

HAUBENSCHILD FARMS – PRINCETON, MN

SYSTEM DESIGN

In 1952, the Haubenschild family farm began with two cows and no electricity. Today, the farm's 900 head dairy herd generates enough electricity to meet the farm's needs, plus the farm sells enough excess electricity to power the equivalent of 70 homes. With a mission to be a sustainable, environmentally friendly farm, Haubenschild has become a leader in agricultural sustainability in the United States. The farm recently became one of first dairies in the country to sell carbon credits on the Chicago Climate Exchange.

Built in 1999 as an AgSTAR Charter Farm, the 350,000 gallon plug-flow anaerobic digester generates biogas from manure and four tons per week of newspaper that is used as animal bedding. Bedding and manure are scraped to the digester, where the biogas produced is then used to fuel an engine-generator set for electricity generation. The nameplate capacity of the generator is 150 kW; however, because the Btu content of the biogas is lower than that of more traditional fuels, the actual output is around 135 kW. Regular maintenance on the engine-generator set has ensured greater than 96 percent operating availability since startup. In addition to fueling the generator, a portion of the biogas produced powers a 5 kW fuel cell that is being used by the University of MN to conduct fuel cell research.

PROJECT BENEFITS

- A reduction in the cost of heating hot water and the milking center by capture and use of waste heat from the engine-generator set
- Increased revenue from the sale of carbon credits
- Sale of digester solids to other farms for soil amendment generates revenue

In a four-year [Minnesota Project](#) study, the farm partnered with the University of Minnesota and others to study the economics and benefits of digesters and to educate farmers. The farm's digester, generator, and associated operations serve as a model for renewable energy development according to the University of Minnesota and East Central Energy. East Central Energy welcomes biogas energy as a low cost renewable energy for their green energy program.

Today, the farm continues to demonstrate leadership and innovation. In 2005, Dennis Haubenschild and a team of researchers celebrated being the first to intermittently run a small fuel cell (5 kW) using biogas from animal manure. Researchers have found that fuel cell emissions are essentially undetectable when operated using biogas.



Photo: Haubenschild Farms

"Sustainability in agriculture is achieved by using all of Mother Nature's tools."

—Dennis Haubenschild
Haubenschild Farms

- **Population Feeding Digester:** 900
- **Baseline System:** Storage Tank or Pond or Pit
- **Digester Type:** Horizontal Plug Flow
- **System Designer:** RCM International, LLC
- **Biogas Generation:** 70,000 ft³/day
- **Biogas Use:** Cogeneration; Electricity
- **Generating Capacity:** 155 kW
- **Receiving Utility:** East Central Energy