

# Dairy-Based AD and Nutrient Recovery Activities in WA State

Puget Sound Nutrient Forum  
Green River Community College  
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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



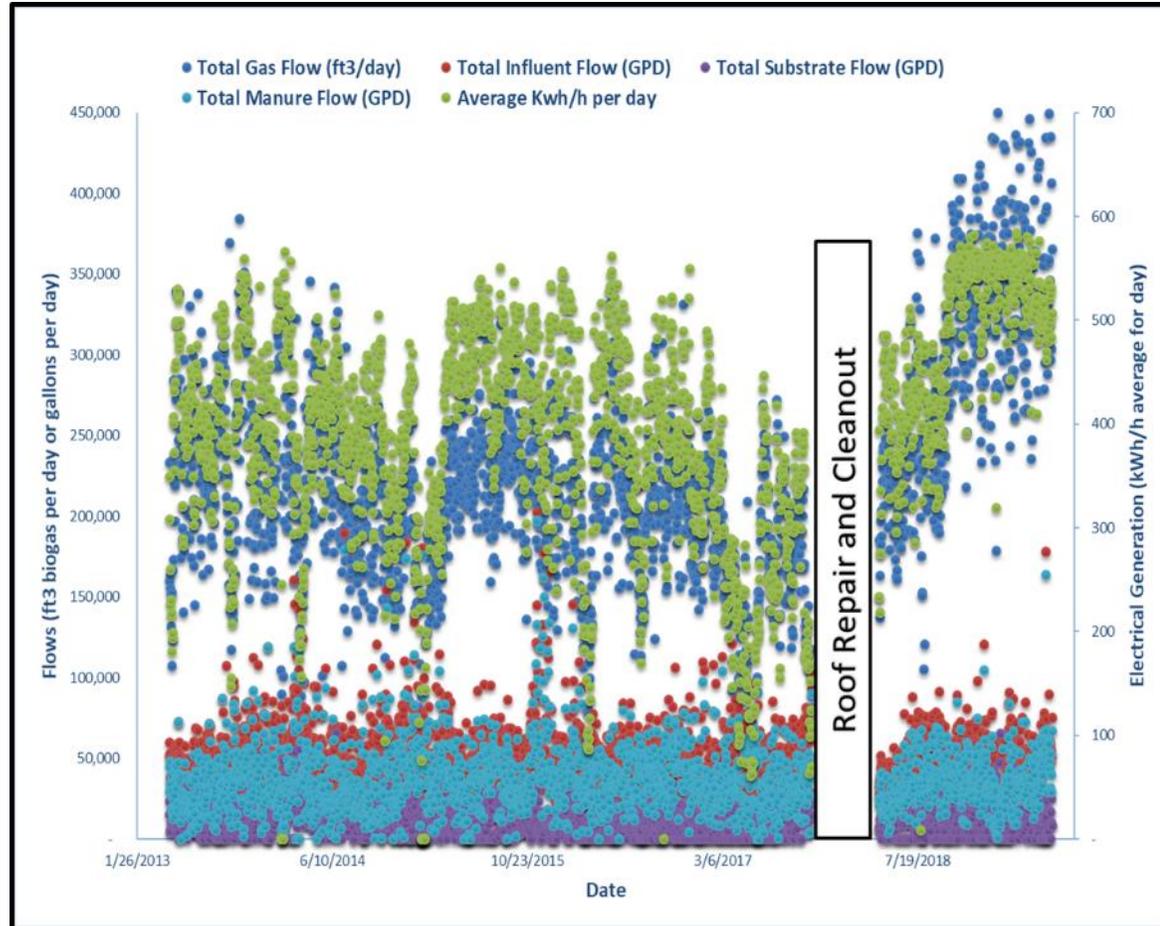
- Anaerobic Digesters
- Agricultural Waste Water Treatment
- Operations and Maintenance

