

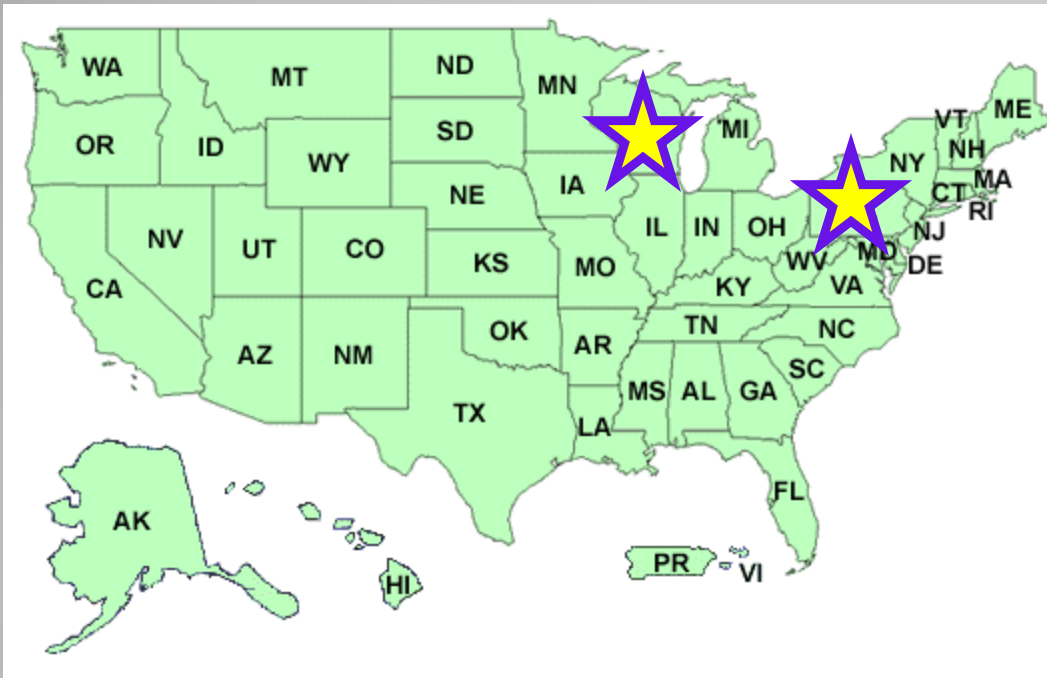
US Case Studies

Allison Costa
GMI Agriculture Meeting
13 October 2011

- 169 ADs with livestock manure
 - 157 on-farm systems
 - 12 centralized/regional systems
- 138 Dairy
- 23 Swine
- 4 Poultry
- 2 Beef
- 2 Mixed
- 79 Plug Flow
- 49 Complete Mix
- 26 Covered Lagoon
- 4 IBR
- 3 Fixed Film
- 8 other
- 151 generate energy
 - 87 Cogeneration
 - 55 Electricity
 - 15 Boiler/Furnace Fuel
 - 1 Vehicle Fuel
 - 1 Pipeline Gas
 - 15 Flare

Overview of AD Status

Case Studies



Reinford Farm
Mifflintown, PA

Dane Co.
Digester
Vienna, WI



Reinford Farm

- Located outside Port Royal, PA in Juniata County
- Established in 1991 with 57 cows
- Currently 440 Lactating Cows & 30 Dry Cows
- Crop 900 acres
- Raise their own heifers

Farm Background

- RCM Complete Mix Digester
 - Operating since February 2008
 - Sized for 1,000 cows
- Cat 342 Engine w/ 130 kW single phase generator
- H₂S Scrubber
- Auto Flare
- Screw Press Separator



Digester Basics

- Manure from 470 total cows
 - Auto alley scrapers in main freestall
 - 2nd freestall and dry cow barn is skid steer scraped into gravity pipe



Digester Inputs

- Other products going in:
 - Food waste (receiving a tipping fee)
 - Working with Team Ag to incorporate into Nutrient Management Plan
 - Have put in feed refusals, caused crusting issues



Digester Inputs

- Wash water from milkhouse and parlor handled separately



Digester Inputs

- Electric
 - Max at 140 kW plus flaring some gas right now
 - Selling to PPL



Outputs

- Manure Solids
 - Using on-farm for bedding
 - Plus selling to 2 other farms
 - Use about 1/3 & sell the other 2/3



Outputs

- Waste Heat
 - From engine coolant & exhaust



Outputs

- Heat House
 - Hot water base board
 - Still have original oil boiler in house for back-up of entire system



Waste Heat Uses

- Heat Shop

- In floor radiant heat in shop floor
- Shop is used for storage of feeding equipment in winter



Waste Heat Uses

- Hot Water in Parlor
 - Replaced an oil fired boiler using about 200 to 250 gallons of fuel oil per month



Waste Heat Uses

- Hot air off engine room to heat main parlor & special needs parlor



Waste Heat Uses

- Grain drying
 - Hot air off engine radiator is piped to grain bin fan
 - Air temperature is controlled with manual slide at bin



Waste Heat Uses

- Pasteurize Milk for Calves
 - Heating pipes inserted in bottom of used bulk tank



Waste Heat Uses

- Still have heat to use if more ideas come along
 - One may be drying solids for bedding



Waste Heat Uses

- The digester has been a positive addition to Reinford Farm
 - Has created additional income opportunities for the farm business
 - Reduced odor from manure
- Still have room for growth:
 - Cows numbers
 - Additional input products
 - Waste heat uses

Conclusions



Dane Co. Regional Digester

- Serves three primary farms
 - Ripp's Dairy Valley
 - Richard Endres Farm
 - Maier's White Gold Dairy
- Approximately 2800 cows total

Participating Farms

AD System



- Manure piped and trucked to facility (cap. 3 million gallons)
- Complete mix mesophilic digestion, followed by solids separation with a centrifuge

- 100,000 gallons per day are tracked by meters
- 50,000-gallon tank of oil leftover from restaurants and industrial kitchens
- Building for box stall-type manure (ground and wet with AD effluent & added to digester)
- 150 monitoring instruments.
- Two 1-megawatt units with V-20 internal combustion engines generate electricity

Process Details

- 60% - 70% P removal
- Solids: Removed with centrifuge and dried for use by landscapers & horticulture industry; trucked out of the watershed and sold to wholesaler for distribution in region
- Liquids: Piped back to farms to be sold on fields (up to 60% of what they piped in)
- 2MW electric production: sold to Alliant Energy

Results

- Dane County objectives: support dairy industry and improve water quality
- Emissions reduction
- Allows farms to better manage nutrients
- Reduced phosphorus
- Less trucking and smaller land base
- Longer spreading window

Benefits

- 1st WI centralized AD
- 1 of only AD systems with P treatment
- 1st in country to be centralized & remove nutrients

- Construction employed over 25 subcontractors and 200 workers.

Importance to Region

http://www.youtube.com/watch?gl=US&v=7aqda_6e_oI

Thank you!

<http://www.epa.gov/agstar/projects/index.html>