

Electric Cooperatives: Necessity Drives Innovation

Ed Torrero, Executive Director
Cooperative Research Network
National Rural Electric Cooperative Association

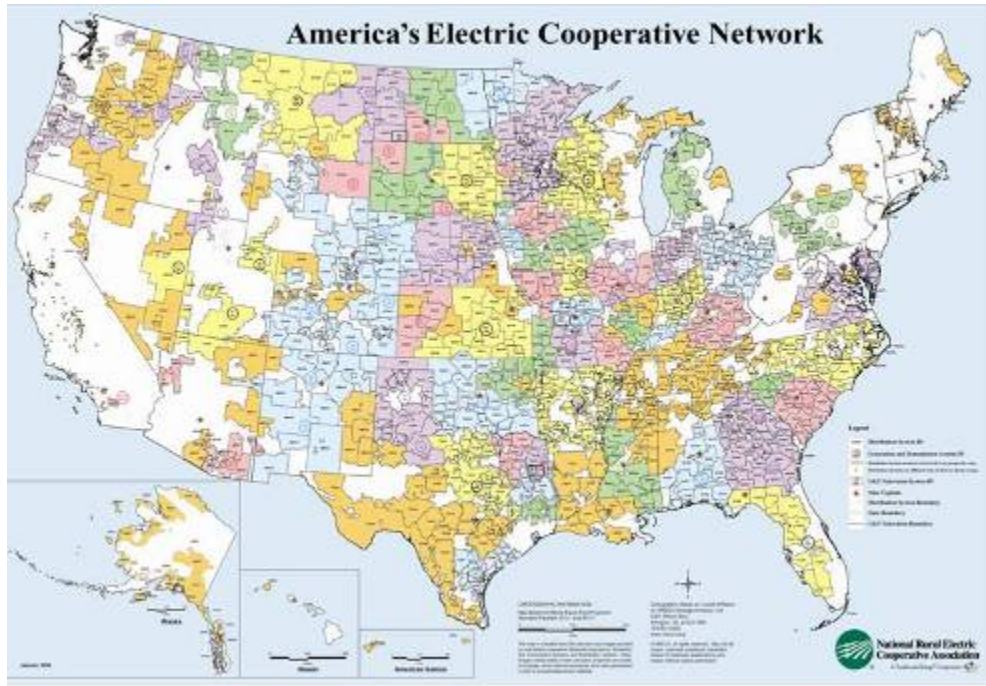
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Co-op Business Realities

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

Electric Cooperatives



- Over 900 co-ops
- 42 million people
- 47 states
- 75 percent of land area
- 83 percent of counties fully or partially served
- 42 percent of nation's distribution lines
- 7 consumers/line mile

Co-op Principal Mission

*Reliable electric service
at an affordable cost*

The Electric Cooperative Network

- A national “living” laboratory
- Technology is often the most significant variable under a co-op’s control
- Solutions are tailored to local conditions and shared among cooperatives

Necessity is Driving Smart Grid Investments

■ Reduced truck rolls

- Automated Meter Reading (AMR)—low-bandwidth “turtle” meter
- Advanced Metering Infrastructure (AMI)—two-way communications for improved operations. Half of all co-ops have at least some AMI

Necessity is Driving Smart Grid Investments

■ Costly software interfaces

– Interoperable software and systems:

MultiSpeak® voluntary specification

- Widely used to speed data transfer
- Internet protocol-based for scalability
- Supported by 48 vendors, including Siemens and Oracle

– Harmonization with IEC Common Interface Model

Co-op Large-Scale Investments in Innovation

- **CO2 Capture & Sequestration**
 - Basin Electric Power Co-op, ND
- **Integrated Gasification Combined Cycle**
 - Wabash Valley Power Association, IN
- **Compressed-Air Energy Storage**
 - PowerSouth Energy Co-op, AL
- **Utility-scale Nickel-Cadmium Battery**
 - Golden Valley Electric Assn, AK

Demand Response Investments

*Co-ops can control 6% of peak load;
almost half have demand response programs:*

- 77% - direct control of water heaters, pool heaters, air conditioners
- 44% - interruptible contracts
- 30% - time-of-use or real-time rates
- 16% - voluntary interruptions

Energy Efficiency Investments

- Light-Emitting Diodes (LEDs)
- Low-temperature Heat Pump
- Thermal Energy Storage for residential cooling
- Waste-Heat-to-Power
- Plug-in Hybrid Electric Vehicles & Battery Electric Vehicles

Planned Utility-Scale Energy Storage

- Support overloaded substations, shave peak
 - Central Electric Power Co-op, SC
 - Illinois Rural Electric Cooperative
- Apply photovoltaic generation to peak hours
 - Seminole Electric Co-op, FL
 - Kauai Island Utility Co-op, HI
- Apply wind generation to peak hours, improve diesel generator operation
 - Kotzebue Electric Assoc., AK

