CASE STUDY
SMART GRID SERVICES

S&C ELECTRIC COMPANY
Excellence Through Innovation

Rapid Expansion at Community College Calls for Smart Grid Technology

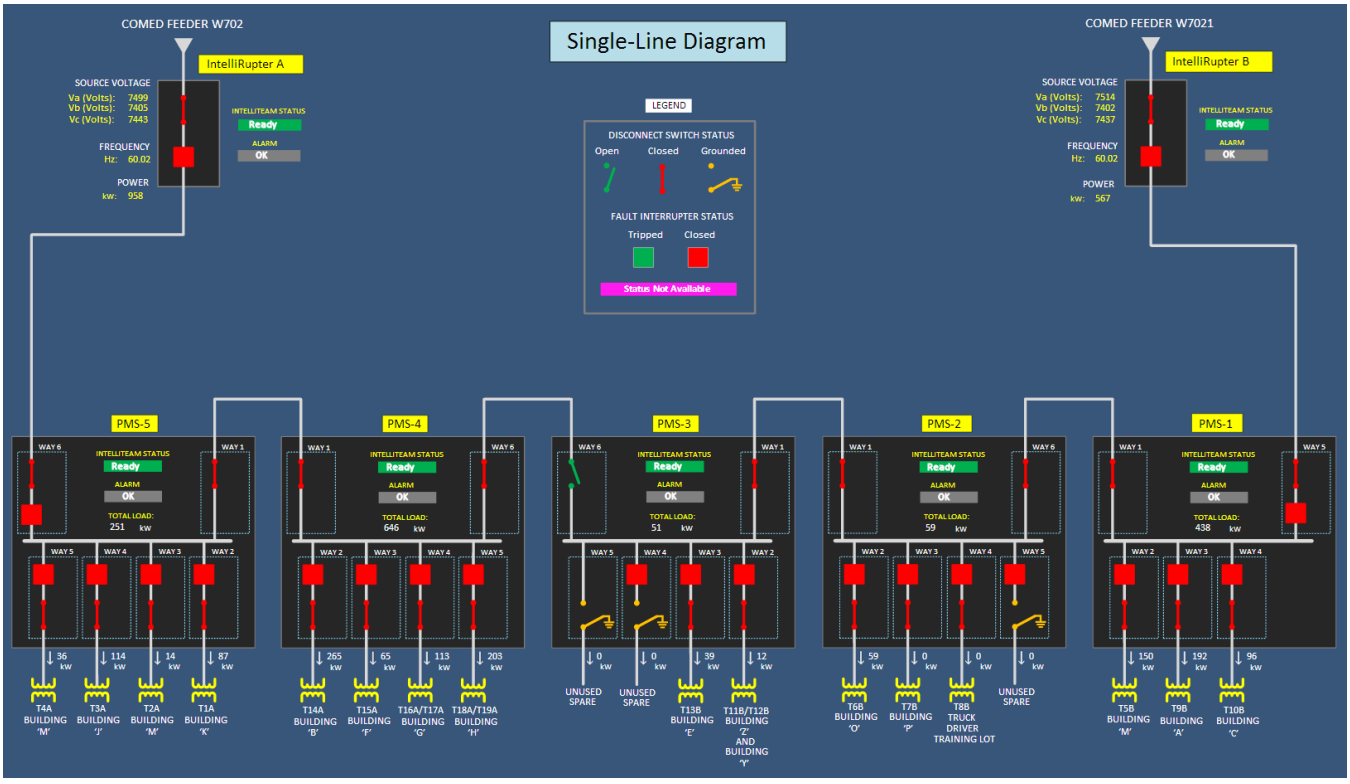
S&C Featured Solution: Self-Healing Grids

Location: Elgin, Illinois

Customer Challenge

In recent years, Elgin Community College in Northeastern Illinois has rapidly expanded to bring cutting-edge academic facilities to the school. As the campus expanded, the school added a number of buildings to the 217-acre campus. Despite adding the latest high-tech facilities, the campus continued to operate off an aging medium-voltage (MV) electrical distribution system built in the late 1960s when the school, founded in 1949, moved to its current location. As buildings were added, the aggregate load of the campus began to reach the capacity limits of the existing electrical infrastructure. The school embarked on a project to update the electrical distribution system and address the load-capacity constraints.

Elgin Community College needed a solution that would update the current electrical system to improve reliability. Furthermore, the new system needed a means to support the campus' existing and future load growth. Also significant, the solution had to be one that matched the high-tech academic atmosphere on campus, yet it had to be easy for facilities personnel to interact with, monitor, and control.



A screen shot from a custom SCADA interface system developed by S&C.

From the latest high-tech switching products to a custom SCADA interface system, S&C delivered a complete solution for Elgin Community College.

S&C Solution

Elgin Community College partnered with a local engineering-services company to design the updated system. Knowing the design had to provide a high level of reliability and incorporate the latest technology to address the campus' load constraints, the pair partnered with S&C Electric Company.

To improve the system reliability, the radially fed design of the existing MV underground distribution system was replaced. A new underground loop design was implemented with a second feed to the campus to provide greater redundancy and to add additional capacity.

