Estonia's National Energy and Climate Plan (NECP) to the year 2030 Update

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SECTION A: NATIONAL PLAN

1. OVERVIEW AND PROCESS FOR UPDATING THE PLAN

1.1. Executive summary

1.1.1. I. Political, economic, environmental, and social context of the plan

Events in recent years, ranging from the global COVID pandemic to military conflicts and geopolitical tensions, have had a major impact on European and global security, economy and infrastructure. In particular, these changes have had an impact on energy policy. Russia's continued military aggression in Ukraine has strongly highlighted the need to strengthen Europe's energy independence and increase the resilience of energy supply and critical infrastructure.

In this unstable situation, Estonia has kept a clear course in shaping its energy and climate policies. Climate and energy objectives are not only a response to the common agreements of the European Union, but are part of the country's longer strategic choice to ensure a sustainable living environment, economic competitiveness and energy security. The steps taken so far have shown that, even in challenging circumstances, progress towards long-term goals can be made. Estonia met its 2020 energy efficiency and renewable energy targets and has taken steps to meet the new climate targets that entered into force in 2022. The 'Estonia 2035' strategy sets the objective of achieving climate neutrality by 2050 at the latest.

The process of drafting a climate- **proof economy law** was launched in September 2023, with the aim of establishing both a cross-sectoral and sector-specific trajectory at law level for the transition to climate neutrality. It provides a long-term and reliable framework for both policy-makers and businesses. In addition, the process of **updating the Energy Economy Development Plan (ENMAK) until 2035** is ongoing. Both documents – ENMAK and the Climate-proof Economy Act – are planned to be completed in the course of 2025.

At the same time, it is important to stress that the **international competitiveness and energy security of Estonian companies** must also be ensured in meeting the climate objectives. Reliable energy supply is the basis for any functioning economy, which is why the transition to clean energy production needs to be balanced in terms of system stability and security of supply.

By 2023, Estonia's share of renewable energy in gross final energy consumption had reached 41 % (32 % in electricity, 67 % in heating and cooling and 9 % in transport). In 2024, around 2/3 of electricity was produced locally in Estonia and 1/3. Around 2/3 of the on-site production was produced from renewable energy and about 1/3 from fossil fuels. The future-proofing of Estonia's energy system will continue and will require new production capacities and external connections in the coming years. In addition to renewable and storage, there is also a need to ensure sufficient controlled capacity. According to the security of supply analysis, 1 000 MW of controlled capacity will be needed until 2030, followed by at least 1 200 MW. The generation adequacy shall be analysed annually by the TSO with a minimum 10-year perspective. In case the analyses show a potential deviation from the reliability standard, the necessary measures (e.g. strategic reserve) shall be put in place to ensure the availability or construction of controlled capacities.

As an important step in strengthening energy security, in 2025 the electricity grids of Estonia, Latvia and Lithuania were synchronised with the frequency band in continental Europe with EU co-financing. This project strengthened the Baltic States' electricity grids and increased energy security, and independence. At the same time, in February 2025, Baltic system operators launched a common electricity system

frequencyreserves to[1]ensure the functioning and balance of the electricity system at all times.

In April 2022, the Government of the Republic decided to strengthen Estonia's energy security and mitigate the risks associated with dependence on Russian gas. On the basis of this decision, a reception capacity for liquefied natural gas (LNG) was built in Pakrineem in autumn 2022 by building a pit and the necessary infrastructure for the reception of floating LNG terminals. The import of natural gas from Russia was officially banned as of 31 December 2022 due to market circumstances that already existed in the past (Spring 2022). In order to ensure security of gas supply, Estonia has existing solidarity arrangements with Finland and Latvia, with two neighbouring countries to which the Estonian gas system is connected.

Estonia is well on track to reach its climate targets: In 2023, total greenhouse gas emissions (excluding the LULUCF sector) amounted to 10.86 million tonnesof $CO2$ equivalent. Together with net emissions from the LULUCF sector, it amounted to 12.99 million tonnes. Compared to 1990, emissions (including LULUCF) have decreased by 63.2 %, reflecting an important transformation of Estonia's energy sector, with the share of fossil fuel-based electricity production falling significantly, while the share of renewable energy has increased strongly. Nevertheless, the energy sector remained the largest source of emissions in 2023, accounting for 56 % of total greenhouse gas emissions. At the same time, developments in this sector are clearly geared towards significantly reducing emissions.

Transport was the second largest source of emissions in 2023, with 24 %, followed by the agricultural sector, accounting for 14 % of total emissions in 2023. Emissions from waste and industrial processes and product use accounted for 3 % and 2 % of total emissions, respectively.

Local authorities (local authorities) have a key role to play in achieving national climate targets, as they are responsible for a number of areas that have a direct impact on greenhouse gas emissions, energy savings and the deployment of renewable energy. Local authority policies and measures in the areas of spatial planning, energy policy, public transport, buildings and infrastructure development directly shape both the consumption habits of the population and the local environmental footprint. Thanks to this role, **78 % of Estonian local authorities and major cities have their own energy and climate plans.** These strategy papers will help link local decisions to national targets and ensure that climate action is delivered where its impact is most direct and tangible. They also make it possible to target investments knowingly and to raise awareness and involvement of local communities in mitigating climate change.

The **'Estonia's National Energy and Climate Plan 2030' (hereinafter '** ***NECP 2030*****') is a communication prepared in order to fulfil the requirement laid down in** ***Article 3(1) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action of the European Union (EU) 2018/1999 ('Regulation (EU)*** 2018/1999') to submit a national energy and climate plan to the European Commission every 10 years, including the submission of the plan to the European Commission on 19 December 2019. Regulation (EU) 2018/1999 sets out the format for the preparation of the plan. The European Commission publishes the energy and climate plans of all EU Member States on itswebsite[2].

The strategic planning carried out by the State in Estonia is based on the basis[3] described in the State Budget Acts. According to the State Budget Act, Estonia has two types of development documents: policy principles and development plans. The basic principles of the policy are approved by a decision of the Riigikogu and the development plans are approved by the Government of the Republic after they have been

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The outcome of the[1] ongoing tender for the Estonian frequency reserves is known in summer 2025 Elering extended the tender deadline for the long-term procurement of frequency reserves | Elering

2 National energy and climate planshttps://commission.europa.eu/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and- climate-plans_en

3 State Budget Acthttps://www.riigiteataja.ee/akt/107072017040

discussed in the Riigikogu.

The NEC 2030 does not set new targets for Estonia, but reflects the targets set out in already existing development documents. No new objectives or actions are proposed in this plan – they are defined in the sectoral development documents and policy fundamentals, which are also the basis for its update. The main underlying documents on which the NECK 2030 is based are highlighted below.

1) The country's long-term development strategy "Estonia 2035"
2) The fundamentals of Estonia's climate policy until 2050 4 (hereinafter referred to as *KPP 2050*);
3) Estonia's 2030 Energy Development Plan (hereinafter ' *ENMAK 2030', under preparation of ENMAK 2035*)5;
4) Climate change adaptation development plan until 20306;
5) Transport and Mobility Development Plan 2021-2035
6) The draft Forestry Development Plan (originally planned for 2021-2030) is in the process of being updated and is now planned for 2025-2035;
7) National Development Plan for oil shale 2016-2030;
8) National Waste Management Plan 2023-20287;
9) The CAP Strategic Plan 2023-2027, the Agriculture and Fisheries Development Plan until 2030, the operational programme for the European Maritime, Fisheries and Aquaculture Fund 2021-2027;
10) Strategic Plan for Cohesion Policy Funds 2021-2027
11) Estonia's recovery plan 8
12) R & D & I & Entrepreneurship Development Plan 2021-2035, including roadmaps for related focus areas
13) Ida-Viru Territorial Transition Plan;
14) Long-term strategy for building renovation;
15) NOP 2030 Progress Report data provided on e-platforms 15.3.2025.

The **NEC 2030 was updated on the basis of the development documents produced between 2023 and 2025. On 15 August 2023, the European Commission received a draft update of the NEC 2030 and a final version in June 2025. The** NEC 2030 describes the objectives set out in the development documents listed above, as well as the existing and planned measures. Strategic Environmental Assessments (SEAs) have been carried out in accordance with the Environmental Impact Assessment and Environmental Management System Act (hereinafter referred to as the Environmental Impact Assessment and Environmental Management System Act) for the sectoral development plans which led to the preparation of the NECK 2030. **The NEC 2030 notification is not a strategic planning document under Section 31 of the KeHJS, as the requirement to prepare the NEC 2030 stems from Regulation (EU) 2018/1999.**

The KeHJS regulates the process of initiating and drafting a SEA for national strategic planning documents, but not for documents drawn up to meet European Union and international requirements. For these reasons, the SEA process carried out during the preparation of the NECAP 2030 is not

Fundamentals of4 Estonia's climate policy until 2050https://www.riigiteataja.ee/akt/307042017001
5 Energy Development Plan (ENMAK) | Ministry of Climate
6 Climate Change Adaptation Development Plan 2030: https://kliimaministeerium.ee/rohereform- Climate/ Climate Policy/Adaptation to Climate Change
7 National Waste Management Plan 2023-2028 National Waste Management Plan 2023-2028 | Ministry of Climate
8 Recovery and Resilience Facility (RRF)

This document has been prepared jointly by the Ministry of Climate (Klim), the Ministry of Regional and Agriculture (ReM), the Ministry of Economic Affairs and Communications (MKM) and the Ministry of Finance (RaM) on the basis of the above-listed development documents and studies and other relevant analyses, based on the content and timeline of the EU 2018/1999 Energy Union Regulation. The update of the NECQ 2030 has taken into account, inter alia, the results of the following studies carried out with the support of the European Commission:

- **Transition to climate-neutral electricity generation**Transitioning*to a climate-neutral electricity generation9,* REFORM/SC2020/068, European Commission funding)
- **Roadmaps for Decarbonisation** *Pathways for Estonia 10(* DG REFORM, European Commission funding)
- **Support** *to the renovation wave – energy efficiency pathways and energy saving obligation in Estonia, REFORM/SC2022/06117* – European Commission funding

During the development of the NEC 2030, experts from businesses, research institutions, local authorities and their representative organisations, community, environmental and professional associations were involved in the preparation of the above-mentioned development documents and studies.

i. Strategy related to the five dimensions of the Energy Union.

The NECQ 2030 has been updated on the basis of national development documents, which take into account the European Union's international environmental, energy and climate trends. The integration of the five dimensions of the Energy Union into Estonian policies and measures has been addressed in chapter 1.2.ii. **The objectives and measures set out in the update of the NECQ 2030 are based on the following European Union directives and regulations relating to five dimensions:**

Responsibility of the Ministry of Climate

Directive 2003/87/EC and amending Directive (EU) 2023/959 establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme
Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants
Effort Sharing Regulation (EU) 2018/842 and its amending Regulation (EU) 2023/857 Land Use, Land Use Change and Forestry (LULUCF) Regulation (EU) 2018/841 and its amending Regulation (EU) 2023/839
Fluorinated greenhouse gases Regulation (EU) 2024/573
Directive 2006/40/EC on emissions from air-conditioning systems in motor vehicles
Regulation (EU) 2023/851 on CO_2 emission performance standards for new vehicles to strengthen the CO_2 emission performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition

Directive 91/676/EEC on the protection of waters against pollution caused by nitrates from agricultural sources
Renewable Energy Directive (EU) 2018/2001 and amending Directive (EU) 2023/2413
Energy Efficiency Directive 2012/27/EU, as amended by EU 2018/2002 and Directive (EU) 2023/1791
Energy Performance of Buildings Directive 2010/31/EU, as amended by Directive (EU) 2018/844 and Directive (EU) 2024/1275
Directive 2009/119/EC on minimum stocks of crude oil and/or petroleum products
Energy Union Regulation (EU) 2018/1999
Energy Infrastructure Regulation (EU) No 347/2013
Regulation (EU) 2019/943 on the internal market for electricity

9 Electricity studies | Energy Actions
10 Gas Network Decarbonisation Study 2022 | Energy Actions
11 Energy efficiency studies | Energy Actions

Directive (EU) 2019/944 on internal markets for electricity
Security of Gas Supply Regulation (EU) 2017/1938
Regulation (EC) No 715/2009 on access to natural gas transmission networks
Fuel Quality Directive 2009/30/EC
Directive (EU) 2019/692 amending the Directive on common rules for the internal market in natural gas
Regulation (EU) 2017/460 on harmonised transmission tariff design for gas
Regulation (EU) 2015/459 Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems
Regulation (EU) 2015/703 on rules for interoperability and data exchange
Regulation (EU) 1227/2011 on wholesale energy market integrity and transparency
Gas and Hydrogen Standards Directive (EU) 2024/1788
Trans-European Networks for Energy (TEN-E) Regulation
Directive (EU) 2022/2557 on the provision of essential services
New Alternative Fuels Infrastructure Regulation (AFIR) 12

Responsibility of the Ministry of Economic Affairs and Communications
Framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem (Net Zero Industry Act) 13 14
Organisation of the area of spatial planning (including strengthening planning)[15.]

