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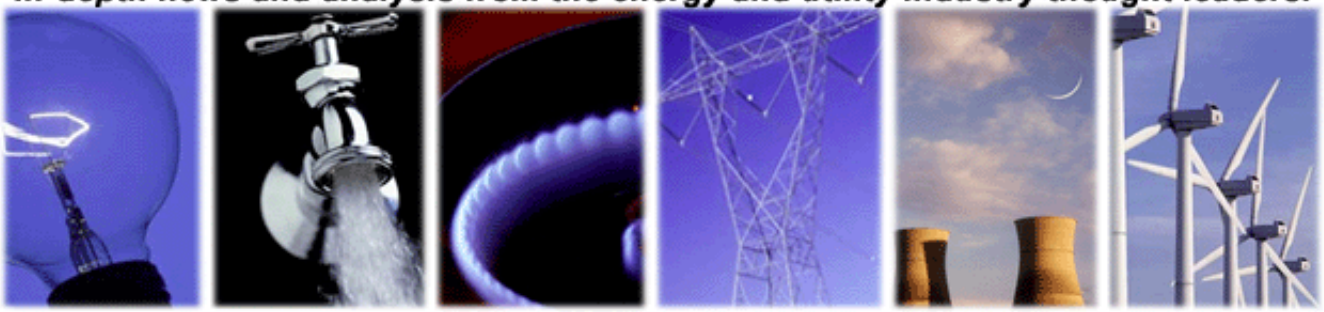

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Venture Capitalists are Warming to Fuel Cells

By Ken Silverstein
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Are fuel cells ready to rev up? It depends on who is asked but some indications have surfaced that suggest the market for the technology could accelerate. The science will undoubtedly advance and the associated costs with drop. And that could have a dramatic effect on the environment and global energy markets sooner than many think.

Fuel cells were the toast of the venture capital world in the late 1990s. But investors soured on them after taking huge losses on the devices, which could potentially be used to power everything from laptop computers to manufacturing plants. The stock prices of those in the sector had nosedived by 2001 and fuel cell makers have struggled to find the needed financing to grow. In 2001, for example, only three such companies were able to attract $8.7 million, says VentureWire.

But that may be changing. In January, President Bush called for $1.7 billion over five years to research and develop fuel cells. And now that the economy and the stock market are a little brighter, venture capital firms say that they are ready to listen once again to pitches. This year, fuel cell manufacturers have raised $25 million,

VentureWire says. While small, it's a start.

"We are very bullish about this sector," says Raj Alturu, managing director of Draper Fisher Jurvetson, an information technology venture capital firm in Redwood City, Calif. "The level of innovation is enormous. A lot of core technologies that have been developed in laboratories over the past 10 years are now ready to come to market," which doesn't just include fuel cells but also micro-turbines and solar cells.

The market for stationary fuel cells used in the production of electricity is expected to grow from $21.4 million to $1.3 billion by 2009, says Frost & Sullivan. But, that will only happen if technological advances can bring down costs even more. And, the firm has some concerns, noting that the industry has difficulty getting the needed economies of scale because it is fragmented. Still, the group says that more trials are in the offing and the activity could spawn more investment and new developments.

Commercially available fuel cells produce electricity from hydrogen through a non-combustion chemical reaction rather that direct firing. As a result, they are quiet, clean and efficient—and produce energy in the form of electricity and heat when fuel is supplied, discharging benign byproducts like water. Residential fuel cells supply between 2-5 kilowatts of power and are mostly in the experimental stage. Meanwhile, those used for commercial enterprises can generate 200-plus kilowatts and are implemented if businesses need uninterruptible power or where access to the transmission grid is limited.

While nearly all fuel cells are currently utilizing natural gas as their fuel source, other companies are looking for alternatives. A California-based company, Scientific Applications & Research Associates, Inc. (SARA), has successfully tested a fuel cell that runs on carbon, which is derived from one of the Unites States' most abundant natural resources, coal. To progress the technology, SARA and American Electric Power (AEP) have formed a Joint Industry Program (JIP) to enable the scale-up of the Direct Carbon Fuel Cell to commercial viability.

