



# ClimateAdvanced® Treatment Biomethane Production via Cryogenics

*Cryo Fuel® Biogas Upgrading System*

## DESCRIPTION OF THE TECHNOLOGY

Biogas can be obtained from organic waste in many environmental facilities through an anaerobic digestion process. It is primarily composed of methane and carbon dioxide, along with smaller quantities of other gases such as nitrogen and oxygen, and impurities like hydrogen sulfide (H<sub>2</sub>S), Volatile Organic Compounds (VOCs), or siloxanes. Thanks to its high calorific value, biogas **can be upgraded through an enrichment process** where methane is separated from these compounds. This results in **biomethane**, a gas equivalent to natural gas but of **non-fossil** origin.

SUEZ AIR & CLIMATE, in collaboration with CryoPur, designs and supplies gas enrichment solutions using **CryoFuel®** technology.

The process employs **cryogenics** to upgrade biogas by separating its components based on their different condensation temperatures. This produces **high-purity** biomethane suitable for injection into the grid, for use in vehicles as compressed natural gas (CNG), or liquified natural gas (LNG) production.

The technology integrates **biogas upgrading, BioCO<sub>2</sub> liquefaction, and BioLNG production in a single process**, optimising investment and operational costs.

## ADVANTAGES AND BENEFITS OF THE SOLUTION



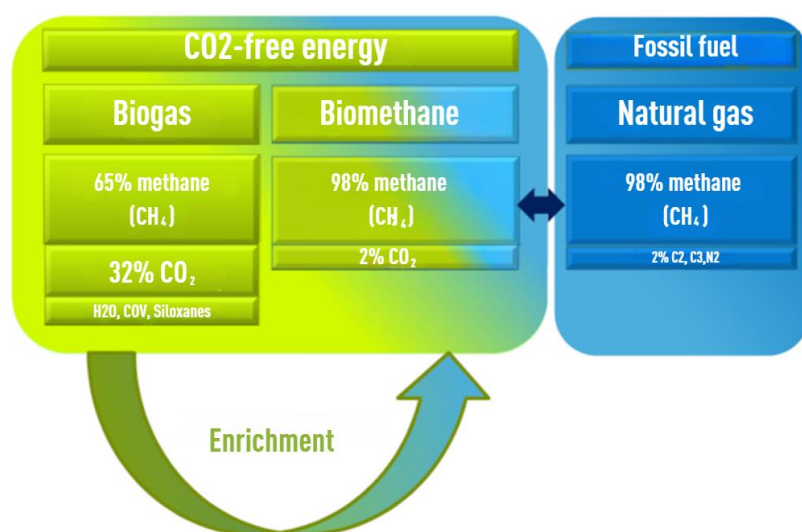
**Quality and safety** are key characteristics of CryoPur technology



**Highly reliable** components and instruments; a **robust technology**



**Compact equipment** that simultaneously produces liquified BioCO<sub>2</sub> and BioLNG



## KEY FIGURES

>99.5%

The purity of captured CO<sub>2</sub> exceeds **99.5%**, enabling food-grade CO<sub>2</sub> production

~99.9%

A **biomethane** stream with **99.9% purity**, ready for conversion to **LNG** without additional polishing stages

70-4.000  
Nm<sup>3</sup>/h

Wide operating range for  
biogas flow rates

## DESIGN AND EFFICIENCY DATA

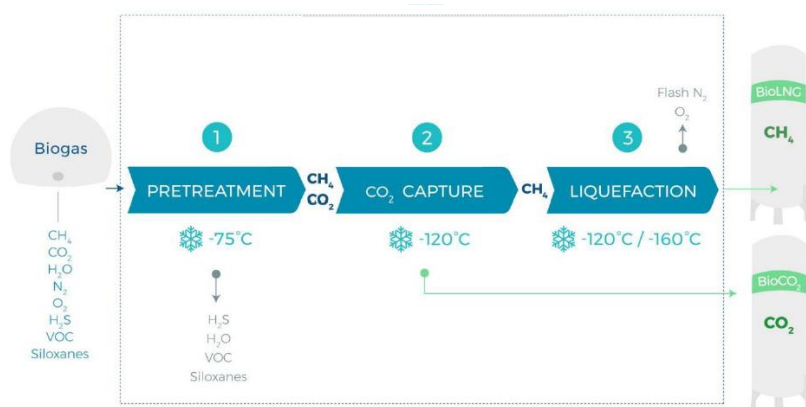
The CryoFuel® technology is an integrated solution that simultaneously enables **CO<sub>2</sub> liquefaction** and the **production of biomethane** in gaseous or liquid form, with low electricity consumption.

The process ensures **very high methane recovery without losses**. It is flexible and can operate over a wide range of biogas flow rates, from 70 to 4,000Nm<sup>3</sup>/h.

The process begins with a pretreatment stage to eliminate water and potential contaminants. Subsequently, CO<sub>2</sub> is captured through a freeze-thaw method, yielding a stream of food-grade liquefied CO<sub>2</sub>.

For biogas with high N<sub>2</sub> and O<sub>2</sub> content, the process includes an additional phase in the **Nitrogen Removal Unit (NRU)**.

The process produces a methane-rich stream that can be compressed into **CNG** or, if necessary, **liquified** by cooling the gas to its dew point for transportation or use as LNG.



## INDUSTRIAL APPLICATIONS

The technology offered by SUEZ AIR & CLIMATE is well-referenced in Europe and is capable of producing biomethane suitable for a variety of applications including:

- Injection into the existing natural gas grid to meet industrial and residential energy needs
- Compression to 200-250 barg for use as biofuel in public or private vehicles, truck fleets, buses, etc
- Liquefaction of biomethane for Bio-LNG production to be used as fuel.



SUEZ

AIR & CLIMATE

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