DECODING **BIOGASES**

MADE IN EUROPE, SUSTAINABLE, AFFORDABLE

EBA
European Biogas Association

Biogases: the all-rounders of the future energy mix

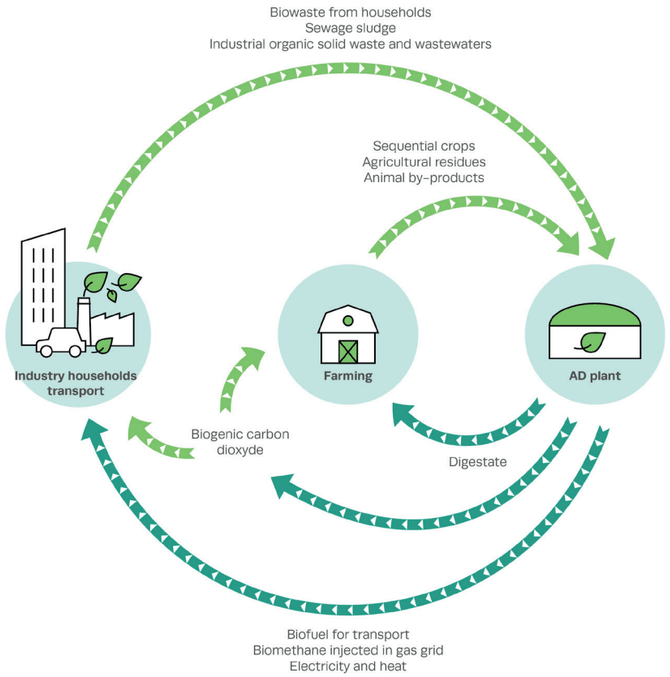
Biogas is produced by converting biomass, placing it in an anaerobic digester where microorganisms break down the organic matter, producing a blend of gases.

The output of this process is a raw **renewable gas that can be used for multiple applications**. Upgrading biogas to biomethane, which is chemically identical to natural gas, we can benefit from the excellent distribution and transportation network and replace all natural gas end-uses.

The impact of biogases goes far beyond energy production, as they provide solutions to great societal challenges. They help balance the grid, providing affordable and sustainable energy, and waste management solutions.

The offsetting of fossil energy with biogases stimulates leadership on clean technologies and creation of green jobs, boosting the development of a **European Bioeconomy**.

How do we produce and use biogases?



Organic matter as feedstock (i.e. food waste, agri residues, residues from industries, sewage sludge).

Biogas composition 60% CH4 40% CO_2 **Digestate & bio-CO_2** as co-products

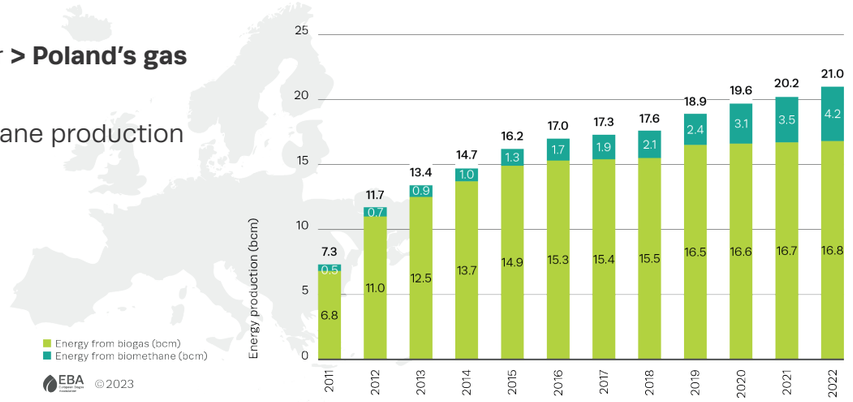
Biomethane is upgraded biogas: **Renewable alternative to natural gas**

21 bcm of biogases are produced in Europe today

Combined biomethane and biogas production per year in Europe (bcm)

