Pepco - Maryland
Smart Grid Project

Abstract

The Pepco - Maryland Smart Grid project includes distribution automation, advanced metering infrastructure (AMI), and a demand response program that involves direct load control and time-based rate programs. The AMI installation is designed to provide customers and Pepco with detailed electricity usage information, which, when combined with demand response programs, can help customers reduce their electricity usage and manage their electricity costs. The distribution automation deployment includes substation smart devices, automated distribution circuit reclosers/switches, fault indicators, and transformer monitors that can improve the reliability of the distribution system while decreasing the cost of operations and maintenance.

Smart Grid Features

Communications infrastructure involves components of the wireless AMI mesh network. The system has the capability to route traffic through the AMI meters, and Pepco is designing the system to route distribution automation traffic through battery-backed wireless communications devices. This approach ensures that distribution automation traffic remains on energized communications devices during power outages. The system uses the same backhaul communications systems to transport AMI and distribution automation data to the appropriate end points.

Advanced metering infrastructure includes the installation of 550,000 smart meters across Pepco's Maryland service territory. These meters record electricity usage for time intervals of an hour or less, and can be used by Pepco to detect power outages and provide notification to the utility. AMI supports demand response and time-based rate programs and reduces the cost of meter operations.

Advanced electricity service options offered through the project include a Web portal for electric customers to access their consumption data and programmable communicating thermostats. The Web portal allows customers to view the data collected from their smart meters, giving them information with which to manage their consumption and costs. The Web portal also provides the platform for control of new programmable thermostats. Net metering programs to enable distributed generation are also being offered.

At-A-Glance

Recipient: Potomac Electric Power Company (Maryland)

State: Maryland

NERC Region: ReliabilityFirst Corporation

Total Budget: $213,354,494

Federal Share: $104,780,549

Project Type: Integrated and/or Crosscutting Systems

Equipment
- 550,000 Smart Meters
- AMI Communication Systems
  - Meter Communications Network
  - Backhaul Communications
- Meter Data Management System
- Customer Web Portal
- 168,000 Air Conditioner Direct Load Control Devices
  - Programmable Communicating Thermostats
  - Outdoor Cycling Switches
- Distribution Automation Equipment for 67 out of 701 Circuits
  - Distribution Automation Communications Network
  - Control of 193 Automated Distribution Circuit Reclosers/Switches
  - 200 Circuit Sensors/Fault Indicators
  - 12 Transformer Health Sensors/Monitors
  - Upgrading 23 Substations with smart devices

Time-Based Rate Programs
- Peak Time Rebate

Key Targeted Benefits
- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Equipment Failures and Theft
- Reduced Greenhouse Gas and Criteria Pollutant

Direct load control devices deployed by the project include 168,000 AMI-enabled load control devices for cycling residential air conditioning equipment off and on during peak demand periods and system emergencies. The aim is to lower operating costs and defer capacity additions through reductions in peak demand. Participating customers have the opportunity to lower their bills through financial incentives for contributing load reductions.

Time-based rate programs include customer options to enroll in time-of-use programs. The time based rate program is aimed at encouraging participating customers to shift their consumption from on-to off-peak periods, thus reducing peak demand and lowering Pepco's operating costs.

Distribution automation systems include new automated feeder reclosers /switches and associated controllers, fault sensors/indicators, substation transformer monitors; electronic substation relays substation Distributed Remote Terminal Units (DRTU), and Automatic Sectionalizing and Restoration (ASR) programs. Automated feeder reclosers/switches, electronic relays, DRTUs, and the ASR programs work together to detect and isolate faults more precisely, and reduce the number of customers affected by the power outage. Fault sensors/indicators will communicate back to the control center when a fault occurs in selected underground residential developments. Transformer health monitors analyze the gasses in the transformer insulating oil to help Pepco know when to perform maintenance and avoid equipment failure before it causes a power outage. Together, these distribution automation technologies help improve reliability and operational efficiency.

Timeline

Key Milestones	Target Dates
Direct load control installation start	Q2 2010
Distribution automation installation start	Q2 2010
AMI installation start	Q2 2011
AMI installation complete	Q3 2013
Distribution automation installation complete	Q4 2013

Contact Information

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