U.S. Department of Energy

Office of Electricity Delivery and Energy Reliability

Smart Grid Activities at the Department of Energy

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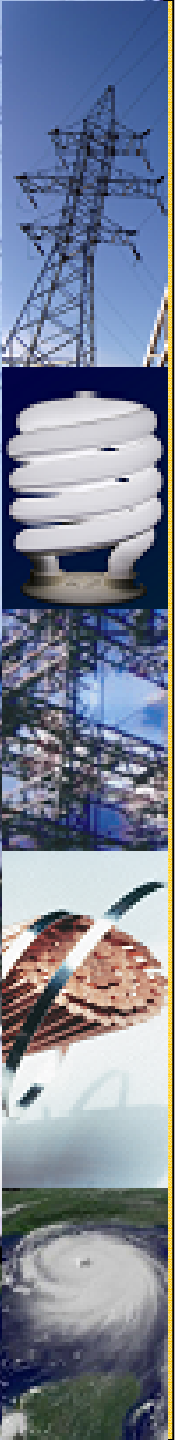
June 28, 2010

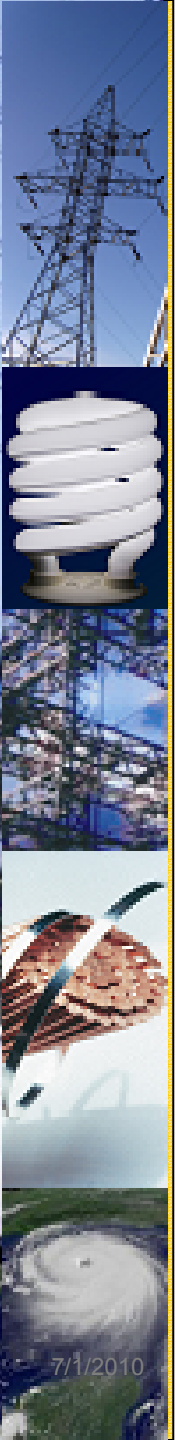


"We'll fund a better, smarter electricity grid and train workers to build it… "

President Barack Obama

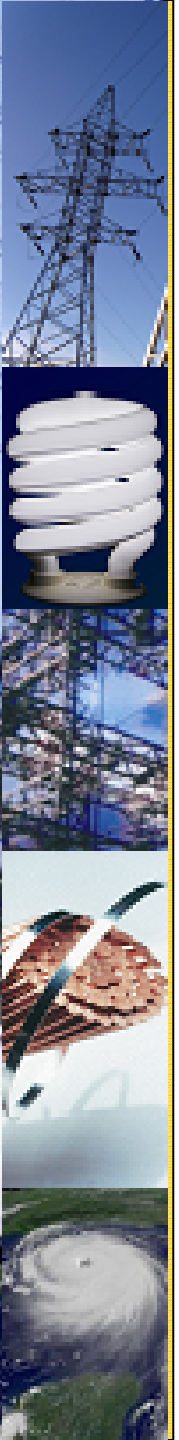
"To meet the energy challenge and create a 21st century energy economy, we need a 21st century electric grid"

DOE Secretary Chu
GridWeek, September 2009



Smart Grid: A National Priority

- The Energy Independence and Security Act ("EISA") of 2007established "modernization of the nation's electricity transmission and distribution system" as a U.S. policy goal.
- EISA required DOE, among other things, to:
  - Establish a Smart Grid Advisory Committee
  - Establish a Smart Grid Task Force
  - Submit to Congress a report concerning the status of Smart Grid systems deployments
  - Establish a Smart Grid regional demonstration initiative showcasing advanced technologies

