

Biogas in the UK explained

March 2026

Methane is a potent greenhouse gas, largely emitted in the UK by the agriculture and waste industries.¹ In these industries, methane is emitted when organic matter, like food waste and slurry, decomposes. Reducing these emissions, or capturing them before they escape, is vital to limit the climate impacts of methane. At the same time, the UK remains reliant on imported fossil gas, exposing consumers to volatile prices and higher energy bills. As gas continues to play a central role in the energy system, the government is seeking lower carbon alternatives that can strengthen energy security and reduce dependence on imports.

Redirecting organic waste away from decomposition in landfills and slurry tanks into sealed systems that capture methane addresses both these challenges at once by preventing emissions from escaping and providing a cleaner alternative energy source, biogas. However, biogas production presents certain risks that, unless properly managed, may offset the anticipated environmental benefits from this energy source.

In this briefing, we explain what this 'green gas' is, the current state of its production in the UK and future prospects.

For a detailed analysis of the risks associated with expanding biogas production and our policy recommendations, read our companion briefing [‘Biogas in the UK: potential risks and how to prevent them’](#).

What is biogas?

Biogas is a gaseous mixture composed mainly of methane and CO₂. It can be used as fuel to generate heat or electricity, sometimes as a direct replacement of fossil gas.

It is produced through anaerobic digestion (AD), when organic material decomposes in the absence of oxygen, which happens naturally (eg in landfill or slurry tanks) or can be intentional (eg in an anaerobic digester). A wide variety of feedstocks can be used to produce it in a digester, including crop residues, animal manure, food waste and sewage sludge. Feedstocks are drawn from waste streams, including slurry and food waste, as well as from

purpose-grown energy crops, although the use of these should be minimised as they compete with food production and other land use priorities.

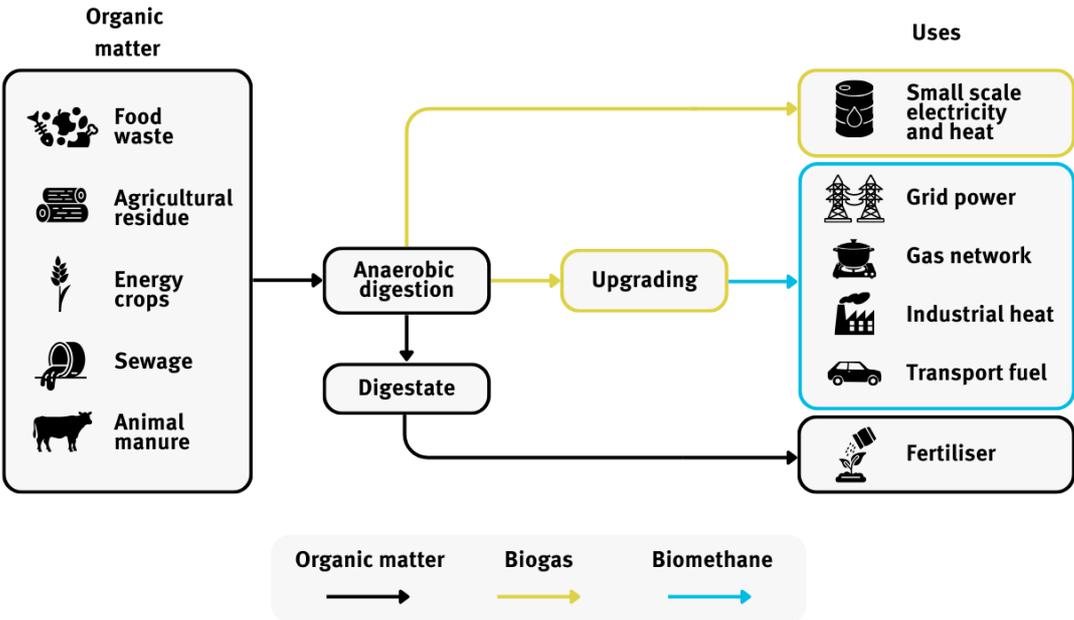
The methane content of biogas ranges from 45 per cent to 75 per cent by volume, with most of the remaining gas being CO₂.² As CO₂ is incombustible, the variation means the energy content of biogas can vary.