# COMPANY INFORMATION

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

Project	Location	Flow (GPD)	Installed KW	Full O&M	RNG Conversion	Nutrient Recovery
Vander Haak Dairy	Lynden WA	45,000	600	✓		Fiber, AS
George DeRuyter and Sons Dairy	Outlook WA	132,000	1200		✓	Fiber, DAF, NDN
Dry Creek Dairy	Hansen ID	210,000	2250	✓		Fiber
Big Sky Dairy	Gooding ID	141,000	1420	✓		Fiber
Qualco Energy Corporation	Monroe WA	66,000	450			Fiber
Farm Power Rexville	Mt. Vernon WA	45,000	750			Fiber
Farm Power Lynden	Lynden WA	70,000	750			Fiber
Double A Dairy	Jerome ID	500,000	4500	✓	✓	Fiber
Farm Power Tillamook	Tillamook OR	60,000	1000			Fiber
Edaleen Cow Power	Lynden WA	75,000	750	✓		Fiber, DAF
Rainier Biogas	Enumclaw WA	50,000	1000			Fiber, AS
Farm Power Misty Meadow	Tillamook OR	54,000	750			Fiber
Pixley Biogas	Pixley CA	55,000	Thermal			Fiber
Coldstream Farms	Deming WA	20,000	---			Fiber, DAF, CW

# Anaerobic Digestion-WA Example

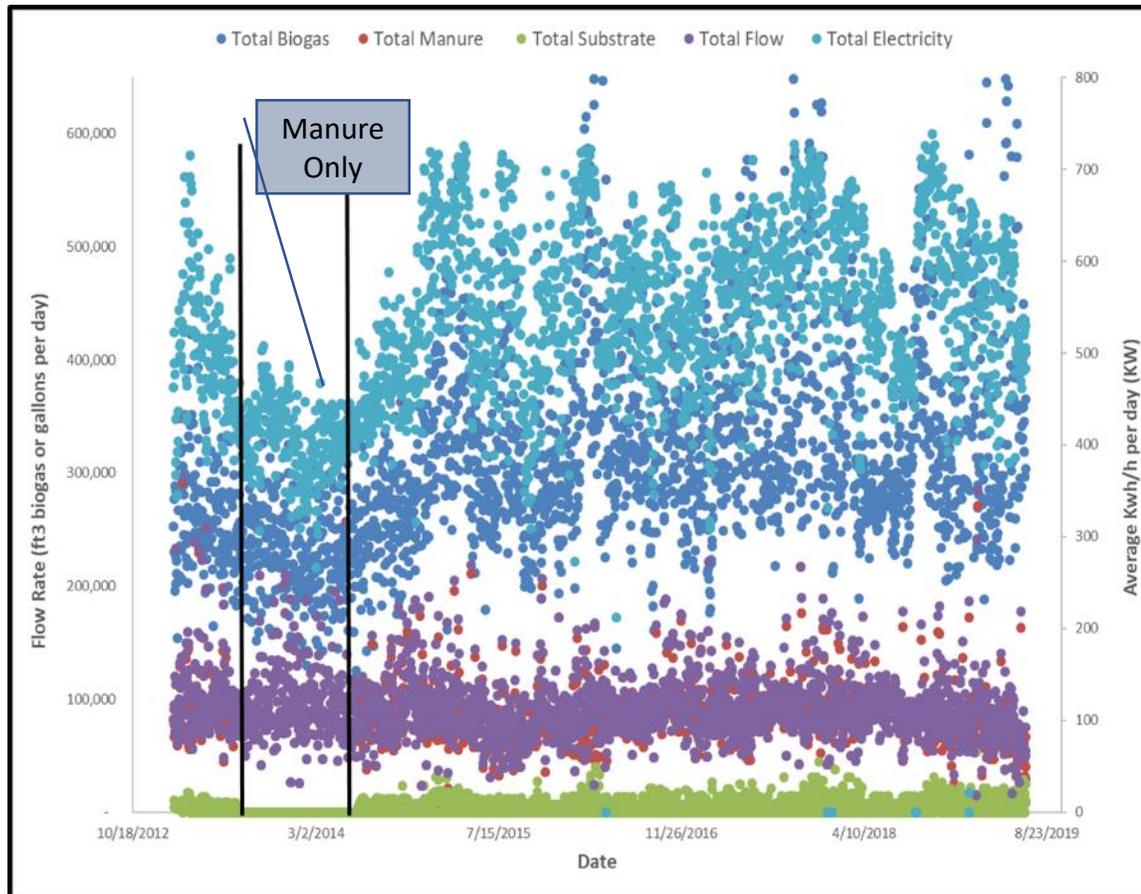


Commissioned 2004—Starting its 15<sup>th</sup> year of service. Data for last 6-months:

- 529 KW grid-electricity (445 homes)
- ~3,400 MT CO<sub>2eq</sub>/year in carbon offset
- ~15,000 GPD of co-digestion treatment
- ~7,500 yd<sup>3</sup> fibrous bedding for cows



# Anaerobic Digestion-WA Example

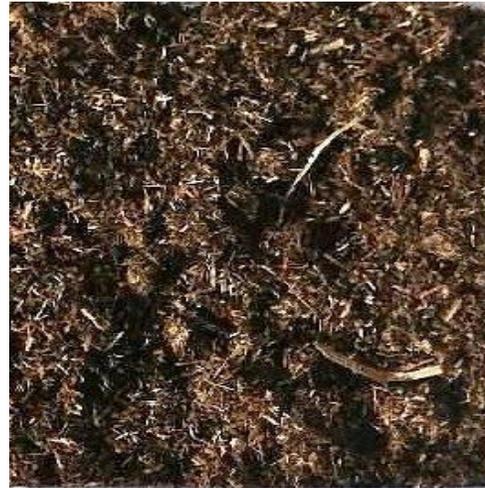
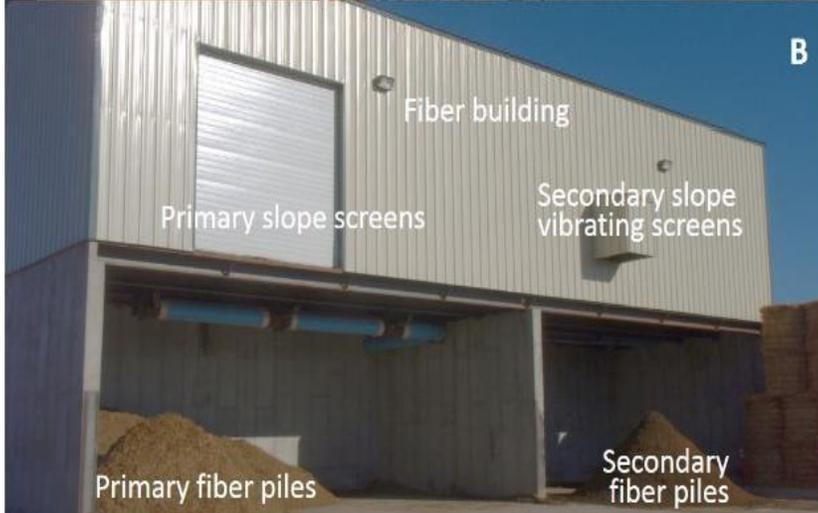


Commissioned 2012—Starting its 7<sup>th</sup> year of service. Data for last 6-months:

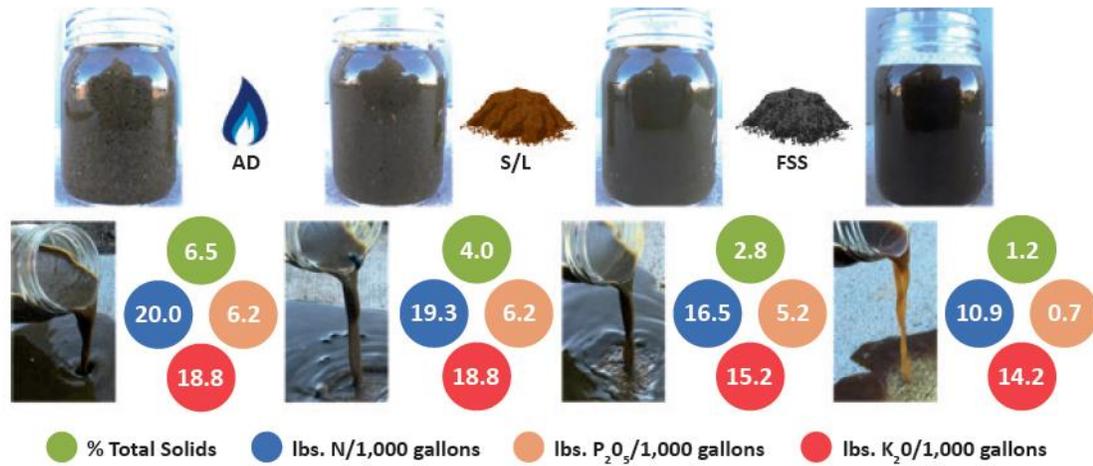
- 545 KW grid-electricity (448 homes)
- ~8,000 MT CO<sub>2eq</sub>/year in carbon offset
- ~7,500 GPD of co-digestion treatment
- ~18,000 yd<sup>3</sup> /year bedding/sales