21 bcm/year **> Poland's gas demand**

X2 biomethane production **in 4 years**

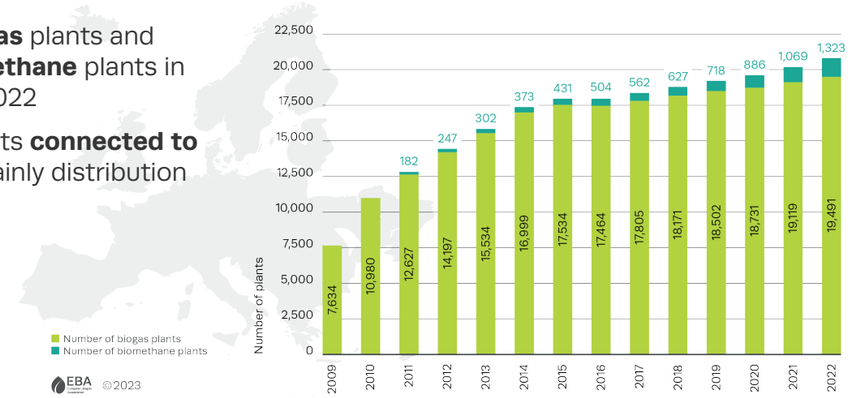


Leading the production and scale-up of biogases in the EU

Combined number of biomethane and biogas plants per year in Europe (bcm)

19,491 biogas plants and **1,323 biomethane** plants in Europe in 2022

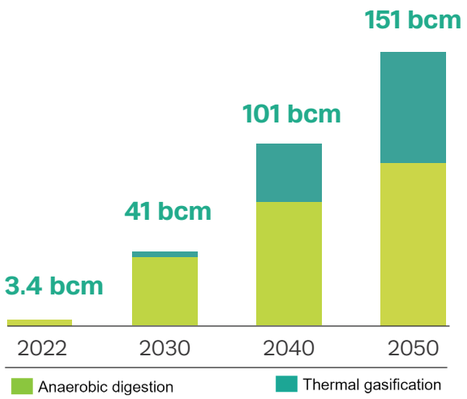
75% of plants **connected to gas grid**, mainly distribution network



Enabling a resilient energy transition

Biogases could significantly replace the future needs of gas, breaking the EU's dependency from natural gas imports with a renewable alternative produced and used in Europe.

Biomethane production potential in EU-27 until 2050 compared to existing production (bcm/year)

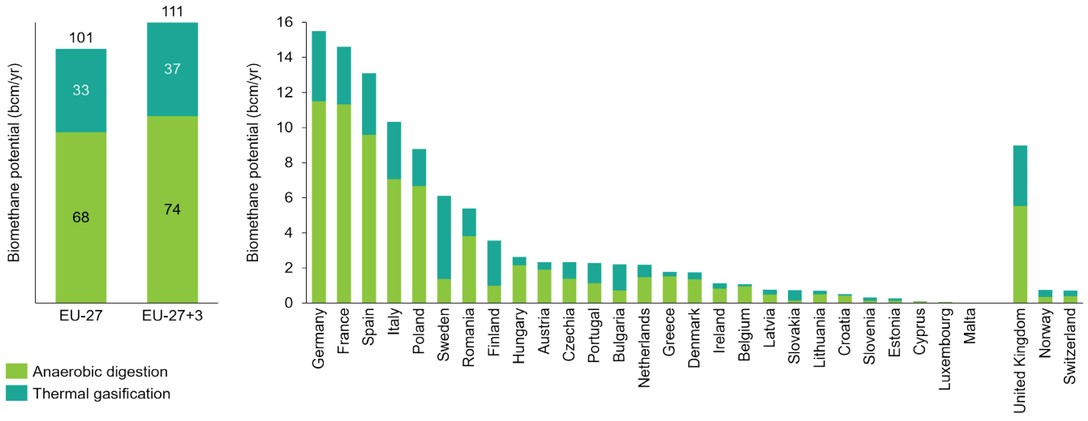


Biomethane production potential by **2030** is higher than the 35 bcm proposed in the REPowerEU but needs to be unlocked.

By **2040**, biomethane production could supply 85% of a reduced gaseous fuels demand.

** 2040 Target Plan estimates that combined consumption of natural gas, biomethane and biogas in 2040 will be of around 105 and 155 Mtoe (circa 125-184 bcm).*

2040 production potential per country for anaerobic digestion and gasification (bcm/year)



Production based on **sustainable feedstocks** such as agri residues, manure, sequential crops, municipal solid waste, wood waste and forest residues.

