

BIOGAS

Solutions for the decarbonisation of the pulp and paper industry

The pulp and paper sector is committed to achieving climate neutrality in Europe by 2050. This requires reducing emissions in our production processes by the implementation of energy-efficient technologies and the effective use of fossil-free energy sources.

Cepi's Energy Efficiency Solutions Forum (EESF) aims to accelerate the development and implementation of carbon-reducing technologies and solutions in our sector. We accomplish this by forging new partnerships and collaborating with developers and suppliers of energy efficiency technologies, as well as providers of fossil-free energy.

One of these fossil-free energy sources is **biogas**.

Biogas production and growth potential

Europe is producing today 21 billion m³ of biogas and biomethane combined. By 2030, production could double and reach 35-45 billion m³. By 2050, production could increase to 167 billion m³, representing up to 40% of gas consumption in the EU.

Financial drivers

- On-site production of biogas creates additional revenues and saves energy and waste treatment costs
- Sourcing sustainable biogases allows carbon cost savings under the EU Emissions Trading Scheme (ETS)
- The purchase of biomethane using Biomethane Purchase Agreements replaces natural gas in a cost-effective way
- By upgrading the biogas to biomethane and injecting it into the grid, it can be used in hard-to-decarbonise sectors such as transport, where the value is a multiple in comparison to the value when burnt in a boiler or gas engine (EU ETS)

How can biogas help to decarbonise the paper production process and value chain?

Biogas and biomethane can provide flexibility by contributing to all energy outputs (electricity, heat and transport):

1. Biomethane is chemically equivalent to natural gas and contains the same amount of energy.
2. Raw biogas or biomethane cogeneration plants allow the simultaneous production of electricity and steam.
3. Biogas and biomethane can also be used directly to produce steam via (bio)gas boilers.
4. Biomethane can be injected into the existing gas infrastructure. Biomethane can also be used in transport and seasonal energy storage.
5. Biomethane can be sourced using the existing gas networks via biomethane purchase agreements.
6. BioLPG can replace fossil LPG, using the same delivery method.
7. Biogas can be produced from the effluents from pulp and paper production processes. The concentration and composition of the effluent highly depends on the feedstock. Where the use of paper for recycling and chemical pulping processes increases the load, other paper production processes lead to more diluted streams that require specific anaerobic digestion technologies.

What is biogas?

Biogas is produced by bacteria that decompose organic materials into a blend of gases: 45 – 85 vol% methane (CH₄) and 25 – 50 vol% carbon dioxide (CO₂).

Biomethane is the upgraded form of biogas, consisting of almost 100% methane and approximately equal to natural gas in quality. It can also be produced by gasification or power-to-methane technologies.

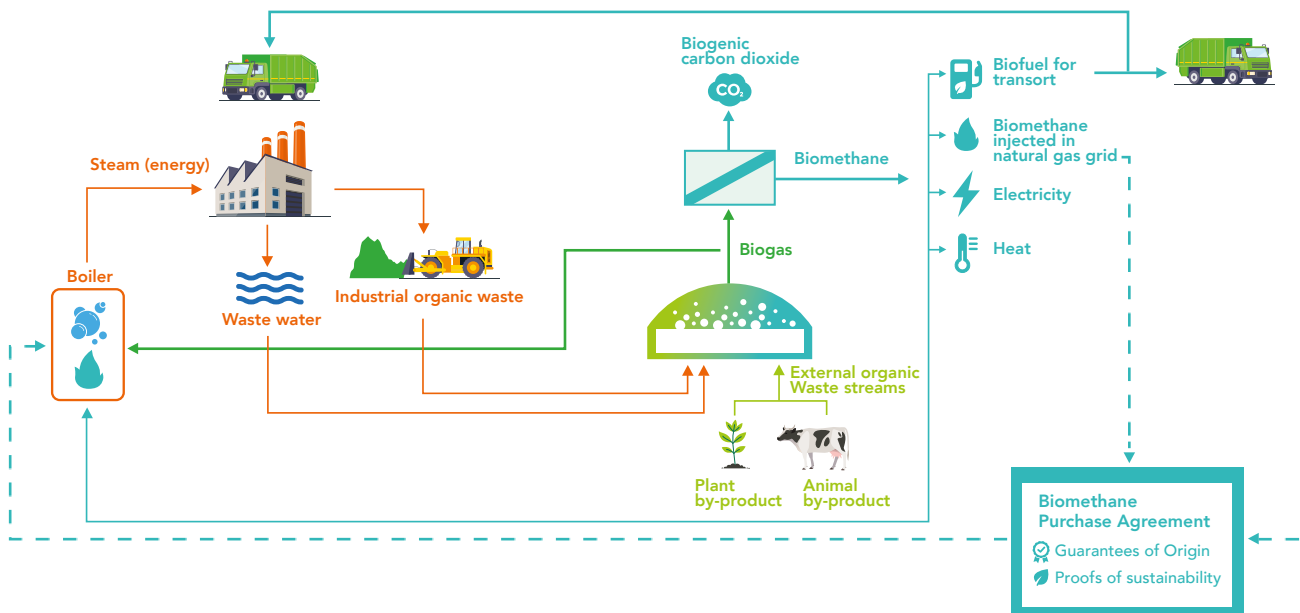
Syngas is the primary product of gasification: a mixture of carbon monoxide (CO) and hydrogen (H₂), with traces of methane and carbon dioxide. Like bio-methane, it may be used directly for electricity and/or heat generation.

Liquefied natural gas (LNG) is natural gas that has been cooled down to liquid form for ease and safety of non-pressurised storage or transport. BioLNG is produced from biomethane.

Compressed natural gas (CNG) is natural gas compressed to less than 1% of the volume it occupies at standard atmospheric pressure. It is stored and distributed in hard containers at a pressure of 20–25 MPa. BioCNG is produced from biomethane.

Case studies

VPK Packaging Dendermonde has produced biogas from its waste water since 2005; 40% is used on-site in a highly efficient 3MWe CHP engine producing 2 tonnes of steam per hour and 60% fuels a high-pressure steam boiler.



Biomethane Purchase Agreements

A Biomethane Purchase Agreement (BPA) is a contract between a biomethane producer and an industrial consumer, in which the price and the duration is negotiated between the parties involved. The origin of the biomethane purchased can be precisely identified thanks to the Guarantee of Origin that is provided to the industrial consumer. Biomethane can be sourced from one or several production facilities. A BPA provides long-term price stability for both parties, as well as independence from a public support scheme for the producer.