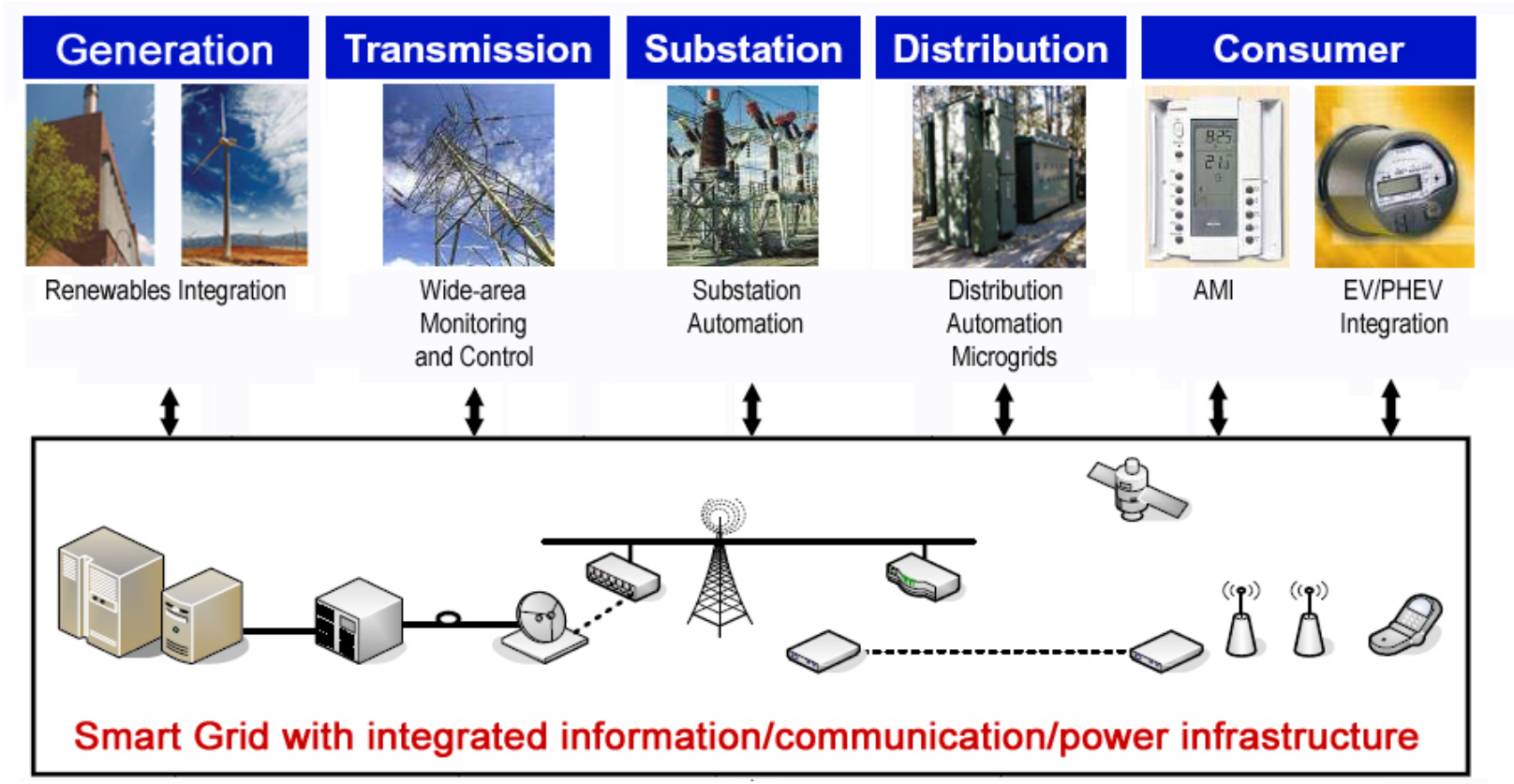


What is the Smart Grid?

