**National Rural Electric Cooperative Association**
A Touchstone Energy® Cooperative

VIA ELECTRONIC FIING SYSTEM (ECFS)

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: A National Broadband Plan for Our Future, GN Docket No. 09-51

Dear Ms. Dortch:

Pursuant to Section 1.1206 of the Commission's rule, this ex parte notice is filed on behalf of the National Rural Electric Cooperative Association ("NRECA"). On September 25, 2009, David Mohre, NRECA Executive Director, Energy & Power Division, Tracey Steiner, NRECA Senior Director Corporate Counsel, David Predmore, NRECA Senior Principal Corporate Counsel, and Robert Saint, Principal T & D Engineering met with Nick Sinai, Energy and Environment, Director, Charles Worthington, Energy and Environment, Program Analyst and Brian Korgaonkar, Energy and Environment Program Analyst, to discuss NRECA generally, and the Smart Grid and Broadband deployment efforts and requirements of rural electric cooperative utilities. The parties also discussed the issues described in the attached handouts.

A copy of this letter and the handouts presented during the meeting are being filed via ECFS with your office. Please do not hesitate to contact me if you have any questions.

Sincerely,

David N. Predmore
cc: Nick Sinai
Charles Worthington
Brian Korgaonkar

# NRECA Meeting

*To Discuss Electric Cooperatives & Smart Grid*

September 25, 2009

National Rural Electric Cooperative Association

## Electric Cooperatives at a Glance

- 864 electric distribution cooperatives + 66 Generation & Transmission Cooperatives
  - Serve 42 million consumers
  - In 47 states
- Own and maintain 2.5 million miles, or 42%, of the nation's electric distribution lines, covering 75% of the nation's land mass
- 7 consumers per mile of line on average vs. 35 for Investor-owned Utilities and 47 for Municipal-owned
- Median per capita income for electric co-op consumers = 21% below the national average (or $21,435)

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## America's Electric Cooperative Network

## Recognition of Broadband's Link to Smart Grid: NRECA Member Resolutions

"Advancements in the telecommunications industry and new operational challenges ... make telecommunications technology an integral part of the distribution and transmission system. To continue providing the highest levels of electric service to our consumer-owners, we must also adopt and embrace advanced telecommunications technologies and the development of the utilities' "Smart Grid," enhancing system inter-operability and efficiency." (09-K-2)

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## NEETRAC

"Real-time and reliable information are the key factors for reliable delivery of power to the end-users, profitability of the electric utility and customer satisfaction. Both operational and commercial demands of electric utilities require a high performance communication network, not only to support the existing functionalities but also to support new operational requirements of electric systems."

*- National Electric Energy Testing Research & Applications Center Baseline Project 05-259 Final Report (May 2007)*

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## Smart Grid Technologies

- Two-way communications – Some at broadband speed
- Distributed computing
- Intelligent electronic sensors
- Optimization software
- Advanced Metering Infrastructure (AMI)
- Data management systems

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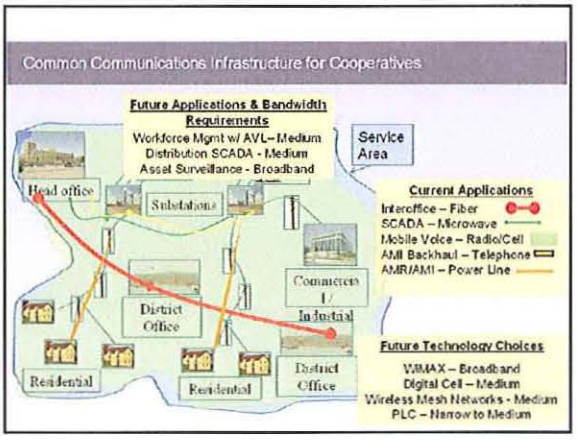
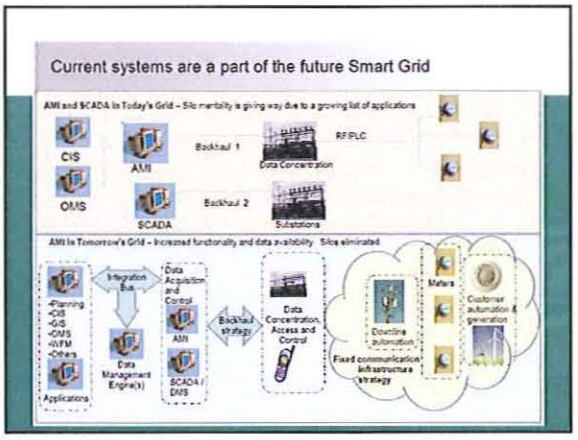
## Co-op View of Smart Grid

