

## BIOMETHANE FICHE – Czechia (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 CZECHIA (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.7 bcm of biogases, without distinguishing the type.
- Biogases make 7.8% of gas supply.
- 0.7 bcm of biogases are used for electricity (72%), either in electricity only or CHP plants. Final energy consumption (28%) had agriculture & forestry (21%), transport and commercial & public services (3%, each) as main consumers.
- European Biogas Association (EBA) reports<sup>1</sup> 0.64 bcm of biogas produced in 2021 (99.9% in 573 biogas plants and 0.1% in 2 biomethane plants).
- In 2021, all biomethane produced was used in the transport sector or 3% of the biogases produced.
- CNG Europe reports 171 CNG stations for Czech Republic, out of 3,769 in the EU27, in 2022<sup>2</sup>.

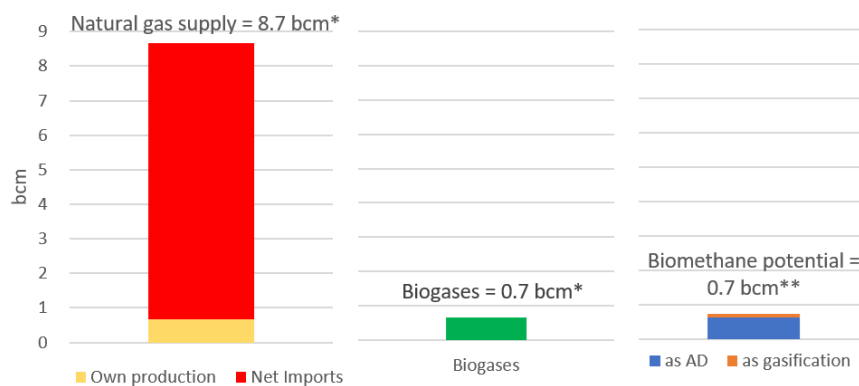


Figure 1 Comparison of current natural gas supply, biomethane production and potential in Czechia (2021) (sources: Eurostat: Energy Balances, 2022\*; Guidehouse: Gas for Climate Report 2022\*\*)

<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.

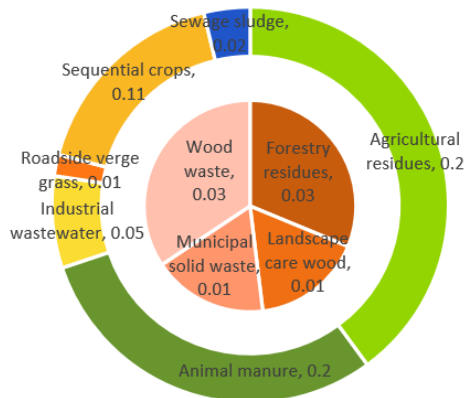


Figure 2 Biogas/biomethane potential in bcm, by feedstock for Czechia (inner pie gasification and outer circle AD) (source: Guidehouse: Gas for Climate Report, 2022)

Industry estimates Czech’s potential as 0.7 bcm (0.6 bcm from AD and 0.1 from gasification) by 2030 (Figure 3).

Considering the sustainable biomethane potential, Czech Republic seems to be close to its maximum production.

Czech Republic consumes 285 kt and 21 kt of nitrogen and phosphorus fertiliser<sup>5</sup> that could be partially replaced by digestate.

Electricity, gas, steam & air conditioning supply and Manufacturing are the 2 main sources of GHG emissions by economic activity in Czech Republic with 70 MtCO<sub>2eq</sub> (63%)<sup>6</sup>, which can be tackled both integrating biomethane production and use in industry.

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 CZECHIA (2021)

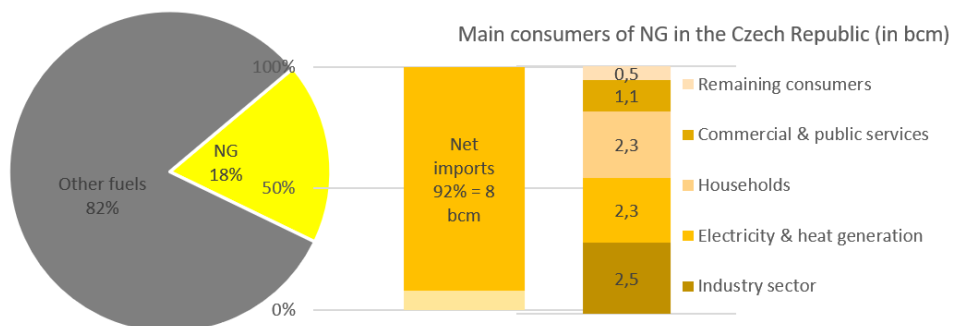


Figure 3 Natural gas share in total energy supply, origin and main consumers for Czechia (2021) (source: Eurostat: Energy Balances, 2022)

<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 18% of the total energy supply (TES) of Czechia, out of which 92% (8 bcm) is imported.
- Roughly, NG is used 99% for energy purposes and 1% for non-energy purposes (synthetic fertilizers).
- The main NG consumption sectors in Czechia are industry (29%), households (27%) and transformation input for electricity production, either in electricity only or CHP plants (26%).

### Key messages for biomethane in Czechia:

- Czech Republic has established the Act on promoting Renewable Energy Sources which provides support for biogas and biomethane production.
- Sustainable biomethane potential seems to be close to the current production of biogas in the Czech Republic, replacing about 9% of the NG imports.
- Proposal is to, where is it possible, integrate biogas electricity in ancillary services of power grid balancing.
- A programme to repower biogas CHP plants, without grid balancing function, 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).
- Czech Republic has infrastructure to start supplying biomethane to transport in the existing 171 CNG filling stations.
- 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.