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Biogas and Biomethane

What it is and why it matters

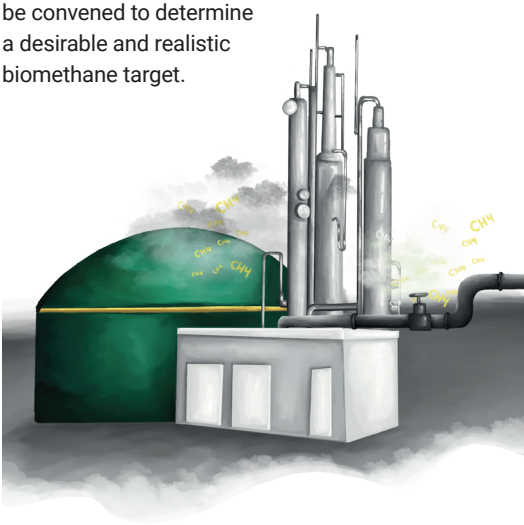
Biogas is produced by breaking down organic materials in the absence of oxygen in a process called anaerobic digestion. The organic materials used for production (feedstocks) include: crops specially grown for this purpose, most often maize; food and plants considered waste; sewage sludge; industrial wastewater; as well as animal manure. Gas from landfills can also be collected. Biogas can be used directly for heating and electricity generation.

Biomethane is biogas that has been purified to increase the methane concentration, making it similar to fossil gas. Once upgraded, biomethane can be injected into the gas grid and used in systems that run on fossil gas.

The European Commission's REPowerEU action plan of May 2022 set biomethane production on a course of massive upscale as part of efforts to increase EU energy independence, fixing a target of 35 billion cubic meters (bcm) per year by 2030 – up from 4,1 bcm in 2023. However, **no Impact Assessment was carried out on the target**.

As biomethane production continues to grow rapidly (with a currently 21% year-over-year growth), so do concerns about its associated environmental and social risks. While biogas production from sludge or collecting the gas that is produced in landfills is appropriate, **there are particular concerns about the effects of large-scale biogas production on the use of limited agricultural land, the continuation of polluting industrial animal production, harm to local communities, and the effects of methane leaking from biogas facilities**. Further concerns arise when looking closer at promoted use cases for biomethane such as heating or transport which are often inefficient, expensive, and lock Europe into fossil infrastructure.

We call on EU policymakers to review the biomethane ambitions of the REPowerEU plan through an independent Impact Assessment to ensure adverse impacts are avoided. As research has shown, there are simply **not enough sustainable feedstocks to meet the 35 bcm ambition**. Therefore, an interdisciplinary team of experts needs to be convened to determine a desirable and realistic biomethane target.



The StopTheBiomethaneRush coalition

We are a group of independent not-for-profit organisations that have come together to ensure that the environmental, community, and climate risks of the massive upscaling of biomethane are heard by decision makers.

Our StopTheBiomethaneRush coalition represents a broad range of organisations active in the fields of food sovereignty, sustainable land use, animal rights, energy systems, shipping, the heating transition, and emissions mitigation. Significantly, local communities around Europe are also represented in our coalition, giving voice to the people directly affected on the ground.

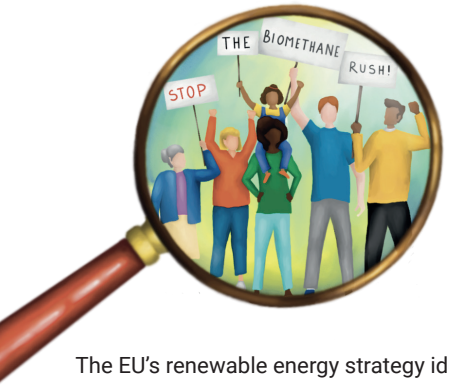
Together, we challenge the large-scale development of industrial biogas operations that creates risks of additional environmental pollution, climate impacts, and social injustices.

While we recognise that biomethane from unavoidable organic waste streams can contribute to energy needs, levels produced must be kept within a sustainable niche.