Responsibility of the Ministry of Finance
Energy Taxation Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity
Classification system for environmentally sustainable activities, the taxonomy for sustainable finance and its climate criteria framework
Disclosure framework for non-financial and financial undertakings or corporate sustainability reporting
Social Climate Fund Regulation (EU) 2023/955
Recovery and Resilience Facility Regulation (EU) 2021/241

Responsibility of the Ministry of Regional Affairs and Agriculture

Law implementing the European Union Common Agricultural Policy
Cooperation between public authorities and local authorities (KOV), capacity of local authorities to develop energy efficiency and renewable energy use in local authority buildings (support measures)

Regulation (EC) No 1370/2007 of the European Parliament and of the Council on public passenger transport services by rail and by road
Regulation (EU) No 181/2011 of the European Parliament and of the Council on bus and coach passenger rights and obligations of bus and coach undertakings
Regulation (EU) 2021/782 of the European Parliament and of the Council on rail passengers' rights and obligations Directive (EU) 2019/882 of the European Parliament and of the Council on accessibility requirements for products and services

The update of the NECQ 2030 has been prepared taking into account the relevant European Union legislation in the relevant areas, for which negotiations on drafts and amendments have not yet been

12 New law agreed to deploy alternative fuels infrastructure (europa.eu)
13 Net Zero Industry Acthttps://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023PC0161
14 Until 1 July 2023, the Ministry of Finance was responsible for the area, estimated from 1.1.2025 Ministry of Economic Affairs and Communications

finalised as of spring 2025. Following agreements and entry into force, the content of these EU legislation will be transposed into the Estonian legal area and development documents, including updates of related objectives and measures if necessary. **In the context of Russia's war of aggression against Ukraine, which began in 2022, the European Commission's plan to make Europe independent from Russian fossil fuels before 2030 (RePowerEU) takes into account the corresponding changes** in the Renewable Energy Directive (including amendmentd) related to accelerating the production and deployment of renewable energy), the15Energy Efficiency and Energy Performance of Buildings Directives, the Recovery and Resilience Facility Regulation (EU) 2021/241. In addition, relevant European Union communications such as the REPowerEU Communication, the Solar Energy Strategy Communication, the Communication on Promoting Energy Savings and the Hydrogen Strategy for a climate-neutral Europe will be taken into account.

The following processes contribute to the Strategy on the five dimensions of the Energy Union in this context:

- Preparation of green budgeting (public budgetd16)
- Sustainable finance processes (private finance/budgets)[20]
- Energy taxation (in the EU, Estonia)[20]
- Developing energy efficiency and renewable energy production and consumption
- Just Transition Ida-Virumaa (Territorial Just Transition Plan)

ii. An overview of the plan's main objectives, policies and measures.

The main objectives of the update of the NECQ 2030 are:

- Estonia's long-term objective is to balance greenhouse gas emissions and removals by 2050 at the latest, i.e. **net zero greenhouse gas emissions by 2050, according to the 'Estonia 2035' strategy.**
- In the **sectors covered by the Effort Sharing Regulation** (transport, small energy, agriculture, waste management, industrial processes), **total emissions could be close to 4.7 Mt** CO2 in 2030 (2005= 6.3MtCO2), i.e. a 24% reduction in greenhouse gas emissions by 2030 compared to 20051718.
- **In the land use, land use change and forestry sector ('LULUCF') compared to the baseline (2016-2018 average), GHG removals must be 0.434 million tonnes of CO2 higher by 2030**, including offsetting the sector's emissions with carbon removals by the same sector in the period 2021-2025 and within the defined GHG budget for 2026-2029.
- **The share of renewable energy in gross final energy consumption in 2030 shall be at least 65 %**
- **Final energy consumption will have to remain at a level of up to 29,4 19 TWh/y until 2030**, with an overallenergy saving20 obligationof up to 21.28 TWh in the period 2021-2030, contributing

15Act amending the Atmospheric Air Protection Act and other Acts (transposition of amendments to the Renewable Energy Directive) – EIS

16Law on the organisation of the energy sector-State Gazette

17 Annual national emission levels for the sectors covered by the Effort Sharing Regulation for the period 2021—2030 will be established at European Union level by means of implementing acts after the entry into force of the Regulation.

19 This is an indicative target as the European Commission recalculates it annually, see Table 19: Indicative national contributions for FEC for all Member States Detailed calculations for the Member States https://energy.ec.europa.eu/document/download/1be582f1-5029-40c4-b9ca-04ca546b99ae_en?filename=2024_03_13_Detailed_calculations_for_EED_Article%204.pdf

20 The overall energy savings obligation (i.e. the obligation to achieve energy savings and improve energy efficiency) must distinguish between the primary energy consumption reduction target, by which the contribution to the overall

to maintaining the same level of final energy consumption.

- An **indicative reduction of up to 48 % in primary energy consumption by 2030 (compared to a peak in 2016=69.8 TWh) inparticular21with** a reduction in the use of oil shale and other fossil fuels, Article 4l of the new EED22 has to have a primary energy consumption of up to 36,5 23 TWh in 2030.
- **Ensuring energy security by keeping the rate of dependence on imported energy as low as possible,** reducing the use of fossil gas, maintaining full energy independence from the Russian Federation, increasing the resilience of critical energy infrastructure in line with today's risks, increasing the use of indigenous renewable energy sources (wind on land and sea, solar) and ensuring sufficient controlled capacity in electricity.
- **Meeting the minimum criteria for electricity interconnections by maintaining at least 15 % of electricity interconnections between Member States of the European Union in 2030, inter alia by synchronising the electricity grid with the Central European band in 2025 and, where appropriate, by strengthening interconnections between countries** (EstLink 3 and Estonia-Latvia 'fourth connection').
- **Implementing R & D & I to keep the economy competitive through the development** of climate-neutral energy production, smart and sustainable energy solutions (green hydrogen, biomethane), flexibility market (including consumption management, energy storage) and transmission networks.

Measures have been developed in the areas of energy, agriculture, transport, building stock, LULUCF, waste management, industry and green technologies to meet updated targets and policies and forecast greenhouse gas emission reductions. The24 contribution of the existing and plannedmeasure to GHG reduction, renewable energy and energy efficiency is set out in Annex III to the plan. In addition, the draft will include descriptions of R & I and competitiveness actions and other relevant actions. The main measures in place are set out in Table 1.1.

EU target is indicative (indicative) and the final energy consumption target, which is collectively binding and through which Member States contribute to the Union's final energy consumption target.

21 Primary energy consumptionhttps://ec.europa.eu/eurostat/databrowser/view/sdg_07_10/default/table?lang=en

22 EU agree stronger rules to boost energy efficiency (europa.eu)

23 This is an indicative target as the European Commission recalculates it annually, see Table 13. Eed recast Annex I formula results (EU Reference Scenario 2020 & updated EU Reference Scenario 2020), in Mtoe https://energy.ec.europa.eu/document/download/1be582f1-5029-40c4-b9ca- 04ca546b99ae_en?filename=2024_03_13_Detailed_calculations_for_EED_Article%204.pdf

24 Existing and planned measures are defined in accordance with Article 2 of the Energy Union Governance Regulation.

Table 1.1 Main energy and climate action applies by sector.

Areas	Main activities supported
ENERGY:	Development of renewable energy production Boosting the construction of wind farms Development of heat management Electricity grid development, including synchronisation in Central Europe bandwidth Energy and resource efficiency in enterprises Boosting the production and uptake of renewable fuels Boosting the build-up of recording equipment Thematic R & D programmes
TRANSPORT:	Increasing electric transport, light mobility, biofuels economy; energy and fuel efficiency rectification Development of public transport Development of railway infrastructure Encouraging the uptake of biomethane
BUILDING STOCK:	Improving the energy efficiency of public buildings (central and local government), commercial and residential buildings and street lighting
AGRICULTURE:	Increasing the production and use of biogas and biomethane Animal welfare Advice, knowledge transfer and communication to businesses Investments in the valorisation of bio-resources
WASTE MANAGEMENT:	Reducing the generation of biodegradable waste in landfills
LULUCF:	Regeneration of private forests Compensation for nature conservation restrictions in private forests Ensuring the protection of biodiversity (including precious habitats) Protection of habitats and populations of species common to Estonia
INDUSTRIAL PROCESSES:	Reducing emissions of fluorinated greenhouse gases and replacing them with alternative substances
GREEN TECHNOLOGIES INVESTMENT PROGRAMME:	Green tech investment programme
RESEARCH, INNOVATION AND COMPETITIVENESS:	Smart and sustainable energy solutions Grants for entrepreneurship and innovation Grants for international research cooperation, knowledge transfer, Centres of Excellence

Estonia's main energy and climate policy objectives and policies are set out in Table 1.2.

Table 1.2, Estonia's main energy and climate policy objectives, policies (see Annex III for related measures).

2030 targets	Policy orientations
Estonian greenhouse gas (GHG) emissions reduction binding national objective for ESR sectors 24 % by 2030 compared	Transport, agriculture, waste management and industrial in processes and small in the case of energy generation from plants with a nominal capacity of less than 20 MW, reductions in fossil fuel use and energy savings reduce GHG emissions.
2021-2025 for the years LULUCF sector emissions shall be compensated by at least equivalent carbon removals by the same sector. 2030 target with baseline (2016-2018) medium) compared to 0.434 Mt CO2 sequestration	The volume of production and use of wood fuels is primarily influenced by the carbon sequestration obligation of managed forest land set out in the National ForestAccounting Plan25and supported by measures in the draft Forestry Development Plan 2021-2030. The Forest Act and the Nature Conservation Act are in the process of renewal.
Final energy consumption 29.4 TWh/y	From 2021 to 2030, energy savings are required to maintain final energy consumption each year of 0.8 % (up to 2023), 1.3 % (2024-2025), 1.5 % (2026-2027) and 1.9 % (2028-2030 and beyond) of the average final energy consumption in 2017-2019. The cumulative energy savings obligation for the period 2021-2030 is 21.28 TWh.for the
Reduction in primary energy consumption of up to 48 %	Estonian economy are EU of member states highest for countries with primary energy intensity,4th place26. The Directive requires Estonia to reduce primary energy
Renewables share total 65 % of final energy consumption	Increasing the share of renewable energy using fossil fuels boilers exchange renewable fuels; fuel-free energy sources electricity generation; renewable fuels and —electrically vehicles
100 % renewable electricity	New renewable electricity production equipment set-up
Share of renewable energy in heat management 63 %	As regards heat and cooling, the potential of Estonian wood fuels and waste heat is being exploited, and the uptake of heat pumps and storage is increasing.
Renewable transport fuels share in accordance with renewables in the Directive:	In particular, domestic biomethane will be covered in the perspective of the use of gaseous fuels in Estonia. Increased use of electro-mobility based on renewable

The proposed measures will contribute to the following necessary changes to the Estonian 2035 strategy, on a sectoral basis, as follows:

- **ENERGY:** Go beyond climate-neutral energy production, ensuring energy security
- **TRANSPORT:** Deploying safe, green, competitive, needs-based and sustainable transport and energy infrastructure

25 Ministry of Environment 2019 National Forest Accounting Plan 2021-2025 Summary https://www.envir.ee/sites/default/files/riiklik_metsanduse_arvestuskava_eestikeelne_kokkuvote.pdf
26 European Union Primary Energy Intensity 2020https://www.indicators.odyssee-mure.eu/online-indicators.html
27 EU Member States are in the process of transposing today's Renewable Energy Directive (EU) 2023/2413 and, as a result, the overall target in the transport sector is changing in the near future. The target for Estonia could be 26 % by 2030 or a 14.5 % reduction in GHG emissions by 2030 compared to the 2010 baseline.

