

Central Lincoln People's Utility District

Smart Grid Team 2020 Program

Scope of Work

As part of their Smart Grid Team 2020 Project, Central Lincoln People's Utility District (Central Lincoln PUD) deployed advanced metering infrastructure (AMI), a meter data management system (MDMS), an AMI-enabled web portal, an outage management system (OMS), and distribution automation (DA) assets. The AMI component of the project included system-wide installation of smart meters and deployment of communications infrastructure to support the AMI data transfer. DA upgrades included deployment of an enhanced supervisory control and data acquisition (SCADA) system; automated distribution feeder controls, regulators, monitors, and fault indicators; and an upgraded fiber optic cable network.

Objectives

Central Lincoln PUD's primary goal was to establish a two-way communications network between the utility monitoring and control systems and intelligent grid devices to enable a variety of smart grid and energy conservation programs and applications. The enhancements also improve power quality, system reliability, and system efficiency.

Deployed Smart Grid Tools and Technologies

- **Communications infrastructure:** A combination radio frequency (RF) mesh and fiber optic cable network connects the system-wide deployment of smart meters. The network provides the necessary communications infrastructure to enable smart grid features such as AMI portal-based customer energy management tools and time-based pricing programs. Additional fiber was deployed to connect all substations to the control center. DA devices communicate with the substations via a high-speed wireless connection.
- **Advanced metering infrastructure:** Central Lincoln PUD deployed 38,620 smart meters to residential, commercial, and industrial customers system-wide. Residential meters are equipped with remote service disconnect and wireless home area network capability.
- **Advanced electricity service options:** All customers receiving smart meters now have access to a customer web portal that displays interval usage data, trending information, and energy conservation tips. All residential meters now have operational remote connect/disconnect functionality and can support time-based pricing if needed in the future.

At-A-Glance

Recipient: Central Lincoln People's Utility District

State: Oregon

NERC Region: Western Electricity Coordinating
Council

Total Project Cost: \$19,203,396

Total Federal Share: \$9,601,696

Project Type: Advanced Metering Infrastructure
Customer Systems
Electric Distribution Systems

Equipment Installed

- 38,620 Smart Meters
- AMI Communications Systems
 - Meter Communications Network (RF Mesh)
 - Backhaul Communications (Fiber Optic)
- Meter Data Management System
- 46 In-Home Displays
- Customer Web Portal Access
- Outage Management System
- Distribution Automation
 - SCADA System
 - Communications Network (Fiber Optic Cable and High-Speed Wireless)
 - Automated Feeder Switches
 - Automated Reclosers
 - Regulator Automation Equipment

Key Benefits

- Reduced Operating and Maintenance Costs
- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Distribution Line Losses
- Reduced Truck Fleet Fuel Usage

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- **Distribution automation systems:** Central Lincoln PUD deployed automated line sectionalizing switches. Feeders can now be reconfigured remotely to reduce the affected area in the event of a fault or to handle unexpected changes in electricity demand. These assets work together to improve distribution system reliability, stability, and operational efficiency.
- **Distribution system energy efficiency improvements:** Automated regulators were deployed at select substations to pilot the use of AMI voltage readings at the meter level to enable a conservation voltage regulation capability.

Benefits Realized

- **Reduced operating and maintenance costs:** The AMI system enables efficiency in dispatching field crews which, in turn, reduces meter operations miles and costs and associated greenhouse gases. AMI also allows for remote monitoring and troubleshooting of the 38,620 meters on its system.
- **Reduced costs from distribution line losses and improved electric service reliability:** Central Lincoln PUD has implemented a unique approach to voltage optimization, utilizing near-real-time premise-level voltage measurements collected through the AMI system and integrated with SCADA control to deliver voltages more closely aligned with optimal operating requirements.

Lessons Learned

- AMI transforms every aspect of utility operations. It is especially important to dedicate time and resources to engage all departments in requirements collection and business process redesign.
- Leveraging the AMI system to implement a conservation voltage regulation capability benefits all customers without requiring their active participation.
- The integration effort between legacy and new information technology (IT) systems is significant and should be adequately planned for during the design phase.
- A robust communications network is critical for both AMI and DA. In Central Lincoln PUD's case, utilizing a variety of communications technologies was necessary to ensure adequate coverage, redundancy, and performance. Collecting GPS location data for each meter and DA device was essential for network optimization.

Future Plans

- Central Lincoln PUD plans to leverage experience gained on this project to implement conservation voltage regulation territory-wide and install additional DA devices on the system. Additionally, a prepay program and time-based pricing options for customers, made feasible by AMI, are in early planning stages.

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