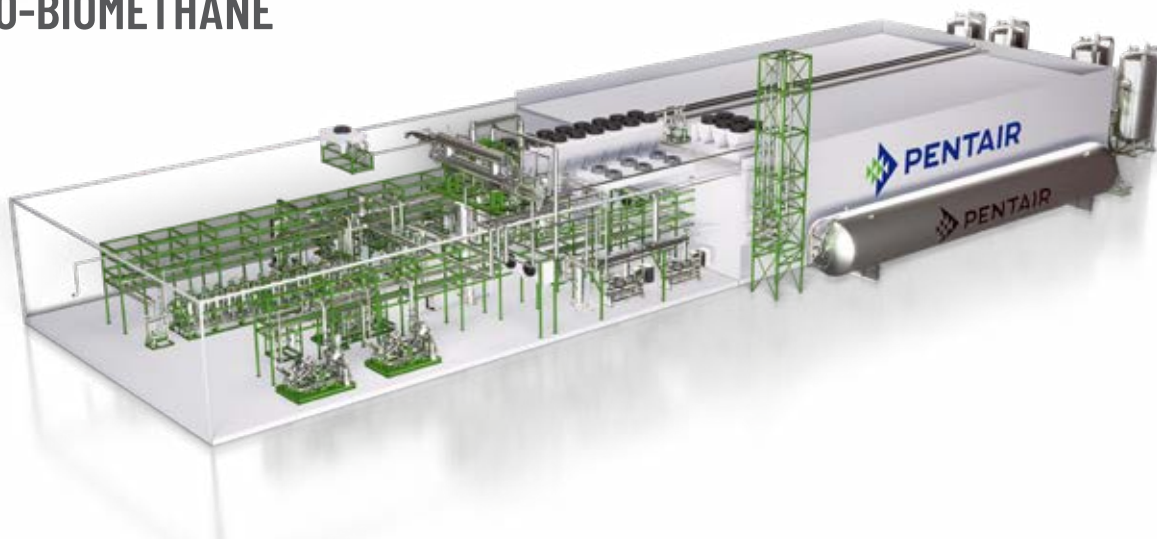


# BIOGAS UPGRADING

## BIOGAS-TO-BIOMETHANE SYSTEM



### Utilize Your Biogas to its Full Potential

Pentair offers a comprehensive solution for upgrading biogas into high-value biomethane. Our innovative two-in-one system not only transforms biogas into Renewable Natural Gas (RNG) but also enables the recovery of CO<sub>2</sub> from a secondary stream – turning a byproduct into a valuable resource – biogenic CO<sub>2</sub>.

#### Key Benefits

- **Energy-Efficient CO<sub>2</sub> & CH<sub>4</sub> Separation**  
Optimize gas purification with minimal energy consumption, reducing operational costs and environmental impact.
- **Comprehensive Lifecycle Support**  
Enjoy peace of mind with expert service and support throughout the entire system lifecycle from installation to maintenance and upgrades.
- **Plug & Play Flexibility**  
Simplify deployment with modular, easy-to-install systems designed for quick integration and minimal disruption.

#### Options

- **VOC Sensor for Biogas Monitoring**
  - Detect unexpected or harmful compounds
  - Monitor the performance of digesters or upgrading systems
  - Minimize plant downtime caused by contaminants
- **Heat Recovery System**  
Improve overall energy efficiency by capturing and reusing waste heat within your process.
- **Pentair Service Level Agreement (SLA)**

