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**INSIDE TECHNOLOGY**

**Catching heat brings business opportunity**

BY JON VAN  
February 11, 2008

Producing silicon, the economic workhorse found in commodities from computer chips to aluminum beer cans, takes way more energy than lighting Wrigley Field for a doubleheader.

It's a very heat-intense process.

Quartz rocks placed in electric-arc furnaces exude oxygen as superheated gas, leaving molten silicon. Just venting all that heat without setting something afire is a concern. But what has been a problem has become an opportunity for a Westmont-based firm, Recycled Energy Development LLC.

Last week Recycled Energy Development closed on a deal to

build an electricity-generation system for West Virginia Alloys, a subsidiary of Globe Metallurgical Inc. that is the country's largest silicon producer. The system, to be engineered, built and operated by Recycled Energy Development, will capture hot gases coming from silicon furnaces to make steam and run generators.

It will cost an estimated \$45 million to \$55 million to build the system, which will generate more than 40 megawatts of electricity. That is enough to power 20,000 homes and will supply about one-third of the silicon-maker's power needs, said Sean Casten, Recycled Energy's chief executive.

Globe Metallurgical will buy that electricity for 25 years at a set cost, said Casten, because unlike juice from the electric company it is possible to predict decades ahead how much this electricity will cost.

"We know the cost of our capital," Casten said, "and we know the cost of our fuel because it's zero. We're recovering waste heat."

Because electricity is the highest single cost for West Virginia Alloys, locking in a price for 25 years for a major chunk of that power is attractive. Another benefit may come from the new federal energy law that could subsidize plants that recycle waste heat.

Nearly all electricity generated in West Virginia comes from burning coal, Casten said, so when the recycling-energy operation kicks in two years from now it will replace electricity associated with an estimated 290,000 metric tons of greenhouse gases annually.

This is the first recycling deal landed by Recycled Energy Development since last autumn, when it made a \$1.5 billion deal with Boston-based Denham Capital Management, a private-equity firm that focuses on energy and commodity investments. While a \$50 million project might not attract much attention in Chicago, Casten said the governor of West Virginia turned out to announce the deal there.

Such attention is welcome, he said, because it could lead to more projects with West Virginia companies that use oodles of electricity and produce copious waste heat.

**Making ethylene:** Ethylene, a chemical with many industrial uses, can be expensive and messy to make, so a new technology from Argonne National Laboratory intended to cut expenses and pollution might hold commercial potential.

An Argonne research team led by Balu Balachandran has created a membrane that enables hydrogen to separate from ethane gas, cutting several steps from traditional methods for producing ethylene.

"This is a clean, energy-efficient way of producing a chemical that before required methods that were Balachandran said

Ethylene can prorr by physicians as a research has dem scientists hope to find a commercial partner to help develop it into a marketable process.

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Long nanowires: A method to make very long nanowires has been reported by researchers at the University of Illinois at Urbana-Champaign.

"The process is like drawing with a fountain pen," said Min-Feng Yu, a mechanical science and engineering professor. "The ink comes out and quickly dries or solidifies. But unlike drawing with a fountain pen, we can draw objects in three dimensions."

The scientists, who applied for a patent on the process, have demonstrated that the technology will work with a variety of substances, including sugar and potassium hydroxide, that were spun into nanofibers.

The technique is similar to technology developed some years ago at Northwestern University that is the basis for the start-up company NanoInk.

"It is a very clever variation that allows one to synthesize nanofibers with exquisite control," said Chad Mirkin, the NU scientist who pioneered dip-pen nanography.

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