

Case Study

Backup power for an off-grid radio transmission and BTS site in Wales

Challenge

Orange UK, the United Kingdom's leading wireless and wire line carrier, was tasked with replacing an LPG (Liquid Petroleum Gas) generator at a remote radio transmission and Base Transceiver Station (BTS) off-grid site in a natural park in Wales. Although a difficult-to-access remote site, it was essential that the power remain on, as the site supports critical public safety communications. Orange UK wanted an environmentally-sound solution for the off-grid location that was attractive to the carrier, and yet dependability, reliability and seamless transition to power were all mandatory elements for the replacement system. Quiet operation was also a goal due to the natural setting.

Solution

After a careful selection process, Orange UK selected the IdaTech ElectraGen™ 5 System and ElectraGen™ XTR module for an **extended run** solution. The 5 kW integrated fuel cell system was installed to work in combination with a 2.5 kW solar panel array and a 2.5 kW wind turbine for a truly hybrid solution. A 1000 AH battery bank stores the energy generated by the fuel cell, solar array and turbine, and powers telecommunications equipment located on the site. The outdoor installation incorporates the three renewable energy systems and an integrated stainless steel methanol storage tank.

The ElectraGen™ 5 and ElectraGen™ XTR solution was selected to reliably recharge the battery string when sun or wind power is not available, to ensure continuous power for the site power requirements through an environmentally-friendly energy combination. The IdaTech solution was an attractive combination to Orange UK, as the ElectraGen™ 5 fuel cell system is able to provide up to 5 kW of charging power, while the ElectraGen™ XTR module liquid-fueled reformer enables extended run times by producing high-purity hydrogen from a hydrogen-rich liquid fuel. In combination, the two systems remove the need for onsite hydrogen storage as the hydrogen is created and purified on demand. This was of significant importance, as its ability to operate on liquid fuel simplified fuel delivery logistics.



Overview

Site: Elan Valley (Wales), United Kingdom

Application: Backup power for an off-grid radio transmission and base transceiver station

Product: ElectraGen™ 5 System and ElectraGen™ XTR module

Configuration: 48 Vdc

Fuel: HydroPlus

Customer Motivations: Environmentally sound, onsite hydrogen generation, high reliability, seamless transition to power, quiet operation, remote monitoring

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Results

The ElectraGen™ XTR module operates on HydroPlus, a fuel mixture of methanol and water, removing any requirements of onsite hydrogen storage. This fuel provides a higher energy density and lower siting risk when compared to hydrogen-only solutions. As a liquid, HydroPlus is a more compact fuel, enabling significantly longer power autonomy at the site, which is difficult to achieve with industrial hydrogen cylinders. In addition to the onsite hydrogen generation aspect, the IdaTech extended run fuel cell solution was chosen for its remote monitoring capabilities through a GSM connection, low maintenance requirements.

IdaTech's Proton Exchange Membrane (PEM) fuel cell systems have the ability to reform HydroPlus into pure hydrogen as needed, eliminating the need for the storage of compressed hydrogen gas. The methanol/water fuel mixture is chosen for its many benefits as a fuel. Methanol is an ideal source of hydrogen due to its consistent high quality, very low freezing point (-76°C), lower reforming temperature and readily available supply options. The low sulfur content further simplifies the reforming and purification processes, reduces capital, operating and maintenance costs of the fuel cell system and reduces the risk of damage to the fuel cell. The methanol-water fuel is converted very cleanly into hydrogen and can be produced from renewable sources.