



# Biogas Upgrading Solutions for desulfurization

Greenlane™ **Cascade H<sub>2</sub>S** product line delivers a robust and cost effective regenerative biogas desulfurization solution where the goal is low operating expenses.



# Removing hydrogen sulfide from biogas more efficiently and cost effectively

Greenlane™ **Cascade H<sub>2</sub>S** product solution is an established, cost effective regenerative desulfurization system for applications with higher flow and higher concentrations of hydrogen sulfide.

All biogas contains hydrogen sulfide which must be removed to mitigate its impact to health, safety, the environment, and the engines that burn the biogas or the upgrading equipment that turns biogas into clean, high-purity, low-carbon biomethane, or renewable natural gas (RNG) that's ready for pipelines.

## Cascade H<sub>2</sub>S important benefits

- **Improves uptime and economics:**  
Easy to install, operate and removes many of the operational issues and costs that come with traditional biological scrubbing and media-based H<sub>2</sub>S removal systems.
- **Protects valuable assets:**  
Extends the life of engines or upgrading plants by safely and efficiently removing hydrogen sulfide and other contaminant that can damage equipment.

## → How Cascade H<sub>2</sub>S works

1. biogas feeds into the bottom of a scrubbing tower where it flows, countercurrent, to a proprietary chemical solution
2. treated gas exits through the top of the scrubber with typically more than 90% of the H<sub>2</sub>S removed
3. sulfur rich solution is regenerated in a separate oxidation tank
4. regenerated solution is transferred from the oxidation tank to a sedimentation tank resulting in separation of elemental sulfur solids
5. clean, regenerated solution returns to the scrubbing tower in a continuous process



Cascade H<sub>2</sub>S installation



## Why regenerative desulfurization?

- for lowest operating expense
- does not require oxygen addition to the biogas, which enables upgrading systems to meet pipeline requirements for RNG
- minimizes pressure drop to improve the overall energy efficiency of the desulfurization process
- can take biogas directly from anaerobic digesters or landfills without need for additional pressurization

Conventional hydrogen sulfide removal solutions – including biological-chemical scrubbers or media-based systems – may be sensitive to upsets in operating conditions or have high operating and maintenance costs.



Indoor installation for extreme ambient conditions

## Cascade H<sub>2</sub>S operating range

Typical Flows (Nm <sup>3</sup> /h)	Typical Flows (scfm)	Typical H <sub>2</sub> S levels (ppmv)
250-5000	150-3100	up to 3000*

\* contact us for higher H<sub>2</sub>S levels.

- ⓘ Please contact us to size your system.

## The Cascade H<sub>2</sub>S advantage

- + No biological process involved
- + No direct addition of oxygen to biogas
- + Easy to install and operate
- + Capable of ultra-high H<sub>2</sub>S levels
- + High uptime
- + Produces sulfur-rich, field spreadable fertilizer
- + 24/7/365 on-call technical support
- + fast startup

## Your trusted biogas upgrading partner



Greenlane Renewables is a leading global provider of integrated biogas upgrading systems, with more than 140 installations worldwide to date. We believe renewable natural gas is the most relevant renewable energy to support the decarbonization of commercial transportation and the natural gas grid.

Greenlane™ **Cascade suite of technologies** and products produce clean, low-carbon and carbon-negative RNG, creating value from organic waste at landfills and water recovery facilities, agricultural, food and organics. With water wash, pressure swing adsorption, membrane separation and proprietary desulfurization products available, Greenlane's commitment is to deliver exactly the right technology and level of service to meet our customers specific biogas upgrading needs and objectives.

## Our services:

- 24/7 helpline
- Installation training, consulting, inspection
- Operator training and support
- Commissioning and performance testing
- Service and performance reporting
- Preventative and corrective maintenance
- Performance data analysis
- Options for service/maintenance contract
- Remote monitoring and management

For more information, visit [greenlanerenewables.com](https://greenlanerenewables.com)

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# #1

in global  
supplied capacity

# 140+

upgrading  
systems deployed

# 35+

years  
experience

# 19

countries  
supplied