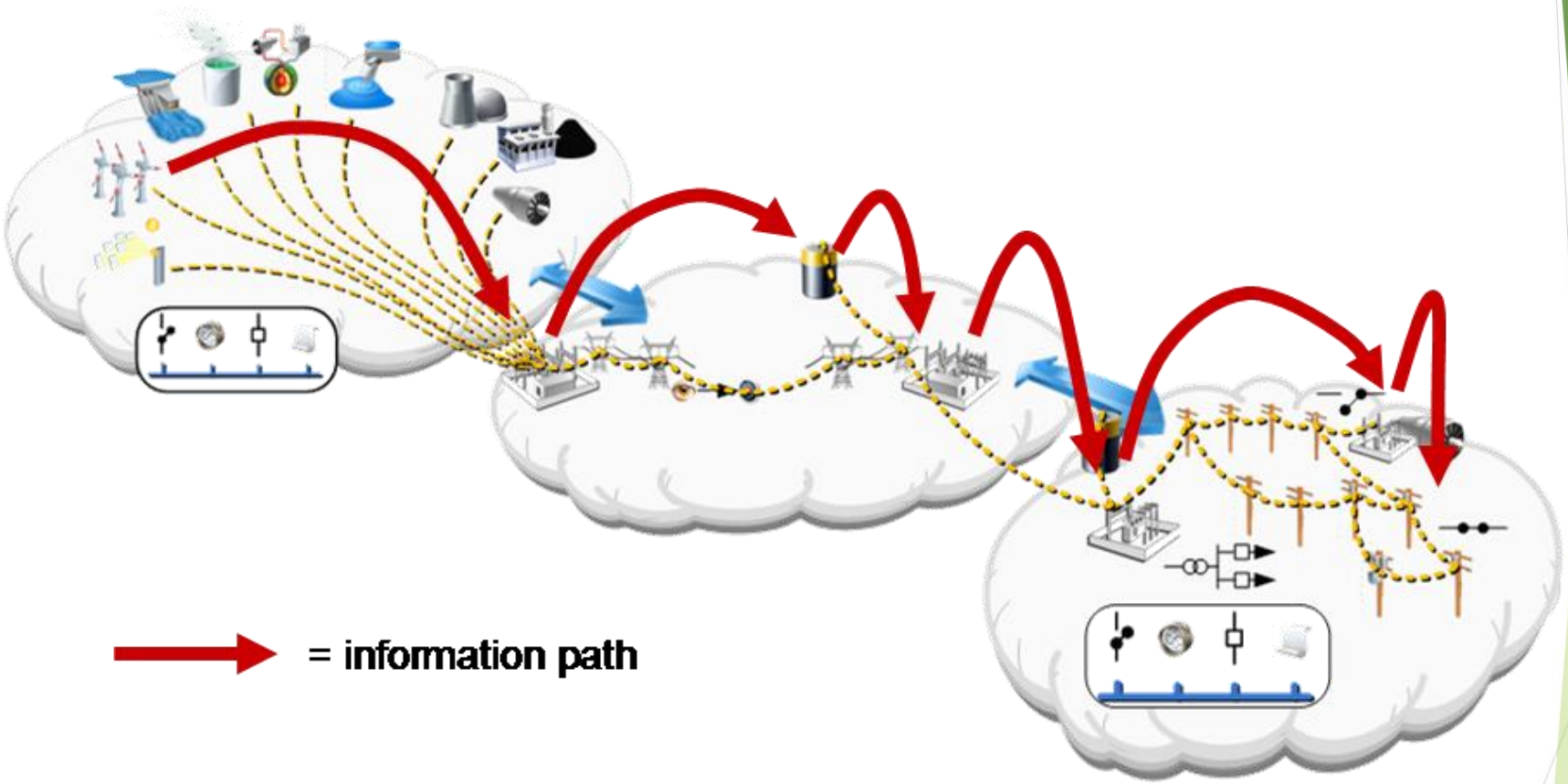
Smart Grid Conceptual Model

The SGIP Smart Grid Conceptual Model, showing the seven “domains” of the Smart Grid



(http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/SGConceptualModel)

