

BIOGASES: BEYOND ENERGY

As part of a balanced, forward-looking renewable energy mix, biogases are set to play a pivotal role in delivering Europe's long-term energy security and climate mitigation objectives. The benefits of biogases go far beyond the reduction of greenhouse gas (GHG) emissions. This series of six factsheets will explore the multiple solutions that biogases are already providing in the development of a European bioeconomy.

3. Transport



Biomethane in transport

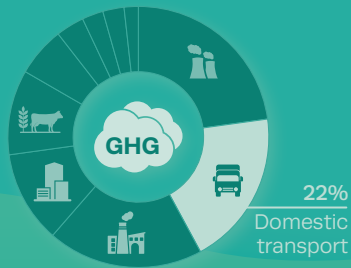
The transport sector currently accounts for about a quarter of the EU's total greenhouse gas emissions, despite efficiency improvements and the emergence of climate mitigation policies. Almost three quarters of the EU's transport emissions come from road transport.

Existing policy measures are expected to curb a thirty-year upward trend in Europe's transport emissions. Without applying a technology neutral approach, however, the reduction in emissions may not be enough to meet the EU's 2050 climate-neutrality target.

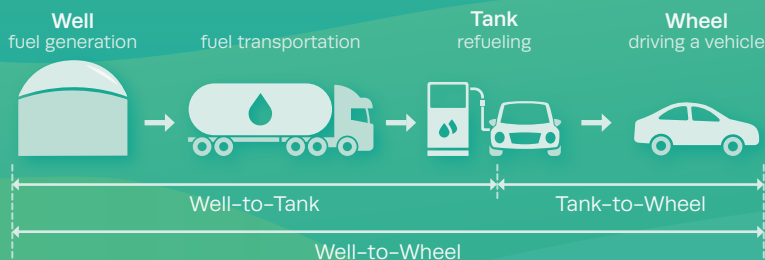
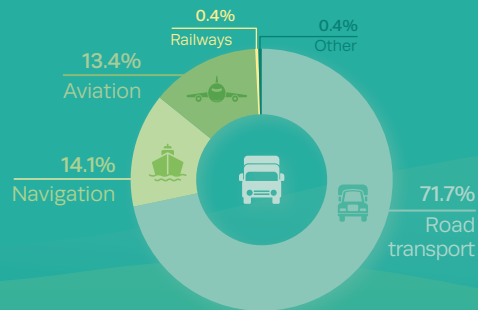
Biomethane provides a sustainable and cost-competitive substitute for fossil fuels, representing one of the few readily available fossil fuel alternatives for long distance and energy intensive transport segments. This makes biomethane a key player in the transition towards a climate neutral economy.

Reducing GHG emissions in transport with biomethane

GHG emissions in the EU by sector with a focus on domestic transport



GHG emissions from domestic transport in the EU by segment



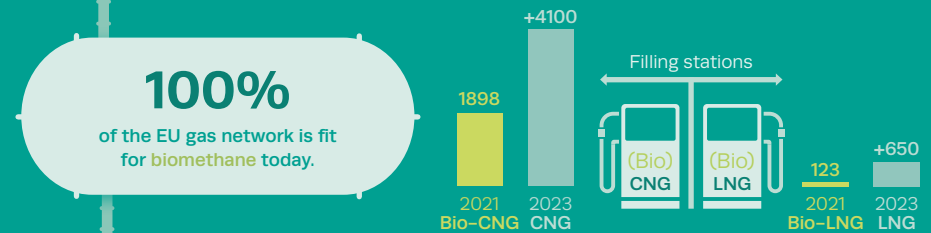
Explanation of Well-to-Wheel / Wake (WtW) methodology

How can biomethane contribute to the decarbonisation of EU transport?

Well-to-Wheel/Wake (WtW) methodology, which allows for a complete assessment of the environmental impact of a given fuel, shows biomethane to be a high performer in terms of GHG emissions reduction in transport.

According to analysis using the WtW principle, a vehicle running on 40% biomethane mixed with natural gas can reduce its CO₂ emissions by 55%. Depending on the feedstock used to generate the biomethane, a vehicle running on 100% bio-LNG can even achieve a negative GHG emissions balance. Even on a Tank-to-Wheel/Wake basis, which only considers emissions produced once the fuel is in the vehicle, a blend of 20% bio-LNG can reduce maritime GHG emissions by up to 18%; at 100% bio-LNG, GHG emissions reduce by up to 93% in the combustion cycle.

Existing gas infrastructure is biomethane-ready



Biomethane reduces GHG emissions and improves air quality



Biomethane vehicles compared to diesel vehicles

Facts

Is biomethane a cost-effective solution for transport decarbonisation?

