

# CONVERTING BIOGAS INTO BIOMETHANE

The increasing popularity of biogas and biomethane as alternative renewable energy sources is attributed to the possibility to use gas generally as an energy source and to its excellent, long-lasting storage capacity.

## A Wide Range of Biomethane Applications

- Space heating
- Use in industrial processes
- Electricity production in large power plants
- Motor vehicle fuel

## Biogas Treatment (Cleaning)

Biogas is made of organic materials and wastes (biomass) from the anaerobic digestion process. It is a natural process that occurs in an environment without access to oxygen. The produced biogas usually consists of methane, carbon dioxide and traces of components such as hydrogen sulphate, siloxanes, ammonia and nitrogen. The undesirable inert and corrosive substances are removed in the biogas treatment process.

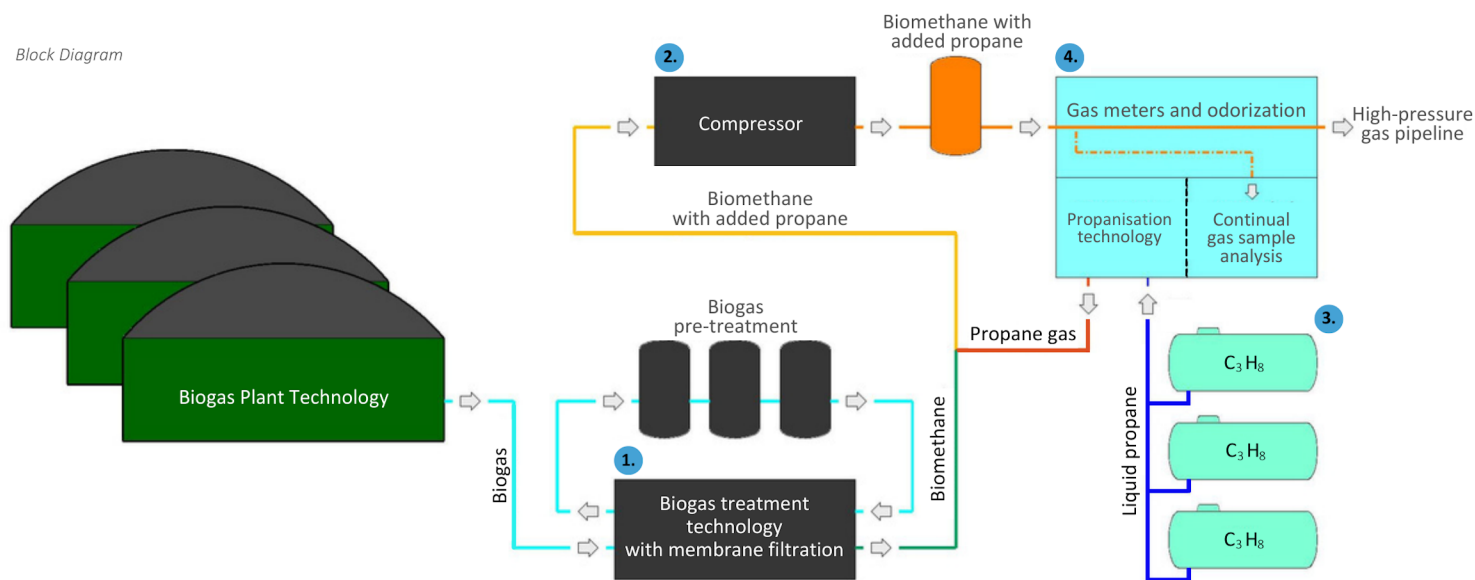
However, the most important step is to eliminate  $\text{CO}_2$ , which increases the percentage content of methane. This process increases the energy value of biogas up to a quality level equivalent to natural gas. Such treated biogas is known as biomethane.

The biogas treatment plant is specifically designed to ensure that the quality of the biomethane at the point of injection equals the composition of natural gas. The treatment process, however, is not just about reducing the content of  $\text{CO}_2$ . It is necessary to ensure that all biomethane parameters are suitable for further application in the natural gas distribution system.

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Block Diagram



## Case Example

In 2021, we implemented an order for PM, s.r.o., as a pilot project entitled

### “Connecting Jelšava 2 Biogas Plant into SPP-D Distribution Network”

using the method of cleaning biomethane using membrane separation. This standard treatment method for biogas is based on the principle permeable membranes that separate methane and  $\text{CO}_2$  and it is demonstrably a simple, energy-saving and ecological method for biogas treatment.

Moreover, it provides several advantages:

- minimal methane loss
- low production and maintenance costs
- compact and easy to control

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## 1. Biogas-to-Biomethane Conversion Technology (Upgrading)

Installed power 250 kW, 400 V, 50 Hz  
Biogas flow rate 600 Nm<sup>3</sup>/h  
Built-up area 135 m<sup>2</sup>

Input biogas parameters:

- CH<sub>4</sub> 53 %
- H<sub>2</sub>S 215 ppm
- O<sub>2</sub> 0,16 %
- CO<sub>2</sub> 45 %

Output biomethane parameters:

- CH<sub>4</sub> 97 %
- H<sub>2</sub>S 0,0 ppm
- O<sub>2</sub> 0,21 %
- CO<sub>2</sub> 1,5 %

## 2. Compressor

Installed power 30 kW, 400 V  
Biomethane flow rate 345 Nm<sup>3</sup>/h  
Input pressure 0 bar  
Output pressure 25 bar  
Built-in compression object area 60 m<sup>2</sup>

## 3. Liquid Propane Storage Tanks

Number of tanks three  
Tank construction overground  
Total storage volume 12 300 l  
Maximum storage pressure 14,7 bar  
Built-in warehouse area 200 m<sup>2</sup>

## 4. GASCONTROL Transfer Station

Functions:

- volumetric measurement of the supplied biomethane
- continual sample analysis of the supplied biomethane in compliance with Slovak legislation
- process of enriching biomethane to the required gross calorific value (propanisation)
- odorization of the supplied biomethane
- data transfer into the SPP-DISTRIBUCIA master system