



Estonian Biomethane Roadmap 2030 (2050)

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Estonian Biogas Association

Background

The year 2020 was of significant importance in the Estonian biomethane market. In the middle of the year, 2 new biomethane producers were added, Tartu Biogaas OÜ Ilmatsalu and Vinni Biogaas OÜ, where biomethane up-grading equipment were added to the existing biogas production plant. A 6 km long gas pipeline was built in Tartu, along which biomethane produced in Ilmatsalu reaches Tartu buses. In Vinni, on the other hand, the natural gas pipeline is located in the immediate vicinity of biomethane production plant, which is an ideal way to inject biomethane into the natural gas system. Eesti Biogaas OÜ completed the biomethane up-grading facility in the Oisu Biogas OÜ at the second half of 2021. So far the biogas was used in the cogeneration of electricity and heat in Oisu, Vinni and Ilmatsalu. There is no natural gas pipeline in Oisu and compressed biomethane is transported from Oisu to the consumer in Tartu within. The addition of 2 new biomethane plants increased the amount of biomethane produced by approx. 50%, compared to the amount of biomethane produced in 2019, which was 63,080 (MWh), ie approx. 6.3 million Nm³.

In 2020, AS Elering issued 97,408 (MWh) gas origin certificates to biomethane producers, of which 54,184 MWh for biomethane produced from sewage sludge and 43,224 MWh from biomethane produced from animal manure, biomass, biowaste and food industry residues.

In 2021, 152,352 (MWh) biomethane was produced in Estonia, of which 55,567 MWh was produced from sewage sludge, 61,081 MWh from animal manure, 24,978 MWh from food industry residues, 5,897 MWh from biowaste and 4,829 MWh from other biomass.

Consumption of biomethane in transport has also increased. An important contribution has been made by the commissioning of TLT's first 100 gas buses in Tallinn, increasing consumption by about 5 million Nm³, and the next 100 gas buses should be added this year. In addition to Tallinn gas buses, buses from Tartu city and county, Saaremaa, Pärnu city and county, Võru city and county are also consumers of biomethane. Many taxi companies and other regular transport operators have started using methane fuels (natural gas or biomethane) in their vehicles.

The ever-expanding network of methane filling stations has certainly contributed to the introduction of the CNG vehicles. If 10 years ago there were 2 of them, today there are 26 of CNG filling stations and some are still adding. The circle of operators of CNG filling stations has also increased, in addition to the filling stations of AS Eesti Gaas, AS Alexela and Jetgas OÜ, the circle of operators of Bioforce Infra OÜ, AS Krooning, Thori Tanklad OÜ and AS Olerex has been added.

The corona pandemic is not known to have significantly disrupted the biomethane sector, as it is a primary sector with raw materials from agriculture or (food industry) residues, production is largely dispersed and automated, biomethane is discharged and there is no unavoidable contact with humans in normal production. However, the pandemic has disrupted the arrival of foreign maintenance engineers in Estonia,



as mandatory tests and / or isolation days make business trips significantly longer and therefore more expensive.

Recently compressed natural gas or compressed biomethane cylinders were installed in heavy goods vehicles up to 750 hp, which significantly reduces air emissions from heavy transport. Unfortunately, these dozens and dozens of heavy trucks using methane gas will not stay in Estonia, but will go to Germany. This is because heavy transport using methane fuel in Germany was exempted from tolls and also created an economic incentive to convert existing diesel vehicles to compressed natural gas or compressed biomethane. Even Germany finished this mechanism, we suggest to introduce it in Estonia.

Principles

A clear distinction must be made between natural gas and biomethane. Natural gas is fossil fuel, **biomethane and green hydrogen as renewable fuels**. Thus, increasing the consumption of natural gas (incl. **making grey hydrogen from fossil natural gas or from fossil oil shale**) **does NOT contribute** to the Green Turn and the achievement of the goals of the EU Climate Strategy.

EBA shares the concerns of businesses regarding the EC's "Fit to 55" proposal to tax excise duty¹ on biogas used in transport at half the rate of excise duty on fossil fuels in 2030.

Until now, investors doubted the profitability of biomethane production, the application of the excise duty will certainly reduce investment security in new biogas plants. Is the EC's desire to achieve a Green Deal by taxing biofuels? This is completely incomprehensible.

Investors and producers in good faith believed in the government that the statutory certainty in the exemption of biomethane from excise duty is valid at least until 2030. In conclusion, if the EC wants to eliminate the production and consumption of biofuels then taxing of biofuels definitely help make this wish come true! Only a small nuance, in this case (without biofuel e.g. biomethane production) Europe will never be able to implement the Green Deal!

