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FOUNTAINS OF YOUTH

In deploying smart meters and other system automation technologies, electric co-ops are keeping an eye on future needs

By **Bill Koch**



Using simple spinning metal discs, electromechanical meters have been tallying up monthly electric bills for more than a century. But clearly, their days are numbered. By the end of 2012, more than 52 million smart meters—a digital device that identifies consumption patterns in detail over various time intervals, then uses two-way communications to transmit the information back to a local utility for power-quality monitoring and billing purposes (as well as letting consumers react to electricity price signals and more actively participate in demand-response activities)—will have been installed at homes and businesses across the United States, according to a survey recently published by Zpryme, a market research outfit. For electric co-ops considering large-scale smart-meter deployment, a bit of apprehension generally accompanies the selection process—there’s always a fear the system won’t be able to adapt as distribution automation advances.

“A hasty rollout or an overlooked interoperability problem can lead to premature equipment obsolescence and waste millions of dollars of members’ money,” observes Bob

Saint, NRECA principal distribution engineer. “For most co-ops, the looming question is: Will the smart meter and accompanying advanced metering infrastructure [AMI] system perform well economically and technically over time in the midst of constantly changing regulations, technology, and vendors? The most forward-facing choices should be made by carefully analyzing which AMI systems and software programs were developed with tomorrow in mind.”

In the winter of 2005, La Pine, Ore.-

based Midstate Electric, which served 18,000 members at the time, began a measured smart meter project (putting in 1,200 to 1,500 single-phase REX meters annually) after determining that Elster’s (elster.com) EnergyAxis RF mesh wireless AMI could perform well even in a rural area with dense tree and snow cover. Mesh communications continues to operate when a single node or multiple nodes break down or a connection is severed, as nodes dynamically switch to neighboring ones as conditions warrant.

INFO TO GO

Five things to consider as you select smart meters and system automation technologies:

1. *Avoid a “keeping up with the Joneses” approach; just because a solution worked for a neighboring electric cooperative doesn’t mean it will work for you.*
2. *Bandwidth provides the key to more than just monthly or even daily meter readings—make sure you have enough bandwidth to support future requirements.*
3. *Hasty smart meter and communication system deployment sets the stage for technology to quickly become obsolete; brainstorming, research, and pilot studies are vital to making the right choices.*
4. *Successful implementation of a smart meter system requires careful attention to project planning and staffing.*
5. *For more on this subject, check out the NRECA Cooperative Research Network report, Strategic Technology Planning: A Navigational Aid for Electric Cooperatives.*

"We based our decision on the assumption that if you buy something today, you may have to replace it in 10 years due to technical obsolescence, even though the meter still works just fine," relates Tom Weller, Midstate Electric engineering supervisor.

That strategy paid dividends when Elster,

in 2009, released its REX2 meter boasting enhanced memory, greater security, and the ability for its software to be remotely upgraded. The REX2 also featured expanded support for outage and voltage monitoring through Elster's two-way communications EnergyAxis 900-MHz local area network (EA_LAN) and the ability to incorporate personal energy management units, such as in-home displays, through a ZigBee 2.4-GHz home area network.

"Since the original REX meters couldn't

be upgraded, we began installing REX2 meters as they became available," Weller comments. "From 2009 to 2011, we increased our pace to 5,000 REX2 meters per year. Now, we obtain meter reads and half-hour load profiles daily from both meter models through the EA_LAN."

Finding that no single vendor's smart grid solution met all of its requirements, Lebanon, Ind.-based Boone Rural Electric Membership Corporation began integrating new meters after implementing an AMI system.

"As technology and pricing improved, we decided in 2008 to move from leased meters to an in-house owned-and-operated AMI setup and meter shop," comments Valerie Sharp, Boone REMC manager of engineering services. The Hoosier State co-op, which serves 12,000 members on the north-west side of Indianapolis, went with Cooper Power Systems' (cooperindustries.com) Cannon powerline carrier (PLC) AMI.

In early 2011, a desire to more fully exploit AMI communications bandwidth for 15-minute-interval meter reads prompted Boone REMC to move to Landis+Gyr (landis continued on page 38



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gyr.com) FOCUS meters. "We purchased E130 FOCUS AL meters for residential use and E350 FOCUS AX-SD polyphase meters for three-phase accounts," Sharp notes. "Both products have configurable displays, robust lightning-resistance capabilities, and an enhanced plug-and-play tie to the Cannon PLC system. We're integrating them as older meters fail."

To achieve faster meter data retrieval, the co-op also boosted its backhaul system to Solectek (solectek.com) radios, which include a 5.8-GHz loop and two 11-GHz microwave sections. "Right now, we can't read our whole system at one time, so we must stagger our reads," Sharp points out. "Our ultimate objective is to be able to read our whole system as fast as technology will allow."

Victoria Electric Cooperative, headquartered in Victoria, Texas, has embarked on adding smart grid communications that leverage the Trilliant (trilliantinc.com) Platform and its multi-tier SecureMesh system.

"We felt strongly that Trilliant Secure-

Mesh would provide us with robust, high-speed, low-latency two-way communications that will serve as our smart grid foundation and meet AMI objectives and future demands," explains Blaine Warzecha, Victoria Electric general manager.

After reviewing meters from major manufacturers that factory-install SecureMesh communications modules, the co-op opted for I-210+ and I-210+c residential meters from General Electric (gedigitalenergy.com), which permit time-of-use and interval data recording. Warzecha comments: "We worked closely with Trilliant and find their system scalable and able to grow with us."

If smart meters are to earn their keep, thorough planning remains key. CoServ Electric, based in Corinth, Texas, has launched CoServ eCoGrid, an advanced distribution system technology project that includes AMI, distribution automation, and personal energy management applications.

"This initiative will touch every person and most every business process at our cooperative," asserts Curtis Trivitt, CoServ Electric senior vice president-energy services. "We had been looking at AMI for some time, but the investment did not pencil out on remote

meter reads alone. The system needed to deliver numerous tangible and intangible benefits, operating efficiencies, and functionality to be justified."

To underpin its AMI effort, CoServ Electric eventually zeroed in on the Gridstream RF mesh communication system from Landis+Gyr as well as E350 FOCUS AX-SD meters for single-phase services and E650 S4e and E330 FOCUS AX polyphase meters for three-phase. "The meters contain firmware that can be upgraded right from the office, removing obsolescence concerns," Trivitt indicates. "Our projections show that our eCoGrid AMI outlay will not, in and of itself, lead to a rate increase."

Over the summer, CoServ Electric began hooking up smart meters across its service territory. "Deployment completion is set for the middle of next year, a milestone that lays the foundation for a great many innovations," Trivitt concludes. ■

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