### Choosing the Right System for You

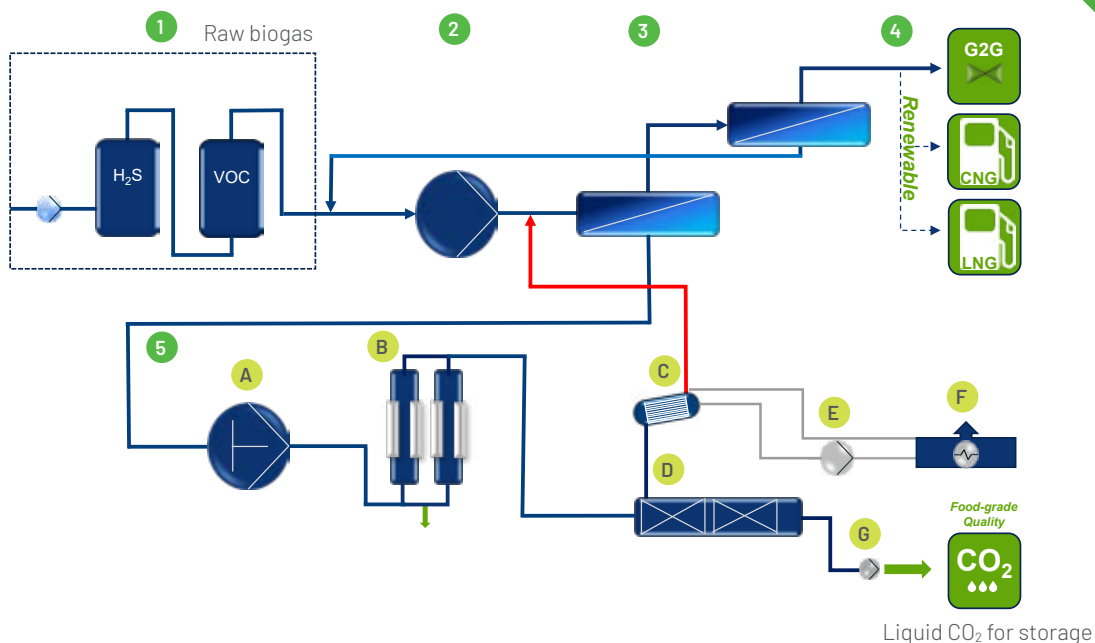
BIOGAS PROCESSING CAPACITY	FOOTPRINT (LXWXH)	SPECIFIC ENERGY CONSUMPTION	BIOMETHANE PURITY
1680 m <sup>3</sup> /h	20 x 20 x 3.6 m 65.6 x 65.6 x 11.8 ft	~ 0,18 kWh/Nm <sup>3</sup> ~ 0,22 kWh/kg (CO <sub>2</sub> )	> 90 - 97 % CH <sub>4</sub>
2390 m <sup>3</sup> /h	20 x 20 x 3.6 m 65.6 x 65.6 x 11.8 ft	~ 0,18 kWh/Nm <sup>3</sup> ~ 0,22 kWh/kg (CO <sub>2</sub> )	> 90 - 97 % CH <sub>4</sub>

# BIOGAS UPGRADING

## BIOGAS-TO-BIOMETHANE 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 CO<sub>2</sub> Recovery:
  - A CO<sub>2</sub> compressor
  - B Activated carbon filter/drier
  - C CO<sub>2</sub> condenser
  - D Stripper/re-boiler
  - E Cooling compressor
  - F Dry cooler
  - G CO<sub>2</sub> pump
- > All parts skid mounted and controlled MCC



### How it works

#### 1. Pre-Treatment

The process begins with the removal of water and contaminants such as hydrogen sulfide (H<sub>2</sub>S) and volatile organic compounds (VOC). Our system tolerates moderate levels of these impurities, with additional options available for bulk removal.

#### 2. Compression & CO<sub>2</sub> Removal

The pre-treated biogas is compressed to an optimal pressure that balances operational and capital expenditures. Advanced membrane technology then separates CO<sub>2</sub> from methane, producing biomethane that meets stringent RNG specifications.

#### 3. Biomethane Utilization

The biomethane can be:

- injected directly into the national gas grid.
- further processed into bio-LNG or bio-CNG for transport and industrial use.

#### 4. CO<sub>2</sub> Recovery

The separated CO<sub>2</sub> stream is compressed, cleaned, liquefied, and purified into food-grade quality liquid CO<sub>2</sub> ready for reuse in various industries.

The separated CO<sub>2</sub> stream is further compressed, cleaned, liquefied, and purified into food-grade quality liquid CO<sub>2</sub>.

Let's work together to explore your biogas upgrading potential.  
Visit [biogas.pentair.com](https://biogas.pentair.com) to find out more.



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