# Fiber Bedding/Soil Amendment



# Fine Solids/Nutrient Separation



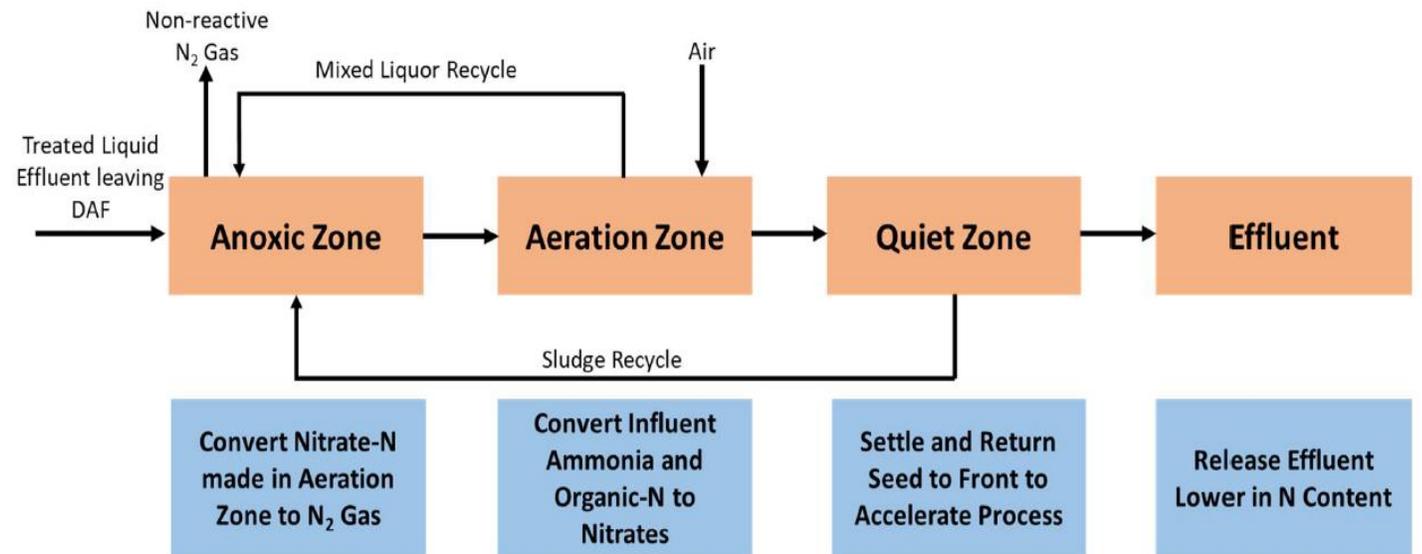
*"We invested in the advanced solids/nutrient system because the future of the dairy industry is evolving, and the needle is moving towards nutrient management systems as a key element in creating a closed loop, sustainable farm where nothing goes to waste, and we steward the land with utmost care so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



