The Role of Manure Digesters

in Dane County Manure Management

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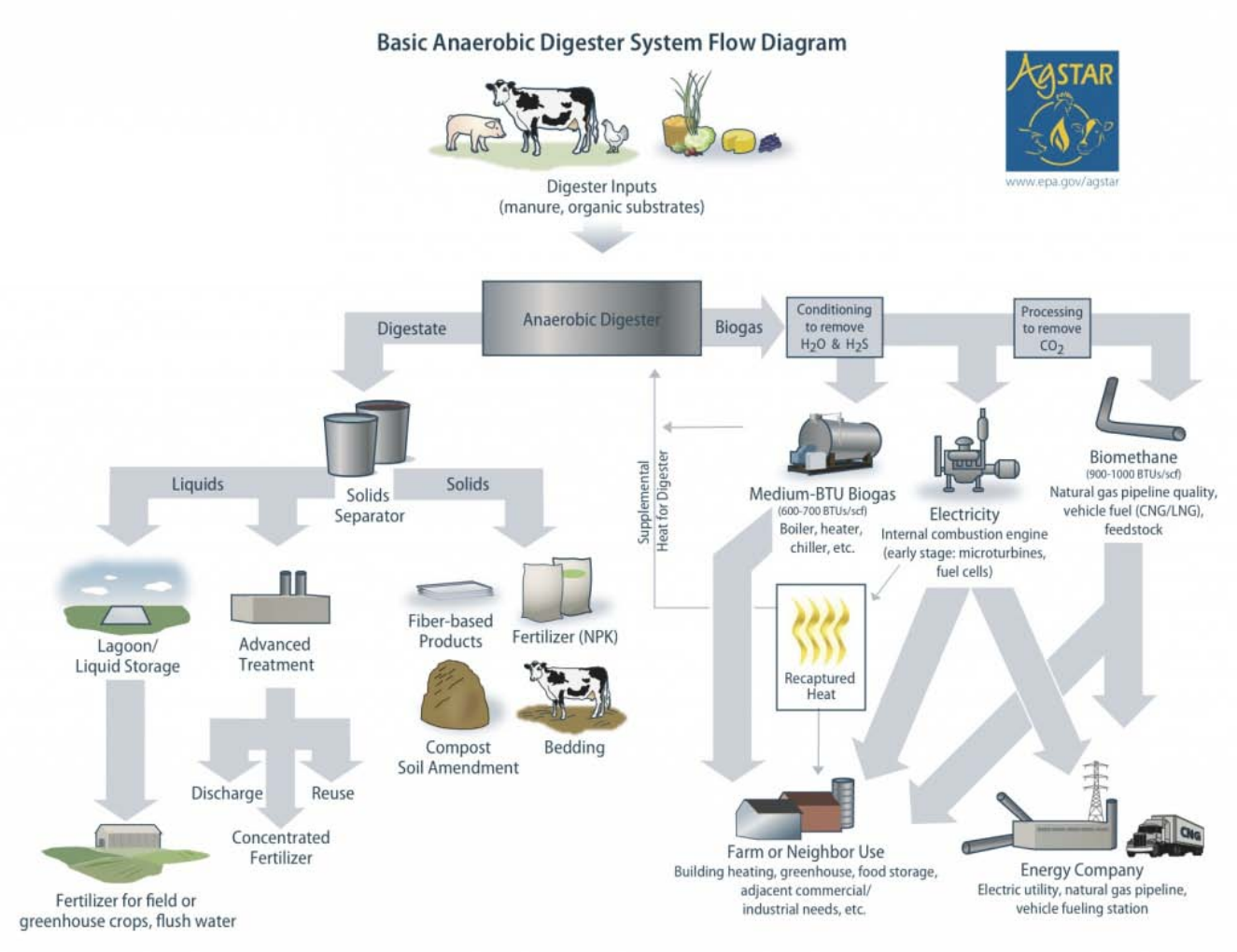
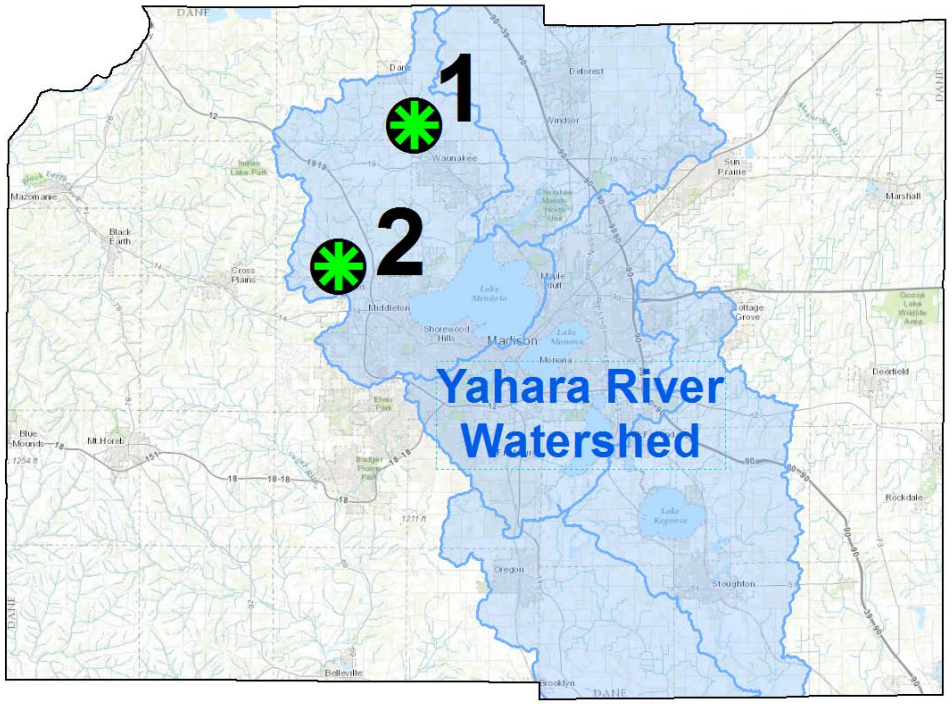
DOE/USDA Biomass R & D Technical Advisory Committee