EU countries with highest potentials

** Source: Guidehouse 2024*

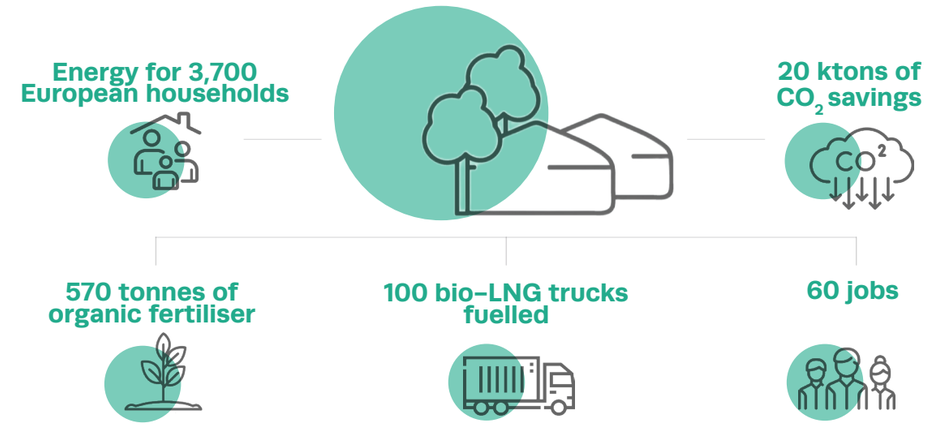
Defossilising the EU economy with biogases

Biogases play an important role in complementing and enabling the rise of other renewables, as they are an important source of flexibility in the energy system. They provide clean dispatchable power generation capacity, essential to bridge periods with prolonged low solar and wind output. This requires stronger connections between the electricity and gas systems to compensate for the drop in dispatchable power, mitigate grid congestion and ensure grid stability.

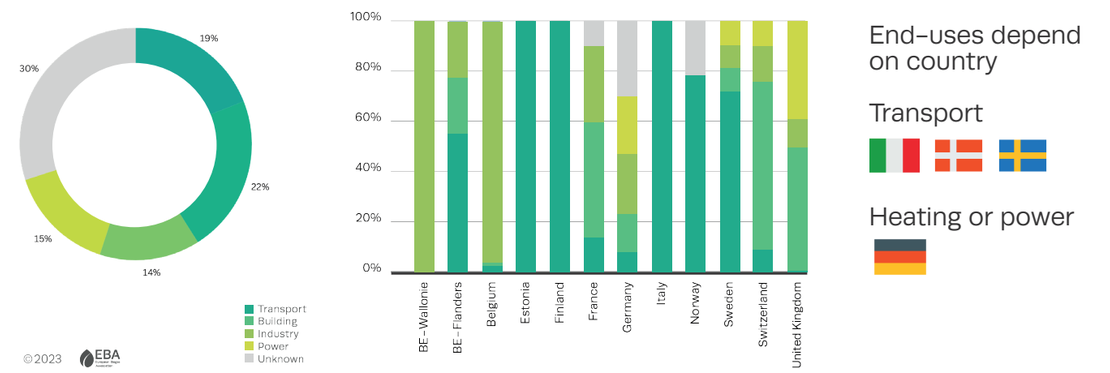
As biomethane is the chemical equivalent to natural gas, it can help **swiftly decarbonise the EU gas grid by being directly injected into the existing gas infrastructure.** Re-using this pre-existing asset in the energy transition **avoids significant costs and time** associated with the production of new vehicles, heating appliances or energy storage and networks. Sustainable biomethane will allow us to decarbonise faster our energy system, providing heat and electricity for households and industries, and sustainable transport fuels.

+80% of the energy in the EU is consumed in: **Buildings** **Industry** **Transport**

The average size of a biomethane plant is **43 GWh/year**. A plant of that size can provide:



Percentage of biomethane production used in different sectors



Valorising digestate and bio–CO_2

Digestate is a co–product of biogas production that can be used as **organic fertiliser.** By doing so, we can already replace different types of synthetic fertilisers of which we are heavily dependent from third countries. This can result in a reduction on natural gas consumption, as the production of synthetic fertilisers is quite energy–intensive.

Additionally, the application of digestate to agricultural soils is recognised as a **sustainable soil management** practice. The stable organic fraction of digestate sustainably enriches the humus content of the soil, which is the foundation of our agri–food system. Soil regulates nutrient, carbon and water cycles, provides a habitat for biodiversity and plays an essential role in the circular economy and the adaptation to climate change.

