

BIOMETHANE FICHE – Ireland (2021)

BIOMETHANE PRODUCTION, POTENTIALS AND PATHWAYS

Biomethane is upgraded (purified) biogas to the quality of natural gas (methane). Currently, biogas is dominantly used for the production of electricity and heat in CHP plants.

Biogas/biomethane is 100% of domestic origin and has cross-sectoral effects.

Upgrading of biogas in the EU started in 2011. In 2021, total biomethane production in the EU27 was 3.5 bcm. REPowerEU has biomethane as one of the short and medium-time measures to reduce natural gas imports by boosting biomethane production to 35 bcm by 2030.

BIOGAS / BIOMETHANE IN IRELAND (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.1 bcm of biogases, without distinguishing the type.
- Biogases make 1.2% of gas supply.
- 0.1 bcm of biogases are used to produce electricity, either in electricity only or CHP plants (76%), whereas Final energy consumption (24%) had industry (12%) and commercial & public services (12%) as consumers.
- Biomethane in transport is not recorded.
- European Biogas Association (EBA) reports¹ 0.05 bcm of biogas produced in 2021 (96% in 31 biogas plants and 4% in 2 biomethane plants).
- The 2021 Climate Action Plan committed to a biomethane production target of 1.6 TWh (~0.16 bcm) injected into the Natural Gas Grid by 2030. The Renewable Gas Forum Ireland (RGFI), together with key stakeholders, has put forward a target of 2.5 TWh/year (~0.26 bcm) domestic biomethane injection as a practical and technical achievable target by 2030. The Irish Government has increased this ambition further and has agreed to the production of up to 5.7 TWh (~0.58 bcm) of Biomethane by 2030.
- The 2023 Climate Action Plan has committed to the development of a National Biomethane Strategy by Q3 2023 to support delivery of this target, and the milestone production target of 1TWh of indigenous Biomethane by 2025.
- CNG Europe reports² no CNG stations for Ireland, out of 3,769 in the EU27, in 2022.

¹ [EBA Statistical Report 2022 | European Biogas Association](#)

² [CNG Europe | Map of Natural Gas Vehicle \(NVG\) Compressed natural gas \(CNG\) filling stations in Europe, Mappa Stazioni di rifornimento di metano, Landkarten Methantankstellen erdgastankstellen](#)

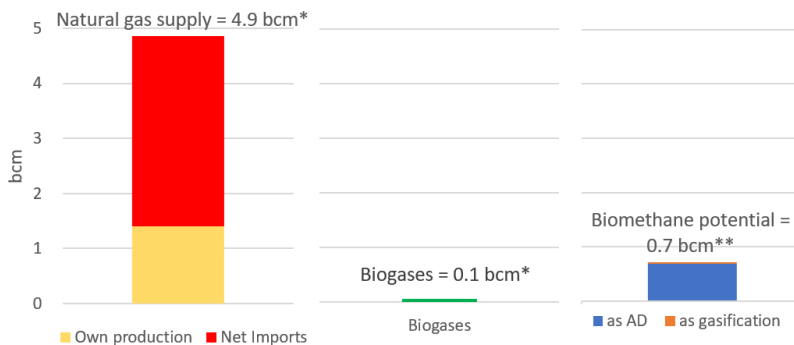


Figure 1 Comparison of current natural gas supply, biomethane production and potential in Ireland (2021) (sources: Eurostat: Energy Balances, 2022*; Guidehouse: Gas for Climate Report 2022**)

Biomethane has two production pathways:

- **Anaerobic digestion (AD)** produces biogas and digestate (fermented organic matter, similar to slurry) as a local source of nutrients and GHG emission mitigation option for land management.
 - Macro and micro nutrient composition of digestate depends on the feedstock used for AD³
 - Digestate contains phosphorus (0.2-1.5 kg/t) that is on the list of critical raw materials for the EU⁴.
- **Gasification** produces biogas and biochar (carbonized organic matter, similar to charcoal) as a land-based carbon removal option (IPCC, 2019) and soil amendment.

To maximize the multisectoral value of biomethane, byproducts must be recognized and valorized.

