



**IEEE PES SF Chapter presents:**  
**Electric Grid Modernization**  
**(Smart Grid)**  
**Current Standards Development**  
**& Cyber Security Work**

**Introduction by**

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**October 17, 2011**





- Introductions
- Emergency Evacuation Information
- Workshop Logistics (Restrooms, etc)
- Background & Related Information:
  - U.S. Smart Grid Policy
  - California Smart Grid Policy
  - California's SG Deployment Plans





# Energy Independence & Security Act (EISA) 2007

## U.S. ELECTRICITY GRID MODERNIZATION (Smart Grid) POLICY

- Support the modernization of the Nation's electricity T&D system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve each of the following, which together characterize a ***Smart Grid***:





# U.S. Smart Grid Policy

- 1) Increased use of **digital information and controls technology** to improve reliability, security, and efficiency of the electric grid.
- 2) **Dynamic optimization** of grid operations and resources, with full cyber-security.
- 3) Deployment and integration of **distributed resources and generation, including renewable resources.**
- 4) Development and incorporation of **demand response, demand-side resources, and energy-efficiency resources.**





# U.S. Smart Grid Policy

- 5) Deployment of `smart' technologies (**real-time, automated, interactive technologies** that optimize the physical operation of appliances and consumer devices) for **metering, communications** concerning **grid operations and status**, and **distribution automation**.
- 6) Integration of `smart' **appliances and consumer devices**.
- 7) Deployment & integration of **advanced electricity storage & peak-shaving technologies**, including **plug-in electric & hybrid electric vehicles**, & **thermal-storage air conditioning**.





# U.S. Smart Grid Policy

- 8) Provision to **consumers** of **timely information and control options**.
- 9) Development of **standards** for **communication and interoperability** of **appliances and equipment** connected to the electric grid, **including the infrastructure serving the grid**.
- 10) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.





# California Smart Grid Policy

## (Senate Bill 17 - October 11, 2009)

Almost identical to US EISA 2007 Smart Grid Policy with few additions:

- Modernization to also maintain “safe” and “efficient” electrical service;
- Requires dynamic optimization of grid operations & resources to include *appropriate consideration for **asset management & utilization** of related grid operations & resources*;
- Requires “cost-effective” technologies, devices & cyber-security (term added seven (7) times!!!).





# CA SB 17 – Standards & Protocols

- The commission shall institute a rulemaking or expand the scope of an existing rulemaking to adopt standards and protocols to ensure functionality and interoperability developed by public and private entities, including, but not limited to, the National Institute of Standards and Technology, Gridwise Architecture Council, the International Electrical and Electronics Engineers, and the National Electric Reliability Organization recognized by the Federal Energy Regulatory Commission.





# SG Deployment Plans (SGDPs)

- California legislatively (SB 17) required that CA utilities develop Smart Grid Deployment Plans.
  - CPUC established requirements in June 2010 for SCE, PG&E and SDG&E Deployment Plan filings.
  - Requirements included Vision, Baseline, Strategy, Grid & Cyber Security Strategy, Roadmap, Cost Estimates, Benefit Estimates & Metrics.
  - More information on SGDP requirements in CPUC Rulemaking R-08-12-009 and Decision D.10-06-047.
  - Decision D.10-06-047: “We agree with SCE that the Commission should act in parallel with FERC to adopt Smart Grid standards as NIST achieves consensus. We will defer until that time to adopt Smart Grid standards and protocols.”
  - <http://www.cpuc.ca.gov/PUC/energy/smartgrid.htm>





# Standards, Protocols & Guidelines

- National standard setting bodies and other public and private entities, including the NIST, Gridwise Architecture Council, the International Electrical and Electronics Engineers, and the National Electric Reliability Organization recognized by FERC are in the process of developing standards and protocols for the Smart Grid.
- One way to lower unnecessary barriers is for California's Smart Grid deployment to follow national standards and guidelines for interoperability and incorporate national communication protocols.





# SGDP Roadmap

- A Smart Grid Roadmap can show how a proposed deployment of infrastructure can aid California in meeting the deadlines adopted in legislation for renewable energy projects and other energy-related environmental policies, such as those pertaining to green house gases, energy efficiency, demand-side management, and demand response.





# CPUC Conclusions

- It is reasonable and consistent with SB 17 to defer consideration of standards and protocols for the Smart Grid until further action by NIST, Gridwise Architecture Council, the International Electrical and Electronics Engineers, and the National Electric Reliability Organization recognized by the Federal Energy Regulatory Commission.
- It is reasonable for the Commission to defer the adoption of Smart Grid standards and protocols until NIST achieves consensus on specific standards.





# Eleven CA SG Policy Goals

- a. Be self-healing and resilient;
- b. Empower consumers to actively participate in the operations of the grid;
- c. Resist attack;
- d. Provide higher quality of power and avoid outages;
- e. Accommodate all generation and energy storage options;
- f. Enable electricity markets to flourish;
- g. Run the grid more efficiently;
- h. Enable penetration of intermittent power generation sources;
- i. Create a platform for deployment of a wide range of energy technologies and management services;
- j. Enable and support the sale of demand response, energy efficiency, distributed generation, and storage into wholesale energy markets as a resource, on equal footing with traditional generation resources; and
- k. Significantly reduce the total environmental footprint of the current electric generation and delivery system in California.





# CPUC SGDP Strategy Requirement

- The Smart Grid Strategy section must also consider how interoperability standards will be used and how the utility will minimize the risk of stranded costs in cases where consensus standards are evolving.





# SDG&E, PG&E & SCE SGDPs

- SDG&E, PG&E and SCE complied & filed their SGDPs.
- For SDG&E's SGDP, see Application filed on June 6, 2011 at: <http://docs.cpuc.ca.gov/published/proceedings/A1106006.htm>
- For PG&E's SGDP, see Application filed on June 30, 2011 at: <http://docs.cpuc.ca.gov/published/proceedings/A1106029.htm>
- For SCE's SGDP, see Application filed on July 1, 2011 at: <http://docs.cpuc.ca.gov/published/proceedings/A1107001.htm>
- To access all filed documents related to all three utilities' SGDPs, see SDG&E's SGDP link as the CPUC has consolidated all into one rulemaking.
- Anyone can subscribe to receive updated filings.
- Parties may file comments on the Smart Grid Deployment Plans by October 24, 2011.





**Please feel free to contact me for more info.**

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