MICHIGAN SOYBEAN PROMOTION COMMITTEE

a new release

FOR IMMEDIATE RELEASE
October 14, 2010

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Michigan Turkey Farmers Take Sustainability to a New Level

Farmers have been recycling animal manure by applying it to farm fields as an organic fertilizer for generations. But one Michigan farm family has taken sustainability to a new level.

Sietsema Farm Feeds in Howard City, the Sietsema family's feed mill that prepares feed for turkeys and hogs, and will be converting turkey litter into steam, electricity, and fertilizer starting in the spring of 2011. It's the state's first gasification plant and the world's first biomass turbine powered by manure, according to David Prouty, president and CEO of Heat Transfer International (HTI). Based in Kentwood, Michigan, HTI designed and built the energy plant.

Harley Sietsema grew up on a generations-old dairy farm and started his own turkey farm in 1979. Today he heads the family that owns and operates Sietsema Farms and the feed mills. The family operation includes Harley's two sons Rick and Jamy, and daughter Tina Brown. Rick's son Eric and daughter Kristi Roelofs also work in the family business.

The family raises 1.2 million large tom turkeys each year for Michigan Turkey Producers, a cooperative of 16 turkey farms, and operates several hog farms with a combined 26,000 sows for Newsham Choice Genetics.

The litter from 1.1 million turkeys raised each year comes from eight farms in rural Allendale, Coopersville, Fremont, and Ravenna. Concrete roofed structures store the litter until it's needed at the gasifier facility.

Gasification is an efficient way to extract energy from organic materials without using water — and it's a clean waste-disposal system with a zero-carbon footprint, according to Harley Sietsema.

In gasification, the plant heats turkey litter to the point that it emits a gas. It draws the gas off, burns it much like natural gas or propane, and uses it to make heat, which first turns an electric turbine and then is converted into steam through a boiler.

In the process, the litter is reduced to an ash that's still useful as a fertilizer. The majority of the fertilizer nutrients, other than nitrogen, are concentrated in the ash. No longer trucking inert ingredients to farms reduces transportation volume, saving fuel, and making the farm more sustainable.

The roasted litter fuels a turbine and boiler, which generates electricity and steam for the feed mill. The 70,000 pounds (two semi-truckloads) of turkey litter the plant uses each day generates the energy equivalent of nearly 8,500 barrels of oil annually. That's 75 percent of the electrical power needed to run the mill, or enough to provide electricity for 350 to 400 average American homes, according to Pat Dickinson of HTI.

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Heat that otherwise might be wasted in the system is used to heat water in a boiler that formerly used natural gas. Steam created by the boiler is used to soften grain used in the feed mill to pelletize turkey and hog feed.

The mill produces 400 tons of livestock feed per day for 1.2 million turkeys and 600,000 hogs on 65 farms each year. The pellets are made of soybean meal as the major protein source, corn for energy, vitamins and minerals for animal health, and vegetable oil to add calories. The Sietsema's hogs and turkeys consume 2,000 tons of soybean meal a month. Rick Sietsema said soybean meal is a good source of protein for both species. "It fits into a least-cost, high-performance diet," he added.

The mill makes about 40 different feed formulations to meet the needs of the animals, tailored to their growth stage. The feed not only produces the best possible nutrition for the animals, it keeps them healthy and helps them gain weight efficiently, helping livestock producers operate more sustainably.

"Harley Sietsema can turn off his gas and electric, get rid of manure storage problems in the winter, and get fertilizer he can use later," said Prouty.

After meeting the energy requirements for the mill, the new biomass facility will provide excess electricity to the utility grid.

Harley Sietsema said Sietsema Farms Feeds had been paying more than $500,000 annually for natural gas and electric energy. Still, it will take several years to recoup the investment in the biomass plant. But, he said, "this will make agriculture environmentally and economically sustainable. It's a matter of getting the most out of your products and byproducts."

"Environmental assurance is very important to us," Rick Sietsema said. That's one reason the farm spent $3 million on the state-of-the-art facility that began commissioning this fall. "We're a closed loop, environmentally."

The farms are cropping, livestock, and farmstead environmentally verified as part of the Michigan Agriculture Environmental Assurance Program and were re-verified this past August.

The cost of increased regulations, encroachment of residential development, and rising energy costs all contribute to increasingly challenging business conditions for Michigan farmers like the Sietsemas. Manure management is particularly affected, requiring farms to install expensive storage systems, drive up to 100 miles to spread manure on farm fields, and spend money transporting it.

The gasification plant not only sustains the environment, it sustains the family farmers and their employees. As long as turkeys are raised, the energy source won't run out.

The equipment, construction, and integration of the project employed hundreds of Michigan workers in direct and indirect employment, according to Prouty.

Besides Sietsema Farm Feeds, eight other Michigan companies were involved in building the plant. Prouty said more than 90 percent of the needed supplies came from Michigan businesses.

Although turkeys are raised in open houses, not cages, very little land has to be devoted to producing turkey. Producing a lot of meat on a few acres in the United States prevents rainforests from being destroyed elsewhere in the world.

The turkey growers follow the National Turkey Federation's *Environmental Best Management Practices*, which include managing litter carefully to meet the nutritional needs of crops while keeping it out of the groundwater and surface water. The turkey industry group's standards of conduct and code of ethics state that the industry works to reduce its use of resources, reuse appropriate materials, recycle what can be reprocessed, and research further ways to reduce the industry's ecological footprint.

As one of the state's three largest turkey producers, Sietsema Farms has a big impact on Michigan soybean farmers. The Sietsemas purchase 24,000 tons of soybean meal every year from Zeeland Farm Services. That accounts for the average annual production of 169 Michigan soybean farmers.

The Sietsemas buy corn from 75 to 80 other farmers individually, helping sustain each of those farms in the process.

Sietsema Farms not only benefits the environment, but also boosts the economy in the communities they farm. Rick Sietsema notes that many local businesses — propane, hardware, building maintenance — are sustained as Sietsema Farms relies on them for inputs. "The cash flow effect of that economic operation is substantial," he said.

Not only does Sietsema Farms provide for the family, it provides jobs for dozens of other Michiganians. At any given time, 220 to 225 people get their paychecks from Sietsema Farms; all of them are fulltime.

Agriculture has fed people and the land for many generations. Now it can create energy as well. Sietsema Farms has proved that, adding to the energy produced by soy-based biodiesel and corn-based ethanol.

The Michigan Soybean Promotion Committee invests soybean checkoff funds to enhance the profitability of Michigan's soybean producers. A board of seven Governor appointed farmer-leaders directs MSPC on behalf of more than 11,000 Michigan soybean farmers. For information about the soybean checkoff call 989.652.3294 or visit www.michigansoybean.org. To learn more about good stewardship practices and the connection between crop production and animal agriculture, visit www.animalag.org.

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Photo cutlines (full-resolution photos available upon request)

	Rick Sietsema is the chief financial officer of Sietsema Farms, now powering its associated feed mill with the farm's turkey litter. *Photo by Sue Stuever Battel.*
	Rick Sietsema checks out the turkeys that provide feedstock for the world's first biomass turbine powered by manure. *Photo by Sue Stuever Battel.*
	Sietsema Farm Feeds, just outside Howard City, Michigan, is converting turkey litter into steam, electricity, and fertilizer, taking farm sustainability to a new level.