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 MILLE LACS ENERGY COOPERATIVE

I. Introduction

a. Identification/description of our company.

Mille Lacs Energy Cooperative is a not-for-profit distribution cooperative serving parts of 4 counties in central Minnesota. Our service area is very rural with the largest town in our service area being Aitkin with a population of less than 2,000. We provide electric service to 14,000 members. We are also an ISP for the area providing internet services to the rural areas not covered the other major providers of the area.

b. Overview of communications networks

Mille Lacs leases a 10 Meg fiber circuit from Aitkin to Minneapolis for broadband services.

Mille Lacs uses unlicensed 5.8 GHz spectrum for PtP backhaul circuits across its service territory.

Mille Lacs uses unlicensed 2.4 GHz spectrum for broadband access for public use and for Smart Grid communications to our substations and line switches.

Mille Lacs shares the use of a licensed 450 MHz trunked radio system for communications to the line trucks in the field.

i. Why private networks?

Mille Lacs has more of a public network with private connections (VPN) to our substations. We have done this communications network because we do not have any other good choices for communications to our smart grid equipment.

ii. What technologies are used?

Basically Mille Lacs uses unlicensed 2.4 GHz 802.11b for its point to multi-point communications and 5.8 GHz 802.11a for its backhauls. There are real shortcomings to these technologies and we are trying to find better solutions with the economics to make

them usable. We also use PLC for AMI. The Power-line-carrier is very slow, but reliable.

c. Overview smart grid deployment plans

i. Types of applications and number of devices

SCADA to all our substations (10 now, up to 13 in the next 10 years). We also communicate with line switches and capacitor controls down-line from the substations. We presently communicate with 6 devices, but this could be closer to 60 if we had good communications. Mille Lacs also has an AMI system that uses power-line-carrier for communications. We communicate with approximately 16,000 endpoints with our AMI. This has limitations on speed and could be greatly enhanced if our members had better access to broadband to their homes.

ii. Timeframe for deployment

Mille Lacs would immediately start to automate more switches, capacitors, and line sensors if better communications infrastructure were available. We would also implement AVL to all our trucks.

d. Overview of communications requirements

i. Current

Mille Lacs requires secure, reliable, low cost communications with broadband speeds of 512k – 1 Meg to all our substations and line switches.

ii. Future

In the future this requirement could double depending on required speed and data being collected. Also the members metering, allowing for TOU pricing, in-home displays, and real time communications to the members' in-home displays, the home could need 2-3Meg connections.

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

i. What are the communications gaps?

We need AVL (automatic vehicle location) for safety and fleet management and there is no affordable/available spectrum for this technology. The local cell phone carriers do not provide blanket coverage for our remote areas.

We need the ability to do mobile data solutions for our business, again, we need spectrum that will cover our entire service area.

We need coverage so we can proceed with implementing more smart grid technologies. The unlicensed spectrum we presently use is available (only minor interference issues), but the power is so limited we can not get the coverage we need and it is not designed for mobile technologies.

ii. What do you need to fill those gaps?

We need access to spectrum at an affordable cost that will

provide coverage across our service area. Dedicated, secure, dependable!

f. Commercial services

i. Do they currently meet utility needs?

Commercial services do not meet our needs. They do not provide reliable coverage in many of our more rural areas.

1. **Mission critical applications**
2. **Non-mission critical applications**

ii. How can they be improved?

More towers, more coverage, lower costs, more reliability, redundant paths. We are non-profit. We are rural, we are trying to keep our rates low. We cannot fully automate our distribution system while paying the rates they charge for service. Also once we make these kinds of investments, they need to work 100% of the time. When storms occur is when we need our communications the most.

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.

AMI – Presently upgrading to a fully two-way system. Once fully functional, this will be mission critical in keeping customer loads under control and keeping DR programs functioning.

DA – Presently have 100% SCADA in substations. SCADA is used for monitoring, control, and automatic control of down-line devices. This is mission critical in keeping the system operating as desired. We are also installing line switches, capacitors, and voltage regulator control for more real time system operations. As the distribution system continues to be operated near full capacity these devices become more critical that they function as required.

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?

Site equipment needs to be <$800/site and about $25/mo to operate. 100% service area coverage is required. Bandwidth needs are probably < 1 Meg per site, but latency must be <2 sec and the sites must be reliable. (99.999% availability). Security is an issue and is part of the cost per site for the communications.

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.

Not sure how to answer this question. I think if we had the proper communications infrastructure available, there would be applications we can not even think of at this time. But right now we would be doing more DA, we would have a better grasp of what we could be doing with DR and AMI and we might have a better idea of how we might handle the EV of the very near future as far as charging, re-claiming the charge if needed, etc.

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?**

IV. Technology Options and Other Considerations

a. **What technology options are available to meet your needs?**
    i. **Wireless**
        1. **Licensed**
           700 MHz, 450 MHz, 2.3 GHz, 2.5 GHz
        2. **Unlicensed**
           900 MHz, 2.4 GHz, 3.65 GHz, 5.8 GHz, (but these all have power issues, very short range)
    ii. **Wireline**
        1. **Fiber –**not available
        2. **PLC or other private wireline –** Use PLC for AMI, but limited flexibility.
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.**

V. Recommendations

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

    Need wireless, licensed spectrum with the ability to deliver at least 3 Mbp to the end-user.

VI. Commercial systems

a. **Do they meet your needs? -** no
b. **What improvements would meet your needs? –** lower costs, more reliable, and complete coverage.

VII. Conclusion

Respectfully submitted,

Mille Lacs Energy Cooperative

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