

HOMESTEAD GREEN ENERGY

Dairy farm in line for five-year payback on waste-to-energy project



Homestead Dairy has come a long way from 1979, when Floyd Houin and his brother, Dan, purchased a modest family farm from their dad. At the time, they were milking 110 cows.

Today, the Plymouth, Indiana dairy numbers 1,800 milking cows and 300 dry cows, while milking another 1,700 cows at three other nearby facilities.

Plans call for continued expansion of the dairy within the next five years.

But more cows means more odor emanating from the dairy, which impacts neighboring residents. About five years ago, Houin started researching ways to lessen the impact of the odor from cow manure. Based on the experience of several farming operations in northern Indiana and southern Michigan, Houin



determined that building a biomass waste-to-energy facility that converts a steady stream of manure into electric power was the direction he wanted to take.

The new facility, called Homestead Green Energy, began operations in October.

“The addition of Homestead Green Energy is going to help us remain competitive,” says Houin, who serves as CEO of the dairy. “It will be another income source.”

A major incentive for Homestead Dairy was the opportunity to enter into a Power Producer Agreement (PPA) with Northern Indiana Public Service Co.

(NIPSCO). Under a 15-year contract, the dairy is producing one megawatt of electricity—enough to power 1,000 homes.

The other incentive is a federal 1603 renewable energy grant program that pays a substantial portion of the upfront cost of installing a system.

In the case of Homestead Dairy, the upfront costs included installing two anaerobic digesters, two Cat® G3512A gensets, and ancillary equipment for the waste-to-energy system. Full payback on the system is estimated to take five years.

“The way things turned out, the grant paid for 25 percent of the total cost,” Houin says. “The federal grant and

the Power Purchase Agreement with NIPSCO made the economics of the project work.”

Pooling resources

At Homestead Dairy, cow manure from the main dairy is collected in pools and piped 1,700 feet to a pair of mixing tanks, which empty into two complete mix anaerobic digesters. Once inside the tanks, the manure is heated and treated with microbes that produce methane gas, which is used to fuel the gas generators.

Heat from the genset exhaust, as well as jacket water heat, are used to heat the digesters as part of the fermentation process.



Customer Profile

Homestead Dairy

LOCATION: Plymouth, Ind.

APPLICATION: Biomass, waste-to-energy

CAT® EQUIPMENT: Two G3512A gensets, each rated at 500 kW



Cow manure is piped to a mixing tank (foreground) that empties into two anaerobic digesters (background).

There are other benefits beyond odor reduction and the financial return from producing electricity. Homestead uses the dewatered solids from the digesters as clean bedding for the cows. The liquid nutrient byproduct is held in lagoons and used to more effectively fertilize the farm fields.

“It’s driven to make money, or we wouldn’t be doing it,” says Ryan Rogers, who operates Homestead’s renewable energy plant. “It also helps the environment from the standpoint of nutrient value. The crops use the manure better, and the odor reduction for the community is a huge benefit.

“But making money is the key,” Rogers adds. “It makes the dairy more profitable by turning a substance that we have in abundance into an income stream.”

Less downtime

Homestead Dairy partnered with a Michigan contractor to build the digester facility. When he looked at several other

farm-renewable energy facilities, Houin determined that Cat gensets were his best choice.

“We looked at several installations and talked to the people who run them. Some have foreign-made engines, and the biggest complaint was parts availability and cost,” Houin says.

One of the farm installations he toured used older Cat gensets, which were operating at peak efficiency with few problems. Houin liked the dependability aspect, and ended up investing in two Cat gensets that run on methane at 1,200 rpm.

“I just like the noise level difference from 1,800 rpms, so we invested more money up front on the slower-speed generators,” he says. “We basically went up a size in generators where we didn’t have to. But, over the long term, we are going to have less wear because we’re not running them as hard.”

Parts availability and service were major considerations for Houin.



Facility Operator, Ryan Rogers

“At some point, they’re going to need service, so you’ve got to have parts and service available,” he says. “We can’t afford the downtime. I’ve seen a lot of these older Cat engines that are still running, so that reliability really helped seal the decision.”

When the gensets were due for their first oil change, Rogers required some help servicing the valves.

“I called the dealer, and the next day they were here, no questions asked,” he says. “They are very helpful people who understand that it’s got to be running, not sitting idle.”

Both gensets run seven days a week,



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Floyd Houin
Owner
Homestead Dairy



24/7 in a building adjacent to the digesters. Once Homestead upgrades another dairy three-quarters of a mile away and brings it online, Houin plans to add a third digester tank and another generator.

“We have a lot of heat that we are not consuming, so we are looking at more ways of using it,” Houin says. “Maybe we will add some greenhouses, or find some other way to capture the value of that heat. That will be another step down the road.”

The Homestead Green Energy installation clearly demonstrates the economic viability of smaller-scale, waste-to-energy operations, says Mike Fenton, a landfill and biogas energy account manager with Michigan Cat.

“I could see many dairies taking advantage of resources they have, and turning a liability from a pollution/odor standpoint, into a valuable community resource,” Fenton says. “I do believe there are great benefits for the dairy industry in installations such as this.”



MAKING IT HAPPEN

Experimental Rate program provides incentives for renewable energy

NIPSCO

A pilot program designed to support the development of renewable power generation in northern Indiana is catching on since its inception two years ago.

Experimental Rate 665 was created in 2011 by Northern Indiana Public Service Co. (NIPSCO) in the wake of the utility's existing net-metering program, which provides clean energy-generating customers with utility bill credits.

The feed-in tariff program is specifically designed to cater to industrial and large business customers, and provides an opportunity for the customer to receive a check from NIPSCO for the amount of electricity generated from a renewable energy project. The program is designed to connect solar, wind, hydro or biomass systems to the grid, making renewable energy a financially viable investment.

Homestead Green Energy in Plymouth, Indiana recently signed on to the feed-in tariff program, and started producing power derived from biomass this past Fall as part of a 15-year contract with the utility.

“It really drove the project to fruition,” says Mike Fenton, a landfill and biogas energy specialist with Michigan Cat. “It gave the dairy incentive to invest in a facility, and it provided a higher buyback rate than you would typically see at a utility.”

While the feed-in tariff model was designed for larger energy users, small businesses and residential customers can also take advantage of its rewards. Both the feed-in tariff and net-metering programs are open to all NIPSCO customers. About 30 participants currently use the net-metering program, and about a half-dozen large businesses are participating in the feed-in tariff program.

The feed-in tariff and net metering programs are limited to 30 megawatts total, which equates to about two percent of NIPSCO's peak summer demand.

Purchase rates for participating feed-in electric rate customers of NIPSCO include biomass projects up to 5MW. Contract terms extend for 15 years, and the purchase rate is subject to a two percent per year escalator.

An interconnection agreement and Power Purchase Agreement between NIPSCO and the eligible feed-in tariff customer must be executed before the eligible facility may be interconnected with the NIPSCO electric system. A NIPSCO meter measures exported electricity.

Customers can register to participate in either program by going to www.nipSCO.com and clicking on “Connecting to the Grid” under the “Our Services” tab.

