

## BIOMETHANE FICHE – Slovakia (2021)

### BIOMETHANE PRODUCTION, POTENTIALS AND PATHWAYS

Biomethane is upgraded (purified) biogas to the quality of natural gas (methane). Currently, biogas is dominantly used to produce 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 SLOVAKIA (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.1 bcm of biogases, without distinguishing the type.
- Biogases make 2.9% of gas supply.
- 0.1 bcm of biogas / biomethane are used to produce electricity, either in electricity only or CHP plants (81%), followed by agriculture & forestry (14%) and commercial & public services (5%) in Final energy consumption.
- Biomethane in transport is not recorded in Energy balances.
- National statistics report 0.25 bcm of biogas production.
- CNG Europe reports<sup>1</sup> 13 CNG stations for Slovakia, out of 3,769 in the EU27, in 2022.



Figure 1 Comparison of current natural gas supply, biomethane production and potential in Slovakia (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.

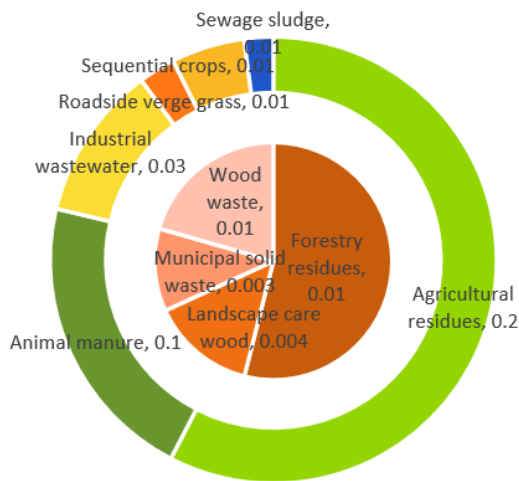


Figure 2 Biogas/biomethane potential in bcm, by feedstock for Slovakia (inner pie gasification and outer circle AD) (source: Guidehouse: Gas for Climate Report, 2022)

Industry estimates Slovakia's potential as 0.3 bcm (0.27 bcm from AD and 0.03 bcm from gasification) by 2030 (Figure 2). This potential has been commented as underestimated, from the national sources.

Considering the sustainable potential (Figure 2), Slovakia could be a small biomethane market among the EU27 but with great national benefits.

Slovakia consumes 128 kt and 12 kt of nitrogen and phosphorus fertiliser<sup>4</sup> that could be partially replaced by digestate.

Manufacturing is, by far, a dominant GHG emission source by economic activity with 52% (17.45 MtCO<sub>2eq</sub>)<sup>5</sup> in Slovakia, which can be tackled by linking biomethane with industry applications.

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 \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2023/160/oj)

<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 \(europa.eu\)](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 SLOVAKIA (2021)

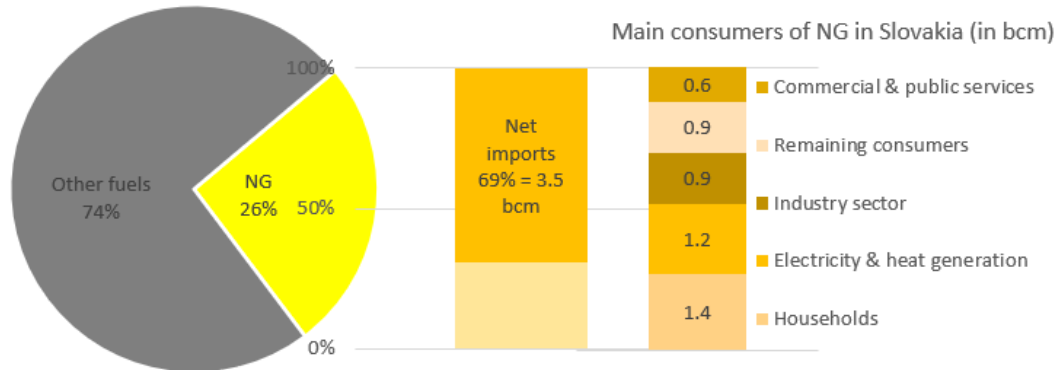


Figure 3 Natural gas share in total energy supply, origin and main consumers for Slovakia (2021) (source: Eurostat: Energy Balances, 2022)

- NG makes 26% of the total energy supply (TES) of Slovakia, out of which 69% (3.5 bcm) is imported. National sources report own supply as low as 100 mcm.
- NG is used 91% for energy purposes and 9% for non-energy purposes (synthetic fertilizers).
- The main NG consumption sectors in Slovakia are energy companies producing electricity (28%), households (27%) and industry (18%).

### Key messages for biomethane in Slovakia:

- Slovakia relies heavily on NG imports, that could be alleviated with biomethane.
- The existing number of CNG filling stations allow supply of biomethane to transport.
- Full effect of biomethane in the green transition would be framing support schemes around agri-food industry to reduce carbon footprint of food products as well as GHG emissions from both manufacturing and agriculture.
- 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).
- 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 CO<sub>2</sub> and biomethane use.
- Sustainable biomethane potential could be increased by using digestate as a local source of nutrients.