Our analysis, based on scientific evidence and the experiences of impacted communities, identifies how policy can ensure biomethane production remains compatible with sustainable practices in the farming, food, and energy sectors whilst ensuring it also respects community well-being.

Local communities perspective

While EU targets for biomethane production are widely publicised, the burden falls largely on local and rural communities



The EU's renewable energy strategy identifies biomethane as a key component in achieving climate targets. However, implementing this strategy **places a disproportionate burden on rural communities, without adequate regulatory protection**.

When tailored to local contexts, farm-scale, closed-loop biogas systems can offer genuine environmental and economic benefits. In contrast, the expansion of **profit-driven industrial-scale anaerobic digestion projects**, largely driven by multinational agribusinesses, is transforming rural landscapes across the EU. Such operations utilise diverse feedstocks, sourced from extensive areas, **placing heavy demands on local infrastructure, increasing traffic from heavy vehicles, and disrupting rural economies and tourism**.

The environmental risks are equally concerning including **high water consumption, biodiversity loss, soil health, and groundwater quality**.

Without careful planning and strong regulatory frameworks, the unchecked growth of industrial biomethane production risks undermining the very communities it relies on. **EU policy must ensure that biomethane development aligns with local needs and capacities**. This includes enforcing strict environmental safeguards, mandating genuine community participation, and supporting the development of appropriately scaled, circular bioenergy systems.

Only when responsibly managed, biogas and biomethane can meaningfully contribute to the energy transition, without compromising the resilience and well-being of rural communities.

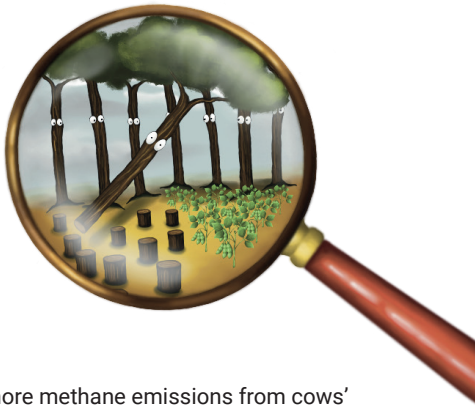
Food systems perspective

Why large-scale biomethane production reinforces harmful and polluting industrial agricultural practices

To be economically viable, industrial biogas plants require a constant supply of crops and manure. This has caused monoculture production of energy crops, harming biodiversity and taking land away from sustainably growing food to eat or other materials needed to move away from a fossil-fuel economy.

Worse still, industrial biogas may incentivise more and larger factory farms, or at least lock in current production levels, even though there is an urgent need to reduce the production and consumption of animal products in order to achieve climate targets. Animal herds, like the EU's average of 50 dairy cows, are largely economically unattractive for biomethane production. In the U.S., the installation of biogas infrastructure promoted through subsidies is leading to growing **animal factory farms**. From a climate, environmental and food systems perspective, smaller grazed herds is a beneficial model. Yet, industrial biogas production advantages intensive production models over extensive, pasture-based ones since manure is more easily collected.

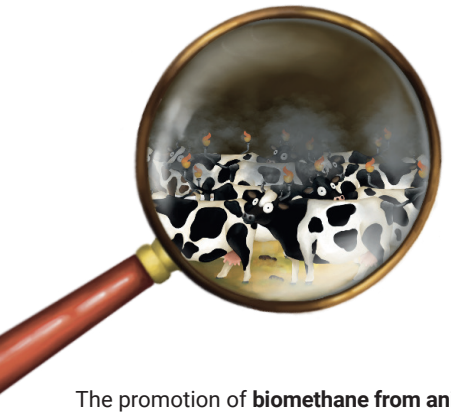
Even though biogas production is marketed as a climate fix, its approach to reducing animal emissions – two thirds of the EU's agricultural emissions – is simplistic and narrow, ignoring the broader scope of emissions connected to industrial animal production. Not only does it ignore methane emissions from cows' burps ('enteric fermentation') but it also turns a blind eye to emissions from growing animal feed which is often linked to biodiversity loss and deforestation, especially in Latin America. The climate benefits of biogas production are dwarfed by the emissions caused by raising animals in the first place.



