

# Biogasclean has the optimal solution for your biogas plant

**BIO**  
GASCLEAN

the key to efficient  
and successful  
utilization of biogas



Plant: *Nature Energy  
Maanåon  
Denmark*

Capacity: *600 m<sup>3</sup>/h  
(off-gas from  
upgrading)  
7,500 ppm H<sub>2</sub>S*

**Biological removal of H<sub>2</sub>S from biogas**



Plant: Perdana Palm Oil Mill Indonesia  
Capacity: 1200 m<sup>3</sup>/h  
3,000 ppm H<sub>2</sub>S

## Low operating costs coupled with high availability

Biogasclean's H<sub>2</sub>S removal process is 100% biological and operating costs 70-80% lower than chemical gas cleaning systems as Biogasclean's systems neither consume caustic soda nor require frequent media replacement such as iron sponge, activated carbon, etc. The availability is above 98%. The only residue from the process is a valuable liquid fertilizer.

Therefore, a gas cleaner from Biogasclean is not only economically but also an environmentally sound investment.

### How it works

The biological H<sub>2</sub>S removal process requires oxygen. Therefore, atmospheric air is injected into the raw biogas at the inlet to the scrubber tank.

The packing media houses the bacteria which oxidize H<sub>2</sub>S to sulfate and elemental sulfur. The scrubber liquid is trickling down the packing media and provides moisture and nutrients for the bacteria. The effluent from the process is a liquid fertilizer which is discharged into the outflow from the anaerobic digester.



### Biogasclean ECO

This type is for small H<sub>2</sub>S loads. The gas cleaner can be loaded on a truck or shipped worldwide in one forty feet container. The packing media can be cleaned inside the tank.



### Biogasclean BASIC

This type is for smaller and larger H<sub>2</sub>S loads. It is the cheapest model as the tank is without grating and not designed for being filled with water and the control unit skid mounted. The packing media shall be moved outside the tank for cleaning.



### Biogasclean QSR

This type is for smaller and larger H<sub>2</sub>S loads. We manufacture fiberglass tanks in several countries to reduce transportation costs. The packing media can be cleaned inside the tank with the QSR® - Quick Sludge Removal - system.



### Biogasclean OS

This type is for large H<sub>2</sub>S loads at a.o. ethanol distilleries and paper mills. The diameter of the tank is so big that it is not possible to transport from a workshop; therefore the tank is manufactured on site. The packing media can be cleaned inside the tank with the QSR® - Quick Sludge Removal - system.



### Biogasclean MBR

This type is for cleaning of biogas with high H<sub>2</sub>S loads generated on waste waters with high organic loads, i.e. >130,000 mg/l COD before anaerobic digestion. Depending on the volume of H<sub>2</sub>S we use either prefabricated tanks or field erected tanks. The packing media is floating in the scrubber liquid and no special cleaning is required.

Plant: Thai Beverage  
Energy  
Thailand

Capacity: 600 m<sup>3</sup>/h  
8,000 ppm H<sub>2</sub>S



### **Biogas - renewable energy from organic waste streams**

Biogas is a byproduct from anaerobic digestion of organic waste streams at livestock farms, food processing plants, breweries, palm oil mills, starch factories, ethanol distilleries, paper mills and other waste water treatment plants. Biogas is a renewable energy source and contains 50-70% methane (CH<sub>4</sub>), 30-50% carbon dioxide (CO<sub>2</sub>) and 0.1% to 3% (1,000 to 30,000 ppm) hydrogen sulfide (H<sub>2</sub>S). When the H<sub>2</sub>S is removed biogas can substitute oil and gas and be used for power and heat production or upgraded to natural gas quality.

### **Why it is necessary to reduce the H<sub>2</sub>S**

H<sub>2</sub>S will form sulfur dioxide (SO<sub>2</sub>) and sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) during combustion which results in a very aggressive corrosion. The corrosion will literally reduce the lifetime of the downstream equipment by years! This is why gas engine manufacturers require that H<sub>2</sub>S in the clean gas must not exceed 100-250 ppm. Otherwise, the operating costs for change of engine oil, spark plugs and other maintenance will increase significantly. Furthermore, there will be high costs for repairs and income lost during overhauls and break downs. Air quality standards is another driver as combustion of un-cleaned biogas will result in acid rain from emissions of sulfur dioxide (SO<sub>2</sub>). Also health and safety standards may require H<sub>2</sub>S removal as H<sub>2</sub>S is toxic even in small concentrations.

### **Biogasclean A/S**

*Biogasclean is specialized in biological desulfurization of biogas without the use of chemicals. We develop, manufacture and supply fully automated gas cleaning systems for H<sub>2</sub>S removal combining low operating costs with high availability. Our track record comprises mid 2018 more than 235 plants in operation or under construction in 40 countries. Biogasclean supplies clean gas to more than 540 MW gas engines and boilers and removes sulfur from biogas upgrading units.*



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