Biogas can be upgraded to 'biomethane'. In this case, impurities and CO₂ are removed to leave around 97 per cent methane content.³ As biomethane it closely resembles natural gas so can be used in existing gas infrastructure and injected into the gas grid. It can also be used as a transport fuel (BioLNG). However, leaky infrastructure can allow significant amounts of methane to escape into the atmosphere, potentially undermining the climate benefits.

The AD process also produces digestate, a nutrient-rich organic material that can be used as fertiliser. When sold on for fertiliser it provides an additional revenue stream and reduces reliance on fossil-based fertilisers. However, digestate also has nitrogen pollution risks for both land and water.

Therefore, biogas production can support a more sustainable circular economy by reusing a byproduct gas, but only when unavoidable waste is used as the feedstock. The resulting digestate can replace synthetic fossil-based fertilisers if it is used carefully to avoid unwanted land and water pollution.⁴

Production pathways



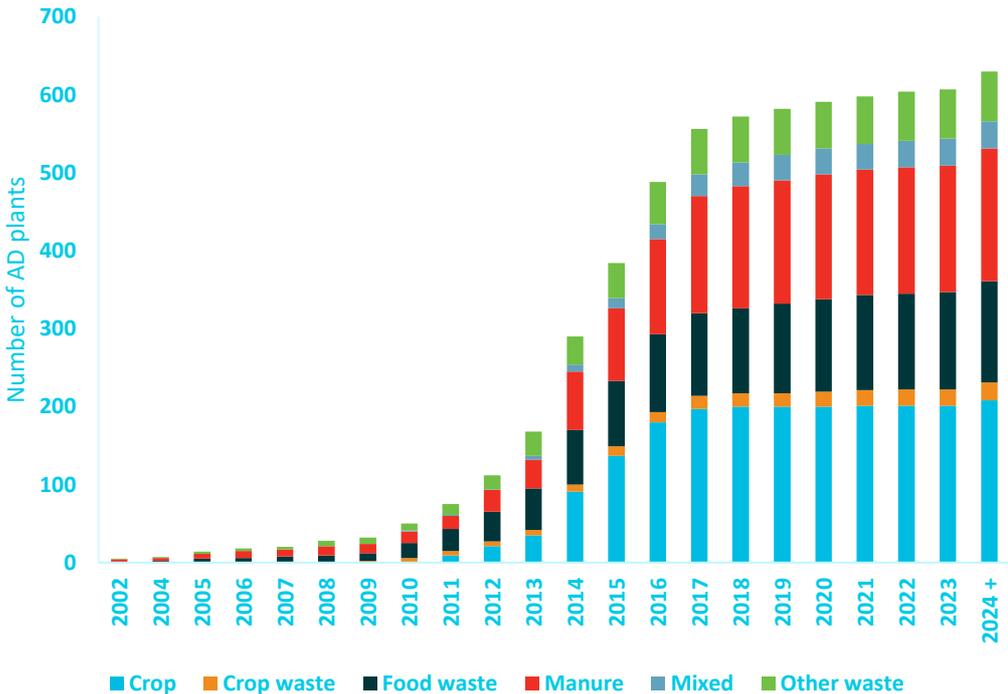
The future of biogas in the UK

The UK had approximately 630 operational AD plants in 2024, according to the National Non-Food Crop Centre (NNFCC), with total biogas use in the UK estimated at 31TWh.^{5,6} Its production has grown 67 per cent over the past 24 years.

