CASE STUDY
Briceburg Remote Grid
BRICEBURG, CALIFORNIA

CHALLENGE:
Provide customers a local and decentralized energy source that could lower fire ignition risk as an alternative to or in conjunction with system hardening.

SOLUTION:
A dual solar array, with a nominal PV power of 36.5 kW and 69.12 kWh lithium ferro phosphate battery bank, supported by two integrated 35 kVA Generac non-emergency, propane-fueled generators.

RESULT:
A Standalone Power System (SPS), or Remote Grid, using decentralized energy sources and utility infrastructure for permanent energy supply.

"Integrating the proven reliability of a cleaner burning Generac propane generator into the remote grid with renewable energy resources like solar and storage provides customers with a flexible, dependable package with a very low carbon footprint."

Hybrid Renewable Standalone Power System Energizes Isolated Customers

OPPORTUNITY
Throughout Pacific Gas & Electric's (PG&E) service area, there are pockets of isolated small customer loads that are currently served by long electric distribution lines. In many circumstances, these lines cross through high fire threat district areas. Traditional wires-and-poles infrastructure carries the risk of transmission-sparked wildfires. This is a major concern across California and particularly in remote communities like Briceburg. Communities served by the grid are also subject to Public Safety Power Shutoff (PSPS) events as part of wildfire mitigation efforts. If these distribution lines were removed and the customers were served from a local and decentralized energy source, the reduction in overhead lines could lower fire ignition risk as an alternative to or in conjunction with system hardening.

Servicing customers from a local decentralized energy source became a sought after solution in the wake of a 2019 wildfire that destroyed distribution lines that served Briceburg. The historical line route would have been challenging to rebuild through the rugged terrain. PG&E instead wanted to deploy a hybrid renewable standalone power system (SPS) to energize the isolated customers.

Installing an integrated solar, battery and generator SPS represented an opportunity to not only address the utility-related wildfire concerns, but also to increase grid resilience and to reduce greenhouse gas emissions in line with California SB100's path to 100-percent renewable electricity by 2045. As is detailed in PG&E's 2021 Wildfire Mitigation Plan, an SPS, or remote grid, is

a new utility service concept that PG&E is developing using decentralized energy sources and utility infrastructure for permanent energy supply to remote customers as an alternative to energy supply through hardened traditional utility infrastructure.

PROPOSED SOLUTION
BoxPower developed a dual solar array – one ground mounted and one container mounted – with a nominal PV power of 36.5 kW and 69.12 kWh lithium ferro phosphate battery bank. It can provide up to 27.2 kW of continuous power output and a surge capacity of up to 48 kW. The system has two integrated 35 kVA Generac non-emergency, propane-fueled generators as backup, and a fire suppression system to protect the hardware – an especially important feature in this high fire-risk area.

"BoxPower's hybrid renewable remote grids are an ideal solution for utility companies serving small, remote populations," said Michele Nesbit, chief operating officer/co-founder at BoxPower. "We're proud to not only provide the consumers they serve with renewable electricity, but also to help make the electrical distribution system as a whole safer."

BoxPower designed and installed the Briceburg remote grid system for PG&E and they continue to operate it today.

"Integrating the proven reliability of a cleaner burning Generac propane generator into the remote grid with renewable energy resources like solar and storage provides customers with a

flexible, dependable package with a lower carbon output," said Tony Mente, industrial solutions manager, Generac Industrial Power. "The generator works together seamlessly with the renewable resources to provide greater reliability and resiliency for the overall system."

"By locating electricity generation close to the electrical users, they could more efficiently deliver the required power," said Mente. "The SPS provides a significant improvement in power reliability by its ability to operate independently of the utility's grid. Remote grids like this provide increased resiliency and allow for continued power through grid outages."

PG&E and BoxPower remotely monitor and control the system via satellite, with performance monitoring, reporting and automated propane delivery capabilities.

OUTCOME

BoxPower's solar power with battery storage solution offered PG&E significant savings over rebuilding and improving the distribution lines that were destroyed in the 2019 fire season. Grid hardening efforts alone, which can include upgrades to transmission equipment and poles, insulating lines and intensive vegetation management can cost utilities an estimated $1 million per mile in these remote, rugged areas. Distributed energy resources like BoxPower's standalone microgrid system represent an increasingly attractive, cost-effective non-wired alternative for some segments of utility company's markets.

Ultimately, these initial projects will enable PG&E to determine an appropriate expansion of remote grid using SPSs to serve remote customers at the same or higher levels of reliability than they have experienced in the past with a lower risk profile and at a lower total cost to distribution customers. Per the 2021 Wildfire Mitigation plan, PG&E is targeting 20 operational remote grid sites by the end of 2022.

ABOUT BOXPOWER, INC.

An employee-owned company located in Grass Valley, California, BoxPower is a mission-driven social enterprise. BoxPower helps communities, governments, businesses, humanitarian and emergency relief agencies provide energy resilience when power supply from the grid is unavailable or unreliable. Visit https://boxpower.io to learn more.