

## BIOMETHANE FICHE – Romania (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 ROMANIA (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.03 bcm of biogases, without distinguishing the type.
- Biogases make 0.2% of gas supply.
- 0.03 bcm of biogases are mainly used to produce electricity, either in electricity only or CHP plants (89%), whereas Final energy consumption (11%) had industry (7%) and commercial & public services (4%) as consumers.
- There are no records of biomethane in transport.
- CNG Europe reports 3 CNG stations for Romania, out of 3,769 in the EU27, in 2022<sup>1</sup>.

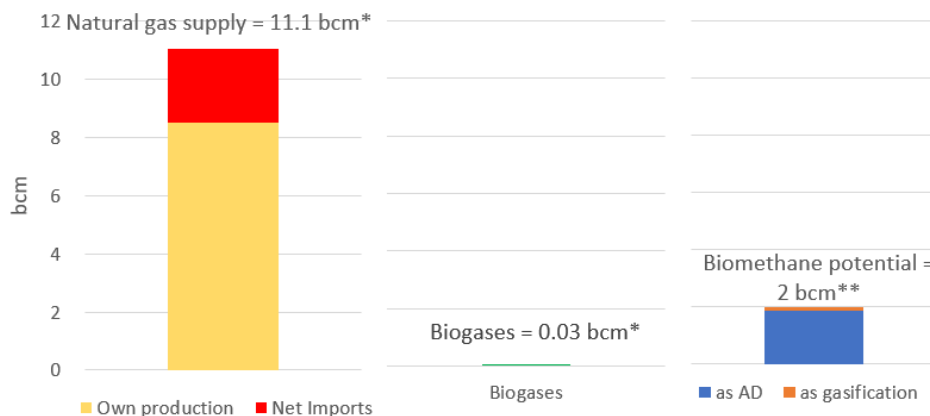


Figure 1 Comparison of current natural gas supply, biomethane production and potential in Romania (2021) (sources: Eurostat: Energy Balances, 2022\*; Guidehouse: Gas for Climate Report 2022\*\*)

<sup>1</sup> 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

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 AD<sup>2</sup>
  - Digestate contains phosphorus (0.2-1.5 kg/t) that is on the list of critical raw materials for the EU<sup>3</sup>.
- **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.

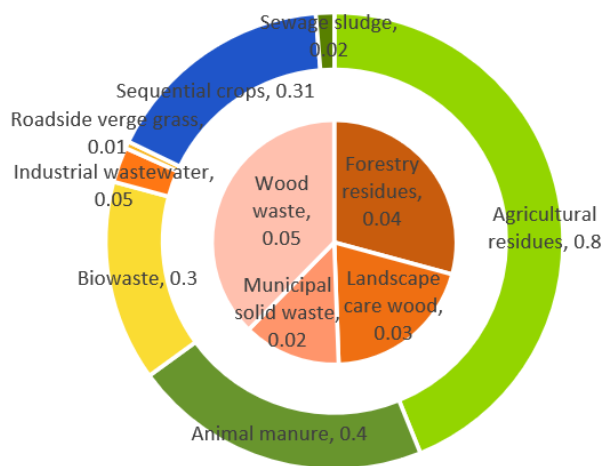


Figure 2 Biogas/biomethane potential in bcm, by feedstock for Romania (inner pie gasification and outer circle AD) (source: Guidehouse: Gas for Climate Report, 2022)

Industry estimates Romania's sustainable biomethane potential as 2.0 bcm (1.9 bcm from AD and 0.1 from gasification) by 2030 (Figure 2).

Considering the sustainable potential, Romania could be among the top biomethane markets in the EU27, with significant national benefits.

Romania consumes 469 kt and 82 kt of nitrogen and phosphorus fertiliser<sup>4</sup> that could be partially replaced by digestate.

Manufacture and Agriculture, forestry & fisheries are the 2 main GHG emission sources by economic activity with 51% (50.6 MtCO<sub>2eq</sub>)<sup>5</sup> in Romania, which can be tackled both by manure management in anaerobic digestion and 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.

<sup>2</sup> 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.

<sup>3</sup> [EUR-Lex - 52023PC0160 - EN - EUR-Lex \(europa.eu\)](#)

<sup>4</sup> [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental\\_indicator\\_-\\_mineral\\_fertiliser\\_consumption#Analysis\\_at\\_country\\_level](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_mineral_fertiliser_consumption#Analysis_at_country_level)

<sup>5</sup> [File:Greenhouse gas emissions by economic activity, 2021 \(thousand tonnes of CO2 equivalents\).png - Statistics Explained \(europa.eu\)](#)

## NATURAL GAS (NG) SUPPLY AND CONSUMPTION OF ROMANIA (2021)

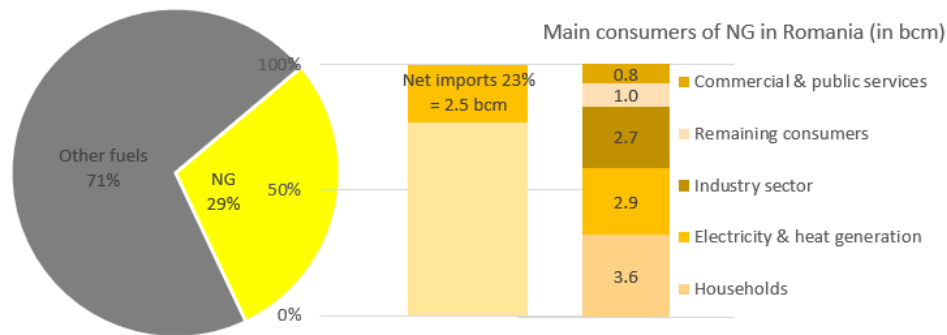


Figure 3 Natural gas share in total energy supply, origin and main consumers for Romania (2021) (source: Eurostat: Energy Balances, 2022)

- NG makes 29% of the total energy supply (TES) of Romania, out of which 23% (2.5 bcm) is imported.
- Roughly, NG is used 96% for energy purposes and 4% for non-energy purposes (synthetic fertilizers).
- The main NG consumption sectors in Romania are households (33%) and industry (25%) from final energy consumption and production of electricity (27%), either in electricity only or CHP plants.

### Key messages for biomethane in Romania:

- Romania has ability to replace about 80% of current NG imports with biomethane.
- Romania represents one of the least developed biogas markets in the EU27.
- Current number CNG filling stations (3) are not sufficient to have a larger uptake of biomethane in transport.
- Romania has ability to replace about a quarter of current NG imports with biomethane which would be beneficial for both energy security and GHG emission reduction from energy sector.
- To have full effect of biomethane production on the green transition, biomethane production is to be linked with agri-food industry that is the largest employer (2M persons or 89%)<sup>6</sup> in the current bioeconomy and generates most of the feedstock for biomethane production. Short supply chains to reduce transportation costs and close to the end-user or NG gas pipeline, with digestate use as a local source of nutrients.
- Romania could additionally reduce NG import dependency by including the synthetic fertiliser production capacities in improvement and marketing of digestate, or extract of macro-nutrients for bio-fertilizers.

<sup>6</sup> <https://datam.irc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html>