



EnviThan gas upgrading with membrane technology

→ The upgraded biomethane is fed into the natural gas grid and afterwards available as bio-natural gas for households or as CO₂-neutral fuel. The electricity and the heat that can be generated from biomethane can be used by public buildings or even housing estates.



The future of renewable energy sources is biomethane.

Biomethane has the same characteristics as natural gas: it is just as flexible in its usage, is easier to store than other energy sources, is renewable and – last but not least – can even be fed into the public natural gas grid.

From biogas to biomethane

Biogas is formed by fermentation in which micro-organisms anaerobically decompose biomass into methane and carbon dioxide. To upgrade the biogas to natural gas-quality biomethane, the crude gas is first purified and compressed. Then comes the next – and crucial – step: the virtually complete separation of CO₂ from the valuable methane, which is then fed into the natural gas grid.

When it comes to renewables, biomethane is an all-rounder:

+ Flexibility of use

Whether used in homes, as a carbon-neutral fuel or converted on-demand into electricity and heat, biomethane is a true all-rounder that can also be used in decentralised systems: biomethane is simply fed into the existing natural gas grid, where it can be stored at capacities that comfortably exceed other models for energy storage.

+ Independent

Biomethane frees us from our dependence both on fossil natural gas and natural gas importers, thereby helping to support predictable long-term pricing trends in the domestic energy market.



+ Excellent public acceptance

Biomethane is renewable. This means heating consumers benefit from an improved CO₂ footprint and potential savings resulting from the more efficient use of energy.

As a highly efficient fuel, biomethane is also a star performer in the fuel market and can help to reduce emissions many times over.

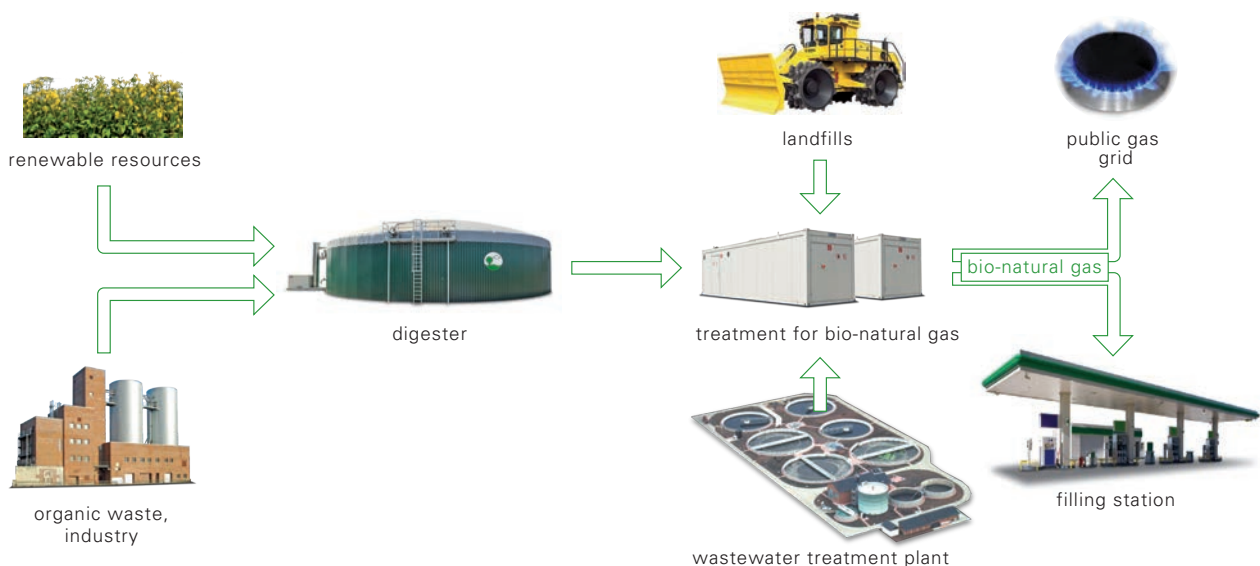
+ Strong market potential

Since crude gas sources and gas grid infrastructure are both available, neither time nor capital investment is necessary to establish them. On the contrary: the use of biomethane can unburden the electricity network and contribute to a temporary easing of cost-intensive upgrading work.

+ Regional value chains

Biomethane promotes economic growth both in the feed-in region – which is in the immediate vicinity of the gas generating plant – and in the consuming region, which is independent of the feed-in location.

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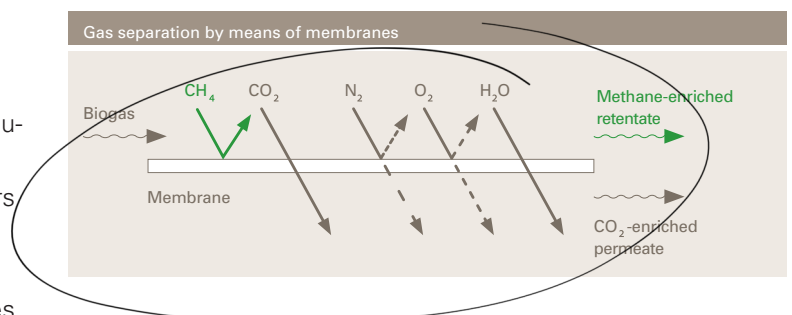
Our upgrading technology – refreshingly simple and flexible

... since it boosts the proportion of energy-rich methane by about 50 to over 97 percent by volume, making it more environmentally friendly, significantly more energy- and cost-efficient, and much more flexible than other technologies.

