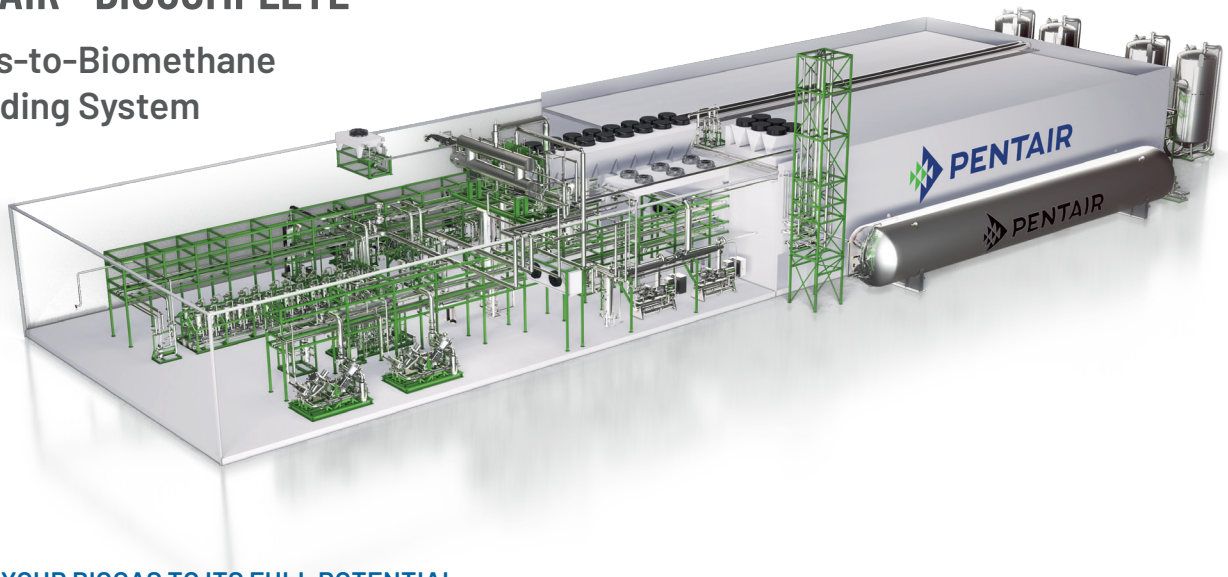


BIOGAS UPGRADING SOLUTIONS

PENTAIR® BIOCOMPLETE

Biogas-to-Biomethane Upgrading System



UTILIZE YOUR BIOGAS TO ITS FULL POTENTIAL

Biogas can be a viable option for producing heat and electricity from organic matter. However, the calorific value of biogas is low, making it a less cost-competitive energy source.¹

Why settle for the modest yields of biogas? Utilize your biogas to its full potential by upgrading it into biomethane.

Pentair BioComplete is a comprehensive approach to upgrading biogas into biomethane. Furthermore, our CO₂ recovery technology, Pentair CO₂Bolt-On recovers the CO₂ waste stream.

HOW IT WORKS

In pre-treatment, water and contaminants are removed from the biogas. The biogas pre-treatment allows for modest contamination levels of hydrogen sulfide (H₂S) and volatile organic compounds (VOC). For bulk removal of H₂S or VOCs, other options are available.

After pre-treatment, the biogas is compressed to the most OPEX and CAPEX efficient pressure that allows for the removal of CO₂. The membranes remove the CO₂ from the methane to meet the required Renewable Natural Gas (RNG) specifications. The resulting biomethane can then be injected directly into the national grid or further processed into biofuels: bio-LNG and bio-CNG.

The separated CO₂ stream is further compressed, cleaned, liquefied, and purified into food-grade quality liquid CO₂.

BIOGAS-TO-BIOMETHANE UPGRADING FOR:

- Gas-to-grid energy source.
- Non-fossil-based biofuels: Bio-LNG and Bio-CNG.

CO₂ recovery outcome:

- Commercial by-product: bio-CO₂.

BENEFITS

- Energy and cost-efficient CO₂ & CH₄ separation.
- Optimize the predictability of biomethane output with Pentair IoT.
- Improve biogas quality with VOC sensor device.
- Peace of mind with service for the complete life cycle of a system.
- Flexibility with plug & play installation.

