

Case Study

Allen Farms, Digester



References

Construction of the Allen Farms' small-scale, plug-and-play digester began in Fall 2012 to process manure and bedding from 136 dairy cows. Herd size and progressive farming practices made Allen Farms an ideal partner for UW-Oshkosh's and BIOFerm™ Energy System's first United States installation of the small-scale digester system, EUCOline. The digester's completion marks a pioneer effort to bring technology previously available only to large industrial facilities to the family-sized farm. The economical and sustainable implementation of the digester opens a new market for U.S. facilities that produce smaller amounts of waste.

Plant Dimensions and Process

The digester consists of two fermentation vessels, each measuring 55.7' x 11.5' x 11.5', and a PASCO feeding hopper with 13' x 30' dimensions. The total footprint is approximately 2,460 square feet, and the system averages a retention time between 25-35 days.

Feedstock

The plant is designed to handle up to 2,000 tons of the farm's manure and animal bedding each year supplemented by parlor wash water, lactose pellets, and fats, oils, and grease (FOGs).

Financials

- \$1.2 million capital investment
 - Focus on Energy (State of Wisconsin) grant: \$125,000
 - Wisconsin State Energy Office grant: \$125,000

Power Production

- 64 kW_e continuous power engine (combined heat and power unit)
 - 64 kW electric capacity
 - 101 kW thermal capacity
- Average annual energy production
 - = 512,000 kWh electrical production
 - = 2,778 MMBTU thermal production
- The estimated energy produced could:
 - Provide electricity to 45 homes (average American home using 11,280 kWh per year)
 - Heat 63 homes per year (average American home using 43.9 MMBTU of energy per year for space heating)

Emission Reduction

- Methane displacement: 58 metric tons CO₂ equivalent
- Electricity generation from renewable sources: 430 metric tons CO₂ equivalent

About BIOFerm™

BIOFerm™ Energy Systems is a member of the Viessmann Group, a \$2.5 billion family owned business founded in 1917. Viessmann has installed over 350 AD facilities around the globe. BIOFerm™ Energy Systems was founded in Madison, WI in 2007 and now offers all biogas technologies of the Viessmann Group.



The Technology

EUCOLino—The Perfect Fit for Small Farms

The average dairy in the United States is sized at 129 cattle. Until recently, these smaller dairies were unable to utilize digesters for their on-farm energy needs. BIOFerm™ Energy System's integration of the EUCOLino digester onto Allen Farms extends this opportunity for digester investment to the thousands of United States dairies with 100-500 cows. This installation also paves the way for other U.S. operations with limited space or waste streams, such as universities, farm co-ops, and more, to turn their waste into power; the smaller footprint and investment cost make the EUCOLino ideal and versatile.

Dairy Size (Cow Number)	Electricity Production Potential (kWh/year)	Number of Homes Powered	CNG Gas Gallons Equivalent
100	176,036	13.3	11,565
150	264,053	20	17,348
200	352,071	26.7	23,130
250	440,089	33.3	28,913
300	528,107	40	34,696
350	616,125	46.7	40,478
400	704,143	53.3	46,261
450	792,160	60	52,043
500	880,178	66.7	57,826

*the figures presented in this table are based off of theoretical values and a TS of 15%

Added Farm Benefits

- Continuous supply of electricity and heat
- Odor reduction
- Savings on bedding
- Nutrient-rich digestate that can be used on-farm or sold as a soil additive providing supplementary income
- Decreased phosphorus and nitrogen run-off
- Reduction in the load size that must be shipped off-site
- Electricity generation from renewable sources to be used on-farm or sold back to the grid

