



# AHEAD OF THE CURVE

## BIOTECH4

Turning waste into biogas  
to power energy's transition

PRIVATE EQUITY  
INSIGHTS INTO  
TRENDS  
AROUND THE  
CORNER

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# POWERING THE GREEN ENERGY TRANSITION BY TRANSFORMING WASTE AND LEVERAGING GREEN CERTIFICATES

**Ahead Of The Curve** is a collection of reports in which Oliver Wyman Private Capital Partners share unique insights on innovative trends. The objective is to guide private equity clients through the investment landscape and to prepare them for twists and turns. In this edition, Alexander Lesch and Paul Jowett share their perspective on the impact of anaerobic digestion and green certificates on the green energy transition.

# FOREWORD

by Chris McMillan, Head of Oliver Wyman Private Capital Europe

In Formula One motor racing, heading into a corner represents the time of greatest opportunity for drivers, especially in the wet: grip is uncertain; drivers' lines around the bend differ; and each car performs differently in braking and acceleration. Careful preparation and a marriage of driver skill and teamwork can make a critical difference.

The same is true in private equity investing. It is crucial to prepare for inflection in cycles, to see around the corner to get ahead of trends, and to back the right platforms and assets.

At Oliver Wyman, we continue to think about where the next big opportunities might lie in private equity. Some ideas we will reserve for our clients; others we will write about in combination with companies that present or illustrate opportunities.

This video and article are the first in a series, and they address some of the less obvious opportunities arising from the green energy transition. It is clear that industries are on a march to decarbonize, and that they need to transition towards green sources of energy. Yet some sectors — such as power, aviation, and heavy trucks — will not be easy to electrify or convert to hydrogen power, at least for the foreseeable future.

The good news is that biogas, made from agricultural and food waste, can both reduce landfill and provide green sources of methane and diesel. Importantly, biogas also reduces dependency on imported natural gas, providing a useful fuel-security hedge for national governments.

In this video we talk with the CEO and management team of an innovative player, BioteCH4. The company has pioneered and patented technologies to make biogas and bio-oils, which can be used to produce diesel. It's a new bioenergy business which can serve end-uses that will be stubbornly hard to transition off hydrocarbons and hence need greener fuel sources.

# INDUSTRY TRENDS

## Core Trend

Decarbonization of energy and circular waste management

## Ahead Of The Curve Trend

Closed loop partnerships and the green-certificate economy

## INDUSTRY CONTEXT AND MAIN TRENDS

Energy production from sources other than fossil fuels is a major part of efforts to achieve a net-zero economy. The United Kingdom, for example, now has a legally binding carbon budget and wider commitments under the 2015 Paris Agreement, which require a rapid scaling of decarbonized energy. The need to decarbonize and make Europe energy-independent has become even more pressing since Russia's invasion of Ukraine, which triggered a spike in energy prices and led many European companies to seek alternative sources of natural gas.

One contributor to these goals is biogas. Mostly produced from biodegradable raw materials such as agricultural and food waste, it consists in large part of methane that is chemically identical to natural gas. It can be produced by a process called anaerobic digestion, in which microorganisms break down the feedstock in the absence of oxygen to form biogas. This biogas is then refined into biomethane.

The biogas sector is undergoing a paradigm shift. Some industries — such as metals, transportation and building heating — cannot easily be converted to use hydrogen or electric power, making them hard to decarbonize. But companies in these sectors often have existing gas infrastructure that enables the use of biomethane, so they are keen to secure sources of this.

As a result, the biogas sector is evolving from a local, decentralized heat-and-power business to a global, customer-driven biomethane industry. This shift is driving consolidation: At current energy prices, biomethane is economically viable independent of public support.

To access feedstock, biogas companies can form partnerships with waste-producing companies such as food manufacturers. These partners can then also be customers for the energy produced —whether this is provided directly via private power wire or by injecting biomethane into the grid.