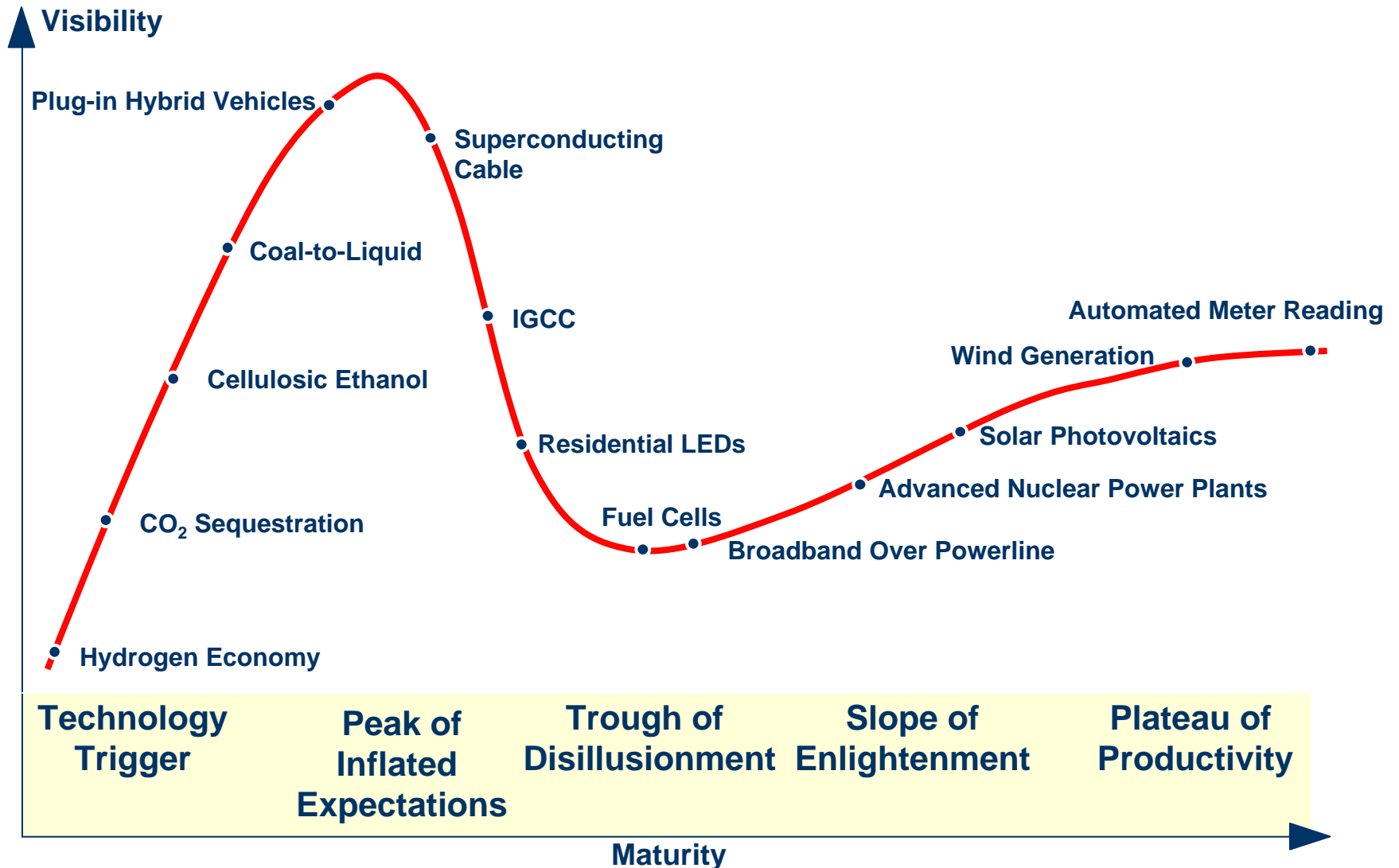
Strategies to Support Small Utilities in a Changing Industry

- Domestic: NRECA provides education and training support to 70,000 co-op employees and 10,000 directors
- Global: NRECA's International Rural Electrification Program has aided over 35 nations and 70 million people since 1962

Additional Strategies to Support Small Utilities

- Wholesale trading
 - ACES Power Marketing
- Renewable energy
 - National Renewables Cooperative Organization
- Broadband and telecommunications
 - National Rural Telecommunications Co-op
- Data management
 - National Information Solutions Cooperative
 - South East Data Cooperative

Helping Co-ops Make Wise Investments & Avoid Costly Mistakes



Thank you!

Courtesy NASA