

# Cars aside, fuel cells catching on as a power supply

ROBERT GELASCHI / CORRESPONDENT

The fuel cell is finally coming into its own as a power source. And not a moment too soon, say some of its ardent supporters.

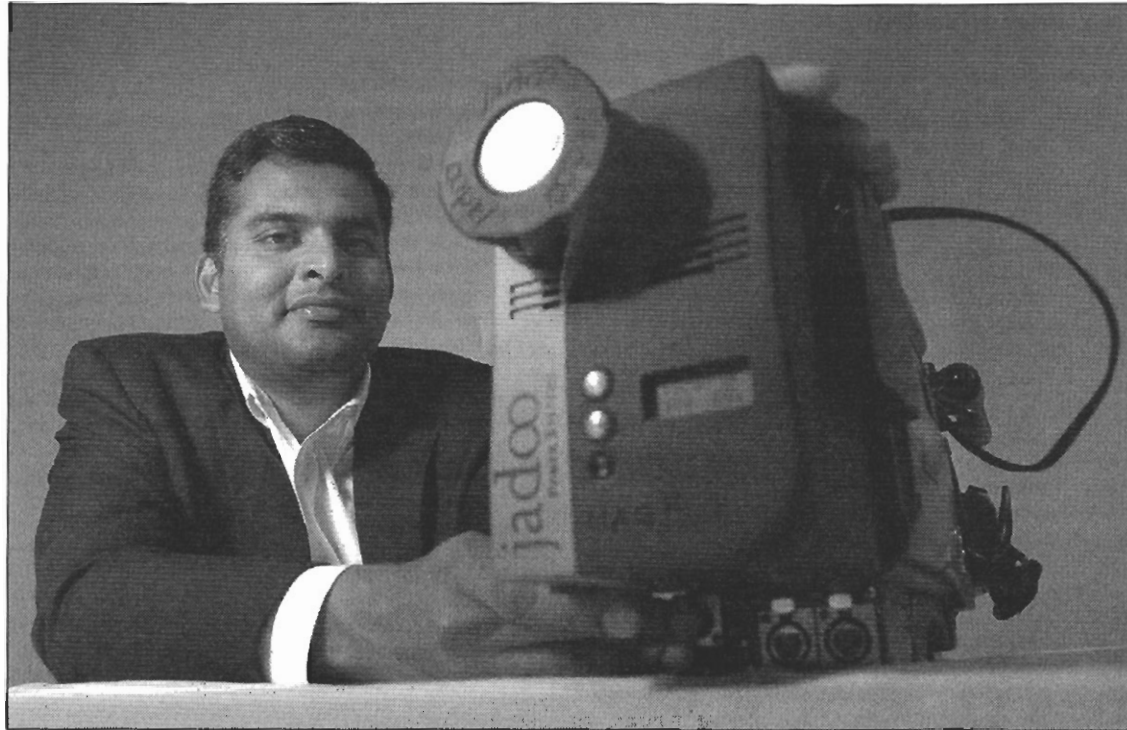
"I think the fuel-cell industry has had a black eye because the industry keeps saying, 'We'll be ready in five to 10 years,' and then five to 10 years later it was still five to 10 years," said Ron Friesen, executive director of the California Stationary Fuel Cell Collaborative.

In some applications, most notably cars and trucks, fuel cells are still in the development stages. But in office buildings, electronic devices and broadcasting, the market for fuel cells is starting to take off.

**A premium power source:** Fuel cells convert a fuel such as hydrogen, propane or methane into electricity, with the only byproduct being warm water. They have no moving parts, and can be refilled with fuel.

Industrial applications were the first area of significant market penetration. As of last year there were already more than 250 stationary fuel-cell systems generating power for industrial applications around the world, according to the U.S. Fuel Cell Council, based in Washington, D.C.

They have proved popular with hospitals, data processing centers, semiconductor chipmakers and other businesses that need extremely reliable electricity no matter what happens to the public power grid. Fuel cells also produce a consistent voltage, an important consideration for businesses with computers or other devices that are sensitive to fluctuations. Where fuel cells are used on a large enough scale,



Lee Arikara displays one of the fuel-cell battery packs that Jadoo Power Systems makes for video cameras

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waste heat can be used for cogeneration.

Residential use has been a tougher sell. Demonstration units are being tested around the country by several manufacturers, but cost is still a factor.

Right now some of the larger fuel cells are selling for about \$3,500 per kilowatt, said Friesen. Companies that depend on "premium-grade" power are willing to pay the price, but fuel cells won't be competitive with other sources until the price drops to about \$1,000 per kilowatt. That will take a few more years, Friesen said.

Even so, the U.S. Fuel Cell Council cites research by Allied Business Intelligence Inc. that the market for stationary fuel cells had reached \$40 million last year and should grow to more than \$10 billion by 2010.

