# The Biogas Industry's Pivotal Role in Reaching Net Zero

## Lazard Sustainable Private Infrastructure

Our focus in private infrastructure investing spans key sectors of our society and economy, including the energy transition, transport, energy and resources, and digital and social assets.[1] To a large extent, private capital requirements in these sectors are driven by binding national and international decarbonisation targets. Over the past 10 years, the global net zero toolbox has evolved rapidly, moving from a largely singular focus on "renewable power" to ever-more complex sets of technologies that seek to reduce the carbon footprint at multiple points along the value chain across the energy, transport, industrial, and residential sectors. Two green renewable gases—biogas and biomethane—are increasingly being recognised as being integral to the transition to net zero and circular economy. That is because they support emissions reduction while also helping improve the sustainability of waste management practices.

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## Government Support as a Catalyst for Private Investment

We believe private capital is crucial for the growth and innovation in the biogas industry, providing the funding and expertise necessary to build the infrastructure needed to support the sector. This includes investment in anaerobic digestion plants, biomethane upgrading facilities, development of green gas grids, and supply chains to transport biomethane and its byproducts such as biofertiliser and captured carbon.

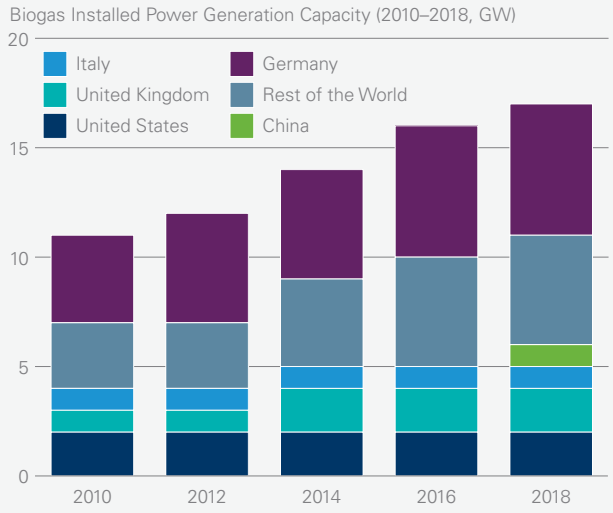
Despite its established status in countries such as the UK, Germany, and Denmark, the sector is yet to reach its full potential, in our view. In countries where the anaerobic digestion sector is yet to develop, and as with many nascent and capital-intensive sectors, private investment is sometimes slow to arrive. There is a perceived first-mover disadvantage in being an early funder in an industry that is fragmented and doesn't yet have a decades-long track record of profitability, investment returns, and institutional capital raising.

This is why early government support is important. In some cases, it helps to make projects financially viable, but for projects that are viable even without subsidies they demonstrate a long-term commitment to the sector at a policy level and signal confidence to institutional investors.

## Regional Perspectives

Many countries are certainly moving in this direction. Governments are increasingly recognising the importance and utility of biogas, as evidenced by a growing number of countries adopting policies and subsidies that promote biogas investment (Exhibit 1). For example, the European Union recently published a RepowerEU Plan, which proposes to increase the target for renewable energy to 45% of total energy consumption by 2030.[2] Biomethane is set to play an important role in achieving this plan.[3] The EU forecasts biomethane production to increase tenfold, from 3 billion cubic metres today (which satisfies less than 1% of total EU gas consumption[4]) to 35 billion cubic metres by 2030,[5] an amount sufficient to cover over 8% of the EU's energy needs.[6] The number of biomethane plants have doubled in Europe in a mere three years[7] (from over 500 to over 1,000 units, according to the European Biogas Association), which makes 2030 targets look achievable, in our view. Still, getting there will require ongoing substantial investment—some estimate it will cost over €80bn to do so.[8] Here, we believe interest from the private sector will really need to come to bear.

Exhibit 1
**The Biogas Sector Is Growing, Particularly in Europe**




As of 31 December 2018
Source: www.iea.org/data-and-statistics/charts/biogas-production-by-region-and-by-feedstock-type-2018

### A "Two-in-One" Environmental Solution

Biomethane is a form of green renewable gas, produced through the purification of biogas. It is considered a carbon-neutral fuel that has the same quality and characteristics as traditional fossil gas and can be used in the same applications such as heating, cooking, transportation, and electricity generation, while reducing greenhouse emissions and dependency on fossil fuels.

Biogas is typically generated through the process of anaerobic digestion, where microorganisms break down organic matter in the absence of oxygen to produce a mixture of methane and carbon dioxide. This process can take place in purpose-built facilities (anaerobic digestion plants) or in landfills, where the organic waste generates biogas naturally.

