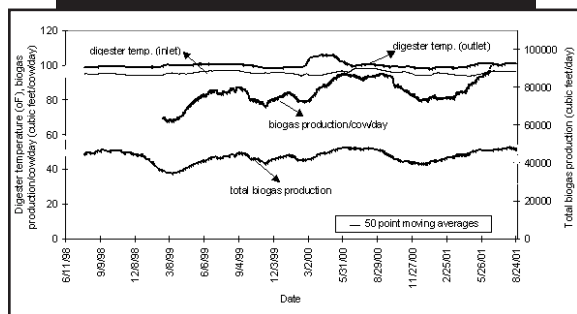
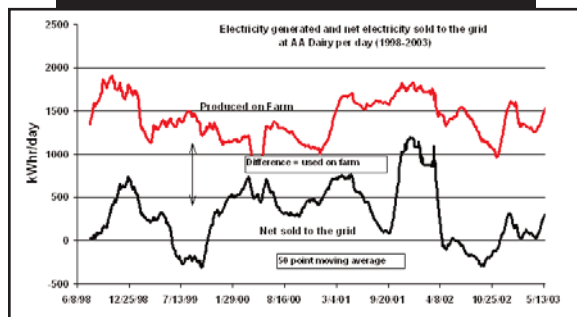


# ANAEROBIC DIGESTION WITH COMBINED HEAT AND POWER

AA Dairy, Candor, Tioga County



**Digester temperature, total biogas production, and biogas production per cow at AA Dairy, 1998-2001**



**Electricity generated and net electricity sold to the grid at AA Dairy per day (1998-2003)**

**“We want to stay on the cutting edge of the dairy industry, utilizing new technologies and innovations to increase efficiency of milk production.”**

– Bob Aman

## RESULTS

A large amount of data has been collected daily since operation began in 1998. The average biogas flow from 500 cows has been between 35,000-50,000 CF/day, or about 60-100 CF/cow/day). The gas is collected, filtered, measured and slightly pressurized before fueling a 130kW (3306 Caterpillar) engine. The engine is a diesel block with a natural gas head that has been converted to run on methane. The engine drives an induction generator to produce about 70 kW (~613,000 kWh/year) with downtime around 5%. Electricity produced meets the electricity needs for the dairy farm and provides some excess electrical power for sale to the local utility, New York State Electric & Gas (NYSEG).

Engine heat is fed to a loop in 4000-gallon hot water storage tank that warms the digester. Initially it was expected to offset propane use for other farm needs, however, the loop loses too much heat during the cold months to be effective for other farm heating needs.

After digestion, the treated slurry is pumped to a screw-press slurry separator with a 7.5 Hp pump. The separated roughage or fiber (total solids is approximately 24.0%) is transferred to a compost area and the excess liquid (total solids is about 5.2%) is pumped to a plastic-lined liquid storage lagoon.

## LESSONS LEARNED

- The system needs daily attention, but fairly minimal time.
- Maintaining data information is crucial.
- Maintaining digester temperature at 100F is very important.
- The system will become more financially appealing when it can offset more heating costs.
- Use of separated solids as bedding material for cows could also improve system financial return.
- Beyond capital costs, system economics are most sensitive to the market pricing of electricity.
- The system as more than an anaerobic digester, because it is an integrated cogeneration system for electricity and heat, while creating entrepreneurial opportunities for value-added byproducts.

