

## CASE STUDY

# H<sub>2</sub>S sensor optimizes odor emissions control at Vesthimmerland Biogas

Vesthimmerland Biogas wanted an alternative to grab sampling for measuring the plant's odor emissions. To achieve this, two SulfiLogger™ H<sub>2</sub>S sensors were installed in the CO<sub>2</sub> discharge stream. This eliminated the plant's need for manual grab samples and costly tests by external bodies, and the sensors' real-time data furthermore provided valuable insights into biofilter and scrubber performance.

## Background

Hydrogen sulfide (H<sub>2</sub>S) odors pose a significant challenge in biogas operations as they may cause complaints from nearby communities surrounding a biogas plant. If this challenge isn't addressed, it may trigger municipality-initiated control measures by certified third bodies, burdening the biogas plant and potentially resulting in a shutdown. Hence, accurate measurements of H<sub>2</sub>S emissions are essential for efficient management and regulatory compliance in biogas operations.

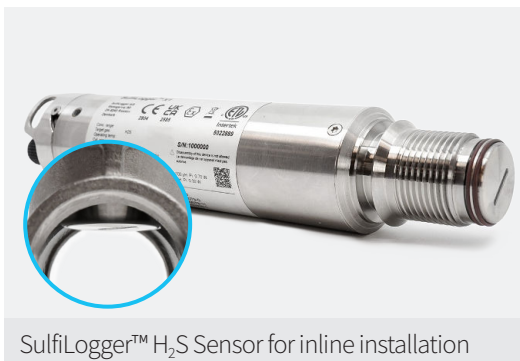
## Challenge

Vesthimmerland Biogas, an upgrading biogas plant supplying renewable natural gas to the Danish natural gas network, faced a challenge stemming from inefficient monitoring of H<sub>2</sub>S emissions. The inefficiency arose from the plant's reliance on time-consuming grab sampling techniques, which failed to provide real-time insights into emission trends. Consequently, the plant lacked a clear

picture of the trend in H<sub>2</sub>S emissions.

Flemming Nielsen, Operations Manager at Vesthimmerland Biogas, explained:

*"Avoiding odor issues for the neighborhood and continuously emitting desulfurized gas was critical for the plant. However, relying solely on grab sampling posed difficulties. For instance, conducting measurements on Monday and then again on Thursday meant we lacked crucial data in between that helped reveal the trend."*



SulfiLogger™ H<sub>2</sub>S Sensor for inline installation

## Industry

Biogas

## Business needs

- ▶ Better odor emissions setup uncovering H<sub>2</sub>S trends with minimal manual labor
- ▶ Prevent external odor tests

## Solution

2 SulfiLogger™ H<sub>2</sub>S sensors measuring continuously in the CO<sub>2</sub> discharge stream

## Benefits

- ▶ Fully automated odor emissions monitoring with real-time data and minimal sensor maintenance
- ▶ No need for external odor tests
- ▶ Reliable insights into the performance of bioscrubber and biofilter

This challenge underscored the importance of implementing a simple, robust, and precise H<sub>2</sub>S monitoring solution capable of providing real-time data throughout the biogas process.

### Solution

To avoid being dependent on grab sampling and to get a more thorough understanding of the issue, Vesthimmerland Biogas installed two SulfiLogger™ H<sub>2</sub>S sensors in the CO<sub>2</sub> discharge stream. One sensor was placed after an H<sub>2</sub>S scrubber, while another sensor was placed in the exhaust following a biofilter. Both sensors were installed inline, continuously monitoring directly in the pipe in wet and anoxic conditions with no sample conditioning required. The sensors were connected to the existing SCADA system via a 4-20 mA loop power connection. The sensors were calibrated by the local operators at three-month intervals in accordance with the manufacturer's specifications. Before calibration, the sensors were cleaned with water.

### Results

After implementing the two SulfiLogger™ H<sub>2</sub>S sensors, Vesthimmerland Biogas experienced significant benefits in odor control and operational efficiency. Real-time data provided by the sensors enabled

the plant to demonstrate its adherence to emissions standards, thereby eliminating the need for costly sample controls imposed by external regulatory bodies.

