FAIR OAKS DAIRY DIGESTER – FAIR OAKS, IN

DAIRY FARM IN INDIANA – CNG POWERING FARM TRANSPORTATION

SYSTEM DESIGN

Fair Oaks Dairy is located in Fair Oaks, Indiana, and has two anaerobic digesters onsite: a large DVO two-stage mixed-plug flow™ and a smaller vertical-plug flow. The dairy has approximately 12,000 lactating cows producing manure that feed the anaerobic digesters. Currently, no codigestion is conducted, but in the past ethanol syrups collected from regional ethanol plants were codigested and typically amounted to five percent of the feedstock.

- **Digester type:** Vertical Plug Flow
- **Feedstock processed:** Dairy Manure
- **Capacity:** 700 kW
- **Biogas generation:** 200,000 ft^3/day
- **Biogas uses:** Electricity

The vertical-plug flow digester began operating in 2003. It receives manure from approximately 3,000 dairy cows each day and is equipped with two 350 kW gensets. This system produces electricity for on-farm use, and any excess electricity produced is used at the dairy visitor center. Waste heat from the genset is recovered and used to heat the digester.

- **Digester type:** DVO Two-Stage Mixed Plug Flow™
- **Feedstock processed:** Dairy Manure
- **Capacity:** 1,060 kW
- **Biogas generation:** 1,200,000 ft^3/day
- **Biogas uses:** Cogeneration; CNG

The DVO two-stage mixed-plug flow™ began operating in 2008 and receives manure from approximately 9,000 dairy cows each day. Biogas is used for on-farm electricity generation, waste heat to heat the digester, and CNG for use as transportation fuel in vehicles. Any excess electricity after the on-farm electricity needs are met is sold to the local utility.

Image Credit: DVO Inc.

This system is also equipped with a gas cleaning system that cleans and scrubs contaminants from the biogas to meet purity levels for use as a renewable transportation fuel.

PROJECT BENEFITS

- Compressed Natural Gas (CNG) for transportation fuel and sale
- On-farm use of the generated electricity allows the farm to purchase less electricity
- Recovery of waste heat from the engine/genset to heat the digester allows the farm to avoid purchase of heating fuel for the digester

Biogas is being used to produce CNG for use as a transportation fuel to power CNG tractor trailers that deliver milk to processing plants in three Midwestern states (replacing diesel fuel-powered vehicles). The farm received a grant under a separate program for the extra CNG tanks to extend the range of these trucks powered by CNG. The farm has reduced its use (and cost) of diesel fuel by 1.5 million gallons per year. The surplus clean biogas will be piped and sold to a CNG fueling station. It is estimated that after installation of the gas cleaning system in 2011 and the beginning of CNG sales to the fueling station, the simple payback period for the gas cleaning system project will be approximately three years. (See BioCycle article for details.)