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 CROW WING POWER

I. Introduction

a. Identification/description of our company

Crow Wing Power is a not-for-profit electric distribution cooperative which provides retail electricity to over 41,500 consumers in central Minnesota. Crow Wing Power owns and operates approximately 2,500 miles of overhead distribution lines and 2,700 miles of underground distribution lines. Our service territory cover approximately 4000 sq. miles and consists of flat farm fields in the south and to the north there are rolling hills, many lakes and heavy tree cover. Our main power supplier is Great River Energy. We also buy power from Basin Electric.

b. Overview of communications networks

1. User of Great River Energy 700 MHz system.
2. Fiber
3. VHF Land Mobile Radios

ii. Why private networks?

1. Better reliability and coverage than commercial carriers.
2. Security

iii. What technologies are used?

1. Fiber
2. Licensed 700 MHz for SCADA

c. Overview smart grid deployment plans

i. Types of applications and number of devices

1. Video surveillance and proximity readers-0
2. Fully deployed AMI system consisting of collectors in 23 substations and 56,000 endpoints.
3. Demand Response-1,400 PLC switches and 7000 RF switches.
4. SCADA in 12 of our 23 substations.

ii. Timeframe for deployment

1. IEC 61850 – within 5 years
2. Backhaul for AMR/AMI/DA ongoing

3. SCADA: 2 stations per year.
4. Video surveillance with 5 years.
5. Demand Response-Ongoing.

d. Overview of communications requirements

i. Current

1. Two Way LMR, 700 Mhz, Fiber

ii. Future

1. Same as above plus: Automatic Vehicle Location, Mobile Data, Smart Meter (real time) data, Distribution system automation.

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

i. What are the communications gaps?

1. AVL/mobile data – no broadband spectrum for utilities to build out mobile data systems like public safety has
2. Dedicated spectrum so we could build out a network like we use for 700 MHz
3. Dedicated spectrum for mobile radio – on shared spectrum with Industrial Business pool

ii. What do you need to fill those gaps?

1. Dedicated spectrum for critical infrastructure

f. Commercial services

i. Do they currently meet utility needs?

1. Mission critical applications

a. No generator backup so during disasters or storms, communication from commercial carriers is lost.
b. No build out in rural areas. Coverage is poor in much of territory.
c. No priority.

2. Non-mission critical applications

a. If there was build out in rural areas
b. Needs to be priced competitively

ii. How can they be improved?

1. Generator backup
2. Build out in rural areas
3. Priorities for critical infrastructure

II. Smart grid and communications requirements today

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

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

1. Demand Response is mission critical. We have furnaces, water heaters, air conditioning, irrigators, generators all under control. We can reduce our load during times of high energy pricing.
2. Substation and switch monitoring and control is mission

critical. We monitor and control feeders in our substations w/ SCADA hardware installed.

3. AMI is mission critical. 100 percent of our system is equipped w/ AMI. Billing is done via AMI along with voltage monitoring and load profiling.

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

i. 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?

1. Crow Wing Power needs a communication system that can operate at reasonable costs and also be reliable. We need an "always on" connection that can withstand power interruptions. Our current system requirements are relatively low band with but will most certainly increase as time moves forward.

III. Smart grid and communications requirements of tomorrow

a. Detailed description of future smart grid applications

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

1. AVL, Mobile Data, down line Distribution Automation, Smart Meters communicating real-time to consumer. All mission critical.

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

i. 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?

1. The requirements for mobile data will be for reliable wide area coverage, bandwidths that carry more data than is done w/ present offerings. Reliability is major importance….especially since commercial carriers fail during emergency situations. Security for SCADA applications. All at competitive pricing.

IV. Technology Options and Other Considerations

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

i. Wireless

1. Licensed

a. Microwave for backhaul
b. 700 MHz for mid-mile and last-mile
c. 254 MHz for mobile radio

2. Unlicensed

a. 900 MHz for short, rural devices such as switches or other down line devices

ii. **Wireline**
    1. **Fiber**
        a. Backhaul
    2. **PLC or other private wire line**
        a. PLC for AMI meter reads.
        b. Have eliminated majority of copper, wire line phone services to substations for safety, etc.

b. **What other considerations come into play in terms of choosing a technology option for your utility?**
    i. **Terrain, Foliage, Customer Density, Size of Service Territory, Overhead/Underground Grid Topology, etc.**
        1. 4,000 square mile service territory
        2. Average nearly 8 customers/mile
        3. Roughly 2,500 miles of overhead and 2,700 miles of underground.
        4. Flat farmland in southern territory to dense foliage with hills and Lakes in northern territory.

V. Recommendations

a. **Based on your functional requirements and applications, what technology options would you prefer to use for your utility?**
    i. **Current**
        1. Fiber
        2. Licensed Microwave
        3. Licensed 700 MHz
        4. Licensed 250 MHZ
    ii. **Future**
        1. Fiber
        2. Licensed Microwave
        3. Licensed 700 MHz
        4. Licensed 250 MHz
        5. Licensed VHF spectrum for AVL/mobile data

VI. Commercial systems

a. **Do they meet your needs?**
    i. No.

b. **What improvements would meet your needs?**
    i. Not sure we ever want critical control functions on a commercial system
    ii. Generator backup
    iii. Build out in rural areas
    iv. Priorities for critical infrastructure

VII. Conclusion

At present times, commercial services do not provide adequate solutions for our critical assets. These assets are spread across a diverse service territory which is mostly rural. Coverage is marginal at best and reliability is worse yet. We need dedicated frequencies and equipment that can leverage the existing equipment we already have in place.

Respectfully submitted,

Eric Quale

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