Smaller, portable fuel cells are finding uses in many settings where power is needed far from an electric outlet. The U.S. Fuel Cell Council says the market for handheld fuel cells is conservatively forecast at 105 million units worth a total \$2 billion by 2011. Next year production

should reach 19 million units.

**Weigh less, last longer:** One local company finding success is Jadoo Power Systems, based in Folsom.

"We serve two markets: One is the broadcast market, which is television stations; the other is law enforcement, essentially various government agencies who wish not to be named," said Lee Arikara, vice president of business development.

In broadcasting, Jadoo's fuel cells take  
See **FUEL CELLS**, Page S-11

# FUEL CELLS: Industry says lack of public awareness limits market

From Page S-10

the place of batteries used on portable television cameras. The traditional batteries weigh about 5 pounds, and cameras typically need three or four of them to head into the field.

The equivalent output requires only 8 or 9 pounds of fuel cells, and they give a longer run time, Arikara said.

The big advantage is that the fuel cells can be refueled in less than an hour, versus the several hours needed to recharge a battery. And while a battery's life diminishes the more often it is recharged, a fuel cell's output stays the same every time it's refilled.

A Jadoo fuel cell with two cartridges and refill system costs about \$3,500. Because one refill station can serve several fuel cells, it's not necessary to have one for each camera.

On the military side Jadoo offers few details, but the applications are similar: radios, surveillance systems and medical equipment.

What makes these markets ripe is that there is a low infrastructure barrier, said Arikara. Someone driving a fuel-cell-powered car would have a tough time finding a place to fill the tank with compressed hydrogen, a typical fuel. But most television stations already carry compressed gases. Jadoo also has relationships with gas suppliers that mean discounts for Jadoo customers.

Also active locally is Gold River's Altery Systems. The company sells sta-

tionary and portable fuel cells of up to 50 kilowatts, along with hydride fuel cartridges and refilling stations. Altery's marketing materials target primary or backup power applications in security, surveillance, telecommunications and utilities. The company claims to have nine additional product introductions planned through 2008.

Even one out-of-state firm has a sales representative based in Sacramento. Plug Power, based in Latham, N.Y., is likewise targeting telecommunications companies, offering fuel cells as backup power for cell-phone towers.

"Right now what we're saying is the initial cost of a fuel-cell system as a replacement option is definitely more expensive than what you would pay to purchase a bank of batteries," said Cynthia Mahoney White, manager of public relations and marketing for Plug Power. But since the fuel cells have a life expectancy of 10 years, compared with five to seven years for batteries, the company is touting long-term savings.

**Not a household name:** The big problem is getting people to become familiar with the technology.

"It's not like selling refrigerators," White said. "People understand refrigerators. They don't understand fuel cells."

Educating the public is still the industry's big hurdle, said Boh Wichert, a Sacramento energy consultant and member of the U.S. Fuel Cell Council.

"They really don't know enough about

fuel cells right now," he said. "They are not the same as batteries, they are not the same as internal-combustion engines, they are not the same as steam turbine generators."

The council's task is to spread the word. One aspect of that is clearing a path for people to use fuel cells in laptop computers, cell phones and other personal electronic devices, and to take them aboard airplanes.

"What we are doing is working with the International Electrical Technical Commission to put together a safety standard," he said. The current expectation is that the standard will be approved by January 2007.

Getting a clear forecast has proved tricky for the California Stationary Fuel Cell Collaborative. In 2002 it surveyed major fuel-cell manufacturers and projected sales of 600 megawatts by 2005. But when the same survey was done in 2003, the companies had dramatically reduced their expectations, looking at sales of only about 60 megawatts by 2006.

A new survey conducted this year but not yet published shows a forecast about double the figures from 2003, Friesen said.

One thing that should help in California

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**Cynthia Mahoney White**

Plug Power

is a restructuring of the collaborative itself. Since it was formed in 2001, it has comprised federal, state, regional and local government agencies, and an industry advisory panel. Under a new structure implemented last month, industry representatives will provide membership fees that can be used to advance the adoption of fuel cells in California.

Another measure of the growing commercial market is the annual Fuel Cell Seminar, a conference and trade show that draws participants from around the world. In 1998, only 44 companies had exhibits, according to the organizers. Last year that figure had swelled to 158. This year's event, slated for next month in Palm Springs, has 175 exhibitors on the list.

The state of the market might best be illustrated by Sierra Nevada Brewing Co. in Chico. This year it installed four 250-kilowatt fuel cells with some financial help through the state Public Utilities Commission's Self Generation Incentive Program. The company said the fuel cells would supply most of the brewery's electrical demand. Cogeneration boilers harvest the waste heat and produce steam for making beer and other heating needs.

The purchase showed that businesses are willing to take fuel cells seriously as a power source, but it was also a large enough and rare enough move to get Gov. Arnold Schwarzenegger to pay a visit for the dedication. At a total of 1 megawatt, it's said to be the largest commercial installation of fuel cells in California.