Keeping today's high levels of animal farming means huge amounts of feed are needed – much of it imported. **If we tried to replace just half of those soy imports with EU-grown crops, we'd need to convert 12% of our farmland to soy**. Industrial biogas models incentivise large-scale factory farming, making it harder for the EU to become self-sufficient in animal feed production and reinforcing polluting industrial agricultural practices.

Animal rights perspective

Why biomethane fuels the exploitation of animals and is a barrier to a just food system



The promotion of **biomethane from animal manure dangerously legitimises and entrenches industrial animal agriculture**. Rather than addressing the root cause of environmental destruction – our over-reliance on animal-based food systems – **biomethane provides a false solution that props up a harmful status quo**.

Industrial farming is inherently exploitative, subjecting animals to systematic confinement, mutilation, and premature death. **By monetising manure through biomethane, we create subversive incentives to sustain or even expand these systems under the guise of sustainability**.

This approach undermines the urgent need to transition away from intensive animal farming for the sake of animal rights, climate action, public health, and food safety. The biomethane industry diverts attention and resources from genuinely sustainable solutions, including a shift towards more plant-based food systems, while masking the sector's massive emissions, deforestation, water pollution, and antibiotic resistance risks. A truly just and sustainable food system cannot be built on the exploitation of animals.

Food waste perspective

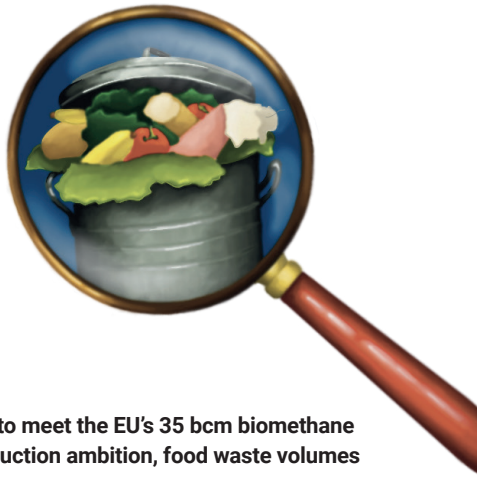
Why the biomethane rush undermines the EU's first-ever food waste reduction targets

In early 2025, the EU agreed to introduce the **first-ever binding food waste reduction targets** for its member states, to be achieved by 2030 – a historic decision. Why? Because in 2022, the EU still wasted **between 59 and 144 million tonnes of food per year**, including food wasted at farm level. That **could well be equivalent to about three quarters of the food the EU imports!** But food waste isn't inevitable — it's a result of business decisions in the food value chain, especially by powerful players like supermarkets.

Our priority should be preventing food waste arising in the first place – which avoids an estimated 9 times more emissions than sending it to biomethane plants. **But badly designed biomethane policy can significantly undermine food waste prevention**.

Firstly, if badly designed policies like biomethane subsidies make it too cheap to send food waste to biomethane plants, this creates perverse incentives because it makes food waste cheap to dispose of. This also risks diverting wasted food from secondary uses like redistribution and animal feed, which save more emissions.

Secondly, **scaling up biomethane plants has the risk of locking in demand for food waste**. EU countries must at least meet the EU's legally binding food waste reduction targets – and many have pledged to go beyond this and halve food waste by 2030.

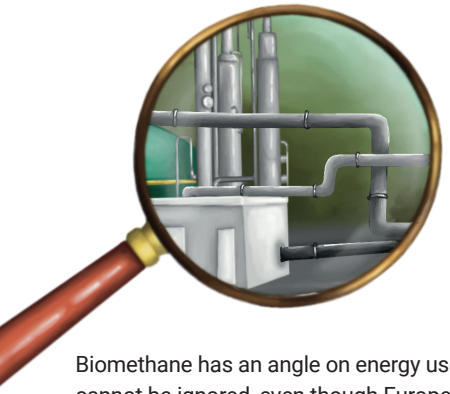


Yet, **to meet the EU's 35 bcm biomethane production ambition, food waste volumes will need to remain similar to current levels**. This creates a perverse incentive: instead of preventing waste, the system locks in reliance on a steady flow of it, directly undermining efforts aimed at reducing food waste at its source. As a result, we risk generating energy from food that did not need to be grown, harvested, transported, processed, or packaged in the first place.

