

INSIGHTS INTO THE CURRENT COST OF BIOMETHANE PRODUCTION FROM REAL INDUSTRY DATA

BIOMETHANE INDUSTRIAL PARTNERSHIP

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EXECUTIVE SUMMARY

PREPARED BY TASK FORCE 4



TASK FORCE 4

The work of Task Force 4.2 comes as part of the broader Task Force 4 effort to provide insights into best practices for efficient and low-cost biomethane production and grid injection. Within this work subgroup 4.2 specifically focuses on the cost of biomethane production today and how this cost of production can be reduced in the future.



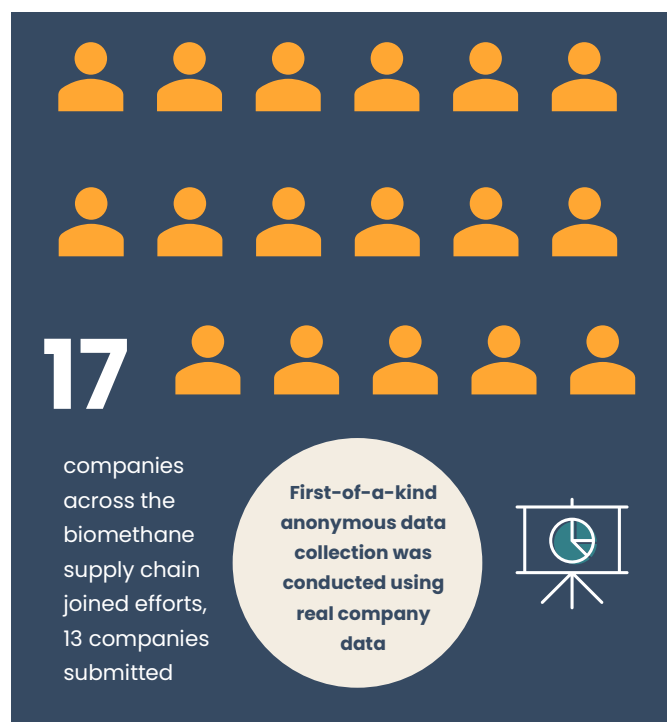
Process followed

There are many reasons to investigate the cost of biomethane production. Varying estimates from literature on the cost of biomethane production make it tough for policy makers to effectively support biomethane production. At the same time, it is tough for industry players to understand how they compare to the competition, and what parts of their production process are cost efficient or inefficient.

Given this, an analysis using real industry data was proposed. A first-of-a-kind data collection process was implemented to enable the gathering of valuable industry data in a confidential and anonymous way.

Biomethane plant owners, operators, developers, and EPC and technology providers were invited to anonymously share their cost data, in compliance with EU competition law, to allow for this analysis. A group of 17 joined the Task Force

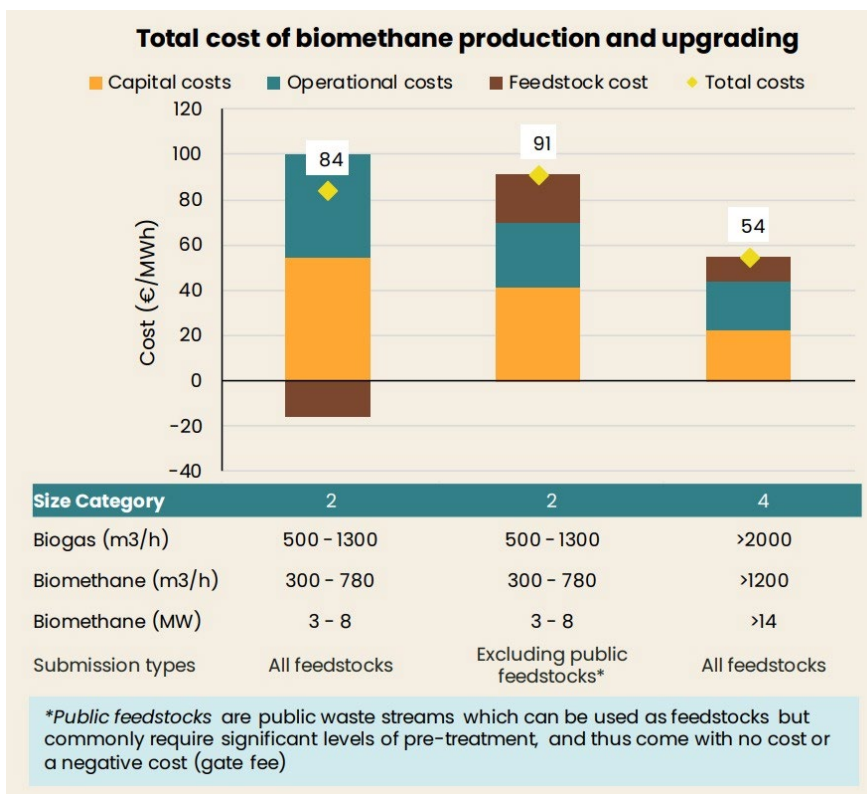
with 13 companies submitting data through a confidential and anonymous process, with the results and the potential cost developments discussed by the subgroup in a workshop in Brussels in the summer of 2023.



