

NSTAR Electric Company

Grid Self-Healing and Efficiency Expansion

Abstract

The NSTAR Electric Company (NSTAR) Grid Self-Healing and Efficiency Expansion project involves the installation of significant new equipment for automation and management of the distribution grid. A network of new and existing switches, monitors, and reclosers are installed on selected circuits to provide the grid with the capability to automatically isolate grid power disturbances and to rapidly restore functional portions of circuits. New automated distribution equipment is also being deployed by the utility as a means to better manage power fluctuations on the grid, thus improving power factor and system energy efficiency.

Smart Grid Features

Communications infrastructure includes the installation of a new integrated supervisory control and data acquisition (SCADA) software throughout the entire NSTAR service territory. This upgrade to the communications and control interface allows grid operators to more precisely observe and manage the new equipment in the distribution system, leading to more effective response to and avoidance of power interruptions, thereby enhancing system reliability.

Distribution automation systems include the installation of new automated monitors, switches, sectionalizers, and capacitor banks in the distribution grid. The new equipment allows NSTAR to provide rapid and effective response to destabilizing grid events, thereby reducing the duration and extent of power fluctuations and outages.

The new equipment allows NSTAR's system to rapidly and automatically isolate faulted circuit sections after a pre-programmed sequence of algorithms has determined that portion of the circuit is available to be re-energized. Along with improved system reliability, automation systems also reduce costs and emissions from grid operations and maintenance through reduced need for truck visits to distribution circuits.

Distribution system energy efficiency improvements involve the integration of automated capacitors with a power quality monitoring system. The new system includes more effective phase balancing and voltage and volt ampere reactive (VAR) control, which improves power quality and increases distribution capacity by reducing energy losses on the distribution system.

At-A-Glance

Recipient: NSTAR Electric Company

State: Massachusetts

NERC Region: Northeast Power Coordinating Council

Total Budget: \$20,123,766

Federal Share: \$10,061,883

Project Type: Electric Distributions Systems

Equipment

- Distribution Automation Equipment for Approximately 400 out of 1,960 Circuits
 - Distribution Automation Communications Network
 - SCADA Communications Network
 - ~360 Automated Distribution Circuit Switches
 - ~109 Automated Capacitors
 - Equipment Condition Monitor (PI System)

Key Targeted Benefits

- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Equipment Failures, Distribution, and Line Losses

NSTAR Electric Company *(continued)*

Timeline

Key Milestones	Target Dates
Distribution systems installation starts	Q2 2010
Distribution systems installation complete	Q4 2012
Communications infrastructure installation starts	Q2 2010
Communications infrastructure installation complete	Q4 2012
PowerLink Advantage software development starts	Q2 2010
PowerLink Advantage software development complete	Q4 2013

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