Biomethane does have an important role for treating food waste, within limits – for unavoidable food waste, sending it to biomethane or composting should be the bare minimum – and diverting food waste from incineration and landfill will require an upscaling of biomethane plants. But policies should be well-designed to ensure food waste prevention is prioritised.

Energy system perspective

Why biomethane can play an important role in the energy system, but only if adjusted to its possibilities



Biomethane has an angle on energy use that cannot be ignored, even though European targets give it a greater role than we consider achievable within its **sustainable** niche. However, **in no way will biomethane be able to replace all the current uses of fossil gas** and in the new sectors in which it is announced to be developed, such as maritime transport.

In Spain, numerous unsustainable biomethane projects represent a greenwashing of an outdated and dangerous agro-industrial model, based on the transport of waste from distant sources and on the artificial demand for more industrial animal production waste, with minimal impact on real decarbonisation.

For this reason, **priority should be given to local production and the direct use of biogas in locations close to its production, favouring the emergence of synergies with related industries, which are necessary for the ecosocial transition, use high temperatures, and have no other option for decarbonisation. Its use should also be prioritised for self-consumption in the production plants themselves**.

As mentioned above, the potential for biomethane production will not replace the current uses of fossil gas, which is why its development cannot be an excuse for not addressing the necessary abandonment of fossil gas before 2030 in the electricity sector and in households, and in 2035 in the entire energy system. However, **biomethane could serve as a source of manageable electricity generation in small and medium-sized plants**.

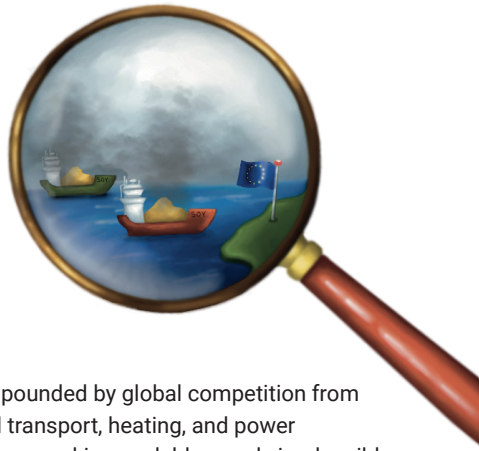
Shipping perspective

Why biomethane locks shipping into a climate-wrecking path

The push to use biomethane (also called bio-LNG) in shipping is a dangerous diversion from real climate action. Much like fossil LNG, biomethane use in marine engines results in methane slip, releasing unburned methane—an extremely potent greenhouse gas, over 80 times more powerful than CO_2 in the short term. **Lifecycle emissions studies reveal that biomethane can have a higher climate impact than conventional fuels like marine gas oil, especially when upstream leakage and methane slip are accounted for**.

Despite this, industry projections suggest LNG—including biomethane—could fuel 20% of the global fleet by 2050, driven by industry interests to lock in climate-intensive infrastructure from LNG pipelines to bunkering facilities refuelling LNG ships.

Biomethane volumes are nowhere near sufficient to cater to the needs of the shipping sector. Even if all of Europe's biogas in 2020 were refined to biomethane, it would still only cover 6% of the EU shipping fuel demand. This limited availability is further



compounded by global competition from road transport, heating, and power sectors, making scalable supply implausible. Certification schemes are also weak, traceability is poor, and fraudulent double-counting is already documented.

By investing in biomethane, the shipping industry perpetuates reliance on fossil LNG terminals and engine technologies. The result is a costly detour — biomethane delays the urgent transition needed towards scalable, zero-emissions shipping solutions.