"Markets for their products are developing and the technologies are progressing," says Nancy Floyd, co-founder of Nth Power, a venture capital firm in San Francisco. "So we are now getting serious traction and a good flow of deals."

Future Promise

Fuel cell demonstration projects have shown promise. The technology has helped power city buses and local hospitals. But developers are concerned that investors might construe the hype surrounding them as similar to that of dot.com businesses that made such a splash before they drowned. The difference between the two concepts is profound: One used a dubious business model for unproven markets while the other has real products that are used for life's essential needs, say fuel cell advocates.

Unlike the dot.coms that are clustered in Silicon Valley and a few other hotspots, the energy start-ups are globally dispersed. Moreover, the early markets for many new energy generation storage and management products are expected to be outside the United States. The markets that are driving the demand for all types of fuel cells and particularly stationary ones are in Asia where electricity prices run high.

Hoku Scientific, for example, plans to introduce its first innovation to Asia in 2005. The company says that it is developing a high-efficiency fuel cell that will generate electricity and hot water for the family home. Similarly, Vancouver, Canada-based Ballard Power Systems recently launched a pre-commercial one kilowatt combined heat and power fuel cell generator to be used in the residential market in Japan. Currently, more than 200 phosphoric acid fuel cells using hydrogen as a fuel source are operating worldwide, says the U.S. Department of Energy.

The delay with unveiling fuel cells on a massive scale is both technological and economical. Right now, hydrogen is produced mainly from natural gas using steam reformation—a method that does nothing to limit the reliance on fossil fuels or the infrastructure that must carry them.

Running electricity through water can also create hydrogen. But this requires burning more natural gas or coal—an inefficient process that not only pollutes but also may

not make enough hydrogen to justify the added fuel consumption. Other renewable sources could create the electricity to produce hydrogen but may not be as reliable or cost effective. Proponents of nuclear say that it could be an ideal power form to generate the hydrogen needed to power fuel cells.

Worst Fears

Critics say that because hydrogen is hazardous, any leakage could be highly explosive and might possibly accumulate in the atmosphere and harm parts of the ozone layer. Moreover, the amount of energy used to make hydrogen is more than the amount of power produced by fuel cells. If fossil fuels are extracted to make the hydrogen, then more pollutants would be released. A more effective tack to cleaning the environment, some say, is to mandate increased car mileage and to close down dirty power plants.

"Only conservation, renewables and nuclear can reduce our dependency on fossil fuels," says William Dunlay, with Control Technologies in Cape Elizabeth, Maine. "Hydrogen has its place, most notably as a fuel for vehicles in a sustainable economy."

The will does exist to make the hydrogen economy a reality. Every major automaker is investing in fuel cells, not to mention the major fuel cell makers: Ballard, FuelCell Energy, Siemens-Westinghouse and International Fuel Cells. And this past summer, Dow Chemical Co. and General Motors Corp. partnered to foster the development of fuel cells—a deal which could lead to the buying or leasing of 500 more units by 2010.

As far as stationary fuel cells go, the electricity efficiency rate for commercially available units is about 40 percent but can be as high as 92 percent if the heat can be captured and re-used. By comparison, modern combined cycle power plants have a 50-55 percent efficiency rate while coal-fired plants are about 30-40 percent. "The time is finally right for new energy technologies to be commercialized," says Matt Horton, director of Garage Venture Technologies.

Fuel cells hold lots of potential and will eventually play a key role in helping to build a diversified economy and to create a cleaner environment. To get there, more investment is needed. And now that the general economy is improving, venture capitalists are once again studying the technology. That will spur additional research and bring the concept closer to fruition.

Correction: December 15th's IssueAlert neglected to say that FPL Group won Renewable Company of the Year at Platts' Global Energy Awards.

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