

Delivering green power against the odds

Van Halteren Technologies integrates sustainable
sofc technology into a mini power station.

As the world prepares for a transition to renewable energy, the need for innovative power solutions is growing. Solid oxide fuel cells (SOFC) are a promising solution for stable power supply in decentralized grids. In only six months, and despite the challenges of a global pandemic, VHT developed a prototype 'plug-and-play' SOFC power station. Creativity and team spirit were the keys to success, according to engineers on the team.

In January 2021, the Greentech division at VHT accepted a challenging task from the Bosch Group. To integrate ten high-efficiency SOFC's from Bosch,

into a 'plug-and-play' power station that could support a local grid. Powerful enough to contribute to the electrification of a factory or residential area, the station also needed to be portable enough for transportation with a regular truck.

A fully functioning prototype of the 'micro power station' was scheduled for July the same year, with serial production planned to start in 2024. The VHT team knew this would be challenging. But they had experience developing complex power management systems for a range of applications. They saw a real possibility of housing the SOFC's together with a Grid Connection Module from VHT, in a regular shipping container.

The Grid Connection Module was developed by VHT as a key part of its Power Management System solutions. And it was a perfect fit for the SOFC project.

The module enables large-battery power storage for handling fluctuations in power demand. It would also provide the DC/AC conversion needed before feeding electricity from the SOFC's into a local grid. Thanks to the module, the mini power station would be truly 'plug-and-play', ready to supply power almost immediately after installation..

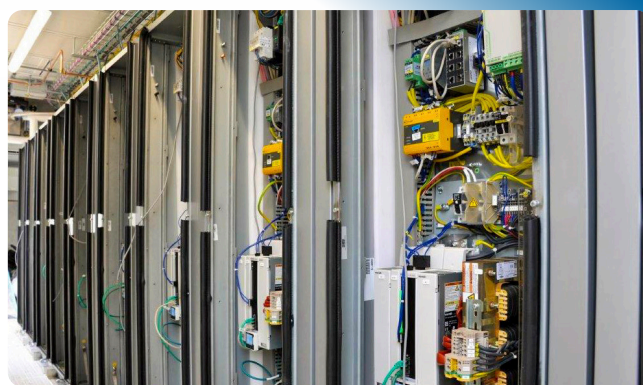
Creativity overcoming obstacles

Determined to keep the challenging project time frame, the team worked hard and quickly came up with a plan. But soon, exceptional circumstances brought new difficulties. The Covid-19 pandemic created worldwide shortages, both of necessary components and of shipping containers. The team were forced to swiftly modify their plan, when their chosen container suddenly couldn't be delivered. Thinking outside the box became key to the success of the project. With a different container, the team made every effort to get everything in place. Incomplete equipment had to be installed into the modified container, with the missing parts added as they became available. In addition, pandemic restrictions meant only a limited amount

of people could work in the container at any time. Nevertheless, by July a fully functioning prototype was ready for testing. The team had achieved something that seemed impossible, through dedication and creativity. With the combined experience and know-how, in close cooperation with our partners, it was possible to surprise both ourselves and the client.

Power wherever it's needed

The potential of SOFC power stations is significant. They can create stability in naturally fluctuating solar- or wind powered grids, with minimal environmental impact. They can also act as sole providers of electricity in remote areas. This enables large data centers and other applications to get reliable and sustainable power while operating off the regular power grid. The project is drawing attention from a variety of sectors, and orders for the mini power station are already being placed. By 2024, lead times and production costs should be fine-tuned for serial production. The collaboration between VHT and the Bosch group continues to create truly sustainable power management for the future. This project really shows that with a dedicated team, sharing the same goal and keeping the enthusiasm and team spirit going, real progress can be made.



Facts: SOFC

Bosch's high-temperature SOFC runs on a variety of fuels, such as hydrogen, natural- or biogas. Inside the unit, fuel is oxidized using a ceramic electrolyte, at a temperature of about 700°C. The electro-chemical reaction produces a current of up to 11 kW per unit, emitting only a small amount of CO₂ and water. Surplus heat from the SOFC can also be used for additional applications, such as heating water.