Heating perspective

Why heating Europe's homes with biomethane is inefficient, unsafe, and unnecessary

Greenhouse gas emissions from buildings need to be reduced by at least 60% during this decade according to the European Commission in order to reach the EU's overall 55% emission reduction target by 2030. Renewable heating represents together with building renovation and energy efficiency the best-placed solutions to reach this climate goal in time. In the face of soaring energy prices, heat pumps and solar thermal systems will also critically contribute to reducing both energy bills and dependence on Russian gas as over 40% of imported gas is used for heating buildings. Remarkably, the European Social Climate Fund and the Emissions Trading System ETS 2 funds could deliver most of the needed investment.

The idea that so-called "decarbonised gases" such as biomethane can replace Russian gas and fossil gas more generally in heating systems is flawed. Firstly, the limited sustainable potential of biomethane production makes it **insufficient to meet the extensive demands of the heating sector and is in direct competition with the use in hard-to-abate sectors**. Secondly, using biomethane in heating systems other than local small district heating grids, would result in minimal shares blended in the grids, would constitute a **mere alibi to continued use of fossil gas beyond 2040, and is up to 7 times less efficient than electrification options**. Thirdly, the continued use of gaseous fuels would result in **continued domestic casualties in the EU**, which are taking a serious toll across the whole EU due to **accidents and carbon monoxide poisoning**. Finally, the promotion of biomethane – manifested by the industry push for "biomethane-ready boilers" – as a substitute for fossil gas **locks-in existing fossil fuel infrastructure**, with the growing running and maintenance cost weighting heavily on the shoulders of the remaining customers, and sabotages electrification efforts in the heating sector.

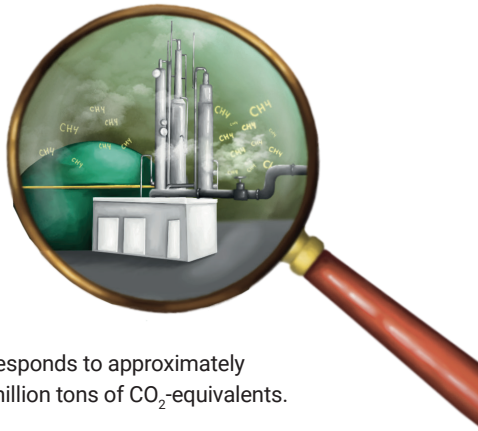
Alternative fuels such as biomethane should be used in limited industry sectors which are hard to electrify, which is not the case for domestic heating. Energy efficiency measures and direct electrification through the deployment of heat pumps and solar thermal systems are both critical and possible to achieve. These renewable heat solutions will help make European homes and offices climate neutral by 2040 and should be prioritised as part of the decarbonisation transition of the heating sector.

Methane leakages perspective

Why methane leaks make biomethane a climate liability, not a solution

Methane emissions from biogas and biomethane are a serious and growing climate, health, and environmental liability. Methane **warms the planet over 80 times more than CO_2** over a 20-year period. Methane also acts as a **precursor of air pollution, specifically to ground-level ozone, which poses severe health risks, including respiratory problems and aggravation of asthma**. Such ground-level ozone also affects ecosystems and the economy by harming sensitive species, and damaging crop harvests.