- Focused on more efficient, reliable, economic operation of the entire grid
- Increased demand response, customer information
- Implemented at pace of value to consumers
- Preparing for renewables, DG, storage, PHEVs, etc.
- Preventing shifting of inappropriate risks to consumer-owners



## How Co-ops Use the Smart Grid

- Efficiency & Cost Savings:
  - Reduce costs from manual meter reading, theft and system losses
  - Reduce truck rolls for inspection, maintenance, service disconnects & reconnects
  - More efficient preventive maintenance, asset management
- Speeds outage recovery
- Enables new direct control, rate options
- Can avoid or delay generation, transmission or distribution investments

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## Co-ops Lead in Smart Grid

- Recognized in FERC, DOE studies
- About half co-ops have begun AMI deployment
- About 79% with AMI/AMR have begun integrating AMI/AMR with CIS, 26%- GIS, 23%- OMS
- Co-ops developed MultiSpeak® for interoperability
- Co-ops also lead in demand response

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## *FERC's 2008 Assessment of Demand Response & Advanced Metering*

- Cooperatives:
  - Have a 16.4% penetration of advanced meters compared to the industry's average of 4.7%;
  - Have 18% of the nation's demand response capability;
  - While selling only 10% of the nation's energy.

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## Co-ops and Demand Response

- Co-ops can control over 6% of peak demand
- Leading co-ops can control 25-50% of peak demand
- With 10% of nationwide electric load, co-ops have more than 18% of the nation's demand response capability

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## Co-op Stimulus Grant Requests

- About 300 co-ops, directly or through their G&T, have requested smart grid investment grants
- 27 co-ops have applied through NRECA's research program for a $34 million smart grid demonstration grant to test end-to end connectivity and interoperability using MultiSpeak®

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## Stimulus Applications

- 27-co-op Demonstration Application through NRECA:
  - Will test end-to-end connectivity using MultiSpeak®
  - Install 3,958 in-home displays/smart thermostats
  - Install 2,825 ZigBee gateways

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## Stimulus Applications

- Some Co-op Investment Application Examples:
  - Bluebonnet Electric Co-op, TX
    - Began Smart Grid conversion 5 years ago deploying 80,000 Smart Meters
    - $18.8 million of stimulus $$ to install more advanced meters, a wireless & fiber hybrid telecom network, and in-home wireless displays, & web portal

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## Co-ops Building on Earlier Smart Grid Efforts

- Mid-Carolina Electric Cooperative (serving 40,000 members in South Carolina):
  - Advanced Metering Infrastructure (AMI) deployed system-wide
  - 50,000 smart meters provide hourly readings to the co-op
  - Plans to interface AMI with the SCADA system, which has been in place since 1983, enabling installation of intermediate devices enabling remote rerouting of power remotely in an outage.
  - Greater efficiency through better and more accurate line-loss prevention technology.