Smart Grid Model – Information Flow



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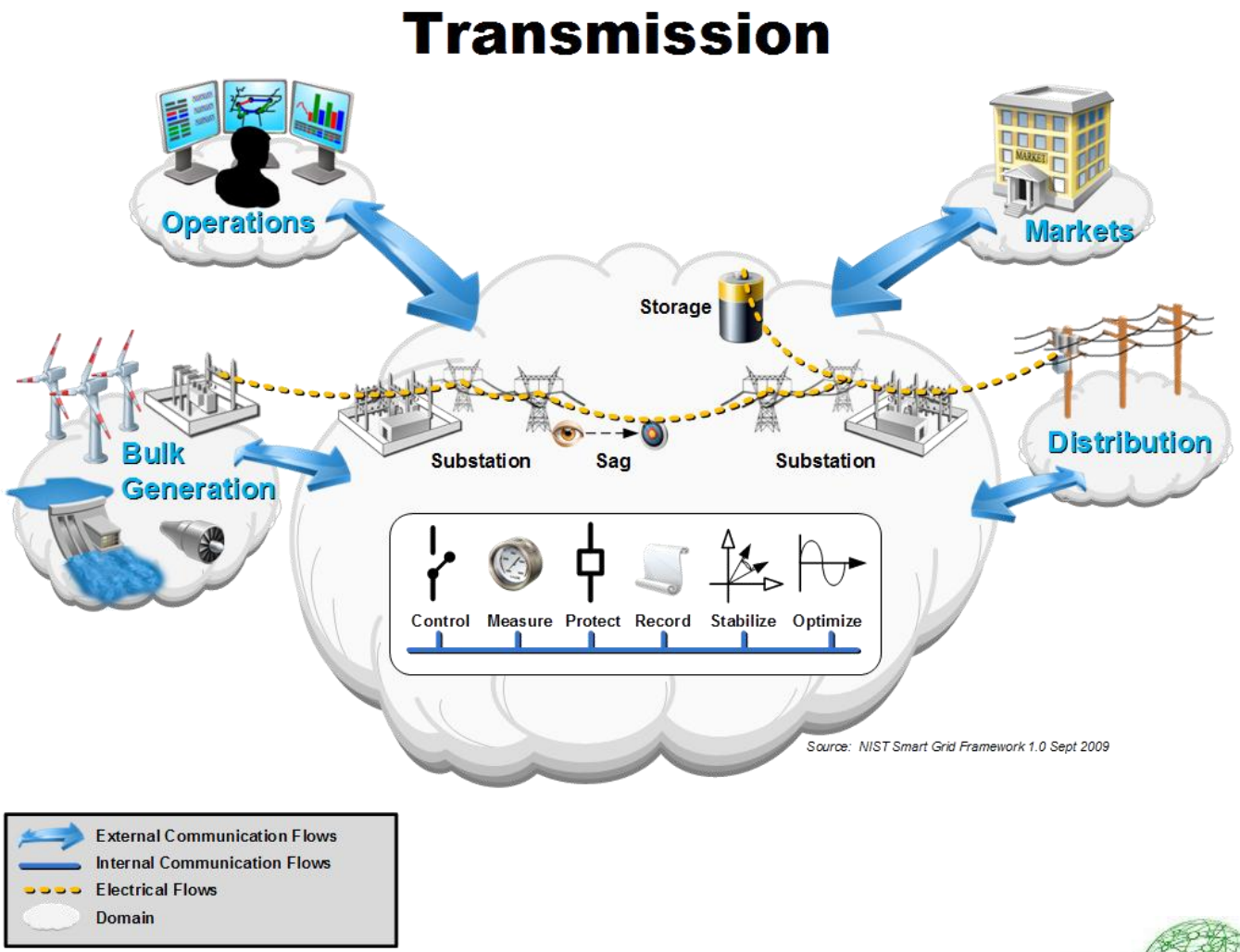
Smart Grid Conceptual Model



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Heterogeneity
Vive la Difference!

- Multiple applications seeking integration
  - Within a division
  - Within an enterprise
  - Between companies
- Multiple vendors with multiple products
- Multiple versions and mixtures of technology
- Overlapping representations/models
- Interaction requires a shared process view
  - At the boundaries where transactions take place

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*Inter*operability – Integration at Arm's Length

- Exchange of actionable information
  - between two or more systems
  - across organizational boundaries
- Shared meaning of the exchanged information
- Agreed expectation with consequences for the response to the information exchange
- Requisite quality of service in information exchange
  - reliability, fidelity, security

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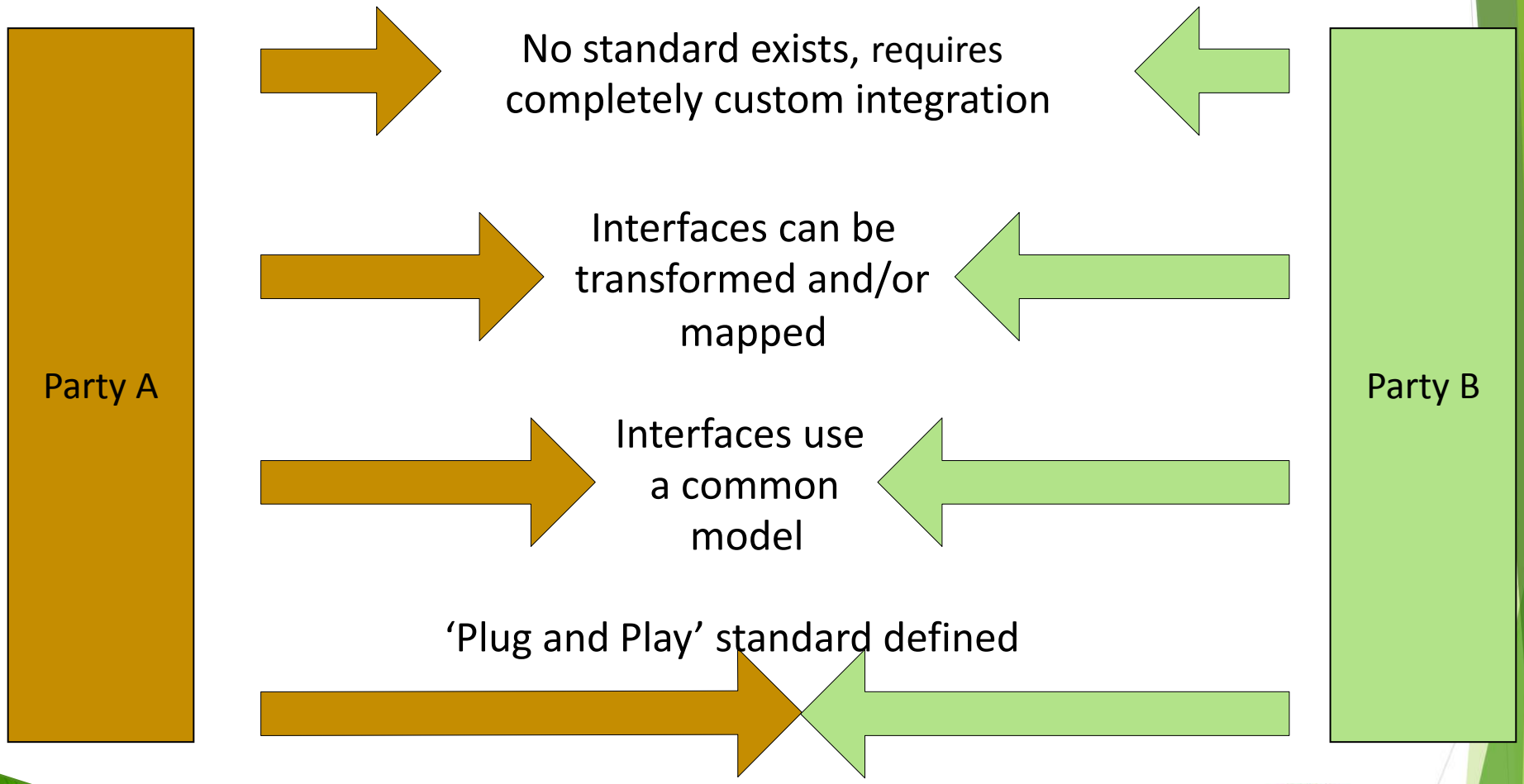
Reduce Distance to Integrate



