



Special Topics Series:
"A Path Forward for Dairy
Digesters in CA"
March 15, 2011 Webinar

CA Dairy Anaerobic Digester Case study: Fiscalini Farms

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Fiscalini Farms - Modesto, CA. USA



Fiscalini Farms ADPG Project

- 4th generation dairyman at the same site
- 1,500 milk cow flush dairy
- Triple cropping with gravity flow irrigation
 - Winter wheat and summer corn for silage- primary base for all dairy cow rations, and early fall sudan grass crop for digester feedstock
- On-farm cheese facility producing 500,000 pounds of raw-milk aged cheese per year
 - Whey used as digester feedstock
- Prior to ADPG system installation all waste was handled in a traditional way: separate solids, windrow and turn to dry, use for bedding.
- Pursued ADPG system because of ensuing regulatory pressure and need for alternative revenue streams.

Required Permits

STATE PERMITS

Air Permits:

- ATC: AD system, flare, power generation/gas conditioning, feedstock handling equipment (i.e. liquid manure pre processing pits).
- PTO: Issued after construction and within 90 days of start up source testing all equipment.

Water Permit:

- Waste Discharge Permit: revise current permit or issue entirely new permit, depending on site location and function.
- Additional monitoring will be required for salt, N, P, K, and potentially heavy metals, COD, BOD of influent and effluent.

Federal Permits

- NEPA, NPDES

Local Permits

- City and County permits will vary depending on location and system (food processing or dairy)

Timeline to Permit Completion

- Water Board
 - Started **January 2007**
 - Ended with Permit in **June 2007**
- Air Board
 - Started initial ATC permits for component of the system in **January 2007**
 - Completed initial ATC permits for components of the system in **September 2007**
 - Started revisions to the initial ATC in **October 2007**
 - Completed revisions to the initial ATC in **December 2008**
- County Permit
 - Started County Building Permits in **January 2007**
 - Completed County Building Permits in **September 2007**

Results of Permit Process

- *Water Board*: Permit to Operate under an Individual Waste Discharge Requirement Permit
- *Air Board*: Authority to Construct that will transfer to a Permit to Operate after the project operates 24 months.
- *Stanislaus County*: Only required a building permit.

Two Complete-Mix Mesophilic Digesters



Commissioned June 2009

Infrastructure
to move,
measure, and
monitor the
entire system



Benefits of the System

- Generate power to use on site.
- Generate heat for use to heat the digester tanks, water for cleaning, and water for processing cheese production.
- Additional Revenue by selling power, saving cost of propane, digested solids as a soil builder
- Environmental credits that may be worth money some day
- Just doing the right thing- reducing GHG emissions

Electrical Generation Performance

- **June 1 through Dec 31 2009**
 - 1,951,111 Total Kwh produced or 278,730 Kwh per month
 - \$213,646.70 Total Revenue or \$30,520.95 per month
- **Jan 1 through July 31 2010**
 - 1,936,932 Total Kwh produced or 276,704 Kwh per month
 - \$212,094.05 Total Revenue or \$30,299.15 per month
- Engine performance is 53% of maximum
- Total possible Kwh per month is 515,000
- Total possible revenue per month is \$56,390

Energy Savings from Heat Production

Prior to CHP unit operating:

- Digester heating operation used 2500 gal propane at \$3,575/mo
- Dairy barn heating operation used 1050 gal propane at \$1,501/mo
- Calf milk pasteurizer operation used 510 gal of propane at \$730/mo
- Cheese plant heating operation used 440 gal propane at \$629/mo

Once CHP unit operating:

- Total propane savings were 4,500 gal/mo at \$6,435/mo
- Total propane savings are 54,000 gal annually at \$77,220 annually

Environmental Attributes

- Greenhouse gas reduction – equivalent to the reduction of 5,000 automobiles
- Nutrients in the effluent become more available for plant uptake
- Renewable energy generation
- Reduced need for outside fertilizer purchases
- Ability to divert and co-digest landfill bound material
- Reduced odor
- Alternative source of soil amendments (Peat Moss)

Specific Challenges with Permitting

- Water Board
 - Educating staff on newer technology
 - Co-digesting off site nutrient feedstock
- Air Board
 - Lack of clear understanding of the technology
 - Proposed for project
 - Functional technologies for application
 - Outdated policy
 - Unclear permit application process
 - Expensive and time consuming



**THANK YOU
ANY QUESTIONS?**

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