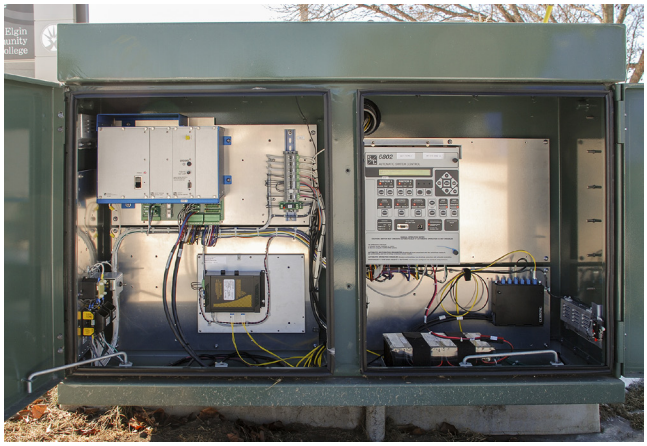
At the heart of the new design were two different types of S&C smart grid technology. This included two S&C Pad-Mounted Style IntelliRupter® PulseCloser® Fault Interrupters used on the incoming utility feeds, and Remote Supervisory Vista® Underground Distribution Switchgear in between the IntelliRupter fault interrupters to form the open loop. The IntelliRupter fault interrupters were a great fit for the project because of their unique PulseClosing™ Technology. Unlike conventional reclosing operations, the PulseClosing feature of IntelliRupter fault interrupters tests for faults before initiating point-on-wave closing. This was an attractive option for the school to help reduce stress on equipment and assist with preserving the longevity of the new underground cable system. The Vista switchgear was a perfect match for the campus because of its compact design and ability to provide fault protection for the system and to perform automated switching for the numerous campus loads.

S&C's IntelliTeam® SG Automatic Restoration System controlled the entire network of IntelliRupter fault interrupters and Vista switchgear. Unlike conventional automation systems, S&C's IntelliTeam SG system is a distributed intelligence solution that automatically reconfigures the system after a fault and quickly restores service to segments of the feeder that aren't affected by the fault. Pairing this system with IntelliRupter fault interrupters and Vista switchgear meant the new solution would have some of the most advanced switching equipment available backed by an automation system that could quickly perform automatic fault isolation, restoration, and self-healing.

With the addition of the second feed onto the campus, the new open-loop system added additional capacity to support the load growth of new and future buildings. However, this presented another challenge. The additional capacity meant the total load drawn by the campus during peak consumption may reach the limits of the school's feed set by the local utility.

S&C's solution also addressed this challenge. The Vista switchgear used to distribute power to the various campus facilities was equipped with load ways protected by overcurrent relays. Though the overcurrent relays were non-S&C devices, each relay turned into a member of the IntelliTeam SG team by using S&C's IntelliNode™ Interface Module. This

S&C IntelliRupter fault interrupters at the campus incoming utility feeds.



View of automation equipment inside S&C Vista switchgear.

enabled data from each feeder's overcurrent relay to be shared within the IntelliTeam SG system. The system will then use this data in the future to perform selective load shedding if limits are reached. In situations where the total load is higher than the available power, the system will automatically shed load feeder by feeder to reach a desired level to ensure compliance with utility mandates.

To ensure that Elgin Community College's staff had complete onsite monitoring and control of the new system, S&C developed a state-of-the-art Supervisory Control and Data Acquisition (SCADA) system specifically for the campus. The solution included a touch-screen Human Machine Interface on 42-inch monitors for simplified monitoring and operation by facilities personnel. The custom system also included data population on a segmented basis to document power consumption, reliability, and event history across campus. To follow the overall project theme of delivering a solution with unrivaled reliability, S&C is also providing 24/7 offsite monitoring of the system via its Global Support and Monitoring Center (GSMC). In the event of a system alarm at the school, the GSMC will notify Elgin Community College of the event and find a solution if necessary, providing yet another layer of reliability.

"Due to proactive testing and planning, the entire solution was implemented in a tight timeframe without any interruptions to campus activities or classes."

—Ed Cook, Manager of Plant Operations

Elgin Community College

Elgin Community College had ambitious goals for implementing the new system. To ensure ongoing campus activities were not affected by the transition, tight installation and commissioning deadlines were agreed upon.

Understanding how critical the process on site would be in meeting the deadlines, S&C took several proactive measures. One of these measures included performing Factory Acceptance Testing of the system in S&C's IntelliLab in Chicago before the implementation. S&C's IntelliLab has an IntelliTeam Test System made of actual processor boards from S&C products running the same IntelliTeam software that would be deployed in the field. Testing on the system before field implementation provides significant insight into how IntelliTeam SG systems will work on the user's system because it uses the customer's specific protection settings, available fault currents, connected loads, and other site-specific information. During the testing for Elgin Community College, S&C performed specific system test scenarios to ensure all information required for a successful IntelliTeam SG implementation was gathered and understood prior to onsite commissioning. This enabled the team to meet the short implementation deadlines by ensuring a trouble-free deployment of the system onsite.

Before turning the system over to Elgin Community College personnel, S&C provided onsite training support. The training was tailored to meet the specific needs of the customer. This included interactive training on the switchgear, IntelliRupter fault interrupters, IntelliTeam SG system, and the custom SCADA monitoring system. This ensured that onsite personnel were entirely comfortable with the new system before they took control.

Results

S&C provided a complete solution to assist with replacing an aging electrical distribution system at Elgin Community College. The solution helped solve the customer's reliability and load-limitation concerns through advanced switching products and smart grid technology that provide fault isolation, self-healing, and load shedding. S&C complemented this solution with a custom SCADA system for superior control and monitoring. To add another level of reliability, S&C provided 24/7 offsite monitoring.

Proactive testing and planning ensured the entire solution was implemented in a tight timeframe, without any interruptions to campus activities or classes. Once the solution was implemented, custom training was provided to make sure that the customer was entirely satisfied and comfortable with the new system. Ultimately, S&C assisted with implementing a total solution of equipment and services to vastly improve the reliability and functionality of Elgin Community College's electrical distribution system.

August 10, 2015