What is a Manure Digester?



Manure Digester Locations

- 1. Clean Fuel Partners (formerly Clear Horizons) near Waunakee
- 2. GL Dairy Biogas – Gundersen Health System near Middleton
- Yahara CLEAN recommends 5 total



Myth – Digesters "Remove" Phosphorus

- **FACT** – a **Dane County Manure Digester** is a **SYSTEM,** that consists of multiple components, including:

  - manure collection and digestion
  - fiber separation from digestate
  - fiber (phosphorus) export out of the watershed
  - centrate application to fields to meet crop needs according to a land spreading plan

Photo from Gundersen Health System

Background

Two Manure Discharge Events in 2005

1. Lake Mendota
2. Sugar River Fish Kill

Manure on frozen field blamed for killing trout

By The Associated Press Mar 1, 2005 0

Manure spread on a frozen field is blamed for killing dozens of brown trout in southern Wisconsin -- just two weeks before public hearings start on proposed new rules that would streamline the process for expanding livestock farms in the state.

The West Branch of the Sugar River, near Mount Horeb in Dane County, had been removed last October from a federal government list of impaired waters, after more than $900,000 in state and federal grants and thousands of volunteer hours turned a shallow, muddy stream into prime trout habitat.

But officials said Monday that the stream was damaged because a farmer last week spread liquid cow manure on an icy field.