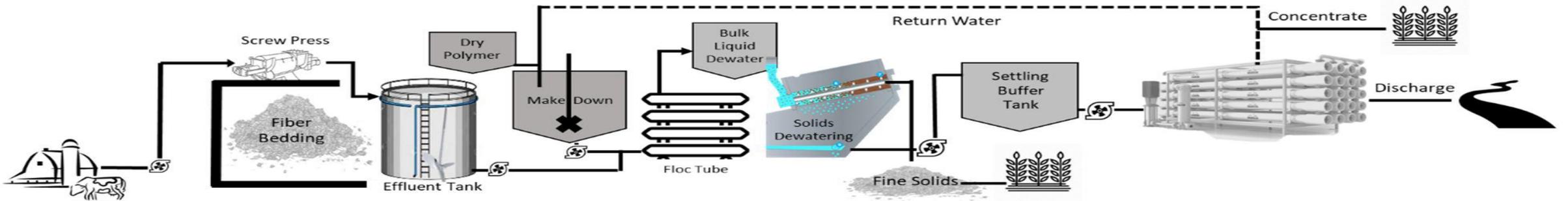
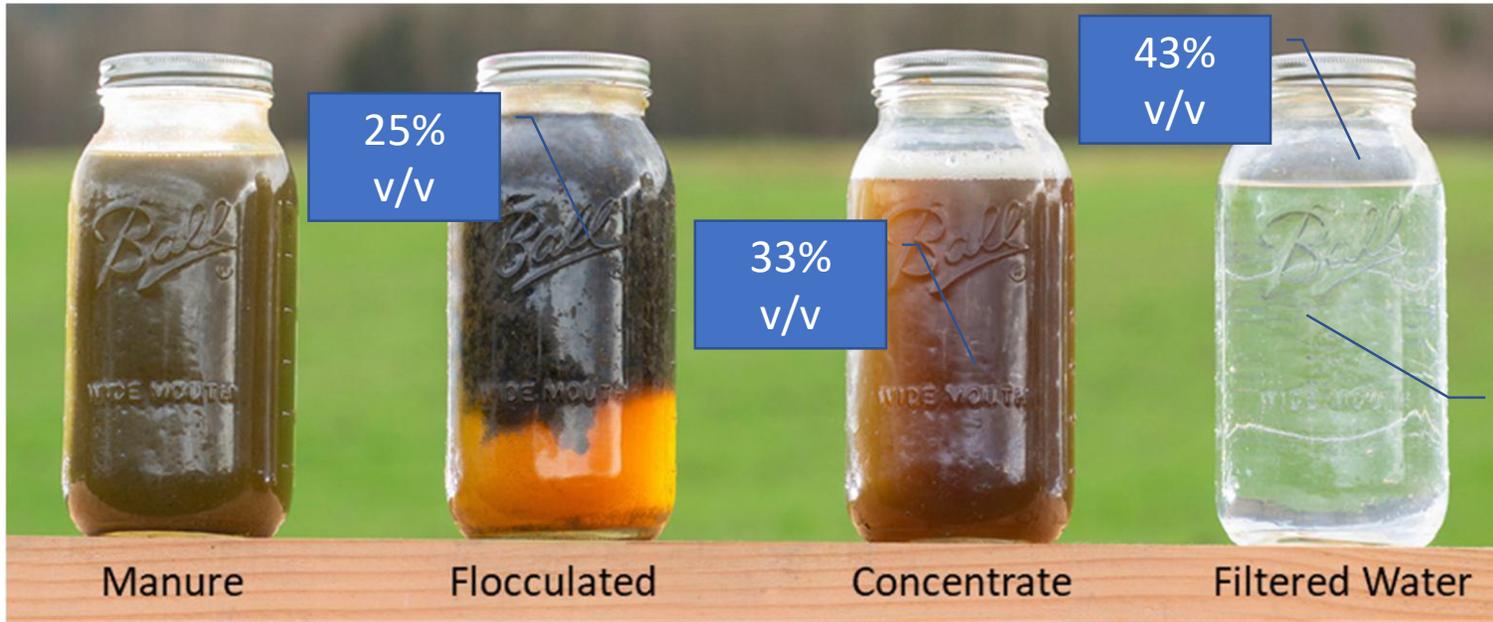
# Nitrification/Denitrification



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



# Conclusion

- AD of dairy manure a 'hot topic' right now due to potential to produce pipeline quality RNG with a very low carbon index score (-250 MJ/g CO<sub>2e</sub>)
  - 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
  - Important for state to incentivize with cost shares, nutrient trading, biofertilizer credits, tax breaks, etc.

Questions ?

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