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## Co-ops Building on Earlier Smart Grid Efforts

- New Hampshire Electric Cooperative (80,000 members):
  - Combined a wide array of communications technologies, including SCADA, outage reporting, GIS and an Interactive Voice Response (IVR), into a system that can be controlled and monitored with accuracy from the central office.
  - New Hampshire Electric is planning to overhaul its system, deploying AMI system-wide and building its own telecommunications infrastructure.
  - While New Hampshire Electric already has an extensive demand-response system, the new meters will allow the cooperative to send price signals to its commercial and industrial members.

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## Co-ops Building on Earlier Smart Grid Efforts

- Crow Wing Power (36,000 consumers in north central Minnesota):
  - Piggybacked on 700 MHz wireless broadband network of its power supplier, Great River Energy, to support two-way 25 substations, advanced metering
  - Currently working on new load control initiatives

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## Co-ops Building on Earlier Smart Grid Efforts

- Southwestern Electric Cooperative (22,000 members)
  - Integrated Outage Management System, SCADA and Automated Meter Reading using MultiSpeak
  - Moving to AMI to pinpoint outages

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## Co-ops Building on Earlier Smart Grid Efforts

- Dairyland Power (with 25 distribution co-op members that serve 247,000 consumers in 4 states):
  - Has advanced demand response system that can control as much as 175 MW of load (residential water heaters, HVAC, etc.)
  - Equals 20% of its winter peak
  - Results in a savings of $11 million per year

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## What's Needed to Move the Smart Grid Forward

- Communication Standards
  - IEEE
  - ZigBee
- Security
- Interoperability of System Elements
  - NIST
  - MultiSpeak
- Spectrum for Robust, Reliable, Secure Telecommunications Networks

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## *UTC's The Utility Spectrum Crisis Report*

- ". . . electric, gas and water utilities in the United States need an estimated 30 MHz of radio spectrum dedicated to their use to meet infrastructure needs and to help ensure reliable service for the next two decades."
- NRECA supports the UTC proposal allocating spectrum in the 1800-1830 MHz band.

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## *UTC's The Utility Spectrum Crisis Report*

1. Utilities access to shared spectrum has declined as needs have increased.
2. Demand for critical emergency communications in the face of disasters – both natural and manmade – have stepped up dramatically.
3. Federal requirements to report and monitor the security of critical infrastructure resources.
4. Realization by Congress and other regulators that the electric grid of the future is critical to national security.
5. No other communications technology can cost-effectively support the rapid deployment of smart grids in North America.

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## Smart Grid & Consumers

- Co-ops Support Implementing Smart Grid Technologies that Benefit Consumers
- States & FERC Are Wrestling With Whether/How Much Consumers Will Benefit
- Retail Consumers' Energy Data Traditionally Has Been A State Concern

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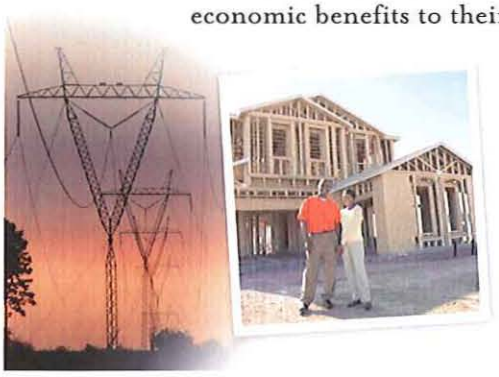
# ELECTRIC COOPERATIVES

AMERICA'S MEMBER OWNED UTILITIES

## *What is an* ELECTRIC COOPERATIVE?

Electric cooperatives are private, not-for-profit businesses governed by their consumers (known as "member-owners"). Two federal requirements for all co-ops, including electric co-ops, are democratic governance and operation at cost. Specifically, every member-owner can vote to choose local boards that oversee the co-op, and the co-op must, with few exceptions, return to member-owners revenue above what is needed for operation. Under this structure, electric co-ops provide economic benefits to their local communities.