Manure Task Force

- Formed by County Executive Falk in 2005, includes the following members:
  - 3 livestock farmers
  - 2 environmental and water quality experts
  - 4 county board supervisors representing urban, rural interests along with the Land Conservation Committee and Lakes & Watershed Commission

- 6 Meetings

Short-term Recommendations

- 1. Require a permit and winter spreading plan for spreading manure on snow-covered or frozen ground
- 2. Encourage professional waste haulers to join a professional nutrient applicators association
- 3. Provide county funding for technical assistance and to expand manure storage facility capacity
- 4. Require an emergency response plan for permit holders (spreading and storage permits)

Long-term Recommendations

- 1. Regional Manure Facility
  (anaerobic digesters to process manure)

  - Generates methane for renewable energy
  - Separates fiber
  (export biosolids with phosphorus out of watershed)
  - Provides emergency storage

Photo from UW Extension

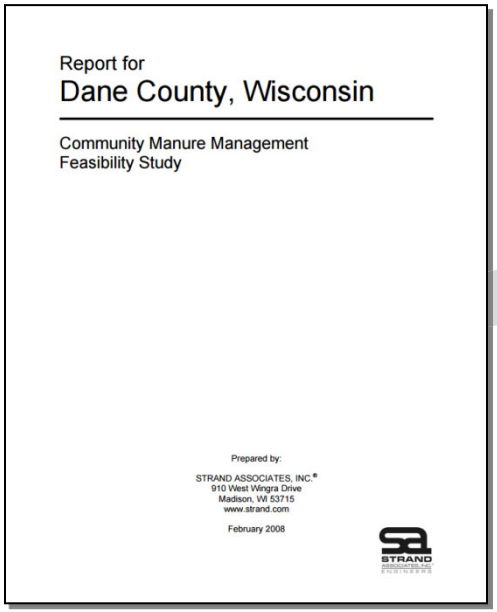
Long-term Recommendations (cont.)

- 2. Explore Municipal Treatment of Manure
- 3. Match Manure Supply with Demand (brokering between livestock producers and cash grain operations)
- 4. Conduct a Feasibility Study on Anaerobic Manure Digesters

Photo from MMSD

Community Manure Feasibility Study

- Study (2006 – 2008) evaluated options that would meet county's nutrient management goal


Report for
Dane County, Wisconsin

Community Manure Management
Feasibility Study

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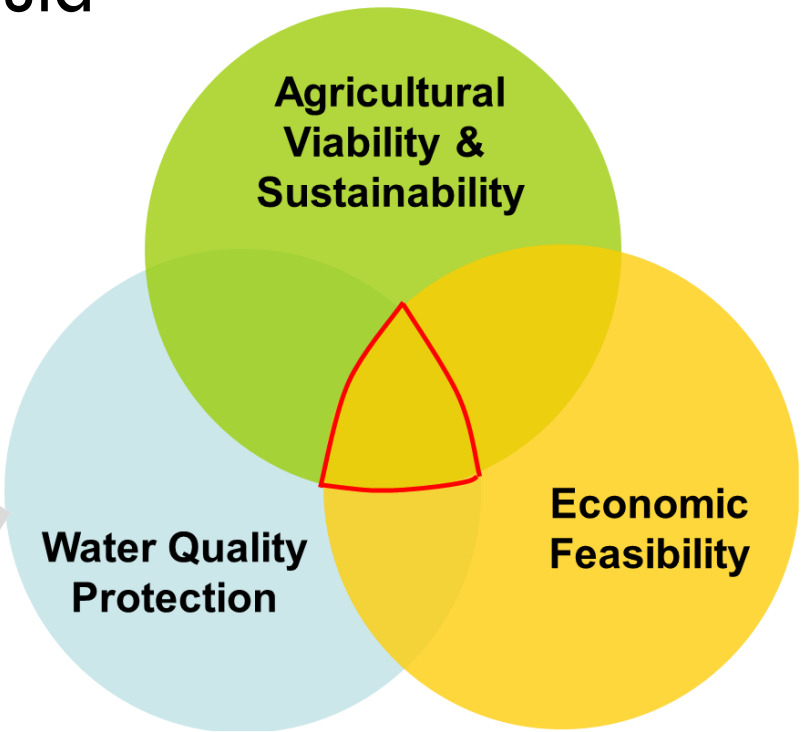
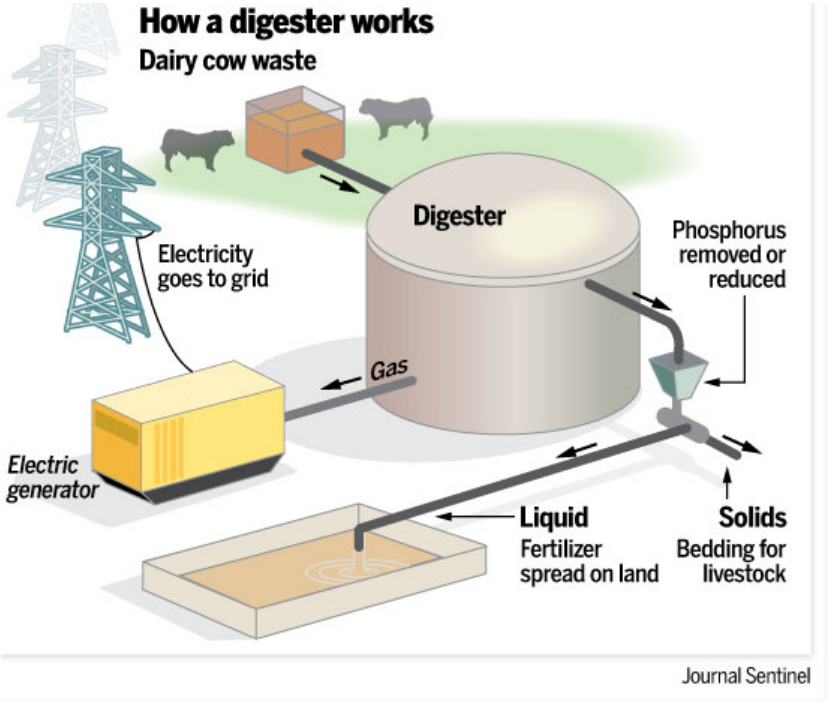