This shift is driving consolidation, and at current energy prices, biomethane is economically viable, independent of public support. **At the same time, governments are increasingly enthusiastic about the biomethane industry.** The European Union is aiming for between €70 and €80 billion of investment in the sector by 2030 under the REPowerEU plan and the Biomethane Industrial Partnership. Since Russia invaded Ukraine, the EU has provided extra funding and doubled its biomethane production target for 2030 to 35 billion cubic meters. The UK government is targeting zero food waste to landfill by 2030 and zero avoidable waste to landfill by 2050, encouraging the supply of feedstock to generate biomethane. These policies provide a huge opportunity to invest in companies with capabilities in anaerobic digestion.

## SEEING AHEAD OF THE CURVE

Many companies are pursuing decarbonization further and faster than governments, driven by voluntary net-zero targets and increasingly strong compliance requirements. Environmental, social, and governance policies have had an impact on corporations in recent years, and net-zero commitments are creating the most tangible and measurable changes.

There are limits to energy efficiency, but companies can offset their residual emissions by buying green certificates. These are issued to energy producers for every megawatt-hour of renewable energy they supply to the grid. Other companies can then buy these certificates, creating a green-certificate economy, in which the certificates provide a source of revenue for producers of energy from renewable sources.

European certificate markets are still developing, but cross-border flows are already significant: around 40% of UK certificates are exported to high-priced markets in Central Europe, where much hard-to-decarbonize industry is based. In the long term, these certificates will be the main support mechanism for green energy, supplementing today's direct government subsidies.

The increasing value of green certificates is giving anaerobic digestion operators a powerful strategic lever. As well as a revenue source, the certificates can be incentives to build long-term partnerships. For example, operators could provide distilleries with power, heat, and green certificates, and in return receive waste as feedstock for anaerobic digestion. These closed-loop partnerships could provide long-term, stable revenue streams.

# PLAYER PROFILE: BIOTECH4

The BioteCH4 Group is an integrated business based on the production of renewable energy via the anaerobic digestion of food waste.

It has the following assets:

- Five anaerobic-digestion plants, together capable of generating 67 thermal megawatts (MWth) of biogas from about 520 kilotons a year (ktpa) of food waste (approximately one-third of all UK commercial food waste). The plants have the potential to produce some 11,000 cubic meters of bio-oil per year
- Two further anaerobic-digestion plants due in 2024
- Three waste-management businesses
- A construction and engineering firm

BioteCH4 employs about 190 people and is headquartered in Hemswell, Lincolnshire in the UK. The Group is led by an experienced team that has over the past decade pioneered the development of the UK's food-waste-based anaerobic digestion sector.

In 2022, BioteCH4 generated about 300 gigawatt-hours of various kinds of energy, which is the annual consumption of an UK average town. It processed over half a million tons of food, and replaced 175,000 tons of chemical fertilizer that would otherwise have been used on farmland. BioteCH4's revenues from its multiple streams (including gas, electricity, and separated oil) were approximately £100 million, representing average growth of 60% over the past three years.

**Transforming food waste for good. Delivering sustainable and economical solutions for your food waste recycling needs.**

## TRENDS AND COMPANY DIFFERENTIATORS

BioteCH4 was an early mover in anaerobic digestion and has grown rapidly. The company established its first renewable-energy plant in 2011 and now has five in England. Today, electricity generated at its Hemswell site powers the UK's largest bottle recycling plant via private wire, and the company is seeking to expand its direct B2B energy partnerships.

To obtain feedstock for its gas production, BioteCH4 has become one of the most trusted partners in the commercial food waste industry. It currently manages approximately one-third of the UK's commercial food waste produced in the UK, providing safe disposal for commercial food companies.