- **BUILDING STOCK:** Plan and renew space in a holistic and high-quality way, taking into account societal needs, changes in population, health and the environment
- **AGRICULTURE:** Building capacity in key areas for the Estonian economy
- **WASTE MANAGEMENT:** Putting the principles of the circular economy into practice
- **LULUCF:** Plan and renew space in a holistic and high-quality way, taking into account societal needs, changes in population, health and the environment
- **INDUSTRIAL PROCESSES:** Creating a flexible and secure economic environment that fosters innovative and responsible business conduct and fair competition
- **GREEN TECH INVESTMENT PROGRAMME:** Let's go beyond climate neutrality ensuring energy security for energy production
- **RESEARCH, INNOVATION AND COMPETITIVENESS:** Introduce new solutions to encourage business R & D & I

1.2. Overview of current policy situation

i. National and EU energy system and policy context of the national plan

Since the submission of the NECY 2030 to the European Commission in 2019, Estonia has taken important steps towards meeting the targets in the field of energy. In the Energy Organisation Act, we have set more ambitious targets in the field of renewable energy: the overall target for renewable energy has been increased from 42 % to 65 % of gross final energy consumption and the target for renewable electricity from 40 % to 100 % of electricity consumption.

As part of the REPowerEU plan, an audit was carried out to identify the biggest bottlenecks in the planning, permitting and construction of renewable energy projects. As a result of the audit, drafts were prepared to speed up procedures and increase transparency. The amendments created an integrated permit for offshore wind farms, with one permit instead of three permit-granting processes. Amendments were also adopted to speed up the planning process (the obligation to adopt a detailed solution has been removed in the case of State and LOV special plans) and impact assessments. A number of legislative changes resulting from EU initiatives are still under preparation, both to make land use more multi-purpose and to speed up permitting procedures for renewable energy and enable renewable energy developments on extracted land, including the creation of a single entry point for renewable energy permitting procedures. In spring 2023, Estonia completed its roadmap for hydrogen. The auctions for renewable electricity that took place between 2019 and 2021 added 0.5 TWh of additional electricity to the market (mainly solar power plants, one hybrid wind and solar park). The 2023 auction confirms an increase of 0.78 TWh of additional renewable electricity capacity, a new auction planned in 2025. Measures for biomethane infrastructure and use, pilot programmes for storage and green hydrogen, and current energy and climate policies and measures related to the five dimensions of the Energy Union have been successfully launched.

The **additional measures proposed to meet the increased climate ambition targets compared to the 2019 NEC 2030 Communication (including under the Recovery and Resilience Plan and the European Commission's REPowerEU Plan) have been due to the closure of pipeline gas and electricity interconnections** with Russia, which has accelerated the deployment of energy efficiency and renewable energy.

ii. Current energy and climate policies and measures related to the five dimensions of the Energy Union

The orientations and measures related to the five dimensions of the Energy Union are set out in Table 1.3.

Table 1.3 Estonian policies related to the dimensions of the Energy Union (measures set out in Annex III).

Dimension	Policy orientations

Decarbonisation	By 2050, Estonia will be a competitive, climate-neutral country with a knowledge-based society and economy, ensuring a high-quality and species-rich living environment and being prepared and able to reduce the adverse effects of climate change and make the best use of the positive effects.
Energy efficiency	Increasing energy efficiency in energy production, buildings and transport, agriculture
Energy security	Use of domestic fuels and fuel-free energy sources, maintenance of controlled capacities and new ones, diversification of energy sources and supplies, provision of affordable energy supply, development of transmission and distribution networks, provision of sufficient managed capacity, synchronisation of the electricity system with the Central European band,
Internal energy market	Development and readiness of external connections, market development for flexibility services, decarbonisation of the gas network
Research, innovation an	Support for the implementation of the measures of this programme, studies and pilot projects for climate impact assessment

iii. Key issues of cross-border relevance

The main issues with cross-border relevance in Estonia's energy economy are:

- joining the Continental Europe synchronous area in February 2025;
- monitoring and protection of critical infrastructure for electricity interconnections;
- ensuring the adequacy of electricity generation capacities and grid connections in the region, integration of the electricity system services market;
- ensuring security of gas supply by having sufficient regional infrastructure and solidarity agreements between Member States, further integration of the gas market (including the harmonisation of regional retail gas markets);
- possible cross-border hydrogen transit corridor through Estonia
- development of infrastructure for recharging or refuelling of alternative fuels vehicles and cross-border cooperation (deployment of alternative fuels in the transport sector);
- achieving renewable energy targets in the most cost-effective way (utilising wind potential in land and sea areas and adding cross-border interconnections to enable energy trade).

iv. Administrative structure for the implementation of national climate and energy policies

Estonia's climate target was set out in a vision document entitled 'Buildings for climate policy up to 2050', approved by the Estonian Parliament in 2017. The principles and policies outlined in this document served as a basis for the drafting of the NECTP 2030. The strategy for Estonia 2035, adopted by the Parliament in 2021 and prepared by the State Chancellery, envisages the creation of a climate-neutral country by 2050. On 8 February 2023, the Estonian Parliament approved the renewal of the 'fundamentals of climate policy', which set Estonia's long-term goal of achieving climate neutrality by 2050.

The Ministry of Climate is responsible for preparing, implementing and monitoring the implementation of the plan (Figure Klim). The financing of the scheme is carried out under the responsibility of the Ministry of Finance on the basis of the state budget drawn up in cooperation with other ministries. **The ministries responsible for planning, implementing and monitoring the implementation of planned actions in the areas covered by** the plan are shown in Figure 1.1.

Figure 1.1 Climate and energy policies are designed and implemented by government bodies.

1.3. Consultation and involvement of Member States and EU entities and the outcome thereof

The involvement required for the preparation of the NEC 2030 has been further carried out within the framework of existing and planned sectoral development documents and laws underpinning the preparation of the NEC 2030 (e.g. ENMAK 2035, Climate-proof Economy Act)

i. Involvement of the national parliament

Elections to the Riigikogu took place on 5 March 2023 and an amendment to the Government took place. In June 2023, the draft version of the NEC 2030 update was presented to Parliament's parliamentary committees, on the basis of which clarifications were made to the draft. On 10 August 2023, the new Government of the Republic approved the draft update of the NEC 2030 and submitted it to the European Commission. The changes planned in the updated NEC 2030 were also presented to the Estonian Parliament's Economic Affairs Committee in July 2024. The updated version was approved by the Government of the Republic and submitted to the European Commission in June 2025.

ii. Involvement of local and regional authorities

For the purposes of the application of the REPowerEU plan in Estonian national law, a working group analysing the failures of renewable energy deployment was established, involving the Ministry of Finance in charge of spatial planning policy (from 1 January 2025, the Ministry of Economic Affairs and Communications in charge of spatial planning), the Ministry of the Environment responsible for environmental impact assessment and the Ministry of Economic Affairs and Communications responsible for the construction permit and until 31 June 2023 for the energy sector. The Environmental Agency (KAUR) was also involved as a sub-unit of KeM, which is tasked with mapping go-to areas according to the national renewable energy targets. As this is a workflow across ministries, the working group was chaired by the State Chancellery. The joint work resulted in an audit which led the drafting of a draft law speeding up renewable energy procedures (see 1.2 (i).the drafting of a draft law speeding up renewable energy procedures (see 1.2 (i).

In addition to the audit, changes to national legislation have been initiated in recent years in relation to a number of EU initiatives (e.g. EU Council Regulation 2022/2577 laying down a framework to accelerate the deployment of renewable energy, several amendments to the Renewable Energy Directive). The preparation of drafts resulting from renewable energy initiatives has been carried out in close cooperation with stakeholders, including local authorities, renewable energy developers, and competent government and public authorities.

In summer 2023, the process of drafting the Climate-proof Economy Act was launched with the aim of setting a cross-sectoral and sector-specific trajectory towards Estonia's climate neutrality. This is one of Estonia's

largest and most broad-based policy-making process, with a wide range of stakeholders involved in drafting legislation with a wide impact. The private and non-profit sectors, as well as the public sector, including local authorities, were mainly involved through working groups. The task of the working groups was to advise sectors and individual companies on the drafting of a draft law on a climate-proof economy. Six working groups were set up to draft a climate-proof economy law and agree on climate targets (energy; space and mobility; spatial creation and buildings; biodiversity and land use; circular economy; industry and Minerals Working Groups) plus 3 subgroups (Maritime; a sustainable food system; working Groups on Entrepreneurship and Resource Use). The public consultation on the draft law on a climate-proof economy received more than 900 proposals from more than 60 organisations. As the law has a significant impact on different areas of life, the process was not rushed and work on the draft law will continue.

The new coalition of government sets a clear goal: In 2025, Estonia's climate targets will be confirmed at the level of the law, giving them stronger legal weight and ensuring consistency in sectoral policy-making. This is an important step towards a coherent, transparent and predictable climate policy for both the public and private sectors. A Climate Council composed of academics and sectoral experts was established on 23 August 2023 to advise the government, the State Assembly, ministries and interest groups on the preparation of the Climate-proof Economy Act. The Council shall be independent in its activities and in shaping its positions. The Climate Council plans to remain active even after the climate-proof economy law has been enacted, to monitor the achievement of the targets and to make recommendations to the government on an ongoing basis.

The proposals made by the authorities and stakeholders for the draft updated version of the NEC 2030, and an overview of how they have been taken into account, are set out in Annex V to the draft updated version of the NEC 2030 submitted in 2023.

Two engagement workshops took place on 17 March and 10 May 2023 on the drafting of the draft NEC 2030 update. You were involved through the MKM ENMAK 2035 inclusion list, the KeM and MeM stakeholder lists. The events were announced on the MKM's REKK 2030 portal. The draft updated version of the NEC 2030 was made available for public consultation on the Ministry of Economic Affairs and Communications portal.

On 10 August 2023, the Government approved the revised draft update of the NEC 2030 on the basis of proposals received by 30 June 2023.

Two engagement workshops took place on 17 March and 10 May 2023 on the drafting of the draft NEC 2030 update. You were involved through the MKM ENMAK 2035 inclusion list, the KeM and MeM stakeholder lists. The events were announced on the MKM's REKK 2030 portal. The draft updated version of the NEC 2030 was made available for public consultation on the Ministry of Economic Affairs and Communications portal.

On 10 August 2023, the Government approved the revised draft update of the NEC 2030 on the basis of proposals received by 30 June 2023.

Public consultation on the draft update of the NECQ 2030

From 6 April to 8 May 2023, the draft update of the NECMM 2030 was available for comments on the MKMPortal28. The notification of the public consultation was communicated by the Ministry of Economic Affairs and Communications through the MKM ENMAK 2035 engagement list, the KeM and MeM stakeholder lists.

The first working version of the draft update of the NEC 2030 was published by ministries for coordination

28 National Energy and Climate Plan | Ministry of Economic Affairs and Communications (mkm.ee)

on 28 April 2023 on the Government of the Republic's Preliminary RequirementsInformation System29.

Summary of the proposals for the draft update of the NECQ 2030

In the course of the public consultation and in the Government Drafts Information System with the side letters of ministerial coordination, **proposals were received from 14 organisations**: Latvian Ministry of Climate and Energy, Ministry of the Interior, Ministry of Education and Research, Ministry of Rural Affairs, Viru Keemia Grupp, European Commission Directorate-General for Regional and Urban Policy Estonia, Finland, Latvia and Lithuania, Association for Living Environment and Population Development, Statistics Estonia, Estonian Electricity Industry Association, Estonian Chamber of Environmental Associations, Estonian Renewable Energy Chamber, Ministry of Finance, Competition Authority and Fermi Energia OÜ.

The draft was the subject of technical and substantive proposals to clarify the legal status of the NECTP 2030, the input materials to be used (studies, analyses, etc.), the content of objectives and measures, the benchmarks, terminology, forecasts, development projects to be reflected, the continuing effects, funding, cooperation and involvement, the implementation of draft legislation and the plans related to the European Commission (Fit for 55, the Recovery Plan, RePowerEU, Clean Energy for EU Islands, Just Transition, etc.) in Estonia, substantive and numerical contradictions between the different chapters, clarification of wording and format. The additions to the draft on the basis of the proposals are reflected in Annex V to the draft updated version of the NEC 2030 submitted in 2023.

iii. Consultation of stakeholders, including social partners, and involvement of civil society and the public

The involvement of stakeholders in energy and climate policy-making in Estonia takes place more broadly throughout the policy-making process. Stakeholders are therefore involved not only in drawing up development plans, but also in discussions on sectoral developments and the effects of existing measures, which in turn contribute to Estonia's 2030 National Energy and Climate Plan.

Stakeholders have been involved in the working groups preparing ENMAK 2035 and in the drafting of the draft update of the NEC 2030 exactly as local authorities, whose involvement is outlined in chapter (ii).

