

Analysis system for quality control of biomethane

Reducing carbon footprints with renewable energy



On-line measurement of quality and impurities in biomethane

Biomethane is an important energy source which can be obtained from a wide variety of waste material: agricultural and green wastes, livestock wastes, wastewater purification, and especially the organic fraction of municipal solid waste.

In many countries worldwide, decrees have been published to promote the use of biomethane and other advanced biofuels in the energy and transportation sectors. The European Community, for example, has approved and encouraged feeding biomethane into natural gas networks or liquefying it for automotive use.

The process of producing biomethane

Biomethane is a green gas produced by biogas purification and refining. The biogas is usually generated through organic matter digestion. The production of this energy resource can start from different sources: industrial wastewater, organic municipal solid waste, sewage sludge, and livestock wastes. These compounds are commonly referred to as "biomass."

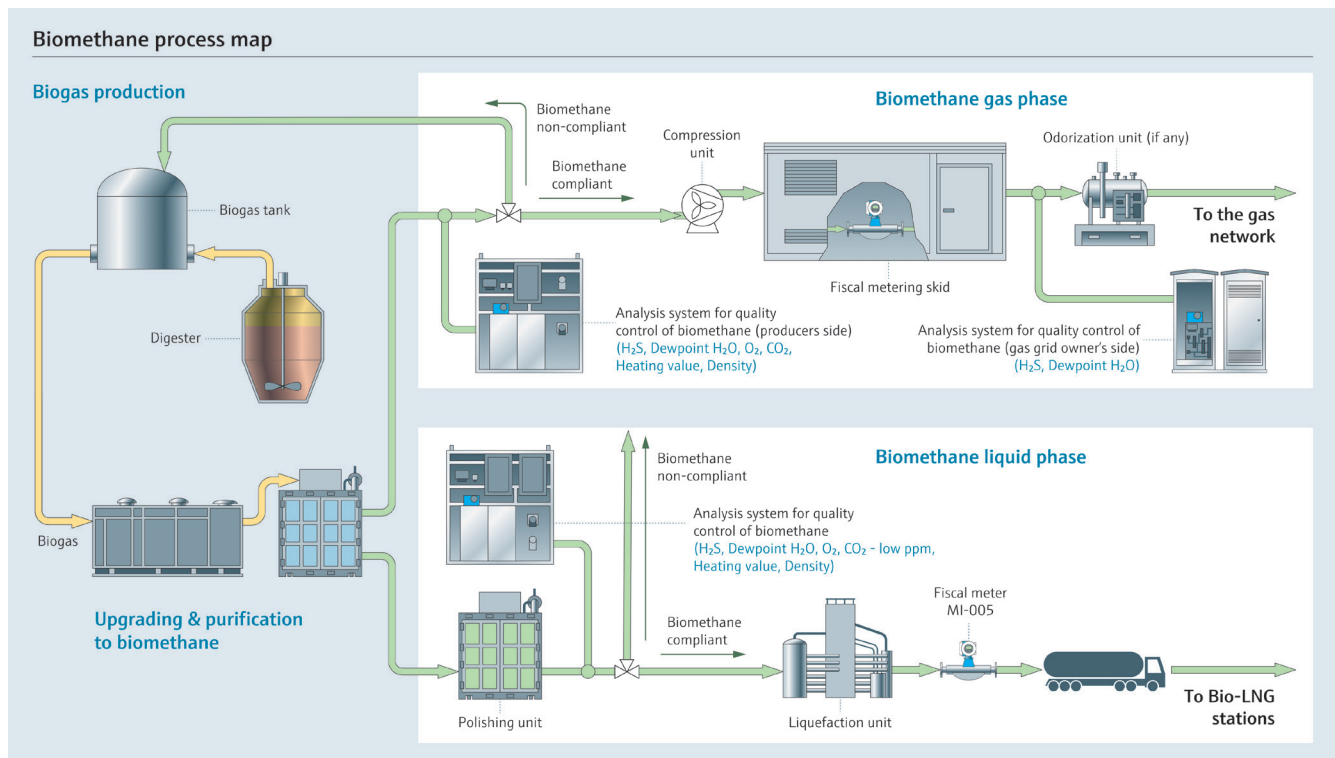
The removal of impurities is carried out by upgrading plants. These upgrades are necessary for the injection of biomethane into national natural gas grids or local natural gas distribution grids.