Production of biogas uses a variety of feedstocks, including agricultural waste, food waste, and sewage. Using local organic waste for feedstock allows anaerobic digestion plants to contribute to the displacement of fossil fuels while also becoming a vital part of local and regional natural capital preservation, through circular economy efforts. Anaerobic digestion plants also provide an alternative solution for traditional waste management methods—such as landfill or incineration—which are typically associated with inefficiencies and a negative environmental impact.

Biogas and biomethane can be used in a variety of ways, including direct injection into the gas grid, or conversion into electricity through combined heat and power plants. This versatility provides significant opportunities for biogas and biomethane to make a flexible contribution to the energy mix, helping to achieve a net zero future more efficiently.

The UK has also introduced a range of measures to support the development of biomethane, including subsidies for biomethane production and funding for green gas infrastructure, which has led to material growth in the sector. Similarly, the US is experiencing significant growth in the biogas sector, primarily in landfill gas,[9] although at this stage the overall market is lagging Europe in its evolution.[10]

Outside of this, secondary policy levers, such as low-touch regulatory changes can help to encourage rapid growth of the biogas sector. Implementing waste segregation and recycling policies, levying a landfill tax to encourage the diversion of organic waste from landfill to anaerobic digestion plants, or imposing a minimum percentage of biomethane transported in the gas network are examples of such measures that can help to increase feedstocks for biogas production and promote sustainability.

## Biogas Is Just the Beginning

Biomethane is produced by "upgrading" or splitting biogas predominantly into biomethane and carbon. By capturing this carbon, biomethane production becomes de facto carbon negative. Captured carbon can be stored or used in industrial applications or in the food industry, for instance in carbonated drinks and packaging. The technology, as well as the carbon trading market, are nascent but rapidly growing. We believe that there are at least 15 anaerobic digestion plants in the UK already capturing carbon, with more projects announced and backed by major industrial companies.

Another byproduct of the anaerobic digestion process that produces biogas, known as digestate, can also be used as a biofertiliser, helping to reduce the need for synthetic fertilisers and promote sustainable agriculture. Food-grade carbon and biofertiliser are just two examples of value-add byproducts that are already produced and monetised today from anaerobic digestion processes. It is easy to imagine that with investment and the right expertise, the biogas industry is well placed to create other applications that could further enhance the commercial attractiveness of the sector. Some large energy players are already toying with the idea of converting biomethane into renewable hydrogen,[11] while others see a future in using biomethane to produce bioLNG for road transport.[12] Time will show what other commercial avenues the biogas industry is capable of opening.

## Looking Ahead

Biogas and biomethane will play a crucial role in the transition to a net zero future, providing a sustainable solution for energy production and waste management. It does not, however, imply that every biogas business is destined to be a highly successful investment. What we seek in biogas opportunities is strong baseline performance with wide optionality to benefit from future market developments. When it comes to baseline business, we tend to prefer features such as government subsidies and offtakes with blue-chip counterparties that provide a good degree of revenue certainty. Proven ability to source high-quality feedstock is another critical aspect of operating a robust biogas business. In terms of optionality, when we assess an opportunity in the sector, we want to know whether plant expansion is possible, who the local buyers for biofertiliser and carbon are, and what the local authorities' political ambition is in relation to waste recycling, anaerobic digestion, and biofuels.

Further, due to the distributed and inevitably "local" nature of individual plants, combining assets into a portfolio could prove very beneficial—by extracting operational synergies (such as staff sharing and feedstock supply optimisation) and providing diversification—or indeed it could be a critical mistake if plants are too remote and too different from each other. Ultimately, there is no shortcut to picking the right investment. Investors cannot rely on sector and macro tailwinds alone. The characteristics of an individual asset and determining the appropriate price to pay for it are also important considerations.

With that being said, we believe supportive government policies, growing investment, and a slowly but steadily maturing ecosystem mean that the future of biogas looks highly attractive and promises to have plenty of opportunities, particularly for investors who are focused not only on benefitting from long-term sustainability trends, but also contributing to them.

## About the Authors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Robert Wall is the Head of Sustainable Private Infrastructure at Lazard Asset Management. He has more than 20 years of experience in growing private market investment portfolios, investing in infrastructure companies, and delivering engineering projects. Robert began working in the investment field in 2007, and prior to joining Lazard in 2021, he was a partner and member of the infrastructure investment committee in private markets at Federated Hermes. Previously, he was a founding member of the infrastructure investments team at the Canada Pension Plan Investment Board. Robert has acted as a Non-Executive Director of operating companies and he began his career as a professional engineer. Robert has an MBA from Queen's University and a BE in Civil Engineering from the University of Canterbury.

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## Notes

1 Lazard Sustainable Private Infrastructure
2 ec.europa.eu/commission/presscorner/detail/en/ip_22_3131
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## Important Information

Published on 1 March 2023.