In 2024, two working versions of the Energy Development Plan 2035 (21/03/2024 and 13/11/2024) were prepared (complementary to the first working version completed in 2023) as proposed by the relevant authorities, market participants, steering committee and impact assessors. The additions made on the basis of the proposals thus relate to the wording of the general objective; targets, metrics and targets for 2035; clarifications of the proposed activities; forecasts of electricity, heat and gas consumption; capacity and production forecasts; energy price forecasts. In the course of 2024, related impact assessments (including Strategic Environmental Assessments) were prepared. In April 2025, the Minister for Energy and the Environment declared the Strategic Environmental Assessment (SEA) to be compliant with the Environmental Impact Assessment and Environmental Management System Act. As a next step, the Development Plan goes to the Government Draft Information System to obtain coordination between ministries and other relevant bodies. According to the timetable, the approval of the development plan by the Government of the Republic is planned by December 2025 at the latest.

Key stakeholder representatives are part of the Renewable Energy Board and the Energy Council of the Ministry of Climate, which holds a multilevel climate and energy dialogue, the establishment of which is mandatory for Member States under Article 11 of Regulation (EU) 2018/1999.

A large number of stakeholders were involved in the drafting process of the Climate-proof Economy Act. While engagement normally starts when the first draft is ready, but the creation of the Climate-proof Economy Act also took place in the Ideekorje working groups and in the form of an opinion migration.

29 Estonian National Energy and Climate Plan 2030, Draft https://eelnoud.valitsus.ee/main/mount/docList/80cc82db-711d -481b-8b4f-82af433ee9#M3B2cDTl

Climate ambassadors also attended schools to make climate feelings and the Minister of Climate met with Estonian employers. In addition, in the context of the drafting of the Act, in the context of the drafting of the Act, there was an opinion-maker during which all interested parties had the opportunity to discuss the Climate Change Mitigation and Adaptation Act and the upcoming Climate-proof Economy Act. Discussions took place from 15 March to 15 April 2024. More than 500 people participated in the discussions and received around 200 proposals. In conclusion, a closing workshop for moderators took place on 8 May at the Ministry of Climate. The proposals sent were discussed with the ministry's deputy secretaries and other experts and how they could be taken into account in future policy-making. The proposals received and comments from the Ministry of Climate can be found on the Ministry ofClimate website[32].

iv. Consultation of other Member States

In April 2023, a summary of the plan's main objectives and measures was sent to the Ministry responsible for energy in Finland, Latvia and Lithuania for comments. On 26-27 October 2023, a regional consultation took place in Vilnius, led by Lithuania, for the NECK experts on the NEC2030 topics3031. In May 2024, a meeting took place with Finland for a mutual presentation and discussion of the projections of greenhouse gas emissions from the NKK 2030. In June 2024, EUSBSR PA Energy organised a32 regional webinar with the participation of countries in the Baltic Sea region, presenting their NECI documents and discussing common topics.

v. A gradual process involving the European Commission

The update of the NEC 2030 was based on the European Commission's guidelines33 and recommendations on the updated draft NEC 2030 (e)34

1.4. Regional cooperation in preparing the plan

i. Elements subject to joint or coordinated planning with other Member States

The objectives and measures of the draft NEC 2030 update were sent to Lithuania, Latvia and Finland in April 2023.

ii. Explanation of how regional cooperation is considered in the plan

As regards climate and energy policy, Estonia participates in various regional cooperation formats (Paris Agreement on Climate Change in the context of climate and energy policy), including:

- BalticAssembly35;
- Balticnational summits of prime ministers;
- BalticThe Council of Ministers (BCM);
- The European Union Baltic Sea Strategy (EUSBSR) PA Energy and the Baltic Energy Market Interconnection Plan (BEMIP);

30 https://kliimaministeerium.ee/rohereform-kliima/kliimakindla-majanduse-seadus/kliimanoukogu
31 Challenges and opportunities of green transformation: What can we learn from each other? (youtube.com)
32 Policy Area Energy – EUSBSR
33 Commission Notice on the Guidance to Member States for the update of the 2021-2030 national energy and climate plans
34 https://commission.europa.eu/publications/commission-recommendation-assessment-swd-and-factsheet-draft-updated-national-energy-and-climate-13_en
35 Cooperation among the National Parliaments of Estonia, Latvia and Lithuania

- Baltic-Nordic Energy ResearchProgramme36.
- Project on the regional gas supply of Latvia and Lithuania for the import of TEU-I 37 gas from the Klaipeda LNG terminal and from Poland to the Inculkans gas storage facility for the supply of Estonia, Latvia and Finland
- Horizon Europe and EU missions (climate-neutral and smart cities; adaptation to climate change)

The format of regional cooperation between the Baltic States is the intergovernmental cooperation institution of the three Baltic States, the **Baltic Council of Ministers**, in which Prime Ministers meet at least twice a year, energy ministers, according to the current nature of regional issues. At the policy-making level, a format of meetings of Senior Energy Officers has been established, chaired by the Deputy State Secretary Generals in the field of energy. Senior officials meet regularly in accordance with the work programme of the country of the Presidency (presidency rotating everyyear). The Baltic States' energy policy issues are closely coordinated at the level of meetings of senior officials of the Baltic Council of Ministers, but broader regional cooperation also includes Finland, Sweden, Poland, Denmark and Germany. It will discuss and plan joint activities in priority regional areas such as the integration of the Baltic States' electricity systems into the Central European band, the development of regional electricity and gas markets, the promotion of joint infrastructure projects and critical infrastructure protection, and the preparation of national strategy papers. The Committee supervises and monitors the work of the Regional Gas Market Coordination Group, which aims to create a regional gas market operating on a uniform basis, including the Baltic States and Finland. The work will be based on the Action Plan for the development of a single gas market.

Estonia actively participates in the **Baltic Energy Market Interconnection Plan (BEMIP)**, which discusses regional cooperation on electricity, gas, renewable energy (including offshore wind farmd38) and energy efficiency. Cooperation includes inter alia infrastructure planning and more efficient use of financial resources (including the Connecting Europe Facility), which only supports cross-border energy projects by boosting cooperation in the Baltic Sea region. A number of joint projects have improved the security of electricity and gas supply in the Baltic Sea region by helping to ensure efficient market development. The most important regional project is the synchronisation of the Baltic electricity system with the European electricity system. In addition, there are other important projects ensuring the efficient functioning of the market, such as improving cross-border interconnections or developing the regional gas market. The implementation of the Baltic Power System Synchronisation Action Plan is monitored and coordinated by the BEMIP High Level Group on Synchronisation, composed of members of the Baltic States, Poland and the European Commission.

A renewal of the BEMIP cooperation framework was prepared in 2024. A working group on decarbonising gas supply and developing hydrogen infrastructure was set up as a new working group. Greater cooperation on critical infrastructure protection has also been decided in the framework of BEMIP. Estonia is actively contributing to this exercise. Estonia and Finland have signed a Memorandum of Understanding for joint action in the field of critical infrastructure protection. It is hoped that the conclusion of a similar cooperation agreement will in the future lead to the joint development of critical infrastructure in the wider Baltic Sea region.

to the study on the energy potential of offshore wind farms in the Baltic Sea, the total potential capacity of wind farms in the Baltic Sea is above 93 GW (i.e. a total of 187 wind farms with an electricity generation capacity of 500 MW), including:to the study on the energy potential of offshore wind farms in the Baltic Sea, the total potential capacity of wind farms in the Baltic Sea is above 93 GW (i.e. a total of 187 wind farms with an electricity generation capacity of 500 MW), including:

- 14 Estonian offshore wind farms with a capacity of 7 GW and an annual production of 26 TWh
- 29 Latvian offshore wind farms with a capacity of 15.5 GW and an annual production of 49.2 TWh
- 9 Lithuanian offshore wind farms with a capacity of 4.5 GW and an annual production of 15.5 TWh.

36 Baltic Nordic Energy Research program https://www.nordicenergy.org/programme/the-joint-baltic-nordic-energy-research-programme-2/

37 Enhancement of Latvia – Lithuania interconnection | Conexus

38 Study ON BALTIC OFFSHORE WIND ENERGY Cooperation UNDER BEMIP https://op.europa.eu/en/publication-detail/-/publication/9590cdee -cd30-11e-992f-01aed71a1/language-en

In autumn 2020, the Baltic Sea countries signed a political declaration on the development of offshore wind energy in Poland, on the basis of which, under the leadership of Elering, at the end of 2020, cooperation between system operators under the **Baltic Offshore Grid Initiative (Bog)** aimed at co-planning and developing grids for offshore wind farms in the Baltic Sea region was launched. At the beginning of 2023, Poland also joined the cooperation, which was so far removed from it as a country in the last region.

At **the Marienborg Summit in Denmark in August 2022, the Heads of Government agreed to increase energy cooperation, with a focus on offshore wind. According to the declaration, wind capacity in the Baltic Sea is expected to grow 7 times to 19.6 GW by 2030. At** the meeting of EU Energy Directors-General on 19 January 2023, the first non-binding agreements on the development and use of wind energy in the EU's maritime areas were made. The Baltic Sea States will regularly update these non-binding arrangements for the development of offshore wind by 2030, 2040 and 2050. The TEN-E Regulation requires all EU Member States to renew non-binding agreements every two years, most recently by the end of202439. Estonia plans to carry out a further socio-economic analysis to assess the offshore wind value chain.

On 10 April 24 Lithuania organised an Energy Security Meeting at the level of Energy Ministers **in Vilnius, where the Baltic Sea Region Ministerial Declaration was signed, confirming further cooperation on offshore wind and critical infrastructure protection** and inviting TSOs to assess the potential of offshore wind hybrid projects.

In BEMIP (Baltic Sea), the 2030 target is 22.4 GW of offshore wind farms. The Marienborg political agreement was a preliminary step towards achieving it. While the targets are non-binding and can also be reviewed every two years, they are the basis for the preparation of long-term network development plans by European network operators (which in turn serve as a basis for project development and EU funding requests). The*of ENTSO-E's Ten Year Network Development Plan*(TYNDP) provides guidance for this activity. **Offshore Network Development Plan (ONDP)** identifies the Baltic Sea offshore wind potential as 26.7 GW by 2 030.45 GW by 2040 and 70 GW by 2050.*of ENTSO-E's Ten Year Network Development Plan*(TYNDP) provides guidance for this activity. **Offshore Network Development Plan (ONDP)** identifies the Baltic Sea offshore wind potential as 26.7 GW by 2 030.45 GW by 2040 and 70 GW by 2050.

In the longer term, increased EU support for the Baltic Sea Grid Project ONDP is essential to create a network infrastructure to connect offshore wind farms, while also serving as new trans-national electricity interconnections.

In the transport sector, there is cooperation between the Rail Baltic project and the transition of the transport sector to alternative fuels. Cooperation takes place within the framework of the TEN-T corridors cooperation. Since 2024, Estonia has been on two TEN-T corridors: The North Sea – Baltic (North-Sea Baltic) and Baltic Sea-Black Sea-Aegean Sea (Baltic Sea-Black Sea-Aegean Sea) corridors.

In reducing GHG emissions from agriculture, *there is cooperation within the Expert Group for sustainability and quality of agriculture and rural development – sub-group on methane emissions in agriculture*. The expert group shall provide the Commission with expertise in the context of the methane strategy, assist the Commission in drawing up a list of best practices, available technologies and innovative technologies.

The Baltic States agreed to extend regional cooperation to energy efficiency and renewable energy development, especially in the transport sector, including:

- development of biomethane production and market;
- coordination of biofuel requirements (blending and tax issues);
- coordination of possible road user charges and customs for heavy goods.

In addition, it is possible to extend regional cooperation to the agriculture and forestry sector (e.g. in land

39 Member States' updated non-binding targets for offshore renewable energy development in December 2024: https://energy.ec.europa.eu/news/member-states-agree-new-ambition-expanding-offshore-renewable-energy-2024-12-18_en?prefLang=et&etrans=et

improvement, soil quality measurement, etc.) taking into account the transboundary effects of agriculture, forestry and fisheries.

The **Baltic States have and will cooperate in the development and implementation of measures contributing to renewable energy, energy savings and climate change management, as well as R & D activities, including** the Nordic Council of Ministers; Nordic Energy Research; Baltic RCC, Regional Security Coordinator established by the Baltic TSOs (Elering, AST, Litgrid); The Nordic power exchange Nord Pool; regional *Gas Market Coordination Group* (RCMCG); UAB GET Baltic, a regional operator of the natural gas market, and the International Energy Agency (IEA), collaborative research projects and PhD exchanges under the Baltic-Nordic Energy Research Programme. In cooperation between the various partners, a PCI is being carried out for synchronisation with the Baltic Central European band, an undersea gas pipeline between EE and FI has been established: Balticconnector, under construction the Rail Baltic transport infrastructure project and integrated cable connections in the electricity systems (Estonia-Latvia IV connection under ELWIND project, Estlink 3, the third undersea electricity connection between Estonia and Finland). The MKM and the Estonian Research Agency are also part of a consortium of donors to the European Horizon Research Partnership “Clean Energy Transition”, which will work together to develop the science needed by the sector and cover most EU Member States.