The upgrading units are, in turn, connected to the analysis systems which perform continuous monitoring of the biomethane energy and quality parameters.

Verification of biomethane parameters is carried out with a dual purpose. First, the proper operation and functionality of upgrading units are checked. Secondly, the quality of biomethane, which must be in accordance with local norms and regulations, is certified.

Stakeholders

Key stakeholders are biogas and biomass plant owners, as well as companies specializing in organic waste collection and recycling.



Norms and regulations for biomethane production and injection

Meeting quality standards is a fundamental goal for biomethane producers. Many countries have defined their own standards. In Europe, for instance, all the local norms come from EN16723:2017, the European Standard which specifies the requirements and test methods for natural gas (group L and H), biomethane, and blends of both at the point of use as automotive fuels.

The critical element of the upgrading plant is the analysis system for the quality control of biomethane. The parameters monitored continuously are:

- Calorific value
- Wobbe index
- Relative density
- Carbon dioxide (CO₂) content
- Humidity content (Dew point H₂O)
- Hydrogen sulfide (H₂S) content
- Oxygen content (O₂)

Benefits of Endress+Hauser's analysis system

Endress+Hauser has engineered a turnkey solution, which also includes third-party devices carefully selected for their performance and compliance with references standards. The following are benefits of Endress+Hauser's analysis system:

- Full compliance with all local regulations and performance which are often better than the minimum requirements (superior analysis methods)
- Proven analyzer technologies, already in use by gas network operators
- Minimal maintenance requirements and no consumables
- Easy analyzer validation in the field so periodic verifications are simple, effective and fast
- Very easy to install: analysis system is certified for use in hazardous areas (ATEX/IECEX/CSA), IP66 degree of protection, and suitable for ambient temperature from -20 to +50 °C.

The solution consists of:

- Two gas analyzers with tunable diode laser absorption spectroscopy (TDLAS) technology for the analysis of H₂S and H₂O dewpoint in biomethane
- A shared sampling conditioning system (the measurement of H₂S involves an integrated and patented system for suppression and/or compensation of interferences)
- An oxygen analyzer with an optical sensor that uses quenched fluorescence (QF) technology
- A gas chromatograph for the measurement of calorific value, Wobbe index, relative density and of CO₂, certified Class A OIML R 140 and/or applicable regional metrology approvals.

Everything is fully integrated and pre-assembled on a chassis to facilitate field installation. Endress+Hauser may offer flow metering solutions with the following devices: flow meters, temperature sensors, pressure transmitters and all instruments necessary for volume calculation and correction (flow computer). Contact your local Endress+Hauser sales center for more information.

The proposed solution for this application is proven by the positive feedback obtained from hundreds of biomethane producers and gas grid operators with installed gas analysis systems in biomethane production and treatment plants throughout Europe and North America.



Endress+Hauser quality parameter analysis system

Endress+Hauser's experience in BioLNG

Endress+Hauser also has experience with BioLNG processes and offers H₂S, H₂O, CO₂ and O₂ measurement prior to liquefaction. The analysis of low ppm CO₂ and sub-ppm H₂O are essential to ensure the requirements for liquefaction. These measurements are necessary to protect the liquefaction unit from damage caused by solid phase H₂O and CO₂.



Value-added services

Endress+Hauser offers technical assistance ranging from simple start-up to global service contracts including quality benchmarks based on the uptime of the system. Endress+Hauser supports the customer throughout the life cycle of the system, thanks to a widespread network of service technicians located throughout the world. Endress+Hauser serves in a consulting and partnership role for the streamlining of production processes and the development of customized solutions.

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CP015131C/66/EN/03.23