BECAUSE

All biofuels are **100% carbon neutral**, and the CO₂ emitted from the combustion of biofuels is **captured by 100% of plants, fungi and other growing biomass**. When CO₂ is burned, CO₂ **is not added** to the atmosphere and the **burning of biofuels is climate-neutral**, ie it does not cause climate change. Carbon from biofuels cycles in nature, being captured when tree or grass grows and emitted when burning and captured when growing.

PROPOSAL

Biomethane must be **very clearly defined as a renewable fuel**, ideally to ensure that biomethane is exempted from fuel excise duty across Europe by 2050.

¹ European Commission's proposal in the form of a draft Council Directive, COM (2021) 563 final.

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only such tax policy certainty **will contribute to the EU's carbon neutrality by 2050**. Similarly, if biogas is to be used in fuel cells and in CHPs, it must be clearly defined as a renewable fuel, biogas must not be subject to fuel excise duty.

Biomethane production creates jobs, such as for biogas plant operators. In Estonia, a national professional vocational education standard for a biogas plant operator has been developed, a national curriculum and a curriculum for a biogas plant operator in Järva County Vocational Education Centre have been prepared, on the basis of which the first 12 students acquired the profession of a biogas plant operator in 2021. Additional jobs will be created for maintenance and repair. Forecasts made under ENMAK 2030 show thousands of additional jobs according to the realization of the potential of biomethane.

Indicator	Unit	2015	2020	2025	2030	2035	2040	2045	2050	Average
GROSS DOMESTIC PRODUKT (GDP)										
GDP_Basic prognosis	MEUR	18 362	21 842	25 237	28 643	31 738	34 530	36 897	38 693	29 493
GDP CHANGE_ENMAK IMPACT	MEUR	71	280	281	472	479	513	554	589	405
<i>increase</i>	%	0,39%	1,28%	1,11%	1,65%	1,51%	1,49%	1,50%	1,52%	1,31%
GDP per capita (PPP**)_Basic prognosis	EUR/person	18 585	21 301	24 027	26 907	29 698	32 279	34 368	36 054	27 902
GDP per capita_ENMAK impact	EUR/person	72	274	267	443	449	480	516	549	381
<i>increase with ENMAK impact</i>	%	0,39%	1,28%	1,11%	1,65%	1,51%	1,49%	1,50%	1,52%	
GOVERNMENT SECTOR & FOREIGN TRADE										
Government sector netto-income	MEUR	8	33	66	69	129	137	147	156	93
Foreign trade saldo	MEUR	-94	-81	6	-63	125	173	208	263	67
<i>Foreign trade saldo/GDP</i>	%	-0,5%	-0,4%	0,0%	-0,2%	0,4%	0,5%	0,6%	0,7%	0,13%
LABOUR MARKET										
Jobs_Basic prognosis	persons	635 000	629 933	620 541	607 653	593 262	575 952	552 230	523 165	
Jobs created with _ENMAK impact	persons	2 037	5 286	4 404	6 185	5 049	4 808	4 724	4 528	
<i>change</i>	%	0,32%	0,84%	0,71%	1,02%	0,85%	0,83%	0,86%	0,87%	0,79%
Productivity_Basic prognosis	EUR/employee	28 916	34 674	40 669	47 137	53 498	59 952	66 814	73 960	50 703
Productivity with _ENMAK impact	EUR/employee	28 936	34 827	40 832	47 431	53 848	60 340	67 243	74 442	50 987
<i>ENMAK/Basic prognosis</i>		100,1%	100,4%	100,4%	100,6%	100,7%	100,6%	100,6%	100,7%	100,6%

Previous investments in fossil fuels are in jeopardy, as the threat to climate change posed by the burning of fossil fuels is detrimental to human life (humanity). Any investment in the production, processing, transport and use of fossil fuels will not contribute to carbon neutrality. Legislation should not set precedents for investment in fossil fuel infrastructure.



Biomethane **production is already a reality in the EU green and circular economy**, no longer in vision papers, strategy papers and budget explanatory notes. Excise taxation of biogas and biomethane **signals the opposite effect to society**, entrepreneurs, investors, the media and the public that the production of biomethane, which actually implements the circular economy and the green revolution, **taxing biofuels is reprehensible**, which has so far been taxed at 0 € / 1000 m³.