Credit: Scott Neumann, UISol GWAC position paper

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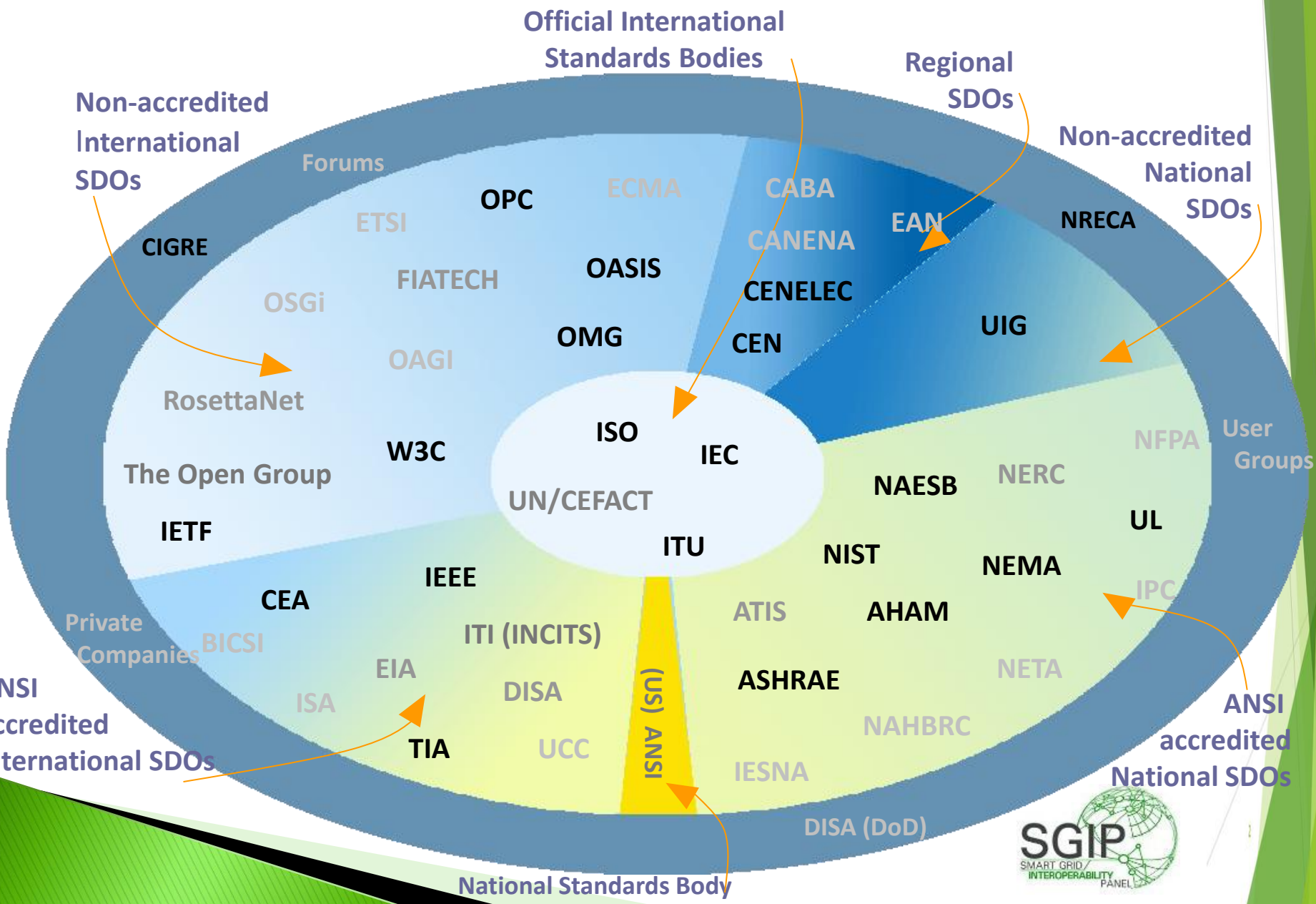
Standards Organizations: a Tangled Web



What is SGIP?

An entity created by the US Energy Independence and Security Act (EISA) of 2007 to provide a framework for coordinating all Smart Grid stakeholders in an effort to accelerate standards harmonization and advance the interoperability of Smart Grid devices and systems

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Smart Grid Interoperability Panel 1.0

- Public-private partnership created in Nov 2009
  - Attained nearly 800 member organizations
  - Over 1900 participants from 22 stakeholder categories
- SGIP 1.0 supported NIST in coordinating, accelerating, & harmonizing the development of standards
  - Prioritized standards development programs
  - Identified requirements
  - Worked with over 20 Standards Development Organizations

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NIST Three Phase Plan

1. Establish a dialogue — multiple workshops in 2009, culminating in *NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0*
2. Develop organization and consensus process — creation of SGIP 1.0
3. Transition to industry-funded organization — evolution of SGIP 2.0

SGIP 2.0: Transition to Independent Entity

- **Ensure everything in SGIP v1 is accounted for**
- **Institutionalize new organization**
  - Foundational documents (Bylaws, IPR, etc.)
  - Membership campaign
  - Technical working priorities
  - Board of Director elections
  - Budget and P&L
- **Establish basic business functionality**
  - Hire Executive Director and staff
  - Procure services
    - IT/Website
    - Marketing and communications
    - Accounting and auditing
    - Event management
- **Update relationships**
  - NIST memo of understanding
  - International cooperation

Transition the SGIP to a self-sustaining entity as smoothly as possible while preserving the mission, values, and spirit of the unique organization our members have created.

