EBA
European Biogas Association

Statistical Report 2022

Tracking biogas and biomethane deployment across Europe

Supported by:

About the EBA

The EBA fully believes in the future potential of renewable gas in Europe. Founded in February 2009, the association is committed to the deployment of sustainable biogas and biomethane production and use throughout the continent. EBA counts today on a well established network of over 200 national organisations covering the whole biogas and biomethane value chain across Europe and beyond.

Foreword

Harmen Dekker,
CEO

This year, we have experienced the consequences of the extremely volatile price of fossil gas. The excessive dependence of the European Union (EU) on external energy supplies from Russia is hindering energy security and inflating the energy bills of thousands of European households and industries. The EU is determined to steer away from Russian gas while holding climate change mitigation efforts up, by expediting the production and uptake of renewable energy.

In this context, renewable gases, including biogas and biomethane, are becoming instrumental in shaping the future energy mix. Their deployment will reduce Europe's dependency on natural gas. Additionally, it will substantially contribute to an integrated net-zero energy system, encompassing the energy and agroecological transitions and helping Europe embrace circular economy. As demonstrated by this report, our sector is already providing 18.4 bcm of renewable gas to Europe. By 2050 it could provide up to 167 bcm, covering 35-62% of 2050's gas demand.

The EBA Statistical Report is the only detailed publication tracking the state of play of biogas and biomethane production and use across Europe every year, and covering the latest updates in multiple national markets. The report has become a reference publication, engaging with policymakers, market developers, investors and consumers in our continent. The 12th edition includes a specific chapter dedicated to digestate use, brand-new country profiles, fresh analysis on the evolution of Europe's energy mix, as well as updates on the sector's production costs and contribution to green jobs, among other relevant highlights.

We have been able to consolidate our data with the support of the EBA national associations. Special thanks go to the EBA secretariat and in particular to Mieke Decorte and Marina Pasteris, who have led the work to put together this thorough review of Europe's biogas and biomethane deployment. We are also grateful to all our sponsors who have supported the design of this publication through their contributions.

Giulia Cancian
Secretary General

2022 taught us that the EU climate agenda is not at odds with energy security. In face of the geopolitical crises and the Ukrainian war, the EU resilience was put to test. The REPowerEU plan, launched by the European Commission last May, outlined the strategy to counter Russia's energy blackmail.

Our sector is a key pillar of this strategy: the deployment of 35 bcm of sustainable biomethane a year by 2030 will contribute to energy security and climate change mitigation. REPowerEU has been a game-changer in the EU policy cycle. Climate and energy targets have been bolstered by this strategy and necessity has impressed a new pace to policy making.

To reach the 35 bcm target, biomethane must sustain a substantial growth until 2030. This will only be possible if market actors, civil society and policy makers work together to identify and tear down current barriers, improve market access opportunities and tradability, and plan clear trajectories towards the target.

The present publication shows us that the demand for biomethane for all final uses is strong: last year the growth of the sector was unprecedented, with a 20% increase in biomethane production.

For the sector to continue growing, and to allow policy makers to provide the right regulatory framework, the next steps must build on an evidence-based approach.

The EBA statistical Report keeps track of the achievements of our dynamic and forward-looking sector and for this reason it is an essential tool to back up wise investment decisions and solid policy design.

Colour Key

The following colour coding is used in the graphics contained in this report.

Feedstock types	Agricultural	Agricultural residues
		Sequential cropping
		Monocrops
		Manure
	Sewage sludge	
	Landfill	
	Organic municipal solid waste	
	Industrial (food and drink)	Industrial solid waste
		Industrial wastewater
	Other	
Upgrading technologies	Pressure swing adsorption	Membrane separation
	Water scrubbing	Physical absorption
	Chemical absorption	Cryogenic separation
Connection to grid	Distribution grid	% use in transport
	Transport grid	Not connected
Other	Biogas	Biomethane
	Bio-LNG / Bio-CNG	Unknown

Definitions

Feedstock types

Agricultural: All substrates related to agricultural production. This includes manure and other residues, such as straw, husks and cobs stripped of kernels of corn; sequential crops that are grown before or after the main crop, such as cover crops or catch crops (which reduce the chemical input into the soil and restore soil health); and other fresh crops, or primary crops. A further distinction is made as follows:

- **Agricultural residues**
- **Sequential crops**
- **Monocrops**

Sewage: Sewage sludge produced at municipal wastewater treatment plants.

Landfill: Organic waste on a landfill site. As the waste breaks down it produces biogas, which can be collected on-site and is also referred to as 'landfill gas'.