Horizon Europe is the European Union’s Framework Programme for Research and Innovation, which aims to strengthen the EU’s scientific and technological bases, including by developing solutions to address policy priorities such as the green and digital transitions. Estonia participates in the coordination of the missions established under the programme through the sub-committees of the Strategic Programme Committee. The objectives of the Missions ‘Climate-Neutral and Smart Cities’ and ‘Adaptation to Climate Change’ are 100+ climate-neutral cities by 2030 and thereby encourage all other cities to follow their example by 2050 and support at least 150 European regions and communities to make them climate resilient.

2. NATIONAL TARGETS

2.1. CO_2emission reduction measuree [40]

2.1.1. GHG emissions and removals

1. Elements set out in Article 4(a)(1)

Across the European Union

The European Union’s contribution to the 2015 Paris Agreement is binding and covers all sectors of the economy. The Glasgow Climate Pact, adopted at COP26, called on countries to accelerate their emission reductions and update their national climate targets by the end of 2022. Ahead of the COP26 climate negotiations, the European Union presented a renewed EU climate target to the UN, to which Estonia also contributes. The EU-wide climate target of a 55 % reduction in net greenhouse gas (GHG) emissions by 2030 compared to 1990 (previously -40 %) was agreed by the December 2020 European Council and legally enshrined in the European Climate Law adopted in summer 2021, together with the climate neutrality objective. The European Commission has adopted a series of legislative proposals (Fit for 55 Acquis) to change EU policies to reach the target of reducing GHG emissions by 55 % compared to 1990 levels by 2030 in the updated European Climate Law. Under the acquis, target 55 is **modernising the EU’s greenhouse gas emission allowance trading system (EU ETS)** and establishing a Social Climate Fund. The corresponding amendments to the Directive entered into force on 16 May 2023. To reach the 2030 target, the sectors covered by the EU ETS will need to reduce their emissions by 62 % by 2030 compared to 2005 levels. Under the new agreement, emissions from **maritime transport** will also be included in the

40 Consistency to be ensured with long-term strategies pursuant to Article 15.

scope of the EU ETS.

A **new separate emissions trading system for fuels in the buildings and road transport and additional sectors** was also set up, to be implemented in 2027. The new system will apply to installations supplying fuels for buildings, road transport and certain additional sectors. Part of the revenues of the system will be used to support vulnerable households and micro-enterprises through a dedicated Social Climate Fund.

As regards the sectors covered by the **Carbon Border Adjustment Mechanism (CBAM)** – cement, aluminium, fertilisers, electricity generation, hydrogen, iron and steel, as well as some feedstocks and a limited number of downstream products – the Council and Parliament agreed to abolish free allowances for these sectors over a nine-year period between 2026 and 2034.

Emissions from sectors not covered by the EU ETS, the so-called **Effort Sharing Regulation** (transport, agriculture, waste management and industrial processes, as well as small-scale energy generation from plants with a nominal capacity of less than 20 MW) will have to be reduced by 40 % by 2030 compared to 2005 levels. The proposal for 'target 55' also concerned **the*Land Use, Land Use Change and Forestry (LULUCF)*** Regulation, which must contribute to the EU GHG reduction target. The Council and Parliament have agreed an overall EU-level target for 2030 of 310 Mkt CO_2 net removals in the LULUCF sector. In addition, under the new agreement, the LULUCF sectors are subject to the principle that the country must ensure compliance with the no-debit rule between 2021 and 2025, i.e. the sector's emissions must be compensated by equivalent removals. However, for 2026-2029, an annual GHG removal trajectory for Member States will be set to set the 2030 LULUCF target. Estonia has a commitment to further increase removals or reduce emissions by 434 kt CO2 by 2030 compared to the average over the period 2016-2018.

The **European Commission's adaptation strategy** "Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change" is one of the initiatives of the European Green Deal. This strategy follows up on the Strategy on Adaptation to Climate Change adopted in 2013 "Adapting to climate change: Towards a European framework for action".

The strategy sets out a long-term vision for transforming the European Union into a society that is resilient to climate change and fully adapted to the unavoidable impacts of climate change by 2050. It also aims to improve the Union's adaptability and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement and the proposal for a European Climate Law.

Estonia's obligations to the European Union

Estonia plans to set out the principles and intermediate **targets for achieving climate neutrality by 2050, climate mitigation and adaptation to the impacts of climate change through the Climate-proof Economy Act** under development. In order to carry out the tasks necessary for the implementation of the law, responsible parties and forms of cooperation between the different sectors shall be designated.

The binding GHG reduction targets for Estonia under the Effort Sharing Regulation and the LULUCF Regulation are set out in Table 2.1. **The Effort Sharing Regulation** sets binding emission reduction targets for the Member States of the European Union for the period from 2021 to 2030 in sectors outside the scope of the EU Emissions Trading System. Under the new agreement, Estonia aims to reduce GHG emissions in the above-mentioned sectors by 24 % by 2030 compared to 2005.

According to the accounting principles applied in the **LULUCF Regulation**, emissions must not exceed the amounts of carbon captured in the period 2021-2025 (the so *-called no-debit* rule). According to the update of the LULUCF Regulation, Estonia will have to increase GHG removals by 0.434Mt CO2 by 2030 compared to the baseline (2016-2018 average). The national greenhouse gas removal budget for 2026-2029, to be maintained, shall be established by means of an implementing act by the Commission by December 2025 at the latest.

2021. the European Climate Law, adopted in 2008, requires EU Member States to have **national adaptation strategies and action** plans, their implementation to be periodically reported and regularly updated.

Table 2.1 Estonia's nationally binding GHG emission reduction targets for 2030

OBJECTIVE	EU LEGISLATION
Reduce greenhouse gas emissions by 24 % by 2030 compared to 2005 in sectors covered by the Effort Sharing Regulation	Regulation (EU) 2018/84 of the European Parliament and of41 the Council 2and amending Regulation (EU) 2023/857 42
Ensure that between 2021 and 2025 emissions from the LULUCF sector are offset by carbon removals by the same sector	Regulation (EU) 2018/84 of the European Parliament and of the Council1 43 and its amending Regulation (EU) 2023/839 44
2030 removal target for the LULUCF sector, which requires Estonia to increase GHG removals by 0.434 Mt CO2 compared to the baseline (average for 2016-2018).	Regulation (EU) 2018/84 of the European Parliament and of the Council1 45 and its amending Regulation (EU) 2023/839

11. Where applicable, other national objectives and targets consistent with the Paris Agreement and the existing long-term strategies. Where applicable for the contribution to the overall Union commitment of reducing the GHG emissions, other objectives and targets, including sector targets and adaptation goals, if available

12. on 17 May 2021, the Estonian Parliament adopted the Estonian long-term strategy 'Estonia 2035', which sets out five long-term strategic goals, which are value-based targets and as a basis for the country's strategic choices, with all Estonia's strategic development documents contributing to its implementation. These targets will also be taken into account in the preparation of the country's fiscal strategy and government action programme. In order to achieve the targets, it is necessary to take into account Estonia's development needs, global trends, the European Union's policy framework and the global objectives of sustainable development.

According to the strategy, Estonia will be a competitive and climate-neutral country by 2050, with a knowledge-based society and economy and a high quality and species-rich living environment that is willing and able to reduce the adverse effects of climate change and make the best use of its benefits. Coordinated development of the cultural, social, environmental, and economic fields is a prerequisite for achieving the goals of sustainable development. In Estonia, decision-making is knowledge-based, with effective and innovative approaches being preferred when choosing solutions.

Until autumn 2024, the 'Estonia 2035' action plan was updated annually, where necessary, on the basis of a national event affecting the country's development and changes in the external environment. The 'Estonia 2035' action plan was also Estonia's national report submitted in the context of the European Semester of economic policy coordination.

Since autumn 2024, the European economic governance framework changed and no further national reports will be drawn up. Instead of the country reports, a fiscal-structural plan (submitted to the EC in October 2024) will be prepared and submitted to the European Commission until the next elections or the change of government. Every spring, it is the responsibility of the Member State to submit a progress report. The VV endorsed the progress report on 24 April 2025 and submitted it to the Commission at the end of April.

In March 2022, a proposal was submitted to the Riigikogu to amend the fundamentals of climate policy until 2050 (hereinafter referred to as KPP 2050) in Estonia's long-term objective of reducing greenhouse gas

41 (EU) 2018/842 https://eur-lex.europa.eu/legal-content/ET/TXT/PDF/?uri=CELEX:32018R0842&from=EN
42 (EU) 2023/857 https://eur-lex.europa.eu/legal-content/ET/TXT/PDF/?uri=CELEX:32023R0857&qid=1682600447962
43 (EU) 2018/841 https://eur-lex.europa.eu/legal-content/ET/TXT/PDF/?uri=CELEX:32018R0841
44 (EU) 2023/839 https://eur-lex.europa.eu/legal-content/ET/TXT/PDF/?uri=CELEX:32023R0839
45 (EU) 2018/841 https://eur-lex.europa.eu/legal-content/ET/TXT/PDF/?uri=CELEX:32018R0841

emissions by 80 % by 2050, in line with Estonia's long-term strategy 'Estonia 2035' to achieve a climate-neutral country by 2050. The Estonian Parliament approved the amendment to KPP2050 on 8 February 2023 (see Table 2.2).

A kick-off event took place in September 2023 **to develop the Estonian Climate-proof Economy Act**, while the Climate-proof Economy Act under development plans to set cross-sectoral and sector-specific targets to ensure a smooth trajectory towards climate neutrality by 2050. Sector-specific targets are set for the energy, industry, buildings, transport, agriculture, waste and land use sectors. Setting separate sector-specific targets is necessary to ensure greater legal clarity and thus investment certainty.

Important orientations in the proposed law are:

- **Energy** is a key area for achieving climate objectives. The transition to renewable energy needs to be smooth and balanced, ensuring energy security and affordable prices.
- Increased valorisation of natural resources (including wood) and improved value-added clean and the development and growth of a resource-efficient industry.
- **In the transport sector**, the focus is on reducing emissions in cities because of their main emissions and at the same time:
  realistic pathways to reduce emissions.
- In the **agricultural sector**, production volumes are not reduced and food security is ensured. The reduction of CO2 emissions is to be achieved through precision solutions, a reduction in the use of mineral fertilisers and the development of biogas production.
- Increasing **carbon** sequestration in the land use sector, with a view at the same time to the competitiveness of economic sectors and the preservation of biodiversity.

Estonia has systematically and at the highest level introduced the principles of the Green Deal since 2021, when the Steering Committee on Green Policy was set up by government order on 9 July. Now called the lead committee for green reform:

coordinate the implementation of the green reform in Estonia to promote sustainable growth;
finds cross-sectoral solutions for the implementation of green reform in Estonia;
welcomes the Green Reform Action Plan and assesses the effectiveness of its implementation.

The Commission's work is coordinated by the Ministry of Climate. The Commission is chaired by the Minister for Energy and the Environment. The Commission is composed of the Minister for Infrastructure, the Minister for Finance, the Minister of Economy and Industry, the Minister for Education and Science, the Minister for Regional Affairs and Agriculture and the Minister for Foreign Affairs.

The Green Reform *Action Plan 2023-2025 approved by the Government of the Republic in August 2023 is the central document guiding the implementation of the green reform46.* It describes how the green reform (green transition) is treated in Estonia as the areas in which it is composed and the objectives set therein. It is a cross-cutting framework for activities necessary to achieve long-term environmental and climate objectives in the context of a sustainable economy.

The Green Reform Action Plan is under renewal to accompany the EU's regulatory shift in the enforcement of the Green Deal and developments in the implementation of green reform in Estonia.
We are also preparing a monitoring solution for the progress of the green reform, where the selected sectoral metrics are displayed in one data gate and updated automatically and as quickly as possible. The monitoring solution will be ready by the beginning of 2026. **An overview of the implementation of the Green Reform Action Plan 2023-2025** is published on the website of the Ministry of Climate.