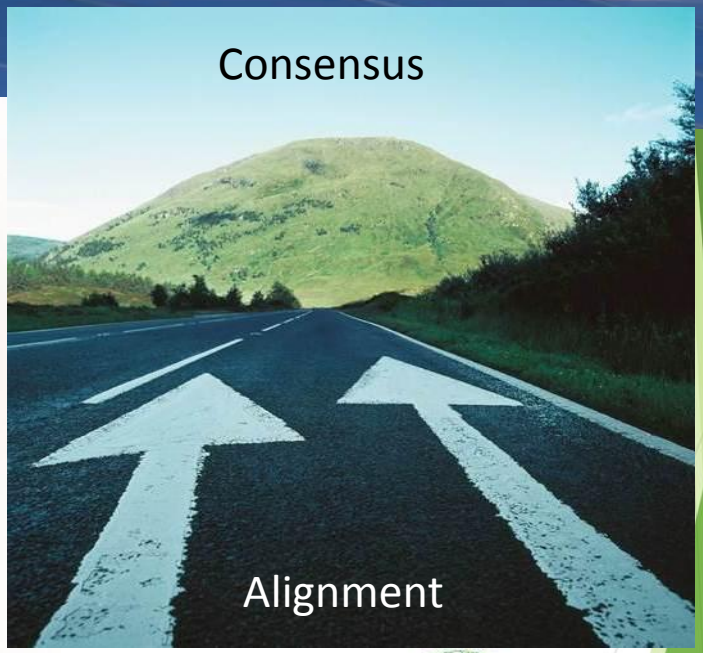
SGIP 1.0 Twiki:
http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid

SGIP 2.0 website:
http://sgip.org

Create an Open, Big Tent

Inclusive

Balance



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Interoperability Is Not an Entitlement, but…

- It supports the freedom to choose and to change
- It underlies your future economic well-being
- It demands the private sector to take charge and not just be observers

SGIP 2.0 Overview

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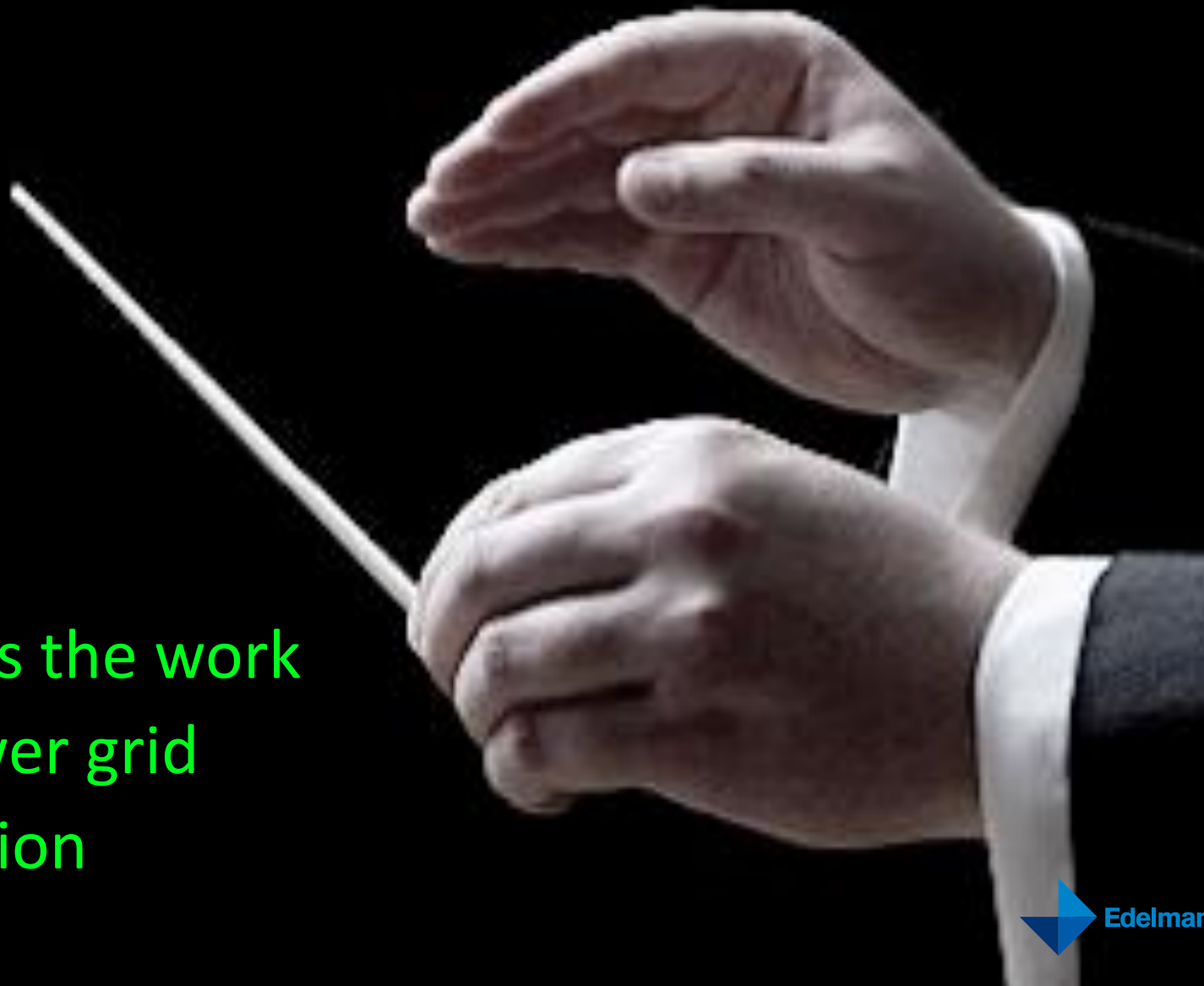
Smart Grid Interoperability Panel



orchestrates the work behind power grid modernization

Edelman

SGIP

provides a framework for orchestrating all Smart Grid stakeholders to accelerate standards harmonization and interoperability

