BIOGASES: BEYOND ENERGY

As part of a balanced, forward-looking renewable energy mix, biogases are set to play a pivotal role in delivering Europe's long-term energy security and climate mitigation objectives. The benefits of biogases go far beyond the reduction of greenhouse gas (GHG) emissions. This series of six factsheets will explore the multiple solutions that biogases are already providing in the development of a European bioeconomy.

6. Sustainability

Biogases' sustainability

Sustainability ensures our well-being while respecting our environment and that of future generations: it underpins the further development of biogases in Europe. The production and use of biogases in the EU must comply with a set of sustainability criteria that came into force in 2018. These criteria ensure that sourcing feedstock does not negatively impact on biodiversity and the environment, biogases are used in an efficient fashion, and greenhouse gas (GHG) emissions are substantially reduced, relative to the use of fossil fuels.

Over the past decade, significant steps have been taken to preserve our natural environment. The 2030 Agenda for Sustainable Development outlines 17 sustainable development goals (SDGs); the achievement of many of these can be supported via the production and use of biogases.

How are biogases boosting sustainability across their value chain?

Facts

How can biogases support sustainable economic growth?

A: Biogases contribute directly to 12 of the 17 SDGs, thanks to their ability to increase the share of renewable energy, reduce climate change effects, enhance waste management and create sustainable jobs. The recent Guidehouse study, *Monetising biomethane's whole system benefits (2022)*, concludes that by 2030, the socio-economic and environmental benefits of biomethane production to the EU27 and the UK will range from €38-78 billion per year, with the potential to reach €283 billion by 2050.

How are biogases contributing to GHG savings?

A: Biogases have the unique ability to remove carbon from circulation and thus be carbon negative: the biogases value chain starts with the extraction of carbon dioxide (CO_2) from the atmosphere via photosynthesis. Further contributions to GHG savings along the biogases value chain include avoiding methane emissions; replacing the energy-intensive production of synthetic fertlisers; building soil organic carbon via the application of digestate and the introduction of new agricultural practices; replacing fossil CO_2 in chemical usage; permanently removing CO_2 from the atmosphere by carbon capture and storage; and replacing fossil fuels, as well as supporting the development of other renewables by facilitating energy system integration.

How can plant design and mitigation help to reduce methane emissions?

A: Biodegradable waste is widespread and originates from many different societal and economic activities. Examples include food waste, agricultural by-products, and sewage sludge. If left untreated, these and other waste products generate an uncontrolled release of methane. Anaerobic Digestion (AD) plants are controlled environments where these emissions are turned into renewable gas. Although AD-related methane emissions do occur, the biogases industry is a net reducer of methane emissions. Thanks to successful monitoring programmes and technical advancements, actual methane emissions are kept to a minimum.

What are the RED sustainability criteria and why are they so important for the sector?

A: In 2018, the Renewable Energy Directive (RED) introduced a set of sustainability and GHG emissions savings criteria for biogases. These requirements ensure that biogases are produced using sustainably sourced feedstocks, soil health is safeguarded, and significant GHG emissions savings are made relative to the use of fossil fuels.

Our sector must comply with these requirements, in order to:

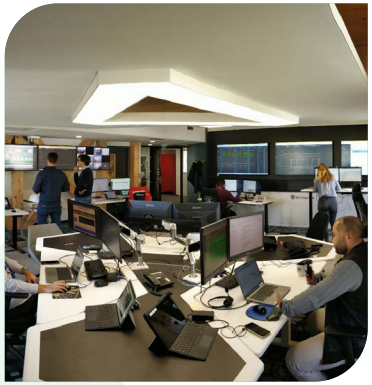
- count towards the EU overall renewable energy target and sectoral sub-targets;
- be eligible for public support;
- achieve a zero-rating in the EU emissions trading system and be considered as a valid GHG emissions mitigation option.

The RED policy has had a positive impact on the quality of feedstocks used for biogases. The data show that, since the regulations were introduced, new biomethane plants have increasingly looked to waste- and residues-based feedstocks for their operations.

Case studies

Biogases 4.0

Air Liquide Biogas Solutions has set-up an operations control centre remotely monitoring and optimising all its Europe-based biomethane production plants, 24/7. The digital platform and the constant observation it enables have allowed the company to enhance the safety of their operations by having eyes on the assets around the clock; to improve the reliability of their sites by reacting instantly to any event; and to increase the load rate and efficiency of the plants by optimising process parameters using advanced analytics.



Circularity and the building of a sustainable future

The Bresso-Niguarda wastewater treatment facility, part of the BIOMETHAVERSE research project, pioneers Italy's first biomethane production from sewage sludge. With a water treatment capacity of 2,200 m^3/h, the treated water is repurposed for agriculture, while the sludge undergoes anaerobic digestion (AD) to produce biogas. 600,000 m^3/year of upgraded biogas are then injected into the grid.

In a further step towards circularity, four innovations are implemented at the site: (1) feedstock pretreatment via ozonolysis to enhance biogas yield from sewage sludge, (2) hydrogen-assisted biological biogas upgrading, utilizing specific microorganismn to convert CO_2 into methane, (3) a reactor for microalgae biomass growth fed with unconverted CO_2 and liquid digestate and (4) a unit for co-digestion of sewage sludge and microalgae to enhance biomethane production.

Recommendations

Ensure the correct and harmonised implementation of the EU sustainability criteria for biomass used for energy production, as set out in the Renewable Energy Directive (REDIII).

Support the target of 35 bcm biomethane production by 2030, which represents an opportunity for the industry to boost the efficiency and sustainability of the production process.

Fully acknowledge the GHG emissions mitigation and circularity potential of biogases across their whole production chain.

Reward and recognise in future climate, energy and waste policies, the socio-economic and environmental externalities that biogases deliver.

Follow this campaign:

European Biogas Association
Renewable Energy House
Rue d'Arlon 63–65
B – 1040 Brussels (Belgium)
info@europeanbiogas.eu
T. +32 24 00 10 89
www.europeanbiogas.eu