



# BioReact AD boosts biogas generation 32% and lowers natural gas use 10% at 55-MGD WWTP

## Results Summary

- Biogas generation: +32 percent (212 MWH/month)
- Natural gas consumption: -10 percent (221 MWH/month)
- Volatiles Solids (VS) reduction: +10 percent
- Total Solids (TS) reduction: +9 percent (2.82 dry tons/day)
- Gross savings: \$22,000 per month

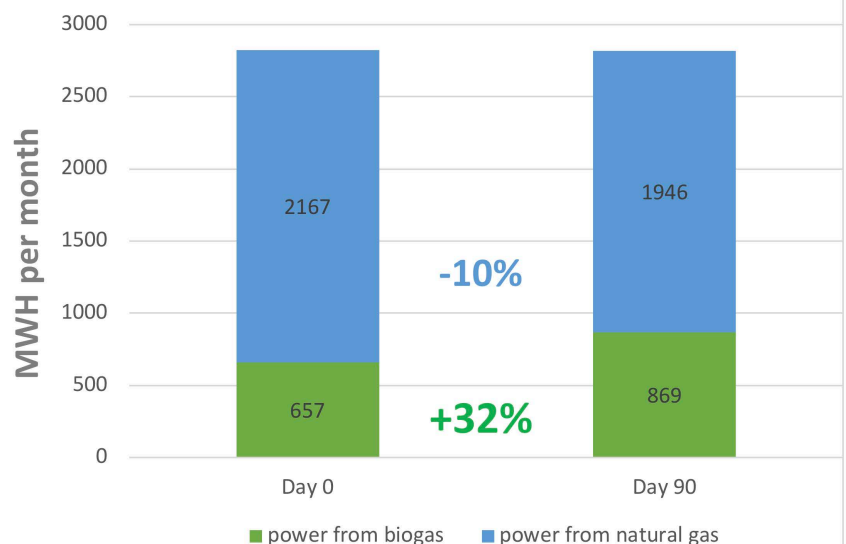
## THE SITE

The 55-MGD wastewater treatment plant has been a leader in the use of renewable energy for wastewater treatment. It currently generates 95-percent of the energy it uses from onsite biogas, purchased natural gas, and solar energy generation. Only 5 percent of its energy requirement is imported from the local power utility.

## THE TECHNOLOGY

Drylet's innovative technology draws from material science and microbiology. Its BioReact AD product is comprised of carefully selected beneficial microbes embedded inside non-toxic particles made of an engineered porous media substrate. The particles are approximately 200-600 µm in size. They protect the microbes, allowing them to thrive and replicate fast so they can be effectively integrated into microbial ecosystems.

## GAS-POWERED ENERGY BREAKDOWN



## THE PROCESS

BioReact AD was added to the digesters starting in November 2018 with a daily dosing of 50 lbs. The goal was to boost biogas and enhance solids reduction. The demonstration took place over 90 days. Training was provided to facility personnel on the best points of product application.



**32%**  
biogas boost



**10%**  
natural gas reduction



**9%**  
Total Solids reduction

## How it works

Anaerobic digestion is a three-step process:

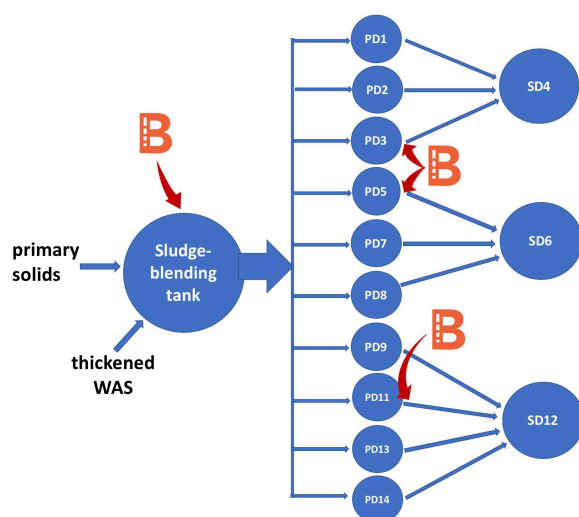
1. **Hydrolysis:** Secondary and primary solids are broken down into smaller molecules.
2. **Acidogenesis** and **acetogenesis:** The products of hydrolysis are converted into short chain fatty acids (e.g. acetate), CO<sub>2</sub> and H<sub>2</sub>.
3. **Methanogenesis:** Archaea (methanogens) convert SCFA, H<sub>2</sub> and CO<sub>2</sub> into methane.

WAS (Waste Activated Sludge) is the portion of the solids that is most difficult to degrade because it is made up of excess bacterial cells from the activated-sludge process. The breakdown of WAS requires the lysis or breakdown of the bacterial cell wall before the interior cellular contents – which are made up of long chain molecules like carbohydrates, proteins and lipids – can be broken down. Drylet's innovative technology enables the enhanced degradation of undigested solid waste (hydrolysis), promoting a reduction in biosolids and an increase in the generation of biogas.

## Demonstration protocol

Drylet proposed the addition of BioReact AD to the primary and secondary digesters to enable up to a 20-30% boost in solids destruction and biogas generation. Its engineers worked with the plant's personnel to develop a comprehensive demonstration protocol to guide the demonstration. **Data was collected on a broad range of operational parameters such as biogas generation, biogas composition, alkalinity, sludge-haulage volumes, solids flows to and from the digesters, energy generation from various sources and natural gas costs.**

BioReact AD was fed to both the 10 primary and 3 secondary digesters in varying amounts, totalling 50 lbs per day (one of the secondary digesters was offline and under maintenance during the demonstration period.) The sludge-feeding arrangement into the secondary digesters is as follows:



Primary solids and thickened WAS are mixed in a sludge-blending tank prior to being fed into the primary digesters. During the feeding of solids into the 10 primary digesters, the overflow of the corresponding quantity of fed raw digester solids (primary digestate) flows into the connected secondary digester.

A single feed point was used for all the primary digesters. The overflow from three selected primary digesters (PD3, PD5, PD11), was used for applying product dosage into the secondary digesters.

## PLANT OVERVIEW

**14 primary and secondary anaerobic digesters** make up the anaerobic digester complex. The primary digester contents are heated and maintained at about 95°F.

**1,000 KSCF (Kilo Standard Cubic Foot) of biogas are generated per day**, with methane making up 60 percent of its content.

**90 percent** of the power used by the facility is generated onsite from biogas and natural gas.

**59,000 pounds of solids are destroyed each day on average** in the process, for a biogas yield of approximately **11.3 SCF per pound of Total Solids**. Average TS and VS destruction in the digesters prior to the addition of the Drylet was 43% and 55% respectively.



Product dosing into the thickened sludge feed to the primary digesters.

## OUTCOME

**Within 90 days, results showed:**  
**32% boost to biogas generation led to a 10% decrease in natural gas procurement + \$10,825 monthly cost savings in solids handling.**  
**Total gross monthly savings: \$22,000**



contact info: [sales@drylet.com](mailto:sales@drylet.com) | +1.346.980.9570