

EnerCEE report: The role of biomass in the Baltic region

Introduction

The biomass from forestry and agricultural waste is primarily used for energy generation and heating. The bioenergy market is an essential part of sustainable forest management and circular bio-economy development. Biomass counts as the key renewable heating energy source in rural and urban regions. The use of biomass in district heating systems can contribute to more flexibility in the power system, diversification of Europe's energy supply and decrease the CO₂ emissions.¹

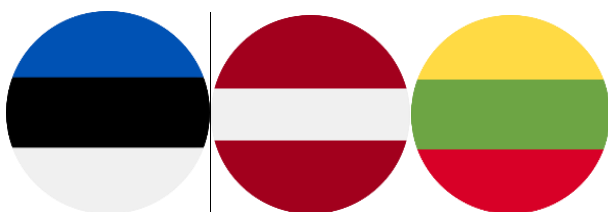
The greatest advantage of biomass is mainly its wide range of potential uses. Biomass energy is very flexible and can be easily converted into all major energy sources (heat, electricity, liquid and gas) to meet various energy demands. By burning wood waste, the amount of waste can be reduced by 60 to 90 per cent. Biomass energy generation creates added value by converting wood waste into energy. Although the energy from biomass has many advantages, (potential) disadvantages should be also taken into consideration. Compared to fossil fuels, energy from biomass is less efficient. Biomass often

needs to be enriched with fossil fuels to improve its efficiency. Biomass is carbon neutral, but the use of animal and human waste increases the number of methane gases. There is also a risk of deforestation if the desired amount of energy cannot be met by the available wood waste. Biomass obtained from monocultures declines natural biodiversity and the soil loses its nutrients more rapidly.

Therefore, the measures and regulations to make biomass supply chains sustainable are of great importance. The use of biomass is regulated by the *EU Renewable Energy Directive (REC)*, *Regulation on Land Use, Land Use Change and Forestry 2018/841 (LULUCF)* and the *EU's Biodiversity Strategy for 2030*.¹ *The Clean Energy Package* defines sustainability policy for the use of biomass in electricity and heating sectors, including targets for 2030. Estonia, Latvia and Lithuania are members of *the Bioeast initiative* for knowledge-based agriculture and forestry in Central and Eastern Europe, which aims to create a common strategic research and innovation framework for the development of a sustainable bio-economy.

Western Baltic Region

The increased costs of carbon emissions from fossil fuels are leading to the wider use of biomass in the Baltic region, mainly in the district heating sector. The Baltic countries hold great potential for biomass energy generation. Energy biomass production has increased in the Baltic region significantly in the last few years and shows a continuing upward trend.



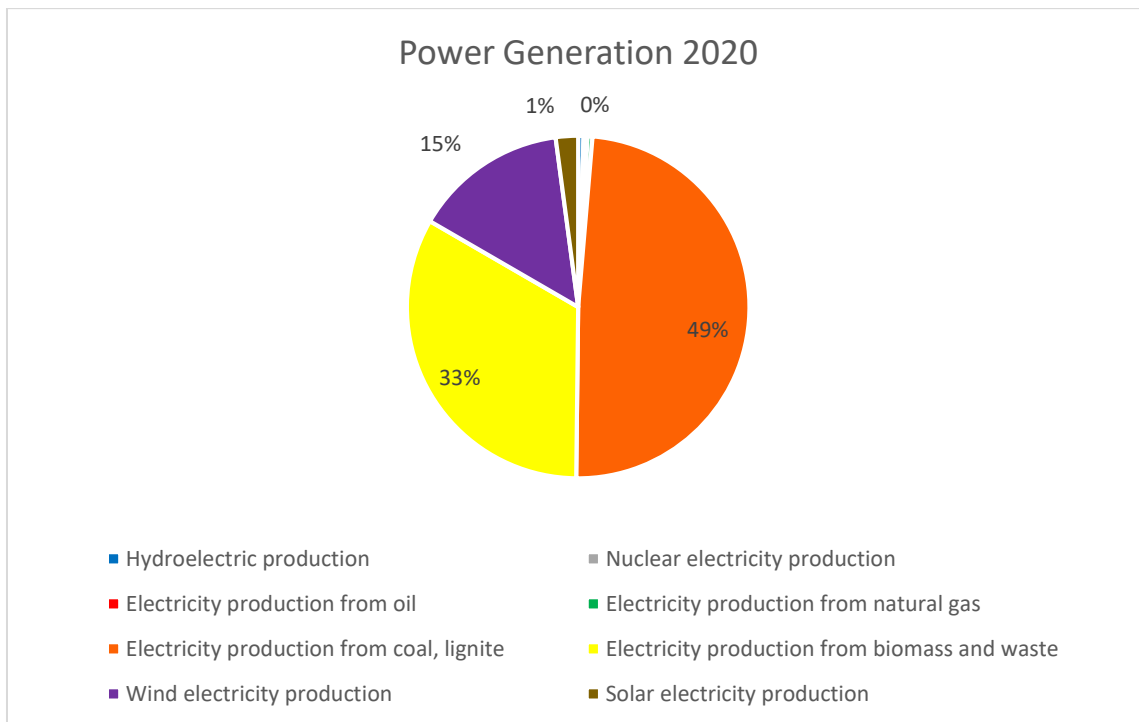
¹ <https://sites.utu.fi/bre/biomass-for-heating-opportunities-in-the-baltic-region>

