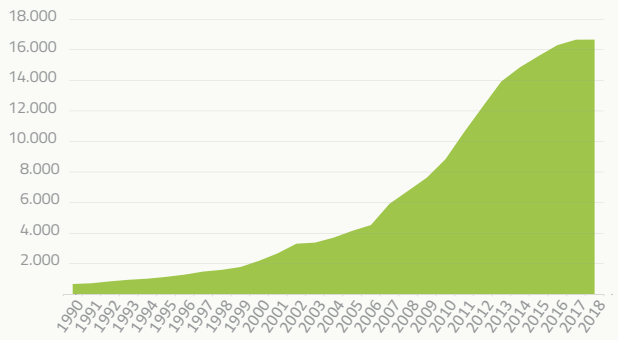
BIOGAS

Biogas is a versatile renewable fuel that can be used to produce heat, electricity or both in CHP plants. It can also be upgraded to biomethane, to be injected into the existing gas grid, used in industrial processes or as a transport fuel. Sustainable biogas production contributes to the decarbonisation of the EU energy system, reduces methane emissions from manure and landfilling, limits dependency on mineral-based fertilisers and brings various positive externalities such as low grid adaptation costs, flexible energy supply, resource-efficiency and agroecology.

The European biogas market is well established and mature: biogas consumption has grown almost 26 times since 1990 reaching a total of 16.670 ktoe in 2018 from 18.802 plants. It represents about 1% of the total gross inland energy consumption of the EU-28.

Evolution of the gross inland energy consumption of biogas in EU28 (in ktoe) (Source: Eurostat)



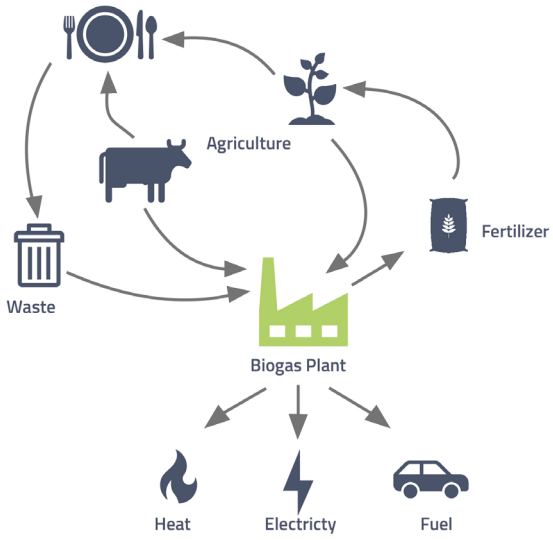
Evolution of the number of biogas plants in Europe (Source: EBA)*

Biogas and the circular bioeconomy

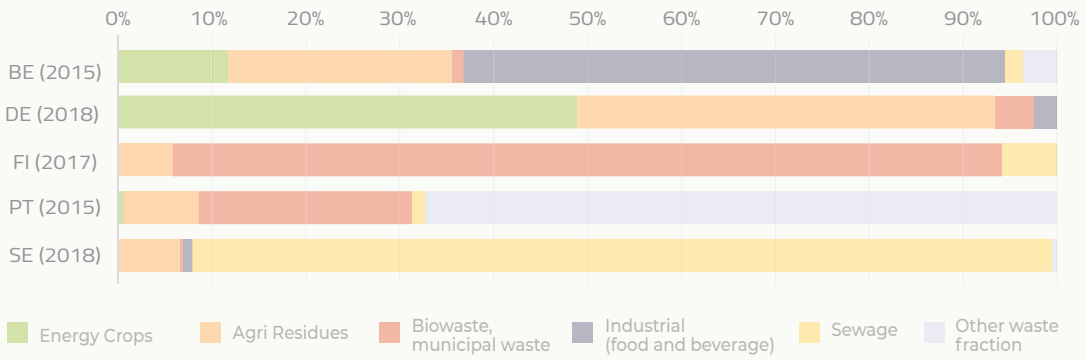
Biogas is produced through the anaerobic digestion (AD) of agricultural residues, energy crops, sewage sludge and biodegradable wastes or captured from landfills.