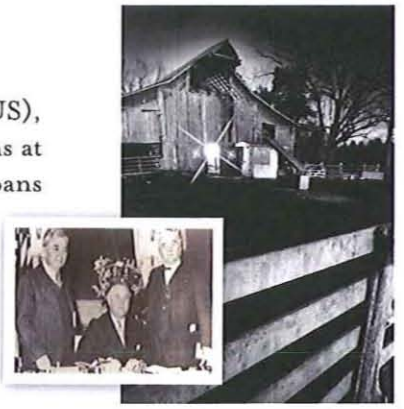


The majority of co-ops distribute electricity to consumers through low-voltage residential lines that cover over 75 percent of the nation's land mass. Many of these "distribution co-ops" have joined to create co-ops that provide them with generation and transmission services ("G&T" co-ops). Distribution co-ops also buy power from investor-owned utilities (IOUs), public power systems, federal hydropower Power Marketing Administrations (PMAs), and the Tennessee Valley Authority (TVA).

## THE DAWN OF RURAL ELECTRIFICATION

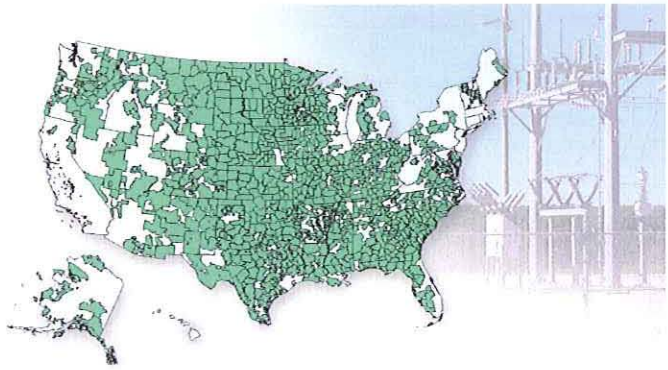
In 1935, about 90 percent of the rural farms and communities in America had no electricity. To bring electricity to everyone, President Franklin D. Roosevelt created, by executive order, the Rural Electrification Administration (REA). Farm communities across the country tapped financing from the REA and adapted the private co-op business model to deliver electricity in their communities.

## COOPERATIVES IN PERSPECTIVE

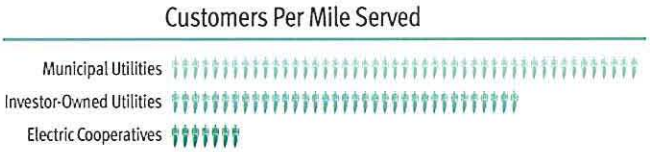


Many co-ops rely on the successor to REA, the Rural Utilities Service (RUS), a branch of the U.S. Department of Agriculture, to provide electric co-ops loans at the government's cost of money plus an administration fee. These low-interest loans are essential because not-for-profit electric co-ops cannot use federal tax subsidies available to for-profit companies. Further, electric co-ops collect an average of only $10,565 of revenue per mile of distribution line, compared with IOUs that collect an average of $62,665 per mile of line and public power systems that collect $86,302 per mile.

*The National Rural Electric Cooperative Association is the national service organization representing the interests of cooperative electric utilities and their consumers. In addition to advocating consensus views on legislative and regulatory issues, NRECA aggregates health care, pension and many other programs for its members.*



Today, 930 electric co-ops serve 42 million consumers in 47 states. Electric co-ops serve an average of 7 customers per mile, compared with 35 customers per mile served by IOUs and 47 customers per mile served by public power systems. Electric co-ops bring electricity to only 12 percent of the population, but maintain 42 percent of the nation's electricity distribution lines.




## THE ELECTRIC COOPERATIVE DIFFERENCE

The co-op business model keeps the focus on the member-owner and local community. Electric co-ops are involved in community development and revitalization projects, such as small business development and job creation, improvement of water and sewer systems, and assistance in health care and education services. Local ownership and the accountability it demands is one reason that electric co-ops enjoy the highest average customer satisfaction rating in the industry, according to the University of Michigan's American Customer Satisfaction Index.

