

Memphis Light, Gas, and Water Division

Implementation of Smart Grid Technology in a Network Electric Distribution System

Abstract

Memphis Light, Gas, and Water Division's (Memphis's) project to implement smart grid technology in a network electric distribution system includes new intelligent relays and sensor equipment to provide remote switching at the transformer level and vital information to aid in the design, operation, and preventive maintenance of this complex electric system. A communications system is being deployed which facilitates the flow of real-time data from intelligent electronic devices and sensors installed in the field with the Memphis's control systems. Memphis expects these upgrades to reduce restoration times and the need for truck rolls for grid maintenance, improving reliability and reducing operating costs and pollutant emissions.

Smart Grid Features

Communications infrastructure includes deployment of fiber optic and copper instrumentation cable networks throughout Memphis's network power distribution territory. Initially, four substations are receiving connections through these new networks, which enable them for remote monitoring and control of network distribution feeder switching. This communications network integrates the new automated distribution equipment with the existing supervisory control and data acquisition (SCADA) system and a new distribution management system.

Distribution automation systems include the development and installation of new intelligent relays for the network electric distribution system that supplies the Downtown and Medical Center districts. Memphis is installing almost 500 smart relays with communications capabilities across 40 distribution circuits out of the four substations that support the network system. The relays, in collaboration with new automated monitoring and sensing devices, enable remote monitoring, improved fault isolation, and reduced disturbances on the grid. Memphis intends this automated distribution management to reduce maintenance costs and improve distribution system reliability by providing rapid and coordinated response to grid outages and disturbances and improved preventive maintenance of key equipment.

At-A-Glance

Recipient: Memphis Light, Gas, and Water Division

State: Tennessee

NERC Region: SERC Reliability Corporation

Total Budget: \$13,112,363

Federal Share: \$5,063,469

Project Type: Electric Distribution Systems

Equipment

- **Distribution Automation Equipment for 40* out of 464 Circuits**
 - Distribution Management System
 - Distribution Automation Communications Network
 - SCADA Communications Network
 - Automated Distribution Circuit Switches
 - Equipment Health Sensors
 - Smart Relays

* Covers Memphis's entire Network Electric Distribution System

Key Targeted Benefits

- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Equipment Failures
- Reduced Operating and Maintenance Costs
- Reduced Truck Fleet Fuel Usage
- Reduced Greenhouse Gas and Criteria Pollutant Emissions

Memphis Light, Gas, and Water Division *(continued)***Timeline**

Key Milestones	Target Dates
Communications infrastructure installation complete	Q3 2013
Distribution automation field installation complete	Q1 2014
Commissioning and testing control and analysis systems	Q2 2014

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