

During anaerobic digestion, i.e. degradation in the absence of oxygen, organic material is decomposed by bacteria forming biogas, a mixture of CO<sub>2</sub> and CH<sub>4</sub> with trace amounts of H<sub>2</sub>S and H<sub>2</sub>O. The biogas can be used as vehicle fuel, in industrial processes or injected into the gas distribution grid, but first needs to be treated.

GENERON® membrane systems are used to reduce the CO<sub>2</sub> and improve the heating value of the gas. The systems also reduce the H<sub>2</sub>S and H<sub>2</sub>O content. The customized biogas membrane systems (which can also include the feed compressor) are fabricated in our ISO 9000 Certified facilities in Houston, TX while the membrane is fabricated in our Pittsburg, CA facility. GENERON works directly with the client to provide the most efficient and cost effective solution.

The other alternatives for biogas treatment are absorption (water wash) or adsorption (PSA) systems. These systems are complex and have high capital, operating and installation cost compared to membranes.

## The GENERON® Advantage

- **Extensive Experience** - custom designed skids
- **State-of-the-art Membrane** - high recoveries
- **Simple Solution** - no moving parts, minimal maintenance
- **Remote Operation** - Minimal attention required, fully automated systems
- **Minimal Losses** - low HC losses
- **No Chemicals** - environmentally friendly
- **Small Footprint** - easily meet footprint requirements

### RELATED GENERON PRODUCTS:

PSA systems

Instrument air packages

Air and gas compression packages

Blowers

On-site oilfield services—operating personnel and rental equipment

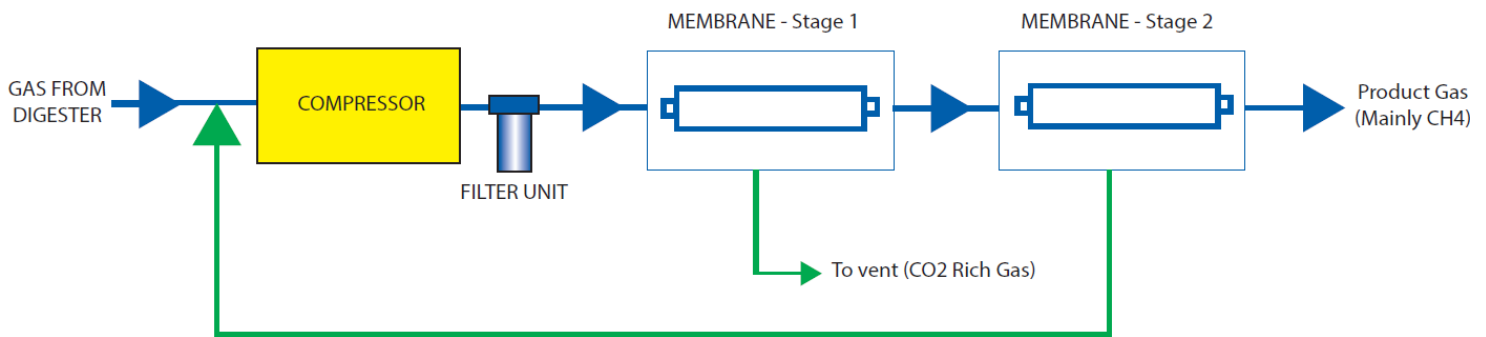
Custom Integrated Skid Packages



# Biogas Treatment

## GENERON® Membrane Technology

In a typical GENERON® biogas membrane system the feed gas is filtered to remove any entrained aerosols and liquids. The gas then enters the GENERON® membrane modules. The CO<sub>2</sub> as well as any H<sub>2</sub>S and H<sub>2</sub>O permeate through the membrane. The non-permeated gas, mainly CH<sub>4</sub>, remains at pressure and is the product gas.



### Advantages of MEMBRANE Systems:

- **No moving parts**, and designed for **remote unmanned operation**
- **Treat a wide range of flow rates**
- **Efficient packaging minimizes space and weight** — ideal for offshore applications
- **Custom designed systems** - maximize total hydrocarbon recovery
- **System flexibility** - Can operate at wide range of flow rates and CO<sub>2</sub> Content

### The System Performance:

- Feed gas pressures up to 2,000 psi (138 bar)
- > 60 vol% CO<sub>2</sub> in feed
- < 2% CO<sub>2</sub> content in product
- > 98% recovery of hydrocarbon gas
- > 90% removal of CO<sub>2</sub>
- Flow rates from 0.01 to 500 MMscfd

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