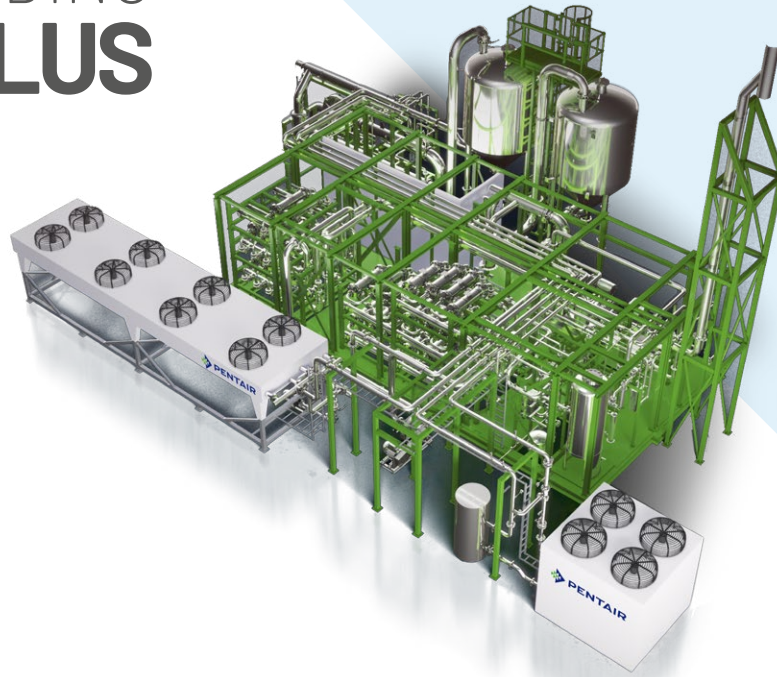
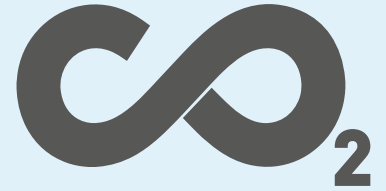


BIOGAS UPGRADING BIOPLUS



MAXIMIZE BIO-METHANE YIELD

Biogas is a key renewable energy source. Pentair is your partner in turning waste streams into sustainable energy solutions and valuable revenue streams.

The advanced approach of turning biogas into bio-methane is realized with Pentair's upgrading solution **BioPlus**, which recovers bio-methane as a replacement for fossil-based natural gas. This highly cost-efficient membrane-based biogas upgrading solution allows for a significantly higher bio-methane yield with low methane slip and low energy consumption. The robust design and our dedicated service teams with 24/7 support (local and remote) provide for the best upgrading system availability.

The bio-methane can be injected into existing gas grids as a sustainable replacement of fossil natural gas or it can be utilized as fuel – either as Renewable Compressed Natural Gas (Renewable CNG) or Renewable Liquid Natural Gas (Renewable LNG). Utilizing bio-methane eliminates fossil fuel based carbon emissions in industrial and domestic environments, transportation, electricity, and heat production.

Did you know that our membrane and amine-based upgrading technologies are both compatible with our efficient CO₂ technologies? Pentair can provide you with the unique opportunity to add another carbon intensity lowering revenue stream to your biogas plant: food-grade CO₂. Needless to say, our products help you control the impurities to produce bio-methane in the most efficient process – with zero methane slip.

BENEFITS

- **Maximized bio-methane yield**
- **Low OPEX with low pressure membrane operation**
- **Low Total Cost of Ownership (TCO)**
- **Increased biogas value with the shift from electricity to bio-methane production**
- **Optional Enclosed Skid solution for ease of installation/relocation and low noise**
- **Small footprint and skid height**
- **24/7 remote service and support for high reliability (availability)**

OPTIONS

- Enclosed Skid plug and play unit
- Biogas blower
- Activated carbon-based bulk pre-treatment (H₂S and VOC)
- Scrubber
- Gas Entry Unit
- CNG compression and storage solutions
- Installation and commissioning services
- Zero methane emission