From the point of view of climate neutrality, it is important that biogas / biomethane is treated as a negative CO₂ equivalent in terms of greenhouse gas emissions (effective from 2021). According to the RED II Directive, the default GHG value for biomethane produced from animal manure is between -80 (minus 80) and -100 (minus 100) gCO₂eq / MJ), as the production of biomethane captures this amount of methane and other greenhouse gases that would otherwise be released directly into the atmosphere when naturally deposited in nature would be thrown.

27% of Estonia's territory is arable land and about 7% is natural grassland. There is forest land 51.4%, the utilized agricultural area is 983,000 hectares. About 250,000 cattle are raised in Estonia, 300,000 pigs and 70,000 sheep and goats. All agriculture is a potential raw material for biogas production - slurry / manure from livestock, biomass crops and grassland.

In 2015, the Estonian Development Fund estimated the production potential of Estonian biomethane at approx. 4.5 TWh. This large number includes 80% herbaceous biomass from arable land as a raw material, which for various reasons⁵, the raw material for biomethane production may not be preferred.

*In addition to its role in energy, biomethane is also useful in solving the problem of agricultural waste - its production reduces waste in an environmentally friendly way, while reducing the climate impact of agriculture. The maximum benefit is derived from biomethane when using raw manure, slurry, food waste (eg whey), spoiled animal feed (thus preventing significant greenhouse gas emissions from the agricultural sector) or landfill gas. **Named the total potential of raw materials in Estonia is sufficient to produce about 1–1.3 TWh of biomethane per year.** In total it would be The optimal for the production of such volumes is about 20–30 biomethane production plants scattered all over Estonia.²*

The real innovation is the use of **biogas directly (without making hydrogen from biogas) in the fuel cell for the cogeneration of electricity and heat**, in places and quantities where electricity and heat are needed, but the amount of biogas for cleaning as transport fuel is too small. EBA is involved in an international cooperation project for a pilot project for cogeneration of electricity and heat with such a solid oxide fuel cell (SOFC) using biogas in practice without combustion of biogas engine.

Consequently, the Energy Roadmap envisages the development of biogas / biomethane production and expansion potential of 1-1.3 TWh per year for the period 2022-2031. Field of application during the period 2021-2040 will change, being in the first half of the period certainly mainly transport-oriented, but In the second half of the period, and especially at the end of the period, biogas / biomethane will be used not only for land transport but also for shipping and as an alternative to controlling peak loads for electricity generation.³

² ENERGIA TEEKAART 2021-2031-204, TalTech, Rohetiiger [Energia-teekaart-17122021.pdf \(rohetiiger.ee\)](https://energia-teekaart-17122021.pdf), p 33.

³ ENERGIA TEEKAART 2021-2031-204, TalTech, Rohetiiger [Energia-teekaart-17122021.pdf \(rohetiiger.ee\)](https://energia-teekaart-17122021.pdf), p 34.



REGATRACE
Renewable Gas Trade Centre in Europe



There is no international or EU-wide quality standard for biomethane and no conditions for injection of the biomethane into natural gas pipeline. Biomethane **production must be supported so that making biomethane from biodegradable waste is a green and circular economy in practice** and also helps countries meet their biowaste recycling targets. Biomethane production also helps to reduce spontaneous (uncontrolled) methane production from biomass and CH₄ emissions into the atmosphere from uncovered manure storages and similar. **Biomethane should be addressed across sectors and not create bureaucratic barriers to biomethane production e.g. with drafting taxing biofuels.**

Estonian Biogas & Biomethane Roadmap 2030

The Estonian Biogas Association propose Estonian Biogas & Biomethane Roadmap 2030:

1. To set a target for the production of biomethane of 100 million Nm³ (**1 TWh**) per year in 2030;
2. To set the target for 2030 for **cars** using methane is **15,000** and for heavy goods vehicles (**buses and lorries**) is **1,500** and the number of methane filling stations is **50**;
3. To support the use of biogas in pilot projects for the use of **solid oxide fuel cells** (SOFCs), in particular for small-scale installations at source. The heat and electricity generated in the SOFC can be used on site, including in autonomous areas without mains electricity, not to mention district heating;

Deadline for implementation: from the first quarter of 2024;

4. As a measure to implement the EU Green Deal, **to extend the eligibility period for support** for biomethane producers by extending the eligibility period for support for the development of the biomethane market until 2030 or adopt a new similar regulation;

Deadline for implementation: from the first quarter of 2024;

5. To **exempt and differentiate 40% -80% of heavy goods vehicles** consuming methane fuel from road tolls in Estonia on the basis of EURO classes;

Deadline for implementation: from the first quarter of 2023;