Estonia

The forestry and wood industry with a share of 11% of the GDP plays an important role in the Estonian economy. Energy generation is based up to 36% on wood biomass. The forest covers more than half of the land. Forest management in Estonia is regulated by the “Forest Act”. The "Estonian Forestry Development Program until 2020" is defined as the optimal harvesting level of 12-15 million m³ per year. The proportion of mature stocks in Estonian forests is relatively high - in 2019 was around 2.0 million ha of forest suitable for wood supply (86% of the forest area).

Bioenergy in Estonia is mainly used for heating (50% share of biomass).

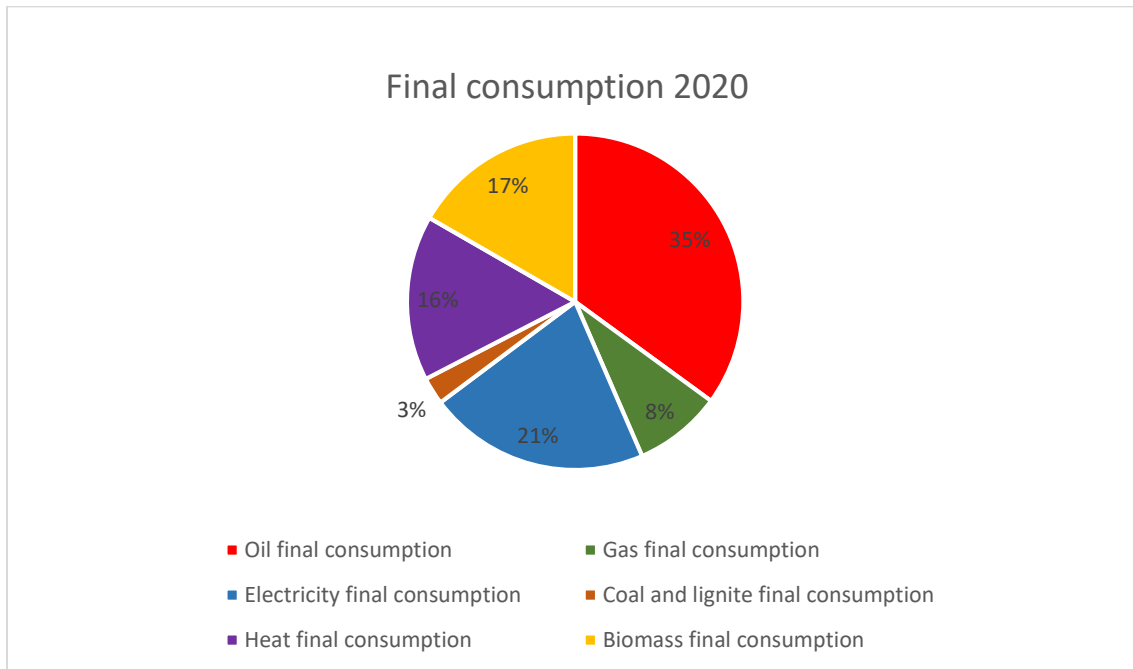
In the past decades was the electricity generation in Estonia dominated by oil – the share was 80% or even more. Electricity generation was reduced by 52% between 2018 and 2020, which has increased the electricity imports as well as the generation of renewable electricity. The role of bioenergy is therefore becoming increasingly important.²



Source: Enerdata Design: AEA

Thermal generation dropped by 58% while renewable generation increased by 46%, coal still accounts for 49% and biomass for 33%.²

² Enerdata (2022): Country report, Estonia, July 2022, <https://global-energy-data.enerdata.net/database/>, accessed on 27.04.2023



Source: Enerdata Design: AEA

Oil still makes up a majority of the energy mix, covering 35% of the total final energy consumption in 2020, while biomass accounts for 17%.

