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## Turning to tech for cleaner water

**INVESTORS SEE BIG GROWTH FOR FIRMS WITH NEW WAYS TO PURIFY WHAT WE DRINK**

**By Matt Marshall**  
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Ever heard of a Silicon Valley "water" start-up?

Didn't think so. After all, water isn't exactly high tech.

Yet local investors now see big opportunities in the growing demand worldwide – from Fresno to the Philippines – for cleaner water, from bottled water in the developed world to basic water without pollutants in arid countries in Asia and Africa. Bay Area water companies like Livermore's Novazone, San Carlos' Pionetics and Petaluma's HydroPoint are pushing to grow quickly, mixing deep technology with the classic fast-growth recipe favored by Silicon Valley's venture capitalists.

"There's going to be a huge market in water information technology," says Robert Day, a venture capitalist at Expansion Capital Partners in San Francisco, who is prowling to make investments into companies that use high-tech to monitor water quality and usage.

Many of the sophisticated sensor and optical technologies developed by telecom start-ups here in the late 1990s can also be applied to water treatment techniques, he said.

"Water is the oil of the 21st century," said Ira Ehrenpreis, an investor with Technology Partners, who is also eager to invest in water start-ups. "There is such a huge demand, and finite supply."

Of course, not everybody sees money in water. Water start-ups still remain a tiny proportion of overall venture capital investments: Investors poured \$165 million into 44 companies focused on water purification and management between 2002 and 2004, according to Cleantech Venture Network.

Many investors are still skeptical about the potential for fast-growth start-ups in the sector. The market is dominated by slow-moving, giant water utilities.

Still, entrepreneurs like Eric Nyberg are trying their luck.

Nyberg, a chemist, began working on his water idea 13 years ago. His garage became a lab for testing ways to purify water with electricity.

He co-founded a company, Pionetics, in 1995 and won a broad patent in 1998. Soon he began winning customers, including EcoWater, a major international water treatment company.

Venture capitalists began investing. In February, Pionetics raised \$6.4 million more in venture capital, for a total of \$11 million.

Pionetics' secret is its method of water treatment, called deionization, a process that has been around for a while. But Pionetics improved on existing techniques by using less energy and wasting less water.

Basically, the process splits the one hydrogen atom and two oxygen atoms in the molecule of water (H<sub>2</sub>O) into a positive H<sup>+</sup> ion and a negative OH<sup>-</sup> ion. Those ions are stored within membranes, through which dirty water passes. The ions, with help from electrical charges outside the membranes, react with chemicals like

sulfur and nitrate and remove them from the water flow.

Ion exchange is particularly good for grabbing certain contaminants, such as arsenic or perchlorate, the chemical found in Morgan Hill's drinking-water wells. Existing deionization technology relies on a process called reverse osmosis, which typically wastes between five and seven gallons of water for each gallon of drinking water produced, compared with a gallon or less for Pionetics, says Nyberg. Such waste is a problem in areas of short supply, including many arid countries.

Also, reverse osmosis consumes more electricity. While bottled water costs about \$5 a gallon, Pionetics produces similar water for about 5 cents a gallon, Nyberg says.

Right now, he's seeking ways to take the technology to places like India, China and Latin America.

The Bay Area, meanwhile, gets much of its water from the giant Hetch Hetchy reservoir, but a costly restoration project could mean price increases.

"Right now, people consider water to be free," he says. "But the price is going to go up by a factor of three."

The company will also allow consumers to "dial-a-taste." The ion exchange process removes all minerals from water, and with them flavor. Pionetics' process puts desirable flavors back in, based on individual preferences.

Marty Lagod, a venture capitalist in Palo Alto at Firelake Capital, has invested in several water companies, including Pionetics, and Petaluma's HydroPoint, a company that monitors climate to control irrigation. His office shelves and desk are stacked with scientific books and magazines.

He lifts a picture of the brown, dirty water pipes of a municipal water system: "After water leaves the water treatment plant, do you know when it is tested again?" he asks. "It isn't."

Water districts do random testing. While most water is safe to drink, people are still resorting to drinking bottled water, he says.

He found out when he helped his two daughters enroll at university. They asked him to buy them a supply of bottled or filtered water, like everyone else in their dormitory had. Some 76 percent of all Californians drink bottled water, he says.

Meanwhile, Novazone, in Livermore, is also getting attention – and venture capitalists' injections. It uses a different technology: ozone, a powerful disinfectant, less effective at removing chemicals like arsenic, but useful in eradicating all kinds of other pathogens.

Novazone's process squeezes oxygen out of regular air, and converts it to ozone. The process creates heat, which is bad because it causes ozone to revert back to oxygen too quickly. So Novazone uses patented technology, based on thermoelectric cooling methods developed by NASA's space shuttle program, to cool the production process.

Existing ozone-creating technologies generate more heat and have less efficient cooling processes, according to David Cope, the company's chief marketing officer. Ozone is preferred to chlorine and other disinfectants, too. It was approved by the U.S. Department of Agriculture for use on food in 2001, and is certified as organic.

Novazone has also signed up major customers, including Coca-Cola, Pepsi and Kimberly-Clark. Its ozone generator is the size of a refrigerator. The company says it has 200 customers, in 15 countries.

It too is benefiting from an injection of venture capitalist-like urgency. Founded in the mid-1990s, it languished under its prior management. Then Warren Weiss, a venture capitalist with Silicon Valley venture firm Foundation Capital, led a \$10.6 million investment in the company last month. On Thursday, the entire management team flew up to Washington state, where apple and cherry growers are looking for ways to

meet demands from customers – from Taiwan to Wal-Mart and Costco – for more chemical-free ways of keeping the fruit clean and fresh.

The company has 30 people and is hiring, said Cope.

"I've done a lot of high-flying companies," he says, "but I'm looking for an opportunity to use technology to make a difference."

Making a difference doesn't mean not making money, he says: "Most start-ups are focusing on a market a tenth of the size we're after," he says.