Gifted and Possibly Brilliant—Smart Grid's Impacts on Low-Income Customers

Doug Micheel
Senior Advisor

National Energy and Utility Affordability Conference
San Antonio, Texas
June 15, 2010

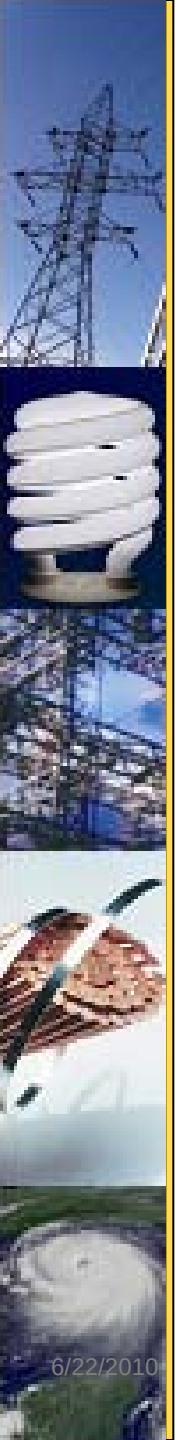
Plenary-1

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

President Barack Obama

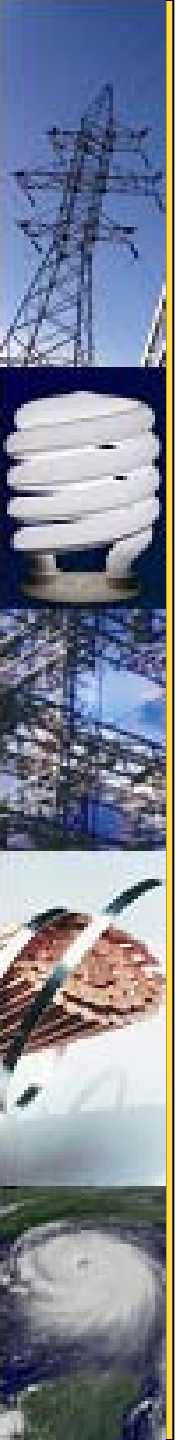
"To meet the energy challenge and create a 21st century energy economy, we need a 21st century electric grid"