The share of renewable energy in final energy consumption is about 30 %. More than 90% of renewable energy comes from biomass. Therefore, wood fuels play an important role in Estonia's energy system. Although the share of oil is still quite high, it has decreased sharply (-15% since 2010). In turn, the share of biomass has increased massively since 2010 (from 14% to 28%), while the share of gas has fallen slightly (from 10% to 8%). According to the NECP, Estonia aims to generate 4.3 TWh of electricity from renewables by 2030, including 1.2 TWh from biomass. Estonia has achieved its overall renewable energy target for 2020 in almost all areas – except the transport. Especially in the heating sector, the share of renewable rapidly increased - from 32.2% in 2005 to 52.3% in 2019.³



Photo Credit: Shutterstock

³ IEA Bioenergy (2021): Implementation of bioenergy in Estonia, https://www.ieabioenergy.com/wp-content/uploads/2021/11/CountryReport2021_Estonia_final.pdf, accessed on 24.04.2023

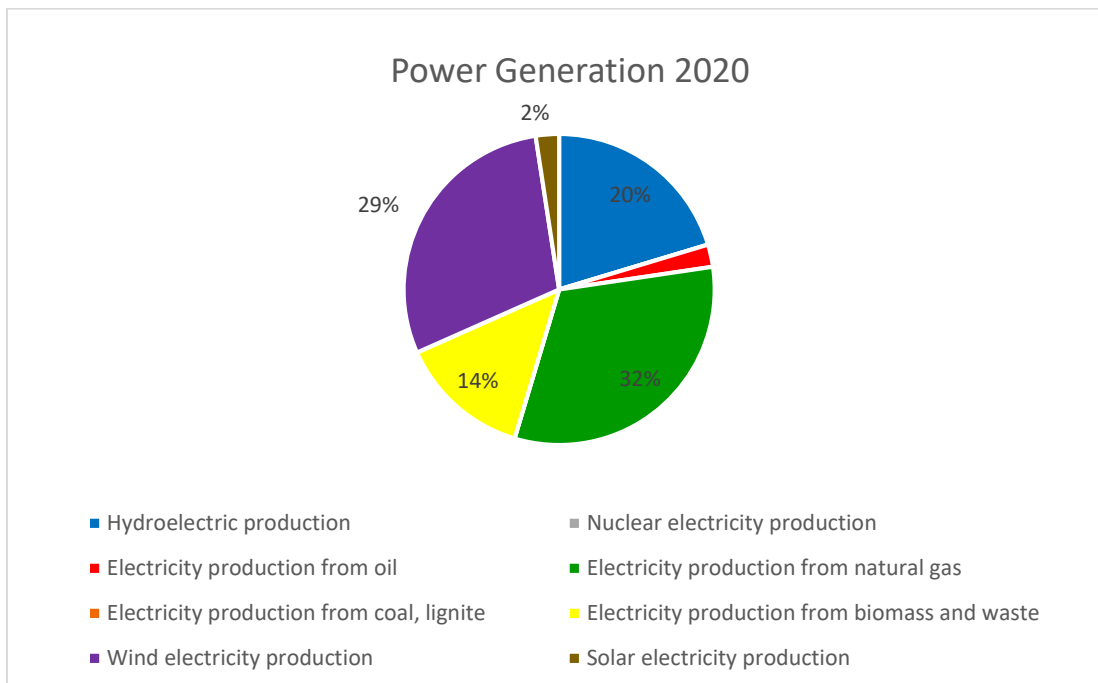
Lithuania

According to the National Energy Strategy, Lithuania aims to boost the share of renewable energy sources in total energy consumption from the current 30% in 2020 up to 45% in 2030 and 80% in 2050.

Power generation dropped significantly after the abrogation of the two nuclear plants in 2005 (-23%) and 2010 (-63%). This has led to an increase in the share of renewables. The share of gas has turned down from 40% in 2015 to 13% in 2019, whereby the share of wind and hydropower

(from 21% in 2015 to 24% in 2019), as well as biomass (from 16% in 2015 to 22% in 2019), has grown.