46 https://kliimaministeerium.ee/sites/default/files/documents/2024-03/Rohereformi_tegevuskava_27.03.2027.pdf

Table 2.2 Long-term national objectives for climate change mitigation and adaptation in development documents

OBJECTIVE	DEVELOPMENT DOCUMENT
Estonian longterm target are rebalancing greenhouse gas emissions and removals by 2050 at the latest, which means reducing greenhouse	Fundamentals of climate policy until 2050
Increase the preparedness and capacity of Estonia at national, regional and local level to adapt to the impacts of climate change.	Estonia 2035 Action Plan; Climate Change Adaptation Development Plan until 2030

Climate Change Adaptation Development Plan

Adaptation to climate change has been included as a horizontal topic in a number of sectoral development documents and development plans, as well as in the national long-term development strategy 'Estonia 2035'. The underlying principles of the national long-term development strategy 'Estonia 2035' agree that Estonia must ensure a high-quality, species-rich living environment and preparedness and ability to reduce adverse impacts caused by climate change in order to make the best use of the positive impacts.

This is achieved by aiming for a cross-cutting deployment of solutions contributing to the green transition and supporting planning in cooperation with local authorities to mitigate climate change, reduce and adapt to climate change, enhance and preserve biodiversity, diversify the living environment, promote green living and visitor environments.

In 2017, the Government of the Republic of Estonia adopted the 'Development Plan for Adaptation to Climate Change until 2030' (hereinafter 'the **KOHAK**'), together with an implementation plan. The process of drawing up the development plan was supported by the European Economic Company's financial mechanism. The strategic objective of the Climate Change Adaptation Development Plan is to increase the preparedness and capacity of Estonia at national, regional and local level to adapt to the impacts of climate change. As a result of the implementation of the plan, Estonia will improve its preparedness and capacity to deal with climate change at local, regional and national level and identify the areas most vulnerable to climate change. The development plan plans and manages the area of adaptation to the impacts of climate change in a holistic manner through a single strategy document and consolidates and streamlines the approach to adaptation to the impacts of climate change. This will ensure better coherence between the different sectors of adaptation to the impacts of climate change. The development plan sets eight sub-objectives according to eight priority areas. These areas are:

1. health and rescue capabilities;
2. plans and land use (including coastal areas, other flood/soil risk areas; land improvement, irrigation, drainage, urban planning);
3. natural environment (including biodiversity, terrestrial ecosystems, freshwater ecosystems and the environment; Baltic Sea and marine environment, ecosystem services);
4. Bioeconomy (including agriculture, forestry, fisheries, game and hunting, tourism, peat production);
5. economy (including insurance, banking and other financial institutions, employment, business and entrepreneurship, industry);
6. society, awareness and cooperation (including education, awareness and science, communication, society, international relations and cooperation);
7. infrastructure and buildings (including technical support systems and transport);
8. energy and energy supply (including energy independence, security and security of supply, energy resources, energy efficiency implementation, heat generation, electricity generation).

The main sub-objectives are to mitigate storm, flood and erosion risks, mitigate thermal island effects, increase the climate resilience of settlements by choosing the best solutions in land use and planning.

Estonia's projected climate change for 2100 and the main risks posed by change are:

- the increase in temperature in Estonia, which has been faster than the world average in the second half of the 20th century, results in a decrease in ice and snow cover; periods of heat and drought; changes in plant growth; the spread of non-native species, including new pests and pathogens, unfrozen and excess forest land limiting harvesting opportunities, changes in seasonal energy consumption patterns; increase in public health problems, etc.;
- the increase in rainfall, especially during the winter period and the resulting flooding, the increase in the capacity of drainage ditches and systems and the maintenance of dams, the increase in shore erosion of rivers and the resulting increase in shoreproofing, pressure to relocate residential/facilities, increased pumping capacity of mining water, etc.;
- sea level rise; and resulting shore erosion, threat to shore structures, pressure on buildings relocation, etc.;
- the increase in storms and the resulting requirements for the durability of infrastructure and buildings; and

the effects of storm on their ability to eliminate the storm.

Territorial Just Transition Plan

The use of the **Just Transition** (JT) mechanism (including the European Union Just Transition Fund (JTF) established in 2020) is based on a territorial plan, which was drawn up with public involvement as an annex to the EU Structural Instruments Operational Programme for the 2021-2027 funding period and negotiated with the European Commission in the same process.

Estonia's Territorial Just Transition Plan was endorsed by the European Commission on4.10.202 247. **The general objective of the Plan is to enable the transition to a climate-neutral economy in Ida-Virumaa in a way that ensures the well-being of the local community, while supporting businesses in identifying and implementing new business opportunities related to the transition.** The measures of the plan are divided into two strands: the first strand aims to help restructure and diversify the economy and workforce in Ida-Viru, while the second strand addresses the social, environmental and community aspects of the transition. The share between the strands is 80/20 (80 % for entrepreneurship and 20 % for supporting the living environment). Under the LCAF regulation, activities related to fossil fuels (including oil shale) (including production, processing, storage, distribution, combustion) are not supported.

The shale sector has been shrinking in Ida-Virumaa for many years. The peak of oil shale extraction and processing was in Ida-Virus in the 1980s, when more than 14000 people were employed in mines alone. As of 2021, around 5000 people were employed in core companies in the oil shale sector in Ida-Viru. By 2030, the oil shale sector is expected to lose some 1000 additional jobs (in addition to indirect job losses – around 2700 people), which has the potential to increase the region's existing social challenges (low wages, unemployment, declining and ageing population, etc.). The Territorial Plan has put in place a number of measures to mitigate change and support the development of Ida-Virumaa.

Due to decades of industrial development, resilient infrastructure networks, high development potential of unbuilt and abandoned industrial sites and a workforce with strong STEM skills, the **development of clean industries** should be a priority in the context of the transition to a climate-neutral economy.

Regardless of the sector of activity, the objective must be to develop **future-proof products and services with higher added value**, which in turn creates jobs with a wage level above the average of the sectors concerned. In this context, the expertise of local **research institutions** needs to be used to increase the technology awareness of local businesses by supporting them in implementing **R &** D & I.

The creation of supporting infrastructure for the emergence of an active **ecosystem** for micro-enterprises,

47 Just Transition Plan | Just Transition Fund (https://idavirufond.ee/)

start-ups, creative industries, ICT, sustainable tourism and other aid sectors is also important for the comprehensive transition of the region's economy. We need to address the **market failures** related to access to capital that have long been a problem for local small and medium-sized enterprises (*SMEs*).

To support people and communities affected by the transition process, it is necessary to provide a safety net, especially for those for whom the transition entails loss of income. If we want to avoid long-term unemployment and poverty, we need to encourage effective **reprofiling** and provide comprehensive **labour market mobility** solutions for workers in the oil shale sector.

Local **social services** need to be modernised to successfully cope with the increase in demand resulting from the economic and psychological consequences of shale shale depletion for former workers in the sector and their families. Sectorial innovation and **development is needed to create a well-integrated, accessible and place-specific network of health and** social services, which is impossible to implement without attracting **qualified health professionals** to Ida-Virumaa.

The **Just Transition Fund (JTF), which makes** this change possible, amounts to ~340 million euro + technical assistance to ~353 million euro in Estonia. The time horizon for the mobilisation of the Fund is 2029. Estonia receives the highest amount of money per inhabitant compared to other European countries. In addition to the LÜF, other EU structural funds are available in Ida-Virumaa (including some specific activities targeting Ida-Virumaa); at national level, the Ida-Virumaa programme supports the development of the region.

Renewable electricity target for 2030

The Energy Organisation Act requires at least 100 % renewable energy in gross final consumption by 2030. This is an annual target and not only renewable energy production, but also sufficient controlled capacity in the electricity system must be ensured at all times. As long as new controlled production capacities have not been built, existing ones must be maintained.

Reducing emissions from the oil shale sector

Emissions from the oil shale sector have gradually decreased. While 15.9 million tonnes of oil shale were extracted in 2018, mining volumes have remained close to or below 10 million tonnes in recent years. The use of oil shale has changed and the production of electricity from oil shale has decreased, but the use of oil shale for the production of crude oil has increased. In electricity production, oil shale electricity accounted for 86 % in 2013 but twice as low as 40 % in 2020 and has thus been on a downward trend (up in 2022 but further decreased in 2023 from non-renewable energysources48). **In 2023, for the first time renewable energy sources (mainly biomass, wind and solar) produced more electricity than oil shale**, a third of the electricity consumed was imported. Until 2018, Estonia was an exporting country for electricity. The situation changed in 2019 when Estonian electricity production no longer covered the need for domestic consumption and the deficit had to be covered by imported electricity. In doing so, the geopolitical situation in 2022 (the start of Russia's war of aggression in Ukraine on 24 February 2022) developed into a growing need to use local resources, including to ensure the security of supply of oil shale energy.

Emission reductions in oil shale energy and industry must be based on Estonia's long-term strategy 'Estonia 2035', which sets out a climate-neutral country by 2050. The deployment of renewable energy, the development of storage technologies and the deployment of new technologies play an important role in reducing emissions from the oil shale sector.

Prior to the closure of the current oil shale power plants, it is important to prepare for the deployment of new controlled forms of production (e.g. nuclear power plant, gas power plant). The reduction in **emissions from the slurry industry will take place gradually and above all on the basis of existing regulation (e.g. the regulation of CO2 emission allowances resulting from the EU ETS). The socio-economic impacts of** shale shale decline in East Virumaa are addressed by the above-mentioned Just Transition Fon the

48 Net production mix by fuel.xlsx (live.com)

territorialplan49.the territorialplan50.

Estonia's recovery and resilience plan

As part of Estonia's recovery and resilience plan, the reform 'Accelerating the green transition in the energy economy' is proposed as an annex to the Council Implementing Decision on the approval of the assessment of the recovery and resilience plan for Estonia. The aim is to contribute to the decarbonisation of Estonia's energy production and consumption by updating Estonia's energy policy targets and measures and removing administrative barriers to the installation of renewable energy generating installations. Reform 8.1 of Estonia's recovery and resilience plan, which includes activities supporting the European Union's RePowerEU objectives, is aimed at accelerating the deployment of renewable energy. The National Development Plan of the Energy Sector shall be updated and shall include targets on renewable energy production, energy efficiency and security of supply. The NEEAP also addresses how electricity and heat supply (in relevant regions) will be ensured once oil shale electricity and oil production becomes uncompetitive on the market. 51

2.1.2. Renewables

i. The elements set out in Article 4(a)(2).

Estonia's renewable energy trajectory results from national renewable energy targets that are more ambitious than those set out in the Directives ((EU) 2018/2001 and (EU) 2018/1999) agreed at European Union level, with an overall EU target of 42.5 % + 2.5 % and a national target of 65 %, including Estonia's renewable energy trajectory in line with the intermediate targets (at least 18 % of the overall target must be met in 2022, at least 43 % of the overall target by 2025 and at least 65 % of the overall target by 2027). Industry needs to strive for an average annual increase of 1.6 % renewable energy deployment calculated for the 2021-2025 period and[77]for 2026-2030, and the use of fuels of non-biological origin (*RFNBO*) by industry must be at least 42 % of the industry's hydrogen consumption in 2030. In the building sector, a 49 % share of renewable energy is being pursued. Based on Eurostat data, the European Commission has set the corresponding value for 2020 at 35.2% for Estonia52. The renewable energy target for industry and buildings shall be met on the basis of the overall national renewable energy share. Between 2021 and 2025, the average annual increase is projected to be above 3 %, and over 4 % between 2026 and 2030. There is no hydrogen use in the Estonian industrial sector (mining, manufacturing, construction, information activities) and therefore the RFNBO target is met by default. The sea heat pump in the Gulf of Tallinn, which will start operating in 2028 and accounts for 1.4 % of the country's gross final energy consumption, contributes in particular to the innovation target (5 %). As a result of the Renewable Energy Directive (EU) 2023/2413 in 2025, at least 1 % of the fuels used in transport must be produced from biofuels and biogas produced from feedstocks listed in Part A of Annex IX and from renewable fuels of non-biological origin. This share shall be 5.5 % by 2030, of which at least 1 % shall be renewable fuel of non-biological origin. The trajectories are based on projections that take into account current trends in renewable energy production and consumption. Estonia's renewable energy baseline is set at 25 % for 2020. The renewable energy statistics sold in the statistical trade must be subtracted from the levels shown in the renewable energy trajectories shown in Figure 2.1.

