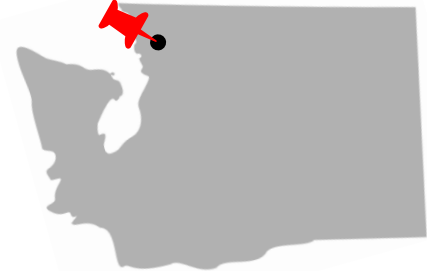
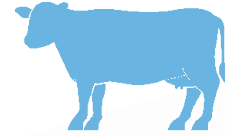


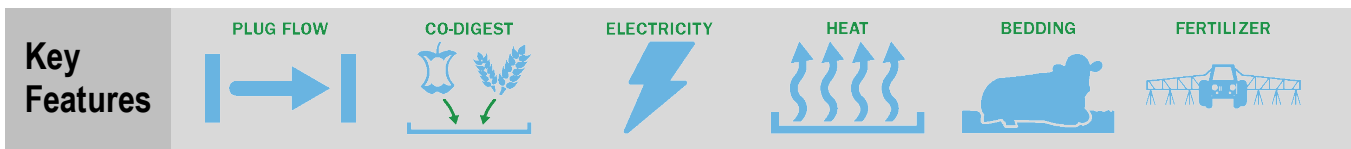
Project Profile: Vander Haak Dairy

DAIRY



Lynden, WA

Photo Credit: Regenis LLC



Highlights

- First dairy with an anaerobic digestion system in the state of Washington – now operating for over 20 years.
- Environmental benefits include production of renewable electricity for use within EVs, partial stabilization of the manure for reduction in pathogens and odors, as well as production of animal bedding and a valued liquid fertilizer.
- The farm receives revenue from sale of electricity, LCFS credits, livestock bedding, and tipping fees.

The AD system at Vander Haak Dairy co-digests dairy manure and off-farm organics to produce electricity, livestock bedding, and fertilizer, and their operations help to reduce odors and pathogens.

Background

In 2004, Vander Haak Dairy became the first dairy in the state of Washington to install a digester. Regenis LLC and its parent company Andgar Corporation developed the project in partnership with Washington State University’s Center for Sustaining Agriculture and Natural Resources. In addition to the manure from the farm’s 700-cow dairy herd, the digester accepts off-farm organics from local processors.

Ongoing digester system updates have allowed the farm to increase its power output, reduce odors, and produce value-added products. Presently, the digester treats approximately 45,000 gallons per day of influent comprising roughly 40% by volume, off-farm organics. The digester produces 300 SCFM of biogas, producing 500 KW of power in their 600 KW nameplate IC engine, with the excess biogas flared. All electricity is exported to the grid. Revenues are the tipping fees, electrical sales from Puget Sound Energy PPA, and LCFS credits for fueling of EVs.

“If dairy farming on the West Coast is to survive, we need to move ahead with projects like this.”

— Darryl Vander Haak,
Vander Haak Dairy

About the Digester System

Vander Haak Dairy's digester has served as a testbed for numerous technologies being developed or vetted by Regenis, Washington State University and other academic and industry partners. Vander Haak Dairy digester has and continues to open its doors to numerous annual extension field days and school/university/NGO trips and visits.

Manure at the main dairy is scraped into a receiving pit, where it is pumped underground approximately a mile to the digester facility that is located near a main road for ease of off-farm organics receipts. Off farm organics are delivered to a substrate pit which meters the organics into the manure stream for entry to the digester. The influent is digested in a mesophilic mixed plug-flow digester (DVO, Chilton WI). During the digestion process, the influent is heated through internal heat exchangers that transfer recovered engine heat to the manure for maintenance of the 100F temperature. In addition, a portion of the produced biogas is recycled in a patented manner to allow for axial mixing of the flow while maintaining forward motion of the plug for maintenance of effective mixing as well as first-in/first-out plug flow hydraulic retention (HRT).

Biogas generated from the digester is burned in an internal combustion (IC) engine set, with a nameplate capacity of 600 KW. Approximately 40% percent of the heat from the engine is recovered and used to heat the digesters, with excess used to heat a youth basketball facility and/or released to the air. Effluent from the digester is processed across a screw press for separation of a solid product for use as animal bedding and a liquid component that is stored in lagoons prior to use as a crop fertilizer.

Electricity generated from the system is sold to a local utility, Puget Sound Energy. Environmental credits are transferred/shared to a contractual partner, Clean Future, who processes the manure credits through the Oregon Clean Fuel Program for production of LCFS credits, with fuel used to operate EVs within the Clean Future fleet. The farm also receives tipping fees from off farm organics brokered by FPE Renewables and received to the site.

Benefits

Vander Haak Dairy advances sustainability in the following ways:



- Protects human health by reducing pathogens in manure through the AD process.
- Improves quality of life in the community through odor reduction.
- Generates enough sustainable electricity to power 900 EVs annually.
- Reduces the use of petrochemical fertilizers by using liquid effluent as a nutrient-rich fertilizer product.
- Diverts organic waste from landfills by co-digesting food waste.
- Generates revenue through sale of electricity.
- Reduces operating costs and energy usage by recovering heat from the generator set.
- Produces natural fertilizer and livestock bedding that is used on the farm, saving costs.
- Generates revenue through sale of LCFS credits.
- Provides an additional stream of revenue via tipping fees from off farm organics.

SYSTEM DESIGN PROPERTIES	
Feedstock Processed	Dairy cow manure; food waste
Throughput	45,000 gallons per day of manure
Digester type	Two-Stage Mixed Plug Flow™
Population Feeding Digester	700 dairy cows
Baseline System	Storage lagoon
System Designer and Developer	DVO, Inc. (Design); Regenix LLC (General Contractor and O&M)
Biogas Uses	Cogeneration
Receiving Utility	Puget Sound Energy and Oregon CFP
Genset Capacity	600 kW

System Financing

The original project was funded via both grants and private funding for a total cost of \$1.2 million. The farm received \$272,000 from U.S. Department of Agriculture 9006 grant funds, \$160,000 from the Washington State University Center for Sustaining Agriculture & Natural Resources Climate Friendly Farming Project, and the remaining \$768,000 was paid for by Vander Haak Dairy, LLC. Since installation, the facility has received additional REAP and government funding for engine/facility upgrades as well as demonstration of emerging technologies.

Recognition

The Vander Haak Dairy digester project was awarded the [2014 Outstanding Achievement in Renewable Energy award](#) from the Innovation Center for U.S. Dairy.

Want to learn more?

View a [case study](#) on Vander Haak Dairy produced for the Animal Agriculture in a Changing Climate project in 2015.

View Northwest Dairy Association's 2021 [Farm Friday profile](#) on Vander Haak Dairy.

For more information about DVO, Inc, visit <https://www.dvoinc.com>.

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Reviewed April 2024