Energy Efficiency, Smart Policies, Smart Grid

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The Regulatory Assistance Project
About the Regulatory Assistance Project

- RAP is a non-profit organization providing technical and educational assistance to government officials on energy and environmental issues. RAP Principals all have extensive utility regulatory experience.
  - Richard Sedano was commissioner of the Vermont Department of Public Service from 1991-2001 and is an engineer.

- Funded by foundations, the US Department Of Energy & Environmental Protection Agency. We have worked in nearly every state and 16 nations.

- Also provides educational assistance to stakeholders, utilities, advocates.
Key Points

- Designing Smart Grid to support energy efficiency is important to climate policy
- Smart Grid vision presents a Market Transformation challenge
- Engaging the public is hard and worth doing
- Utility Incentives matter
Working Definition of the Smart Grid

The Smart Grid is an interconnected system of information and communication technologies and electricity generation, transmission, distribution and end-use technologies that will:

- enable consumers to manage their usage and choose the most economically efficient offering,
- maintain delivery system reliability and stability enhanced by automation, and
- use the most environmentally benign generation alternatives including renewable resources and energy storage.

Adapted from Roger Levy, Smart Grid Technical Advisory Project, Lawrence Berkeley National Laboratory.
### Goals and Characteristics of a Smart Grid

1. Increased use of digital information and controls technologies 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 incorporation of **distributed resources and generation, including renewable resources**.

4. Development and incorporation of **demand response, demand-side resources, and energy efficiency resources**.

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 and integration of advanced electricity storage and peak shaving technologies, including **plug-in electric and hybrid electric vehicles, and thermal storage air conditioning**.

8. Provision to **consumers of time information and control options**.

9. Development of **standards** for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure service the grid.

10. Identification and lowering of unreasonable or unnecessary **barriers** to adoption of smart grid technologies, practices, and services. *

*Energy Independence and Security Act of 2007 (EISA), Section 1301.
How can the Smart Grid Promote Energy Efficiency?

- Make energy efficiency deployment a fundamental design feature
  - Reform EM&V to use customized baselines
  - New program designs that use Smart Grid features, for example:
    - Continuous Building Commissioning
    - Reduced incremental costs for programs relying on communications and customer information
Another Way Smart Grid Can Promote Energy Efficiency

- Apply time based pricing
  - Associate with energy efficiency programs
  - Enable access to information for customers
  - Particularly useful for building controls

- Retail perspective of Smart Grid:
  - One Big Market Transformation Program!
Market transformation: key to making it work for folks

- What are customers to think of varying prices and all this information?
- Can better information about consumption change energy use by mass market customers?
- Aggressive two way public campaign
  - Expensive and essential to influence behavior
Is Retail Smart Grid One Big MT Program?

- Apply what we know about market transformation energy efficiency programs
  - Lasting, structural and behavioral changes
    - Engaging supporting market delivery channels
  - Resulting in increased adoption of EE
  - Overcome market barriers
    - Lack of awareness (or even resistance?)
    - Lack of information
    - Lack of advice on options to act
    - Lack of availability of products and services
How else can the Smart Grid Promote Energy Efficiency?

- Distribution Automation
  - Enables more precise, effective use of conservation voltage reduction
  - Reduce losses
Energy Efficiency Supports Climate Stabilization

- Smart Grid will enable shifting of demand
- Will that shift increase carbon emissions, or decrease them?
  - Hourly marginal emissions analysis will tell and should be part of smart grid deployment and any evaluation of demand shifting programs
  - Find out the MEA that applies to your market
And then come plug in hybrid vehicles

- PHVs seem to be coming
  - Big market transformation effort
- The U.S. has notice and a bit of a head start to get ready
  - Rate design
  - Distribution automation
  - Rules and incentives about charging rate, which affects peak everyone pays for
What Government Can Do

- Design in energy efficiency as fundamental to smart grid
  - Programs with a coherent plan for how customer behavior will change
- Build in a public campaign at an appropriate point in smart grid development to help customers of every type make use of the capabilities of the smart grid
- Deliver quality basic regulation as a basis
Thanks for your attention

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- RAP Mission: **RAP is committed to fostering regulatory policies for the electric industry that encourage economic efficiency, protect environmental quality, assure system reliability, and allocate system benefits fairly to all customers.**