Innovative Business Models for On-farm Anaerobic Digestion

Overview

Introduction to AgSTAR
Overview of U.S. Biogas Industry
Innovative Business Models
  - Third-Party Owned and Operated Systems
  - Eco-markets for coproducts
  - Renewable Natural Gas to Vehicle Fuel

Anaerobic Digester Projects in the U.S.

The archived presentation is available at:
http://articles.extension.org/pages/21819/chronological-webcast-archive
Livestock Anaerobic Digester Systems in the United States

- 8,000 additional livestock anaerobic digester systems in the U.S.
- 257 billion cubic feet per year of biogas
- 1 million American homes can be heated for one year or provide enough natural gas to heat 2 million passenger cars for one year.
- If fully realized, these digesters would produce 195 billion billion cubic feet of biogas per year.
- Livestock anaerobic digester systems across the U.S.
- 85% of the biogas energy can be converted into electricity, and 17% can be used for other purposes or animal feed.

What’s Happening in the U.S. Market?

Growth in Farm Digester Market is Slowing

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Why

Challenges Facing Digester Development

- Low energy prices
- Low milk prices
- Interconnection hurdles
- Renewable Fuel Standard Uncertainty

What can be done?

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Innovative Business Models

New opportunities to diversify revenue and share risks and rewards

- Third-Party Owned and Operated Systems
- Eco-Markets for Coproducts
- Renewable Natural Gas to Vehicle Fuel

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Third-Party Owned and Operated Models

Bar-way Farm - Deerfield, MA

**Digester Facts**
- Construction 2016
- 660,000-gallon capacity

**Future Annual Digester Input:**
- 9,200 tons of manure
- 30,000 tons of food waste

**Future Annual Digester Output:**
- Produces 7,700 MWh energy/year
- Offsets 5,500 lbs of CO2 emissions daily

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Shared Risks and Rewards

- **Vanguard Renewables** – develops, owns, operates and invests in digester.
  Coordinates with food producers, waste haulers, utilities, government, supermarkets and farmers to achieve common goals with universal benefits.

- **Farmer** - invests in project, provides manure feedstock, leases land for digester

- **Food waste producers:** provide feedstock, receive renewable energy

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Eco-Markets for Coproducts

**Magic Dirt**
- Potting soil produced from digested dairy manure fibers.
- Magic Dirt partners with 19 dairy farms across the country, utilizing separated manure fibers.
- Magic Dirt plans to be on the shelves at ½ of the Walmart stores in the U.S. in 2017.
- More nutrients than traditional soil products.
- Each cubic yard avoids about one ton CO2e.

**Eco-Markets for Coproducts**

**Freund Farm – East Canaan, CT**
- Small family-owned farm
- 300 dairy cows feeding horizontal plug flow digester

**Cow Pots**
- Biodegradable planter pots made from digested manure solids
- Displaces unsustainable peat moss and plastic planters

**Renewable Natural Gas to Vehicle Fuel**

**Fair Oaks Dairy – Fair Oaks, IN**
- 12 family-run dairies
- Attracts more than 500,000 visitors yearly to its agricultural science center

**Digester Facts**
- Operational since 2008
- 12,000 cows plus swine manure feeding digester

**Energy Production**
- Produces compressed natural gas (CNG) to fuel 42 tractor trailers that deliver milk daily to processing plants in 3 states
- Displaces about 2 million gallons of diesel fuel annually

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Renewable Natural Gas to Vehicle Fuel

Hilarides Dairy – Lindsay, CA
- Family-run dairy
- 10,000 cows feeding digester

Digester Facts
- Operational since 2004
- Covered lagoon digester
- Produces 226,000 cubic feet of biogas per day

Energy Production
- Produces compressed natural gas (CNG) to fuel 2 milk trucks and 6 on-farm pickups.
- Displaces 230,000 gallons of diesel annually

Why is RNG such a big opportunity?
- RINs and Low Carbon Fuel Standard (LCFS) credits from California exist to help fund projects
- Producers can lock in long term fuel prices
- Natural gas burns much cleaner and quieter than diesel, making it more desirable for vehicle operators

Think Big (aspirational examples – don’t quote me 😊)
- All dairy and meat products in the US hauled by RNG fueled trucks.
- 50% of fertilizer market replaced by manure-based organic products.
- Dairy fiber products will surpass peat moss use in the horticulture sector.
- 1,000 livestock farms will be energy independent based on AD-biogas based energy streams.
- 20M tons of wasted food will be managed in on-farm AD systems by 2030.
Take-Aways

- Technology choices are important, but viable business model is critical
- With low energy prices in most areas, must have a diversified revenue portfolio to drive project
- Growing interest in broader eco-markets aspects of AD systems gaining traction

For more information:

www.epa.gov/agstar

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Photo courtesy of Michigan State University