

Biogas News

SECOND EDITION

GHD Digesters Come to NY



Sunnyside Farm anaerobic digester under construction. Picture taken October 2008.

Two New York State dairy farms, Sunny Side Dairy and Aurora Ridge Dairy, began construction of GHD digesters this past summer. These are the first two GHD digesters constructed in New York. GHD, Inc. is located in Chilton, Wisconsin and has constructed over a dozen on-farm anaerobic digesters nationally.

Both farms built their digester to address community-based and farm business reasons. The farms had already implemented other practices to control odor emissions when recycling manure back to the land base, but also wanted to do something to reduce the farmstead odor emissions - anaerobic digestion helps achieves this goal.

The farms also wanted to reduce their environmental footprint and at the same time contribute to the State's renewable energy efforts. Biogas produced by each digester will be used to make electricity and hot water for use on-farm, while excess electricity will be sold to others who desire to purchase power generated by renewable energy sources. This will reduce the overall greenhouse gas emissions from the farms and the buyers.

In order to provide management flexibility, Sunny Side Dairy constructed two side-by-side digesters that combined, are sized for 4,400 cow equivalents. Together, the two digesters are 240' long, 144' wide, and 16' deep. A Caterpillar engine-generator set (2,300-Hp and 1.6-MW generator) will generate electrical power. The farm plans to separate digester effluent and use separated solids for freestall bedding.

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Two Important Changes to NYS Net Metering



Dairy farms can now import up to 50% (by volume of manure) food waste substrates to be co-digested with manure. Also, an increased engine generator capacity of 500-kW is now permitted. The previous limits were 25% substrate addition and 400-kW eng-gen set capacity.



The Manure Management website is currently being extensively updated. The image to the left is a snapshot of what the homepage will look like. Some new features of the site include: an interactive map to locate NYS digesters, and a more user-friendly menu layout to find documents and information.

The website is scheduled to be launched in December of 2008. Stay tuned, and check back often for the new site!

News and Events

News:

The NYS Public Service Commission has made \$7.6 million in additional funding available for anaerobic digester gas to electricity projects through the Renewable Portfolio Standards program. For more information contact Sarah Osgood at (518) 862-1090 or visit: www.nyscrda.org/funding/1146pon.asp

Upcoming Events:

- Manure, Nutrient, and Renewable Energy Workshops:

(1) Held December 3rd in Auburn, NY at the Holiday Inn. Preregistration is required. Registration fee is \$18/person if received by Nov. 25, late registration is \$22. Registration fee includes lunch and coffee/snacks. In order to register, and for more information, contact Cayuga County Cooperative Extension at 315-255-1183.

(2) Held December 16th at the Batavia Party House. Registration (by Dec. 8) is \$20/person. Contact Kathy Wallace at (585) 343-3040 (ext. 138) or visit www.nwny.team and click on "Upcoming Events".

- NYSERDA 2009 Innovations of Agriculture Conference, 2009 in Syracuse, NY.

- The Ontario Ministry of Agriculture, Food and Rural Affairs is holding a 2-day Biogas Systems Operator Training Course in February 2009. Cornell will be taking a van to the workshop in southern Ontario, and can bring up to 11 people interested in attending. Please contact jpg67@cornell.edu for more information on dates and cost of the trip.

- 2009 AgSTAR National Conference, Feb. 24-25 in Baltimore, Maryland. Please visit www.epa.gov/agstar/conference09.html for more information.

New Cornell Professor



Dr. Lars Angenent, a recently hired associate professor in Biological and Environmental Engineering, knows biogas. He has studied anaerobic digestion since his work as a graduate student and was co-inventor of a digester design (AMBR) that effectively

increases solids retention time while not affecting hydraulic retention time. Recently, he has helped several breweries improve their biogas production systems, and published work that could result in offsetting 50% of the natural gas used in ethanol plants.

Feature Farm: Sheland Farm

AD Overview:

- 560 dairy cows
- Manure solids used as stall bedding
- Vertical complete mixed digester
- Designed by Siemen's Building Technologies
- Commissioned in 2007
- Influent is 60% raw manure + 40% screw - press separated liquid
- Roto-Mix[®] pump agitation system
- Dimensions (diameter, height): 30' X 35'
- Biogas used to fire 125-kW Caterpillar engine-generator set

By: Stanley Weeks, PhD
Stanley A. Weeks, LLC

After considerable discussion it was decided that producing separated manure solids for bedding was the number one priority for this system. Separated solids needed to be adequate in quantity and quality for bedding the milking herd. From prior experience with manure separators and anaerobic digesters it had become clear that the volume of separated solids prior to digestion was approximately 1.5 cubic feet per cow per day, while separation after digestion yielded 1.0 cubic feet per cow per day. There is also considerable reduction of separated solids volume during the composting operation. A rotary drum composter was selected to allow for good pathogen kill resulting from three days of processing time. Separated solids were tested to assure quality equal to or better than sawdust, which had been used prior to the manure treatment system installation.

The FAN separator separates about 2/3 of the raw manure; separated liquid is then combined with the remainder of the raw manure and fed to the digester.

It is not necessary to separate all the raw manure to provide adequate bedding, and we thus get more gas than if feeding the digester only separated liquid. Digester influent is approximately 7% total solids.

