

ANAEROBIC DIGESTION

COMBINED HEAT AND POWER

Twin Birch Farm

Owasco, Cayuga County, NY



Aerial view of the farm



Microturbines in foreground and heating system in background



Separated manure solids to be used as freestall bedding

Digester type	Plug-Flow
Digester designer	AnAerobics & Twin Birch Farms
Influent	Raw manure
Stall bedding material	Post digested separated solids
Number of cows	1,200 dairy cows
Rumensin [®] usage	Yes
Dimensions (length, width, height)	140'x40'x14'
Cover material	Concrete hard-top
Design temperature	100°F
Estimated total loading rate	29,000 gallons per day
Treatment volume	586,500 gallons
Estimated hydraulic retention time	20 days
Solid-liquid separator	Yes
Biogas utilization	4 Capstone 30-kW microturbines
Carbon credits	Yes; AgCert™
Monitoring results to date	None available

Farm Background

- The farm is owned and managed by Dirk Young.
- The farm is located across from a golf course and in two sensitive watersheds (Skaneateles and Owasco lakes)
- Digester construction began in 2001; the digester was successfully commissioned in September 2006 .
- The microturbines started producing power in January 2007.
- Biogas moisture is removed prior to compressing gas to 90 psi; there is no H₂S removal.
- The farm has acted as its own designer and general contractor after the original system designer failed to perform.
- The digester was funded in part by the NYS Clean Water, Clean Air Act and in part by NYSERDA

Lessons Learned

The farm has overcome many difficulties to successfully operate the digester system. Below are some of the major problems they encountered.

- It is important to review experience and success of past projects for the engineering company chosen.
- Drains to control the water table around the digester are vital to prevent buoyancy of an empty digester and to control heat loss.
- The greater the pressure of the digester, the more difficulties there are in sealing it. Digesters operating at high pressures should be pressure tested as part of the start-up procedure.
- The heat balance of the digester system is vital. Designs need to address heat recovery from biogas, methods to heat incoming manure, and correct estimates of the heat needed to maintain a constant temperature for the digester in all weather conditions.