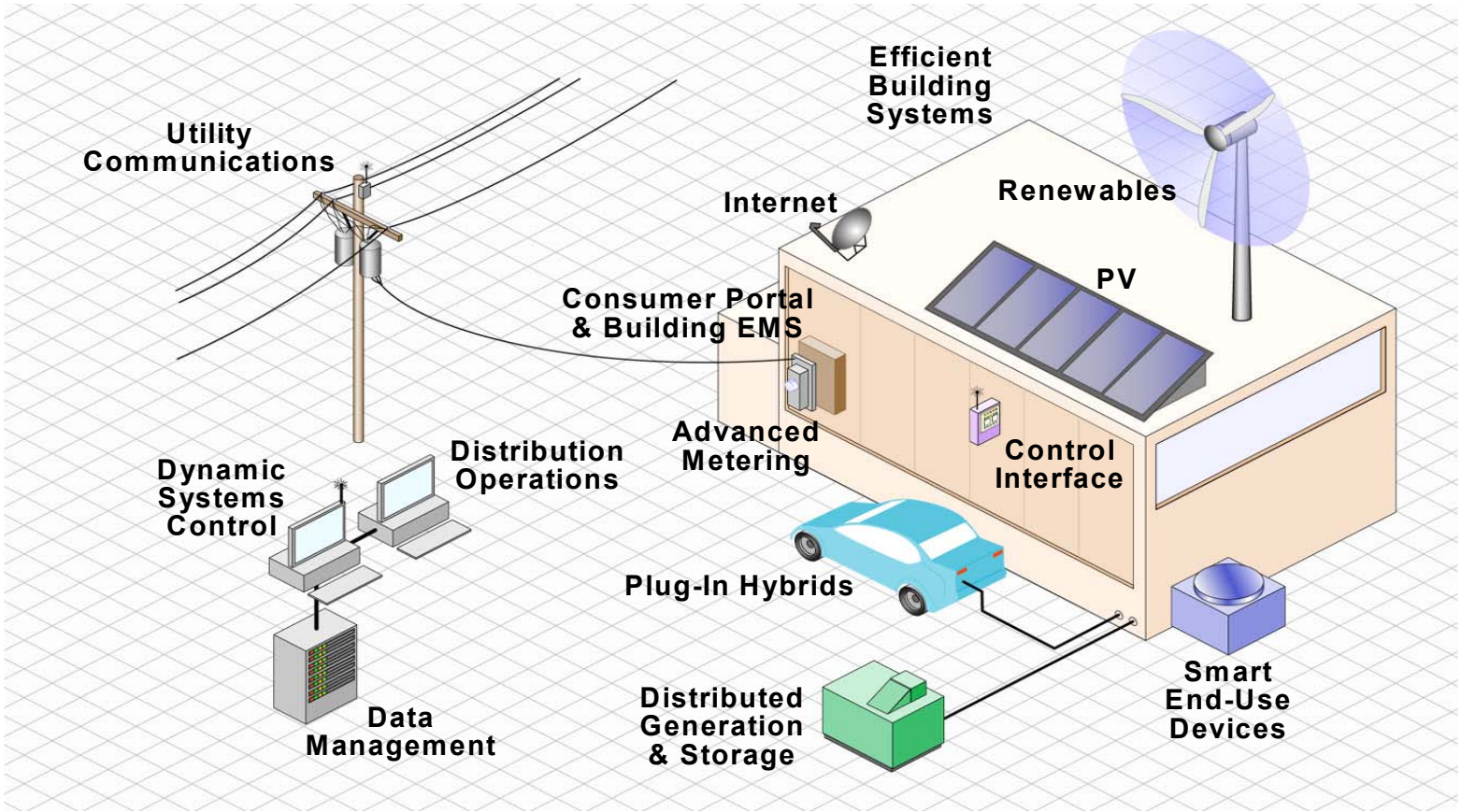
The Smart Grid isn't a "thing" but rather a "vision" and is defined by its characteristics. The Smart Grid will:

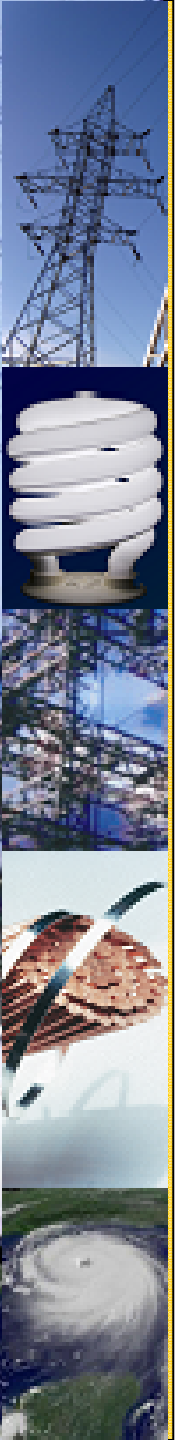
- Enable active participation by consumers.
- Accommodate all generation and storage options.
- Enable new products, services and markets.
- Provide power quality for the digital economy.
- Optimize asset utilization and operate efficiently.
- Anticipate & respond to system disturbances (self-heal).
- Operate resiliently against attack and natural disaster.

