5-Year Status for an On-Farm Anaerobic Digester – Money Well Spent?

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Purpose: Share results of an operating AD

- Project inception & expectations
- Status today – changes
- Current and future opportunities
- Conclusions

Project inception (2006)

- Location: Sheland Farms, family owned, Adams, NY (cold!)
- Initially 750 cows
- Dairy farm looking to control expenditures
- Proactive owner
- Manure/Nutrient Management

Project inception (2006)

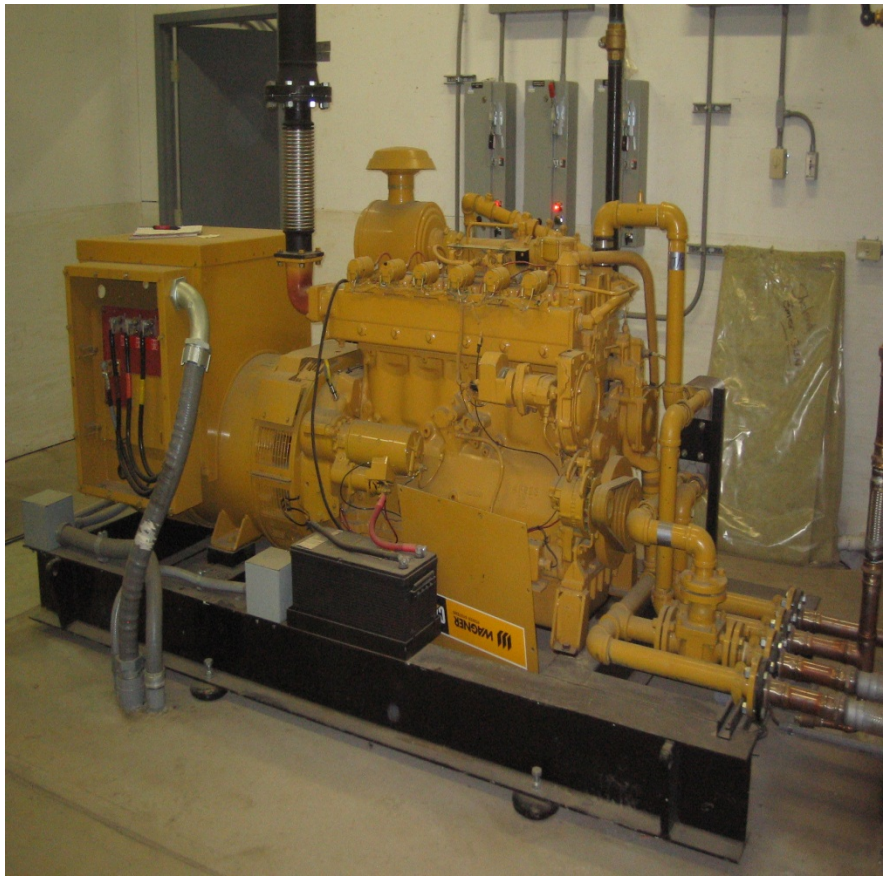
- Incentives for energy recovery and reuse
- Siemens Technologies (developer)
  - Performance contract
  - Guaranteed (lower) electric rate
  - Capital funding
  - REC incentives
  - GHD design team
- New York State Energy Research & Development Authority (NYSERDA)
  - Grants and assistance

SIEMENS

nyserda
Energy. Innovation. Solutions.

Project inception (2006)