Compared to Estonia and Latvia, the focus in Lithuania is on energy production from wind and hydropower rather than on biomass. Before the shutdown of reactors, nuclear energy made up 1/3 of the total consumption. In 2020, natural gas accounted for 32% of total power generation, wind energy production for 29%, hydro energy for 20% and biomass for 14%.⁴

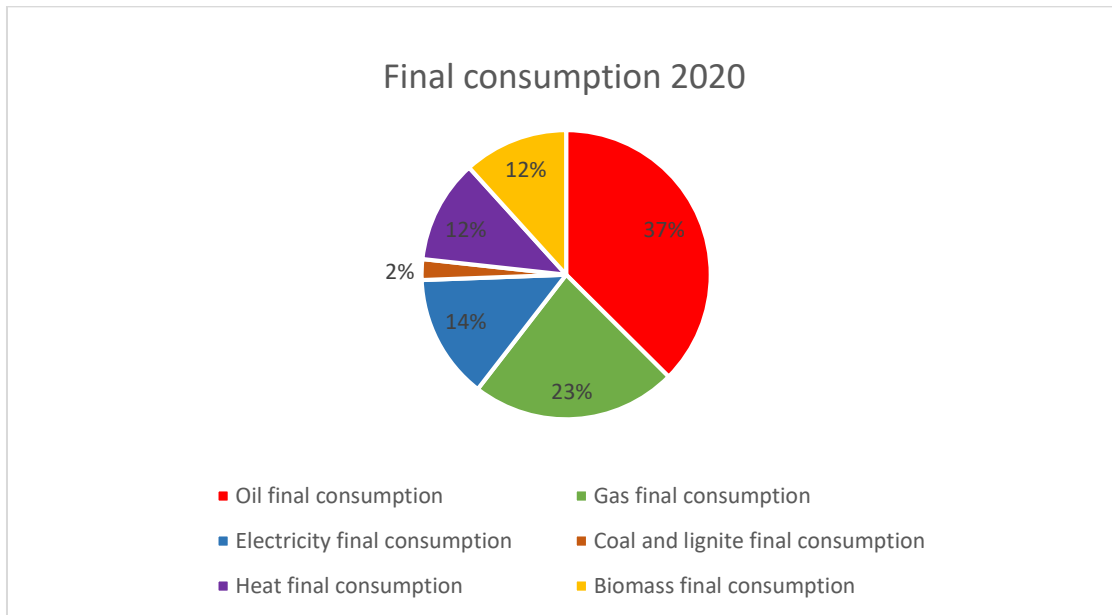


Source: Enerdata Design: AEA

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Legislation and state subsidies for the energy biomass market in Lithuania have contributed to the restructuring of the energy sector, especially the heating sector, which has led to a reduction of natural gas imports and a price reduction for end consumers. The local forest biomass is mainly used in the heating sector.

⁴ Enerdata (2022): Country report, Lithuania, January 2022, <https://global-energy-data.enerdata.net/database/>, accessed on 11.04.2023



Source: Enerdata Design: AEA

Oil made up 35% of the total final energy consumption in 2020, while natural gas accounts for 23% and biomass for 12%.