Smart Grid Enables Dynamic Optimization of Grid Resources and Operations



Smart Grid Enables Consumer Participation and Demand Response

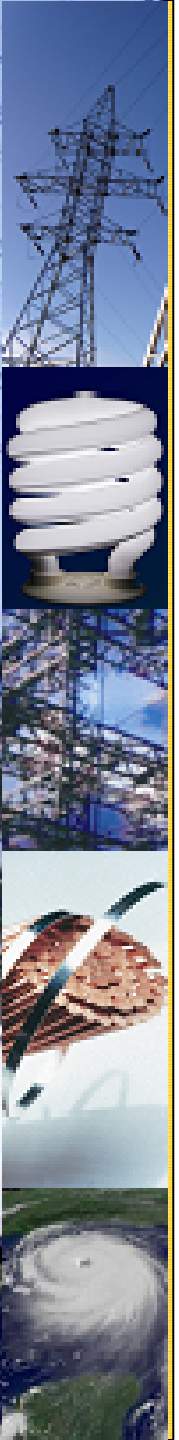




How will the Smart Grid differ from today's grid?

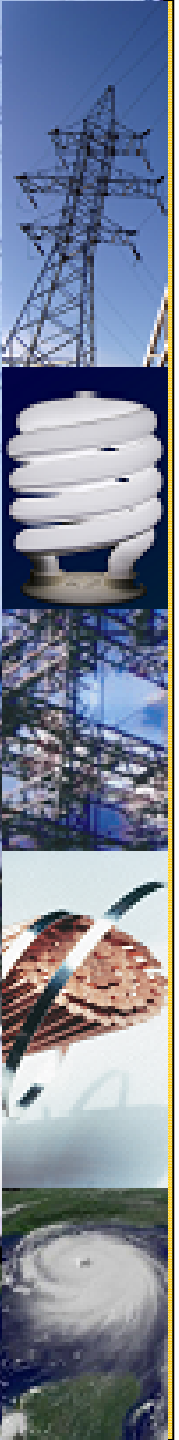
Three Fundamental Differences

- Incorporates both a centralized and decentralized supply and control model.
- Provides for two-way power flow.
- Provides for two-way information flow.



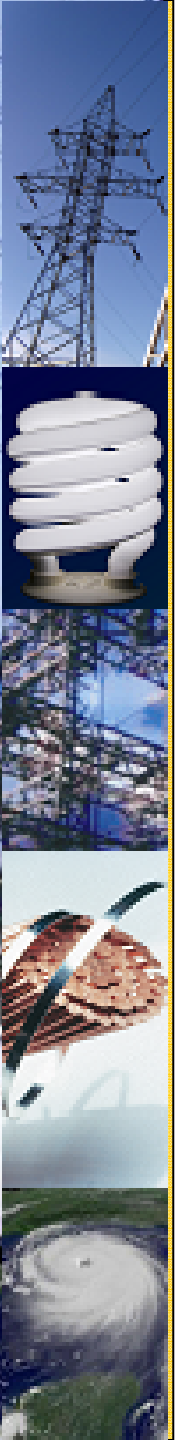
Who will benefit from the Smart Grid?

- Utilities
  - Benefit from cost reductions e.g. reduced O&M
  - Enhanced system reliability
  - Improved customer service
  - More efficient planning and maintenance of system
- Consumers
  - Control over energy use and monthly bills
  - Improved reliability
  - Improved customer service
  - Support for in-home networking
- Society at large
  - Possible reduction in carbon emissions
  - Reduced need for power plants
  - Infrastructure that can support variable renewable generation
  - Infrastructure that can support PHEV



