



New York State Energy Research and Development Authority

Lamb Farms

Biogas-Driven Engine System

DG/CHP Program

Project Profile

Combined heat and power for
Dairy Farm



Overview

Lamb Farms is a dairy farm located in Oakfield, NY. The farm recently installed a heated, plug flow anaerobic digester with mixing to treat manure from approximately 1,100 animals and food waste; Biogas from the digester is used by an engine to produce electric power. The power is used on the farm or exported back to the local utility via a net metering arrangement. Waste heat from the engine is used to maintain the digester at 100°F. Separated manure solids from the digester are also used for animal bedding.

Quick Facts

- Location:**
Oakfield, NY (National Grid)
- Installation Date:**
January 2009
- Operating Experience:**
2 years
- CHP Equipment:**
416 kW (on biogas) Engine
(Guascor MGG-712)
- Contracted Capacity:** 400 kW
- Heat Recovery Application:**
Digester Heat,
In-floor heating in separator barn,
utility room, and parlor.
- Type of Fuel:** Digester Gas

The Application

Lamb Farms is a large dairy operation in Genesee County. In order to control odors and provide better manure management, they decided to install an anaerobic digester. The digester is a mixed and heated plug flow design with a hard top, from GHD Anaerobic Digesters. The digester was also designed to use food waste. This provides the farm with extra feed for the digester, resulting in increased digester gas production.

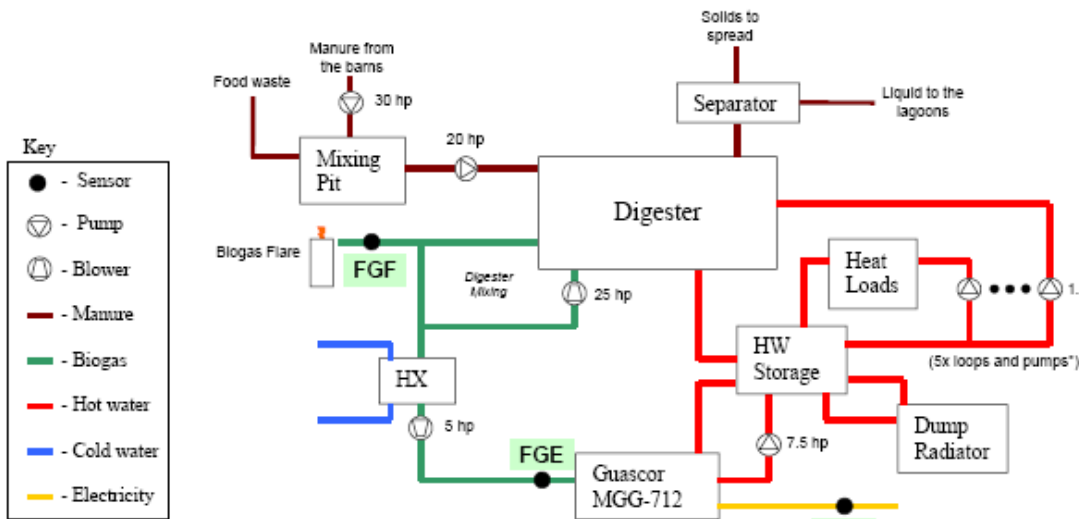
Lamb Farms also installed a solids separation system. Separated liquid effluent is pumped to a long-term storage lagoon, while the separated solids are spread over the fields as fertilizer and dried for use as bedding.



Separated Manure Solids from the Digester are Used for Bedding

CHP System and Equipment

Biogas from the completely mixed digester is cooled and dewatered in a heat exchanger before being combusted in the Guascor engine. Any unused gas is burned in the biogas flare. Hot water from the engine jacket and exhaust heat exchanger are sent to the hot water storage tank which serves the digester and additional heat loads. If the water returning to the engine is too hot, the dump radiator is activated to reject heat. Recovered heat is used to maintain the digester near 100°F in addition to providing heating to the separator barn, utility room, and parlor. The digester is with re-circulated biogas that is pumped thru nozzles lining the bottom of the digester wall



* Three digester heating loops, one to separator barn & milk house, and one to food waste storage tanks.

Schematic of Engine and Digester System



Engine and control panel



Digester heat piping

Economics and Environmental Benefits

The system currently produces slightly more biogas than can be used in the engine. Approximately less than 5% of the biogas is flared. The farm consistently exports electric power to the utility, offsetting their utility purchases through a net metering arrangement.

Summary of Benefits

- Plug flow type digester uses both animal and food waste
- Solids are separated from the effluent to provide bedding
- System consistently produces 300 kW; power is exported back to the utility

“Policies to reduce greenhouse gas emissions could create new opportunities for livestock producers to earn revenue from burning methane from manure, making such biogas recovery facilities profitable for many livestock producers.”

~ Economic Research Service Report

Web Links and Further Information:

Designer

<http://www.ghdinc.net/>

Engine Manufacturer

www.martinmachinery.com

Other DG/CHP Resources

chp.nyserda.org

www.northeastchp.org

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