The Harmonization Process

Smart Grid Ecosystem

- Electricity drives society's lifestyles, security, growth
- Without a standardized technical approach to grid modernization
  - Electric grid will languish as a collection of inert equipment
  - Remain prone to massive inefficiencies, too-frequent outages
- Smart Grid solutions can:
  - Improve reliability, efficiency and security
  - Use modern management with advanced components
  - Enable self-diagnosing and self-healing infrastructures

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Smart Grid Challenges

- Today's electric grid is built on old technology, business models and regulations
- Connecting legacy systems & new technologies
  - Poses a challenge to reliability, security and efficiency
- Technology upgrades = digital communication
  - Modernization will be more complex, expensive
  - If components lack interoperable capability
- As more devices, subsystems connect to grids
  - Careful evaluation of cybersecurity risks is vital

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SGIP's Role

- SGIP members collaborate
  - Identify technical standards & gaps among standards
  - Influence how the electric grid is modernized
- SGIP Members access collected knowledge of all the domains in the Smart Grid ecosystem
  - Accelerate interoperability, testing, & certification
- Enables efficient, secure electrical power
  - Maintain & increase standards of living

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SGIP & Interoperability

- SGIP oversees the path to interoperability
  - Link Smart Grid hardware, software and systems throughout the grid
- SGIP defines customer requirements
  - Use existing standards or leads to new standards
- SGIP engages all stakeholders in demonstrating these standards
  - Solving critical, real-world problems with interoperable solutions
- SGIP defines, evaluates, harmonizes standards
  - Grid components can talk to each other
- ATMs, mobile phones lacked interoperability at first
  - Frustrated early users and slowed wide adoption
- The modernized electrical power grid is in a similar infancy
- SGIP eases Smart Grid growing pains
  - Encouraging practical interoperable solutions enabled by standards

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SGIP & Knowledge

- Smart Grid solutions driving dramatic overhaul and modernization of the electric power
- New ways to think about power generation, transmission and distribution are required
- Next generation of digitally savvy talent
  - Continue connecting legacy systems with Smart Grid technology
  - Modernize grid operations
  - Use SGIP-recognized standards

SGIP & Commerce

- SGIP keeps commerce and trade flowing
  - Recognizing harmonized standards
  - Coordinating a universal architecture
  - Guiding design of the modernized electric grid
- SGIP enables more efficient and robust open standards
  - Multiple vendors with interoperable products
  - Creates more economical solutions
- Business of grid modernization stands to falter
  - Disparate assembly of components, ideas, procedures don't work together
- Products and solutions built on interoperable standards
  - Rigorous open evaluation, especially for cybersecurity vulnerabilities
  - Lowers the risk of implementing new grid modernization solutions
- Investors, suppliers, insurers and power customers
  - Benefit from emerging Smart Grid commerce
  - Robust economies, increased reliability, decreased cost of operation

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SGIP Values & Strategic Goals

SGIP Strategic Values

- **Accelerate**
  - Realize interoperability benefits faster, cheaper
- **Facilitate**
  - Manage member interactions, education and core technical work processes
- **Navigate**
  - Identify stakeholder specific roadmaps
- **Communicate**
  - Clarify Impacts and merits of interoperability

Strategic Goal 1 - Accelerate

- **Accelerate** the realization of interoperability benefits from harmonized standards and faster integration of interoperable technologies.
  - Educate all stakeholders on the benefits of interoperability
  - Highlight the breadth & depth of members' technical capabilities and leadership
  - Communicate the value propositions
  - Establish international relationships, partnerships, and cooperation agreements

Strategic Goal 2 - Facilitate

- **Facilitate** the core technical work by providing thought leadership, a productive collaborative workspace and management process
  - Enhance & maintain a process for identifying & prioritizing the requirements and gaps for harmonizing standards
  - Enhance and maintain the processes for the management of Catalog of Standards (CoS) reviews and lessons learned
  - Communicate all aspects of the technical work processes, progress and results

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Strategic Goal 3 - Navigate

- Help stakeholders **Navigate** among the Smart Grid Ecosystem processes & relationships
  - Develop an Ecosystem picture/roadmap/platform that provides a clear, interactive, logic-driven landscape of the entire Smart Grid value chain
  - Assist members to identify their most relevant “vectors of influence”
  - Deliver training programs for how to use the Ecosystem picture for drawing tailored roadmaps