Latvia

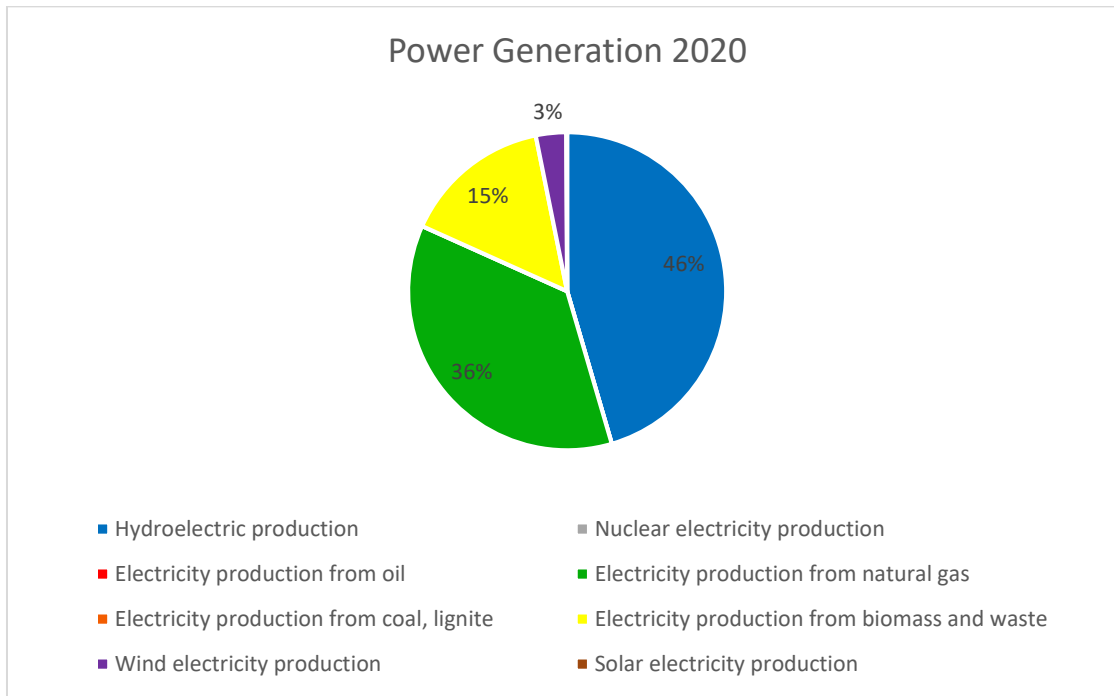
With a forest share of 50.2%, Latvia belongs to the most densely forested countries in Europe. Therefore, the wood industry is one of the most important industries in the country, which reinforces the use of renewable energy sources and significantly contributes to energy self-supply in the industrial sector. Latvia started the intensive use of bioenergy for electricity and heat generation shortly after its EU accession. Biomass is currently the most important energy source in the total energy consumption of Latvia.

The strategic goals in the energy sector were set in the *Energy Sector Development Guidelines 2016-2020* and the *Energy Strategy 2030*, which are linked to the *Latvian Sustainable Development Strategy 2030* and the *National Reform Program for the implementation of the EU2020 Strategy*. Latvian energy policy aims to strengthen energy security and promote sustainability in the energy sector. The future energy goals are embodied in the *National*

Energy and Climate Plan 2021-2030 NEKP 2030 and the *National Development Plan of Latvia NAP2027 for 2021-2027*.⁵

Although the country's current electricity and heat energy production is still largely based on natural gas and crude oil imports, Latvia is moving towards a reduction in energy production from fossil fuels and renewable energy resources are gaining in importance. The share of renewable energy in final energy consumption accounted for 40.3% in 2018. Several aspects favour this development such as geographical location, an abundance of forests and biomass, low population density, low total energy consumption, etc. Among renewable energy sources, wood is the most widely used energy source in Latvia: The share in total consumption reached 80.9% in 2018. The share of biomass, especially for heat generation, has grown constantly in recent years.⁵

⁵ Enerdata (2022): Country report, Latvia, August 2022, <https://global-energy-data.enerdata.net/database/>, accessed on 17.04.2023



Source: Enerdata Design: AEA

In 2020, hydroelectric energy production accounted for 46% of total power generation of Latvia, natural gas for 36% and biomass for 15%.

