

Baltimore Gas and Electric Company

Smart Grid Initiative

Scope of Work

Baltimore Gas and Electric Company's (BGE's) Smart Grid Initiative consisted of a territory-wide deployment of advanced metering infrastructure (AMI), which included the replacement of over 575,000 electric meters.¹ The utility also implemented a customer web portal and home energy management reports, which provide customers with behavioral science-based presentation of usage information to encourage home energy efficiency and conservation. A newly deployed customer care and billing system and meter data management system (MDMS) enable optimal utilization of the new technologies and allow BGE to leverage the AMI data to offer residential customers a peak-time rebate (PTR) program. Finally, the BGE project built upon an existing direct load control program, PeakRewardsSM, that offers customers financial incentives to allow BGE to cycle central air conditioning equipment and electric hot water heaters.

Objectives

The AMI deployment reduced BGE operations and maintenance costs and allowed the utility to retrain and redeploy legacy meter readers. Combined with new capabilities such as remote connect/disconnect and meter pinging, AMI also supports improved customer service and outage management. Direct load control and the new PTR program reduce peak demand and help customers lower their monthly bills.

Deployed Smart Grid Technologies

- **Communications infrastructure:** BGE implemented a two-way radio frequency mesh technology consisting of a network backbone of approximately 1,250 access points and relays. A public carrier network was selected for the backhaul.
- **Advanced metering infrastructure:** The project entailed deployment of AMI meters to over 575,000 electric customers. The new MDMS receives meter data from the AMI head-end system and processes it to support billing and PTR events.
- **Advanced electric service options:** The project implemented a web portal that displays interactive energy usage information and tools to help customers better manage their consumption and bills. The web portal provides interval and trending data, peak event notifications, energy saving tips, and budget alerts. BGE also deployed an advanced customer care and billing system to replace their legacy customer information system and fully leverage

¹ In addition, BGE will deploy a total of 1.2 million electric meters and replace legacy gas meters through a non-SGIG component of the Smart Grid Initiative.

At-A-Glance

Recipient: Baltimore Gas and Electric Company

State: Maryland

NERC Region: Reliability First Corporation

Total Project Cost: \$451,814,234

Total Federal Share: \$200,000,000

Project Type: Advanced Metering Infrastructure
Customer Systems

Equipment

- 575,081 Million Smart Meters
- AMI Communications Systems
 - Meter Communications Network (RF mesh, 1,250 network devices)
 - Backhaul Communications (Cellular)
- Customer Care and Billing System (partially funded by the SGIG program)
- Meter Data Management System
- Customer Web Portal and Home Energy Reports
- 202,906 Direct Load Control Devices
- 144,482 Smart Thermostats

Time-Based Rate Program

- Peak-Time Rebate (Default Residential Tariff)

Key Benefits

- Operational Savings
- Avoided Capital Expenditures
- Avoided Transmission and Distribution Infrastructure
- Wholesale Capacity Market Benefits

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the data produced by the AMI system. This system is used to manage customer accounts, billing, start/stop service requests, on-demand meter reads, payment processing, and collections.

- **Direct load control:** BGE has installed over 202,000 direct load control devices and 144,000 programmable thermostats in customer homes. In exchange for monthly bill credits, customers give the utility the option to cycle air conditioning units and electric hot water heaters during periods of high demand. By curtailing peak loads, investments in generation, transmission, and distribution can be deferred. In addition, demand response capacity puts downward pressure on energy prices, and customers have additional tools to reduce their electric bills.
- **Time-based rate programs:** The AMI system enabled BGE to introduce a PTR tariff to all customers with smart meters. The utility notifies participants about forecasted peak events via phone, email, or text the day before an Energy Savings Day. Customers can choose to use less electricity during the event and earn bill credits of \$1.25 for every kilowatt-hour saved compared to typical usage. This calculation is done for all customers with AMI meters using the new MDMS, and timely feedback is provided to customers earning bill credits to reinforce energy efficient behaviors.

Benefits Realized

- **Operational savings: \$9.2M**
 - Reduction in manual meter reading costs
 - Meter operations costs from remote turn-on and turn-off
- **Avoided capital expenditures: \$7.2M**
 - Avoided capital expenditures relating to legacy metering systems
- **Avoided transmission and distribution infrastructure: \$7.0M**
 - Dollar value of avoided transmission and distribution infrastructure due to load reductions achieved through the Peak Time Rebate program
- **Wholesale capacity market benefits: \$326.3M**
 - Wholesale capacity revenue from sale of load reductions achieved through the Peak Time Rebate program
 - Related reduction in capacity prices associated with lower regional peak demand

Lessons Learned

BGE encountered significant challenges with gaining access to its indoor meter population, which represented approximately 50% of the one million planned meter exchanges. As a result, meter deployment fell behind schedule in May 2012. BGE decided to engage a second meter installation vendor and work proactively with regulators on a program to address customers who opt out of the AMI technology. To accelerate the pace of installations, BGE negotiated with the original vendor to increase the number of planned installers in the field, the second installation vendor was brought on board, and BGE cross-trained more of its own technicians to perform installations.

Future Plans

SGIG funds covered the first 575,081 electric meters under BGE's Smart Grid Initiative. The utility plans to continue AMI deployment—gas and electric—until 100% of their 1.2 million customers are reached. Once the territory is saturated with AMI meters, BGE engineers will work with the technology vendor to fine-tune the network for optimal performance, at which point the utility will retire the manual meter reading system. BGE also plans to implement an enterprise-wide data analytics platform to fully leverage the volumes of meter data being produced by the new system.

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