Dairy-Based AD and Nutrient Recovery Activities in WA State

Puget Sound Nutrient Forum
Green River Community College
August 7, 2019

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COMPANY INFORMATION

Washington-based company, focused on agricultural waste solutions, specifically anaerobic digestion for renewable fuel and/or solids/nutrient/water recovery from wastewater.

- Over 80 years in business
- 150 employees
- Recognized leader in quality and safety

- Metal Roofing
- Metal Siding
- Building Envelope

- Standard Equipment
- Custom/Design Build Equipment
- Service and Maintenance

- Mechanical Contracting
- Commercial/Residential HVAC
- Commercial Plumbing
- Service and Maintenance

- Anaerobic Digesters
- Agricultural Waste Water Treatment
- Operations and Maintenance

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## COMPANY INFORMATION

Multiple projects, mostly west coast, but actively quoting projects across the US, projects involve AD, RNG conversion, and solids/nutrient/water treatment

<table>
<thead>
<tr>
<th>Project</th>
<th>Location</th>
<th>Flow (GPD)</th>
<th>Installed KW</th>
<th>Full O&amp;M</th>
<th>RNG Conversion</th>
<th>Nutrient Recovery</th>
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</thead>
<tbody>
<tr>
<td>Vander Haak Dairy</td>
<td>Lynden WA</td>
<td>45,000</td>
<td>600</td>
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<td></td>
<td>Fiber, AS</td>
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<td>George DeRuyter and Sons Dairy</td>
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<td>Fiber, DAF, NDN</td>
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<td>Farm Power Rexville</td>
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<td>Farm Power Lynden</td>
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<td>Fiber</td>
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<td>Enumclaw WA</td>
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<td>Coldstream Farms</td>
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<td>Fiber, DAF, CW</td>
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</table>
Anaerobic Digestion-WA Example

Commissioned 2004—Starting its 15th year of service. Data for last 6-months:

- 529 KW grid-electricity (445 homes)
- ~3,400 MT CO$_2$eq/year in carbon offset
- ~15,000 GPD of co-digestion treatment
- ~7,500 yd$^3$ fibrous bedding for cows
Anaerobic Digestion-WA Example

Commissioned 2012—Starting its 7th year of service. Data for last 6-months:

- 545 KW grid-electricity (448 homes)
- ~8,000 MT CO$_{2}$eq/year in carbon offset
- ~7,500 GPD of co-digestion treatment
- ~18,000 yd$^3$/year bedding/sales
Fiber Bedding/Soil Amendment

A

Engine building
Digester

B

Fiber building
Primary slope screens
Secondary slope vibrating screens
Primary fiber piles
Secondary fiber piles

REGENIS, LLC
Reimagining Renewable Resources
Fine Solids/Nutrient Separation

“We invested in the advanced solids/nutrient system because the future of the dairy industry is evolving, and the needle is moving towards nutrient management systems as a key element in creating a closed loop, sustainable farm where nothing goes to waste, and we steward the land with utmost care so it can feed future generations.”

Mitch Moorlog, General Manager Edaleen Dairy

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Nitrification/Denitrification

An existing dairy lagoon can be emptied and cleaned for insertion of floating baffles, micro-aerators, and recycle pumps to install a relatively low-cost NDN system on a dairy to **convert appropriately pre-treated liquid ammonia-N** to non-reactive nitrogen gas.
Filtered Water for Discharge

- **25% v/v**
- **33% v/v**
- **43% v/v**

- **TSS < 3 mg/L**
- **BOD < 25 mg/L**
- **F coliform <2 CFU/100 mL**
- **TN < 30 mg/L**
- **TP <0.01 mg/L**
Conclusion

• AD of dairy manure a ‘hot topic’ right now due to potential to produced pipeline quality RNG with a very low carbon index score (-250 MJ/g CO$_{2e}$)
  • Important for state to continue to incentivize projects, credits, access

• Numerous benefits of AD—carbon mitigation, renewable fuel production, odor reduction, pathogen reduction, organic stabilization, fibrous solid by-product, and local/regional organic waste reduction option

• Nutrient partitioning and nutrient conversion commercially available—concern is affordability
  • Import for state to incentivize with cost shares, nutrient trading, biofertilizer credits, tax breaks, etc.
Questions?

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