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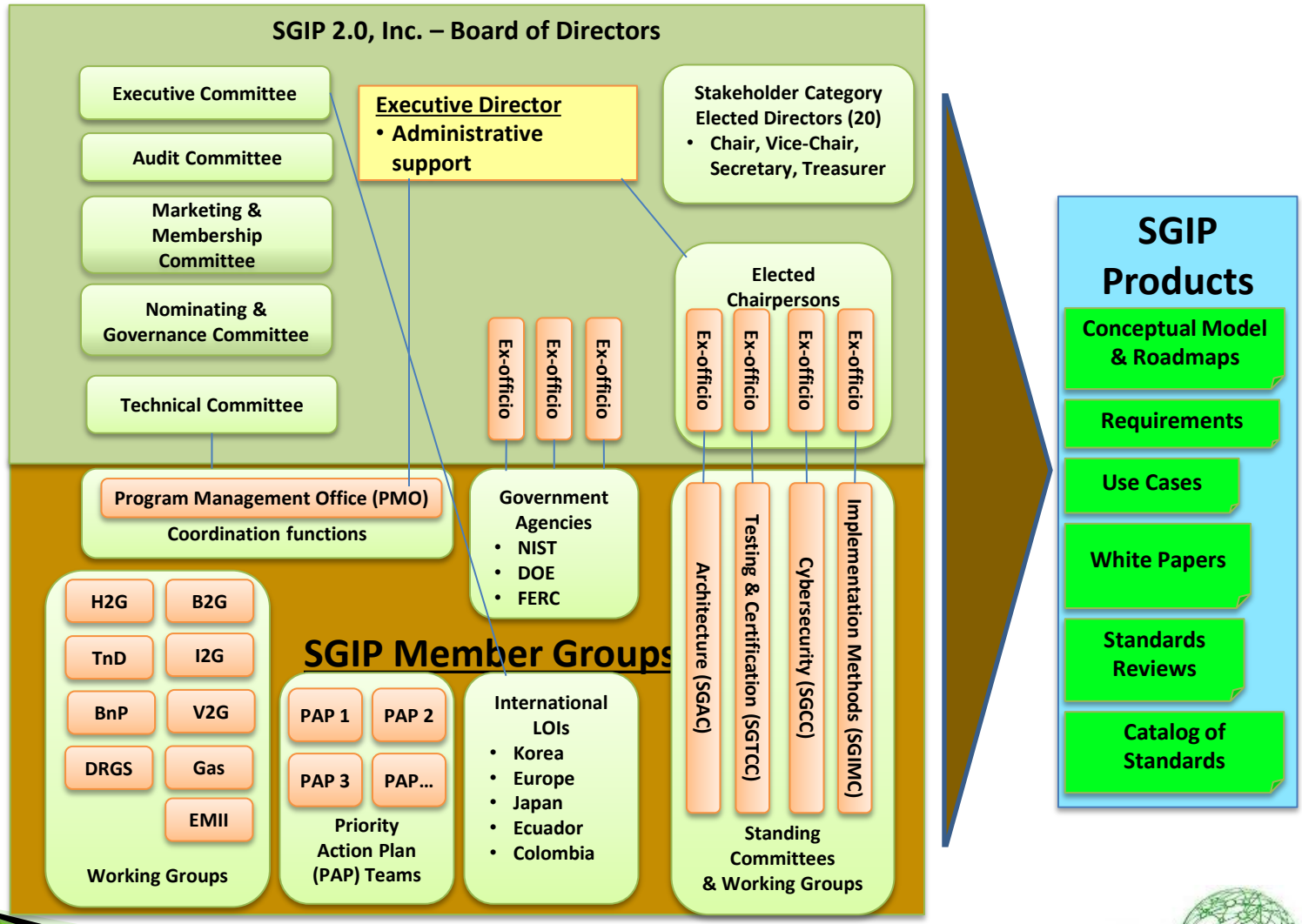
Strategic Goal 4 - Communicate

- **Communicate** with all Smart Grid Ecosystem stakeholders on standards information and benefits from interoperability
  - Produce a resource for Smart Grid standards information and the benefits of interoperability
  - Prepare an Interoperability Transition Roadmap for implementation of Smart Grid standards
  - Identify and implement thought leadership approaches and messaging

SGIP 2.0 Organization



SGIP Member Groups

Membership

Domain Expert Working Groups (DEWGs)

- Building to Grid
- Industry to Grid
- Home to Grid
- Vehicle to Grid
- Transmission & Distribution
- Business & Policy
- Distributed Renewables, Generation & Storage

Priority Action Plans (PAPs)

- Wireless Comm - 02
- Energy Storage Interconnect - 07
- Distribution Grid Mgmt - 08
- Standard DR & DER Signals - 09
- Map IEEE 1815 to IEC 61850 - 12
- Power Line Comm - 15
- Wind Plant Comm - 16
- Facility Smart Grid Info Std - 17
- Wholesale Demand Response - 19
- Green Button ESPI Evolution - 20
- Weather Info - 21
- EV Fueling Submetering - 22

Standing Member Committees

- Architecture
- Cybersecurity
- Implementation Methods
- Testing & Certification

Work Products

- Conceptual Models & Roadmaps
- Requirements
- Use Cases
- Whitepapers
- Standards Evaluations
- Catalog of Standards

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SGIP

Interoperability Mapping Tool

SGIP Interoperability Mapping Tool

- **Based on the SAKET website tool**
  - **S**ystem **A**rchitecture & **K**nowledge **E**ngineering **T**ool developed by Nawal K. Parwal
  - Provides quick navigation and contextual mapping of over 500 Smart Grid standards
  - Maps and links to over 300 Use Cases spanning 190 components in a simple view
  - User can select, customize and display multiple attributes, or dimensions, side by side
  - Currently mapping IEC, ITU and NIST standards

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SGIP Interoperability Mapping Tool

- **The IMT meets SGIP Strategic Goals**
  - **GOAL #3**: Help stakeholders **Navigate** among the Smart Grid Ecosystem players, processes and relationships, and improve the efficiency and effectiveness of producing the Catalog of Standards and deployment of integrated technologies.
  - **Objective 3.1:** *Develop* an Ecosystem picture/roadmap/platform that provides a clear, interactive, logic-driven landscape of the entire Smart Grid value chain, highlighting standards interrelationships and implementation pathways.