Flemming Nielsen, also emphasized the importance of the sensors' ease of use and versatility:

*"The ability to service the sensors ourselves is crucial for ensuring smooth operations."*

Additionally, the real-time data from the sensors benefited by providing insights into the performance of the scrubber and the biofilter. This capability allowed Vesthimmerland Biogas to make timely adjustments, ensuring optimal performance and minimizing the risk of equipment damage.

The plant thus achieved not only improved regulatory compliance of odor emissions, but also enhanced operational efficiency and equipment longevity.

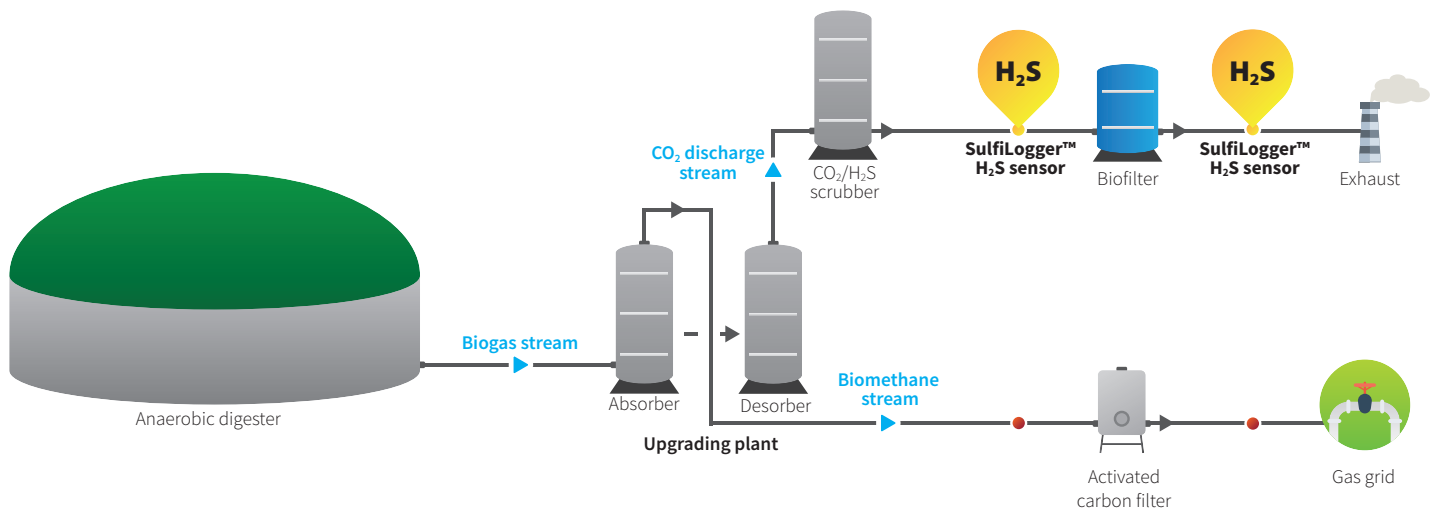


## Vesthimmerland Biogas

Vesthimmerland Biogas supplies renewable natural gas to 18,000 households, handling 275,000 tons of biomass annually.

The plant is a biogas upgrading plant, where CO<sub>2</sub> is removed from the biogas and the upgraded biomethane is supplied to the nationwide Danish natural gas grid.

The plant uses a thermophilic process and uses various feedstock including manure, energy crops, and residual industrial products.



The two SulfiLogger™ H<sub>2</sub>S sensors are installed directly in-pipe in the wet gas in the CO<sub>2</sub> discharge stream after the scrubber and after the biofilter. Vesthimmerland Biogas has a total of 4 SulfiLogger™ H<sub>2</sub>S sensors installed. The two other sensors - indicated by the red dots in the illustration - are used for optimizing the performance of the plant's activated carbon filters in the upgraded biomethane stream. This application is explained in a separate case story by SulfiLogger.