BIOPLUS

PROCESS DESCRIPTION

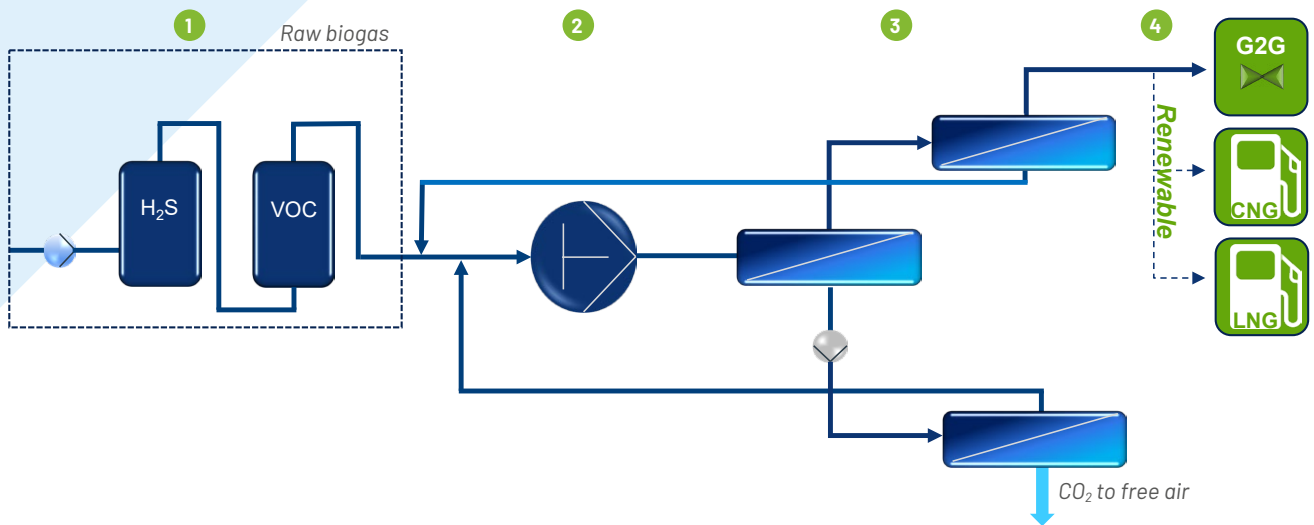
In the pre-treatment, water and contaminants are removed from the biogas. The biogas pre-treatment allows for modest contamination levels of hydrogen sulfide (H₂S) and volatile organic compounds (VOC) – for bulk removal of H₂S or VOC's, other options are available. After pre-treatment, the biogas is compressed to the most OPEX and CAPEX efficient pressure that allows for removal of CO₂. The membranes then remove the CO₂ from the methane to meet the required Renewable Natural Gas (RNG) specifications. Upgraded bio-methane can be injected into the national grid or further processed to renewable CNG or LNG.

WHY PENTAIR?

Pentair's Sustainable Gas Solutions specializes in biogas upgrading and CO₂ recovery systems. With over 1500 installed plants, including more than 40 biogas upgrading systems, Pentair's dedication to this core business is widely recognized within the industry. Our R&D department is constantly researching emerging technologies for improving the efficiency and effectiveness of our biogas upgrading solutions. Most importantly: we are there for you when your system is operating – with global service hubs and dedicated technical support. We diagnose and optimize whenever you need us to keep your plant up and running! *That's why Pentair!*

SCOPE OF SUPPLY

- 1 Pre-treatment biogas (booster with activated carbon filters for H₂S and VOC)
- 2 Biogas compressor
- 3 3-stage membrane unit
- 4 Biogas outlet gas to grid or optional CNG or Bio-LNG
- > Main parts skid mounted and controlled MCC



	BIOGAS CAPACITY	TYPICAL BIOGAS COMPOSITION	FOOTPRINT (L x W x H)	POWER CONSUMPTION	TYPICAL BIO-METHANE OUTLET CONDITIONS	BIO-METHANE TO THE GRID
BioBasic	700 - 2200 Nm ³ /h 435 - 1365 SCFM	55 % CH ₄ , 44% CO ₂ , 1 % air	12.8 x 10 x 2.8 m 42 x 32.8 x 9.2 ft	~ 250 Wh/Nm ³	> 90 - 97 % CH ₄	Renewable CNG/ Renewable-LNG
BioPlus	700 - 2200 Nm³/h 435 - 1365 SCFM	55 % CH₄, 44% CO₂, 1 % air	20 x 12.5 x 3.6 m 65.6 x 41 x 11.8 ft	~ 235 Wh/Nm³	> 90 - 97 % CH₄	Renewable CNG/ Renewable-LNG
BioComplete	700 - 3600 Nm ³ /h 435 - 2234 SCFM	55 % CH ₄ , 44% CO ₂ , 1 % air	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	Renewable CNG/ Renewable-LNG

LEARN MORE

Interested in an inquiry or more information: **Click** or **scan** our QR code to contact us or **visit** us at BIOGAS.PENTAIR.COM



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