

Biological **desulphurization** and **methanation** of biogas and CO₂



Plant: Nature Energy
Maanson
Denmark

Capacity: 600 m³/h
(353 scfm) CO₂
7,500 ppm H₂S



The key to innovative and
efficient production of biogas



Plant: Perdana Palm Oil Mill Indonesia
 Capacity: 1,200 m³/h (705 scfm) biogas
 3,000 ppm H₂S

Low operating costs coupled with high availability

Biogasclean's H₂S removal process is 100% biological and operating costs 80-90% 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.

Why it is necessary to reduce the H₂S

H₂S will form sulfur dioxide (SO₂) and sulfuric acid (H₂SO₄) 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 H₂S 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 (SO₂). Also health and safety standards may require H₂S removal as H₂S is toxic even in small concentrations.



Biogasclean QSR

This type is for smaller and larger H₂S 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 H₂S 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 H₂S loads generated on waste waters with high organic loads such as ethanol distilleries. Depending on the volume of H₂S we use either prefabricated tanks or field erected tanks. The packing media is floating in the scrubber liquid and no special cleaning is required.



Biogasclean BASIC

This type is for smaller and larger H₂S 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 ECO

This type is for small H₂S 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.

Plant: Nature Energy
Holsted
Denmark
Bio E-Fuel
Pilot Plant



Bio E-Fuel

Biogasclean has developed a ground-breaking technology which converts CO₂ from a harmful greenhouse gas to a sustainable green fuel. In the Bio E-Fuel reactor a biological process converts carbon dioxide (CO₂) and hydrogen (H₂) to methane (CH₄). Hydrogen is made from electrolysis of water, which is separated into hydrogen and oxygen. The electrolysis process is powered by wind and solar. The conversion of power to gas or liquid is called Power-To-X (P2X). The most important advantage is that methane – unlike electrical power – can be stored. Methane can replace natural gas and be used for decentralized power and heat production or supplied on the natural gas grid. Methane can also be pressurized to compressed gas for heavy trucks or cooled to liquefied gas for ships. In addition, methane can be processed into green fuel for aircraft and green plastic for the industry.

The lowest hanging fruit is biogas which typically consists of 55-60% CH₄ and 40-45% CO₂. With Bio E-Fuel biogas plants can increase the methane content in biogas to +95%, i.e. the efficiency of biogas production increases by more than 60%! But the Bio E-Fuel technology is not restricted to biogas plants only; it can be applied everywhere where you have a CO₂ source. The biological methanation process is +10 times more efficient than anaerobic digestion. The process is very robust and handles untreated biogas and CO₂ without prior removal of sulfur and other impurities. Furthermore, the biological process takes place at low pressure (<200 mbar or 2.9 psi) and low temperature (<65°C or 149F). Therefore, a Bio E-Fuel system has low operating costs.

Biogasclean A/S

Biogasclean is specialized in biological desulfurization and methanation of biogas. We develop, manufacture and supply fully automated gas conditioning systems combining low operating costs with high availability. Our track record comprises more than 300 plants in operation or under construction in 40 countries. Biogasclean supplies clean gas to more than 650 MW gas engines and boilers and removes sulfur from more than 30 biogas upgrading plants for RNG production.

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GASCLEAN | efficient production of biogas

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