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

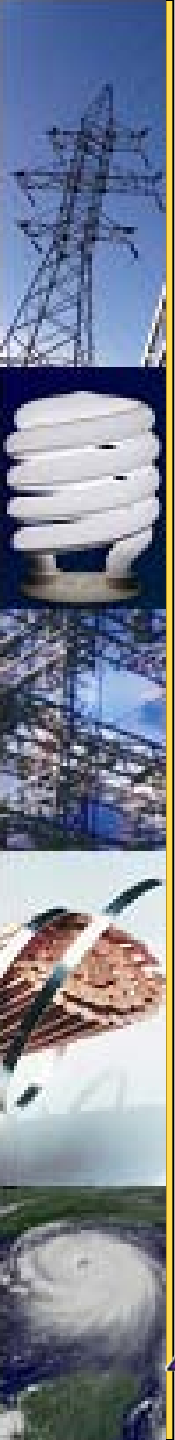


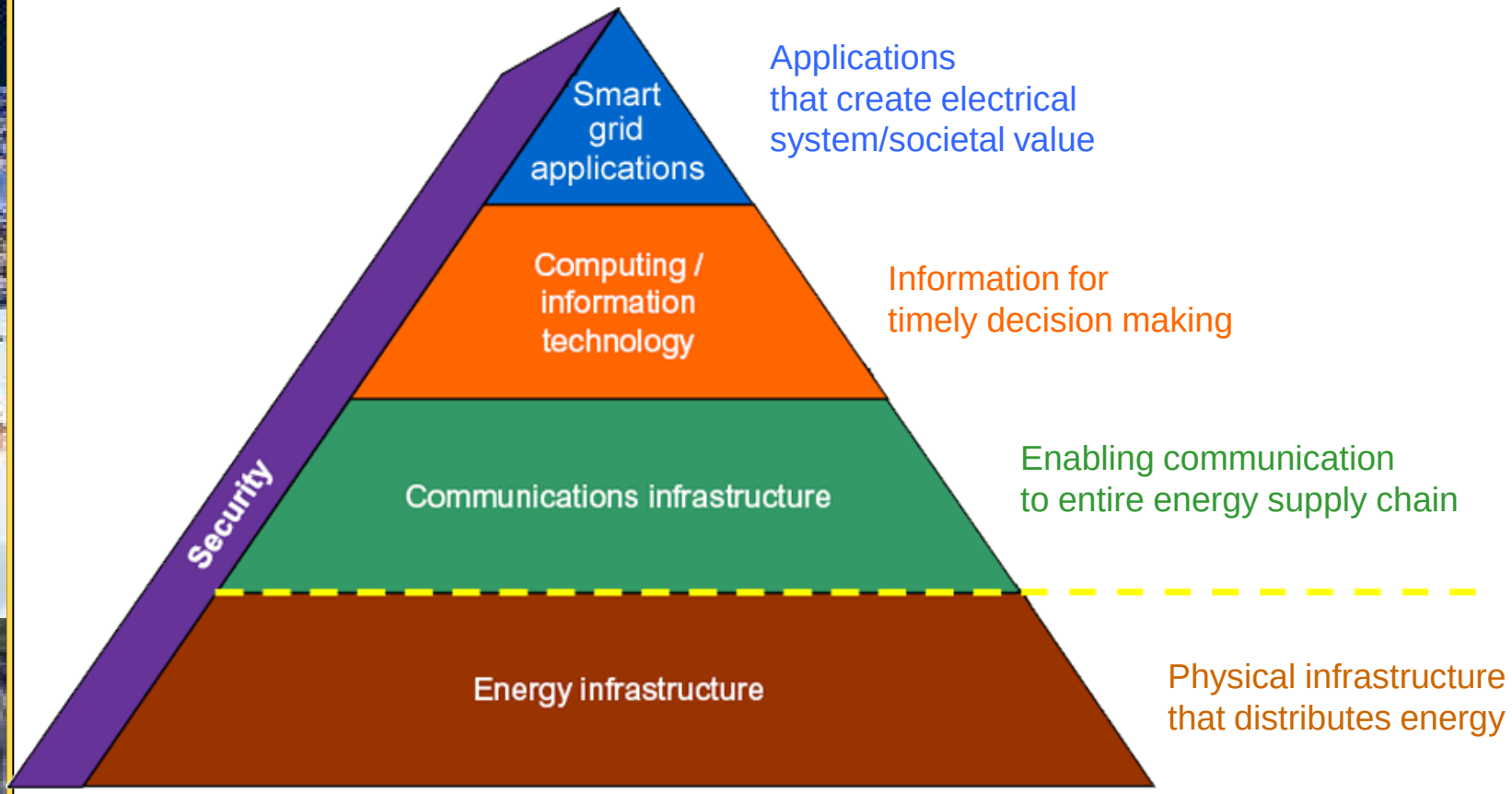
What is the Smart Grid?

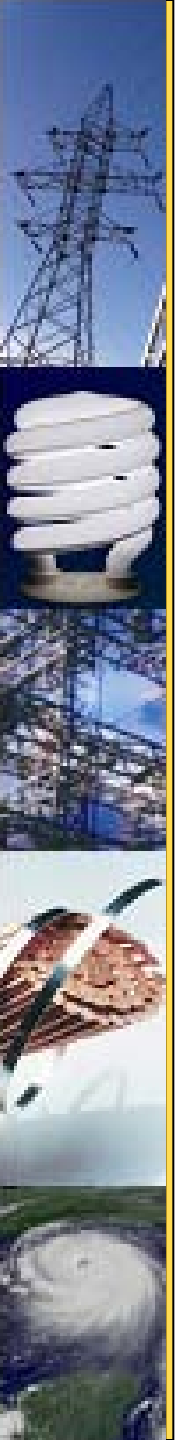
The Smart Grid isn't a "thing" but rather a "vision" and is defined by its characteristics. The Smart Grid will:

- 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 applies a systems approach to grid modernization



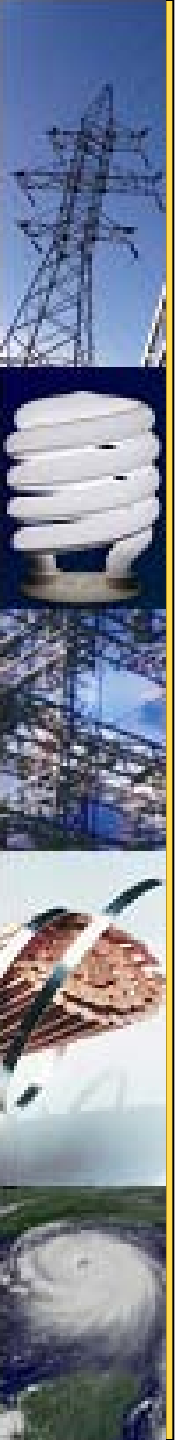




How will the Smart Grid differ from today's grid?

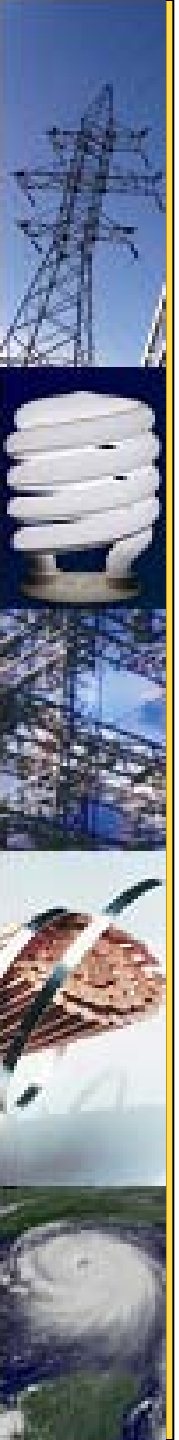
Three Fundamental Differences

- 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?

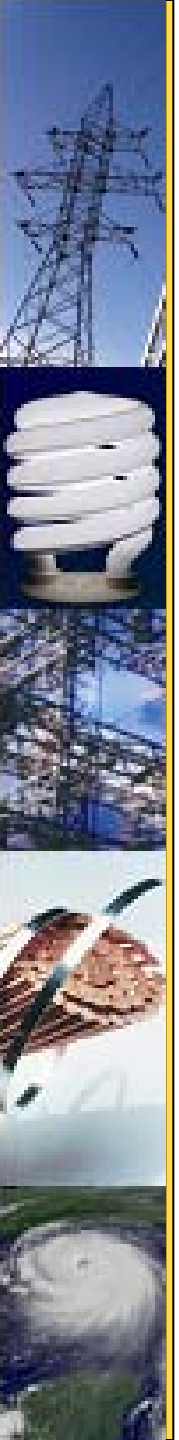
- Utilities
  - Benefit from cost reductions e.g. reduced O&M
  - Enhanced system reliability
  - Improved customer service
  - More efficient planning and maintenance of system
- Consumers
  - Control over energy use and monthly bills
  - Improved reliability
  - Improved customer service
  - Support 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



Low-Income/Elderly Consumer Benefits

- All of the benefits described for consumers.
- Reduced disconnection/reconnection costs.
- Relief of upward pressure on rates.
- Advanced Metering Infrastructure (AMI) offers low-income/elderly consumers the ability to participate in Dynamic Pricing and Time of Use rates offering possible reduced costs.
  - California pilot showed low-income customers reduced load, albeit less than other customers.
  - PG&E low-income customers signed-up for time-based rates at a much higher rate than other customers.

