

COTTONWOOD DAIRY – ATWATER, CA

SYSTEM DESIGN

When Cottonwood Dairy covered its 40 million gallon anaerobic lagoon with a 7.5 acre bank-to-bank cover, the anaerobic digester captured so much biogas, the farm installed a second engine-generator set to utilize all of the gas. Power generated by the 700 kW system provides electricity for Joseph Farms Cheese Plant, which produces 33 million pounds of cheese each year.

Five thousand cows produce over 450,000 pounds of manure each day, which is flushed to the digester. Manure solids are separated prior to digestion and are used for animal bedding. Wastewater from the cheese plant is added to the digester to increase biogas production. Liquid digester effluent is used to irrigate cereal grains, corn, and alfalfa.

A 700 kW engine-generator set provides as much as 80 percent of the electricity required to operate the cheese plant and also offsets some of the plant's propane need. The biogas is scrubbed to remove hydrogen sulfide and dried prior to burning in the engine-generator set. Waste heat from the engine-generator set is used in the cheese plant to produce steam for pasteurizing and sterilizing. Additional heat may be used in the future to preheat air for the whey dryer.



Photo: Joseph Gallo Farms

"We work as hard as anyone in business to turn a profit. And as a family, we have always had a strong commitment to the environment we conduct this business in. Putting this digester to work on our ranch was the right thing to do."

—Mike Gallo
CEO, Joseph Gallo Farms

PROJECT BENEFITS

- Improves water quality and reduces greenhouse gas emissions
- Allows four-year payback on initial investment
- Saves an estimated \$800,000 per year in electricity and propane expenses
- Provides an outlet for cheese plant wastewater

The project received grants from the California Dairy Power Production Program and the California Self-Generation Incentive Program. In addition to methane recovery, the farm has been recognized for its efforts to preserve wildlife habitat.

- **Population Feeding Digester:** 5,000
- **Baseline System:** Storage Lagoon
- **Digester Type:** Covered Lagoon
- **Co-Digestion:** Wastewater (warm clean up water from cheese plant)
- **System Designer:** Williams Engineering Associates; Cover installed by Environmental Fabrics, Inc.
- **Biogas Generation:** 432,000 ft³/day
- **Biogas Use:** Cogeneration Boiler/Furnace Fuel
- **Generating Capacity:** 700 kW