

BIOVIS P500 1-Stage PSA Case Study

Dairy Farm Green Bay, WI

This large Wisconsin dairy milks more than 3,500 cows, utilizing their waste as the biogas source via anaerobic digestion. Family owned and operated, this dairy farm runs the BIOVIS P500 1-Stage gas upgrading plant from BIOFerm Energy Systems on their operation to generate renewable natural gas (RNG) for pipeline injection. BIOFerm currently has several similar facilities contracted and currently in construction throughout the Midwest.



Project Background

Customer: Large dairy farm

Gas Source: Anaerobic digestion of dairy manure

Location: Green Bay, WI

Gas Upgrading Technology: 1-Stage PSA

Operational: February 2021



Skid-Ready PSA Installation Includes:

- Fully integrated control system
- Biogas filtration
- Biological sulfur removal unit
- Biogas compression
- Gas chilling
- Booster blower
- RNG compression



Project Gas Upgrading Specifications

1-Stage PSA: BIOVIS P500

Plant Footprint: 5,000 ft²

Gas Utilization: Pipeline injection

Energy Content: >970 BTU/scf

Pipeline Requirements: Exceeds ANR pipeline specs

Raw Gas Capacity: 500 scfm

Raw Gas: 56% CH₄, 37.5% CO₂, >1,500 ppm H₂S

Product Gas Flow: 280 scfm



Fuel Output

RNG: ~150 million scf/year

Gas Gallon Equivalent: 1.25 million (GGE)/year



BIOVIS

1-Stage PSA

Technology

About BIOFerm Energy Systems

Based in Madison, Wisconsin, BIOFerm Energy Systems is an experienced provider of turnkey renewable energy systems, including anaerobic digestion, gas upgrading, and solar energy. From project conception to commissioning, optimization and training, BIOFerm handles every aspect of the entire process. Our range of biogas solutions allows for seamless integration into a variety of different operations, including landfills, municipalities, wastewater treatment plants, food processors, agricultural operations, and more. BIOFerm is committed to providing successful renewable energy projects to our clients and ensuring that our technologies will produce the results agreed upon by offering the industry's most thorough Performance Guarantee & Warranty.



System Applications

- Landfills
- Wastewater treatment plants
- Municipalities
- Agricultural operations
- Food processors
- Other producers of biogas



Key Features

- Typical CH₄ recovery > 99%
- Pre-manufactured/tested/assembled
- Skid-ready, reducing installation costs
- Capable of meeting stringent pipeline requirements
- In-house VOC removal technology
- No increased CH₄ losses over time
- Low operating costs
- Modular approach
- High processing efficiency



Gas Upgrading System Components

- Biological desulfurization
- Compression
- H₂O removal
- VOC and H₂S removal
- Pressure swing adsorption
- Thermal oxidation
- Fully integrated control system



1-Stage PSA Process Steps

1. Raw biogas is compressed
2. Cooling system removes condensed water vapor
3. Activated carbon removes trace components such as H₂S, VOCs, and siloxanes
4. Conditioned biogas is channeled through PSA adsorbers filled with carbon molecular sieves for adsorption
5. Adsorption removes CO₂, H₂O, NH₃, and parts of O₂ and N₂
6. RNG is produced
7. RNG is injected into the grid, or upgraded to CNG