In 2024, around 7TWh of this was upgraded to biomethane for injection into the gas grid. As total UK gas demand in 2024 was 687TWh, biomethane met one per cent of demand, the equivalent to heating 580,000 UK households a year (two per cent of all UK households).⁷

The industry is diverse, spanning small on-farm digesters to large commercial and industrial plants. Seventeen million tonnes of feedstock a year are used across the 630 operational plants, 15 per cent of which is manure or slurry, 25 per cent is bioenergy crops, 33 per cent is food waste and the remaining 25 per cent is from crop and other waste sources.⁸

Growth in AD across the UK according to the most common feedstock type⁹



AD plants play an important role in rural areas: over two thirds are based in rural communities and the sector currently supports an estimated 4,800 jobs.¹⁰ Past estimates suggest that an AD plant creates jobs at a ratio of 14 temporary to three permanent positions.¹¹

Government support has driven the growth of the industry in the UK. The Renewable Heat Incentive (RHI, 2011-2021) was replaced by the Green Gas Support Scheme (GGSS), offering 15 years of financial support for biomethane injected into the gas grid, funded via a Green Gas Levy. Uptake through the GGSS has been slow, with only one plant operational in the scheme's first three years, due to feedstock shortages and long project timelines. The GGSS, originally set to end in 2025, has been extended to March 2028, with a consultation on its future planned for summer 2026.

Biomethane has been reaffirmed as a key component of the UK's net zero strategy, with the government's Carbon Budget and Growth Delivery Plan estimating that it will lead to emissions savings of 0.63MtCO₂e by 2037.¹² However, estimates of the potential scale of biomethane production in the future vary widely, from 12 to 120TWh in 2050, reflecting uncertainties in long term feedstock availability and technical limitations.¹³

Even if UK feedstocks are maximised to produce biomethane to replace natural gas, it is unlikely to meet more than 18 per cent of current gas demand by 2050; and there are risks around locking in the use of fossil gas, as there is a limit on the amount of biomethane available to displace it on the grid.¹⁴

Government support for biogas and biomethane is expanding, but so are the associated risks as its production rises in the absence of stronger regulations and defined limits.

Read our accompanying briefing '[Biogas in the UK: potential risks and how to prevent them](#)' for further analysis.

Authors: Matilda Dunn, Chris Clark and Liam Hardy

For more information, contact:
Matilda Dunn, policy analyst, Green Alliance
mdunn@green-alliance.org.uk

Endnotes

¹ R Allen, M Dunn and L Hardy, 2025, *The climate emergency brake: an ambitious plan to cut UK methane emissions*, Green Alliance

² International Energy Agency, (IEA), 2020, 'Outlook for biogas and biomethane: Prospects for organic growth', IEA, Paris

³ IEA Bioenergy, 2022, 'Position paper: The role of biogas and biomethane in pathways to net zero', p2

⁴ K Pilarski, A Pilarska and J Dach, 2025, 'Biogas as renewable energy source: a brief overview', *Journal of Ecological Engineering*

⁵ National Non-Food Crops Centre (NNFCC), April 2024, *Anaerobic digestion deployment in the UK*, [Biogas Map](#)

⁶ Total biogas use in the UK is estimated at approximately 31.63 TWh, based on conversion from 2720ktoe (1ktoe = 0.01163TWh). Of this, around 20.9TWh is used for electricity generation, 6.7TWh is injected into the gas grid, 2.2TWh is used for transportation fuel and 1.9 TWh is used directly for heat, according to data from: Department for Energy Security and Net Zero (DESNZ), 31 July 2025, *Digest of UK Energy Statistics (DUKES)*, table 6.4,

⁷ Biomethane injected into the gas grid in 2024 (6.7TWh) was sufficient to meet the typical gas consumption approximately 581,500 two to three bed households, based on typical household gas consumption of around 11,500kWh per year. Considering there to be 28.6 million households in the UK, this equated to heating two per cent of all households.

⁸ NNFCC, op cit

⁹ Ibid

¹⁰ J Bia, 18 November 2024, 'Hundreds of UK green gas plants at risk of closure', Anaerobic Digestion and Bioresources Association (ADBA)

¹¹ Anaerobic Digestion and Bioresources Association, 'Guidance for government'

¹² DESNZ, 29 October 2025, 'Carbon budget and growth delivery plan'

¹³ T Lonsdale-Smith, F Hodgson, J Gowdy, 29 September 2025, *Making the most of biomethane*, Regen

¹⁴ Ibid