## THE FUTURE OF ELECTRIC COOPERATIVES

The private, member-owned co-op business model has been a foundation for growth in many communities. To keep pace with this growth, electric co-ops, like all segments of the utility industry, must now plan for a significant amount of new generation capacity. The growing consumer base will continue to depend upon coal, nuclear, and gas generation, with a supporting role increasingly played by renewable energy resources and efficiency measures. As such, electric co-ops lead the way in developing new, cleaner coal plants along with alternatives to fossil fuels.

Renewable energy makes up almost 11 percent of the electricity provided by electric co-ops, with more than 120 megawatts from non-hydroelectric renewable generation owned by the co-ops themselves and more than 500,000 megawatt hours purchased from renewable developers. Almost 90 percent of the co-op industry offers their consumers power from renewable energy. And, using the Clean Renewable Energy Bond (CREB) program, co-ops are constructing a significant number of new co-op-owned renewable generation projects.

## THE ELECTRIC COOPERATIVE SUCCESS STORY

Many consumers are active politically in their co-op and with their state and federal lawmakers. The core values that inspired farmers to bring electricity to rural America in the 1930s remain in today's electric co-op communities. In addition to providing superior service, electric co-ops play a vital role in economic development and carrying on the tradition of civic responsibility and local democracy.

*For more information call 703.907.5500 or visit www.nreca.coop*

**Title:** Electric Co-ops Offer Unique Assets to DOE Smart Grid Research

**Abstract:** September 8, 2009 - Using the resources of 27 cooperatives from Hawaii to New Hampshire, the Cooperative Research Network's proposed smart grid demonstration project tests interoperability and end-to-end connectivity.

**Text:** The National Rural Electric Cooperative Association's Cooperative Research Network (CRN) has joined with 27 electric cooperatives, varying in size, operation and region, on a proposal to install more than 153,000 smart grid components in a nationwide demonstration project.

At its core, this proposal by CRN and the cooperatives represents the first opportunity to conduct a nationwide pilot extending and testing end-to-end connectivity – from the power plant to the consumer's home – and interoperability using MultiSpeak®, a specification developed by NRECA through the association's MultiSpeak Initiative.

The project will examine deployment of an array of smart grid technologies across a wide range of circumstances. The breadth of this proposal will allow CRN and the cooperatives to conduct, in 27 different regions, real-world testing and investigation of demand management, distribution management, interoperability of software, and cybersecurity.

**Previous Cooperative Demonstration Projects**

CRN submitted a request for half of the project's total cost of $67 million to the Department of Energy, which is seeking to identify and develop new and more effective smart grid technologies.

Rural electric cooperatives own and maintain 42 percent of the nation's distribution infrastructure – any effort to create a nationwide smart grid must be conducted in partnership with rural electric cooperatives.

Cooperatives are well-positioned to advance the implementation of a smart grid. According to the Federal Energy Regulatory Commission (FERC), cooperatives' advanced metering penetration increased from 3.8 percent in 2006 to 16.4 percent in 2008 – well above the industry as a whole. According to research conducted by NRECA, approximately half of cooperatives have installed at least some advanced metering infrastructure (AMI) on their systems, and some 30 percent of cooperatives have begun to integrate their AMI with other systems on their grid.

By implementing the installations in four successive tranches, the cooperatives will be able to apply lessons learned during initial installations for the benefit of successive installations.

Cooperatives have already made important contributions to interoperability of smart grid software with the MultiSpeak® Initiative, launched ten years ago by the National Rural Electric Cooperative Association (NRECA) and leading software vendors. If funded, this project would enable extending the MultiSpeak specification to new functions and applications. Respected cybersecurity consultants SAIC and Cigital will work with the cooperatives to explore security issues surrounding enhanced interoperability and connectivity.

