CASE STUDY
ENERGY STORAGE

S&C ELECTRIC COMPANY
Excellence Through Innovation

Canada's First Utility-Scale Energy Storage System Islands Remote Town During Outages

S&C Featured Solution: Energy Storage

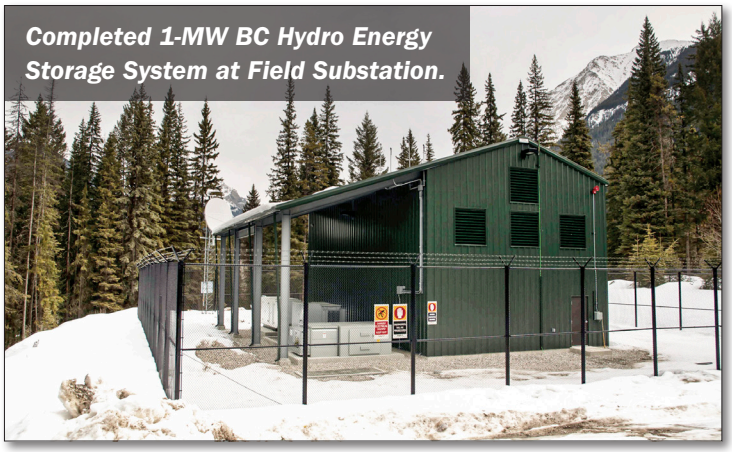
Location: British Columbia, Canada

Customer Challenge

Nestled in the Canadian Rockies, the remote town of Field relies on one 25-kV distribution feeder, provided by BC Hydro, to supply its 300 residents with power. But providing reliable power to Field is challenging. Not only is the town located 55 km from the substation, the feeder runs along a railway line, making access and repair work difficult, time-consuming, and costly.

Due to the geography and climate, faults frequently affect the power line, causing extended outages. Crews must coordinate with the rail system to avoid trains and travel along the rail route to locate the fault and repair the line, often in formidable weather. These factors result in longer-than-average response times for power restoration, impacting every resident in the town.

BC Hydro needed an innovative energy storage technology solution that could swiftly respond to faults by supplying reliable power to Field for extended periods, giving crews time to repair the line and minimizing service disruptions. Not only did BC Hydro seek improved power reliability for Field through "islanding," they wanted to reduce peak load, use clean power to cut greenhouse gas emissions, extend the lives of transformers, and eliminate the need for diesel backup generators —all within a set budget.



Completed 1-MW BC Hydro Energy Storage System at Field Substation.

"With S&C's battery system, we can supply power to Field for about seven hours, which gives us the opportunity to repair the line."

–Helen Whittaker,
Manager of Technology Innovation, BC Hydro

S&C Solution

BC Hydro chose S&C for the project because of the company's extensive experience with large-scale, battery-based energy storage systems. S&C proposed a complete energy storage solution, including all engineering, procurement, and construction services.

The solution enabled BC Hydro to achieve all of their goals, from islanding to using clean power. S&C's proposal also helped BC Hydro to obtain 50% of the project's funding from Natural Resources Canada (NRC).

S&C's PureWave® Storage Management System controls a 1-MW battery, which supplies clean, reliable power to a town with frequent, extended outages.

S&C's solution includes a 1-MW NGK sodium-sulfur (NaS) battery and an S&C PureWave® Storage Management System (SMS), which controls battery charging and discharging. It also includes S&C's IntelliRupter® PulseCloser for fault detection, S&C's System VI™ Switchgear, and S&C's IntelliTeam® SG Automatic Restoration System for peak shaving and transitions between the battery and grid. S&C SpeedNet™ Radios provide fast, two-way communication to help speed restoration.

The first of its kind in Canada, BC Hydro's battery storage facility is 5 km south of Field and supplies uninterruptible power to the entire town for approximately seven hours during feeder related outages. Due to extremely cold temperatures, the battery is housed in a prefabricated building. When the demand in Field is low, the battery charges from the grid. This ensures the system is available to supply power during outages or use for peak shaving. When a fault occurs, S&C's IntelliRupter detects and isolates the upstream fault while signaling the PureWave SMS to start discharging battery power, a seamless process that takes seconds.

In addition to providing islanding, the battery is scheduled through the PureWave SMS to supply power during peak demand periods. This added capacity lessens the load on system components, extends the life of transformers at the main substation, and reduces greenhouse gas emissions by eliminating the need for diesel-powered backup generators.

Valued Outcome

S&C's energy storage solution met all of BC Hydro's expectations, and the project was completed on time and within budget. Field residents now have reliable, clean power available for islanding, greatly reducing outage durations while also reducing the peak demand of the town.

In the first six months of system operation, six major events occurred, ranging from trees falling on the lines to broken poles. Each time, S&C's system operated flawlessly to avoid an outage, supplying Field with battery power for a total of 40 hours over just six months. In fact, during the facility's ribbon-cutting ceremony, a line fault occurred when a feeder pole was broken. S&C's solution quickly demonstrated its value by islanding the town for eight hours until grid power was restored.

This pivotal project promises to accelerate the adoption and integration of innovative energy storage technologies into Canada's grid. With S&C's PureWave Storage Management System and large-scale battery storage, BC Hydro ensures that residents of British Columbia benefit from cleaner, more reliable power.

Construction of energy storage system, enclosure, and controls at Field Substation.

QR Graphic Code

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