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SCHMACK BIOGAS FACILITY, AKRON

Akron leads the way

The first biogas facility in the U.S. is the result of a unique partnership with a German firm



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Akron has stolen the march on the rest of the country with its new \$7 million plant, the first of its kind in the U.S. that will change sewage sludge into electricity. The city worked with a German company, Schmack Biogas AG, on the facility, modeling it after some 200 plants in Europe and Asia. Schmack, based in Schwandorf, Germany, was founded 13 years ago by three dairy farming brothers who saw the value of one of their byproducts. The idea behind the innovation in Ohio was a trip to Europe by Akron's mayor Don Plusquellic in 2003. The process was used at a biogas facility in Switzerland, and Plusquellic was intrigued, bringing the idea back home. KB Compost Services, which has been running Akron's composting plant, opened in 1986, and Schmack Biogas formed a new company, Schmack Bio-Energy LLC, run by Mel Kurtz in Independence. The biogas industry is just beginning to grow in the U.S., and the new firm aims to be a player in that growth.

The plant, owned by the city and operated by KB Compost Services, is on city land along Riverview Road just before it goes into the Merriman Valley, alongside the Cuyahoga River and the uniquely aboveground Akron sewer line, located in the old Ohio & Erie Canal prism, that feeds the plant. The project has been under development for three years, with the State of Ohio EPA approving it late 2005.

A cultural clash

The facility's innovative design and partnership with a German company complicated the construction. "It was a unique contract," says KB Compost Services' Annette Berger, vice president of operations. "We needed an engineering firm that could transfer European technology to a U.S. culture," she adds. "It took time and patience," Applied Technologies was the engineer of record, with KB Compost Services itself serving as construction manager and a five-part bid package, with Great Lakes Construction handling the foundation and concrete work, Fairfield Service Co. of Marion

the conveyor work, Workman of Kent the mechanical work and Doan Pyramid the electrical. Schmack supplied the specialty equipment, and Protech took over the process control side, with the generator by Jenbacher.

KB took on the CM job, says Berger, because of the special needs of this project: "That was the interesting thing," she says. "It was hard to understand the particulars of this job unless you were in it from the beginning. We needed to stay up front and personal."

For instance, in Germany, a 2 x 4 is just that; nothing nominal about it. "It changes a lot of things as we worked on the design, like all the fasteners," says Berger. "Everything on paper was not necessarily the same in reality." Plus, German codes are less stringent than those in the U.S., so things like tank thicknesses, the amount of rebar used and even snowloads had to be adjusted. And Germany has a very different idea about explosion rating of equipment.

Another complication was the fact that the technology joined an existing plant to a new one; the Germans can build a stand-alone in nine months, but just working out the logistics on how to marry the two facilities took about twice as long. However, a lot of bugs were worked out on this project, and future construction will flow a lot easier.

Making the most of it

Mayor Plusquellic terms the plant, an offshoot of the current composting facility, "getting the most out of materials we'd otherwise discard. We already had most of the infrastructure to make it work at our composting facility," says the mayor, "so it wasn't a stretch logistically." The new plant will handle one third of the 15,000 tons of sludge that now goes through the composting plant, about 5,000 tons annually. The facility handles material that is 12%-18% dry solids, vs. the conventional 2%-3%, allowing for a smaller footprint to provide the same amount of solids, says Berger.

Akron invested \$835,000 in the plant, according to Akron's wastewater plant manager Brian Gresser, much of it from the \$250,000 a year the city receives from KB Compost for the soil-additives it sells, processed from city-owned sewage composting plant. KB paid for the rest, hoping it results in an investment in growing this industry in the U.S. The project is financed by the Summit Co. Port Authority, which has also assisted with Goodyear's utility upgrade, the Akron Civic Theater and Lockheed Martin.

The new plant is largely automated and is operated by the current KB staff of 23, who run the composting plant. The city has been testing and fine-tuning the plant since mid-October, and it is expected to become a demonstration project for the Schmack Bio-Energy partnership to boost the biogas industry in this country.

How it works

The facility uses bacteria, in a naturally occurring process known as anaerobic digestion, to feed on the sludge, causing it to ferment, which produces a methane-rich burnable gas called biogas that can power an electric generator, says Akron's wastewater plant manager Brian Gresser. The biogas that results is 60% methane, 35% carbon dioxide and 5% other gases, while natural gas is 99% methane. The process also reduces sludge as well as germs and odor.

The new facility will consume 20% to 30% of the 335 kW generated by the new process, enough to power about 200 homes. The rest will be used to power other operations at the plant, a total of 2.8 megawatts, enough to power 1,700 houses. The power generated would offsetting some of its \$1.35 million in annual electricity costs. The gas could also be sold.

The new plant is "the next step" and will help Akron be more self-reliant, Gresser says. Other wastes, such as animal manure, beverage industry waste, fruit and vegetable leavings, meatpacking and slaughterhouse waste, dairy waste, and waste from certain factories, breweries and

distilleries, could also be processed there. The facility cannot handle yard waste as it is too fiber-rich.

After 18 months, the partners will determine whether the process is successful, and talk about expanding. Expansions would allow the city to replace the current composting plant, which handles 1.2 million gallons of sludge per week, said Gresser, who oversees the city's sewage and composting plants. If successful, the biogas facility could replace the current compost facility, an operation that costs Akron \$6.2 million a year. He notes that the plant should lower the city's growing costs in handling sewage waste from Akron and its suburbs.

The 20-year old plant still emits occasional odors, as bikers and hikers on the Towpath Trail already know. The new process will halve the volume of waste to be discarded, also rendering it virtually odorless.

This is only the first phase, adds Berger, with the operation still working itself out, so any actual measurements of how well the system operates are still a month off. But everyone is excited about what they've seen so far, and this first phase is likely to grow beyond. And the plant is drawing interest from all over, with Berger and company invited to present at a variety of functions and constant interest from the press. The Northeast Ohio Regional Sewer District will hold a tour there on May 22. *BXM*

Owner: Schmack Bio-Energy LLC

Engineer: Applied Technologies, Milwaukee

CM: KB Compost Services

Cost: \$7 million

Timeline: broke ground April 2006, operational Oct. 2007

Vendors:

Great Lakes Construction, foundation and concrete

Fairfield Service Co., conveyor

Workman, mechanical

Doan Pyramid, electrical

Schmack Biogas, specialty supplies

Protech, process controls

Jenbacher, generator

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