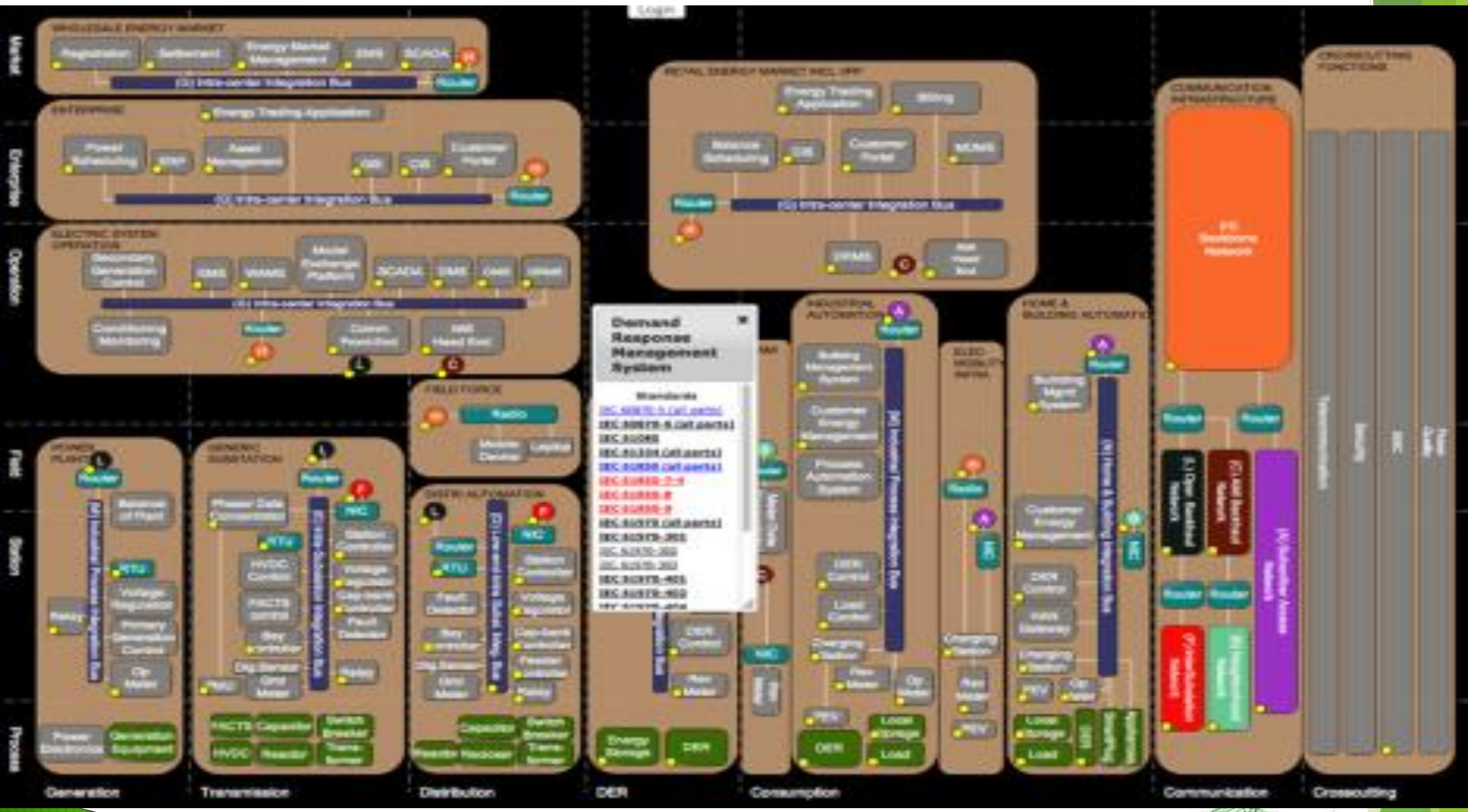
SGIP Interoperability Mapping Tool

- **SGIP IMT to be tailored for SGIMC to include**
  - SGIP Catalog of Standards (CoS) entries (attached to the node in question)
  - Status of standards that are candidate entries in the CoS review process
  - Interoperability “case studies” to be produced by the IMC's core “lessons learned” project
  - Status & deliverables from the SGIP DEWGs and PAPs to relevant nodes in the tool
  - Partner with EPRI to add information at appropriate nodes

SGIP Interoperability Mapping Tool

- **SGIP IMT Becomes Foundation**
  - The tailored IMT would become the foundation for future services
  - IMC would continue to populate the IMT with “lessons learned”
  - Information Services would let members know timing and impact of standards
  - This would helps utility members in planning their Smart Grid deployment projects
- SGIP would hire IMT Project/Product Manager
  - Responsible for data updates and operations

SGIP Interoperability Mapping Tool



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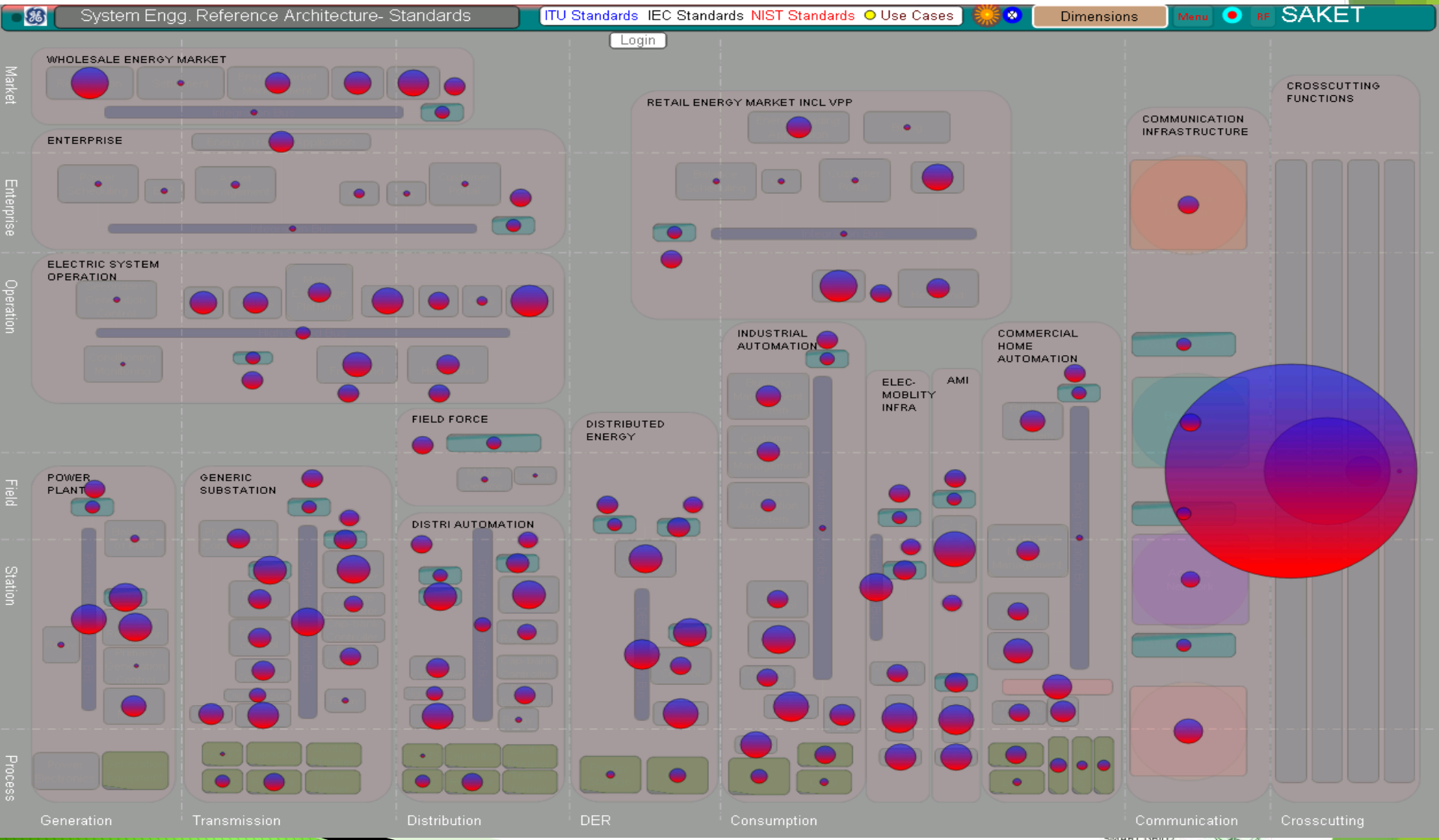
SGIP Interoperability Mapping Tool



