

Woodruff Electric Cooperative

Woodruff Electric Advanced Metering Infrastructure Project

Scope of Work

Woodruff Electric Cooperative's (Woodruff's) advanced metering infrastructure (AMI) project deployed 14,900 two-way communicating smart meters to all of its residential customers and select commercial customers. The communications infrastructure includes a meter communications network using power line carrier (PLC) technology between the meters and substations and an Internet protocol-based fiber backhaul between the substations and the AMI head-end system. Woodruff has enabled remote connect/disconnect and tamper detection functionality through the AMI system.

Objectives

The project's primary purpose was to reduce operating costs to forestall rate increases. By deploying AMI technology to gain operational efficiencies Woodruff could eliminate field trips for routine distribution system service work and start/stop service requests. The utility also expected to gain improvements in system reliability through improved data acquisition and analytics.

Smart Grid Tools and Technologies

- **Smart meters:** Woodruff deployed 14,900 solid-state AMI meters to enable the automated collection of hourly interval reads, remote connect/disconnect functionality, and improved outage management capabilities.
- **Communications infrastructure:** The project team deployed a PLC-based AMI communication network. Utilizing digital signal processing technology, collectors act as gateways between the meters and head-end Command Center software. Installation of transformer coupling units allows the system to maintain a reliable interface between the collectors and the head-end system. The new communications network provides a secure infrastructure for monitoring electricity usage and distribution system conditions.
- **Command Center software:** The heart of the AMI system, the Command Center, integrates AMI data with Woodruff's customer information system, allowing for more efficient and accurate billing, monitoring, and troubleshooting.

At-a-Glance

Recipient: Woodruff Electric Cooperative

State: Arkansas

NERC Region: SERC Reliability Corporation

Total Project Cost: \$5,190,542

Total Federal Share: \$2,357,521

Project Type: Advanced Metering Infrastructure

Equipment Installed

- 14,900 Smart Meters
- AMI Communications Systems
 - Power Line Carrier Network
 - Data Collectors
 - Transformer Coupling Units
 - Head-End System
 - Command Center Software
 - Backhaul Communications

Key Benefits

- Reduced Meter Reading Costs
- Reduced Operating and Maintenance Costs
- Reduced Costs from Theft
- Reduced Truck Fleet Fuel Usage
- Reduced Greenhouse Gas and Pollutant Emissions

Benefits Realized

- **Reduced operating and maintenance costs:** The AMI project helped Woodruff avoid 6,816 truck rolls in 2012, resulting in reduced fuel costs and greenhouse gas emissions. In addition, all meters installed with the project have remote connect/disconnect capability that integrates with the existing PLC infrastructure, allowing Woodruff to drop its reconnection charges by 43 percent. The remote service switches allow customers to adopt prepaid electricity services to better manage their electricity usage and corresponding costs.
- **Improved power quality:** Woodruff is using a subset of the meters to monitor line voltage, which allows the utility to identify power quality problems and make power factor corrections. This practice also allows Woodruff to avoid financial penalties that must be paid if the power factor drops below required levels.
- **Enhanced customer service:** With new AMI features, such as outage and restoration notification and tamper detection, utility personnel can locate and fix system faults and theft-of-energy situations quickly and cost effectively. This enables Woodruff to respond to outages and customer requests more efficiently. In addition, integrating the AMI system with Woodruff's customer information system provides additional operational efficiencies and improved customer service.

Lessons Learned

Woodruff demonstrated the benefits of a pilot approach by launching a small-scale trial of the technology in July 2009. The pilot allowed Woodruff to test interoperability of the various system components and configure firmware to reprogram cycles and test meters, arming utility staff with knowledge that ensured successful implementation of the remaining meters.

Future Plans

The project put in place the basic infrastructure for future smart grid enhancements. Woodruff is currently designing a program to allow for bill prepay options. Once the prepay program is instituted, these options will allow members to save money on deposits and connect/disconnect costs.

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