

Case Study:

Sunfire-Remote Fuel Cells reduce Emissions in Oil & Gas Industry

In critical infrastructures such as the oil and gas industry, safety and reliability are key. But factors such as cost-effectiveness and emissions also play an increasing role.

The Sunfire-Remote 400 are fuel cell power generators with a nominal output of 350 W. These are designed for primary power supply and address an average load range between 80 W and 1.4 kW, among others also in parallel operation and in hybrid configuration with PV. They are currently available for operation with Natural Gas or Propane as a fuel.



Figure 1: Total view on Petronas' BV station

These solid oxide fuel cells (SOFC) with ceramic electrolyte have been proven for use in stationary continuous operation for several years. These are based on the principle that many ceramics become conductive for oxygen ions at temperatures above 650 °C and are therefore high-temperature fuel cells that are usually operated as electrochemical energy converters in the 700 °C to 850 °C range and are suitable for harsh environmental conditions.

Sunfire Fuel Cells GmbH has been manufacturing and selling such fuel cell generators since 2014 in EU and since 2019 in North America.

In 2021, Petronas Malaysia decided to operate a Sunfire Remote 400 Cabinet fuel cell generator as a power supply for a block valve station on the Sabah-Sarawak gas pipeline in Borneo. The fuel cell generator was installed and commissioned by Sunfire's Malaysian sales and integration partner Petrolec Resources. It is in operation now and runs continuously as the primary power supply for all



Figure 2: Sunfire-Remote Cabinet at BV station

electric loads at the station. It generates electrical energy with an efficiency of up to 30 %, replacing the previously used generators, which had an efficiency of only 3 %. This allows the user to reduce greenhouse gas emissions by up to 90%. The power generated is automatically adjusted to the energy demand of the load, with a battery storage system serving as a buffer for rapid load fluctuations and the start-up of the fuel cell generator.

The power supply solution package has a compact 1 x 1 m² / 3 x 3 ft² footprint only and was equipped with interfaces to connect to the natural gas pipeline, site loads and the existing SCADA system, allowing remote monitoring from the control room. Relevant operating parameters including fault and maintenance status are transmitted here.

The end user continues to benefit from the peak load capability of up to 660 W provided by the integrated battery bank and the long maintenance intervals of 10,000 operating hours, as no water, no lubricants and only a few moving parts are involved.

Proactive maintenance is limited to a visual inspection, replacement of the air and Sulphur filters, and a final leak test. This is all done in half an hour.

Experience shows that refurbishment of the fuel cell generator, including stack replacement, is only required in this application between 20,000 to 30,000 hours of operation and can be scheduled as needed through remote monitoring.

The Sunfire-Remote fuel cell generators are third party approved for CE according to international fuel cell standard IEC EN 62282-3-100 Fuel Cell Safety. North American (NRTL) certification is pending and completion is expected in Summer 2022.



Figure 3, 4 and 5: Examples from European Gas Pipeline Operators

Besides the previous references in the European gas industry, this installation demonstrates again how Sunfire-Remote fuel cells helps to reduce time effort, costs, and finally, emissions in the power supply of electrical loads in the oil and gas industry. With the expanded availability of renewable ammonia or hydrogen, corresponding product variants will also be available in time. So, nothing stands in the way of switching to a highly efficient, clean, and sustainable solution.

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