

METHAGEN



YOUR GLOBAL PARTNER FOR BIOGAS UPGRADING

BIOGAS UPGRADING

BIOGAS to BIOMETHANE = NATURAL GAS

Biogas upgrading leads to pure biomethane, a clean fuel that can replace natural gas in all its common applications. When compared with traditional CHP, biogas upgrading allows access to a more efficient and high added-value use of this biofuel.

Sysadvance is a leading player in gas separation and purification technology. **METHAGEN** units are high efficiency systems based on VPSA technology producing high purity CH₄ ensuring simultaneously recovery rates close to 99%.

METHAGEN

METHAGEN is a system, designed to purify biogas from all possible sources:

- Landfill;
- Anaerobic digestion of sludge in waste-water treatment plants;
- Food, organic municipal waste, agricultural waste degraded in biodigestors.

Purification is achieved by removing its main contaminants: Carbon Dioxide, Oxygen and Nitrogen - and enhancing the concentration of Methane up to 99%.

The pre-treatment for removing H₂S and Siloxanes can be also included.

Options available for the **METHAGEN** system:

CARBOGEN - CO₂ purification unit, to be coupled at the exhaust of **METHAGEN** Upgrading unit, able to purify CO₂ up to 99.9%

biOxygen - Oxygen PSA or VSA generator, with controlled injection system, for H₂S reduction in digester head-space, biological scrubber or activated carbon filters. This system replaces the commonly used air injection, avoiding the biogas contamination with nitrogen (N₂).

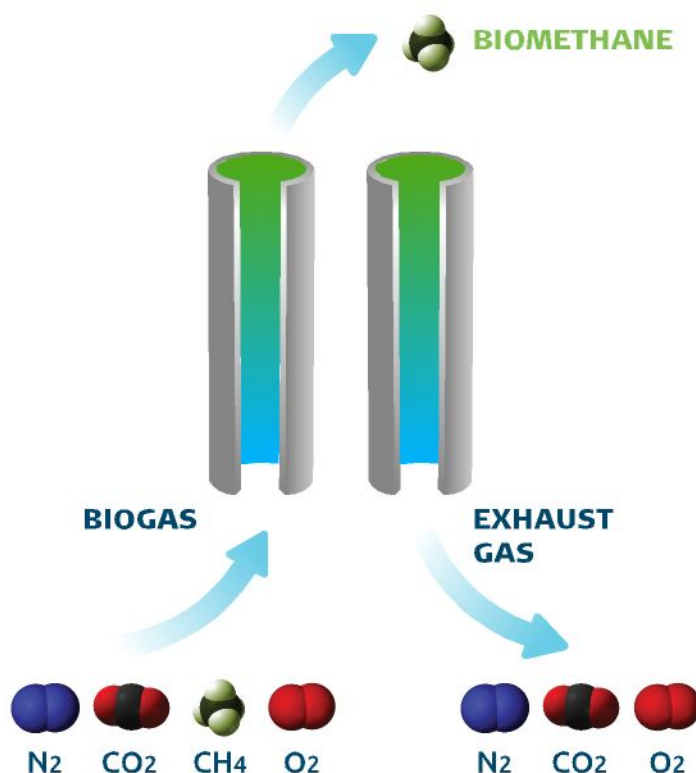
VPSA TECHNOLOGY

At the core of a **METHAGEN** system, there is a VPSA - VACUUM PRESSURE SWING ADSORPTION.

After being previously dried and desulphurized, compressed biogas is fed to the **METHAGEN** Upgrading Unit that makes use of VPSA technology to remove CO₂, N₂, O₂ and residual H₂O from the gas stream.

The **METHAGEN** system contains a set of columns packed with selective adsorbents. Each adsorption column undergoes a cyclic sequence of high and low pressure steps, to produce a continuous flow of high-purity CH₄. The adsorbent regeneration step is assisted by a vacuum system to enhance the process efficiency. The residual methane desorbed during the regeneration step is recycled back to the biogas inlet reservoir, resulting in a methane recovery rate close to 99%.

The **METHAGEN** operation is fully automated and controlled by a PLC. The biomethane composition is continuously monitored by a multi-gas analysis system.



ONE-STOP SHOP FOR BIOGAS UPGRADING



Sysadvance provides full turn-key solution for biogas upgrading or single VPSA unit.

ADVANTAGES

-  EFFICIENT N₂ REMOVAL
-  EFFICIENT O₂ REMOVAL
-  LOW OPERATION COSTS
-  HIGH CH₄ PURITY: UP TO 99%
-  HIGH RECOVERY
-  HIGH PRODUCTIVITY
-  ECO SOLUTION FOR H₂S REMOVAL
-  ATEX CERTIFICATION
-  GSM REMOTE CONTROL AND MONITORING
-  CONTAINER OR SKID MOUNTED



- Pre-treatment and desulphurization;
- Compression and drying (8bar);
- VOC and Siloxane removal;
- METHANE Enrichment by VPSA;
- Compression up to 300bar and filling station (optional).

- Capacity per module: 100Nm³/h to 2000 Nm³/h of Biogas (30°C, 15mBarg, saturated);
- Product gas: up to 99% CH₄;
- CH₄ recovery: up to 99% Methane yield;
- Specific energy consumption: < 0,25 kWh/Nm³ Biogas (6 barg outlet pressure);
- High Oxygen removal capacity - Residual Oxygen was low as 0.2%.

