

Utilities Co-operatives Forum

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**National Rural Electric
Cooperative Association**

A Touchstone Energy® Cooperative 

Cooperative Research Network

- Distribution Operations Best Practices
- Energy Innovation
- Generation, Fuels and Environment
- Renewable and Distributed Energy
- Smarter Grid
- Transmission and Substation Assets

Emerging Technology Priorities

- CO₂ Options
- A “Smarter” Grid?
- Energy Efficiency Innovation
- Renewable Energy Challenges
- Electric Vehicle Challenges

CO₂ Options

- Not just coal, but gas and oil as well
- Carbon sequestration or carbon utilization?
- Recognizing the importance of the entire carbon cycle
- “X Prize” for demonstrating beneficial use of CO₂ on a commercial scale

A “Smarter” Grid?

US Department of Energy/NRECA \$68 Million Demonstration

- Demand Management
- Distribution Automation
- Enabling Technologies
- Cyber security
- System Interoperability

Demand Management

- In-home displays: Will more information create behavior change?
- Demand response over AMI: Will two-way interactive systems be more effective?
- Interactive thermal storage: How much more can we move off-peak?

Distribution Automation

- Smart feeder switching: Can we improve outage response?
- Advanced Volt/VAR: Can we balance voltage and VAR in real time?
- Conservation voltage reduction: How much can be achieved without affecting quality and reliability?

Enabling Technologies

- AMI: Advanced metering infrastructure
- Meter Data Management: A data processing challenge
- High speed telecommunications
 - Wireless (WiMax, Satellite)
 - Fiber
 - Broadband over powerline carrier
- SCADA

The Four Levels of Cyber Security

- Secure Environments
- Secure Organizations
- Secure Systems
- Secure Components

System Interoperability

- MultiSpeak[©]
 - www.multispeak.org
- International Electrotechnical Commission (Geneva, Switzerland)
 - Common Information Model (CIM)
 - MultiSpeak “harmonization”
- National Institute for Standards and Technology

Energy Efficiency Innovation

- Touchstone Energy[©] Cooperatives
 - Together We Save[®] program
 - www.togetherwesave.com
- US Department of Energy/Lawrence Berkeley Laboratory
 - Home Energy Saver (co-sponsored)
 - Home Energy Score (pilot test with electric cooperatives)
 - <http://hes.lbl.gov/consumer>

H.R. 4785: Rural Energy Savings Program Act

“To authorize the Secretary of Agriculture to make loans to certain entities that agree that the funds will be used to make loans to consumers to implement energy efficiency measures involving structural improvements and investments in cost-effective, commercial off-the-shelf technologies to reduce energy use, and for other purposes.”

Renewable Energy Challenges

- Wind and solar intermittency
- New transmission needs
- Grid integration/micro-grids
- New hydroelectric power
- Biomass technologies

Electric Vehicle Challenges

- Recharging infrastructure
- Battery technology
 - Lithium ion
 - Zinc bromide
 - Sodium sulfur
- Utility billing
- System demand

A Closing Thought from Albert Einstein

“Everything needs to be made as simple as possible but no simpler.”