The core of the project comprises installation of the following:

- 131,720 smart meter modules
- 18,480 demand response switches
- 3,958 in-home displays/smart thermostats
- 2,825 ZigBee gateways
- 169 voltage sensors
- 247 fault detectors

**Highlights**

*Time sensitive pricing and in-home energy usage pilots in low-income areas*

Maintaining affordable electricity is a core objective of consumer-owned electric co-ops and NRECA. Co-ops serve a disproportionate number of consumers who live below the median income level. Seventeen cooperatives are pursuing pilot programs that focus on educating consumers with energy use portals, in-home energy displays and time-sensitive pricing. These efficiency programs may help cooperatives avoid the cost of building additional peaking capacity or purchasing power at very high costs during peaks – costs that are passed on to the consumer-members.

*Self-healing feeders for hurricane and flooding-prone regions*

Louisiana-based Washington-St. Tammany Electric Co-op has been ravaged by three hurricanes in the last four years: Katrina, Gustav, and Ike. Clarke Electric Co-op in Iowa is still in the process of rebuilding more than 200 miles of line damaged by an ice storm. Part of Adams Electric's service territory is located in the Mississippi River flood plain; flooding there can wash away electric facilities and require lines to remain de-energized for 2-3 months until waters recede.

To this end, Washington-St. Tammany, Adams, and Clarke are all deploying self-healing feeders.

*Demand response and GIS technologies to reduce agriculture's carbon footprint*

The 10 participating distribution cooperatives who belong to the Corn Belt Cooperative in Iowa have densities that range from 1.7 to 3 meters per mile; 90 percent of the meters located on farms. Many of these cooperatives still send staff around their large service area to read meters. An AMI system will allow these cooperatives to reduce vehicle emissions.

Installing the AMI system will also allow Corn Belt to initiate a demand response program to control the 50 MW of distributed generation currently on its system. The cooperative will be able to better manage the demanding agricultural loads, especially in the fall when the system peaks due to high demand from farms drying their crops.

Recently Iowa became the number two state in installed wind capacity. AMI will provide Corn Belt and its members with better intelligence on the costs of wind and the output of facilities throughout the day. This data will be used to better take advantage of this vast renewable resource in Iowa.

MultiSpeak®

Integration for the Smart Distribution System

**The MultiSpeak® Specification is a key application-related, industry-wide open *de facto* standard for realizing the potential of the smart grid. The MultiSpeak Specification is the most widely applied *de facto* standard in North America pertaining to distribution utilities and all portions of vertically-integrated utilities except generation and power marketing. It is currently in use in the United States in the daily operations of more than 350 electric cooperatives, investor-owned utilities, municipals, and public power districts. Nearly 50 vendors are actively contributing to and using the Specification in developing their standard software product offerings. Over 120 vendor, consulting, and utility personnel have been trained in how to use the specification. The current Specification is mature in its coverage of 25 profiles including meter reading, connect/disconnect, meter data management, outage detection, load management, SCADA, demand response, and distribution automation control – many of the critical aspects of smart grid operation.**

**Why is MultiSpeak Important for Utilities and for the Smart Grid?**

The push to formalize standards for the smart grid has generated tremendous pressure on the standards process. Any imposed interoperability standards must minimize total cost while providing the necessary functionality to cover all foreseeable IT needs. Total costs can be minimized and rapid deployment of smart grid hardware ensured by adopting standards that:

- Are ready to implement today
- Have been proof-tested in multiple existing installations.
- Offer true interoperability in "off-the-shelf" products available in today's market.
- Allow product development that does not require extensive customization by the end user - thus significant technical or IT staffs or outside consulting support are not required.
- Can be used either with or without messaging infrastructure (e.g. "middleware").
- Are extensible without compromising the basic interoperability of the interface.
- Are scalable to allow use for any size utility or information demand.
- Are supported by wide range of vendors.
- Have an existing, modestly-priced commercial testing process to help utilities and vendors ensure interoperability.
- Have a large number of individuals trained in the use of the specification.
  The MultiSpeak Specification meets ***all*** of these requirements today and is the only specification or standard covering the distribution portions of the smart grid that does so.