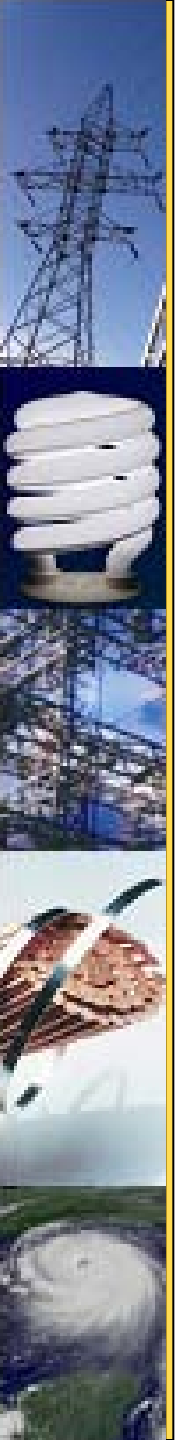
Source: Stephen S. George , Ph.D. CPUC presentation September 25, 2009



But…it raises potential issues for low-income consumers

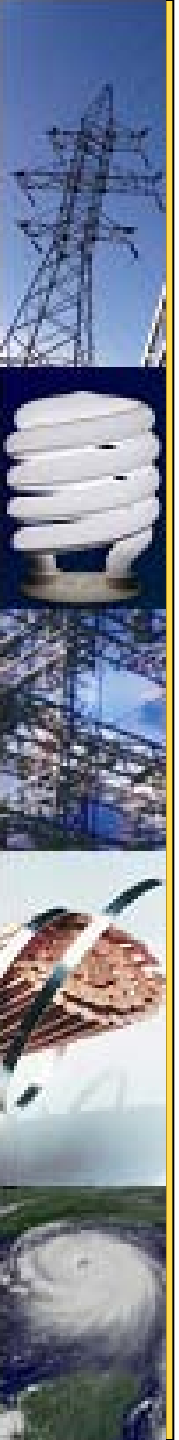
- Utility rates are increasing for a variety of reasons
  - Low-income customers already cannot afford utility service.

- Smart Grid is an enabler. It can “enable” both good and bad policies.
- Potential issues with AMI and Dynamic Pricing:
  - Low- income customers can not shift load because they do not have much load to begin with.
  - Low- income customers do not have the money to invest in enabling technologies.
  - Low- income customers do not have money to pay the AMI metering charge.
  - Possible disconnection issues.



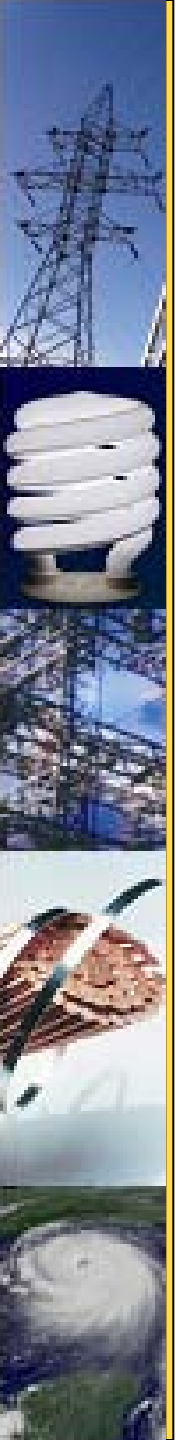
State regulatory policies enacted or that have been suggested for low-income customers

- Dynamic and time-based programs (rebate programs as well) could be optional for low-income customers.
- AMI metering costs could be waived for low-income consumers.
- Make AMI metering fee volumetric, which favors low users.
- Provide low-income customers a discount on the monthly bill.
- Low-income customers could receive rebate coupons for purchase of smart grid applications e.g. HDTV converter rebate program.
- Most, if not all, states require that utility investments be prudent.



