

Biomethane is fuelling an energy revolution

Biomethane could prolong the use of commercial ICE vehicles, cutting well-to-wheel emissions by 80% per km driven. By Elle Farrell-Kingsley

The transport industry is now the largest emitter of greenhouse gas emissions (GHG) in the UK, according to the Department for Business, Energy & Industrial Strategy (BEIS). At the same time, the sector has made the least progress in reducing GHG emissions since 1990. Currently, there are over 525,000 licensed HGVs operating in the UK. 99.5% of these vehicles are fuelled by diesel, contributing 16% of the UK transport sector's total emissions.

A leading piece of legislation in the move to discover more sustainable fuel options has been the [Renewable Transport Fuel Obligation \(RTFO\)](#) order. RTFO applies to suppliers of more than 450,000 litres of fuel per year and requires a percentage of the fuel supplied to come from renewable and sustainable sources. Although electrification can significantly reduce CO2 emissions from commercial vehicles, the limited energy density of current battery technologies is problematic for long-haul driving.

As new diesel cars and vans are set to be banned from 2030 in the UK and 2035 in Europe, the National Infrastructure Commission (NIC) successfully put forward a ban in November 2021, calling for HGVs to be zero-emissions by 2040. It is more crucial than ever to discover a sustainable alternative.

A future in biofuel?

The UK is leading the way in producing a number of biofuel alternatives. There are now over 600 biogas-fuelled HGVs operating in the UK, and this number is rapidly growing. Retailers such as Asda and John Lewis have already transitioned from diesel to bio-gas-fuelled trucks.

Similarly, Bio-Compressed Natural Gas (CNG) stations have been and will be opening across the UK throughout 2022. With more planned over the coming years, these new facilities could fuel about 10% of the UK's high-mileage HGV fleet by 2025.







Methane is a fantastic fuel source for internal combustion engines

One biofuel gaining traction is biomethane. The biomethane industry is currently small, representing 0.1% of natural gas demand today, according to the International Energy Agency (IEA). Methane has a lower ratio of 1:4 carbon atoms per hydrogen atoms, representing a truck fuel that can also reduce carbon emissions. Biomethane is a naturally occurring gas produced by the anaerobic digestion of organic matter such as plant material, manure, sewage, and organic waste.

“Methane is a fantastic fuel source for internal combustion engines (ICEs),” says Chris Mann, Bennamann’s Chairman and Chief Technical Officer. Bennamann is a research company promising to deliver a “local clean energy revolution” by manufacturing net zero-carbon biomethane sourced from organic waste.

Mann says the company “accidentally discovered that large amounts of methane can be produced from biowaste.” While converting biowaste into biomethane isn’t an entirely new concept, British gas supplier SGN reports that only 2.5% of the UK’s available organic farm waste is used to create it, making biomethane a relatively untapped resource of green fuel with enormous potential.

However, it’s not without risks. “Because methane is cryogenic, you must stop it venting,” he explains. Venting is problematic across the energy industry as it contributes further to carbon emissions. To produce a pure stream of biomethane, the methane is cleaned to remove any acidic and corrosive components. The methanation process then uses a catalyst to promote a reaction between hydrogen and carbon monoxide or CO₂ to produce methane. Any remaining CO₂ or water is removed at the end of this process.

	Vehicle Type & Weight	Available Models	Typical HP & Range
Dedicated Gas (CNG & LNG)	 26-44t GVW	Iveco Stralis NP Mercedes Econic Scania P, G and R Volvo F	Up to 460 HP Up to 1,600 km
	 18-26t GVW	Mercedes Econic Scania P Iveco Stralis Volvo F MAN TGM	Up to 460 HP Up to 800 km
	 < 26t GVW	Iveco Daily, Stralis & Eurocargo Mercedes Econic Scania P & G Volvo F MAN TGM	Up to 460 HP Up to 800 km
Dual Fuel	 26-44t GVW	Volvo F LNG	Up to 460 HP Up to 1,000 km

Biomethane is particularly well suited to decarbonise heavier vehicles, such as HGVs, refuse trucks and buses

Converting into vehicle-grade fuel

“Most livestock farms create large amounts of methane that cause pollution, most of which come from the waste lagoons. If you capture 1kg of fugitive methane, you save 86kg of CO₂ equivalent.” To put that into perspective, a typical dairy farm with 150 cows is estimated to generate 36,000kg of methane, which converts into roughly 4,000 tons of CO₂. This can all be used to replace diesel.

“Converting it into vehicle-grade methane, rather than just biomethane or biogas, also means we can put it through cleaner engines,” says Mann. In 2019, the Low Emission Freight and Logistics Trial discovered that, compared to diesel, fuelling HGVs with biomethane can cut well-to-wheel emissions by 80% per km driven.

Government support

Bennamann has publicly responded to the UK’s Department for Transport (DfT) query on how best to phase out carbon emitting vehicles. It cautions that this can only work when zero-emission alternatives are fully compatible with the incumbent technologies. This includes capital costs of purchase, the total cost of operation, supporting infrastructure availability, operational, maintenance and servicing requirements, and workforce skills. The DfT also reported that zero-emission technologies for HGVs (battery electric, electric road systems and hydrogen fuel cells) are currently not practical for mass adoption. This leaves biomethane as an “ideal alternative,” suggests Bennamann.

Cornwall Council has shown support for this initiative. The council has 1,100 vehicles—of which 350 are over 2.5 tonnes—that it intends to convert from diesel fuel to Bennamann’s biomethane by 2026. The UK Government



Dairy farms could prove useful in creating greener energy

commended the council’s decision to harness this greener energy. “Cornwall has a long history of pioneering new technology,” comments Environment Secretary George Eustice. “It is at the forefront of new approaches that could revolutionise how we generate a green fuel that significantly reduces greenhouse gas emissions.”

Similarly, Italian manufacturer and alternative fuel provider FPT and Industrial Vehicles Corporation (Iveco) have partnered with Bennamann, utilising this biomethane data to enhance heavy truckmaker Nikola Corporation’s portfolio of biofuel engines. These partnerships with Bennamann mean these innovations will also circulate across the EU, where a trend for adopting biomethane is already happening. A European Biogas Association (EBA) and Gas Infrastructure Europe (GIE) study reveals that the number of biomethane plants in Europe increased by 51% in two years—from 483 in 2018 to 729 in 2020. Markets are awakening to the fact that biomethane presents a viable and immediate solution for ICE commercial vehicles to coexist with established infrastructure while also lowering carbon emissions in line with future vehicle and sustainability goals.