

Rehiko* Develops *Zero-Emission* Hydrogen Fuel Cell System For Leading Healthcare Facility

Modular and scalable solution to be used by a hospital in Washington State as a prime or backup power source or as part of a distributed energy network



Background: Understanding end-user needs

Klickitat Valley Health (KVH) is a leading non-profit care provider in Washington State, US, offering a broad range of hospital, family medicine, wellness and therapy and specialty clinic services to the local community. Its commitment to quality care is supported by a broader undertaking to maintain the highest standards of environmental, social and corporate governance. This pledge includes adopting more sustainable systems and technologies that help minimize its carbon footprint.

Consequently, KVH is implementing a program of crucial capital improvements and energy efficiency projects that will significantly reduce emissions at its main healthcare facility in **Goldendale, WA**. One of the projects comprises a plan to install an innovative hydrogen fuel cell system – allowing it to deploy sustainable mission-critical power that produces no emissions at the point of use. Depending on the application, the fuel cell could be used as a prime or backup power source or as part of a distributed network, providing KVH with a

sustainable and resilient energy solution to meet its future needs.

Achieving this aim has required collaboration with an experienced and technically-qualified technology provider that could offer an end-to-end solution incorporating design, manufacturing, installation and after-care.

“Like many mission-critical power end users, we have become increasingly aware of our environmental responsibilities and wanted to achieve resiliency by using power generation technologies that were more efficient and less polluting at the point of use,” Jonathan Lewis, Director of Support Services at KVH, contact at the hospital. *“Rehiko has a long history of power systems innovation and has been intensely researching fuel cell technologies for several years. That knowledge and experience meant Rehiko was perfectly positioned to meet our sustainable power requirements.”*



Solution: Developing the hydrogen fuel cell system

Close collaboration between engineering teams from **Rehiko** and **Toyota Motor North America** to develop and install a hydrogen-powered fuel cell system, KVH set the technical objectives. The fuel cell system needed to offer the highest levels of power resiliency to provide grid-following and emergency power with the option to export excess energy to the grid through a net metering program. Space restraints at the Goldendale site meant size mattered too – it needed to be compact yet modular and scalable to allow for future development. And being located outdoors in all weather, it needed to be rugged and reliable while operating with low noise and through-life maintenance costs.

Rehiko scientists and engineers assessed several different fuel cell technologies before selecting a **Solid Polymer Electrolyte Membrane (PEM)** fuel cell due to several reasons. PEM has an excellent electrical efficiency of between 45% and 65% and a fast response to transient loads. Its cells are smaller and lighter than other fuel cells for the same power output. These characteristics, along with start-up times of only a few seconds, made a PEM fuel cell the most suitable architecture for the KVH application.

However, the fuel cell was only one consideration in a more extensive network of technologies, with Rehiko providing one-source of responsibility for the generating system and accessories. These included the inverter, fuel cell electrical system, exhaust, cooling and fuel supply inlets. In each case, system development and integration needed to be performed

with care and attention to result in a highly optimized solution.

The result is a resilient and sustainable fuel cell system built to last. It comes in a compact, durable steel housing featuring lockable access doors and a textured paint finish for corrosion and abrasion protection. Ease of use is enabled through fully integrated controls, including an externally mounted emergency stop switch, electronic trip main line circuit breaker and remote start/stop. The system can operate from -30 to 45C and has a low-maintenance 20-year design life.

The 10-foot hydrogen fuel was prototype-tested and factory-built within Rehiko facilities. It has been configured to meet the **National Fire Protection Association's NFPA110 standard** for emergency and standby power systems – providing KVH with an ultra-safe solution for prime power, peak shaving and emergency power.

“The fuel cell power system has been designed for widespread component interoperability to provide reliable power on demand and offers low-maintenance operation and reduced through-life costs,” says Ben Rapp, Manager – Business Development, at Rehiko. *“At every stage of the development process, we have worked closely with the end-user to ensure all their expectations were met. It was a hugely successful collaborative effort that has resulted in an exceptional solution.”*

Outcome: Further fuel cell opportunities

The fuel cell has now been delivered to the KVH facility, with Rehiko working alongside a local energy service company to oversee installation and commissioning. Customer training will follow to ensure all the features of the fuel cell are fully utilized. The hospital is exploring the potential of establishing a district microgrid that deploys other sustainable technologies to create power for local schools and other buildings.

“We now have a modular, scalable and forward-looking fuel cell system that could prove to be a vital part of a larger clean energy network,” Jonathan Lewis, Director of Support Services at KVH. *“This represents our vision of sustainable and resilient energy supply.”*

Meanwhile, Rehiko is continuing to optimize the performance and layout of the fuel cell system, and there are plans to scale it from 100kW to 500kW, then 1MW. It is also exploring new markets and applications. It could, for instance, be deployed in maritime environments like ports to provide dock-side shore power, reducing emissions from ships idling at berth. Also, with the trend towards vehicle electrification gathering pace, the fuel cell system could be used to recharge electric vehicles. Mining also represents opportunities as sustainable technologies in that sector come to the fore.

“The hydrogen fuel cell system is suitable for a broad range of mission-critical power users, including hospitals, data centers and water treatment plants – or in any application requiring sustainable and resilient prime or backup power,” says Rapp. *“Rehiko will leverage its existing global manufacturing and distribution partners to provide complete end-to-end customer support. Ultimately, the fuel cell is a new and exciting technology that will allow the customer to emit zero emissions at the point of use. This capability represents a huge step toward decarbonization for our customers and a significant advance in the fight against climate change.”*



Visit www.powersystems.rehiko.com/hydrogen-fuel-cell-systems to learn more about Rehiko's fuel cell technology or to get in touch.

* Rehiko, formerly known as Kohler Energy, is a global leader in energy resilience delivering innovative energy solutions critical to sustain and improve life across home energy, industrial energy systems, and powertrain technologies, by delivering control, resilience and innovation.