The 2030 Energy Development Plan (ENMAK 2030) has a national target of renewable energy consumption of at least 50 % of final energy consumption by 2030. The 2022 revised energy architecture must **account for at least 65 % (~20.4 TWh) of the gross domestic final energy consumption t on an annual basis by 2030**. The evolution of renewable energy shares in different sectors until 2030 is reflected in the graph

50 Just Transition Plan | Just Transition Fund (https://idavirufond.ee/)
51 Estonia's recovery plan | State Support Centre (rtk.ee)
52 https://energy.ec.europa.eu/document/download/b2347855-0e3d-4dc8-aed6-338f318e1b20_en?filename=C_2024_6226_1_EN_ACT_part1_v5.pdf

below. The objectives of the sectors set out in the Energy Organisation Act 2022 are as follows:

- At least 100 % renewable energy of gross final consumption of **electricity**
- Renewable energy represents at least 14 % of the **final consumption of transport** fuels. In the context of the renewed Renewable Energy Directive, the country will be given the choice whether the amount of renewable energy used in transport must account for at least 26 % of the energy consumed in this sector by 2030 or whether greenhouse gas emissions must be reduced by at least 13 %, unless first-generation fuels from fork-related raw materials are consumed (otherwise, the targets are 29 % or 14.5 %). The Ministry of Climate has prepared an analysis to assess the choice of target and a draft for this target selection will be finalised in the first half of 2025.
- Renewable energy represents at least 63 % of the gross final consumption of **heat**
- **Indicative: the** innovative technology accounts for 5 % of gross final consumption (target resulting from the amendment of the Renewable Energy Directive)

Expected trajectory for the share of renewable energy consumed in each sector (electricity, heating and cooling and transport) in final energy consumption from 2023 to 2030:

Figure 2.1 – Estonia's share of renewable energy in final energy consumption in general and by sector (based on 2023 Eurostat SHARES data, 2025 and 2030 figures are projections whose realisation depends on the measure implemented and market conditions).

Renewable energy in the electricity economy

The projected trajectory for the share of renewable energy in electricity consumption is shown in Figure 2.1. Wind energy (both onshore and offshore) will also have the highest potential for growth in the next decade in solar energy, see Table 2.4.

Wind energy

A higher increase in the installation of onshore wind farms is expected at the end of the decade, including the introduction of regulatory and subsidising measures to boost their market entry (see policy measures). By 2030, it is estimated that up to 2 850 MW of onshore fireworks will need to be built in Estonia. Offshore wind will contribute to renewable energy generation in the 2030+ period.

In **Estonia, there are three existing maritime spatial plans (Estonian Marine Areas, Hiiu and Pärnu Marine Plans). In Estonia's and Pärnu's maritime plans, a total of 2 439 km 2(6.8 % of Estonia's total sea area) are eligible for wind energy development. As** of May 2025, 11 building permit procedures for the construction of an offshore wind farm (total capacity of 11 690 MW) have been launched, one procedure has been initiated for a wind turbine (4 MW) and one building permit (900 MW) was issued by the State in May 2025. The planning of the Hiiu marine area is valid in the sea area around Hiiumaa, but it does not regulate wind energy.

Solar

The solar energy production target set in 2019 REKK 2030 (415 GWh) has been met as of 2022. By 2030, a total of almost 1 500 MW of solar capacity (2 024 969 MW) is projected. Further growth is seen primarily in the form of panels on the roofs and façades of the building. Further growth is seen primarily in the form of panels on the roofs and façades of the building.

Hydrogen

In response to the growing demand for hydrogen and electrolyser technologies in Europe, the Government of the Republic decided by decision of 6 January 2022 to allocate a maximum of EUR 67160000 until 2026 for applied research and first industrial deployment of electrolysers and fuel cells.

Renewable energy in heat management

Heat pumps have the greatest potential for growth in heating and cooling, see Table 2.4. The use of wood fuels in local heating is on a downward trend, mainly due to the installation of heat pumps, insulation and, to a lesser extent, connection to district heating. Thus, the53 useof heat pumps and connection to district heating are growing in the future. The latter is also supported by the ongoing renovation of district heating infrastructure. Estonia has installed the highest number of heat pumps per capita among Europeancountries54, showing the increasing integration of the Estonian electricity and heat sector. The share of renewable energy in the heating and cooling sector continues to be influenced by energy efficiency, as illustrated by the figure below.

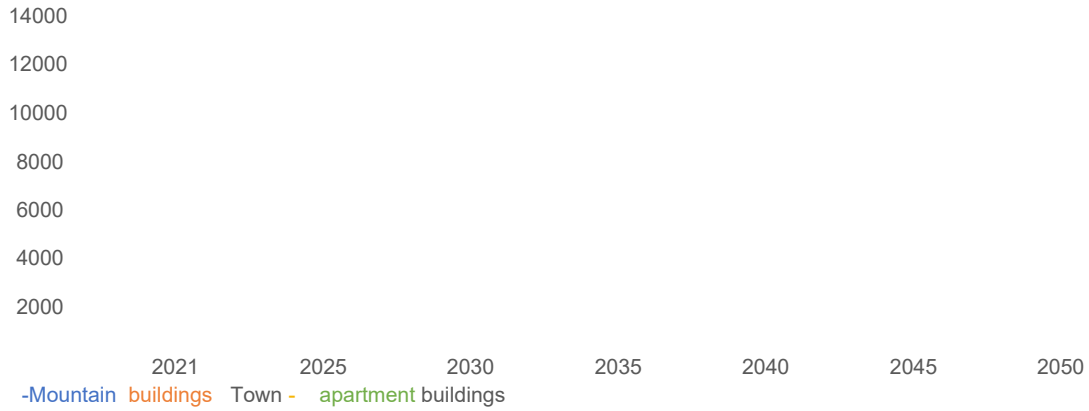


Figure 2.2 Heat demand as a result of building renovations, not inwork 55

The study “Estonia’s transition to a carbon-neutral heating and cooling economy by 205056” modelled four scenarios to achieve carbon-neutral heating and cooling by 2050. The proposed action plan for the study will be implemented from 2023. It is important to ensure the long-term sustainability of the heating and cooling industry, including economic feasibility and potential risk mitigation. The study takes into account the pace of building renovation57 inthe long-term renovation strategy for buildings. In practice, the pace of renovation is likely to be slower and therefore the volume of consumption may vary accordingly. The action plan resulting from the study includes, inter alia, improving the availability of data, allowing for more accurate forecasts in the future.

The share of renewable energy in heating will increase in the coming decades. While industry’s energy needs are increasing, industry and other sectors will be able to use biomethane or renewable gases from the gas grid instead of natural gas in the long term (see chapter 4.3).

Renewable energy in transport

The expected renewable energy transport trajectories, in line with the transport article of the new Renewable Energy Directive, can be found in Figure 2.3. The shares of second generation biofuels and biomethane and electricity are increasing. We will work to minimise the share of 1st generation biofuels in transport as soon as possible. If first-generation fuels from fork-related raw materials are not consumed, the targets under the Renewable Energy Directive can be lowered. In the case of a renewable energy target of at least 26 % by

Dynamics of deployment of 53 heat pumps in Estonia http://www.soojuspumbaliit.ee/upload/editor/files/Soojuspumpade_kasutuselevotu_dynaamika_Eestis.pdf

54 What Countries Are Winning the Heat Pump Race? | ECO Experts (theecoexperts.co.uk)

55 Figure 10 D3 report pdf.pdf

56 Estonia’s transition to carbon-neutral heating andcooling by 2050 https://energiatalgud.ee/node/8931

Long -term57 renovation strategy for buildings https://www.mkm.ee/media/155/download

2030, alternatively a target of 13 % for greenhouse gas emissions (otherwise, the targets will be 29 % or 14.5 %). We want to cover the consumption of second generation fuels as much as possible with nationally produced fuel. The largest domestic fuel potential is in biomethane production and transport.

The role of electricity consumption in the transport sector will increase after 2025. Consumption will be significantly increased by58 changes in the Clean Vehicles Directivet, the depreciation of electric cars and the consequent increase in popularity and the electrification of railways and the completion of Rail Baltic in 2030. According to the Elering electricity consumption projections, Rail Baltic adds 54.4 GWh/a to electricity consumption. 000 electric cars. The contribution of electricity to the target is largely due to renewable energy
the share of the network calculated on the basis of the previous year's indicator.

In light of the obligations stemming from the new Alternative Fuels Infrastructure Regulation (AFIR) 59 and the Renewable Energy Directive (RED) for hydrogen production and consumption, we have predicted the establishment of at least three hydrogen refuelling stations on the main national roads by 2030 in the Hydrogen Roadmap. It is estimated that 2 700 tonnes (90 GWh) of green hydrogen are needed annually to meet the resultingrequirements60. For example, 450 GWh of renewable electricity can be produced in the order of 8 000 tonnes of green hydrogen per year. However, the lack of large-scale consumption of hydrogen, including fuels of non-biological origin, is an important bottleneck (i.e. there is no industry that would give impetus to the hydrogen market). However, it is unknown how much green hydrogen produced qualifies as an RFNBO in order to be counted as renewable for the purpose of meeting the transport targets.

Summary of renewable energy growth by sector

Table 2.3 below shows a total projected increase of more than 9.2 TWh of renewable energy on a sectoral basis in GWh.

Renewable electricity production shows an increase, with the target of producing as much renewable electricity as Estonia's gross final consumption by 2030. The target is mainly achieved through solar and wind energy.

The transport sector shows an increase in the use of renewable energy. Until 2030, both biomethane-based fuels and electricity and, to a lesser extent, hydrogen will increase the share of renewable energy in transport. From 2030 onwards, the use of biofuels and biomethane in the transport sector is on a downward trend due to the shift from biofuels to electric cars, which are more energy efficient and take multipliers into account for the final target.

Production of heat and cooling from renewable energy sources will increase mainly due to the deployment of heat pumps and increased connections to the district heating network.

Table 2.3 Projected renewable energy increments by sector (2023 figures according to Eurostat SHARES)

Increment by sector (GWh)	2023	2030	growth
Renewable electricity production	2 882	11 545	8 663
Renewable energy use in transport (no multipliers)	465	904	439
Production of heat and cooling from renewable energy sources	11 049	11 146	197
Total energy from renewable sources (total)	**14 396**	**23 595**	**9 199**

58Directive (EU) 2019/1161 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles (europa.eu)
59 New law agreed to deploy alternative fuels infrastructure (europa.eu)
90 GWh, i.e. 2 700 tonnes, is needed to meet the 60 1 % RFNBO target. 1 095 tonnes = 36.5 GWh

ii. Estimated trajectories by renewable energy technology that the Member State projects to use to achieve the overall and sectoral trajectories for renewable energy from 2021 to 2030, including expected total gross final energy consumption per technology and sector in Mtoe and total planned installed capacity (divided by new capacity and repowering) per technology and sector in MW

The renewable energy targets agreed at EU and national level will be achieved in the most cost-effective way, with high efficiency and market orientation as keywords. We want to contribute to the development of renewable energy to solutions that make the most of Estonia's geographical and natural conditions. Biomass also plays an important role, where we prefer solutions that maximise the value of this resource. Its use takes into account sustainability and biodiversity conservation aspects and sustainability criteria for biomass under the Renewable Energy Directive (EU) 2018/2001. Compliance with these criteria must be demonstrated (e.g. by means of certificates attesting to sustainable forest management and the production of wood fuels). In the key to achieving the objectives, we see significant potential for synergies between sectors, for example between energy efficiency, energy efficiency of buildings and renewable energy solutions.

Specific renewable energy trajectories by sector and technology are set out in chapter 2.1.2.i. While 13.1 TWh of renewable energy was produced in Estonia in 2021 for electricity and heat production, by 2030, around 10 TWh will be added. The contribution of renewable energy technologies to the trajectory for meeting the renewable energy targets on a sector-by-sector basis is shown in Table 2.4.

Table 2.4 The contribution of renewable energy technologies to the trajectory of renewable energy targets on a sectoral basis (2023 Eurostat SHARES).

Contribution of renewable energy technologies to	2023	2030
Gross final energy consumption (GWh):	**35 4366**	**35 598**
Renewable electricity production:	**2 882**	**11 854**
Hydropower	25	22
Wind energy	696	8655
Solar	693	1668
Biomass	1 202	1 200
Renewable energy consumption in transport (no	**465**	**904**
Electromobility	59	152
Biofuels	406	748
Hydrogen	0	4
Renewable energy consumption in heat management:	**11 049**	**11 165**
District heating	4 942	4 490

Contribution of renewable energy technologies to	2023	2030
District heating	4 452	4 646
Heat pumps	1 655	2 029

In the heating and cooling sector, we see an opportunity to raise ambition. Forecasts and explanations for this purpose are given in Chapter 4.2.2.

iii. Where available, expected trajectories showing the demand for bioenergy, disaggregated by heating, electricity and transport sectors, and the supply of bioenergy by source and origin (separately for domestic production and imports). For forest biomass, an assessment of its source and impact on the LULUCF sink, if available.

