Electric Cooperatives: Putting Smart Grid to the Test

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Electric Cooperative Network

- 900+ co-ops
- 42 million people
- 47 states
- 75% of land area
- 83% of counties fully or partially served
- 42% of nation’s distribution lines
- 7 consumers/line mile
Cooperative Research Network

Approach

- Research backed by NRECA/full electric co-op network
- Driven by CRN members and 80+ advisors
- Focus on savings and avoided costs
- Typically 1-3 year outlook
- Examine technology readiness
- Range of research products
- Strong focus on alliances
Co-op Principal Mission

Reliable electric service at an affordable cost
Co-op Business Realities

Innovation—a result of unique circumstances

- Relatively small utilities with limited staffs
- Service territories vary from suburban to sparse
- Not-for-profit, consumer owned & governed
- Predominantly residential, farm and ranch, while serving leading hi-tech companies
- Household incomes below national average
- Federally-set design and construction standards augmented by industry best practices
Solutions Fostered by Electric Co-ops

• Reduced truck rolls drove AMR/AMI business case
  – low-bandwidth “turtle” meter
  – AMI fully or partially deployed at 50% of co-ops

• Costly software interfaces drove standardization
  – MultiSpeak® voluntary specification working in concert with vendor community
  – Harmonization with IEC Common Interface Model
Co-op Installed Technologies and Plans

Currently installed
- AMI/AMR: 71%
- Work Management: 39%
- AVL/GPS: 14%
- OMS: 9%

Install in next 12 months
- AMI/AMR: 44%
- Work Management: 10%
- AVL/GPS: 12%
- OMS: 9%

Source: 2009 NRECA Co-op Technology Study
Co-op Smart Grid Projects with DOE

Denotes co-op/PPD areas receiving federal stimulus funding for smart grid projects.

$600 million in smart grid investments
NRECA Demonstration Grant

• About 20 co-ops in 10 states—$34M/$68M
• Led by NRECA’s Cooperative Research Network (CRN)
• Install and study range of technologies, applications, and impacts
• Project team includes:
  – SAIC, Cigital
  – Power Systems Engineering, ICF
  – Pacific Northwest National Laboratory
  – EPRI and Industry perspectives
# Primary Demonstration Activities

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<td><strong>Plus enhanced interoperability &amp; cyber security</strong></td>
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Demonstration Parts List

- 130,000 smart meter modules
- 18,000 demand response switches
- 3,000 in-home displays/smart thermostats
- 150 voltage sensors
- 200 fault locators
MultiSpeak® & Smart Grid

Number of Interfaces
Expanding by 50% in 2012

- Better view of current load, system status and load forecasting
- Enable additional rate options for consumers
- Offer energy use via web portals & in-home displays
- Tighter management of demand (volt/VAr control, remote generation, and optimizing voltage profiles)
Cyber Security: Three-Step Approach

- Path to improved security at co-ops
- Security review of what we do in the course of the project – “do no harm”
- Start dialog with DOE, Industry, and vendor community on security requirements, secure development practices and security testing

If we work together, we’ll get there faster with greater economy and better results.
CRN & Co-ops: A Test Bed

Map of the United States with various symbols indicating different technologies and projects:
- All Climate Heat Pumps
- Broadband Over Powerline Demo
- Cyber Security Test
- Electric Vehicle Education
- Fuel Cell
- Hog Waste to Methane
- Ice Storage
- Intermittent Turn Gear Testing
- LED Lamps
- Microturbine
- PHEV
- Radiant Heat Windows
- Solar Options to Enhance Combustion Turbines
- Solar Water Heating
- Thermal Energy Storage
- Transmission Reliability Software
- Virtual Power Plant

DOE Sponsored Sites
Thank You

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