

BIOMETHANE FICHE – Austria (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 AUSTRIA (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.21 bcm of biogases, without distinguishing the type.
- Biogases make 2.1% of natural gas supply.
- 0.21 bcm of biogases are dominantly used to produce electricity, either in electricity only or CHP plants (85%), whereas Final energy consumption (15%) had industry as only consumer.
- In 2022, there were 449 operating biogas plants in Austria (375 biogas, 49 sewage gas, 25 landfill gas)¹ and 14 biomethane balance groups, whereby each group represents 1 plant².
- In 2022, 0.01 bcm of biomethane (136.99 GWh) was injected in the gas grid².
- A shift from biogas towards biomethane production is anticipated with the implementation of the Renewables Expansion Act (in force since beginning of 2022) which supports new biomethane plants as well as repowering of existing biogas CHP plants into biomethane plants feeding into the Austrian gas grid.
- Biomethane use in transport is emerging (< 1%), given the limited CNG (compressed natural gas) vehicle fleet.
- FGW - Fachverband der Gas- und Wärmeversorgungsunternehmen reports 100% supply of biomethane for transport at 108 CNG stations for Austria in 2023. There were 3,769 CNG filling stations in the EU27³ in 2022.

¹ plant register E-Control <https://www.e-control.at/anlagenregister>

² AGCS Biomethane Register Austria.2023

³ <https://www.ngva.eu/medias/2510-biocng-in-2020-new-data-proves-rapid-growth-of-biomethane-in-transport/>

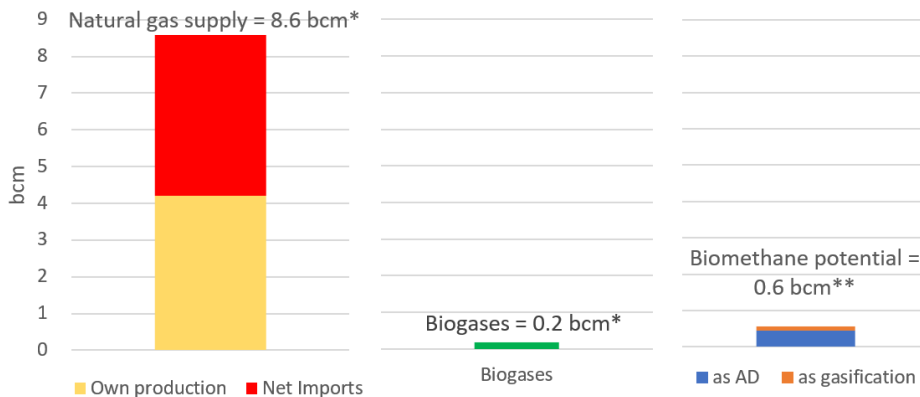


Figure 1 Comparison of current natural gas supply, biomethane production and potential in Austria (2021) (sources: Eurostat: Energy Balances, 2022*; Guidehouse: Gas for Climate Report 2022**)

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 AD⁴
 - Digestate contains phosphorus (0.2-1.5 kg/t) that is on the list of critical raw materials for the EU⁵.
- **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.

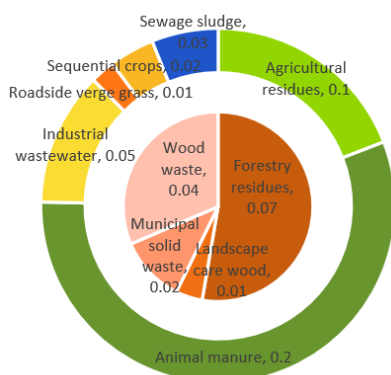


Figure 2 Biogas/biomethane potential in bcm, by feedstock for Austria (inner pie gasification and outer circle AD) (source: Guidehouse: Gas for Climate Report, 2022)

Industry reports on Austria's potential as 0.57 bcm (0.44 bcm from AD and 0.13 from gasification) by 2030 (Figure 2). Environmental Agency Austria reports 0.69 bcm (6.8 TWh) as a feasible biomethane potential.

Considering the sustainable biomethane potential, Austria could further reduce imports of NG.

Austria consumes 117 kt and 12 kt of nitrogen and phosphorus fertiliser⁶ that could be partially replaced by digestate, a byproduct of AD biomethane/biogas.

Manufacturing and Agriculture, forestry and fisheries are the 2 main GHG emission sources by economic activity with 62% (35.6 MtCO_{2eq})⁷ in Austria, which can be tackled both by linking industry with biomethane production and biogenic CO₂ use, manure management in AD, 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.

⁴ 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.

⁵ [EUR-Lex - 52023PC0160 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eur-lex.do?uri=CELEX:52023PC0160-EN)

⁶ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_mineral_fertiliser_consumption#Analysis_at_country_level

⁷ [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 AUSTRIA (2021)

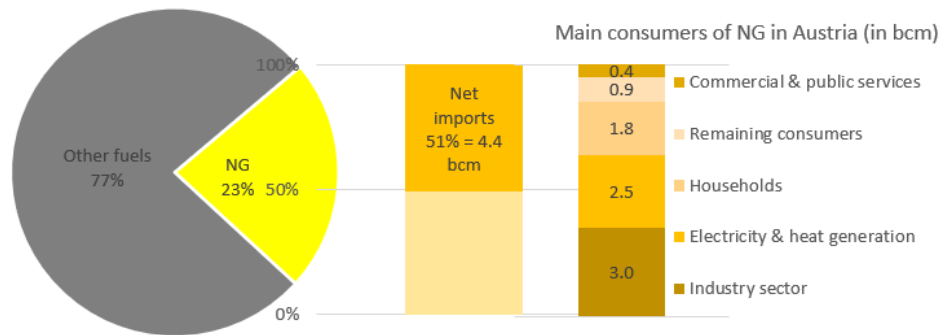


Figure 3 Natural gas share in total energy supply, origin and main consumers for Austria (2021) (source: Eurostat: Energy Balances, 2022)

- NG makes 23% of the total energy supply (TES) of Austria, out of which 51% (4.4 bcm) is imported.
- Roughly, NG is used 96% for energy purposes and 4% for non-energy purposes (e.g., synthetic fertilizers).
- The main NG consumption occurs in final energy consumption (64%) with industry (35%) and households (21%) as the main consumers. 29% of NG is used for production of electricity either in electricity only or CHP plants.

Key messages for biomethane in Austria:

- Austria has ability to replace about 13-16% of the current NG imports with biomethane.
- Full effect of biomethane in the Austrian green transition would be framing support schemes around agri-food industry to combine biomethane production with sequential cropping and digestate use to store carbon in the soil and feedstock (like the BiogasDoneRight concept in Italy) and biogenic CO₂ use in agri-food production.
- Given the feedstock profile, a ripple effect would be created by pairing biomethane production with the industrial wastewater treatment facilities to achieve short supply chains with biogenic CO₂ and biomethane use in industry (ETS sector) or heavy-duty vehicles linked to the industry operation (transport sector).
- Well-developed natural gas grid in Austria gives an advantage to inject biomethane in the grid, with several small ADs clustered around one biomethane upgrading unit.
- Austria has infrastructure to supply biomethane to transport in the existing 108 CNG filling stations.