6. To introduce **purchase aid for the use of local gas vehicles** in Estonia (renewal of the local truck fleet from EUROIII to EUROVI on the example of Germany);

Deadline for implementation: from the first quarter of 2023;

7. **To exemp of heavy goods vehicle tax** for gas vehicles and differentiation on the basis of EURO classes;

Deadline for implementation: from the first quarter of 2023;

8. **To implement the business tax rebate** for biomethane consumption (Swedish example);

9. To use of **more environmentally friendly biomethane-based transport** when purchasing public services (setting an example in the implementation of the Clean Vehicles Directive) - **so-called green procurements**



in road construction, State Real Estate (AS Riigi Kinnisvara) constructions, where the consumption of methane fuel provides additional points in the evaluation of tenders.

Deadline for implementation: from the third quarter of 2022;

10. To continue to give preference to **methane-powered buses in public transport** procurement and to build methane filling stations in areas where this is not available for public transport today.

Deadline for implementation: by the end of 2022;

11. To participate actively in the development of an **international quality standard for biomethane** that takes into account the specificities of biomethane production. Also create preconditions for cross-border trade in biomethane, including certificates of origin;

Deadline for implementation: from the first quarter of 2024;

12. To create opportunities for the **partial replacement of natural gas with biomethane**, synthesis gas or hydrogen in the production of heat.⁴

Deadline for implementation: Develop the necessary legislative changes in the first and third quarters of 2022 and implement 2022/2023 for the heating period;

13. To establish a functioning incentive scheme for the sorting of municipal and agricultural waste in all municipalities in order to **divert all bio-waste to biomethane plants**; and composting and fertilizer production.

Deadline for implementation: mechanism to set up 2022. implemented in the first quarter of 2023.

14. To allow the **use of vehicles of higher weight and length in Estonian road transport** (in order to remain competitive with neighbouring countries, at least up to 25,25 m, but consider allowing, for example, trains up to 34,50 m with a maximum weight of 76 tonnes).

Deadline for implementation: 2022 III quarter;

15. To **promote digestate based biofertilizer** certification, to support digestate based biofertilizer export.

16. To support **power-to-gas technological innovations to double** biomethane production (up to 2 TWh/a) in 2050

17 To use **green CO2 from biomethane** upgrading units **mixed with green hydrogen** (wind, PV, hydro based).

18. To **promote liquefied biomethane production** (Bio-LNG) with objective substitute LNG by 2050 100%.

⁴ Points 12-14 are from ENERGIA TEEKAART 2021-2031-204, TalTech, Rohetiiger [Energia-tee kaart-17122021.pdf](https://energia-tee kaart-17122021.pdf) (rohetiiger.ee)



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19. To **promote green hydrogen production** from biomethane or via mixing green hydrogen with green biomethane to increase heating value of biomethane not increasing volume and pressure, especially when using natural gas network for gas distribution.

20. To build state-owned **2-4 biomethane injection points** to natural gas **transmission** network, which is precondition for biomethane export.

21. To **use LNG tanker for storage of the liquefied biomethane**, to establish state-owned 1 central biomethane liquefaction unit, which increases the independence from natural gas market price fluctuations.

In order to achieve the desired goals of reducing the environmental impact, ensuring security of supply and optimizing the added value, the roadmap describes how to cover national consumption necessary projected investment costs based on current knowledge and 2021. For biomethane the investments costs are 168 million euro during 2022-2025; 168 million euro during 2026-2030; 34million euro during 2031-2035; Altogether 369 million euros. The aggregate results of the value added calculation for biomethane are following 109 million euro by 2031 and 156 million euro by 2040. Activity Coefficient for Biofuels - biomethane is 0.54.⁵

Investments in biomethane production have been assessed by Estonian biomethane production developers and the starting point is 11 million euros per production unit with an annual production volume of 3 million m³ (approx. 28 GWh). The cost of the investment is expected to increase by 2% per year. The growth of biomethane production units will take place until the expected optimal production volume is reached, i.e. 108 million m³ or 1000 GWh per year.⁶

Drafted by EBA with input from Biomethane Working group under umbrella of the Estonian Biomethane Council and input from ENERGIA TEEKAART 2021-2031-204.

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⁵ ENERGIA TEEKAART 2021-2031-204, TalTech, Rohetiiger [Energia-teekaart-17122021.pdf \(rohetiiger.ee\)](#), p 46.

⁶ ENERGIA TEEKAART 2021-2031-204, TalTech, Rohetiiger [Energia-teekaart-17122021.pdf \(rohetiiger.ee\)](#), p 48.