



RGEC territory: Guadalupe Peak

Rio Grande Electric Monitors Remote Energy Assets Over Satellite

Rio Grande Electric Cooperative (RGEC) in Brackettville, Texas, provides electric service to over 10,000 metering points across Texas and New Mexico. Traditionally, the company's commitment to providing a reliable source of power across 27,000-square-miles of barren terrain has presented some interesting challenges; just to check and service remote substations, maintenance crews routinely faced driving times of up to seven hours each way. So when RGEC's Technical Services department considered upgrades to the co-op's electrical metering equipment, the question of communications was paramount.

Application:
Integrated energy management

System:

ION[®] 8500 meters
ION[®] 7600 meters
ION[®] 7350 meters
ION[®] Enterprise™ software

Benefits:

- ◆ Increased reliability
- ◆ Improved power quality
- ◆ Affordable communications
- ◆ Automated alarms

Here was an opportunity to monitor the status of the entire distribution network, while reducing the amount of time technicians must spend on the road - but how could they communicate with remote substations where telephone coverage was sparse, and cellular networks practically nonexistent? As part of a planned upgrade to a full ION[®] enterprise energy management system from Power Measurement, RGEC identified satellite communications as the answer. Combining reasonable costs with unlimited flexibility, satellite stood out as the most cost-effective way to support reliable communications between the energy-management software installed at the headquarters, and the network of intelligent energy meters destined for the remote substations.

The Satellite Solution

According to Mike Wade, technical services manager for RGEC, cost was a key factor in favor of a satellite link. Although RGEC had selected meters with an available modem option, connecting the remote substations via dial-up telephone link would have required the company to install many miles of new telephone lines and poles.

"We realized that the high cost of running a phone line to each of these remote substations -- plus the ongoing fees for using each line per minute -- would not present an affordable solution," said Wade, "and because cell phones aren't supported in most of these locations either, a satellite link was the clear choice. With satellite, the cost for each substation is limited to a satellite system for about \$2,500, and a connection rate of approximately \$200 per month. That price gets us a full-time Ethernet connection by satellite between the meters in the field and the energy-management server at the head office."

Integrated Energy Management

RGEC worked with Power Measurement to pre-assemble and install new electrical panels for each of its 18 substations. Each substation or metering point was equipped with a "master" ION 8500 or ION 7600 revenue-accurate energy meter to monitor total power in the substation, and each circuit exiting the substation was equipped with an ION 7350 feeder meter. A satellite modem and VSAT satellite dish was then installed at each location.

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The revenue meter serves as a gateway, collecting energy data from the feeder meters, and passing it by high-speed Ethernet link to the satellite hardware, and on to a PC server at the RGEC headquarters equipped with the ION Enterprise energy management software.

To help integrate the satellite communications, RGEC worked with a local provider of industrial satellite installations. "They had a lot of experience installing satellite radios for oil and gas drilling businesses, and because this type of industrial application was fairly similar in many respects, there were no surprises," explained Wade. "As Rio Grande's service area is a typically hot, desert-like environment, we also decided to build cooling hardware into the enclosures; this was a fairly straightforward process, too." The end result is an enterprise energy management system that provides real-time power monitoring and control capability across the entire distribution network. The system offers 24-hour access to real-time and logged system information for each substation "and the connection is fast," said Wade, "because it uses Ethernet between the meters and the satellite connection, and between the satellite and the master software station at the head office. This enables a true 'SCADA' operation with real-time monitoring of energy and power-quality conditions."

Remote Notification

The new energy management system also includes an Internet-enabled alarm feature that instantly notifies key personnel of potential areas of concern. Using the system's unique MeterM@il® email messaging feature, personnel can now receive alarm notification for all over/under voltage situations, sags or swells, transients, or unusually high temperatures within a meter enclosure. Also, the system sends an email alarm if the kVA exceeds 80% of the rated kVA of the power transformer. Each "master" meter also hosts its own onboard web page, making detailed power system information accessible to authorized personnel anywhere, through a standard web browser. At RGEC, Technical Services, as well as Engineering and Operations staff regularly use this WebMeter® web-enabled feature to check on conditions at a specific substation (and save themselves a long

drive out to the site).

To monitor consumption across the entire distribution network, the system automatically records total kWh as interval data logs, and distributes this information as monthly reports to TXU, the cooperative's power supplier, and ERCOT, the independent system operator. To help RGEC control power quality and reliability across its distribution network, the system automatically logs line-neutral voltage per phase, amps per phase, kW, KVAR, kVA, kWh, power factor, line frequency, sags, swells, transients, and harmonics.



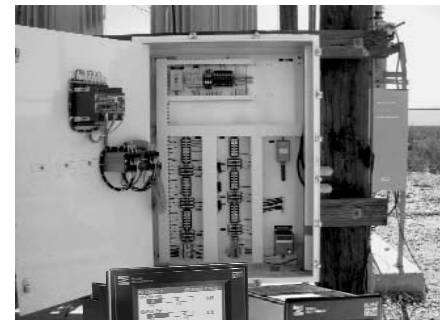
Satellite technology provides an affordable way for RGEC to monitor its remote substations

This detailed power data helps RGEC engineers to continually review and improve the company's engineering processes, and update its system distribution model.

Increased Reliability

Through increased efficiency, reduced response time, and improved awareness, Wade confirms that the new energy management system has already helped to identify and correct potential threats to reliability at several remote substations. "Recently, we received an inrush of alarms from our Cienega substation, indicating multiple transients on one phase. Inspection of the substation revealed a damaged bypass arrester and damaged bushing on the regulator," explained Wade. "In another case, alarms from our Altuda substation warned of low voltage readings, so our area office manager dispatched a lineman to the substation, who then identified and corrected a problem with a regulator control. By automatically monitoring all of our substations 24 hours a day, we can ensure that our technicians spend less time on the road, and more time where they're needed most." With a new substation scheduled for completion soon, RGEC has already arranged to bring it online with another master meter and

four feeder monitors, and like the other locations, the new station will be equipped with a VSAT satellite Internet connection for 24-hour power monitoring and control. "Although this satellite-based application represents a fairly new communications strategy for a rural utility, it's proven to be a very useful one," confirmed Wade. "As we continue to increase efficiency, improve reliability, and reduce operating costs across our entire distribution network, we can extend these benefits to our members, and for a cooperative like Rio Grande Electric, that's the bottom line."



A new substation panel combines an ION 7600 master meter, and two ION 7350 feeder monitors with satellite radio equipment.



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