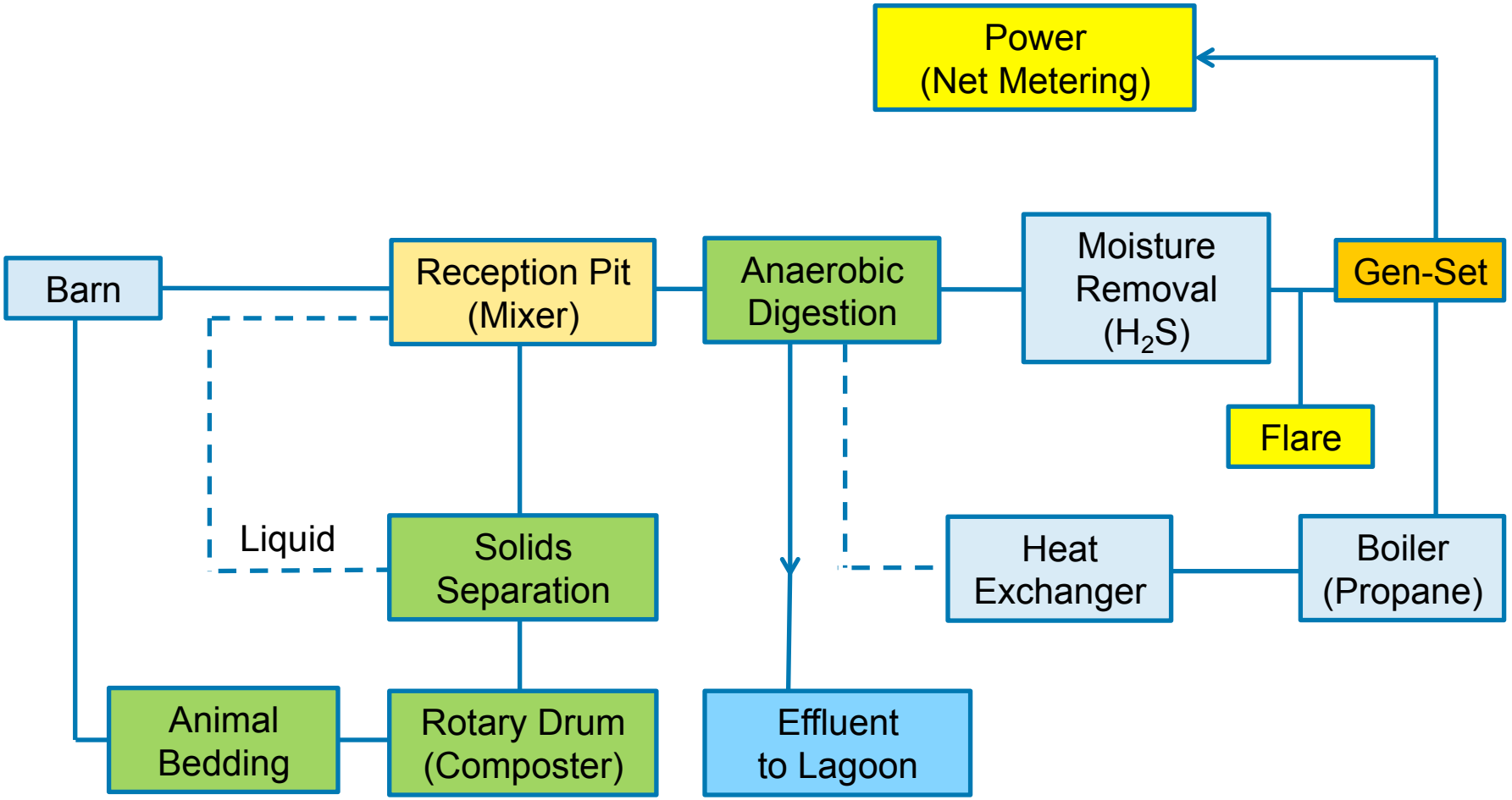
- Develop combined heat and power synergies
- 230,000-gallon AD: 12 to 17-day retention
- 100 kw engine-generator set
- Some heat recovery
- Net metering
- Animal bedding needs



Project inception (2006)

- Capital budget $1.6M
- Annual utility savings ~ $55,000
- Other REC Incentives
- Expected payback ~ 16 years
- Grant participation - $1.3M!
  - NYSERDA
  - USDA
  - State

Project schematic



So how is it going today?

Still cold in the North Country!

- Insulated digester
- Pursuing exhaust heat exchanger
- Added bedding storage

Animal bedding – an unexpected benefit

- Solids separation very effective
- Drum still going strong
- 24 / 7 operation
- 100% of animal bedding needs
- Somatic cell count lowest ever
- Greater savings than energy

Things happen …

Other "stuff" happens, as well…

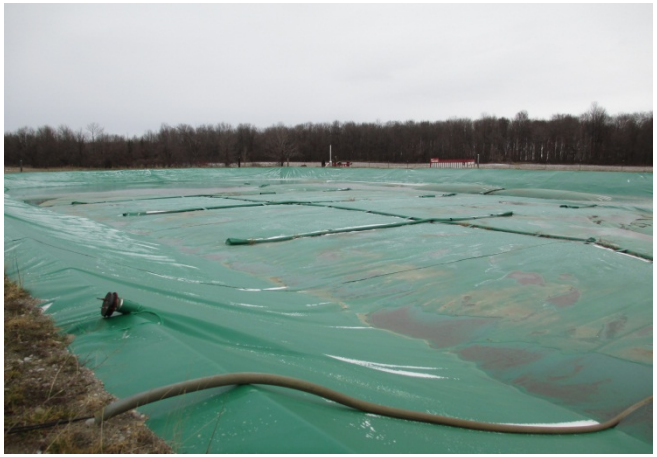
- Why clean-outs are important…

Anaerobic digester mixing

- Hydraulic (water) mixing
- Rotomixer
- Higher power consumption but less “scum” accumulation
- Works well but requires regular maintenance

Seemed like a good idea at the time …

- Private company interested in carbon credits
- Covered lagoon (flare) – methane to CO_2
- Carbon credits
  - Started at $6.00 per metric ton
  - Now at $0.05 per metric ton
- With cover – can't mix lagoon



Developing opportunities

- Additional substrates
  - Whey
  - Fat, oil, grease (potential)
  - Other liquid food waste
- Improve heat recovery – reduce propane use
- More solids recovery
- A second digester and Gen-Set

Immediate impacts

- Whey – 6600 gpd (6 days per week)
- Constructing separate holding tanks
- Annual income ~ $80,000

Results: Was it worth it?

- Capital cost higher ($2.0M vs. $1.6M)
- Grants help!
- 16-year payback?
- $55,000 per year electrical savings (70% of site need)
- Can be done in cold climate
- Higher maintenance $'s than anticipated but still not bad
- No land spreading – nutrient management successful

Unexpected results

- Bedding cost savings > energy savings ($65,000)
- Farm expanded to over 850 cows
- Whey generating $80,000 per year
- Expansion to merchant waste
- Ready to double energy production capacity

Was it worth it?

Thank you!

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