REDHAWK ENERGY

Case Study

Hybrid Power System for Railroad Signaling Application

Customer Motivation:

Seeking an ultra-reliable power system to meet a range of expected on-site conditions and load demands.

System Overview:

This hybrid power system consists of a solar system (250W), solar controller and a fuel cell (250W).

Solar Array

The solar system consists of one (1) circuit totally 250W preassembled to mounting framework. The framework included two (2) cross-arm brackets with U-Bolts to mount to the customer-supplied piping as well as support legs to align the module at a tilt angle of 55° from the horizontal to capture the maximum solar radiation specific to the installation site.

Solar Controller

Regulation of the solar system output is provided by one (1) TriStar PV Controller. The TriStar controller monitors the voltage of the battery bank and controls the solar array outputs to prevent overcharging of the batteries. The controller is provided with integrated metering packages that provide additional monitoring and annunciation capability.

Fuel Cell

In addition to the solar array, system power demand is supplemented by a 250W Ultra-AMI Solid Oxide Fuel Cell. The fuel cell is powered by propane and operated "on-demand" based upon the remaining battery capacity. The fuel cell is housed in an integrated enclosure with a quantity of two (2) twenty pound propane cylinders, a set of filters, appropriate gas connection hoses and a termination section for incoming and outgoing electrical connections. The fuel cell is mounted and secured to a pre-cast concrete pad.

System Operation:

The fuel cell, solar module and battery all work together as a "hybrid" power system. The solar array converts sunlight into electricity. The batteries are charged by the solar controller assembly whenever there is sufficient current available from the solar modules. If the batteries are fully charged and being maintained above a predetermined threshold voltage by the solar array, the fuel cell is idle. When the batteries reach the lower threhold voltage level, the fuel cell system will automatically turn on. After a 25-30 minute start-up period, the fuel cell will begin charging the battery and powering the load.

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Environmental Impact

The system is a clean, eco-friendly energy producer.

Scan QR Code

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RedHawk Energy Systems, LLC
10340 Palmer Rd., S.W.
Pataskala, OH 43062

ph: 740-964-4000
www.redhawkenergy.net