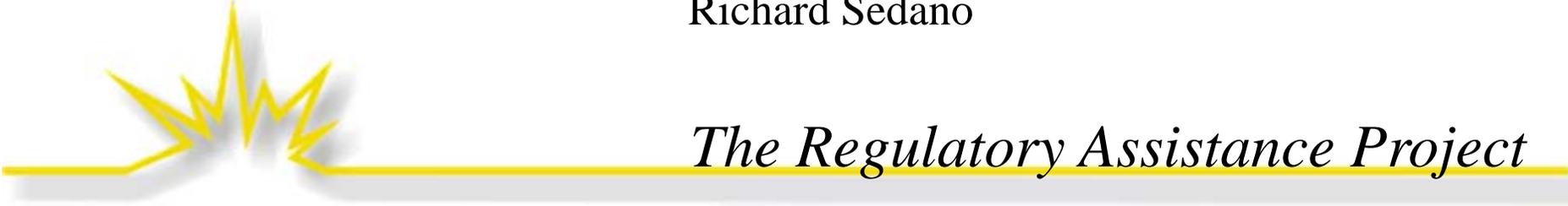


Energy Efficiency, Smart Policies, Smart Grid

ERE Committee, NARUC Summer Meeting

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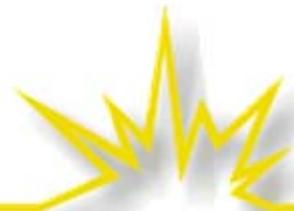
About the Regulatory Assistance Project

- 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

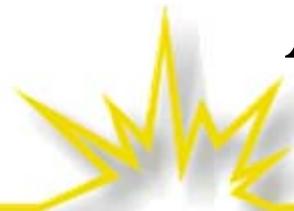
- ➔ 1. Increased use of digital information and controls technologies to improve **reliability, security and efficiency** of the electric grid
- 2. Dynamic **optimization** of grid operations and resources, with full cyber security
- ➔ 3. Deployment and incorporation of **distributed resources and generation, 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.



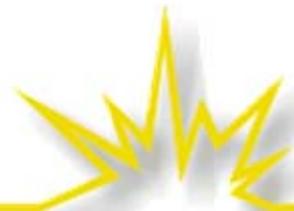
How can the Smart Grid Promote Energy Efficiency?

- 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?

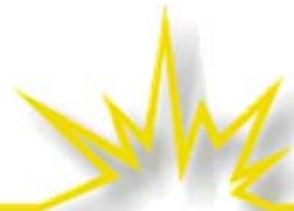
- Apply what we know about market transformation energy efficiency programs
 - Lasting, structural and behavioral changes
 - Engaging supporting market delivery channels
 - Resulting in increased adoption of EE
 - Overcome market barriers
 - Lack of awareness (or even resistance?)
 - Lack of information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



How else can the Smart Grid Promote Energy Efficiency?

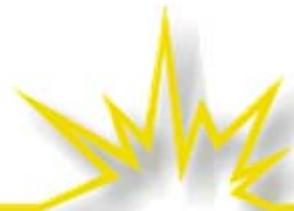
➤ Distribution Automation

- Enables more precise, effective use of conservation voltage reduction
- Reduce losses



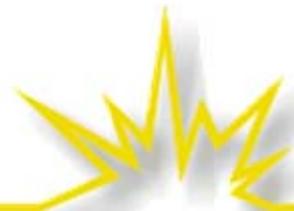
Energy Efficiency Supports Climate Stabilization

- 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



Energy Efficiency Supports Climate

- 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

- rsedano@raponline.org
- <http://www.raponline.org>
- 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.*