

## 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 information to aid in the design, operation, and preventive maintenance of this complex electric system. A fiber optic communications system is being deployed, which integrates real-time data from grid monitors with the grid operator's distribution management software platform. 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 that can support the entire distribution system. 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 installation of new intelligent relays for the network electric distribution system that supplies the Downtown and Medical Center districts. Memphis is installing 489 smart relays with communications capabilities across 30 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 30\* 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	Q2 2012
Distribution automation installation complete	Q2 2013

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