

Lakeland Electric

Smart Grid Initiative

Scope of Work

Lakeland Electric's (Lakeland's) Smart Grid Initiative involved the deployment of smart meters and communications infrastructure. These technologies supported implementation of time-based rate programs and advanced customer service options, which were also part of the project scope. Lakeland's project included a consumer behavior study (CBS) assessing the impacts of time-based rate programs.

Objectives

The project implemented two-way communications and metering that (1) enables customers to monitor energy consumption at their convenience through a web portal and mobile device application, (2) allows Lakeland to provide time-based rate programs to customers, (3) provides information and tools to improve outage management, and (4) reduces distribution operations and maintenance costs.

Deployed Smart Grid Technologies

- **Communications infrastructure:** Lakeland installed an advanced metering infrastructure (AMI) point-to-point radio network. Radio devices in new smart meters transmit data to multiple radio towers through a 900-megahertz (MHz) network licensed by the Federal Communications Commission. The upgraded meter data management system (MDMS) and outage management system (OMS) use data and notifications from smart meters and automated distribution equipment.
- **Advanced metering infrastructure:** The AMI system includes smart meters for essentially all 121,900 Lakeland customers. (Approximately 145 customers chose to opt out of having AMI meters. Their digital electric meters are read manually once per month rather than via the radio network.) The AMI deployment enables time-based rate programs and advanced service options for interested customers. The new infrastructure also supports lower operations costs from remote meter reading and more timely identification of electricity theft.
- **Advanced electricity service options:** Offered in conjunction with time-based rate programs, advanced electricity service options enable customers to monitor and control their electricity use. Through a web portal, Lakeland provides energy feedback on the customers' energy usage and patterns. Similar information is also available through a mobile smartphone/tablet app. These service options provide residential customers with information feedback and control options to reduce their electric costs. In the near future, customers will also be able to enroll in a pre-pay option that helps them to manage the amount of electricity they use each month. They will get emails or voice or text messages when they approach the end of the remaining pre-paid balance.

At-A-Glance

Recipient: Lakeland Electric

State: Florida

NERC Region: SERC Reliability Corporation

Total Project Cost: \$35,081,502

Total Federal Share: \$14,850,000

Project Type: Advanced Metering Infrastructure
Customer Systems

Equipment Installed

- 121,900 Smart Meters
- Meter Communications (900-MHz Point-to-Point Radio Network)
- Meter Data Management System (MDMS)
- Outage Management System (OMS)
- Customer Web Portal Access for 121,900 Customers

Time-Based Rate Programs Available to 121,900 Customers

- Time of Use

Key Benefits

- Reduced Meter Reading Costs
- Reduced Operating and Maintenance Costs
- Improved Electric Service Reliability
- Reduced Truck Fleet Fuel Usage

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- **Time-based rate program:** The project included a new time-of-use pricing option made available for all 121,900 Lakeland customers. In conjunction with informational services and advanced metering, the time-of-use option encourages consumers to shift their consumption from on-peak to off-peak periods.

Consumer Behavior Study

Lakeland's CBS assessed the impacts of time-based rate programs initiated under the project. The objectives of the CBS included estimating peak demand savings, the amount of load shifting from on peak to off peak periods and from shoulder periods to off peak periods, and the amount of net overall electric usage savings to customers. Other objectives included assessing customer acceptance and retention, and assessing customer volunteer rates versus assigned rates, as well as customer dropout rates. CBS results are available on SmartGrid.gov.

Benefits Realized

- **Reduced meter reading costs:** Operational cost savings were derived from the automation of meter reading and customer service activities through the AMI system.
- **Reduced operating and maintenance costs and reduced truck fleet fuel usage:** The AMI system has enabled improved efficiency in dispatching field crews which, in turn, has reduced meter operations miles traveled and associated costs. AMI has also allowed for remote monitoring, detection, diagnostics, and troubleshooting of meter malfunctions, reducing the need to dispatch field crews to investigate poorly performing meters.
- **Improved electric service reliability:** The AMI system has allowed for faster, more efficient outage detection and diagnosis, as well as reduced restoration times. System operators have been able to ping meters to get a clearer picture of what is happening in the field and deploy restoration field crews more efficiently.

Lessons Learned

- Customer education about smart grid deployment is highly beneficial—there cannot be too much communication. By observing meter deployments in other states, Lakeland was able to develop educational materials to address and mitigate issues with meter radio frequency concerns.
- All stakeholders should be involved during system design and implementation to provide the best solutions for the customers and employees who will use the system.
- A process for handling meter alarms should be developed and implemented at project initiation.
- It is essential to plan how to utilize the voluminous data that will be received. A data analytics software package will help maximize the benefits of the system.

Future Plans

Lakeland plans to:

- Integrate the AMI system with the future outage management system to generate an outage ticket when a meter reports a power-out condition.
- Install intelligent devices on the distribution lines that communicate over the AMI radio infrastructure. This will allow the utility to identify and correct problems on the distribution network prior to failure.

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