

TWIN BIRCH DAIRY – SKANEATELES, NY

SYSTEM DESIGN

Located near a golf course and two sensitive watersheds, Twin Birch Dairy Farm decided to install an anaerobic digester because of concerns about odor and water quality. Other goals for the digester system included energy production and production of separated solids for bedding. The 140 foot plug flow digester was designed with a hard, concrete top. The digester generates biogas from manure from dairy cows, manure from older heifers and some beef cattle, milking center wastewater, and used bedding.

Biogas fuels a 900,000 Btu/hr dual-fuel boiler and six 30 kW microturbines and the excess is combusted by a flare. Biogas goes through a dewatering process and is compressed to about 90 psi before it goes to the microturbines. The dual-fuel boiler is used as the secondary method to heat a hot water circulation loop that provides the heat source to the shell and tube heat exchanger within the digester.

The Twin Birch Dairy farm chose microturbines for the power generation system based upon the anticipated long-term operating cost reduction and NYSERDA funding that provided cost-share opportunities for innovative agricultural energy recovery practices.

Digested effluent is pumped to a screw press separator with the liquid effluent pumped to a storage pond 7,500 feet away, with a 220-foot increase in elevation. The separated solids are stacked in a roofed area and used for bedding, sold, or recycled to the land base.

Cornell University completed a [Case Study](#) of the farm and digester system.

PROJECT BENEFITS

- Reduced odor and pathogens
- Increased farm revenue from the sale of excess electricity
- Reduced energy costs
- Nutrient management allows effluent to be spread as a natural fertilizer
- Revenue from the sale of separated solids helps offset the capital cost of the digester



Photo: Cornell University

- **Population Feeding Digester:** 1,900
- **Baseline System:** Storage Tank or Pond or Pit
- **Digester Type:** Horizontal Plug Flow
- **System Designer:** Anaerobics, Inc.
- **Biogas Generation:** 100,000 ft³/day
- **Biogas Use:** Electricity; Boiler/Furnace Fuel
- **Generating Capacity:** 180 kW
- **Boiler Capacity:** 900,000 Btu/hr
- **Receiving Utility:** National Grid