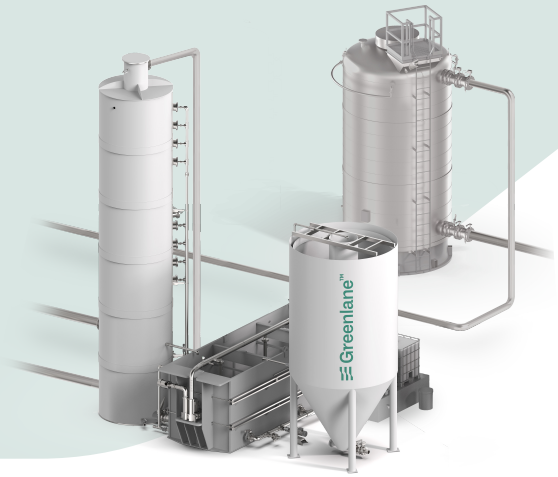
Greenlane™

# Cascade $H_2S$
# Desulfurization for Biogas Upgrading Systems




## Low-cost and reliable regenerative bulk $H_2S$ removal for anaerobic digestion system biogas to meet pipeline specifications.


*Cascade $H_2S$ installation*

No oxygen introduced, therefore avoiding risk of pipeline shut out.

Consistent, reliable, and fast startup as it does not rely on sensitive biological processes.

Simple, scalable, and easily integrated design is inherently cost efficient.

## Standard models available to cover typical flows and $H_2S$ levels.

| Typical Flows ($Nm^3/h$) | Typical Flows (scfm) | Typical $H_2S$ levels (ppmv) |
|---|---|---|
| 250~2,500* | 150~1,550* | up to 10,000* |

**Higher flow rates can be accommodated with multiple units.*

Please contact us to size your system. Cold weather packages available.

## Cascade $H_2S$ Advantages

**Lowest Cost Solution**

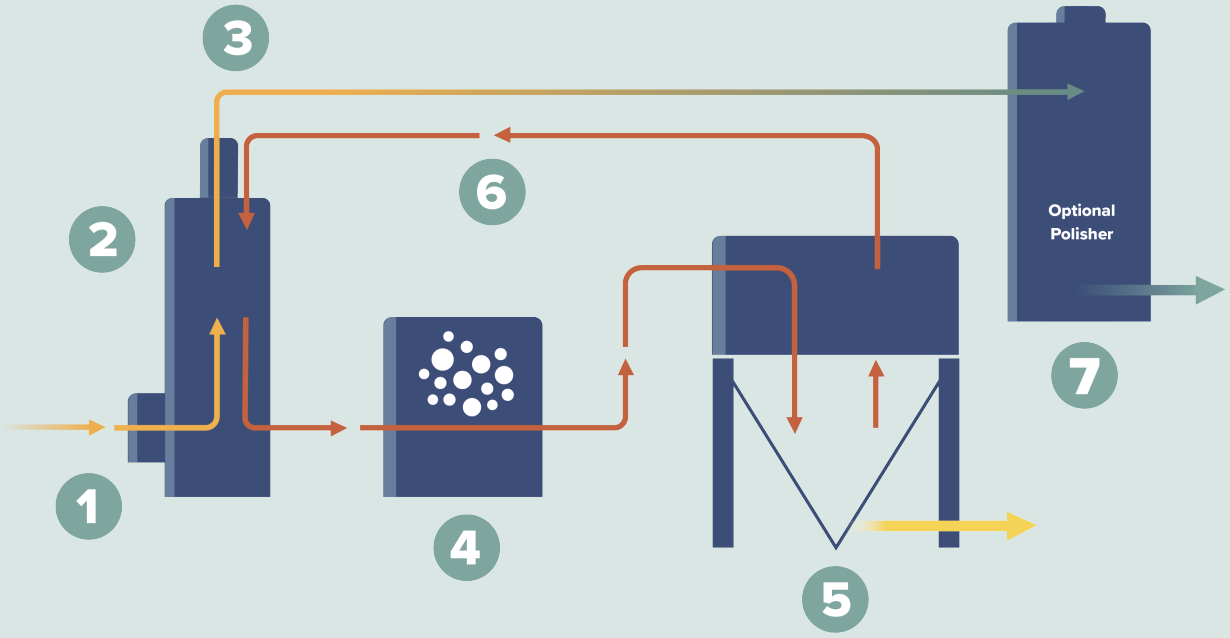
- **Prevents pipeline shut outs**
  Ensures upgrading systems can meet pipeline requirements for RNG, because no oxygen is added.
- **Performant and reliable**
  Highly effective bulk removal of $H_2S$, robust to variations of flow, $H_2S$ concentration and ambient conditions. Quick startup and easy operation maximizes productivity.
- **Low costs**
  Designed specifically for biogas with cost-focused manufacturing. The regenerative process operates at low pressure allowing the use of cost-optimized materials, allowing for minimized CapEx and OpEx.

## Alternative Technologies

- **Passive media systems**
  High operational costs from frequent media replacement and production interruptions.
- **Biological systems**
  Complex operation, slow startup times, and vulnerability to microbe mortality.
- **Oxygen injection**
  Risk of pipeline shut outs due to strict North American oxygen limits in RNG.

## How Cascade $H_2S$ works

1. Raw biogas is taken from the digester at low pressure and enters the scrubbing tower.
2. Biogas flows countercurrent to a regenerative chemical. No oxygen required.
3. Treated gas exits through the top of the scrubber with less than 100ppm $H_2S$ content.
4. Sulfur rich solution is regenerated in a separate oxidation tank.
5. Regenerated solution flows from the oxidation tank to a sedimentation tank resulting inseparation of elemental sulfur solids.
6. Clean, regenerated solution returns to the scrubbing tower in a continuous process.
7. Gas treated by Cascade $H_2S$ is further treated to pipeline spec (≤ 4ppm) by the optional polisher.




## The Greenlane Advantage

- 160+ installations globally
- 24/7/365 on-call technical support
- Preventative and corrective maintenance
- Commissioning and performance testing
- Operator training
- Service contract options



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