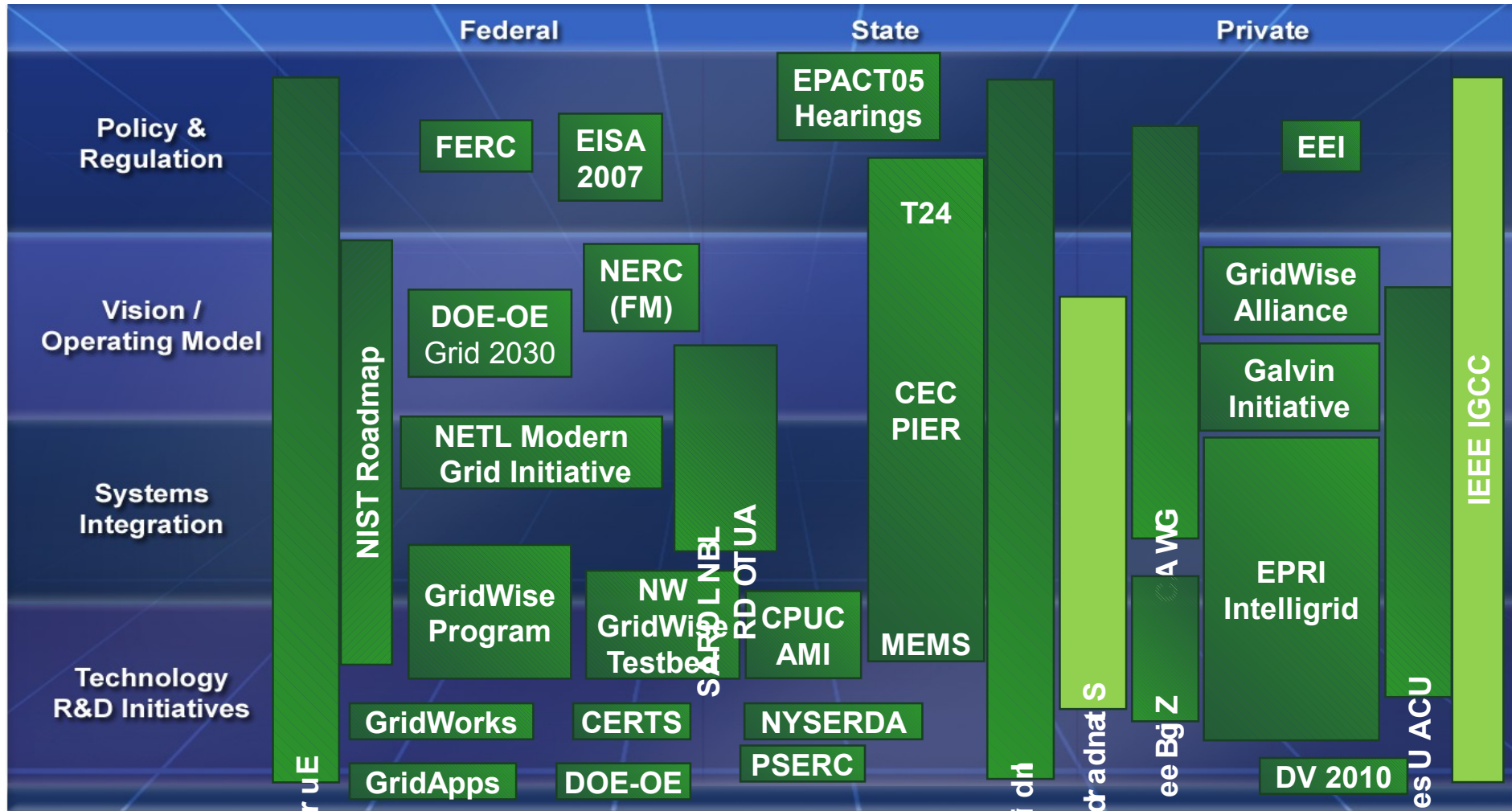


# **IEEE Smart Grid Activities**

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# Smart Grid Activities – Many Players



# IEEE Smart Grid

Organizes, coordinates, leverages and builds upon the strength and experience of all IEEE entities

Provides thought leadership and coordination for the global smart grid movement

- Unmatched diversity of expertise

- Unbiased in nature

- Proven standards-development process

- Stability and global reach

- Comprehensive education programs to share best practices, publish developments, provide intelligence