A: Biomethane is one of the most cost-competitive advanced biofuels available today. Europe is the world's leading producer of biogas and biomethane; European production of compressed and liquified biomethane as transport fuel (bio-CNG and bio-LNG) also continues to grow. Furthermore, the EU is leading the way in technology for gas mobility, which has become a mainstream transport solution.

Because biomethane consists of the same molecule as natural gas, it is already used as a renewable alternative to fossil fuels in gas vehicles and liquid natural gas (LNG) vessels: little to no change to the existing compressed natural gas (CNG) and LNG-fuelled engines is required. In the same way, biomethane can be directly injected into the gas grid and the already well-developed network of CNG and LNG filling stations. The deployment of biomethane to replace fossil fuels does not require any additional investment of resources and time to develop new infrastructure and technology.

Can EU refuelling infrastructure accommodate biomethane for use in transport?

A: The existing EU refuelling infrastructure is biomethane-ready and able to handle the total EU bio-LNG and bio-CNG production. In contrast, the infrastructure for recharging electric vehicles and refuelling those running on hydrogen is unevenly developed across the EU. Numerous biomethane-ready CNG and LNG filling stations are already in place throughout the TEN-T network, with a significant portion of the facilities delivering bio-CNG and bio-LNG via direct physical delivery or guarantees of origin. The fast-expanding EU gas refuelling network now comprises over 4,000 CNG and 650 LNG facilities according to data from NGVA Europe, and there are approximately 1,898 bio-CNG filling stations and 123 bio-LNG filling stations operational throughout Europe, as EBA data shows.

What about the future?

A: With the right policy and market conditions, EU biomethane production can achieve the REPowerEU target of 35 bcm by 2030 and could reach 151 bcm by 2050. Biomethane has the capacity to play an important role in achieving transport decarbonisation, especially in areas of transport which have difficulty adapting to use other alternative fuels.

In road transport, 15 bcm (approx. 154 TWh) would be sufficient to power approximately 20% of the EU's 2050 heavy-duty fleet with biomethane, according to NGVA Europe; 14 bcm would cover 20% of the anticipated bio-LNG demand in the shipping sector in 2050, as reported by SEA-LNG.

Biomethane also has the potential to decarbonise aviation, a transport segment whose emissions are notoriously hard to abate. The aviation sector is uniquely dependant on gas-turbine engines and jet fuel. Both at industry and at government level, however, biomethane – specifically, sustainable aviation fuel (SAF) derived from biomethane – is being seen as a realistic and viable option for this form of transport. Biomethane can pave the way to a more sustainable future for the aviation sector in the short to medium term; a number of companies are now investing in projects that aim to produce SAF using biomethane.

Case studies

Tekniska verken – Linköping, Sweden

Located in central Sweden, Tekniska verken has been producing and distributing biogas for transport since 1997, starting with bio-CNG for city busses.

Today, Tekniska verken owns and operates Sweden's largest biogas plant for liquefied biogas (LBG), with a production of 100 GWh per year, estimated to grow up to 225 GWh per year by 2025. The facility is fed with household and industrial food waste, and slaughterhouse waste.

The development of a CO₂ capture and utilisation facility is now anticipated; this will produce liquid carbon dioxide from the biogas plant's CO₂ output, as a result of which, the plant's LBG will represent an emissions reduction of over 100% relative to fossil diesel.



Cooperativa Agricola Speranza – Candiolo, Italy



Based in Candiolo, in the Piedmont Region in Italy, Cooperativa Agricola Speranza was founded in 1974. It currently involves seven farms with over 2,000 hectares of land and more than 3,000 head of dairy cattle.

Cooperativa Agricola Speranza owns two biogas plants that together produce around 16.8 million GWh per year and supply heat (1,000 KWth/h) to the Candiolo Cancer Institute. In 2020, the cooperative built a new biomethane plant, with CO₂ capture and liquefaction, that produces 2,000 tonnes of bioLNG per year using 100%

agricultural residues and catch crops. The liquefied biomethane is used as an advanced biofuel by Maganetti Spedizioni SPA, an Italian transport company.

Recommendations



Set targets for biomethane use in transport.



Recognise biomethane as a CO₂ neutral fuel, placing it on an equal footing with electric mobility until a WtW or LCA approach is adopted.



Implement a research-based and technology neutral Life-Cycle Approach (LCA) capable of accounting for the full environmental impact of a given fuel, calculating emissions generated from production to end use, and duly recognising the emissions reduction potential of CO₂ neutral and negative emission fuels.



Ensure that current and future legislation is consistent, accelerating the total decarbonisation of EU mobility by using solutions that are already available and avoiding stranded assets.

Follow this campaign:



European Biogas Association

Renewable Energy House

Rue d'Arlon 63-65

B – 1040 Brussels (Belgium)

info@europeanbiogas.eu

T. +32 24 00 10 89

www.europeanbiogas.eu