

## City of Ruston, Louisiana

### *Advanced Metering Infrastructure and Smart Grid Development Program*

#### Scope of Work

The City of Ruston's Smart Grid Investment Grant (SGIG) project implemented advanced metering infrastructure (AMI), a meter data management system (MDMS), and a customer prepay program. The City's customer information system (CIS) was also upgraded to enable the use of AMI data for billing. Distribution automation (DA) improvements included installation of capacitor banks, reclosers, and voltage regulators. The DA project also included the total replacement and modernization of two substations that utilize multi-tap smart grid-enabled transformers. These upgrades will allow the City to implement conservation voltage reduction programs. The AMI and DA networks and applications were blanketed with protection via a newly implemented and robust cybersecurity plan.

#### Objectives

The goal of the project was to move Ruston towards increased automation and full interoperability between its various electric system components through improvements to metering, customer systems, and distribution circuits. The project sought to increase operational efficiency and provide customers with tools that enable more informed energy management. Two-way communications infrastructure and automated distribution circuits significantly enhance Ruston's remote monitoring, diagnostic, and troubleshooting capability, improving overall electric service reliability.

#### Deployed Smart Grid Technologies

- **Communications infrastructure:** Ruston deployed a wireless radio frequency network infrastructure with fiber backhaul to support two-way communication between the utility back office and the meters. The fiber backhaul is also utilized for DA.  
**Advanced metering infrastructure:** Smart meters have been installed for all residential, commercial, and industrial customers in Ruston's service territory. The meters collect customer consumption data in hourly intervals for residential customers and 30-minute intervals for commercial and industrial customers. Ruston's AMI network reports data, in near-real time, to an MDMS. The new MDMS interfaced with the CIS provides a platform for presentation of energy usage and costs to consumers through the new customer portal. AMI,

#### At-A-Glance

Recipient: City of Ruston, Louisiana

State: Louisiana

NERC Region: SERC Reliability Corporation

Total Project Cost: \$8,767,285

Total Federal Share: \$4,331,650

Project Type: Advanced Metering Infrastructure  
Customer Systems  
Electric Distribution Systems

#### Equipment

- 10,596 Smart Meters
- AMI Communications Systems
  - Meter Communications Network (25 Gateways)
  - Complete Fiber Backhaul Communications
- Meter Data Management System
- Customer Web Portal
- Distribution System Automation/Upgrade for 10 of 18 Circuits
  - Distribution Management Systems
  - Distribution Automation Communications Network (fiber backhaul)
  - 6 Automated Distribution Circuit Switches
  - 10 Automated Capacitors
  - Automated Voltage Regulators
  - Equipment Condition Monitors

#### Key Benefits

- Deferred Investment in Distribution Capacity Expansion
- Reduced Costs from Theft
- Reduced Operating and Maintenance Costs
- Improved Electric Service Reliability and Power Quality
- Enhanced Consumer Control of Electricity Costs and Environmental Impacts
- Reduced Truck Fleet Fuel Usage

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combined with these new communications tools, will support advanced pricing programs in the future and allow Ruston to more cost-effectively respond to changes in the energy markets.

- **Distribution system reliability improvements:** The project included installation of new automated switches, reclosers, and transformer monitors. This equipment coordinates sensor data throughout the distribution grid to automatically address power disturbances and quickly isolate outages. Ruston further compiles this data using reporting tools that allow the utility to identify where losses are occurring and where operational corrections can be made. This enables Ruston to rapidly and efficiently deploy field crews where needed. Utilizes
- **Distribution system volt/VAR improvements:** The project included installation of new capacitor banks. This equipment coordinates sensor data throughout the distribution grid to automatically manage power quality. This allows the utility to more efficiently utilize its distribution system, and to defer near-term investments to expand its distribution system capacity.
- **Prepay program:** The City of Ruston's prepay metering system is an integral part of the City's smart grid program. Ruston's prepay system incorporates AMI meters with a remote connect and disconnect feature. This allows for efficient disconnects and reconnects without the need for a truck roll, reducing the cost of service by reducing vehicle use. This in turn allows Ruston to realize its goal of reducing vehicle costs, such as fuel and maintenance, while additionally decreasing greenhouse gas emissions. Ruston is providing its prepay customers with the tools to monitor their usage. The customers' remaining balance and usage data are accessible through a web portal and can also be monitored on smart phones. For customers without Internet access, the City of Ruston has installed several kiosks throughout the City.

**Benefits Realized**

- **Deferred investment in distribution capacity expansion:** Distribution automation equipment such as capacitor banks and voltage regulation devices have enabled a more efficient operation of the grid. In addition to improved utilization, these assets have increased availability of data that can be utilized to more accurately forecast the need for capacity expansion investment.
- **Reduced truck rolls and fleet fuel usage:** As a result of the remote service switching feature on the smart meters, the City can respond to requests to turn service on or off without driving to customers' premises. This reduces truck rolls as well as response time. Furthermore, automated reclosers work to restore power as outages are detected and help identify and isolate faults so that field crews can be more efficiently deployed.
- **Enhanced customer service options:** The prepay program, powered by the new AMI system, provides customers with additional payment options. With prepay, customers do not have to pay high deposits and can manage their electric bills with frequent smaller payments that are budget-friendly. The new web portal provides customers with better understanding of their electricity usage patterns and enables them to manage their utility accounts.

**Lessons Learned**

For the SGIG project, utility staff proactively identified and documented all current state business and financial processes that would be directly affected by deployment of the AMI system, creating the roadmap for future state redesign. That roadmap served as a critical component to inform the change management effort across the organization.

Legacy customer information and billing systems can be bottlenecks for AMI deployments if not properly prepared for the introduction of interval data. Detailing all data requirements from meter inventory, billing, meter change-outs, and

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financial reporting will determine whether the current system can be modified or upgraded to accept AMI data. CIS upgrades, enhancements, or replacement may be necessary for the project to move from pilot to production. This takes time, and identifying this early will allow project timelines to be maintained.

**Future Plans**

The City of Ruston is an electric and water utility. With full AMI deployment of electric meters, Ruston gained some operational efficiency, such as reducing truck rolls for service connect/disconnect activities. However, for customer transfers and water billing, Ruston must still work the territory physically. The first step to automate these processes will be to install water AMI nodes. This will allow Ruston to achieve additional operational efficiencies from a unified AMI system.

While Ruston is limited by their current power purchase agreement, they are well positioned to deploy more advanced demand-side management programs as a result of the deployment of AMI and DA technologies. Future agreements may force Ruston to implement TOU rates and load control devices. With a functional AMI and MDMS, Ruston is better positioned to be able to satisfy the terms of the agreement, and avoid a hardship situation for the utility and the customers it serves.

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