

## BIOMETHANE FICHE – Lithuania (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 LITHUANIA (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.04 bcm of biogases, without distinguishing the type.
- Biogases make 2.1% of gas supply.
- 0.04 bcm of biogases are used to produce electricity, either in electricity only or CHP plants (75%), whereas Final energy consumption (25%) had industry (11%) and commercial & public services (14%) as main consumers.
- Biomethane in transport is not recorded in the Energy Balances.
- European Biogas Association (EBA) reports<sup>1</sup> 0.04 bcm of biogas produced in 2021 (100% in 41 biogas plants). Several support schemes to encourage biomethane production have been announced and some others are under development in Lithuania.
- CNG Europe reports<sup>2</sup> 1,6 CNG stations for Lithuania, out of 3,769 in the EU27, in 2022.

<sup>1</sup> [EBA Statistical Report 2022 | European Biogas Association](#)

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

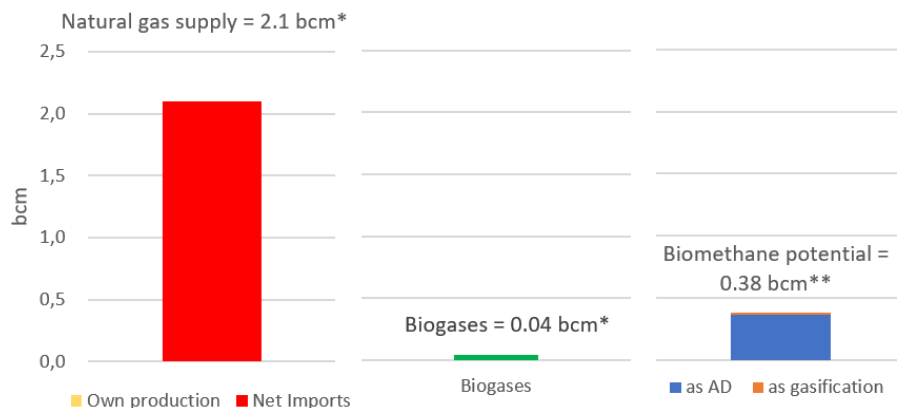


Figure 1 Comparison of current natural gas supply, biomethane production and potential in Lithuania (2021) (sources: Eurostat: Energy Balances, 2022\*; Guidehouse: Gas for Climate Report 2022\*\*)

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 AD<sup>3</sup>
  - Digestate contains phosphorus (0.2-1.5 kg/t) that is on the list of critical raw materials for the EU<sup>4</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.



Industry estimates Lithuania's potential as 4.1 bcm (3.8 bcm from AD and 0.3 from gasification) by 2030 (Figure 2).

Considering the sustainable biomethane potential, Lithuania represents a minor biomethane market at EU27 but with a major national multisectoral impact.

Lithuania consumes 1.059 kt and 212 kt of nitrogen and phosphorus fertiliser<sup>5</sup> that could be partially replaced by digestate.

Manufacturing and Agriculture, forestry & fisheries are the 2 main GHG emission sources by economic activity with 47% (126 MtCO<sub>2eq</sub>)<sup>6</sup> in Lithuania, which can be tackled both by manure management in AD, application of digestate on soil (land management) and use of biomethane and biogenic CO<sub>2</sub> in industry (ETS sector).

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

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>3</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>4</sup> [EUR-Lex - 52023PC0160 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eur-lex.do?uri=CELEX:52023PC0160-EN)

<sup>5</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>6</sup> [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 LITHUANIA (2021)

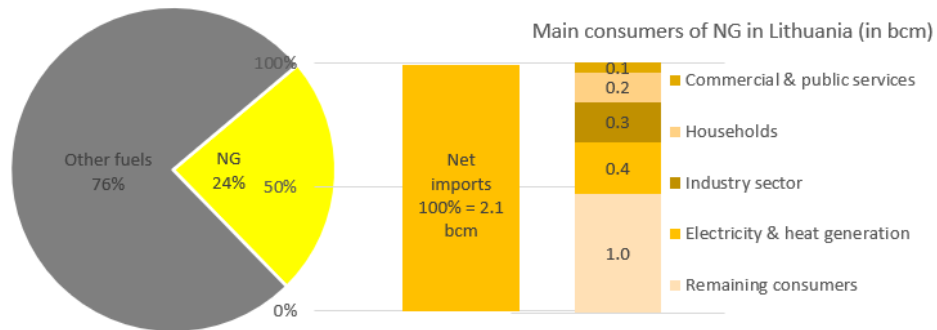


Figure 3 Natural gas share in total energy supply, origin and main consumers for Lithuania (2021) (source: Eurostat: Energy Balances, 2022)

- NG makes 24% of the total energy supply (TES) of Lithuania, out of which 100% (2.1 bcm) is imported.
- Roughly, NG is used 58% for energy purposes and 42% for non-energy purposes (synthetic fertilizers).
- The main NG consumption sectors in Lithuania are production of electricity (21% in transformation input), followed by final energy consumption: industry (16%), households (12%) and commercial & public services (4%).

### Key messages for biomethane in Lithuania:

- Lithuania has ability to replace about 18% of current NG imports (consumption) with biomethane.
- Lithuania currently deploys about 12% of its sustainable biomethane potential.
- The existing number of CNG filling stations is not sufficient to allow wider supply of biomethane to transport.
- Full effect of biomethane in the green transition would be framing support schemes around livestock and meat and dairy industry to reduce carbon footprint of meat and dairy products as well as GHG emissions from agriculture.
- Well-developed natural gas grid gives an advantage to inject biomethane in the grid, with several small ADs clustered around one biomethane upgrading unit.
- A programme to repower biogas CHP plants to biomethane, either as a single upgrading point or a cluster with a centralised upgrading unit close to a NG pipeline injection, industry use (ETS sector) or heavy-duty vehicles linked to the industry operation (transport sector).
- Lithuania could become a good practice example of a small country benefiting from national biomethane market development.
- Sustainable biomethane potential could be increased by using digestate as a local source of nutrients.