# IEEE Smart Grid Web Portal

## IEEE Smart Grid



**IEEE Smart Grid News:**

- 11 January 2010  
IEEE lays groundwork for adoption of DNP3 Protocol as new IEEE standard
- 10 January 2010  
First IEEE SmartGridComm 2010 will take place Oct 4-6, 2010 at NIST, Gaithersburg, MD
- 07 January 2010  
IEEE marks major milestones in advancement of P1901 Draft Standard for Broadband Over Power Line networks
- 09 January 2010  
IEEE engages manufacturers of Home Appliances and Smart Meters in discussions on Smart Grid Standards at International CES 2010, Las Vegas

**Upcoming Events:**

- 19 JAN  
IEEE PES Conference on Innovative Smart Grid Technologies
- 26 JAN  
IEEE P2030 Working Group Meeting
- 23 MAR  
IEEE International Symposium on Power Line Communications
- 28 MAR  
2010 Asia-Pacific Power and Energy Engineering Conference (APPEEC)

**Conferences**  
IEEE annually hosts nearly 1,000 conferences and meetings throughout the world where information and best practices are exchanged. [Learn More](#)

**Smart Grid Spotlight**  
John McDonald  
IEEE Fellow  
In July 2009, IEEE Fellow and GE Energy Transmission & Distribution marketing general manager, John McDonald, and several IEEE members participated at FORTUNE magazine's prestigious FORTUNE Brainstorm. [Learn More](#)

**Featured Articles**  
**THE SMART GRID**  
Taking the latest in computing and communications technology to make the electrical system more interactive, efficient, and robust is not a new idea. What's new is that suddenly more than 10 billion federal dollars are being poured into it. [Learn More](#)

**View all IEEE Videos**  
**A Smart Grid for Intelligent Energy Use...**  
★★★★★  
Our future is in the smart grid that will enable consumers to save money by controlling their use of energy. An 8-minute video, "A Smart Grid for Intelligent Energy Use," explains the smart grid and its importance for reducing our carbon footprint. According to the leading engineers, business leaders and public policy experts interviewed at the 2008 IEEE Energy 2030 Conference, significant energy savings will result from the use of communications and computing technology to improve electricity transmission and distribution. [Read more.](#)

**TOP Publications**  
**Smart Grid**  
**Grid of the future**  
Article # 4787536  
Many believe the electric power system is undergoing a profound change driven by a number of needs. There's the need for environmental compliance and energy conservation. [Read more.](#)

**NIST Smart Grid Framework**  
Bulk Generation  
Transmission  
Distribution  
Customer  
Operations  
Markets  
Service Provider

**Resource Center**  
Contact  
Sitemap  
Get Involved

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- A consolidated gateway to smart grid intelligence, education and news
- Features IEEE multi-disciplinary coordination and expertise
- Created specifically for anyone interested in smart grid
  - Manufacturers
  - Policymakers
  - Educators
  - Governments
  - Researchers

<http://smartgrid.ieee.org/>

# IEEE Smart Grid: Standards

■ ~100 standards spanning smart grid spectrum

■ Examples:

- **IEEE C37.118:**

- Synchronized phasor measurements

- **IEEE 1686:**

- IEEE Standard for Substation Intelligent Electronic Devices (IEDs) Cyber Security Capabilities

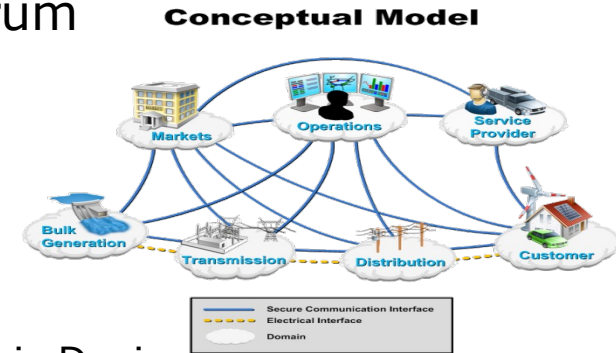
- **IEEE P2030:**

- creating a guide for smart grid interoperability that sets the stage for future standards making

- **IEEE P1815:**

- fast-tracking adoption of DNP3 as an IEEE standard to promote interoperability, strengthen security and maintain compatibility

