ENERGY

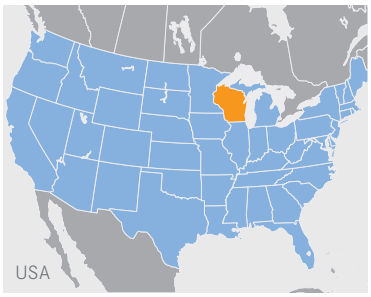
MTU ONSITE ENERGY BIOGAS-FUELED CHP SYSTEM HELPS WISCONSIN DAIRY FARM TURN WASTE INTO USABLE ENERGY

// **Who:** Norm-E-Lane Farm

// **What:** Series 4000 MTU Onsite Energy Biogas CHP system

// **Why:** Upgrade with high-efficiency system for additional savings

// **Where:** Chili, Wisconsin, USA



It's a well-known fact that the dairy industry is a key contributor to the economic vitality of the state of Wisconsin. No single product produced in The Badger State creates a greater economic impact than milk. Generating approximately $43.4 billion annually and providing more than 145,000 jobs, Wisconsin's dairy industry produces nearly half of all specialty cheeses in the United States. Despite this success, misperceptions haunt Wisconsin's farming industry—including the idea that farmers forgo modern technology in their operations.

Farmers across the nation utilize some of most advanced technologies in the world to produce more with less resources, and while lessening environmental impact. One technology is anaerobic digestion, which is the controlled breakdown of organic matter to produce a nutrient-rich organic byproduct and a combustible biogas that can be used by a cogeneration engine to produce usable heat and electricity, helping improve sustainability and the bottom line. Wisconsin leads the industry in the number of on-farm anaerobic digesters, and an example of that leadership can be found at Norm-E-Lane Farm, Inc. in Chili, Wisconsin.

Norm-E-Lane is a progressive, large scale, third-generation family-owned dairy farm first established in 1946 by Norman and Elaine Meissner. Named after its two founders and "The Lane," a farming term for the path cows take from barn to pasture, the farm began with just 80 acres of land, 18 cows and a team of horses. Norm and Elaine raised two daughters and four sons, all of whom contributed to the early success of the farm. Today, the dairy farm is owned and operated by Jerrold, one of their sons, and his son Joshua.

Norm-E-Lane has grown significantly. Today, 34 full-time employees cultivate forage crops on 5,000 acres of land, and care for and manage 2,400 cows and 2,300 head of dairy replacement heifers. Over the years, the farm's growth has required facility updates to keep the operation efficient and profitable. In 2007, a new state-of-the-art facility was built to accommodate the farm's first anaerobic digester.

Norm-E-Lane's anaerobic digester and CHP system produce renewable power, along with a nutrient-rich byproduct used as fertilizer to grow crops.

After just a few years, the number of cows on the farm and related waste volumes became too much for the digester to handle efficiently. As the years began to accrue on the anaerobic digestion system's engine, reliability was compromised and maintenance became arduous. It was time for an upgrade.

"There's such a great need for digesters on farms," said Josh Meissner, co-owner of Norm-E-Lane. "But, the burden lies in owning and operating the systems, particularly maintenance management as you contend with all the other equipment you have on a farm."

The Meissner family turned to DVO, Inc., North America's largest provider of anaerobic digesters, to help expand its digester, replace its cogeneration engine and bring the entire system up-to-date. The goals were simple: transition all power system maintenance to a third-party provider and generate byproducts that could be used around the farm. To meet Norm-E-Lane's needs, DVO recommended the Meissner family replace its ailing cogeneration engine with a Series 4000 MTU Onsite Energy biogas combined heat and power system (CHP).

"Not only does it allow us to turn our manure into green energy, but it also greatly reduces our carbon footprint."

/ // / Josh Meissner, co-owner, Norm-E-Lane

W.W.Williams, an authorized MTU Onsite Energy gas systems distributor, in partnership with DVO, Inc. installed the Series 4000 CHP, which has delivered a 97 percent total runtime for Norm-E-Lane with an output of 1,169 kWe.

From cow pies to profits

The CHP process, also known as cogeneration, is one way businesses and agricultural facilities, like Norm-E-Lane, can control the cost of heating and electricity. During anaerobic digestion, cow manure is collected and heated in the digester tank, which creates a methane biogas. Rather than release methane into the atmosphere, coupling anaerobic digestion with a CHP system allows farmers to use the collected biogas to produce renewable power on-site. For farmers, this translates into turning large amounts of cow manure into heat and electricity, improving manure handling efficiencies and reducing operational costs. It essentially helps eliminate odors while keeping fixed costs down.

Norm-E-Lane's new MTU Onsite Energy CHP system began producing power in September of 2015. The farm doesn't use any of the electrical output. Instead, all of the farm's "cow power" is sold to the grid as part of the Dairyland Power Cooperative. However, the heat generated is utilized on the farm primarily to heat the digester with the excess used to heat nearby facilities. Nutrient-rich liquid byproduct is pumped and injected back into farm fields while solids are used for cow bedding—a savings of $110 per cow each year, according to the Dairyland Power Cooperative, generating significant savings for an operation the size of Norm-E-Lane.

"Not only does it allow us to turn our manure into green energy, but it also greatly reduces our carbon footprint while improving manure handling efficiencies, ultimately building on our interests in being good environmental stewards," said Josh Meissner.

Worry-free maintenance

Cogeneration systems are among the most technically sophisticated pieces of equipment on a farm and they're part of a system that's designed for continuous operation. Keeping them running properly requires a disciplined, proactive approach to maintenance that includes

A service technician from W.W.Williams inspects the CHP system to ensure reliable continuous operation.

scheduled preventive service. In an effort to eliminate margin of error and off-load the burden of maintenance from the farm's personnel, the Meissner family entrusts all maintenance responsibilities to W.W.Williams. This is an ongoing sigh of relief for the busy farm.

Each morning, a service technician conducts a visual on-site system inspection. Although a monitoring system will alert operators to any problems or scheduled maintenance requirements remotely, daily visual inspection adds additional peace of mind, according to Christian Mueller, sales engineer at MTU Onsite Energy. "Service operators are trained to identify part replacement needs, including spark plugs and filters changings, before an issue arises." In addition, W.W.Williams conducts interval system checks and supports the farm in sourcing genuine replacement parts and consumables.

"We have a nice relationship with our service team and they are always on top of things," said Meissner. "Daily inspection is easy and when needed, response to specific concerns are addressed right away."

With a continued relationship with Dairyland Power, a new highly efficient and well-maintained MTU Onsite Energy CHP system, and a fresh generation of farmers to maintain the business, Norm-E-Lane is well equipped to continue their waste-to-revenue stream.

"Overall, we're very happy with the system," said Meissner. "We look forward to benefiting from the upgraded technology for years to come."

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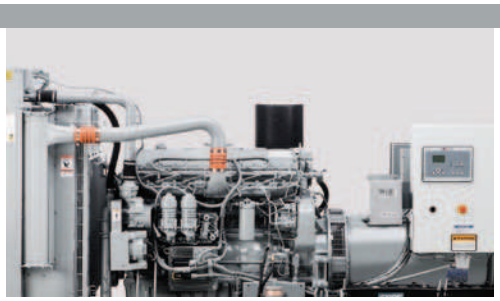

MTU Onsite Energy is a brand of Rolls-Royce Power Systems. It provides diesel and gas-based power system solutions: from mission-critical to standby power to continuous power, heating and cooling. MTU Onsite Energy power systems are based on diesel engines with up to 3,250 kilowatts (kWe) power output and gas engines up to 2,530 kW.