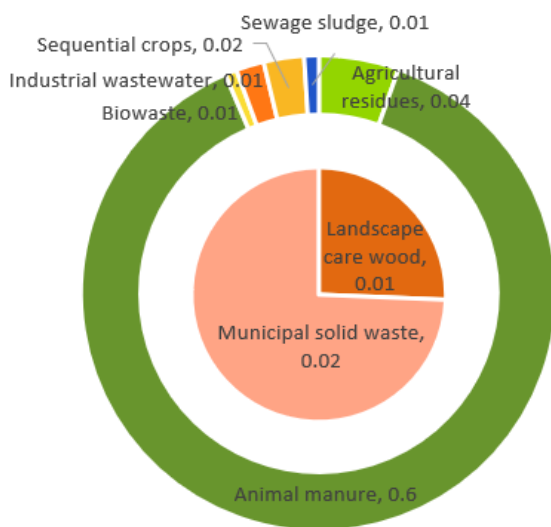


Figure 2 Biogas/biomethane potential in bcm, by feedstock for Ireland (inner pie gasification and outer circle AD) (source: Guidehouse: Gas for Climate Report, 2022)

Industry estimates Ireland's sustainable biomethane potential as 0.7 bcm from AD by 2030 (Figure 2).

Ireland represents a MS with a moderate sustainable biomethane potential in terms of contribution to the overall 2030 target but with strong national benefits from a developed biomethane market.

Ireland consumes 380 kt and 44 kt of nitrogen and phosphorus fertiliser⁵ that could be partially replaced by digestate.

Agriculture, forestry & fisheries are the main GHG emission source by economic activity with 41% (22 MtCO_{2eq})⁶ in Ireland, which can be mitigated both by manure management in AD and low emission application techniques application of digestate on soil (land management).

About 4% (~15.8 bcm) of the total natural gas supply in EU was used for non-energy purposes, dominantly for synthesizing nitrogen-based fertilizers, in addition to the energy input needed to support the production process. Combining biomethane production with a strong support of using digestate as a local source of nutrients would have multiple benefits for the reduction of natural gas imports.

³ As a rule of thumb, 1 ton of digestate contains 2.3-4.2 kg of N; 0.2-1.5 kg of P and 1.3-5.2 kg of K.

⁴ [EUR-Lex - 52023PC0160 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2022/160/oj)

⁵ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_mineral_fertiliser_consumption#Analysis_at_country_level

⁶ [File:Greenhouse gas emissions by economic activity, 2021 \(thousand tonnes of CO2 equivalents\).png - Statistics Explained \(europa.eu\)](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Greenhouse_gas_emissions_by_economic_activity,_2021_(thousand_tonnes_of_CO2_equivalents).png_-_Statistics_Explained_(europa.eu))

NATURAL GAS (NG) SUPPLY AND CONSUMPTION OF IRELAND (2021)



Figure 1 Natural gas share in total energy supply, origin and main consumers for Ireland (2021) (source: Eurostat: Energy Balances, 2022)

- NG makes 32% of the total energy supply (TES) of Ireland, out of which 71% (3.5 bcm) is imported.
- NG is used 100% for energy purposes.
- The main NG consumption sectors are production of electricity (54%), either in electricity only or CHP plants, and industry (23%) and households (14%) from the Final energy consumption.

Key messages for biomethane in Ireland:

- Ireland has potential to replace about 20% of current NG consumption with biomethane.
- To have full effect of biomethane production on the green transition, biomethane production support is to be paired with other circular and sustainable bioeconomy projects/programmes to reach carbon neutrality.
- Developing business models to decarbonise meat and dairy sector with biomethane production and use (either in on-farm filling stations to run the delivery trucks or injection to the natural gas pipeline), digestate use (a local source of nutrients either for feed grow or soil), and biogenic CO₂ as in industry (e.g. cheese packaging, carbonated drinks) would aid to reduce carbon footprint of the meat and dairy products.
- Grass based biorefineries to extract plant protein before biomethane production could be a prominent option for bioeconomy.
- Waste-streams from beer production with extraction of bioactive compounds (e.g. β-glucan) followed by biomethane production and digestate use for bioeconomy would reduce carbon footprint of beer, an important export item for Ireland.