Alaska Co-op Beats Brutal Weather and Tough Terrain With AMR

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If you think you have a rough territory to service, consider this: In the 52 remote communities it supports with electric power, Alaska Village Electric Cooperative – AVEC – must install equipment hardy enough to handle temperature fluctuations between 40 below and the sweltering 90s. Snow buries houses several feet deep. And roads … what roads? Travel to all but one town from AVEC's Anchorage-based headquarters takes place by air. And, in the villages, people ride all-terrain vehicles or snowmobiles.

Conditions like this cry out for automated meter reading, so last year, AVEC started a pilot of Elster Electricity's radio frequency mesh network technology. The system has worked so well, managers from this rugged utility hope to fully deploy AMR in the coming year. Meanwhile, AVEC's smart use of existing Elster units has made others take notice. The co-op earned Pennwell Corporation's Metering Project of the Year award at this year's DistribuTECH conference.

The Diagnostic Advantage

With AMR, AVEC gains diagnostic ability that the co-op's president and CEO, Meera Kohler, calls a "virtual SCADA." To understand the benefits this SCADA stand-in brings AVEC, you need to first understand the utility's operating challenges.

Unlike distribution co-ops, AVEC has prime generation in 48 of the 52 communities it serves. Loads in these communities are very small, Kohler says, adding that the utility's entire peak load is around 20 megawatts. In fact, most villages consume around 160 kilowatts at peak, which is a load similar to that drawn by a supermarket in most major U.S. cities. And, there is no formal SCADA system monitoring these generation facilities or the distribution-sized lines they feed.

Not surprisingly, outages present special problems. First of all, if an outage does occur, there is no option to serve the load from another feeder. "In our villages, you have several small feeders going out, but each is a dead-end," Kohler explains. "There is no looping for backup, diversionary sources."

Then, there's the challenge of moving repair people to the site. "You have to fly to virtually all of our villages, and generally, it takes two flights to get there," Kohler says. One flight gets you to a hub city like Nome, another puts you on an air taxi out into the bush.

"It's not like being in the lower 48 states, traveling along the highway system," Kohler notes. There are no hotels, which means co-op employees must stay in emergency housing attached to power plants. Shopping is so sparse and costly, AVEC's maintenance technicians and linemen generally bring their own supplies and food. Still, because there generally is no repairperson in the village, these arduous trips must be made.

Now that AVEC is getting smart meters throughout its territory, the trips can be made more efficiently. "We're able to communicate with the meters directly, one-to-one, from Anchorage," Kohler says. "For the first time, we can actually dial up a service and see what the load is, what the voltage is, whether it's on or off. We have never been able to do that before."

The AMR system's communication capacity allows AVEC engineers to follow loss-of-service up the system and find where the outage originated. In the past, when the utility had a transformer out with no backup of the right size in the village, technicians had to scramble, sometimes leaving

residents in the dark for a couple days. “Having the ability to remotely trouble-shoot a problem means that if we need to fly a lineman in, he’ll be properly equipped and know what has to be done when he gets there,” Kohler says. The data from AMR is also giving the utility more power to see loading on each feeder and perform more effective load balancing. “We’ll be able to prevent predictable outages a little better,” Kohler says.

The Value of Two-Way Communications

Kohler and her team used the benefit of virtual Scada to justify their AMR system. Meter-reading and bill-collection also came into play.

Right now, each village has one or two plant operators who check the plants a couple times per day and read member meters, weather permitting. Sometimes snow drifts so deeply, meters are buried under several feet. Consequently, AVEC’s cost-per-read is high, usually averaging $1 per meter. With 7,200 meters to read, the co-op spends at least $86,000 annually, and that doesn’t include re-reads or move in/move out support. Naturally, these costs go away with automated meter reading.

So does another pesky problem: delays in disconnects on delinquent accounts. Kohler explains that because of the remoteness of her member villages, employees of the utility are often friends or even relatives of other village residents. This, she says, makes it practically impossible for the utility to hire people who will disconnect service when members don’t pay. “That would mean you’re disconnecting your parents, your cousins, your siblings,” she says. “Delinquent disconnect is not an attractive job, and people don’t want to do it.”

To handle this unappealing task, AVEC has had to hire contract workers in summer months. These employees travel from village to village, often visiting a town only once per year. That means delinquent accounts can go months before paying up or losing their lights.

Elsters’s system gives AVEC the power to shut down and wake-up meters remotely. “We can disconnect power any time, eliminate the need for contract collectors, speed up the collection cycle and operate more like a normal utility.”

Between remote-disconnection benefits, labor savings on meter-reading and the diagnostic power of the system’s interval data, it’s no wonder AVEC’s metering project was deemed a winner.