Biofilter is good news for Merced County dairies

Technology lowers nitrogen in waste water at Hilmar test farm

By Joshua Emerson Smith
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Victor Fanelli calls it a "rock box." Scientists call it a waste-water biofilter.

Whatever it's called, this new technology promises to help clean nitrogen-rich waste water on dairy farms.

Experts see that as a potentially important step in a long-standing effort to reduce the levels of cancer-linked nitrates in the state's water supply.

Fanelli, a Hilmar dairyman, recently volunteered his farm as the test site for the experimental waste-water treatment system.

"Having this tool is going to make my life easier," said Fanelli, who runs a 750-cow farm. "If I got too much nitrogen in my water, I can run the system. That's very valuable, especially in our area."

The system pumps waste water back and forth through a series of pipes between two open-air gravel pits, creating an oxygen-rich environment that helps microbes remove the nitrogen.

"It's like a septic tank on steroids," said Joe Choperena, senior project manager for Sustainable Conservation, the nonprofit that developed the technology for dairy farms.

Traditionally, dairy farmers recycle their waste water by using it to irrigate crops that soak up the nitrogen content. But plants can absorb only so much nitrogen, and the excess seeps into the ground.

As environmental rules have tightened, many farmers have been forced to farm additional cropland to come into compliance. Others have cut back on the number of cows they milk.

Fanelli has a three-crop rotation -- corn in the spring, grass in the summer and fall, and oats in the winter. This new system could allow him to significantly scale back that operation, saving money and water.

"If this system works out the way it's supposed to, we'll have another way to stay in business and be up to the codes of California," he said.

Research data from a scaled-down waste-water biofilter at a research dairy at California Polytechnic State University, San Luis Obispo, has shown promising results.

Initial tests have found benefits not only for water but for air quality as well, such as significantly reduced levels of volatile organic compounds, greenhouse gases and odors.

"We've been meeting with the air district and they're fully on board with permitting this project," Choperena said.

Test is good news

According to a recent test, the waste-water biofilter removed 75 percent of total nitrogen in the Fanelli dairy's waste water.

That's good news for Fanelli, who is surrounded by dairies, leaving little space to expand his cropland.

If results can be repeated on a larger scale, an acre-sized waste-water biofilter system removes in a day the same amount of nitrogen that one acre of corn silage removes in about a year.

"I don't know what (operation) costs are going to occur in the future, but me being the first one and taking advantage of the situation, I could be sitting in a very good spot here," Fanelli said. "We were all pretty excited."

The project is made possible by a $484,000 U.S. Department of Agriculture grant to install and study the system.

Installation of a pilot biofilter system is expected to cost roughly $300,000 and be completed next fall. The final retail price is expected to come down significantly as research and development efforts continue.

Modesto solar plant tour showcases clean, green technology

By John Holland
Modesto Bee, Saturday, October 6, 2012

MODESTO -- Two hours after sunrise Saturday, the big new solar plant on McHenry Avenue was impressing a group of visitors.

The plant, built for the Modesto Irrigation District, was one of the stops on a tour showcasing how sunlight can make electricity.

"We need to clean up the air," said Frieda Rector of Modesto, one of nearly 100 people who visited the plant. "This is a source we can use that won't pollute the air."

The tour was sponsored by solareverywhere.org, which promotes the technology, and the Civic Engagement Project at Modesto Junior College.

It also took in four residential systems; an array at Church of the Brethren, west of Modesto; and the MJC classroom where Adrian De Angelis teaches the technology.

The MID has relied mostly on wind turbines in the Pacific Northwest to get closer to a state mandate for at least 33 percent renewable power by 2020.

The McHenry plant, which started feeding the grid in July and is undergoing final testing this month, is expected to provide only 2 percent of the supply.

Officials said the project is worthwhile nonetheless because it will help meet peak demand on summer afternoons and evenings, when power on the wholesale market is pricey. The panels have small motors that allow them to turn as the sun crosses the sky each day.

Some customers have criticized the MID for paying 17 cents per kilowatt-hour for the solar power over 25 years, about double the current cost of conventional sources such as natural gas.

"What they like about this is once you build it, the fuel is free," said tour guide Paul McMillan, principal for the utility group at SunPower Corp. of San Jose, which built the plant.

The company has spent more than $150 million on the project, the largest solar installation in the Northern San Joaquin Valley by far. It covers 155 acres of open land at the northeast corner of McHenry Avenue and Patterson Road.

The panels are made up of photovoltaic cells, which when struck by sunlight release electrons that then create a current.

The visitors did not see the panels at their best. The glass surfaces were dusty because the ground beneath them had just been harrowed to remove weeds.

The panels will be washed as needed, said Sean Gallagher, managing director for government relations at K Road Power Holdings LLC.

This company, which has offices in San Francisco and New York City, bought the plant in May but kept SunPower on to manage it.