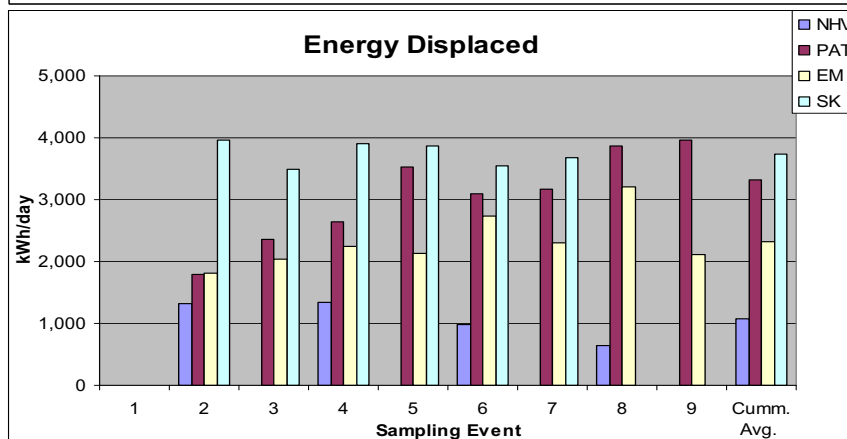
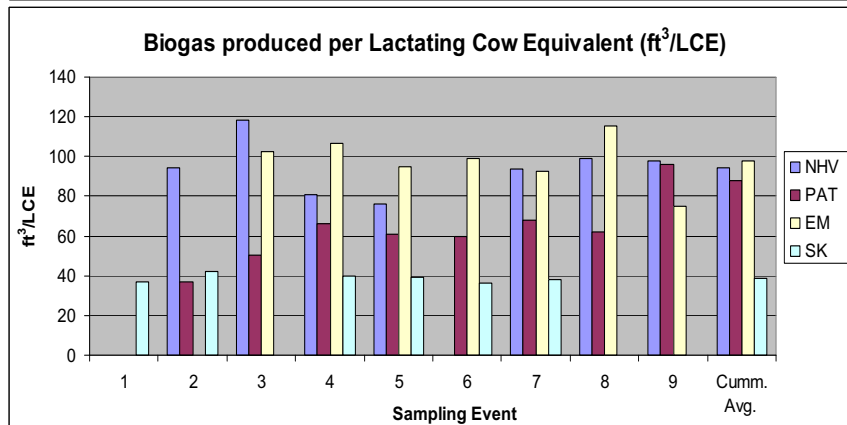
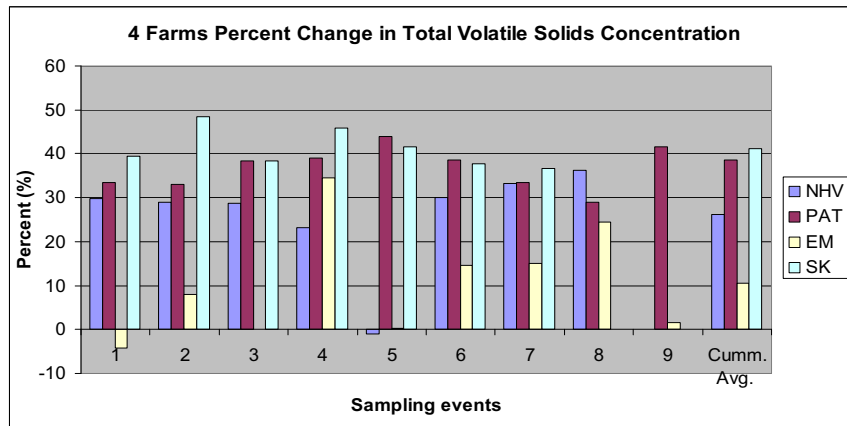
The second product from the system is electricity, with the goal of displacing all or most of the purchased electrical supply. Calculations based on 700 cows estimate biogas production at 31,500 cubic feet per day, and resulting electrical production of 1,270 kWh per day. Estimates were based on digesters that had not been mixed, so the estimated gas production was believed to be conservative. Mixing was absolutely necessary for this digester in order to prevent crusting at the relatively low solids content in the digester.

The overall system was thus designed to produce adequate composted bedding and considerable electricity for the farm. Prior experience had shown no significant difference between composted separated manure solids either prior to or after a digester, so adequate composting is the key. Controlled composting for three days at 135°F yields a very good pathogen kill for the solids. Electrical production is reduced when compared to digesting raw manure, but producing an adequate volume of composted separated manure solids was the number one priority for this system.



Sheland Farm's complete mixed vertical anaerobic digester

Monitoring Update



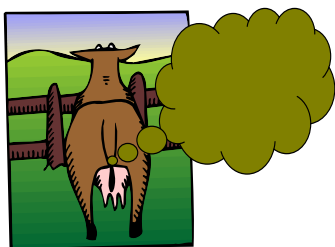
Seven of 11 New York State dairy farms with anaerobic digesters are well into a one year monitoring program following the Association of State Energy Research and Technology Transfer Institutions (ASERTTI) protocol.

The four farms compared in the graphs to the left have the furthest progress, and are all at least six months into monitoring. One other farm undergoing monitoring has dismantled their digester for repairs, and monitoring is on hold until the system is once again at steady-state operation. The remaining two farms (not shown) are one month into monitoring.

The top graph shows the percent change of VS concentration from influent to effluent; this value can be thought of as the overall efficiency of turning manure solids into biogas. A positive change reflects a decrease in the concentration.

The middle graph shows the biogas produced per lactating cow equivalent, with farm PAT adjusted for food waste additions.

The bottom graph shows the energy displaced on each of the farms which is the portion of electrical energy produced that was used on-farm. In other words, the offset in electricity that did not have to be purchased.



Contact us!
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