System is comprised of:

- Pre-treatment and desulphurization;
- Compression and drying (8bar);
- VOC and Siloxane removal;
- METHANE Enrichment by 2 stage VPSPA;
- Compression up to 300bar and filling station (optional);
- High Oxygen removal capacity - Residual Oxygen as low as 0.2%.

METHAGEN S2 can also be used for polishing O₂ and N₂ in contaminated biomethane to meet stringent NG grid injection specifications.

- Capacity per module: 200Nm³/h to 1000 Nm³/h of Biogas;
- Product gas: up to 98% CH₄*;
- CH₄ recovery: up to 94% Methane yield*;
- Specific energy consumption: < 0,35 kWh/Nm³ Biogas (6 barg outlet pressure);
- Maximum contaminant levels (standard units):
N₂ - 8% O₂ - 4% Combined N₂+O₂ < 10%

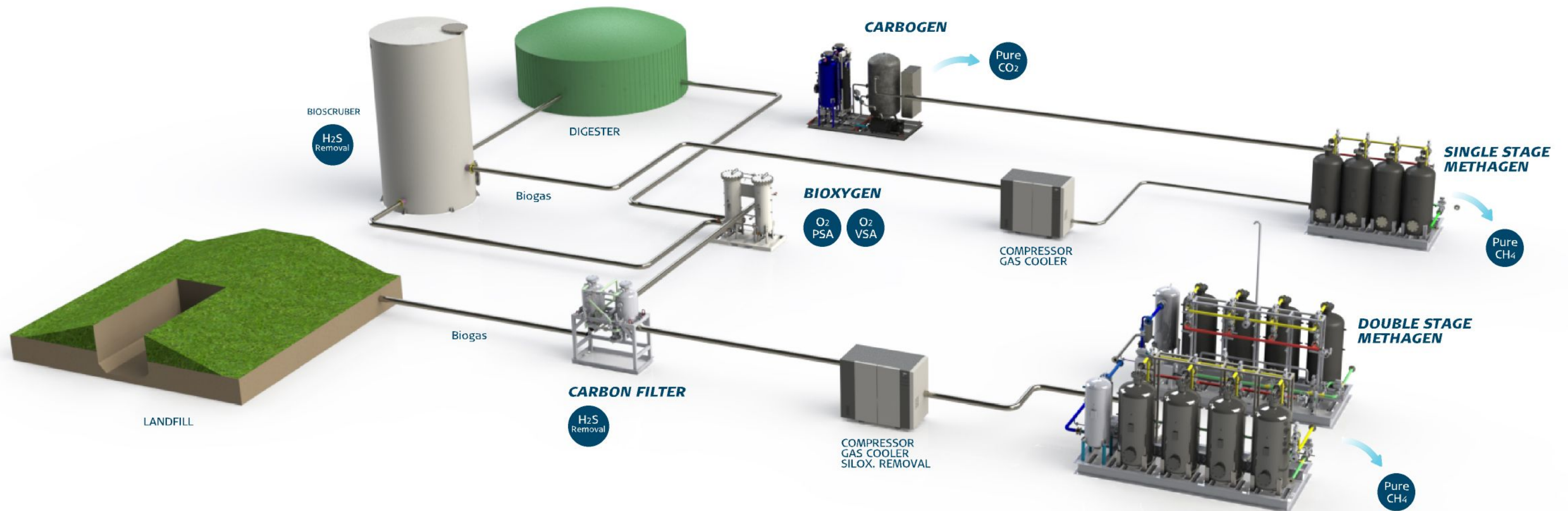
- VSA unit with blower for feed gas;
- CO₂ recovery unit;
- CO₂ storage gas bag;
- CO₂ drying, compression and liquefaction (option).

- Capacity per module: 100 Nm³/h to 1000 Nm³/h of CO₂-rich exhaust gas (30°C, 15mBarg, saturated);
- Product gas: up to 99.9% CO₂;
- Specific energy consumption: < 0,30 kWh/Nm³ purified CO₂.

System is comprised of:

- bioXYGEN O₂PSA (up to 40 Nm³/h of O₂ flow delivery)
- Air compressor and pre-treatment stage;
- O₂PSA with O₂ sensor;
- O₂ controlled injection system;
- Skid or container mounted.

Oxygen purity: from 90 to 95% O₂
Specific energy consumption (per Nm³ of O₂):
PSA: < 1,0 kWh/Nm³ pure O₂ | VSA: < 0,4 kWh/Nm³ pure O₂



SYSADVANCE develops and manufactures equipments for gas separation and supplies integrated solutions for gases and compressed air, such as N₂ Generators, O₂ Generators, Medical Oxygen 93 Generators, Biogas Upgrading systems, O₂ VSA Generators, Helium, Hydrogen and SF₆ Purification and custom engineering solutions.

Since its foundation in 2002, the company has experienced significant and continuous growth, as a result of its customer satisfaction oriented strategy as well as its superior technology and reliability of the products and technologies delivered.

With highly qualified technical personnel and a strong R&D culture, **SYSADVANCE** strives to deliver state-of-the-art technology to its clients in more than 40 countries, in different industries and sectors of activity.