Main results

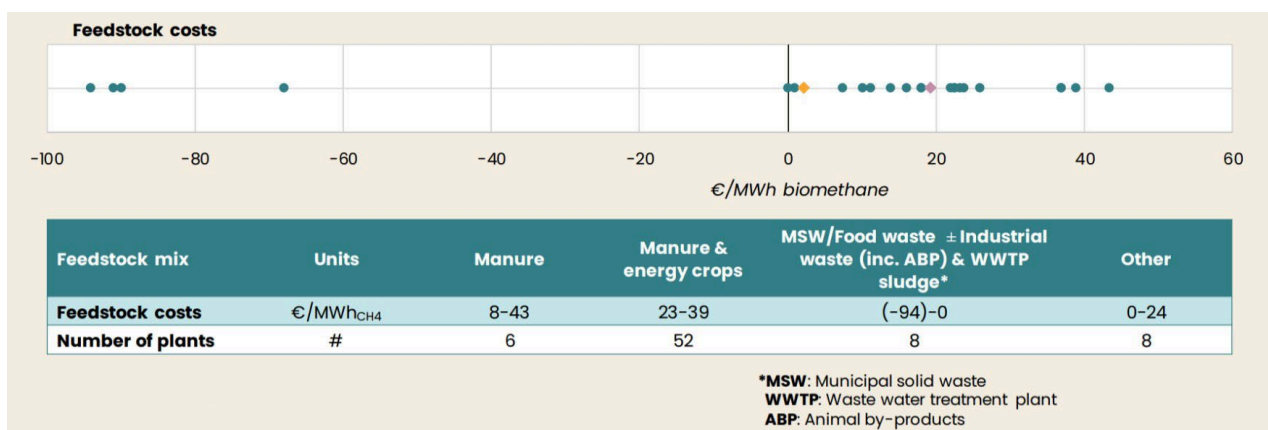
The 13 submissions contain data on a total biomethane production capacity of over 3.5 TWh biomethane, covering over 10% of EU biomethane production in 2022.

The average cost of biogas production and upgrading was found to be €84/MWh for smaller plants with a capacity of ~300-780 Nm³/h biomethane (approximately the average plant size in the EU), decreasing to €54/MWh for large plants with a capacity of >1200 Nm³/h biomethane. It is important to note that cost data was collected for the year 2021, as 2022 was a crisis year for energy prices, combined with high inflation.



As this result indicates, economies of scale are strong in biomethane production. This is particularly true for capital costs, with the smaller facilities having capital costs that are a factor of 2-3 higher per MW of capacity than the capital costs of larger biomethane plants. Operational costs show slight decreases with increased plant size, though they remain largely comparable.

For feedstock costs, the cost paid at the gate range from -€94/MWh to +€43/MWh biomethane, with an average of €2/MWh. This large range comes as different feedstock types can bring very different costs. Feedstocks from public waste streams such as municipal solid waste (MSW) and sewage sludge often come at no cost, or with a received gate fee for the biomethane producer, with a range in this study from -€94/MWh to €0/MWh biomethane.



This is not the full story however, as submissions indicate that there is a big difference in the cost structure of biomethane production when using such 'public feedstocks' compared to other feedstocks. The capital and operational costs of pre-treatment and compliance costs are generally higher when using public feedstocks.

When these costs are added to the feedstock cost, it turns out that the resulting *total feedstock related costs* for both public and non-public feedstock mixes are comparable at an average of €35-45/MWh.

What the cost of biomethane is compared to is important. If natural gas from the grid and the EU ETS CO₂ price are considered, the price of natural gas and cost of carbon in 2024 can be ~€64/MWh. The cost of biomethane production found here indicates that biomethane would on average come at a higher cost to the consumer than this natural gas, while large biomethane plants can already match this level. It is worth noting that for biomethane, a margin for the producer is needed for direct comparison here.

However, this cost comparison considers the valuation of the emissions reduction from the EU ETS, whilst emission reduction in some hard-to-abate end uses, which can influence the cost and is highly dependable on national policy and the national conditions, is not yet considered.

It must be noted that this cost comparison does not consider the full benefit of biomethane, as it is not just an energy carrier, but an enabler of many important sustainable processes, e.g. sustainable and circular agriculture, and can be considered an important part of investment into local rural economies.

