Customer Success Story:
A large investor-owned utility (IOU)

Markets served
Industrial, commercial and residential

One of Canada's largest investor-owned utilities relies on Eaton to help it automate and optimize the electrical grid

Location:
Canada

Segment:
Utility

Challenge:
Implement intelligent Smart Grid solutions to help automatically identify and address power events to improve power reliability and minimize outages for customers

Solution:
Eaton's Cooper Power™ series Yukon™ feeder automation solutions help develop an adaptable and responsive infrastructure

Results:
Expanded and modernized power distribution system, enabling a "self-healing" grid that can automatically detect, isolate and respond to power system disturbances. The investment is paying dividends for customers—reducing blackouts and minimizing associated costs

Background

An investor-owned utility in Canada manages gas and electric distribution resources to deliver quality service to customers. More than 500,000 homes, farms and businesses depend on one of its subsidiaries for reliable power. The utility has a service area that spans more than 200,000 square kilometers (km) and includes one of Canada's oldest national parks.

Challenge

Businesses in the utility's service area have experienced rapid development – increasing nearly 20 percent each year since 2008. Although power demands and the number of customers had increased, the local utility's workforce and power infrastructure was aging. The utility needed to implement Smart Grid solutions that would help automatically identify and address outage events—both minimizing and automatically restoring customers' power, as much as possible.

The utility planned to roll out a feeder automation software solution to support a "self-healing" grid over a ten-year period. The utility rates are performance-based and tied to power reliability and efficiency; this ongoing effort is designed to help improve performance. The system would need to help the utility improve power reliability for its customers and reduce blackouts and restoration time, while requiring minimal maintenance.

To find the best solution, the utility embarked on a pilot project in 2009. The initial project was located in an area where a gas plant required reliable power around the clock and sourced power from two substations.

Three manufacturers were invited to participate in the test project, including Eaton. At that time, the utility had already incorporated Eaton's Cooper Power series products for nearly twenty-five years on various projects to support power reliability for customers in the region.

Previously, a three-recloser loop scheme including Eaton's Cooper Power series solutions was used in the pilot project area. It helped to isolate a faulted area, while reestablishing services to customers outside of the faulted zone. However, the system operated without modern communications. That meant if a midline recloser locked out in response to an in-zone event, the tie recloser would sense a loss of voltage and would close the other line into that isolated feeder. This caused the unaffected line to experience a voltage dip as the tie recloser interrupted the fault it had just closed into.

Powering Business Worldwide

By tapping feeder automation software, the gas plant and utility could take advantage of smarter system tools so that secondary disturbances to the unaffected line could be eliminated, while still restoring power quickly for up-line loss of voltage events.

Since the feeder automation solution would be implemented over time, it was critical that the system:

- Provide centralized architecture: Along with the feeder automations system, the utility was implementing a new SCADA system and wanted the two systems to work together for greater reliability and control.
- Support device independence: The system would need to communicate to devices from many manufacturers that were already incorporated.
- Accommodate modifications easily and support fast, simple installation: Modifications were inevitable and the utility would be installing the system on multiple subsystems over the years.
- Provide flexible communications options: The system needed to accommodate various communications media, including both cellular modems and mesh network radios, as that system was likely to evolve.
- Seamlessly integrate into the substations: Additional hardware or protocol converters need not apply.
- Support simple and fast expansion: The utility sought a scalable solution with the tools to easily add and remove devices using a standardized interface.

Solution

Following the results of the highly competitive pilot project, the utility selected Eaton's Cooper Power series Yukon feeder automation solution. The advanced, dynamic self-healing software leverages real-time data from the distribution system to detect faults and automatically reconfigure the system in an effort to isolate the faults and minimize the number of customers impacted. It provided the utility's engineer with the tools to easily and immediately adjust automation settings—in minutes, not months.

Based on a field-proven, market-leading intelligent electronic device (IED) integration solution, Eaton provided the only solution that can integrate virtually any existing control, using standard communications protocols. This eliminated the need for additional hardware and ensured compatibility with both legacy controls and next generation solutions.

Additionally, the utility's team was able to configure the Eaton system in a little more than two hours. Comparatively, the other systems the utility was testing took about two days to establish.

The pilot project went so well that the utility selected Eaton's Cooper Power series solutions to support another system in 2012. This project would support reliable power for a plant responsible for all of the beef production in a western province.

Today, the utility continues to expand the area of the self-healing grid and is working with Eaton to do so. In 2013, the customer needed another system to protect one of Canada's national parks, a major tourist destination. That system with six devices was commissioned in early 2014. There are also plans for two other major expansions of the system.

Results

Eaton is helping the utility move to an effective and modern self-healing grid. The utility continues to use Eaton's Cooper Power series products to support reliable power for customers across its service area.

With an Eaton solution in place, the grid is able to detect power disturbances and automatically reconfigure the system to isolate it to a smaller area. This helps the utility to restore power to as many customers as possible.

The customer is also able to remotely address temporary faults and reconfigure the load at its control center. This helps to minimize field visits and saves valuable personnel time.

Working with Eaton, the utility is preparing for a future that will always be on, regardless of workforce changes or a growing customer base.

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