Biogasclean Bio E-Fuel - biological methanation of CO_2

Plant: Nature Energy Glansager, Denmark Bio E-Fuel Plant

Biogasclean has developed a ground-breaking technology which converts CO_2 from a harmful greenhouse gas to a sustainable green fuel. In the Bio E-Fuel reactor a biological process converts carbon dioxide (CO_2) and hydrogen (H_2) to methane (CH_4). Hydrogen is made from electrolysis of water powered by wind and solar. The conversion of power to gas or liquid is called Power-To-X (P2X). A key advantage is that methane – unlike electrical power – can be stored.

The Bio E-Fuel technology can be applied everywhere where you have a CO_2 source. However, biogas plants represent the lowest hanging fruit because the CO_2 flow and the infrastructure for methane production are already available. Biogas typically consists of 55-60% CH_4 and 40-45% CO_2. With Bio E-Fuel biogas plants can increase the methane content in biogas to +97-98%, i.e. the biogas production increases by up to 78%!

The biological methanation process is very robust and handles untreated biogas and CO_2 without prior removal of sulfur and other impurities.

Bio E-Fuel have the following key features:

- **The PTU** – the Process Technique Unit - is the technical house built on site, which contains all technical equipment necessary for safe and automatic operation. The technical equipment are skid mounted and comprise a.o. liquid supply and drain system, heating and cooling system and PLC based control system as well as gas analyzers, gas detectors, fire alarm system, etc.

BIO GASCLEAN | Innovative solutions for efficient production of biogas and e-fuels

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

- **Bio E-Fuel reactors** comprise one or more insulated tanks manufactured in high quality fiberglass or stainless steel. Depending on the volume of CO_2 we use either prefabricated tanks or field erected tanks. Each tank is made with a grating, so it is possible to inspect the tank underneath the packing media. The tank is supplied with ladder and handrail. The tank is so robust that it can be filled with water and designed with the **QD®** - **Quick Decompression - system**.
- **The packing media** is manufactured of plastic. The QD® system makes it possible to decompress the packing media to prevent clogging and channeling of the filter.
- **Gas blowers** and air cooler are located outside.
- **Safety;** there are no gas pipes inside the PTU and the potential risk is limited to small unintended gas leakages from liquid pipes. If the gas detectors in the PTU should measure above 25% of the Lower Explosive Level (LEL) for CH_4 or 20% for H_2 the ignition source is removed by cutting the power supply.
- **Efficient and reliable operation;** the system is automatically controlled by the PLC controller board which reduces the risk for manual errors and operation problems. The main function is to provide stable conditions for the biological process and to ensure safe and reliable production. The signals are available in the control room and can be accessed for remote process control.
- **Low operating costs;** as the Bio E-Fuel system operates at low pressure (<200 mbar or 2.9 psi) and temperature (<65°C or 149°F) the power consumption is very low.

Biogasclean A/S

Biogasclean is specialized in biological desulfurization and methanation of biogas and CO_2. We develop, manufacture and supply fully automated gas treatment systems combining low operating costs with high availability. Our track record comprises +340 plants in operation or under construction in +40 countries. Biogasclean supplies clean gas to +700 MW gas engines and boilers and removes sulfur from +35 biogas upgrading plants for biomethane (RNG).

DENMARK
Biogasclean A/S
Ørbækvej 268
DK-5220 Odense SØ
www.biogasclean.com

Tel: +45 6617 2177
Email: sales-dk@biogasclean.com

THAILAND
Biogasclean (Thailand) Ltd.
331 Moo 2, Unit S1/2
Soi Thetsaban Bangpoo 54
Sukhumvit Rd., T. Taiban, A. Muang
Samutprakarn 10270
Tel: +66 (0)2 395-1157
Email: office@biogasclean.com

USA
Biogasclean Americas Inc.
2800 Post Oak Blvd. Suite 1910
77056 Houston, Texas

Tel: +1 713-894-7992
Email: ces@biogasclean.com

BRAZIL
Biogasclean Brasil Ltda.
Av. Norte-Sul 575, Cambuí
Campinas, Sao Paulo
CEP 13025-320

Tel: +55 19 9 9112 0266
Email: jorge.vsn@biogasclean.com