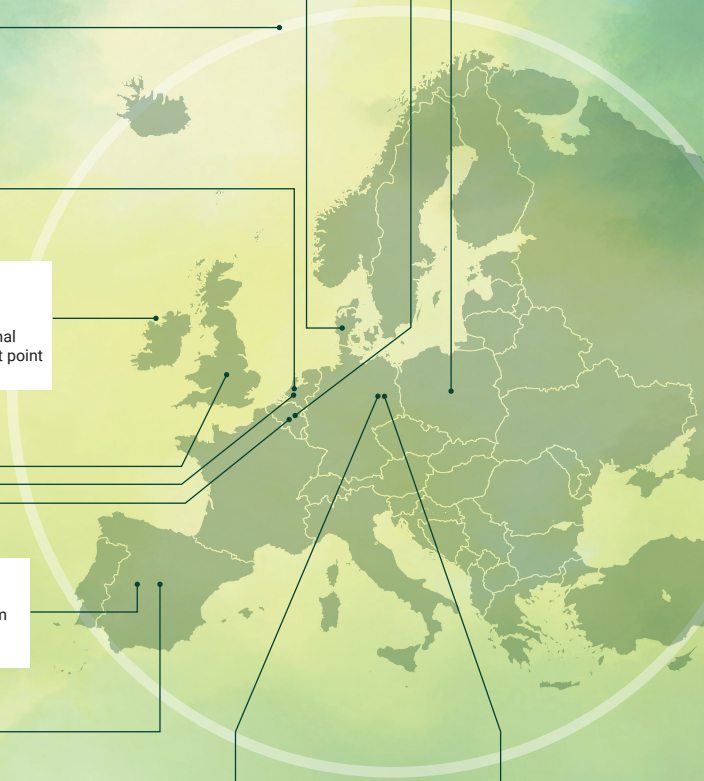
According to a recent study by the EU's Joint Research Centre (JRC), the average methane leakage rate across the biogas and biomethane supply chains in the EU is around 5% of the total methane produced. While the **JRC's estimate of a 5% leakage rate** is already alarming, it is likely a conservative figure. Studies measuring real-world emissions with on-site measurements suggest that actual leakage rates may be significantly higher than 5%. Even taking the 5% figure at face value is dramatic when applied to countries like Germany, where biogas is an established sector. With an average annual biogas output of 87 TWh, a 5% leakage rate translates into massive methane losses. Official calculations by the German Environment Agency (Umweltbundesamt) from 2019 estimated that around 300,000 tons of methane escape from biogas plants each year. Using the global warming potential "GWP-20 metric", this



corresponds to approximately 24 million tons of CO_2-equivalents.

While countries like Germany have introduced technically robust national leakage mitigation policies, research finds that a **lack of enforcement and independent oversight makes many of these policies ineffective in practice**. This raises concerns not only for **countries with poor leakage regulation** in place, but also for supposed frontrunners. If biogas output increases rapidly in unregulated markets, as envisioned by REPowerEU, leakages will likely become an even greater issue.

Methane mitigation in this sector is a low-hanging fruit: **technical solutions are available, cost-effective, and even in the financial interest of plant operators themselves**. That these measures are still not widely implemented highlights a serious failure and underlines how important it is that biomethane expansion is strongly scrutinised and carefully regulated.



NOAH – Friends of the Earth Denmark
Based in: Denmark
Areas of work: Environmental justice
Email: noah@noah.dk

SayNoToLNG
Based in: Global, including Europe
Areas of work: Shipping
Email: admin@saynotolng.org | elissamamenezes@gmail.com

Changing Markets
Based in: Registered in the Netherlands – globally focused NGO
Areas of work: Agricultural methane and food systems
Email: contact@changingmarkets.org

National Biogas Concern Group Ireland | Gort Biogas Concern Group
Based in: Galway, Ireland
Areas of work: Local concern group and National Biogas Concern Group, Ireland (NBCGI) contact point
Email: biogasconcerngroup.gort@gmail.com

Foodrise
Based in: The Netherlands, Brussels and UK
Areas of work: Food systems change – for climate, nature, justice
Email: info@foodrise.eu

Ecologistas en Acción
Based in: Spain
Areas of work: Social Ecology and ecofeminism (Agroecology, energy, climate)
Email: biogas@ecologistasenaccion.org

Gas no es Solución
Based in: Spain
Areas of work: Gas phase out
Email: gas@ecologistasenaccion.org

Green REV Institute
Based in: Poland and Brussels
Areas of work: Food safety, social and environmental justice
Email: kontakt@greenrev.org

Deutsche Umwelthilfe
Based in: Berlin, Germany
Areas of work: Air Quality, Transport, Agriculture, Energy
Email: meunier@duh.de

IATP
Based in: US and EU (Europe office based in Berlin, Germany)
Areas of work: Agriculture
Email: sscherger@iatp.org

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