Organic municipal solid waste: Municipal waste and organic household waste.

Industrial (food and drink): Industrial organic waste, for example from the food and beverage industry. A further distinction is made as follows:

- Industrial waste excluding sludges
- Industrial sludges

Other

Upgrading technologies

Pressure swing adsorption separates carbon dioxide and methane molecules by using differences in their degree of attraction to a surface under elevated pressures.

Membrane separation uses a permeable membrane to separate carbon dioxide and methane molecules based on their different physical characteristics.

Water scrubbing dissolves the carbon dioxide molecules in water and thus separates them from the methane molecules.

Chemical absorption dissolves the carbon dioxide molecules in a chemical solvent and thus separates them from the methane molecules.

Physical absorption dissolves the carbon dioxide molecules in a liquid under pressure and thus separates them from the methane molecules.

Cryogenic separation cools the raw biogas to the condensation point of carbon dioxide. The methane molecules remain in their gaseous form, meaning that the liquid carbon dioxide stream can be easily separated.

Grid types

Distribution grid: In this report, the distribution grid refers to the gas distribution grid. The gas distribution grid delivers natural and renewable gas to individual homes and business. It is mostly operated at low pressure.

Other definitions

Biogas production capacity: The maximum amount of biogas which can be produced by the facility in question at any one point in time. E.g., a biogas plant with a biogas production capacity of 1 MW can produce a maximum of 1 MWh of biogas each hour (1 MWh being the consistent production of 1 MW over the course of an hour).

Biogas production: The actual amount of biogas produced within a certain time interval. E.g., the biogas plant actually produced 0.8 MWh of biogas in the past hour.

Flexible electricity generation: Where an electricity-producing facility can adjust its electricity generation according to demand. E.g., the production facility can produce more electricity when demand is high and less when demand for electricity is low.

Distribution grid: In this report, the distribution grid refers to the gas distribution grid. The gas distribution grid delivers natural and renewable gas to individual homes and business. It is mostly operated at low pressure.

Transport grid: In this report, the transport grid refers to the gas transport grid. The gas transport grid transports gas over long distances nationally and internationally. It is mostly operated at high pressure.

Abbreviations

Countries

AT	Austria
BE	Belgium
CH	Switzerland
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
IE	Ireland
IT	Italy
LT	Lithuania
LV	Latvia
NL	The Netherlands
NO	Norway
PL	Poland
PT	Portugal
RS	Serbia
SE	Sweden
SI	Slovenia
UK	United Kingdom
UKR	Ukraine

Other acronyms

AD	Anaerobic Digestion
bcm	Billion cubic metres
Bio-CNG	Biological Compressed Natural Gas
Bio-LNG	Biological Liquified Natural Gas
CHP	Combined Heat and Power
CNG	Compressed Natural Gas
DG	Directorate General
EC	European Commission
EU	European Union
FiP	Feed in Premium
FiT	Feed in Tarif
GHG	Green House Gas(es)
GO	Guarantee of Origin
kW	Kilowatt
LNG	Liquified Natural Gas
Mio	Million
M-, G-, TWh	Mega-, Giga-, Terawatt hour
NGV	Natural Gas Vehicle
NREAP	National Renewable Energy Action Plan
RED	Renewable Energy Directive
RED II	Renewable Energy Directive II
RES	Renewable Energy Sources
tpd	Tonnes per day

Methodology

The European Biogas Association Statistical Report is an extensive examination of the state of the biogas and biomethane industries in Europe. The report covers the EU-27 Member States as well as Iceland, Norway, Serbia, Switzerland, Ukraine, and the United Kingdom.

The data shown in this report originates mainly from national biogas associations, national statistical reports and industries present in the respective countries. This data is supplemented with data from the EBA-GIE biomethane map 2021, reports from European projects, such as REGATRACE report D6.1, "Mapping the state of play of renewable gases in Europe", and scientific publications. Although the EBA database is mainly based on official facts and figures, in some specific cases, qualified estimates, such as extrapolation from survey data, are made by national stakeholders and by the EBA.

Graphs in this report generally include figures for the period to the end of 2021. Where provisional figures for 2022 are already available, they are coloured in a different shade to indicate that they are not yet consolidated. In contrast, in the few cases where 2021 data is not yet available, the 2020 data is reused as 2021 data and will be updated in next year's report. Data from all years are continuously updated according to newly available information and new insights. There may, therefore, be differences between this report and previous EBA statistical reports. To deliver the comprehensive statistical report presented here, data from different sources is combined. However, this sometimes leads to small inconsistencies between figures.