■ Coordinating with NIST and other Standards Development Organizations (SDOs)



# IEEE Smart Grid: Transactions

- IEEE has ~2,500 smart grid papers in 40 journals
- Creating new, multi-disciplinary scientific journals
  - **IEEE Transaction on Smart Grid**
    - Editor-in-Chief is Mohammad Shahidehpour
    - First issue is June, 2010
  - **IEEE Transaction on Sustainable Energy**
    - Editor-in-Chief is Saifur Rahman
    - First issue in April, 2010
- Dedicated to disseminating smart grid and sustainable energy research and implementation strategies
  - Four releases annually for each transaction
  - Visit <http://mc.manuscriptcentral.com/pes-ieee>

# IEEE Smart Grid: Conferences

- IEEE hosts ~1,000 events throughout the world annually
- Consolidated calendar of IEEE smart grid conferences is included on the IEEE Smart Grid Web Portal

- Selected recent and upcoming IEEE events:

	Starting
- P2030 Working Group Meeting	Jan 23
- 2010 Asia-Pacific Power And Energy Engineering Conf	Mar 28
- International Symposium On Power Line Communications	Mar 23
- Transmission & Distribution Conference & Exposition	April 19
- PES General Meeting	July 25
- SmartGridComm 2010	Oct 4
- Please visit and post IEEE smart grid conferences
  - <http://smartgrid.ieee.org/>



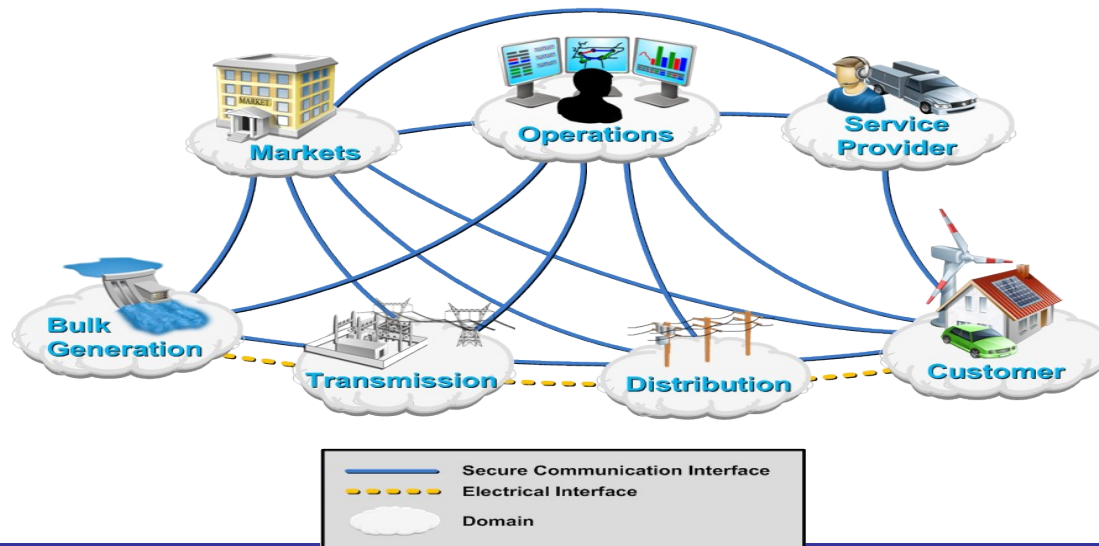
# IEEE PES Smart Grid Activities

PES is involved in all aspects of the “smart grid” through our various committees

At least one committee of PES addresses each domain of the NIST conceptual model

Not all are engaged in the Smart Grid overtly (yet), but all are aware and looking forward

## Conceptual Model





# Smart Grid Activities - Generation

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PE/ED&PG 1595 Standard for Quantifying Greenhouse Gas Emission Credits from Small Hydro and Wind Power Projects and for Grid Baseline Conditions

PE/ED&PG 1797 Guide for Design and Application of Solar Technology in Commercial Power Generating Stations

Many of the generation standards are focused on the nuts and bolts of the equipment, but the equipment is changing.

