

City of Auburn, Indiana *SmartGRID Project*

Scope of Work

The City of Auburn's (Auburn's) SmartGRID project involved deployment of a city-wide advanced metering infrastructure (AMI) system, a meter data management system (MDMS), a customer web portal, a distribution management system (DMS), and distribution automation (DA) equipment on ten circuits: automated switches, capacitors, voltage regulators, fault indicators, smart relays, and equipment sensors.

Objectives

The advanced technologies deployed under the SmartGRID project have improved system reliability and shortened outage durations for Auburn's customers. AMI and DA also helped the utility to reduce operations and maintenance costs, in part by lowering the number of truck rolls required for meter reading and field operations. Additional objectives included reducing overall energy usage and peak loads on the system and engaging customers with improved energy management tools.

Deployed Smart Grid Technologies

- **Communications infrastructure:** Auburn utilized an existing fiber-to-the-home network to connect to the meter. The network provides two-way communications to DA equipment, all new smart meters, and demand response devices. In addition, the meters themselves utilize a 900-megahertz frequency that allows meter-to-meter communication, providing redundant coverage throughout the network. Six substations are outfitted with ethernet processors that collect data from multiple network devices, allowing communication between the communications processor and any device on the network.
- **Advanced metering infrastructure:** Auburn deployed 6,318 smart meters at residential locations and 1,156 meters at commercial/industrial locations. All smart meters have tamper detection, and one fifth of the single-phase smart meters have remote connect/disconnect capabilities. A MDMS was installed to validate, store, and process interval load data used for billing and the customer web portal.
- **Distribution automation systems:** Auburn deployed a new supervisory control and data acquisition (SCADA) system, remote fault indicators, smart relays, feeder monitors, and automated feeder switches, regulators, and capacitors. While all circuits have the ability to transfer complete load from substation to substation, 20% of the feeders have additional reclosers added to help segment the feeders even more to allow for additional restoration capability for smaller feeder segments.

At-A-Glance

Recipient: City of Auburn

State: Indiana

NERC Region: ReliabilityFirst Corporation

Total Project Cost: \$4,171,374

Total Federal Share: \$2,075,080

Project Type: Advanced Metering Infrastructure
Customer Systems
Electric Distribution Systems

Equipment

- 7,474 Smart Meters
- AMI Communications Systems (Fiber)
 - Meter Communications Network
 - Backhaul Communications
- Meter Data Management Systems
- Customer Web Portal Enhancement
- Distribution Automation Equipment for 10 out of 24 Circuits
 - Distribution Management System
 - Distribution Automation Communications Network (Fiber)
 - SCADA Communications Network
 - Automated Distribution Circuit Switches
 - Automated Capacitors

Key Benefits

- Reduced Meter Reading Costs
- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Theft

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- **Advanced electricity service options:** A new web portal facilitates two-way information exchange, presents customers with their interval data, and enables more informed management of electricity consumption and trends.

Benefits Realized

- **Reduced meter reading costs:** Smart meters enable automated remote meter reading, reducing the costs associated with manually reading customers' meters. Auburn reduced the time to collect data and generate utility bills by 210 man-hours per month.
- **Improved electric service reliability:** DA improves system reliability and operational efficiency. Fewer visits to the field, and therefore fewer truck rolls, are required to troubleshoot and resolve system disturbances, allowing for more efficient service and faster responses to outages. Auburn's SCADA system, using information from the geographic information system (GIS) and AMI, generates emails stating the outage location and customers affected, and these messages are distributed to the line crews. Notification also goes to the dispatch and IT departments for website updates and customer notification as required.
- **Improved power quality:** Power factor improvements for the system have resulted in wholesale power cost savings of \$25,620 per year. Additional improvements in voltage across the system have reduced the number of cycles on the load tap changer at each substation.
- **Reduced costs from theft:** Smart meters have a remote tamper detection capability that can be used to more quickly identify and resolve theft-of-energy cases, reducing the costs associated with electricity theft across the customer base. In one instance, the AMI notified Auburn that an outage had occurred at a single location; upon review of the site, Auburn notified the police, and an intruder who was stealing copper was arrested. The police were surprised that the electric department was able to notify them as this was taking place.

Lessons Learned

- Web portal access for meter data management usage viewing is beneficial. However, customers must be engaged in and educated about consumption information and portal usage to fully leverage the benefits that AMI data can enable.
- Automated capacitor banks created issues with certain small machine shops that did not have filters or uninterruptible power supply (UPS) on their equipment. Automatic capacitor cycling created problems with the internal controls. Auburn addressed the issue by going into manual mode and installing UPS devices on the machines.

Future Plans

The City of Auburn continues to build on the base products that were an integral part of this project.

- Auburn is building new products and gaining insight into customer usage with the web-based meter data management model.
- By leveraging the real-time meter data from industrial customers, Auburn has received approval from the Indiana Utility Regulatory Commission to establish a demand incentive program. The program allows industrial customers to offset on-peak and off-peak demand to help create a better load profile for the City and reduce overall wholesale electricity costs.
- Auburn is adapting the AMI network to incorporate water reads.
- The City will install ten more DA switches over the next three years to broaden the system's restoration capability.

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- Auburn continues to improve customer service by enhancing power usage and price point notifications. The ultimate aim is to capitalize on efficiency to drive a return to the wholesale electricity market and away from a formula-based power purchase contract.

Contact Information

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