



Farmers reap savings with irrigation load control

Noble REMC brings innovative demand response to co-op members

At a glance

- The wholesale power supplier that serves Noble Rural Electric Membership Cooperative (REMC) offers substantial rate discounts to co-ops that deliver controlled load enabled and verified by Advanced Metering Infrastructure (AMI).
- With an end-of-life metering system to replace and 33 percent annual increases in irrigation load, Noble wanted an AMI system that would support an irrigation load-control program. The co-op selected Elster technology.
- Today, 95 percent of eligible farmers take part in Noble's agricultural load-control program. The program puts 3.1 megawatts under the co-op's control and saves participants an average of 21 percent on their electric bills.

Scenario

Irrigation packs a big payback for farmers in rural Indiana. Yield more than doubles when you turn on the spigot, jumping from 80 or 90 bushels per acre to more than 200. And, water isn't the only thing that flows. So do the electrons that power pivot irrigators, which use powerful motors – up to 125 HP – to pump groundwater up to the surface. Not surprisingly, this technology can consume as much energy as commercial loads.

For Noble REMC, that irrigation load rose dramatically between 2006 and 2014, when the number of irrigation systems powered by the cooperative jumped an average of 17 percent each year. The KWh growth associated with these systems shot up an average of 32.7 percent annually.

Meanwhile, Wabash Valley Power Association (WVPA), the wholesale electricity provider that supplies Noble REMC, was offering a new load-shedding program that would have given Noble and its members significant savings. But, the distribution co-op didn't have a way to participate. In fact, even its 30-year-old program that controlled 3,000 water-heater loads ended in January 2013, when FCC narrow banding requirements left the communications network obsolete.

At the same time, Noble also was shopping for a metering system to replace power-line technology that had reached end of life. "We were having to go out and read 600 meters manually every month, says Douglas Dickmeyer, manager of Engineering and Operations for the REMC. "We'd started looking for an AMI system, and we put the means of controlling irrigation customers on our list of requirements."

Solution: AMI and smart meters deliver custom load control

Noble REMC engineers worked with the Elster engineering team to determine if a surface mounted smart meter, equipped with a load-break switch, could manage irrigation system loads. As part of a comprehensive AMI system, the gREX uses Elster's EnergyAxis native 900 MHz communication network to provide reliable signal propagation despite dense vegetation and an average of only 9 meters per line mile on the REMC distribution system.

After turning to Elster for additional software integration and customization, the REMC controls the simple magnetic switches that turn a large variety of irrigation equipment types on and off. The control technology uses a batch request



Passing savings on to members is what cooperatives are all about.
DOUGLAS DICKMEYER, MANAGER OF ENGINEERING AND OPERATIONS



tool in Elster's EnergyAxis Management System (EA_MS) that allows Noble REMC to curtail or restore load within minutes of receiving a control signal from WVPA. EA_MS also allows the co-op to verify switch state, and Noble's own SCADA system further validates operation of the system.

The load-management program offered by Wabash Valley Power Association reflected deals WVPA worked out over the last several years with the Regional Transmission Organizations MISO and PJM. MISO and PJM have agreed to count controlled load as spinning reserves and discounted rates based on capacity, not load-control events. WPVA passed its discounts on to Noble REMC, which in turn passed savings to participants in the load-control program.

Nearly 80 irrigation systems are part of Noble's load-control program, and farmers who own those irrigation pivots save all summer long, regardless of how many load-control events occur. In the program inaugural year, only one such event took place.

Benefit: Lower electric bill, higher crop yields

Through its irrigation load-control program, Noble controls 3.1 MW of power and participants save hundreds of dollars on their summer electric bills. "We have a \$9-per-kilowatt demand charge for an irrigation account. If a farmer participates in the load-control program, we credit back \$6 per kilowatt," explains Dickmeyer. This saves an average of 21 percent on each farmer's electric bill, and accounts for what Dickmeyer estimates to be as much as

\$600 per month that the farmer saves in energy costs during the heavy irrigation months of June, July and August.

The co-op achieves as much load control with those 80 irrigation accounts as it did with 3,000 households that participated in a discontinued water-heater load-control program. Once that water-heater program resumes, the co-op can deliver even more load control to WVPA.

Because savings were significant, Dickmeyer had no trouble convincing farmers to sign up for the load-control program. He introduced the rate offering during a breakfast meeting held months before the program went into effect. "We had people signing up before they left the breakfast," Dickmeyer recalls.

Some 95 percent of eligible customers participate in the program. Those who don't participate have limitations imposed by the types of crops they grow.

"Every year, we give our customers the choice to select a different rate and opt out of this program," Dickmeyer says. The opt-out letter that program participants receive states that those who are in the program will remain unless they send back a form asking to be removed. "I've had several customers call and say they don't want us to assume they're in. They want to make sure we know they're participating, and they ask for permission to send the form back anyway to make sure we know they want to keep saving money."

About the deployment

Ownership

Rural Electric Membership Cooperative

Installation

April 2014 to September 2014

Infrastructure

- 11,400 residential and commercial electric meters
- Elster 900 MHz communications network
- 80 irrigation loads with Elster smart meters used as load-control switches

Key applications

- Monthly meter reads with 15-minute interval data
- Load control on 80 irrigation services
- Ahead: water-heater load control and regulator bank voltage reduction

Status

- In production
- Load control installed in two months

Integrations

- Backhaul: Verizon Wireless Private Network
- National Information Solutions Cooperative (NISC) MDM
- NISC CIS
- NISC OMS (planned)
- Load management integrated with WVPA so wholesaler can control loads