Using only these membrane cartridges, a significantly improved separation of carbon dioxide and methane is possible in just a single step. Compared to other membranes available on the market, these membranes feature the highest CO₂/CH₄ selectivity. The upgraded methane is piped to the supply station where it is further treated by the network operator or fed directly into the natural gas grid.

Our membrane technology

Gases exhibit a range of permeation speeds and solubility profiles. CO₂ molecules are smaller than methane molecules, have good solubility in polymers and therefore pass through micropore membranes more rapidly. While most of the CO₂ – along with ammonia gas, hydrogen sulphide and water – passes through the molecular sieve, valuable methane collects on the high-pressure side of the membrane. Thanks to its high selectivity, Evonik's SEPURAN® Green membrane is especially suited to the separation of CO₂ and methane.



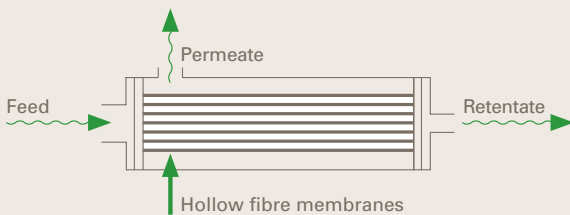
← Interior view of the plant with SEPURAN® Green membrane modules.

→ SEPURAN® Green modules consist of several thousand hollow fibres manufactured from high-performance plastics and bundled in a stainless-steel tube.

→ → Interior view of the technical container with gas compressing unit.



Mode of operation of a membrane module for gas separation



Our design: simple, compact and modular

EnviThan gas upgrading is simple and robust while also being compact and space-saving. The components are installed in sealed containers. Thanks to its modular design, the technology can be installed quickly and easily, and flexibly adapted to a range of quality standards and performance capacities. The system is also designed to ensure impressively low maintenance costs. Since any number of modules can be connected together, depending on plant size, EnviThan always offers "room to grow". The systems always have reserve capacity and are always designed to meet higher performance requirements.

Low pressure loss – low methane slip

In order to be fed to the grid, the upgraded gas must have the same pressure as the natural gas in the grid. In contrast to other techniques, the EnviThan technology produces upgraded gas that can in many cases be fed directly into the public grid. The system configuration makes it possible to achieve waste gas methane content of < 1%.

Rapid controllability for short start-up times

Start-up and shut-down times are very short for an EnviThan system, which needs only a few minutes to ramp up from start to maximum performance. Thanks to good controllability, the technology is easy to adjust to match changing volumetric flows and gas mixtures.



The biogas plant with a gas upgrading capacity of 300 Nm³/h went online in Ipsden (Oxfordshire, UK) in late 2014.

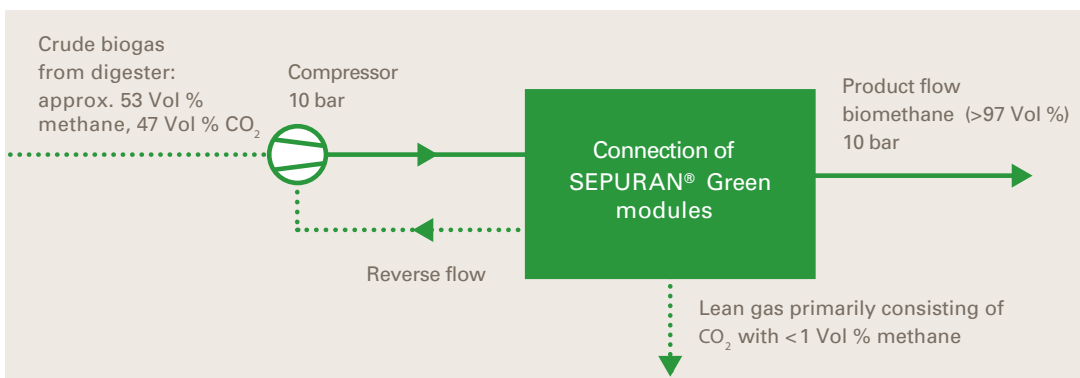
The plant was then upgraded to 700 Nm³/h in 2016.

Cost-effective, environmentally friendly and economical with raw materials

Unlike other gas upgrading methods, our EnviThan technology requires neither chemicals, water, additional heat nor any other resources. This makes EnviThan cost-effective and environmentally friendly, as it generates no waste water or emissions.

Energy-saving and efficient to run

In comparison to other processes, EnviThan technology requires much less energy, which ensures its running costs stay as low as possible. In addition, much of the heat generated during the upgrading process can be recovered and utilised.





The gas upgrading plant in Forst (Lausitz, Germany), has been generating 700 Nm³/h of biomethane from poultry litter and renewables since 2014, which is fed directly into the natural gas grid.

Good products need more than just good technology

... and it's the bright people in our EnviTec team that have developed our technology into a tailor-made, high-quality product for our customers – day in, day out, for over 14 years!

Whether internationally or in our home country of Germany, we're setting standards in biogas. For us, "Made in Germany" stands for quality and sustainability, both in the planning, construction and operation of biogas plants, and in the development of efficient biogas technology.

Our products and services

Our excellent market position has been earned not just with our high-quality products but also with our extensive service portfolio. EnviTec offers you a peace-of-mind package that covers not only planning, financing and insurance but also commissioning, maintenance and support. Thanks to the quality of our service provision, plants managed by EnviTec achieve an average availability of over 98 %.

High quality standards

Quality is our top priority at EnviTec Biogas. To ensure we meet our own high standards at all times, we work only with hand-picked suppliers that share our commitment to quality. We have long-standing business relationships with these highly dependable partners.

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