

XEBEC ENERGIZES BIOGAS SUCCESS

Case Study: Landmark farm project uses XEBEC's gas purification system to deliver pipeline-grade natural gas to Michigan Gas Utilities customers.

Fennville Biogas Project at a Glance:

Type: Animal waste to pipeline-grade natural gas and electricity generation

Claim to fame: First commercial facility in North America to generate both pipeline-grade methane and electricity from animal waste

Location: Scenic View Dairy, Fennville, Michigan

Animal waste received annually: 25 million gallons

Electricity generated: Average of 4.5 million kilowatt-hours per year

Natural gas distribution: 2,000 Michigan Gas Utilities customers

Incentives: Federal Rural Development Grant of \$474,088 in 2005; Carbon equivalents traded on the Chicago Climate Exchange are estimated at \$120,000 per year

Gas purification system of choice: XEBEC's M-3200 PSA system



Scenic View Dairy has turned to biogas purification to develop new revenue streams and on-site power facilities.

Making Money from Manure

Scenic View Dairy in Fennville, Michigan has tackled unpredictable energy prices by becoming a diversified energy producer. The farm, with 3,450 head of cattle, uses a simple, efficient system to create electricity and renewable natural gas from biogas generated from waste manure.

The first phase of the farm's energy project, completed in 2006, generated enough electricity to provide for all on-farm use and extra electricity that was sold to a local electric utility. When the farm expanded with more cattle, farm owners started exploring additional streams of revenue to make the best use of the increased manure. The dairy decided to purchase a gas purification system to enable the farm to purify the biogas and generate clean, renewable natural gas to sell to the local natural gas utility. The farm required gas purification equipment that was low cost, low maintenance, reliable, efficient and compact. After a thorough evaluation of XEBEC and other gas purification systems by expert consultants, Scenic View purchased XEBEC's M-3200 pressure swing adsorption (PSA) system to remove contaminants from the biogas and upgrade the biogas into pipelinegrade natural gas.

"We selected the XEBEC system because of its low operational and maintenance costs," said Norma McDonald, operating manager of Phase 3 Renewables LLC, the system integrator for the biogas plant. "We also like the compact, skid-mounted design of XEBEC's M-3200 because it reduces the project owner's capital costs and the equipment can be easily relocated. Most importantly, the gas upgraded by XEBEC meets and exceeds the stringent purity requirements of Michigan Gas Utilities and government regulators."

XEBEC's Role at Scenic View

Scenic View's biogas system includes a simple, four-step process. Manure is delivered to a collection area where it is agitated and pumped to three above-ground digesters. The biogas generated from the digesters is piped out of the tanks and directed to one of two systems. The first priority for biogas is generation of sufficient electricity to replace all of the farm's purchased power. Then, based on the revenue they can receive, the farm feeds the remaining biogas to create additional electricity for sale to the power grid or to the biogas upgrading system for the sale of renewable natural gas to the gas utility.

XEBEC Advantages

- Strong reliability (24 months of fault-free operation at Scenic View)
- Compact, skid-mounted design
- Low total cost of ownership
- Ease of maintenance (fully automated, unmanned capability)
- Significant and lasting revenue streams

A XEBEC M-3200 gas purification system upgrades the excess gas, which contains a number of impurities including carbon dioxide, before it is injected into the Michigan Gas Utilities pipeline and used by local homes and businesses.

The XEBEC system offers customers in the agriculture industry numerous advantages compared to conventional PSA systems and other gas purification processes. XEBEC's proprietary rapid-cycle technology allows XEBEC PSA systems to operate at higher cycle speeds than conventional PSA systems. This decreases the amount of adsorbent material required and significantly reduces the size of the gas purification equipment. In fact, XEBEC's PSA systems are up to 10 times smaller than conventional PSA technology and are skid-mounted on a portable platform.

XEBEC's proprietary rotary valves replace the bulky piping and valves of conventional systems. These rotary valves are compact, reliable and low maintenance, leading to lower operating costs and low total cost of ownership.

"Since we installed the XEBEC M-3200 last year, it has met all of our needs and lived up to its low-maintenance, low-cost reputation," said Michael Geerlings, the owner of Scenic View Dairy. "The M-3200's textbook operation has led directly to the success we have achieved upgrading and selling pipeline-grade natural gas."

The economic and business case that supports the Scenic View biogas operation is persuasive. The farm's power needs are completely met through electricity generation, excess gas is sold to the local power grid or natural gas utility, and beneficial byproducts of the process – such as organic fertilizers – provide additional revenue streams and cost savings for the farm. XEBEC's gas purification systems have been installed in more than 120 locations in 23 countries around the world due to their reliability, compact design and numerous competitive advantages. The M-3100 and M-3200 are the PSA systems of choice for biogas to renewable natural gas operations for wastewater treatment, agriculture and landfill projects.



XEBEC's compact and reliable M-3200 gas purification system proved a perfect fit for Scenic View Dairy.

In addition to gas purification systems, XEBEC and Phase 3 offer fully integrated upgrading systems tailored for specific biogas projects. These plants offer project developers a turn-key biogas upgrading solution.

Contact Us

If you would like to learn more about XEBEC's proprietary gas purification products, please contact:

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About XEBEC Adsorption Inc.

XEBEC ADSORPTION INC. is a developer and supplier of proprietary and conventional gas purification systems for several large international markets, including biogas production, natural gas processing, natural gas for NGV's, oil refining and compressed air. XEBEC is based in Blainville, Quebec.

NOTE TO READER: At the time this document went to print, Xebec Adsorption Inc. and QuestAir Technologies Inc. were in the process of a merger transaction. All Questair IP will become the property of the combined company under Xebec Adsorption Inc.