Before the
Department of Energy
Washington, D.C. 20585

In the Matter of	)
	)
Implementing the National Broadband	)
Plan by Studying the Communications	)
Requirements of Electric Utilities To	)
Inform Federal Smart Grid Policy	)

NBP RFI: Communications Requirements

COMMENTS OF LAKE REGION ELECTRIC COOPERATIVE-MINNESOTA

I. Introduction

a. **Identification/description of your company.** Lake Region Electric Cooperative is a non-profit electric cooperative serving 26000 consumers and is located in west central Minnesota. The cooperative serves an area of approximately 3200 square miles. The geography varies from flat to large rolling hills with many lakes and wooded areas. For the most part the area is relatively sparsely populated. The average consumer density is less than five consumers per mile. All power purchases are from our cooperative power supplier Great River Energy (GRE).

Overview of communications networks

1. 2 Ghz microwave
2. 900 mhz point to point microwave
3. 900 mhz MAS radio
4. Subscriber of GRE's 450 mhz mobile radio system
5. Unlicensed 900 mhz spread spectrum radio

Why private networks?

Better reliability
Better coverage than commercial providers
Direct control – of assets to respond to communication issues,
Security

What technologies are used?

See above

Overview smart grid deployment plans

Types of applications and number of devices

AMR meters - 32000
Load Control/Demand Response switches - 8000
Home Area Network Devices - 3000
Distribution Automation Devices - 100

Timeframe for deployment

AMR meters and Load Control devices are currently installed
HAN 3-5 years
3-10 years

Overview of communications requirements

Current

Two way mobile radio, point to point, point to multipoint, microwave

i. **Future**

Same as above plus automatic vehicle location (AVL), mobile data broadband, smart meter data gathering.

b. **Assessment of existing networks to meet current and future communications needs**

i. **What are the communications gaps?**

No spectrum available to fill the future comprehensive needs of mobile data and smart metering applications

ii. **What do you need to fill those gaps?**

Dedicated spectrum for critical infrastructure applications

c. **Commercial services**

i. **Do they currently meet utility needs?**

1. **Mission critical applications**

No. Coverage in rural areas such as Lake Region's has areas that are marginal or nonexistent. Many of the sites do not have generator backup so when power fails during storms etc. the sites are not functioning.

Non-mission critical applications

No, need better build out in rural areas. Any applications need to be competitively priced to promote usability

How can they be improved?

Have emergency backup available at all sites, Need a process so that any mission critical items are given high priority for restoration. In reality coordination of such a process will not work.

II. **Smart grid and communications requirements today**

a. **Detailed description of smart grid applications (e.g. AMI, DA, and DR).**

Describe the types of applications, the extent of their deployment and whether they are mission critical.

AMI-Lake Region has nearly 100% deployment of AMI meters that are capturing of hour by hour data which is current to within the last 8 hours. We make this information available to the consumer via web presentation.

DA-Except for a few controlled capacitor installations, all our DA is done at the substation level through a SCADA system controlled by our G&T.

DR-We have an extensive demand response system that directly controls end use devices such as water heaters, AC, heat and irrigation. The system is capable of reducing peak demands between 10-15% depending on season of year. DA and DR are mission

critical in maintaining system continuity. AMI is used to determine abnormal system conditions in both normal and emergency operating conditions.

b. **Functional requirements needed to support those smart grid applications.**

What are your specific requirements with regard to cost, Coverage, Capacity (Bandwidth), Latency, Reliability, Back-up power (AC Independence), and Security for each of these applications?

Lake Region needs a communication system that can be operated at reasonable cost, but also it must be reliable and capable of withstanding power interruptions. The present systems have relatively low bandwidth requirements.

III. Smart grid and communications requirements of tomorrow

a. **Detailed description of future smart grid applications**

Describe the types of applications, the extent of their deployment, and whether they are mission critical.

Mobile data, AVL, device to device communication, and smart meters communicating real time information to the consumer. The first three of these at times will be mission critical

b. **Functional requirements needed to support those smart grid applications.**

What are your specific requirements with regard to cost, Coverage, Capacity (Bandwidth), Latency, Reliability, Back-up power (AC Independence), and Security for each of these applications?

The requirements for mobile data will be for reliable wide area coverage, bandwidths carrying considerably more data than is done with the present system. Reliability will be most important during times of system emergencies when commercial systems are most likely to experience problems. The need will be for a reliable self healing network providing redundant communication paths.

IV. Technology Options and Other Considerations

a. **What technology options are available to meet your needs?**

i. **Wireless**

Licensed

G&T provided microwave backhaul and 700 MHz. Cooperative owned point to point single channel 900 MHz and 900 MHz point to multipoint MAS. G&T licensed 450 MHz mobile radio.

Unlicensed

Spread spectrum 900 MHz, possible future use of some higher frequency and bandwidth spread spectrum peer to peer self healing configurations.

ii. **Wireline**

Fiber

We use none. Fiber is primarily used for backhaul applications

that are currently being met by our G&T

PLC or other private wireline

Use PLC for AMR data gathering. Not suitable for higher speed applications.

What other considerations come into play in terms of choosing a technology option for your utility?

Terrain, Foliage, Customer Density, Size of Service Territory, Overhead/Underground Grid Topology, etc.

Service territory of over 3200 square miles. Low density of less than five consumers/mile. Service territory varies from flat farmland in the western part of system with good line of site to high rolling hills covered with dense foliage in the lakes area of the system. Communications in these areas need to rely short hop communications with store and forward type capabilities.

V. Recommendations

a. Based on your functional requirements and applications, what technology options would you prefer to use for your utility?

Current

Trunked licensed 450 MHz, licensed 900 MHz MAS, unlicensed spread spectrum, licensed microwave,

Future

As above with additional bandwidth to cover AVL and mobile data applications. Future mobile data applications will require more bandwidth than has traditionally been associated with such applications.

VI. Commercial systems

Do they meet your needs?

No. Too many problems with coverage, response to service issues, and cost

What improvements would meet your needs?

Currently these systems are most prone to failure when needs are greatest (no or short backup capability and/or high traffic volume). Would need much more extensive build out of facilities in rural areas to ensure adequate coverage and at an affordable cost. Priority for available communication channels given to critical service customers.

Conclusion

At present the currently available commercial services do not provide adequate reliable coverage. Extensive build out of infrastructure is required. In sparse low density areas it is doubtful that commercial providers would provide needed services at an affordable price. Utilities all ready have many of the basic infrastructure facilities in place. What is needed are frequencies and equipment to augment and add to what already exists.

Respectfully submitted,

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