Factors Evaluated

- Size (individual vs. community)
- Technologies (advanced solids separation, advanced phosphorus separation and recovery, anaerobic digester and methane recovery)
- Economics (current manure handling costs, alternative systems analyses, challenges, costs)
- Financial assistance
- Alternative business structures (individual farm operation, cooperative ownership, third-party technology, power utility and investment company, cooperative or government ownership)
- Non-monetary impacts

Anaerobic Digestion

- Increases availability of plant-available nutrients
- Reduces odors and pathogens
- Produces a renewable fuel
- Provides a consistent product for post secondary processing of nutrients



Non-monetary Impacts

1. Phosphorus Reduction
2. Water Quality Impacts
3. Air Quality Impacts
4. Maintaining Green Space/Water Quantity
5. Maintaining Working Farmland/Culture
6. Nutrient Transportability
7. Greenhouse Gases and Potential Credits
8. Production of Renewable Energy
9. Aesthetics/Nuisances
10. Safety Issues - Farm/Commuter Traffic
11. Impact on Roads/Truck Traffic
12. Animal Disease Control
13. Status of Technology; Reliability
14. Ease of Operation
15. Expandability
16. Ability to Treat Other Feedstocks
17. Regulatory and Permitting Issues

Photo from WI DATCP

Study Conclusions

- The Dane County farming community is interested in developing manure management strategies.
- Currently many Dane County farms have long hauling distances and need to rent land for land application of the manure.
- Water quality impacts from land application of manure have been shown to be significant, and manure is a major source of phosphorus loading (and other nutrient loading) within the Upper Lake Mendota Watershed.

Study Conclusions (cont.)

- Cluster manure management strategies appear to offer significant economies of scale with respect to capital costs compared to the individual farm systems

- Several of the cluster management strategies have significantly lower annual O&M cost projections than the existing annual O&M costs at the farms especially energy recovery alternative

Current

- Two Manure Digester Projects
- Community Manure Storage Cost Share Program
  - UW-Madison BSE Manure Management Study
- Nutrient Concentration System

Photo from M. Kakuska

Questions

Photo from M. Kakuska