Five-Kilowatt Fuel Cell Celebrates One Year

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The University of Alaska Fairbanks and Fuel Cell Technologies of Kingston, Ontario, have announced that **the five-kilowatt solid oxide fuel cell installed in Fairbanks has successfully passed the one-year field operational mark**.

UAF has been testing fuel cell systems, which convert natural gas to grid-compatible AC electricity, for more than six years. Fuel cells promise highly reliable and efficient small-scale systems for remote power applications that may mean a significant reduction in both fuel consumption and CO2 production. Since system lifetime and reliability are major issues preventing deployment of these systems in remote areas, the one-year mark represents a significant milestone for solid oxide fuel cell systems toward proving that the technology is coming of age.

The unit has operated for 8,700 hours and provided 24,000 kilowatt-hours of electricity to the Fairbanks Natural Gas facility. That, together with an average of two kilowatt-hours of generated heat, brings the total system efficiency to 70 percent, a significant efficiency gain when compared to current systems of similar size, such as small diesel generators, which operate at about 25 percent electrical efficiency.

The fuel cell functioned 91.5 percent of the time over the past year, a significant number as the U.S. Department of Defense, a potential user of the fuel cell, requires a minimum—and rarely achieved—90 percent efficiency. During the past year there was only one unplanned interruption of service, which occurred when a minor software error

resulted in a system shutdown that caused some changes to the fuel cell system. Since then, the unit has continued to run reliably at a slightly reduced power. FCT engineers say their new system design precludes the problem from recurring in second-generation units.

Dennis Witmer, director of the UAF Arctic Energy Technology Development Laboratory overseeing the project, is pleased with the cell's performance.

"This unit has proved to be surprisingly robust in the field, considering the current state of product development," he said.

The system has been continuously monitored by FCT at its Kingston facility using its own remote monitoring software; UAF and FNG employees conducted routine maintenance. The fuel cell was designed and developed by FCT and incorporates a fuel cell stack built by Siemens Westinghouse. The project is funded by the U.S. Department of Energy Arctic Energy Office, with the participation of the UAF AETDL and FCT.

Source: University of Alaska