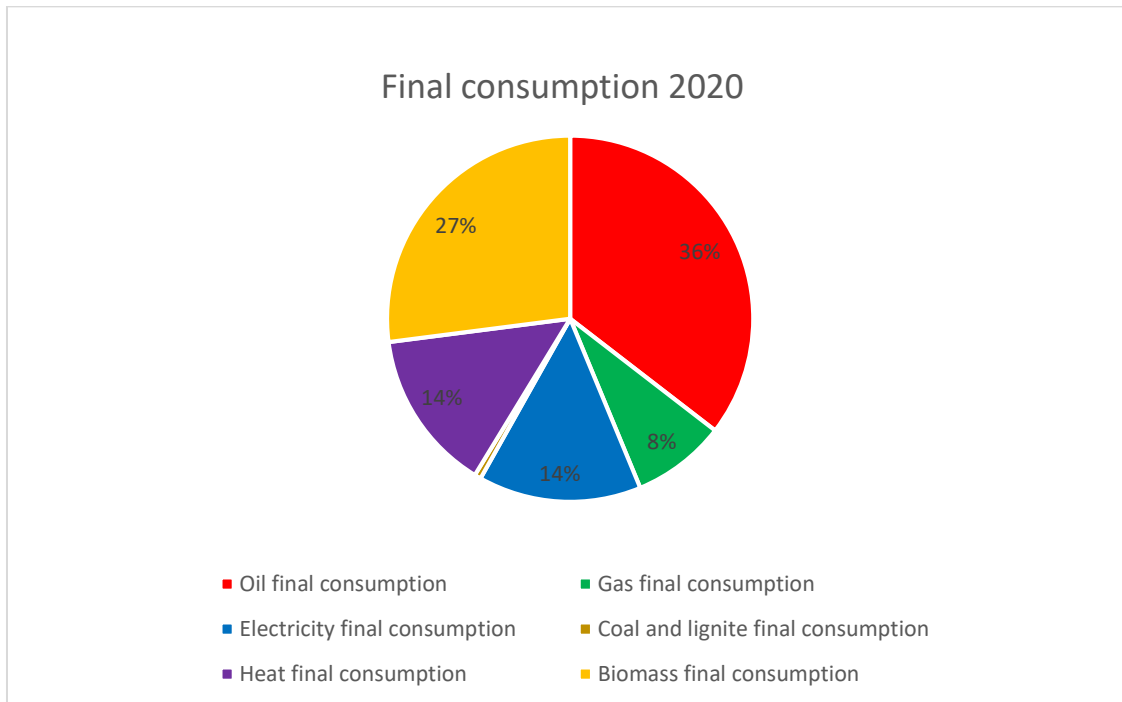
Currently, biomass CHP projects are mainly used by industrial companies - especially wood-processing companies - to cover their own energy needs. It is expected that in the next few years also public buildings will switch their heat supply to biomass and biogas.

According to the national energy targets, the consumption of biomass should increase up to 30% of primary consumption by 2030. This aim was already reached in 2019 with 37% of primary consumption. ⁵

Electricity generation from renewable CHP plants increased by 20.5% between 2015 and 2019. Government support programs have contributed significantly to this development.



Photo Credit: Shutterstock

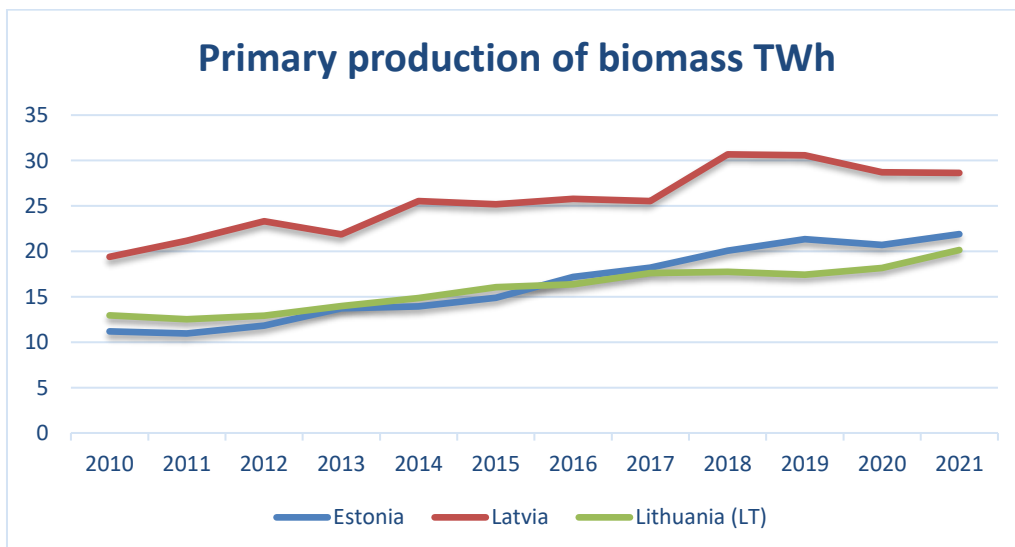


Source: Enerdata Design: AEA

In total energy consumption, oil took the first place with 36% in 2020, followed by biomass (27%) and gas (8%). The high share of biomass is especially due to the large local wood resources and the high share of firewood in private consumption and in CHP plants

Summary

Biomass represents the most significant renewable energy source in the Baltic Region – in particular in the electricity and heat generation sectors. Among the Baltic states, Latvia has the leading role in the primary production of biomass followed by Lithuania and Estonia. Since 2010, the primary production of biomass in all countries increased by between 8 and 10 TWh.



Source: Enerdata Design: AEA

The National Energy Strategies include as a goal a large increase in renewable energy, with biomass playing a central role.