By focusing on food waste from the commercial sector, BioteCH4 differs from its competitors, which mostly get their feedstock from municipal food waste — collected and subsidized by local councils. However, these council contracts are coming up for renewal, which gives BioteCH4 an opportunity to compete for new contracts. Moreover, the UK's 2021 Environment Act mandates all councils to segregate food waste and treat it with anaerobic digestion, an area in which the company is an industry leader. BioteCH4 therefore has the potential to disrupt the UK market for waste processing.

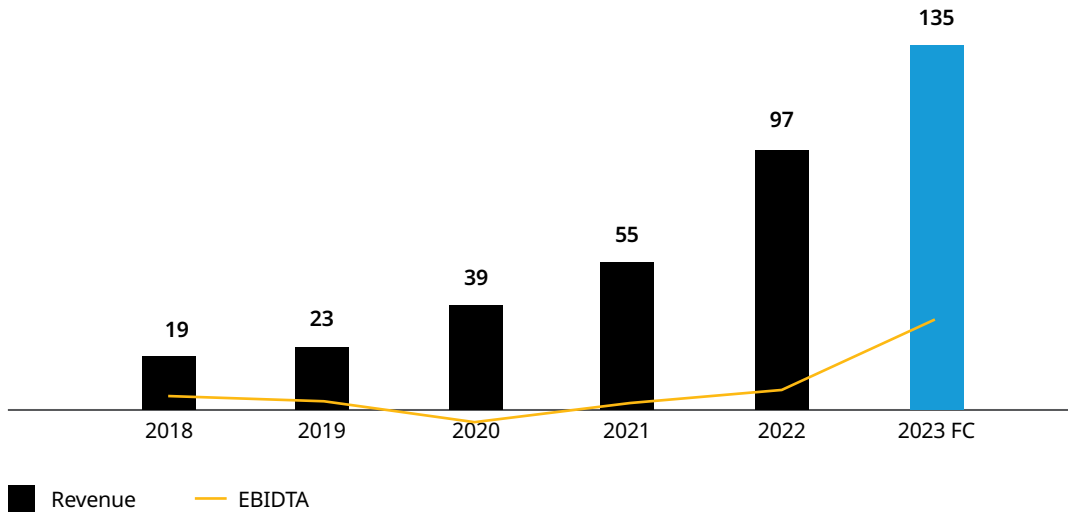
The company is also innovating outside its core business of biogas production. When anaerobic digestion produces biogas, it leaves behind a digestate, some of which is suitable for use as fertilizer. The company currently produces about 400,000 tons of high-quality digestate per year accredited to PAS110, a specification for digestate used in fertilizers. The fertilizers thus produced are used in agriculture near to the company's sites, where they replace others that are either synthetic or derived from fossil fuels.

The company has also developed and patented a process to remove excess oil from anaerobic digestion. This oil goes (in a similar manner to used cooking oil) into the creation of biodiesel and similar biofuels and so has the potential to become another biofuel feedstock in the near future. Other plans include an expansion into further products, for example selling or sequestering the CO<sub>2</sub> extracted in the biomethane process. Thanks to the hydrogen molecules it contains, biomethane will also be usable as a feedstock for green hydrogen when hydrogen technology begins to be deployed at scale.

BioteCH4 has its own construction business, giving the company crucial in-house engineering expertise. This means it carries out the expansion of new facilities itself, another competitive advantage.



### Exhibit 1: BioteCH4 Financial Performance



Source: Oliver Wyman analysis

The BioteCH4 business model is appealing because it provides numerous revenue streams from a multisite offering. Anaerobic digestion transforms food waste into gas and other useful products – yet the company’s logistics capabilities manage the treatment of food waste, from sourcing to eventual processing into gas and electricity.

BioteCH4 has both local and international development prospects. In the UK, BioteCH4 is applying for planning permission for two new sites. Meanwhile, legislative changes are driving organic growth. This means that BioteCH4 is helping to decarbonize the UK’s energy economy and create green jobs. Overseas, both Eastern Europe and the United States have limited infrastructure for commercial food-waste management, so they represent new opportunities.

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