

Modesto Irrigation District

Smart Grid Deployment and Installation Project

Scope of Work

The Modesto Irrigation District's (MID's) Smart Grid Deployment and Installation project involved installation of an advanced metering infrastructure (AMI) system, a meter data management system (MDMS), and a web portal to enable customers to better manage their electricity consumption and costs. The smart meter deployment covered the Mountain House Development, a single isolated area with 3,348 customer sites. The project also included installation of distribution automation (DA) equipment for 45 of 120 circuits and deployment of a distribution management system (DMS).

Objectives

The project aimed to reduce system-wide losses, while improving voltage control. The smart meters and web portal allows MID to consider implementation of time-based rate programs in the future.

Deployed Smart Grid Technologies

- **Communications infrastructure:** The project used RF mesh network for meters and cellular for backhaul in the remote project area. Within their contiguous service area a private fiber network is used for backhaul. This infrastructure provides two-way communication, facilitating a variety of smart meter functions and applications.
- **Advanced metering infrastructure (AMI):** The AMI system provides for several features in addition to automated meter reading, including remote connect/disconnect, outage detection and reporting, power quality monitoring, and tamper detection. The MDMS further processes, validates, and prepares the meter data for billing and web presentment. The meters offer a variety of benefits including reduced meter reading costs and potential to improve outage notification for faster restoration times.
- **Customer system programs:** A customer web portal facilitates two-way information exchange between the customers and MID and enables the participating customers to better manage their electricity use and monthly bills. Through the web portal, customers can monitor hourly, daily, weekly, or monthly electricity use. In addition, the customers can also view and pay their bills.
- **Distribution system energy efficiency improvements:** MID deployed automated capacitors and volt/volt-ampere reactive (VAR) control to improve power quality and reduce line losses. The volt/VAR controls and the automated capacitors help to maintain optimal voltage levels in the distribution system, thus improving the system's operational efficiency and reducing operations and maintenance costs. MID identified a test substation for a Phase

At-A-Glance

Recipient: Modesto Irrigation District

State: California

NERC Region: Western Electricity Coordinating Council

Total Project Cost: \$3,495,107

Total Federal Share: \$1,493,149

Project Types: Advanced Metering Infrastructure
Electric Distribution Systems

Equipment

- 3,538 Smart Meters
- AMI Communications Systems
 - Meter Communications Network (RF mesh)
 - Backhaul Communications (Cellular for the remote project area)
- Meter Data Management System
- Customer Web Portal
- Distribution Automation Equipment for 45 out of 120 Circuits
 - Distribution Management System
 - Automated Distribution Voltage Monitoring
 - Automated Capacitors

Key Benefits

- Reduced Operating and Maintenance Costs
- Reduced Costs from Line Losses
- Reduced Truck Fleet Fuel Usage

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One deployment, piloted the new equipment, and plans to use Phase One results to determine the substations and system upgrades to be included in Phase Two.

Benefits Realized

- **Reduced operating and maintenance costs:** The advanced technologies support better detection of energy diversion, which resulted in correction of tampered service situations.
- **Reduced truck rolls and fleet fuel usage:** Most service turn-ons and turn-offs are now done remotely via the main office. Prior to project implementation, MID would dispatch a technician in a truck for each turn-on /turn-off, entailing a 90-mile-drive (round-trip) to serve the Mountain House area.
- **Improved power quality:** The project has improved stability of end-of-line voltage enabled by continuous monitoring of that parameter and feedback into the control system.
- **Reduced distribution line losses:** Voltage is maintained in the lower band of the acceptable range, and the power factor is maintained closer to unity, which results in a more efficiently operated system.

Lessons Learned

- Integration between new and legacy systems proved to be very challenging.
- The customer portal was far more expensive than initially projected. In addition, the rollout was more complicated than expected because of the need to link portal implementation with the rollout of online billing.

Future Plans

MID is presently developing Phase Two of its volt/VAR project, utilizing experience gained from the pilot. The infrastructure installed provides a platform from which to deploy additional smart grid technologies, such as automated circuit switching and automated detection of power interruption.

Contact Information

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