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Fuel Cells: The Next Generation

By Darren Kimura

Imagine a technology that allows you to produce electricity from water. Imagine electricity on-site at your facility as easily as producing hot water for your show doing all of this with a technology that has no moving parts and no combustion. as this technology sounds, it is a reality today in a product simply know as a Fue



4 Kilowatt System at Pearl Harbor

What is a Fuel Cell?

A fuel cell is a device that uses an electro-chemical process to produce electricity. In essence, a fuel cell is similar to your standard car battery but the chemical component is constantly fed to the fuel cell which translates to constant electrical output. Typical fuel choices include water and a gas such as hydrogen/propane or even methane.

Current Fuel Cell Uses

Fuel cell technology is currently used in a wide range of industries. Fuel cell systems can currently be found on board NASA's Space Shuttle flights producing electricity for astronauts. The automotive industry has embraced fuel cells and virtually every manufacturer is offering a product on the market powered by fuel cells.

GM recently introduced its Sequel, a SUV powered by a hydrogen fuel cell. It is currently in use today. In the commercial sector, companies such as UPS have partnered with the Environmental Protection Agency to test the use and economics of converting to a fuel cell fleet. Fuel cells are also commonly found today aboard mass transit vehicles, at universities and federal facilities, in the military and even at residential homes.

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providing reliable standby power.

Advantages

There are many advantages to using a fuel cell. From a facility operation standpoint a fuel cell has no moving parts, thus it requires low maintenance and emits virtually no noise or emissions. Fuel cell systems create water, electricity and heat allowing for a full use of its chemical inputs. Finally tax credits may be available on the federal and state level which help to offset the high costs of system installations.

Disadvantages

The major limiting factor behind the technology is that systems today are extremely expensive. In comparison, purchasing electrical power from your local utility will run you an average of a kilowatt hour charge of \$0.11. Over a 5 year period photovoltaic power may run \$0.27 cents per kilowatt hour. Fuel cells will presently cost an estimated \$0.42 per kilowatt hour.

While the concept itself is not new, the application is evolving thus and there is a growing understanding of fuel cell system use over time. In fact, it has been speculated that fuel cell systems may lose significant efficiencies as time goes on. These situations are being tested by Hawaiian Electric and the military to quantify the true effect of fuel cell system use over time.

The Future of Fuel Cells

As the market continues to evolve and systems become more economically viable, the future will see vehicles powered completely by fuel cell and more on-site generation systems installed. On the consumer level, in the not too distant future we may see fuel cell powered cell phones, wrist watches, laptop computers. One day you may find that a fuel cell system is producing the electricity for your facility from the waste methane of your trash and your wastewater systems and is producing water for your landscape, as well as heat for your hot water systems.

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