



REDHAWK
ENERGY

Innovative Solutions for Your Critical Power Needs

Case Study

PowerGen 5650 Providing Supplemental Power to Radio Communication Site in Northern California

Customer Motivation:

Seeking an ultra-reliable and low maintenance power solution to provide supplemental power to an existing Solar Powered Radio Communication Site in a mountainous and wildfire-prone area in Northern California.

For years this customer used a Propane Generator to provide supplemental power to the Solar Power System during the winter months or periods of insufficient solar production. This approach however had its drawbacks as the Propane Generator consumed lots of fuel, had dirty emissions and needed constant maintenance (oil changes/lubrication) to remain operational. The site is also snow covered during the winter months, so if an issue occurred it was very difficult, if not impossible to visit the location. The customer yearned for a more reliable and robust power solution.

PowerGen 5650 Series

Pioneered in space and designed for rugged and remote operation, Qnergy's PowerGen 5650 Series Stirling Engine Generator seamlessly integrates with the existing Solar Power System to provide reliable supplemental electrical power supply to this Radio Communication Site in Northern California. Based on Qnergy's no-maintenance and highly reliable PCK series Stirling Engines, the PowerGen 5650 is housed inside an existing equipment enclosure and is powered by propane to generate clean, dependable power up to 5.6kW to feed battery charging and ancillary equipment.

Stirling Engine Technology

Qnergy's Free-Piston Stirling Engine (FPSE) generator can transform virtually any heat source into electricity. Once heat is applied to the FPSE the heat exchangers maintain a temperature differential across the engine causing the helium to shuttle back-and-forth inside the engine, expanding and contracting. The oscillating helium drives the linear reciprocating motion of the piston, which by means of an integral linear alternator, directly converts the reciprocating motion of the piston into electrical power.

The Qnergy engine has fewer moving parts than traditional kinematic Stirling Engines, and no direct-contact points that cause wear and require lubrication. The PowerGen 5650 is truly a maintenance-free solution that offers 80,000+ hours of reliable performance, two key features that make it an ideal and cost-effective power source in lieu of the Propane Generator previously used at this site.



Mountaintop Radio Communications Site in Northern California



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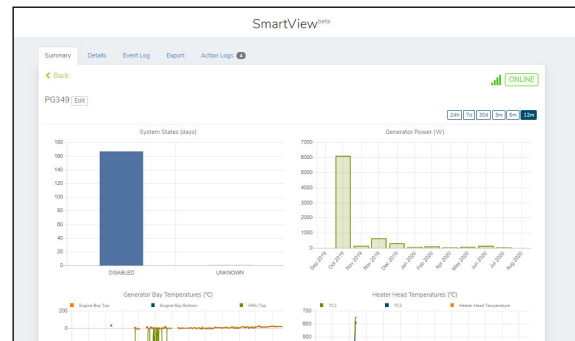
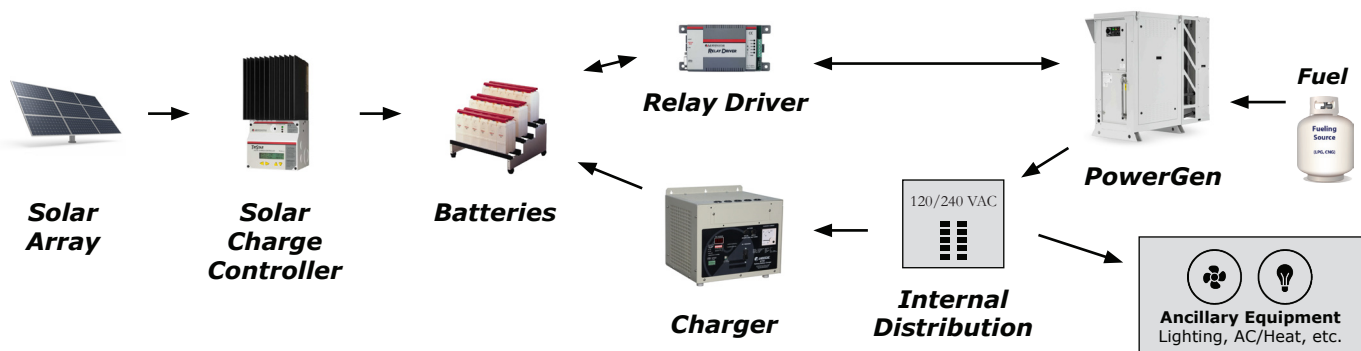
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System Overview

The PowerGen 5650 is well suited to provide supplemental power to the existing Solar Power System to charge batteries. When batteries dip below a certain lower threshold voltage, the PowerGen will be triggered to start via a relay driver. The PowerGen's standard 120/240 VAC output feeds into the sites distribution panel to feed a charger to charge batteries and/or feed power to ancillary equipment. Fueling requirements and runtime of the PowerGen are greatly reduced when used in a solar hybrid configuration as the PowerGen is only periodically called upon during winter months and/or times of limited solar production. Once batteries are fully charged, the PowerGen will return to standby mode.



Heat Recovery

To keep the equipment enclosure properly heated during the winter months, the Heat Recovery Unit (HRU) was provided, piped and mounted to the exterior of the enclosure to capture and use clean dry-air heat. The heat-supply ratio is 2.5-3.5X that of the electrical power with controllable supply temperatures.

Remote Monitoring

The PowerGen 5650 is equipped with Qnergy's SmartView Remote Monitoring System. This web based monitoring solution allows the end user to view operational status of the system from their desktop computer, laptop or smartphone!

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