MultiSpeak has these additional advantages:

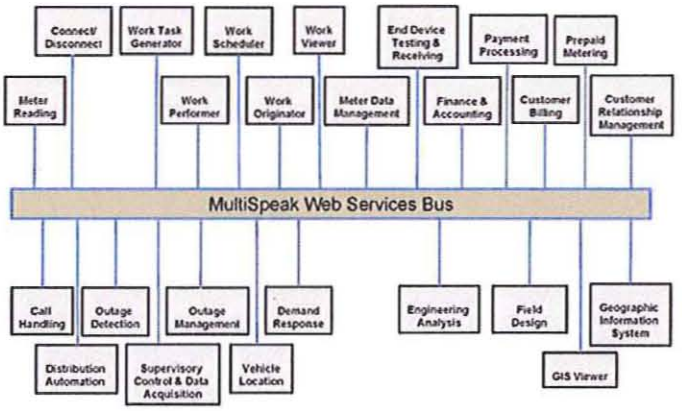
- The emphasis for MultiSpeak is true interoperability, not just adherence to a data model or compliance with a specification.
- The clear documentation in Web Services Description Language (WSDL) format permits clear contracts for interface interoperability and straight-forward development.
- MultiSpeak can also be applied using an optional messaging framework over any message-oriented middleware platform, should a web services implementation not be appropriate for a specific utility.

Any utility, regardless of size, that is entering into an integration initiative, including smart grid development, should consider adopting the MultiSpeak data model and service definitions as the foundation for their planned integration.

***The smart grid standards mix should include MultiSpeak as a fundamental component.***

### What does the MultiSpeak Specification cover?

Twenty-five distribution system and customer support profiles have been defined. As can be seen from the following diagram, many of the practical, data handling needs imposed by smart grid developments are inherent in the mature, field-proven MultiSpeak specification.




### Harmonization with the IEC Common Information Model

There is an alternative data model for utility integration, called the Common Information Model (CIM), which is sponsored by the International Electrotechnical Commission Technical Committee 57. CIM is broader in scope than is MultiSpeak but is less fully developed. Many of the parts of the CIM standards have not been finalized and with a few minor exceptions, there are not well-defined profiles that would enable utilities to develop interoperable implementations. To date only three profiles are finalized: (i) 61968-9 (Metering), (ii) the CPSM for transmission power system model exchange, and (iii) the CDPSM for distribution model exchange. Currently CDPSM only works for European distribution systems and is not adequate for use in the unbalanced distribution systems used in the United States. Both CIM and MultiSpeak bring value to the integration needs of utilities and it is likely that both standards will co-exist. Both efforts have recognized this value and have begun a concerted, mutual effort to (i) bring the specifications together over time as stable profiles are developed by CIM and (ii) develop bridging technologies to permit interoperation of applications that are compatible with the different standards.

### Conclusions

MultiSpeak is a flexible, extensible specification which can be used as the basis for a wide variety of integration efforts from the simplest single point-to-point interface to a complete service-oriented architecture in the largest utility. Furthermore, for many utilities, the MultiSpeak specification is a complete solution to their distribution system integration needs that is available for implementation today. For others it is a solution that may need some customization, but it brings a robust foundation that supports the required extension with minimal development cost and risk. Even those utilities that eventually want to transition to a CIM-based solution in the future, should consider a near-term MultiSpeak solution with a bridge to a longer-term CIM solution as CIM gains maturity.

Additional information about the MultiSpeak specification, including arrangement for a one-hour introductory webinar, training sessions or general questions can be obtained by contact Gary McNaughton, MultiSpeak Technical Coordinator at gmcnaughton@corniceengineering.com