CA Dairy
Anaerobic Digester Case study:
Fiscalini Farms

Nettie R. Drake
Ag Power Development, LLC
nettiedrake@gmail.com
(559) 289-4928
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
Guascar 1095 HP engine with 710 KwH genset

The genset supplies enough electricity for 450 average sized homes in California, with the possibility of 800 homes at 95% efficiency.
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?

Nettie R. Drake
Ag Power Development, LLC
www.agpowerdev.com
nettiedrake@gmail.com
(559) 289-4928