These standards projects address new concerns and new technologies that will certainly play a part in the Smart Grid

# Smart Grid Activities - Transmission

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PE/PSACE 859 IEEE Standard Terms for Reporting and Analyzing Outage Occurrences and Outage States of Electrical Transmission Facilities

PE/PSC 1138 Standard for Testing and Performance for Optical Ground Wire (OPGW) for use on Electric Utility Power Lines

PE/PSR C37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels

PE/1686 – Standard for Substation Intelligent Electronic Devices Cybersecurity Capabilities

We found much more than a slide-full of standards from the Committees related to transmission.

Standards for capacitors, short circuit limiters, and harmonic filters are all players in the Smart Grid game

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# Smart Grid Activities - Distribution

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PE/SUB 1613 IEEE Standard Environmental and Testing Requirements for Communications Networking Devices in Substations

PE/SUB 1402 IEEE Guide for Electric Power Substation Physical and Electronic Security

PE/T&D 1366 IEEE Guide for Electric Power Distribution Reliability Indices

The Substations Committee is active in standards related to the Smart Grid

These are examples, the list is longer

# Smart Grid Activities – T&D

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PE/SWG C37.10 IEEE Guide for Diagnostics and Failure Investigation of Power Circuit Breakers

PE/SWG C37.10.1 IEEE Guide for the Selection of Monitoring for Circuit Breakers

PE/SB 1679 Recommended Practice for the Characterization and Evaluation of Emerging Energy Storage Technologies in Stationary Applications  
Switchgear, Transformers, even Stationary Batteries are now participants in the Smart Grid

# Smart Grid Activities - Consumer

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IEEE 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems

PE/T&D 1250 Guide for Identifying and Improving Voltage Quality in Power Systems

IEEE 1159 – Recommended Practice for Monitoring Power Quality

PE/PQ IEEE 1159.3 – Recommended Practice for Transfer of Power Quality Data

PE/PSR C37.95 Guide for Protective Relaying of Utility-Consumer Interconnections

# Smart Grid Activities - Operations

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PE/SUB C37.1 IEEE Standard for SCADA and Automation Systems

PE/PSR C37.118 Standard for Synchrophasors for Power Systems

P1601 Standard for Optical AC Current and Voltage Sensing Systems

The Analysis and Power System Communications committees are active in Smart Grid work

Communicating data and interpreting the information provided is basic to the Smart Grid

# Intelligent Grid Coordinating Committee

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## A PES Coordinating Committee

This committee addresses the technologies that apply to activities within the IEEE PES, identify opportunities for their future applications, and provide a forum for the free exchange of information.

Rather than duplicate other ongoing efforts, the focus here is to make sure that the IEEE-PES point of view is seen, heard, and utilized in implementing grid modernization.

Note that Smart Grid involves more than applying communications or any one specific technology to the grid – it is a multidisciplinary, systems of systems engineering issue

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# PES IGCC – Scope and Tasks

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Develop a web based repository of summaries of standards and best practices (IEEE, IEC, IETF, etc.) that are key to grid modernization

Interact with other organizations or groups that are doing grid modernization research and early implementations, and get their input as to what standards may be needed in the future

Instantiate working groups if needed to fill gaps in standardization after careful review

Provide input to DOE and NIST to support grid modernization and the Energy Independence Act of 2007 [Sec 1305. (a)(2)]

# PES Smart Grid Activities - Summary

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PES committees have been involved in creating standards for the Smart Grid since well before the “Smart Grid” term was established

We have a great foundation for the Smart Grid, built upon the expertise of the leaders in their fields.

One of the upcoming challenges is to break the expertise out of the silos and create the “system of systems” that will make the Smart Grid work.

We have all been challenged to make it happen faster

As we saw earlier, we have to work across the boundaries to make the systems work

# PES Smart Grid Activities - Summary

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PES has many existing standards and authorized projects relevant to applications that qualify as Smart Grid

A database that captures all of this information, scopes, technical attributes, NIST domains and other relationships is required

Individual committees, subcommittees, and their working groups generally work independently of each other – there is an opportunity for cross committee collaboration

PES is an active participant in the NIST roadmap process to improve existing standards and develop new ones

# Conclusion

■ Through IEEE Smart Grid, all IEEE stakeholders are coming together under one umbrella to become:

- The leader in the Smart Grid movement
- Number one resource for enabling Smart Grid technologies
- THE place for smart grid information and collaboration