In Europe, 72% of the feedstocks used for biogas production come from the agricultural sector. Biogas provides a profitable slurry management solution while creating new business opportunities in rural areas characterised by land abandonment, aging population and higher rates of energy poverty. It also allows farmers to adopt sequential cropping schemes which are a powerful source of ecological restoration.

Waste represents the main source of feedstock in countries such as Finland (88%) and Portugal (89%). The EU obligation to separate bio-waste fraction by 2023 will increase the volume of food waste available for AD. Finally, sewage accounts for 16% of feedstock in Europe and it is the main source of biogas in Sweden (91%).



Feedstock use for biogas production in selected European countries (excluding landfill - expressed as a mass percentage) (Source: EBA)

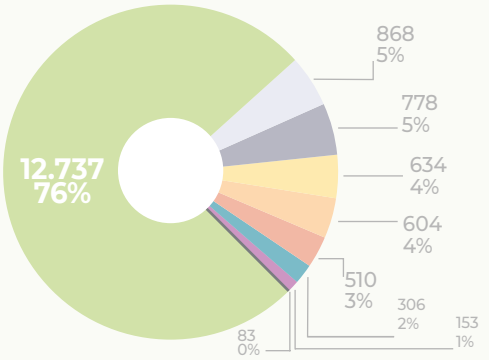


The end-product of the digestion process, known as digestate, can be optimised and used as organic fertiliser, replacing energy-intensive production and supply of mineral fertilisers. These environmental benefits are coupled with socio-economic advantages since the development of digestate market can provide an additional source of income for farmers.

Towards a carbon-neutral economy and an integrated energy system

AD plants provide a stable supply of renewable energy and a form of energy storage. This increases the EU's security of supply, energy independence and reduce GHG emissions and other air pollutants. A smart, integrated and resilient energy system will require a combination of biorefining processes and bioenergy uses, renewable gases production and blending, district heating and cooling system, and biogas for industrial and agro-industrial sector.

Biogas gross inland energy consumption by end-use in 2018 in EU28 (in ktoe and %)
(Source: Eurostat)



Biomethane: Greening the gas grid and transport sector

Once the biogas is clean from CO_2 and impurities, the remaining gas has similar characteristics to the fossil natural gas and, therefore, suitable for injection into the existing gas grid.

Biogas upgrading has tripled since 2011, up to 610 plants in 2018 in the EU, UK and EFTA countries . Given the right incentives and regulatory framework, it is a viable substitute to fossil gas but also to transport fuel, especially for heavy-duty vehicles.

RECOMMENDATIONS

1. **Recognise and incentivise biogas role to achieve carbon neutrality:** To decarbonise all economic sectors, a holistic approach to carbon pricing and the phasing out of subsidies for fossil fuels must accompany the uptake of renewables. This should be addressed in the Strategy for Smart Sector Integration and the Decarbonisation package. A target for biomethane production in the EU should be supported by EU-wide guarantees of origin, and a set of rules facilitating the injection of renewable methane into the gas grid: the grid connection costs must be shared by the operator and the producer; the producers must have a right to inject into the grid and must benefit from a long-term stable support regime.
2. **Enhance circular and bio-based economy:** The environmental and socio-economic potential of feedstocks such as bio-waste and agricultural residues remains mostly untapped. Member States must implement separate bio-waste collection as soon as possible and reinforce their strategies aimed at energy and materials recovery in their waste treatment.
3. **Make agriculture more resource-efficient and sustainable:** The Common Agricultural Policy must adequately recognize the benefits of biogas production for rural development and of the use of digestate as fertiliser and soil improver. This will help reduce costs and emissions caused by mineral fertilisers and lessen dependence on critical raw materials such as phosphorous. It should also promote ecogical intensification of land which enriches carbon content and fertility of soils.
4. **Apply life-cycle emissions approach across sectors:** For example, vehicle standards should cover the whole life-cycle emissions and not just the tailpipe emissions to capture the true impact of energy use along the value chain.