

Consolidated Edison Company of New York, Inc.

Smart Grid Investment Grant Project

Scope of Work

The Consolidated Edison Company of New York, Inc. (Con Edison) Smart Grid Investment Grant project involved installation of smart grid systems and components to enhance the electric grid's performance and operating flexibility. The project installed distribution automation (DA) systems and equipment on 840 out of 2,297 circuits. Con Edison also deployed upgrades to the supervisory control and data acquisition (SCADA) network and launched an integrated distribution management system (DMS) to enable enhanced control over network and system performance, reliability, and resilience.

Objectives

The main objectives of the project were to expand DA on the system, advance self-healing outage operations, augment decision support systems for grid operators, and establish cyber-secure and scalable communications platforms. The selected combination of DA technologies has reduced operations and maintenance costs and deferred the need for distribution capacity investments while increasing distribution system efficiency, reliability, and power quality.

Deployed Smart Grid Technologies

- **Communications infrastructure:** The project installed master radio sites for the SCADA system and upgraded existing sites, greatly increasing capacity while also enhancing security. The new master sites allow for communication and control of overhead and underground switches.
- **Distribution automation systems:** The project included the deployment of automated sectionalizing switches with SCADA control. The switches allow for automatic restoration of power loss to sections of the grid affected by an outage. In addition, Con Edison deployed transformer condition-monitoring devices that use power line communications infrastructure to alert Con Edison to any problems with the distribution equipment. The sensors enable maintenance crews to perform targeted preventative maintenance, thus reducing the number of equipment failures and outages. The automated sectionalizing switches and the equipment condition monitors help to increase reliability and resilience while reducing operations and maintenance costs.
- **Distribution system energy efficiency improvements:** The project integrated capacitor automation and a power quality monitoring system. The enhancements were made to 4-kilovolt (kV) circuits (the 4 kV portion of the grid

At-A-Glance

Recipient: Consolidated Edison Company of New York, Inc.

State: New York and New Jersey

NERC Region: Northeast Power Coordinating Council

Total Project Cost: \$272,058,175

Total Federal Share: \$136,029,089

Key Partner: Orange and Rockland Electric Utilities, Inc.

Project Type: Electric Distribution Systems

Equipment

- **Distribution Automation Equipment for 840 out of 2,297 Circuits**
 - **Distribution Management System**
 - **Upgraded SCADA Communications Network**
 - **797 Automated Distribution Circuit Switches**
 - **SCADA for 175 Network Transformers**
 - **449 Automated Capacitors**
 - **17,401 Equipment Condition Monitors**
- **Distributed Energy Resources Interface**

Key Benefits

- **Improved Electric Service Reliability and Power Quality**
- **Reduced Costs from Equipment Failures and Distribution Line Losses**
- **Reduced Operating and Maintenance Costs**
- **Reduced Greenhouse Gas and Pollutant Emissions**

Consolidated Edison Company of New York, Inc. (continued)

consists of the primary feeders that deliver power to homes, such as the overhead wires seen in residential neighborhoods) and are utilized to improve voltage control and power quality and to reduce system losses.

- **Distributed energy resources interface capability:** The project deployed secure two-way wireless communications equipment to 175 network-type underground distribution transformers. The equipment can be used to implement flexible monitoring and control of grid parameters as future distributed generation, such as solar and combined heat and power, is interconnected.

Benefits Realized

- **Improved electric service reliability:** Feeder sectionalizing capability in the underground distribution system increased by 300%. This allows the system to be reconfigured during events or during planned repair work, which increases system flexibility and reduces the event's impact to the overall system. In addition, two cyber-secure communications systems have been established for increased reliability.
- **Reduced costs from equipment failures:** Equipment monitors have increased underground transformer monitoring capability by 265%, allowing Con Edison to anticipate and respond to problems sooner. The risk of major outages on targeted underground networks has declined by 53%.
- **Reduced greenhouse gas and pollutant emissions:** Annual energy losses have been reduced by approximately 4,500 megawatt hours (MWh), which results in reduced greenhouse gas emissions.

Lessons Learned

- Depending on the frequency of grid state data collection, datasets can be quite large and require robust data storage architecture and analytics tools. Technical architecture should be designed with future data requirements in mind.
- Standardized firmware upgrades and compatibility across vendors can be challenging. Utilities undertaking similar projects should plan for extensive system, integration, and product interoperability testing.

Future Plans

Con Edison intends to continue with its smart grid implementation efforts through the following activities:

- Install underground switches in two targeted networks in flood-prone areas, with communications to sectionalize these networks during future storms.
- Install single-triple-single (STS) overhead switches on 4 kV grid feeders to further sectionalize the main run, further reducing customer outages.
- Install cellular modems on hard-to-reach assets including underground switches, reclosers, photovoltaic sites, and pole-top voltage regulators.

Contact Information

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