SGIP INAUGURAL CONFERENCE

PROGRESS THROUGH COLLABORATION

NOVEMBER 5-7, 2013

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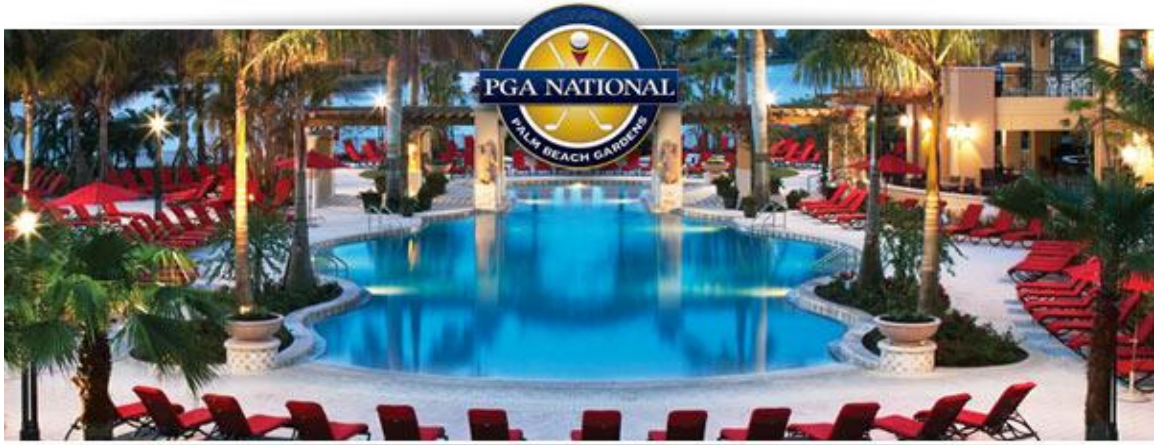
SGIP INAUGURAL CONFERENCE

PROGRESS THROUGH COLLABORATION

NOVEMBER 5-7, 2013

PGA National Hotel | Palm Beach Gardens, Florida

Tutorials and Working Group Meetings November 4-5



http://sgip.org/sgip-inaugural-conference-2/

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Agenda Highlights

- **Monday, November 4**
  - Technical Group Meetings
  - Tutorials (SGIP Intro, Cybersecurity, Interoperability Process Reference)
- **Tuesday, November 5**
  - Technical Committee Meetings
  - Conference Opening Sessions with Keynote
  - NIST Framework v3, Members Meeting
- **Wednesday, November 6**
  - Utility and International Perspectives
  - Transactive Energy Framework; Green Button; Case Studies in ITCA/IPRM
- **Thursday, November 7**
  - Ensuring AMI and Outage Management Success through Interoperability
  - Building an Interoperability Roadmap; Microgrids; Sensors, Data and Internet of Things

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Hot Industry Topics

- **Microgrids**: Resilient and Reliable Power Systems
- **Utility perspectives** for building resiliency
- Release of **Transactive Energy Framework** by GridWise® Architecture Council
- Industry perspectives on Smart Grid **interoperability standards**
- Executive Order 13636, Improving Critical Infrastructure **Cybersecurity**
- **Keynotes** from industry experts
  - Lisa Edgar, NARUC
  - Tom Gross, Eaton
  - Philip Hanser, The Brattle Group
- **Green Button Initiative**: Implementation Successes and Challenges
- Standards **Navigation Tool** Demonstrations
- Face-to-face working group sessions
- International perspectives regarding **Smart Grid implementations**
- **Future Look: Sensors, Big Data and the Internet of Things**

Keynotes

Thomas Gross
Vice Chairman and COO
Electrical Sector, Eaton

Lisa Polak Edgar
Commissioner,
Florida Public Service
Commission, NARUC

Philip Hanser
Principal,
The Brattle Group

Hank Kenchington Deputy Assistant Secretary,
Advanced Grid Integration, Department of Energy

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Discussion

SGIP
Power of Interoperability

Patrick J. Gannon
President & Executive Director
+1 941 357 6224
Patrick.Gannon@sgip.org
www.sgip.org