

Renewable Methanol from Biogas at Industrial Scale

BioMeSyn – Decentralized Bio-Methanol Production as a Substitute in Fossil Synthesis Gas Chemistry and an Alternative Value-Added Option to Biogas-to-Electricity Conversion



Methanol is one of the most important base chemicals in industry. The fossil-based production of methanol emits around 300 million tonnes of CO₂ equivalents per year. In the BioMeSyn project (13BDB60030), FiW and six partners are scaling a process for methanol synthesis from biogas to an economically relevant size. The project aims at a modular plant concept for the decentralised production of renewable methanol at medium-sized biogas plants. The process offers biogas plant operators an alternative to power generation and supplies the chemical industry with a renewable feedstock.

The chemical industry produces around 110 million tonnes of methanol per year as a feedstock for plastics, solvents and fuels, mostly from natural gas. The fossil-based production of methanol accounts for around ten per cent of the CO₂ emissions of the chemical sector. The European Renewable Energy Directive (RED III) requires biogenic fuels from new installations to cut greenhouse gas emissions by at least 65 percent compared with the fossil reference value of 94 g of CO₂ equivalent per megajoule. The associated greenhouse gas accounting covers the entire life cycle.

In the predecessor project GREEN-BEE (49VF190052), FiW and OWI piloted a process for converting biogas into methanol. The process combines autothermal reforming of biogas with catalytic methanol synthesis and has reached TRL 6–7. The process targets compact, decentralised production powered by renewable electricity. BioMeSyn transfers the process to an economically relevant plant size and prepares the construction of a demonstration plant. Once feed-in remuneration under the German Renewable Energy Sources Act (EEG) expires, methanol production offers biogas plant operators a new value-creation option.



Within BioMeSyn, FiW is responsible for the model-based scale-up of the methanol synthesis, including product distillation. FiW investigates electricity-price-driven operating strategies and develops integration concepts for the northern German biogas sites of the project partners Warmser Bioenergie GmbH & Co. KG and AgroEnergie Bierde GmbH & Co. KG. Together with BtX energy GmbH and Aspens GmbH, the consortium prepares a basic engineering package for the plant sites.

On 14 April 2026, the BioMeSyn consortium under the lead of DBFZ hosted the stakeholder workshop "Value creation with impact: market perspectives for renewable methanol" in Leipzig. Around 50 participants from research, industry, politics and practice discussed the economic and regulatory conditions for the market entry of renewable methanol.

The Federal Ministry for Economic Affairs and Energy (BMWE) funds the BioMeSyn joint project under the funding programme "Industrial Bioeconomy", based on the directive on funding the use and construction of demonstration plants and model regions for the industrial bioeconomy. VDI Technologiezentrum GmbH acts as the project management agency.

Project overview

PROJECT TITLE

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PROJECT PERIOD

09/2024 – 08/2026

PROJECT PARTNERS

DBFZ Deutsches Biomasse Forschungszentrum gGmbH; BtX energy GmbH; OWI Science for Fuels gGmbH; Warmser Bioenergie GmbH & Co. KG; AgroEnergie Bierde GmbH & Co. KG; Aspens GmbH
Assoziierte Partner: Methanol Institute; Fachverband Biogas e. V.; OptiGas GmbH

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SUPERVISOR

VDI Technologiezentrum

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