American Recovery and Reinvestment Act *Jumpstarts* Smart Grid

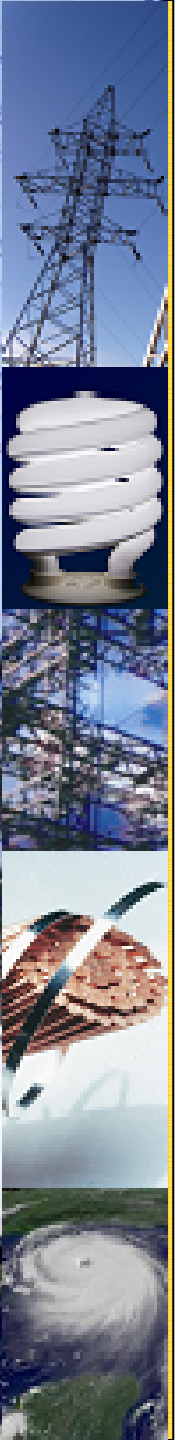
Office of Electricity Delivery and Energy Reliability	$ Millions
Smart Grid Investment Grant (SGIG) Program; ≤3 years	$3,400
Smart Grid Demonstrations; 3-5 years	$615
Interoperability Framework Development by NIST	$10
Workforce Development	$100



ARRA Smart Grid Investment Grants

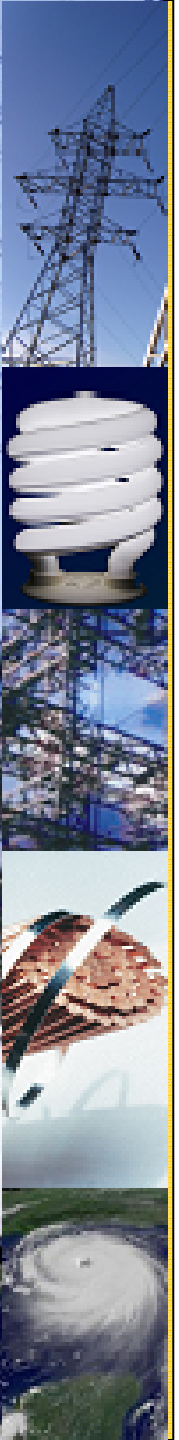
Transform Electricity Delivery

Smart Grid Systems and Equipment	Numbers of Units (self-reported estimates)	Improvements	Impacts
Networked Phasor Measurement Units	877	• *Near-nationwide coverage* • *6X the 166 existing networked PMUs*	***Enhanced situational awareness and electric system reliability and resiliency***
Smart Transformers	205,983	• *Enables preventative maintenance*	
Automated Substations	671	• *5% of 12,466 transmission and distribution substations in the U.S.*	
Load Control Devices	176,814	• *Enables peak demand reductions*	***1444 MWs of peak demand reduction per year*** *(self-reported estimates)*
Smart Thermostats	170,218	• *Enables peak demand reductions*	
Smart Meters	18,179,912	• *13% of the 142 million customers in the U.S.*	***Transformational changes in consumer behavior and energy consumption***
In-Home Display Units	1,183, 265	• *Enables customer empowerment*	
PHEVs/Charging Stations	12/100	• *Accelerates market entry*	***Begins the path toward energy independence***



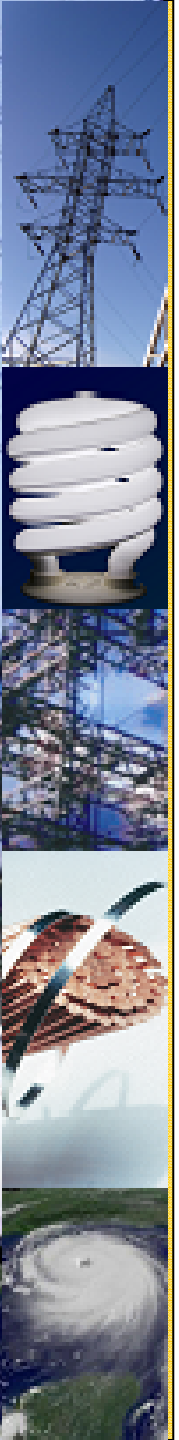
ARRA Smart Grid Activities in Missouri

- City of Fulton $1.5m Smart Grid Investment Grant to the to replace 5,000 meters with a smart meter network that includes a dynamic pricing program.
- KCP&L was awarded a Smart Grid Demonstration Project grant of almost $24m for Kansas City's Green Zone Impact Project.
- Boeing in St. Louis was awarded a Smart Grid Demonstration Project grant of $8.5m to demonstrate advanced smart grid software technology with military-grade cybersecurity for improving regional transmission system planning and operation.
- Ameren Services Company was awarded a Smart Grid Work Force training grant of $3.5m for training in three smart grid areas: Advanced Data Management Systems; new Graphic Information System functionality; and other smart devices for the electric distribution system.
- St. Louis Community College was awarded a Smart Grid Work Force training grant for a $82k to implement a pre-employment program in collaboration with Ameren, to address the necessary critical skills and technical expertise needed in the energy industry.



