

South Mississippi Electric Power Association

Advanced Metering Infrastructure and Associated Smart Grid Investments for Rural Mississippi

Scope of Work

South Mississippi Electric Power Association (SMEPA), a generation and transmission (G&T) cooperative, deployed an advanced metering infrastructure (AMI) system to benefit not only SMEPA but also five of its member distribution cooperatives: Coast Electric Power Association (Coast), Magnolia Electric Power Association (Magnolia), Pearl River Valley Electric Power Association (Pearl River), Southern Pine Electric Power Association (Southern Pine), and Southwest Mississippi Electric Power Association (Southwest). The AMI system has enabled two-way communication between SMEPA and its member cooperatives' substation meters and between the member cooperatives and their customers' meters. Additionally, three of the member cooperatives (Magnolia, Southwest, and Pearl River) implemented supervisory control and data acquisition (SCADA) systems.

Objectives

Automated meter reading has enabled the SMEPA collaborative to improve operational efficiencies and reduce costs. The new SCADA systems enable improved reliability through increased visibility into and remote management of the distribution substations and circuits.

Deployed Smart Grid Technologies

- **Communications infrastructure:** A combination of microwave, radio, digital subscriber line, cellular, and power line carrier equipment support two-way backhaul and meter communications between customers and the utilities. Stand-alone backhaul technologies and SCADA equipment have enabled remote monitoring and control of substation equipment.
- **Advanced metering infrastructure:** The SMEPA collaborative deployed 224,757 smart meters throughout the service territories of the five participating member cooperatives. The smart meters offer two-way communication between customers and the distribution cooperatives and provide aggregate substation load information to the G&T cooperative. Operational cost savings are being derived from the automation of meter reading and enhanced customer service activities through the AMI system.

At-A-Glance

Recipient: South Mississippi Electric Power Association

State: Mississippi

NERC Region: SERC Reliability Corporation

Total Project Cost: \$59,794,448

Total Federal Share: \$29,804,550

Key Partners: Coast Electric Power Association, Magnolia Electric Power Association, Pearl River Valley Electric Power Association, Southern Pine Electric Power Association, and Southwest Mississippi Electric Power Association

Project Type: Advanced Metering Infrastructure
Customer Systems
Electric Distribution Systems

Equipment

- 224,757 Smart Meters
- AMI Communications Systems: Meter and Backhaul Networks (technology varies by individual utility)
- Meter Data Management System
- Substation Automation Equipment for 20 out of 135 Substations
 - SCADA Communications Network

Key Benefits

- Reduced Meter Reading Costs
- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Distribution Line Losses and Theft
- Reduced Operating and Maintenance Costs
- Reduced Truck Fleet Fuel Usage
- Reduced Greenhouse Gas and Criteria Pollutant Emissions

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- **Substation automation systems:** Three distribution cooperatives implemented SCADA systems. Magnolia and Southwest installed SCADA systems and a communications backhaul system to relay data from substations to the main offices. Pearl River installed a geographic information system (GIS) and a SCADA system. The combination of AMI, GIS, and SCADA systems allows the electric cooperatives to monitor and document outages and develop systems for responding to downed lines and restoring services more rapidly.
- **Advanced electric service options:** Several partner cooperatives deployed web portals and mobile apps that allow their customers to access and manage their electric usage information online, and some (such as Coast and Pearl River Valley) used AMI data to offer time-of-use rates. Magnolia also initiated a pre-pay program for customers as part of their SGIG deployment.

Benefits Realized

- **Reduced meter reading and operating and maintenance costs:** Thanks to the AMI deployment, project partner cooperatives no longer need to go into the field to read meters manually, which has improved meter reading efficiency and accuracy, as well as reduced labor costs and truck rolls.
- **Improved electric service reliability:** The AMI and SCADA systems installed by cooperatives have allowed for faster, more efficient outage detection and diagnosis, as well as reduced restoration times. System operators can ping meters and utilize SCADA system data to get a clearer picture of what is happening in the field and deploy restoration field crews more efficiently. The smart grid system has proven particularly valuable in storm restoration efforts due to improved situational awareness.
- **Reduced costs and theft:** AMI technology enables improved tamper and theft detection, reducing losses due to theft for SMEPA partner cooperatives.
- **Reduced truck fleet fuel usage and greenhouse gas emissions:** Multiple truck rolls were formerly required to deploy and retrieve a voltage recorder if additional monitoring was required for a customer. That information is now readily available at utility operating centers.
- **Improved cybersecurity:** SMEPA formed a cybersecurity team as part of the Smart Grid Investment Grant project. Formation of this group has expanded the local knowledge pool and advanced the state of cybersecurity for the participating cooperatives.
- **Increased customer involvement and improved customer service:** The energy consumer used to be just a billing point, but smart grid has made customers active participants in their energy usage. Some SMEPA member cooperative customers can now access hour-by-hour data using web portals and smart phone apps. The increase in data has helped all five distribution cooperatives better address customer issues and concerns. For example, smart grid data have helped SMEPA member cooperatives discover faulty equipment in houses and identify issues with air conditioners, pool pumps, and other appliances.

Lessons Learned

- **Vendor collaboration:** Working closely with the vendor community helps avoid bottlenecks and supply chain issues for meters and substation equipment.
- **Cybersecurity:** Senior management commitment to cybersecurity greatly helps promote awareness and the importance of cyber risk abatement across project partners.
- **Data and customer service:** Having more data available via the AMI system helps to resolve customer complaints and concerns more easily.

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- **Planning with modern technology:** Sometimes technology moves ahead faster than it can be installed, creating challenges for planning upgrades.

Future Plans

SMEPA member cooperatives are exploring various ways to build on their existing systems for additional functionality. Southwest has system improvement work plans in place to address the installation of intelligent regulator controls, recloser/breaker controls, and transformer monitoring devices that communicate via fiber optic cables.

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