BIOMETHANE FICHE – Latvia (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 LATVIA (DATA FROM 2021)

- Energy balances (Eurostat) record production of 0.07 bcm of biogases, without distinguishing the type.
- Biogases make 6.8% of natural gas supply.
- 0.1 bcm of biogases are dominantly used either in CHP plants or heat plants (90%), followed by Agriculture & forestry and Commercial & public services (each 5%) in Final energy consumption.
- Biomethane in transport is not recorded in the Energy Balances.
- Latvia's Central Statistical Bureau reports a total of 0.144 bcm of biogas (17 Mcm landfill gas; 4 Mcm sludge gas and 123 Mcm other biogas) for 2021, which is 12% of natural gas consumption in that year[1].
- European Biogas Association (EBA) reports[2] 0.07 bcm of biogas produced in 2021 (100% in 49 biogas plants).
- Several biogas plants have closed recently due to the phasing out of subsidies (mandatory procurement). The legal framework for introducing biomethane into natural gas transmission and distribution system has been established in 2016. In 2021. the conditions on guarantees of origin were set in Energy Law where the guarantees will be issued by gas TSO.
- A biogas plant started producing biomethane for its own needs since 2020. A total of 8 GWh of biomethane was produced, of which all was used as transport fuel.
- CNG Europe reports[3] 8 CNG stations for Latvia, out of 3,769 in the EU27, in 2022.

[1] https://data.stat.gov.lv/pxweb/en/OSP_PUB/START__NOZ__EN__ENB/ENB050/

[2] EBA Statistical Report 2022 | European Biogas Association

[3] 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

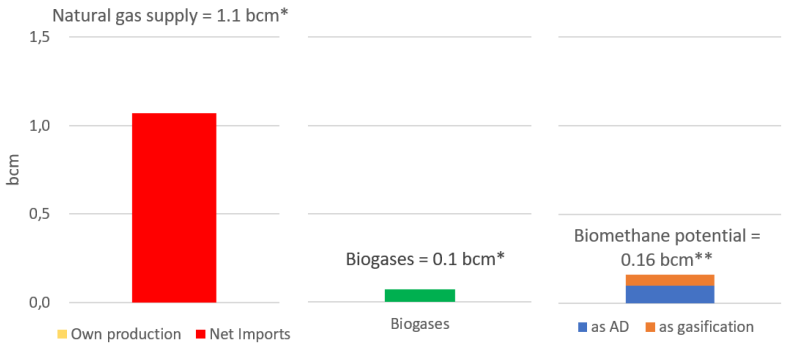
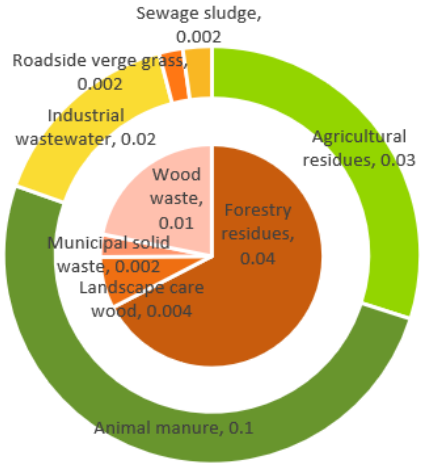


Figure 1 Comparison of current natural gas supply, biomethane production and potential in Latvia (2021) (sources: Eurostat: Energy Balances, 2022; Guidehouse: Gas for Climate Report 2022**)*

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[4]
  - Digestate contains phosphorus (0.2-1.5 kg/t) that is on the list of critical raw materials for the EU[5]**.**
- **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 Latvia's potential is 0.16 bcm (0.1 bcm from AD and 0.06 bcm from gasification) by 2030 (Figure 2).

Considering the sustainable potential, Latvia is small biomethane market among the EU27 but with great national benefits.

Latvia consumes 84.3 kt and 13.6 kt of nitrogen and phosphorus fertiliser[6] that could be partially replaced by digestate.

Agriculture, forestry and fisheries are the 1st GHG emission source by economic activity with 31% (2.9 $MtCO_{2eq}$)[7] in Latvia, which can be tackled both by manure management in anaerobic digestion and application of digestate on soil (land management).

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

[4] 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.
[5] EUR-Lex - 52023PC0160 - EN - EUR-Lex (europa.eu)
[6] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_mineral_fertiliser_consumption#Analysis_at_country_level
[7] 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 LATVIA (2021)

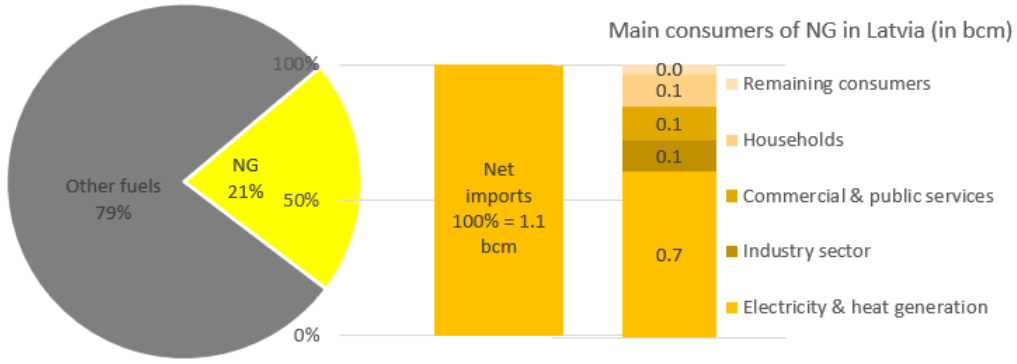


Figure 3 Natural gas share in total energy supply, origin and main consumers for Latvia (2021) (source: Eurostat: Energy Balances, 2022)

- NG makes 21% of the total energy supply (TES) of Latvia, out of which 100% (1.1 bcm) is imported.
- NG is used 100% for energy purposes, with 0.16% used in transport as CNG.
- The main NG consumption sectors in Latvia are production of electricity either in electricity only or CHP plants: 61% (in transformation input), followed by households and commercial & public services (each 12%) and industry (11%) in the final energy consumption.

Key messages for biomethane in Latvia:

- Latvia has ability to replace about 15% of current NG consumption (imports) with biomethane.
- Current AD based biogas production is equal to the estimated sustainable biogas potential.
- The existing number of CNG filling stations allows limited 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 NG 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 or industry use (ETS 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_2 and biomethane use in industry (ETS sector) or heavy-duty vehicles linked to the industry operation (transport sector).
- Sustainable biomethane potential could be increased by using digestate as a local source of nutrients.