

## Central Maine Power Company

### *CMP Advanced Metering Infrastructure Project*

#### Scope of Work

Central Maine Power Company's (CMP's) Advanced Metering Infrastructure (AMI) project featured territory-wide deployment of more than 622,000 smart meters, covering all of CMP's residential, commercial, and industrial customers. This project created a technology platform for providing customers with electricity usage information and alternative electricity rates from third-party energy providers. Customers view their energy consumption through a web portal and can use that information to help manage electricity bills. CMP assessed the load-shape and consumption impacts of providing customers with different types of information using web portals and proactive bill alert messages.

#### Objectives

The objectives of the project were to realize operational and cost benefits related to meter reading, billing, and opening and closing of accounts. The project also aimed to offer benefits to all customers by providing customer electricity usage information via a web portal and home area networks. Other targeted benefits included enabling electricity suppliers to create dynamic pricing options for customers, enhancing CMP's restoration of service after major storms, providing a technology platform to support future applications to monitor power quality, integrating plug-in electric vehicles, and furthering distribution automation.

#### Deployed Smart Grid Technologies

- **Communications infrastructure:** The project deployed a high-bandwidth radio frequency wireless mesh network that provides two-way communications utilizing a combination of multiprotocol label switching (MPLS), digital subscriber line (DSL), and cellular backhaul between smart meters and CMP's back office systems. The high-bandwidth wireless network supports distribution automation devices as well as metering data.
- **Advanced metering infrastructure:** The project included a system-wide rollout of smart meters to more than 622,000 residential, commercial, and industrial customers. New AMI features delivered include outage and restoration notifications, remote connect/disconnect, and improved voltage monitoring. The project also deployed a Meter Data Management System (MDMS) for storing and managing consumption data. The MDMS shares data with CMP's Head End System, Settlement System, Customer Information System, Web Portal, and Computer Aided Mobile Dispatch System.

#### At-A-Glance

**Recipient:** Central Maine Power Company

**State:** Maine

**NERC Region:** Northeast Power Coordinating Council

**Total Project Cost:** \$191,716,615

**Total Federal Share:** \$95,369,154

**Project Type:** Advanced Metering Infrastructure

#### Equipment

- 622,000 Smart Meters
- AMI Communications Systems
  - Meter Communications Networks (Radio Frequency Mesh)
  - Wide Area Network
  - Backhaul Communications (MPLS, DSL, Cellular)
- Meter Data Management System
- Customer Systems
  - Support for Home Area Networks Functionality
    - Customer Web Portal
    - Green Button Initiative

#### Key Benefits

- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Distribution Line Losses and Theft
- Reduced Service Order Costs
- Deferred Investment in Generation Capacity Expansion
- Reduced Truck Fleet Fuel Usage

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- **Advanced electricity service options:** The project provided CMP's customers with access to a web portal that enables them to view their interval data and historical electricity use patterns; the project also set up communications infrastructure to support home-area networking (HAN).

**Benefits Realized**

- **Improved electric service reliability and power quality:** CMP leverages its AMI meter data for faster outage detection and restoration to improve response and restoration efforts.
- **Fewer estimated bills:** Estimated bills have been reduced 10-fold from 300,000 to 30,000 annually due to the ability to collect meter data via the AMI system.
- **Reduced service order costs and greenhouse gas emissions:** Smart meters allow CMP to read meters remotely rather than travel regularly to customer homes and businesses. To date, the project has resulted in over 346,000 avoided truck rolls, which is equivalent to 3.46 million miles, \$807,333 in associated fuel costs, and 623 metric tons of carbon dioxide.
- **Reduced costs from equipment failures and theft:** CMP has further reduced its already low theft-of-service level by using the AMI system to detect dozens of incidents.

**Lessons Learned**

- It is important to support robust communication and education efforts for customers, regulators, and key stakeholders early in the project. Customer concerns regarding security, privacy, safety, and health must be addressed. Having independent third-party studies conducted to address those concerns and referring to those results is particularly effective.
- End-to-end system integration and regression testing, from meter read to bill generation, should be conducted prior to deployment.
- Vendor selection is critical. Each vendor has key drivers for the working relationship. Vendor relationships should be set up to create incentives for successful project delivery.

**Future Plans**

CMP is leveraging its AMI network for distribution automation with a plan to achieve fully optimized automation by 2019. CMP plans to investigate potential applications for conservation voltage reduction (CVR) and the resulting business impacts. CVR could be used in conjunction with AMI meter voltage data to reduce system voltage requirements, ultimately lowering energy usage and associated costs. In addition, distribution engineers can review AMI meter voltage data as a potential troubleshooting and maintenance forecasting tool to identify issues on the distribution network, such as power transformer malfunctions.

**Contact Information**

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