



Iberdrola USA: Central Main Power

Multi-tier AMI Network to Support a Smart Grid Vision

CUSTOMER SUCCESS

Maine, known as the “Pine Tree State,” is the most heavily forested state in the nation with 90 percent of its land base growing trees. Central Maine Power (CMP), one of the state’s largest utilities, serves more than 600,000 customer accounts with a service area that includes 78 percent of Maine’s population and major commercial and manufacturing centers. In fact, CMP’s 11,000-square-mile service area is larger than the states of Massachusetts and Rhode Island combined.

Accolades for CMP

- **Runner-up for POWERGRID International 2012**
- **“Emergency Recovery Award”** from Edison Electric Institute
- **J.D. Power and Associates’ 2012 Electric Business Customer Satisfaction Survey**—1st in business customer satisfaction among midsize electric utilities in the Eastern states
- **J.D. Power and Associates’ 2009 Electric Business Customer Satisfaction Survey**—1st in business customer satisfaction among midsize electric utilities in the Eastern states

“We have ambitious goals to improve our service and deliver value for customers through our smart grid network,” said Sara Burns, CMP’s president and chief executive officer. “Trilliant provided the right combination of communications and metering technology to suit both our initial and long-term needs.”

This large utility successfully deployed a smart metering network with more than 600,000 smart meters across its entire service area on an aggressive schedule and within a tight budget. Even more impressive, CMP has a broad, long-term vision for its smart grid, which will require the wide area and neighborhood area networks — WAN and NAN, respectively — to support applications beyond advanced metering infrastructure (AMI), including smart consumer applications and smart distribution where reliability and real-time performance are mission-critical. To satisfy these demanding requirements while keeping the total cost of ownership low, CMP chose to implement a private, multi-tiered network in the unlicensed wireless spectrum using the Trilliant® Communications Platform SecureMesh® solution.

The Need: Cost-effective Advanced Solutions to Support a Sophisticated Smart Grid Vision

CMP had been planning a smart grid with an AMI since 2007, but decided in 2008 not to proceed because the company operates in a fully unbundled environment where customers purchase their electricity from various competitive power producers. For this reason, demand response—one of the primary benefits of smart grid—offered no potential for cost savings to CMP, and therefore, the nearly \$200 million investment would have required a rate increase for its customers.

The situation changed in 2009 with the availability of Smart Grid Investment Grants (SGIG) from the U.S. Department of Energy (DoE) under the American Recovery and Reinvestment Act (ARRA). The DoE approved a grant of \$96 million to fund half of CMP’s project. This DoE grant represented the third-largest grant in the country, and was expected to deliver benefits to both homeowners and businesses in Maine. The Maine Public Utility Commission quickly and unanimously authorized CMP to proceed with its smart grid project contingent upon receipt of the DoE grant.

The Solution: The Trilliant Communication Platform’s Multi-tier SecureMesh

CMP immediately issued a Request for Proposal (RFP) to formally launch the smart grid project, focusing on finding a partner that could provide complete

coverage of the utility's complex territory, meet the required bandwidth and performance, ensure the system provided future-proof scalability and deliver robust security protections — all at a competitive cost. In addition, the RFP identified four major components of CMP's smart grid: the AMI network; smart meters; a meter data management system (MDMS); and meter and network installation, along with related field services required for the implementation.

During the evaluation, one solution stood out for its ability to offer the most advanced capabilities at a competitive total cost of ownership: the Trilliant Platform's SecureMesh.

CMP had a broad vision for its smart grid from the start, requiring the system to support everything from a home area network (HAN) for demand response to substation and smart distribution. These and other applications would add substantial traffic to the WAN and NAN, and require support for real-time communications. Because these applications also require robust security, CMP developed a comprehensive Cyber Security Plan (CSP) for the network and all related systems. The CSP adopts industry best practices for identifying risks, adhering to applicable security standards, implementing robust solutions, and validating the effectiveness of all security provisions.

Central Maine Power implemented Trilliant's multi-tier SecureMesh network in three tiers:

1. A WAN operating in the unlicensed 5.8 GHz spectrum for backhaul of AMI and future system-wide applications. The WAN delivers up to 54 Mbps of raw throughput and a maximum latency of 12 ms per round-trip hop with up to 10 miles between nodes.

2. A NAN operating in the unlicensed 2.4 GHz for the AMI network and other future field applications. The raw throughput of 250 kbps exceeds DoE's requirement of 80 kbps.

3. A future wireless HAN (already integrated into the smart meters) to support demand response and home energy management applications.

Trilliant's solution also includes UnitySuite™ head-end software for integrating security and device management with data acquisition and communications management. CMP's aggressive schedule required completing the Full System Deployment of more than 600,000 smart meters in less than two years.

The Results: Implementation on Schedule and within Budget

Despite some unusual challenges and the aggressive schedule for the full system deployment, Central Maine Power successfully deployed the entire AMI network and more than 600,000 smart meters on schedule and within budget. The fast-tracked project was even more challenging given the diversified terrain in CMP's service area, consisting of both urban and rural environments with islands, rolling hills and dense forests.

The key to CMP's award-winning execution came from developing rigorous implementation plans early on and partnering with innovative companies like Trilliant to deploy adaptable technology — including an intelligent communications backbone. These factors have enabled CMP to respond more rapidly to power outages, helping to keep the lights on for thousands of customers and businesses throughout Maine.



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