

## Water World, Part II: Investing in Purification

Want to invest in water but are mystified by it? In part two of this three-part series, we break down the market like a big dose of chlorine.

by: Michael Kanellos

November 18, 2008

*Editor's note: this is the second part in a three-part series on water investing. See Part One here.*

### Part II: Purification

Purification companies devise systems that take water permeated with particles or biological material and clean it. Some of these companies say their processes and equipment can be used for desalination. So why aren't they in the first category? If the company seems mostly interested in desalination plants, we put them in that category. If their initial markets lay in equipment that can further purify fresh water, we put them here.

The companies are divided by technology and process. However, you can also divide them up by intended market: agribusiness, industrial and municipal, and consumer.

#### A. Chlorine Replacements

Purfresh offers zone-disinfecting systems for agribusiness. For years, the company sold its systems for a wide variety of applications. Now, it sells them to growers, shippers and produce retailers. It also sells systems to water bottlers. Basically, the company's \$100,000+ machine creates small amounts of O<sub>3</sub> and injects it into water. The ozonated water kills microbes on produce without damaging tissue. (In bottled water, it can also disinfect the plastic bottle.) The trick is digitally controlling the dosages with sensors and software. Purfresh is also acquiring companies and moving into other food preservation technologies. The company has several large customers in the U.S. and Latin America.

Australia's Ioteq aims at the same general market as Purfresh, but the company disinfects with iodine-infused rather than ozone. Iodine is less sensitive to swings in pH than chlorine and lower dosages are required. CEO Jared Franks says iodine is less likely to damage produce than ozone and the systems cost only \$5,000 to \$15,000, less than their ozone equivalents. It has installed over 150 systems. The company is expected to expand into the U.S. soon – some U.S. VCs said they declined to pursue deals with the company earlier because Ioteq wasn't interested in moving.

Another iodine company, BioLargo, is actually a shell company that acquired its technology from Iowc Technologies in April 2007. Like other shell companies, it has expenses but comes up short on revenue. It trades on the bulletin board. BioLargo landed an agreement earlier this year to market Ioteq's Isan system in the states.

#### B. Chlorine Enhancements

Miox has leveled its aim at industrial customers and agribusiness. The company has an onsite system that uses electricity to convert salt into sodium hypochlorite and mixed oxidants, which all get injected into water to

purify it. Salt electrolysis allows sellers and buyers to eliminate the need to transport or store pressurized chlorine gas or bleach, increasing safety and handling costs. The mixed oxidants also help to reduce membrane fouling and kill microbes more effectively for similar dosages, according to Miox. The company raised \$33.5 million in two rounds this year (see Prediction Comes True! Miox Raises \$19M).

HaloSource targets pools, water parks, consumer items and household and commercial point-of-drinking water dispensers. The company binds bromide in polystyrene beads. The chemicals disinfect when water passes over the beads, but they don't get widely dispersed in water. The company has signed deals with Clorox (for disinfecting wipes) and major makers of water purifiers in China, India and Brazil. It raised \$11.5 million in July and \$15 million the year before. It sells the beads as a branded component.

### **C. Synthetic Biology**

Agua Via wants to embed proteins modeled after ones created by living cells to regulate fluids in arrays in membranes. Some of the technology comes from Biophiltre, which specializes in kidney filtration technology. (Both were founded by Gayle Pergamit.) For water, it is looking at the protein aquaporin (see Agua Via: Water, Water Everywhere).

Aquaporin. The company is working with Novozymes and French giant Veolia on a membrane embedded with synthetic aquaporins and hopes to get to market by 2011. Aquaporins control the flow of water in cells and eject impurities. The technology can be used in reverse osmosis systems – CEO Peter Jensen says an aquaporin membrane can handle five times the water flow at one-fifth the pressure of standard reverse osmosis systems – but Aquaporin will initially try to get its membranes into the purification systems used to make ultrapure water in semiconductor fabs.

### **D. Purification by Force**

Among other projects, the Xerox spinout Parc has created a spiral that purifies water through centripetal force. A spiral creates a vortex that forces impurities into a tight stream in the center of the water flow. At that last possible point, the impurities are sucked out from a vacuum.

Sweden's Watreco has devices based around the same principle. It has installed systems in ice rinks in Sweden, Finland and the U.S. to de-gas water before freezing. The company says this reduces the power budget for ice rinks by 130,000 kilowatt-hours or more a year. Water purification systems for agriculture and industrial use are coming in next few years (see Water Companies Taking Cue From Nature).

### **E. Light and Power**

Atlantium is the disco ball of purification. Ultraviolet light gets bounced in a mathematically precise way through a tube transporting water. The Israeli company has installed systems in a few dairies, soda bottlers and fish farms. A high kill rate, but limited water flow.

Pionetics purifies water with an ion-exchange membrane. Focused mostly on the consumer market, Pionetics is moving into commercial deployments.