CASE STUDY

Truckee Microgrid

SAGEHEN, CALIFORNIA

CHALLENGE:

Design a wildfire-mitigation solution that would avoid costly replacement of transmission lines serving Sagehen Creek Field Station.

SOLUTION:

Install a microgrid utilizing solar PV, BESS, and a Generac 35kWe propane generator

RESULT:

A groundbreaking solar + storage container system solution with generator backup to help prevent the start of deadly wildfires that could burn through the state.

"This system will prevent the need to inspect the lines during fire season and possibly eliminate the need for them altogether once more generation is put into place."

Microgrid Proves to be Ideal Solution for California Utility

Hundreds of thousands of acres burn in California every year. Like most of the west, California's vegetation slowly dries out during the summer from a lack of rainfall and warmer temperatures. Then, all it takes is a spark, from people, lightning or the most common in recent years, utility power lines. After researching wildfire mitigation options to harden a transmission line serving one of its customers, a California-based electric utility sought a groundbreaking solar + storage container system solution as part of their Wildfire Mitigation Plan to help prevent the start of deadly wildfires that could burn through the region.

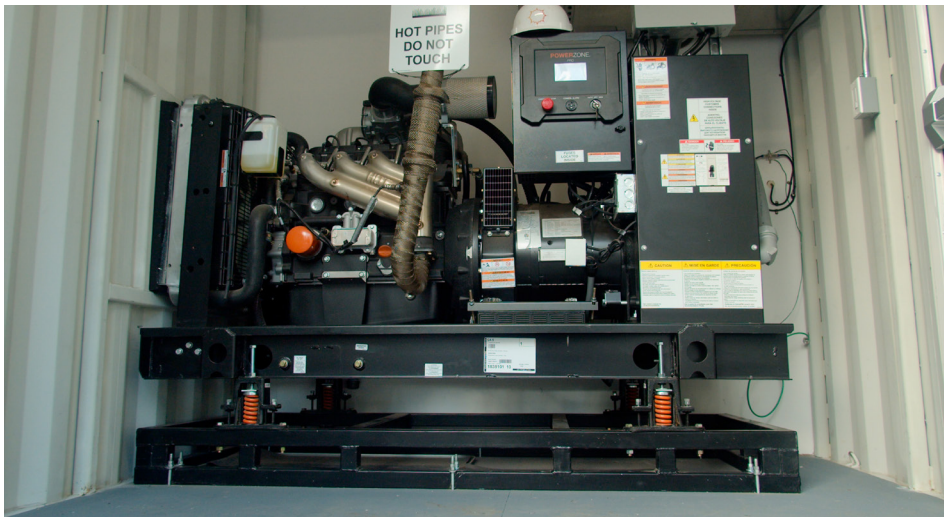
Liberty Utilities, a regulated utility with about 50,000 customers on the west side of Lake Tahoe, wanted to make upgrades, such as installing covered conductors to its transmission lines that run through a mountainous area to a remote research station operated by University of California, Berkeley. However, after running a cost and feasibility analysis, it realized it would be better to de-energize the line during wildfire season and instead utilize a containerized solar + storage system. That is when the utility company selected BoxPower, an expert in modular microgrid solutions, from a competitive bid process.

"We were looking to make certain upgrades to target our transmission lines for wildfire season," said Amanda Chee, program manager, capital administration and planning, Liberty Utilities. "In the process of developing the project for the line, we realized that this could have been a very expensive project." Chee continued by adding it would have cost about $3 million to harden the entire 4-mile line, which has 90 poles and serves Berkeley's Sagehen Creek Field Station. BoxPower's solar + battery storage system with a Generac propane backup generator will allow the utility to de-energize the lines when needed.

Chee said BoxPower's experience in the area and dealing with remote environments helped steer Liberty Utilities toward the company and added that grading and foundation work in the remote area would have been difficult and costly. "We are trying to go against wildfire season, time is of the essence," she said.

"Beyond what we do normally, there were some design constraints that made this rather unique," said Michele Nesbit, co-founder and COO, BoxPower. The project required a unique approach due to its location in a remote area of the Sierra Nevada that gets large amounts of snow in winter. Solar panels and battery provide power to the 20 kW, 68 kWh system with the solar panels on a 60-degree tilt to help prevent snow build up. However, if there is not enough sunlight or if there is too much snow cover, the system needed a backup to ensure power will be available to the facility at all times. Nesbit called upon Generac Industrial Power to help solve the problem.

"Generac specified a 35 kW prime rated, propane generator system to be integrated into the microgrid," said Tony Mente, industrial solutions manager, Generac Industrial Power. "Integrating the proven reliability of a clean burning Generac propane generator into a microgrid with renewable energy resources like solar and storage provides customers with a flexible, dependable package with a very low carbon footprint.



APPLICATION:
Remote Mountain Research Station

MODELS:
35 kW propane generator

The generator provides adequate redundancy to achieve a high level of reliability for the overall system." The current needs of the facility required one generator, but with Generac's Modular Power Systems (MPS), if the power needs increase in the future, more units can be added to the system, providing needed scalability.

"Having multiple energy sources creates resiliency and allows for continued power through any type of event," said Mente. "Microgrids like this provide increased resiliency through several means while being affordable, environmentally friendly and safe." Mente said by locating electricity generation close to the electrical users and the needs they serve, they could more efficiently deliver the required power. Second, he said microgrids provide a significant improvement in power reliability by their ability to operate independently of the utility's grid, if needed.

An important element to the design was making it sustainable. To help meet local and state requirements, the design team did not want to use diesel-fueled generators to support the microgrid. They instead wanted a cleaner fuel choice. "Diesel fuel has challenges with long term storage and higher overall emissions, leaving propane as an ideal solution for this project," said Mente. The microgrid produces its own power by capturing and storing electricity from the solar panels and the generator only turns on after the batteries have been drained.

In partnership with New Sun Road, the system includes real-time monitoring, remote diagnostics, automated alert and reporting. This complete site management tool also enables peak demand reduction, time-of-use optimization, data consolidation and aggregation for resale, as well as virtual power plant (VPP) capabilities. In the end, not only does the system meet the utility's needs, but it also helps prevent the spread of deadly wildfires. "This system will prevent the need to inspect the lines during fire season and possibly eliminate the need for them altogether once more generation is put into place," said Nesbit.

Lindsay Maruncic, senior manager renewable energy, Liberty Utilities, said Berkeley was "100 percent" on board with the microgrid. "They have been so incredibly cooperative with the project. They have even been involved with the design conversation. We really couldn't ask for a better partner in this project," she said. Maruncic added that the U.S. Forest Service was very accepting and that the team has been great to work during the entire project.

An online virtual tour of the site has been posted, which was greatly beneficial during the project development because it avoided the need for onsite visits. That innovative approach is just one more way the Sagehen project developers are using the benefits of technology to reduce costs and complexities, resulting in an safer and more reliable way to meet the needs of customers.

ABOUT BOXPOWER, INC.

BoxPower, Inc. provides clean, reliable, and affordable energy to rural consumers. Our ecosystem of software and hardware solutions optimize the performance and accelerate the deployment of microgrids. From energy audit to operation, BoxPower provides turnkey engineering, construction, and management services.