American Recovery and Reinvestment Act *Jumpstarts* Smart Grid

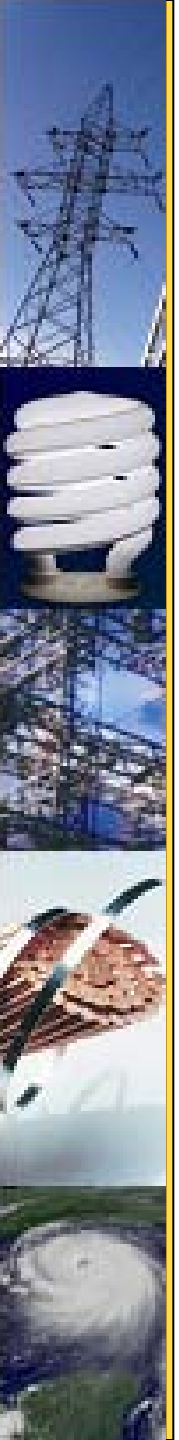
Office of Electricity Delivery and Energy Reliability	$ Millions
Smart Grid Investment Grant (SGIG) Program; ≤3 years	$3,400
Smart Grid Demonstrations; 3-5 years	$615
Interoperability Framework Development by NIST	$10
Workforce Development	$100



ARRA Smart Grid Investment Grants

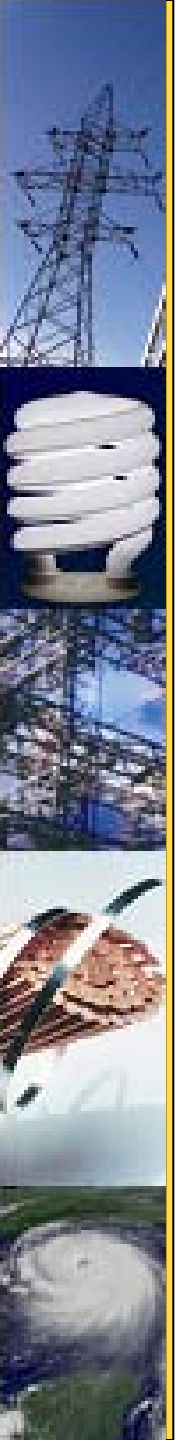
Transform Electricity Delivery

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*



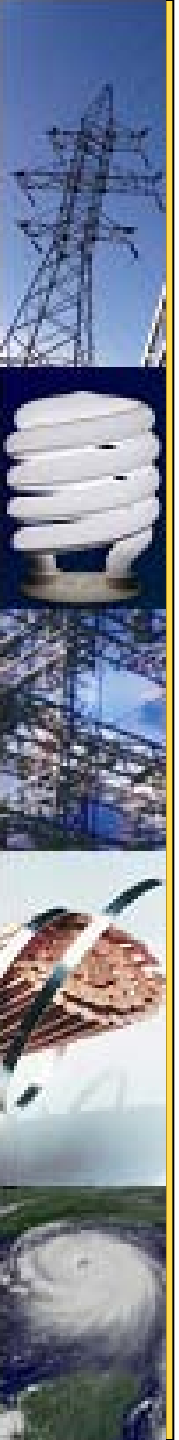
What does this mean for consumers, especially low-income consumers?

- Benefits (or detriments) of smart grid applications will be empirically identified.
- Several SGIG will specifically study consumer behavior.
- One SGIG grant, Entergy New Orleans, will focus on providing 11,000 residential smart meters and in-home display devices, coupled with dynamic pricing to low-income consumers.



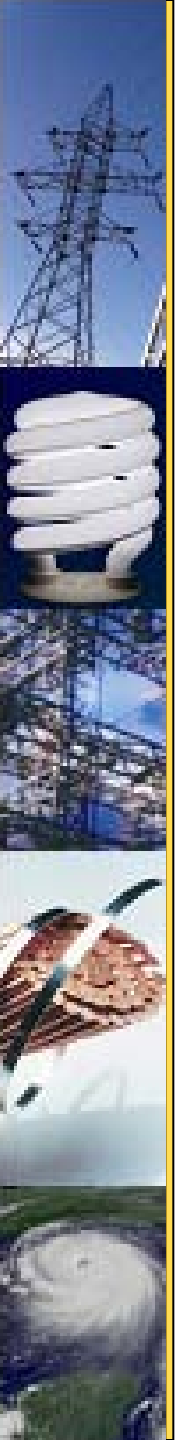
National Broadband Plan and Smart Grid

- 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 to low-income advocates:
  - 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



Contact Information

Doug Micheel
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
doulgas.micheel@hq.doe.gov