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HILLCREST DAIRY – ELMWOOD, IL

SYSTEM DESIGN

Hillcrest Dairy began operating two plug flow digesters in 2002. Approximately 38,000 gallons of manure are sent to the digesters each day. Skid steers are used to collect manure which has an average solids content of about 15 percent. Every day, two front loader buckets of other waste including crop waste, food waste, haylage, and cooking grease is added to the digester influent stream.

The plug flow digesters have flexible covers and share an interior heated wall. The digesters are mostly below-grade with about 1.5 feet of digester wall above ground. The target operating temperature for the digester is 105°F and the designed hydraulic retention time is 20 days.

Biogas is collected and used to fuel two Caterpillar 3406 engine-generator sets that generate 1.2 million kWh per year. These generators have a nameplate capacity of 160 kW each; however, because biogas has a lower Btu content than traditional fuels, their actual output is limited to about 130 kW each, yielding a total capacity of 260 kW. The farm uses the electricity generated by the engine and sells the excess to a local electric company.

The farm uses a Fan separator to separate solid and liquid portions of digester effluent. Solids are composted and can be used for on-farm bedding.

PROJECT BENEFITS

- Odor reduction
- Electricity savings (~\$36,000/year)
- Revenue from sale of excess electricity (\$4,700/year)



Photo: Mattocks R, Environomics Inc.

- **Population Feeding Digester:** 1,400
- **Baseline System:** Storage Lagoon
- **Digester Type:** Horizontal Plug Flow
- **Co-Digestion:** Crop wastes, food wastes, haylage, and cooking grease
- **System Designer:** RCM International, LLC
- **Biogas Use:** Cogeneration
- **Generating Capacity:** 320 kW
- **Receiving Utility:** AmerenCILCO