

## BIOMETHANE FICHE – Hungary (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 HUNGARY (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.1 bcm of biogases, without distinguishing the type.
- Biogases make 0.9% of natural gas supply.
- 0.1 bcm of biogases are mainly used to produce electricity, either in electricity only or CHP plants (66%), whereas Final energy consumption (17%) had industry (13%) and commercial & public services (4%) as main consumers.
- Biomethane use in transport is emerging (0.03% of the total biogases produced in 2021).
- European Biogas Association (EBA) records<sup>1</sup> two biomethane plants in Hungary.
- CNG Europe reports<sup>2</sup> 21 CNG stations for Hungary, out of 3,769 in the EU27, in 2022.

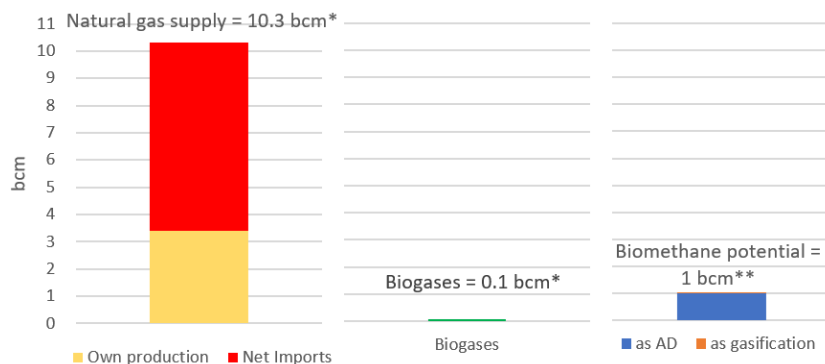


Figure 1 Comparison of current natural gas supply, biomethane production and potential in Hungary (2021) (sources: Eurostat: Energy Balances, 2022\*; Guidehouse: Gas for Climate Report 2022\*\*)

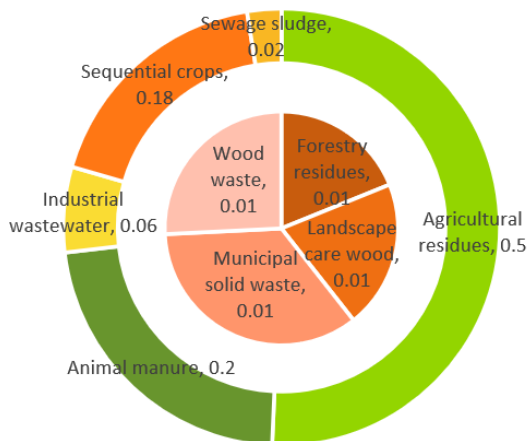
<sup>1</sup> [EBA Statistical Report 2022 | European Biogas Association](#)

<sup>2</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>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 Hungary’s sustainable biomethane potential as 1 bcm, dominantly related to the AD by 2030 (Figure 2).

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

Hungary consumes 443 kt and 48 kt of nitrogen and phosphorus fertiliser<sup>5</sup> that could be partially replaced by digestate.

Manufacturing and Electricity, gas, steam & air conditioning supply and are the 2 main sources of GHG emissions by economic activity in Hungary with 22.7 MtCO<sub>2eq</sub> (45%)<sup>6</sup>, which can be both tackled by integrating biomethane production and use in the industry.

Figure 2 Biogas/biomethane potential in bcm, by feedstock for Hungary (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.

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

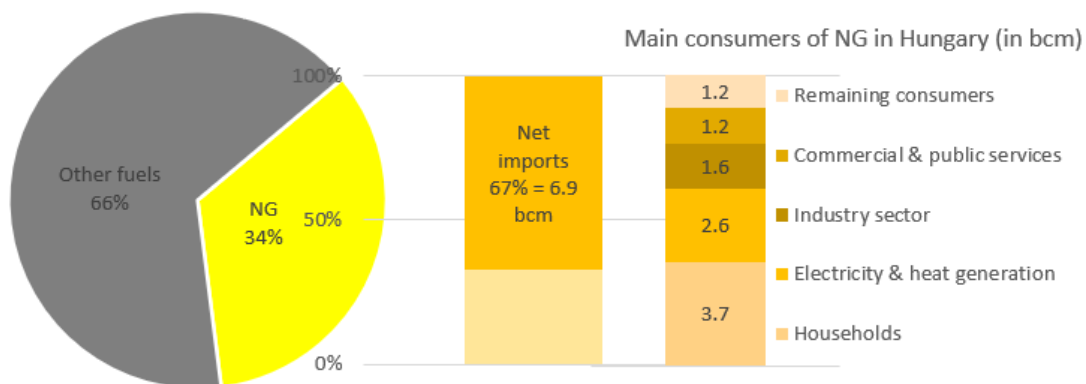


Figure 3 Natural gas share in total energy supply, origin and main consumers for Hungary (2021) (source: Eurostat: Energy Balances, 2022)

<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))

- NG makes 34% of the total energy supply (TES) of Hungary, out of which 67% (6.9 bcm) is imported.
- Roughly, NG is used 94% for energy purposes and 6% for non-energy purposes (synthetic fertilizers).
- The main NG consumption sectors in Hungary are households (36%) and industry (16%) in Final energy consumption whereas 27% is used for production of electricity either in electricity only or CHP plants.

### Key messages for biomethane in Hungary:

- Hungary has ability to replace about 15% of the current NG imports with biomethane.
- Current number CNG filling stations are not sufficient to have a larger uptake of biomethane in transport.
- To have full effect of biomethane production on the green transition, biomethane production support is to be linked with the agri-food industry to avoid transportation costs and feedstock loss, with local digestate application, renewable CO<sub>2</sub> and biomethane use in industry (ETS sector).
- Transition from food & feed feedstock to sequential cropping and digestate use (like the Italian BiogasDoneRight concept) would increase the impact on GHG emission savings and green transition of already operational biogas and biomethane plants.
- A programme for repowering biogas CHP plants to biomethane, either as a single upgrading point or a cluster with a centralised upgrading unit close to the grid injection or industry consumer.
- Hungary could additionally reduce NG import dependency by including its major synthetic fertiliser production capacities in improvement and marketing of digestate, or extract of macro-nutrients for bio-fertilizers.