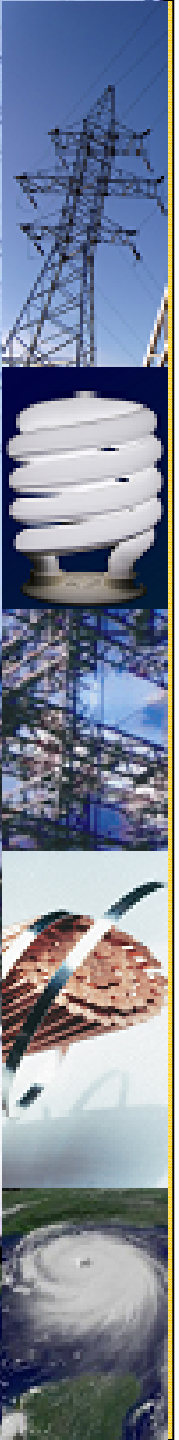
National Broadband Plan and Smart Grid

- In early 2009, Congress directed the Federal Communications Commission ("FCC") to create the National Broadband Plan ("NBP") that was released in early 2010. www.broadband.gov/plan/
- NBP has specific recommendations regarding the Smart Grid and directs the DOE to:
  - Consider consumer data accessibility when evaluating Smart Grid grant applications.
  - Report on States' progress toward enacting consumer data access policies.
  - Provide States guidance regarding data access policies.



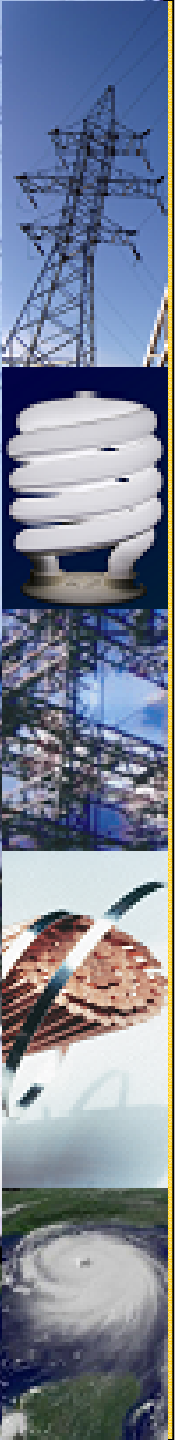
DOE Response to National Broadband Plan

- On May 11, 2010, DOE issued a request for information seeking comments regarding access to energy consumption information and privacy among other issues.
- The request for information asks for responses to the following questions that should be of interest:
  - Who owns energy consumption data?
  - Who should be entitled to privacy protection relating to energy information?
  - What, if any privacy practices should be implemented in protecting energy information?
  - Should consumers be able to opt in/opt out of smart meter deployment or have control over what information is shared with utilities or third parties?
  - What mechanisms should be made available to consumers to report concerns or problems with smart meters?
  - How do policies and practices address the needs of different communities, especially low-income rate payers or consumers with low literacy or limited access to broadband technologies?
  - Initial comments are due July 12, 2010. http://www.gc.energy.gov/documents/Natl_Brdband_Data_Access.pdf



Smart Grid Subcommittee of the White House Office of Science and Technology Committee on Technology

- The Subcommittee will articulate a vision for smart grid technology and the core priorities and opportunities for the development of the Smart Grid.
- The Subcommittee will facilitate a strong, coordinated effort across federal agencies to develop Smart Grid policy.
- The Subcommittee will prepare a report for the NSTC's Committee on Technology that articulates a vision for the smart grid, provides analysis about the social costs and benefits of the smart grid, identifies barriers to smart grid deployment, and makes policy recommendations.



Contact Information

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