

Telstra Green Power Fuel Cell

Telstra is renowned for its innovation and corporate leadership in technology. It looks to provide greater availability in telecommunications network to its users and also to reduce its carbon footprint. It wanted to reduce the battery size at its sites, remove diesel generators and provide highly reliable extended run time in the event of loss of power.

Fuel Cells provide very reliable backup power, but the problem has been re-fuelling. Sefca was able to offer a Fuel Cell system that is self-fuelling; using solar power to generate hydrogen for later use by the Fuel Cell.

This Fuel Cell system called "Bottled Sunshine" has been developed by Acta (Italy). In early 2013 Telstra commenced a Proof of Concept with Sefca to test the capability of the Bottled Sunshine solution.

Client Overview

Telstra is Australia's largest telecommunications and media company. It builds and operates telecommunications networks and markets voice, mobile, internet access, pay television and other entertainment products and services.

Telstra has a long history in Australia, originating together with Australia Post as a government department. Telstra is now fully privatised and has been undergoing a change program to become more "sales and marketing led" under its current CEO, David Thodey.

Business Challenge

Although batteries provide an option for backup power they have limitations that require Telecommunications companies to look at alternative options for solutions that need either long back up autonomy (greater than 8 hours) or very high availability. In the past the most common option has been diesel generators. These bring with them the issue of noise, pollution, maintenance and logistic challenges relating to refilling. The Challenge was to find a solution that provided both long autonomy and high availability.

Solution provided - Sefca was contracted by Telstra to provide a Bottled Sunshine solution. The solution uses either rain water or demineralised water which is stored onsite. This water is converted into hydrogen at 30 bar pressure by the Acta Electrolyser. The stored hydrogen is then used by the Fuel Cell to provide backup power.

The power to generate the hydrogen is provided by onsite solar panels. Site backup autonomy is extended by simply increasing the size of the hydrogen tanks. The Bottled Sunshine unit also monitors the mains power and if a power failure occurs it then uses the hydrogen as fuel to power the Fuel Cell and provide backup site power.

Industry

Telecommunications

Challenge

To deliver a solution that provides extended back-up power, never needs to be refuelled, produces no carbon

Solution

Sefca combined Solar panels with a "Bottled Sunshine" solution from Acta to deliver 10 hours of onsite back-up power and produce its own onsite hydrogen for the Fuel Cell.

Results

- The Bottled Sunshine solution can be set up to use rain water or produce its own water as the initial fuel source
- Solar panels provide the power to electrolyse water to Hydrogen and in essence allows Telstra to Bottle the Sunshine
- The Hydrogen is stored on site in cylinders ready for use when there is a power failure
- The Fuel Cell using the hydrogen can provide up to 10 hours of power for the site.
- No carbon is produced or emitted in any of the processes.

Once the site returns to mains power, hydrogen production re-commences and the hydrogen cylinders are refilled. Telstra has been testing the solution for the past 12 months and it has proven to reliably deliver the desired outcome.

Value Derived - In 12 months of testing, the Bottled Sunshine unit provided backup power on several occasions. These backup events ranged between 15 minutes and about 6 hours. The site has refuelled itself as required and runs without human intervention. A web interface also provides a greater level of information on the site with regard to available power, fuel and site power status.

Significance - The significance of this project cannot be overstated. Telstra has supported a world first in self-refuelling power solutions. Telstra has now proven that hydrogen is a viable energy source that can be produced on site, with no carbon emissions and used to provide power as required. The system requires no special installation techniques – it uses rainwater and solar panels as its fuel source. This simplicity of installation makes the Bottled Sunshine solution also ideal for remote off-grid sites where logistics are difficult.

Telstra invested in and proved the viability of the first commercially available Bottled Sunshine solution in the world. It is this leadership and willingness to integrate green technologies into their solutions that sets Telstra apart.

Sefca - Sefca has been integrating hydrogen Fuel Cell solutions in Australia for the past 7 years and is the only Fuel Cell integrator in Australia that has been continuously providing Fuel Cell solutions. Sefca has achieved several Australian and world firsts being:

- In 2011 Sefca proved the viability of a self-refuelling Fuel Cell working with Professor Akhtar Kalam of Victoria University. We then jointly worked with Acta to assist in the functional design of a commercial product.
- First company to demonstrate the viability for distributed power generation through the use of a Fuel Cell when we jointly developed the solution with Ergon Energy in 2007
- First in Australia to implement commercial backup power solutions using compressed hydrogen Fuel Cells.
- First in Australia to deliver solutions based on methanol fuel for hybrid solar/ Fuel Cell commercial solutions
- First in the world to develop and implement a self-refuelling Fuel Cell.
- Only company in Australia to have provided more than 80 Fuel Cells for commercial use

Sefca has offices in Melbourne and Sydney and worked closely with Telstra and Acta to define the scope of the project, develop product specifications and provide all Australian sales and support.

Acta

Acta S.p.A. is a developer and manufacturer of a range of clean energy products. Based on its world-leading expertise in alkaline membrane technology, the Company has developed a unique range of low-cost, compact hydrogen generators (electrolysers) which produce pure, dry compressed hydrogen at high efficiency from renewable or grid power.