For countries where national data on biogas production is not available, the figures are calculated based on the electricity generated from biogas, assuming a CHP electrical efficiency of 38%. In some cases, to convert data on biogas or biomethane production capacity to actual production figures, biogas and biomethane plants are assumed to have 8,000 yearly productive hours. A conversion factor of 10.61 kWh/m³ was used to calculate from bcm to TWh and vice versa.

Although every effort is made to make the EBA database as accurate as possible, some countries do not produce separate statistics for biogas and biomethane, instead including the number of biomethane plants in their figures for biogas, which makes it impossible to draw a clear distinction between biogas and biomethane. This may lead to a small overestimation of the number of biogas plants in few countries and in Europe as a whole. Bio-CNG and Bio-LNG plants are also considered as biomethane plants and thus included in the biomethane statistics. Gasification plants and biomethane production from gasification are not considered in this report.

Short overview per chapter

1 A circular bioeconomy with renewable gas

Chapter 1 gives a textual introduction and explanation of the role of biogas and biomethane in the total energy demand and production of Europe. Topics covered in this chapter are the primary energy production within the EU; energy consumption by sector; historical trend and future projections of greenhouse gas emissions; a note on historical and recent gas prices and Europe's energy dependency on energy imports; and finally, the role of biogas and biomethane as circular bioeconomy hubs.

2 The biomethane and biogas markets

This chapter analyses the development of the biogas and biomethane markets in Europe from 2011 to 2021. Where available, provisional figures for 2022 are included as well. The growth of both sectors is illustrated based on the total amount of renewable energy produced and the number of anaerobic digestion plants active in Europe.

Particular attention is paid to biomethane, with analysis of new plant installations in each year identifying growth trends in specific countries. The most commonly used upgrading technologies and different national tendencies in feedstock usage are also examined, along with trends in biomethane plant size ranges.

Biogas and biomethane plants are divided into different types in this report: agriculture-based plants; sewage-based plants; plants at landfills; plants processing organic municipal solid waste; plants processing industrial solid and liquid waste; and biogas and biomethane plants classified as "other".

Lastly, the chapter looks at the share of biomethane plants connected to the distribution or transport grids and portion of plants without a grid connection, as well as some information on the cross-border trade of biomethane.

3 Growth prospects and strategies for scale-up

This chapter illustrates the growth potential of the biogas and biomethane sectors according to different studies. It calculates average figures for potential biogas and biomethane production per feedstock type and per country, based on projections made by several different studies. It goes on to examine specific strategies to scale-up biomethane production in Europe. The chapter concludes by highlighting the importance of innovations currently taking place in the biogas and biomethane industry.

4 Biomethane use in transport

This chapter explores the current and projected development of Bio-LNG production between 2018 and 2025. The on-site production of Bio-CNG is investigated as well. For Bio-LNG, the confirmed Bio-LNG production capacity by 2025 per country is illustrated. Additionally, estimates as to the number of Bio-CNG and Bio-LNG filling stations in Europe are included.

5 Renewable gas for a resilient transition to net zero

This chapter describes the contribution of biomethane to Europe's strategic autonomy and includes figures on biomethane production costs, including forecasts, and measures for reducing production costs. To follow, the difference between biomethane production costs and the current volatile natural gas prices is highlighted. Furthermore, the level of current and future job creation from biogas and biomethane industries is calculated, and finally insights are given on the sector's turnover and level of scientific publications.

6 Completing the nutrient cycle with digestate

This chapter describes the advantageous characteristics of digestate, from agricultural to environmental benefits, as well as its general applications and novel uses. Additionally, estimations on total digestate production in Europe are presented together with an equivalent potential for synthetic fertilisers replacement. These estimations were performed considering the current and future potential of biogas and biomethane production. In terms of environmental impact, the GHG reduction potential as well as avoided natural gas consumption when digestate is used as a substitute to synthetic fertilisers are presented. Furthermore, available figures from the EBA database on the digestate production of different European countries are given.

7 Country analyses

Chapter 7 comprises country-specific analyses of 24 countries. The development of the national biogas and biomethane markets in each country is examined, including the impact of specific schemes and policies. Country-specific topics and trends are discussed and, where available, data on feedstock usage and digestate production and use are included. The countries included in chapter 7 are: Austria, Belgium, Switzerland, the Czech Republic, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Ireland, Italy, Lithuania, Latvia, the Netherlands, Norway, Poland, Portugal, Serbia, Slovenia, Sweden, the United Kingdom and Ukraine.

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