

A solution to dairy pollution
System clears the air, produces
electricity



Bill Kagle, Joseph Gallo Farms manager, and Doug Williams of Williams Engineering walk on the seven-acre lagoon cover.
AL GOLUB/THE BEE



Manure produced by the 5,000 cows at Joseph Gallo Farms near Atwater is being converted to electricity to run the company's cheese plant.
AL GOLUB/THE BEE



Meters show the level of electricity generated by the methane digester system.
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The Joseph Gallo Farms Cottonwood Dairy near Atwater has 5,000 cows, and each one of them produces about 120 pounds of liquid and solid waste per day.

That's a lot of cow stuff.

The dairy industry and environmental agencies are struggling with the air and water pollution problems posed by the waste.

But the cows at the Gallo Cottonwood Dairy may be part of the solution, rather than an example of the problem.

Mike Gallo, CEO of Joseph Gallo Farms, unveiled a new methane digester system Thursday that converts cow waste into electricity to run the company's cheese plant.

It works like this:

- A system of concrete trenches collects the waste. It is pumped to a "separator," which removes the solids from the mix. The solids are used for fertilizer in the Joseph Gallo Farms fields.
- The liquid waste goes into a covered seven-acre lagoon, the actual digester, where microbes feed on the nutrients in the waste and create methane gas.
- The plastic cover over the lagoon collects the methane gas and pipes it almost a mile to the cheese plant, where it fuels a huge engine that generates electricity.
- Heat from the engine is also used to create steam for the cheese plant, saving 145,000 gallons of propane per year. The steam is used in pasteurizing the milk, and in cleanup and sterilization operations.

The benefits are several, according to officials who spoke at the plant dedication this week. In a typical open-air dairy lagoon, methane and other air pollutants like ammonia and volatile organic compounds are believed to be released into the air, contributing to smog and global warming.

Dairy waste also poses a risk to ground water, as salts and nitrates can seep into the water table or be washed into streams and rivers by heavy rain.



Manure is flushed into a separator.
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Another advantage is that businesses which generate electricity and become more self-sufficient help California deal with energy shortages.

The Joseph Gallo Farms system generates 300 kilowatts of electricity, enough to supply about 30 percent of the cheese plant's power needs.

The digester is producing more methane than expected, said Carl Morris, chief operating officer and general manager at Joseph Gallo Farms, so a second generator will be installed, boosting output to 600 kilowatts.

The electricity and steam from the generator saves the cheese plant \$1,000 a day, Morris said.

Joseph Gallo Farms has 17,500 dairy cows on five dairies in Merced County, and is looking at putting digester systems at its other four dairies, Morris said.

Of course, the system isn't cheap. Mike Gallo estimated that the initial project has cost more than \$2 million.

The Gallo project had some financial help: It is one of 14 being funded in part by California state grants for alternative energy programs, and administered by Western United Resource Development and Pacific Gas & Electric Co.

There are eight other dairy digesters operating in the state, and three centralized digesters, where manure is trucked from several dairies to create electricity. Seven other digesters are under construction or ready to begin construction, according to Sustainable Conservation, a group that works with business to find solutions to environmental problems.

There are 2,200 dairy farms in California, according to Sustainable Conservation. But not all of them can adapt the digester technology, said Michael Marsh, chief executive of Western United Dairymen and Western United Resource Development.

"It's very difficult to do on a small dairy," Marsh said. A digester system on a 250-cow dairy, for instance, would cost \$300,000, or \$1,200 per cow.