With current **digestate production (31 Mt DM)**, we could replace:

6% Potassium fertilisers

11% Phosphorus fertilisers

15% Nitrogen–based fertilisers

But also... Store **9,3 Mt** of organic carbon

Avoid **2 bcm** of natural gas

Today, CO_2 as feedstock is mainly from fossil origin, obtained from the production of synthetic fertilisers, which is highly energy–intensive. CO_2 is a needed input to produce chemicals, fuels, food and beverage products or construction materials, among others. **Replacing fossil CO_2 by a sustainable and circular alternative** such as bio–CO_2 leads to a **negative emissions footprint** which is not possible in the production of CO_2 from fossil origin.

Bio–CO_2 potential from biogas and biomethane production:

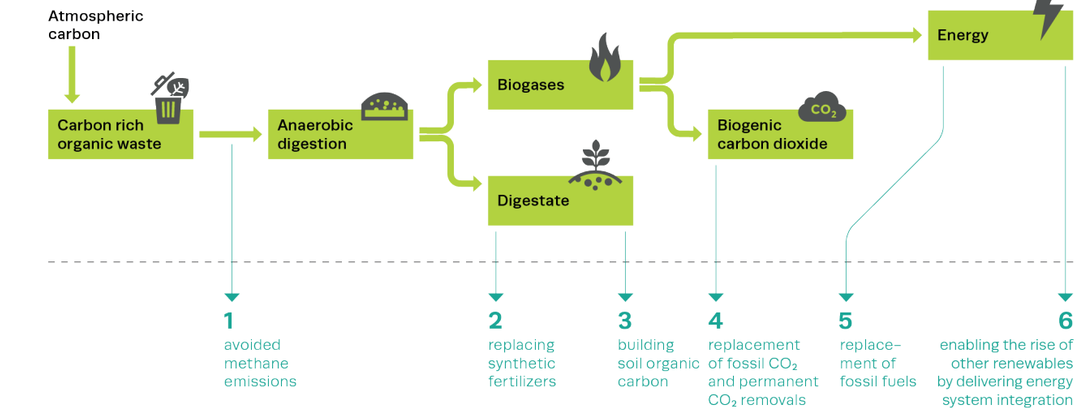
28 Mton today

46 Mton by 2030

130 Mton by 2050

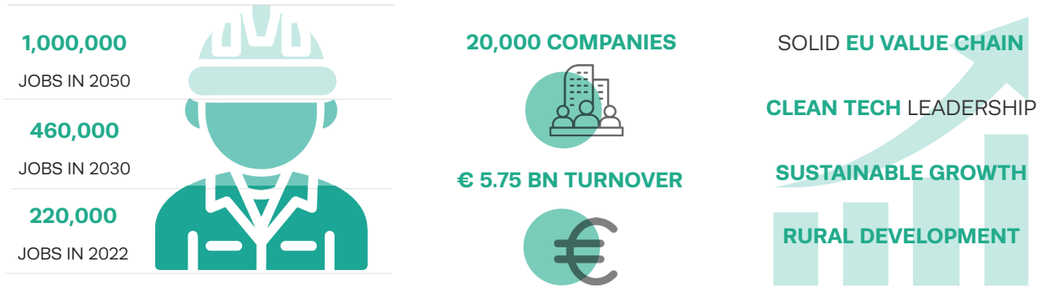
Enabling a negative emissions footprint

The biogases value chain can **reduce GHG emissions in 6 ways:**



This combination of pathways can lead to a negative emissions footprint.

Socio–economic impact of the biogases value chain



Every euro invested in biogases will remain in the European economy and provide an **additional value of 50% before 2030** that will also stay within our economy.

References

'*EBA Statistical Report 2023*' European Biogas Association, 2023
'*Biogases Towards 2040 and beyond. A realistic and resilient path to climate neutrality*' Guidehouse, 2024
'*Beyond Energy. Monetising biomethane's whole–system benefits*' Guidehouse, 2023

ABOUT EBA

The EBA fully believes in the potential of renewable gases in Europe. Founded in 2009, the association is committed to the expansion of sustainable biogas and biomethane production and use across the continent. EBA counts today on a well-established network of over 300 national associations and other organisations covering the whole biogas and biomethane value chain throughout Europe and further afield.

www.europeanbiogas.eu