¹When compared to wind and solar and depending on the type of feedstock used to produce it.²

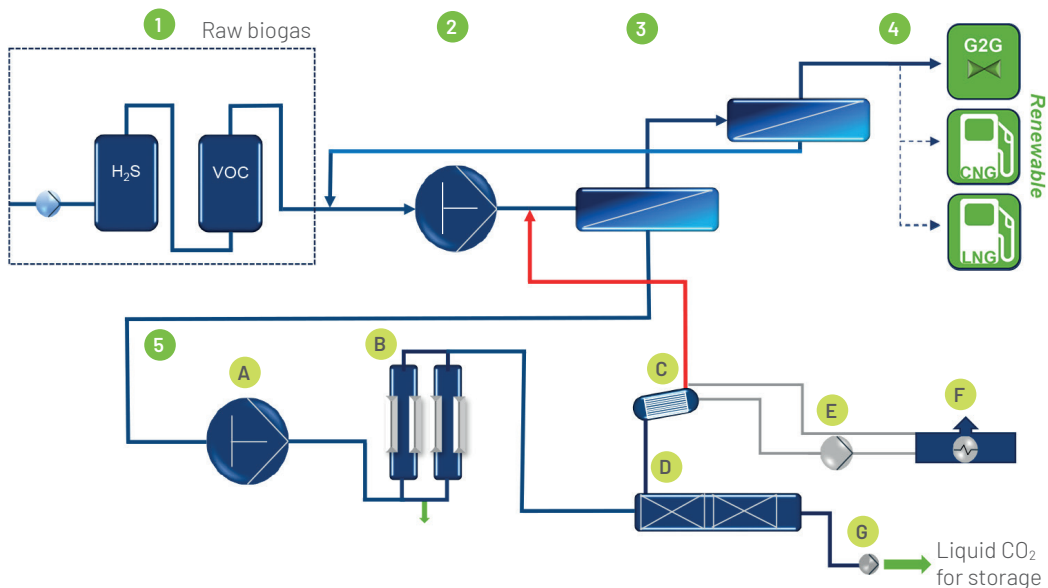
²Report extract: An introduction to biogas and biomethane, IEA, <https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth/an-introduction-to-biogas-and-biomethane>

PENTAIR BIOCOMPLETE

BIOGAS-TO-BIOMETHANE UPGRADING SYSTEM

SCOPE OF SUPPLY

- 1 Pre-treatment biogas
- 2 Biogas compressor
- 3 2-stage membrane unit
- 4 Biogas outlet gas to grid or optional Bio-CNG or Bio-LNG
- 5 CO₂ Recovery:
 - A CO₂ compressor
 - B Activated carbon filter/drier
 - C CO₂ condenser
 - D Stripper/re-boiler
 - E Cooling compressor
 - F Dry cooler
 - G CO₂ pump
- > All parts skid mounted and controlled MCC



CHOOSING THE RIGHT SYSTEM FOR YOU

SYSTEM	BIOGAS CAPACITY	FOOTPRINT (LXWXH)	POWER CONSUMPTION	BIOMETHANE OUTPUT	ADDITIONAL OUTPUT
Pentair BioCompact	400-750 m ³ /h	12.8 x 2.5 x 2.8 m 42 x 8.2 x 9.2 ft	~ 290 Wh/Nm ³	> 90 - 97 % CH ₄	Bio-CNG/ Bio-LNG
Pentair BioPlus	>1000 m ³ /h	20 x 12.5 x 3.6 m 65.6 x 41 x 11.8 ft	~ 235 Wh/Nm ³	> 90 - 97 % CH ₄	Bio-CNG/ Bio-LNG
Pentair BioComplete	>1000 m ³ /h	20 x 20 x 3.6 m 65.6 x 65.6 x 11.8 ft	~ 180 Wh/Nm ³ ~ 220 Wh/kg (CO ₂)	> 90 - 97 % CH ₄	Bio-CNG/ Bio-LNG, Bio-CO ₂

ABOUT PENTAIR

Pentair designs, builds, installs, and services end-to-end membrane-based Biogas Upgrading Solutions that produce biomethane and cryogenic and amine-based CO₂ Capture and Recovery Systems.

Let's work together to explore your biogas upgrading potential.

Visit biogas.pentair.com to find out more.



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