Estonia's bioenergy trajectories to 2030 are shown in Figure 2.3.

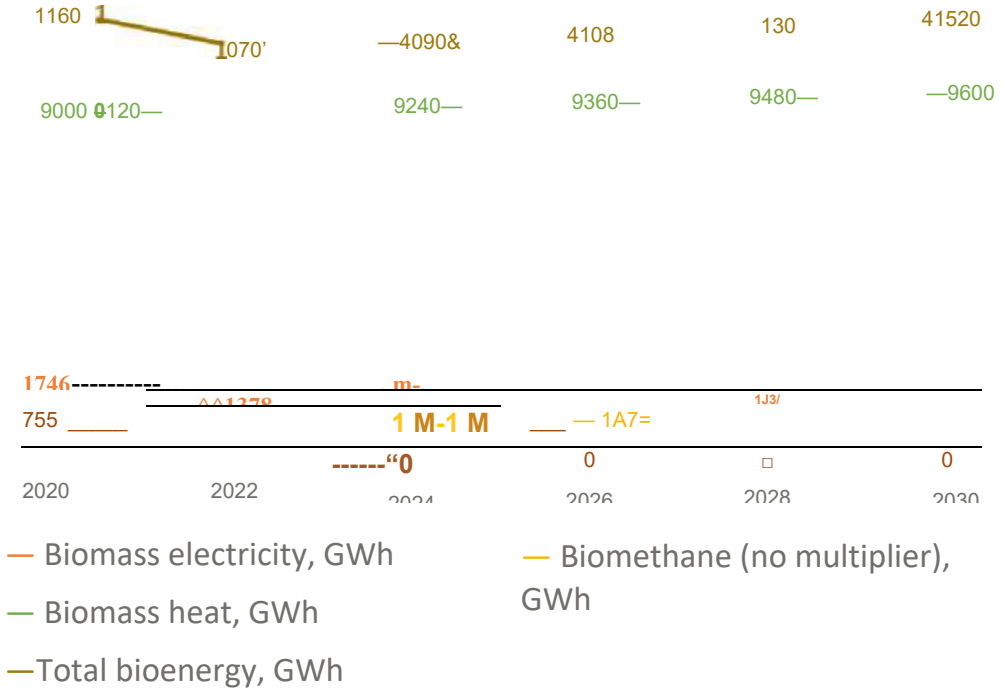


Figure 2.3 Estonian bioenergy consumption (GWh) until 2030.

Covering bioenergy demand is constrained by the ecological boundaries of the bioeconomy, ensuring the functioning of the EU's green network to protect biodiversity, tightening sustainability criteria for biomass, the growing use of biomass as a substitute for fossil materials as a change in fuel prices. The use of wood and wood fuels has been increasing. In 2022, a total of 12,077 million m³ of wood was harvested from and outside woodland, of which 5.8 million m³ were used for national energy purposes and 3 million m³ wood was exported in wood pellets, or more than half of all timber harvested in Estonia. Wood fuels produced 8.1 TWh of electricity and heat in 2022 and 9.2 TWh in 2023. 61 62

In 2022, the energy use of woody biomass in Estonia was around 5.8 million m³ (including imported woody

61 Timber balance 2022 Wood balance – overview of Estonian wood use volume | Environmental Portal
Statistics of62 Estonia KE0230: Energy balance | Year, Indicator and type of fuel/energy. Statistics database

biomass); based on existing measures, knowledge and trends, the national forecast (WEM scenario) suggests that the use of woody biomass in energy will remain at the same level by 2030 (around 5.4 million m³).In accordance with the projected use of woody biomass and the target for felling, Estonia will meet both the national63and LULUCF andRED II64 65 targets. The use of peat is based on similar principles, with an annual peat extraction rate of 2 850 thousand tonnes. In 2022, 1 107.1 thousand tonnes of peat were extracted. The vast majority of all mined peat is used in horticulture, regardless of the degree of degradation. Peat can be burnt competitively in small boiler plants, so a small amount of peat is also used to generate energy of70.

A total of 20 biogas plants are active in Estonia. Of which 9 agricultural biogas plants, 8 waste water treatment and industrial waste water treatment plants and 4 landfill gas productionunits t66. In addition, under the RRF REPowerEU, investment support to increase biomethane production was launched in the first half of 2024 and the construction of at least 4 biogas plants will be supported. Estonia produced 0.3 TWh of biomethane in 2024, an increase of 31 % compared to the previous year. Between 2024 and 2025, at least two biogas plants with a total production volume of around 130 GWh/y and, by 2026, a further four biogas plants with a total production volume of around 180 GWh/a through the KIK support measure, can be estimated at 0.5 TWh/y as of 2027.

Based on the67 68 results of the "analysis of the potential to increase the production and uptake of sustainable biogas", the production potential of sustainable biogas – i.e. biogas produced from the resource of wastes, residues and suitable agricultural by-products – is close to 0.8 TWh/y. The analysis also mapped the additional potential for the production of grassy biomass and biogas based on energy crops, estimated at around 0.7 TWh/a for biogas production (the total potential was then estimated to be around 1.5 TWh).

Estonia's wooded land area is 2.33 million ha, 31.6 % of which are protected forests (18.4 % for strictly protected forests and 13.2 % for forests with economic restrictions). The wood storage of woodland in 2023 was around 454 million m^3 73. The revised draft FDP 2025-2035 does not set the permissible volume of felling. It is recommended that harvesting should not exceed the annual net increment of managed forests in the long term.

iv. Where available, other national trajectories and targets, including long-term and sector-specific (e.g. share of renewable energy in district heating, renewable energy use in buildings, renewable energy produced by cities, energy communities and own energy consumers, energy from sludge from wastewater treatment).

Share of renewable energy in district heating

In the heating sector, there has been a continuous shift to renewable sources in recent years. An increasing number of boilers and cogeneration plants have switched to renewable fuels, and according to 2023 data, the share of renewable energy and waste heat in district heating amounted to around 75[OBJ]93 % of which has become an efficient district heating label. The label 'Efficient district heating' shall be awarded to a district heating system that uses at least 50 % renewable energy or 50 % waste heat or 75 % cogenerated heat or 50 % a combination of such energy and heat for the production of heat, in accordance with the provisions of the Energy Efficiency Directive 2012/27/EU of the European Union. The label

63 By 2030, Estonia has an obligation under the LULUCF Regulation to reduce greenhouse gas emissions from the LULUCF sector; or
further increase removals of 434 kt CO2 equivalent compared to the average 2016-2018 emissions. According to the 2024 GHG inventory, the average emissions from 2016 to 2018 would be 2 381 kt, so Estonia's target for 2030 would therefore be within 1 947 kt (i.e. the sector could remain emitter to meet the obligations under the Regulation).

65 Consolidated balances of the Republic of Estonia's mineral resources in 2022, Land Board 2022

66 Biogas plants in Estonia | Estonian Biogas Association

67 Microsoft Word – Biogas Study. Final report.doc

73https://tableau.envir.ee/views/SMI/1Maakategooriad?%3Aembed=y&%3Aiid=1&%3AisGuestRedirectFromVizportal=y

certifies the efficiency of the district heating system and the share of renewable or cogeneration energy in the heat transferred through the network. Biomass used in heat management has to comply with sustainability criteria under the Renewable Energy Directive (EU) 2018/2001 and take into account the waste hierarchy. In Estonia, 100 district heating network areas(a) 69 and 3 district cooling (i) are efficient70.93 % of which has become an efficient district heating label. The label 'Efficient district heating' shall be awarded to a district heating system that uses at least 50 % renewable energy or 50 % waste heat or 75 % cogenerated heat or 50 % a combination of such energy and heat for the production of heat, in accordance with the provisions of the Energy Efficiency Directive 2012/27/EU of the European Union. The label certifies the efficiency of the district heating system and the share of renewable or cogeneration energy in the heat transferred through the network. Biomass used in heat management has to comply with sustainability criteria under the Renewable Energy Directive (EU) 2018/2001 and take into account the waste hierarchy. In Estonia, 100 district heating network areas(a) 71 and 3 district cooling (i) are efficient72.

Renewable energy use in buildings

The housing and energy sectors are very closely interlinked, the energy needs of buildings represent a significant part of Estonia's energy balance. At the same time, both have great potential for energy savings – the energy costs of buildings account for around 40 % of the European Union's total energy consumption. In 2022, the energy consumption of buildings in Estonia accounted for 53% of the total energy balance73. Buildings mainly consume electricity, gas and heat, the latter representing the largest share of the energy consumed. In 2022, renewable energy accounted for 52 % of final energy consumption in the building stock and 38.5% of total final energy consumption74. The policies implemented by the State to improve energy efficiency are increasingly guiding building renovations to reduce the energy consumption of the housing stock, improve the indoor climate of buildings, reduce energy dependency and reduce greenhouse gas emissions from energy use. We see that renewable energy solutions need to be implemented to make buildings more energy efficient where possible in terms of cost-effectiveness.

Renewable energy communities and renewables for self-consumption

Renewable energy community is defined in the Electricity Market Act, Energy Community is defined in the Energy Sector Organisation Act. This will provide the necessary legal clarity and certainty for those interested in community energy. A more detailed explanation is provided in chapter 3.2.v. Today's legal space in Estonia allows the creation of renewable energy communities and the production of renewable energy for self-consumption with exceptional flexibility. It is possible to create a legal person in minutes and can be controlled by natural persons, small and medium-sized enterprises or representatives of local authorities that are resident or located close to the renewable energy projects concerned. In accordance with the Energy Market Acts, the definition of a legal entity is carried out by means of an item to be inserted in the statutes. The challenge for community energy is to create an appropriate offer of value to the community, to identify the community's shareholders and their role (local resident, regional company, non-profit association, local government, housing association, etc.). According to the definition of the financing of activities, the main purpose of renewable energy communities is not to make a profit and therefore a positive financing decision from financial institutions is unlikely. A working group led by the Tartu Regional

71 Efficient district heating systems – ICTY (epha.ee)

72 Efficient district cooling systems – ICTY (epha.ee)

73 EE01: METRICS OF THE ESTONIA2035 ACTION PLAN. Statistics database

74 No statistics and methodology are available to measure the share of renewable energy in the building stock, but Estonia's share of renewable energy in final energy consumption in electricity and heat is largely indicative of energy consumption in buildings (renewable energy share in transport was 8.5 % in 2022) Eurostat SHARES 2022

Energy Agency (TREA), with the close involvement of the related ministries and all market participants showing interest in the sector, will contribute to the launch of energy communities. A handbook for renewable energy communities was completedin 202075.

In 2022, prosumers produced 61 GWh of energy into the electricity grid and used 665 GWh of energy. Prosumer output is still small, accounting for less than 1 % of total Estonian production and around 12 % of solar energy production. Prosumers consume about 8 % of the electricity consumed in Estonia. It is estimated that in 2040 there will be 2-4 times more prosumers in Estonia, i.e. 17102-43 994 prosumers, who also produce and consume 2-4 times more energy than today, i.e. 111 to 202 GWh and 1219 to 2 208 GWh respectively. However, as Estonia's overall electricity production and consumption is currently expected to grow at a similar level of magnitude, no increase in the share of electricity produced and consumed by prosumers in total electricity production and consumption is expected, with the result that the impact on the energy system will not change significantly in the long term76.

Local Energy and Climate Plans and Clean Energy Islands (CE4EUI)

Estonia has recently implemented national measures to facilitate the clean energy transition in local authorities, including islands. Both Electricity and Elering have planned increased investments to strengthen the West-Estonian and large island networks, and the Ministry of Economic Affairs and Communications has expected the transmission system operator to plan a 330 kV line for Saaremaa, which would strengthen the interconnections of islands (allowing electricity generators to connect to the grid and increasing security of supply).

The largest islands (Hiumaa, Saaremaa, Muhu and the Municipality of Vorms as part of the Western Energy and Climate Plan) have also been leading by drawing up energy and climate plans.

Several workshops were organised in 2022 for the preparation and implementation of energy and climate plans for local authorities, includingislands77. Continuous interaction with local authorities is also taking place through quarterly roundtables.

In 2023, the MTÜ Saarte Energy Agency (Eisea – *Estonian Islands Energy Agency*) was established, a social enterprise whose area of activity is the Western Estonian Islands: Saaremaa, Hiiumaa, Muhu, Vorms, Kihnu and Ruhnu.EISEA are helping local authorities, communities and businesses to implement projects geared towards more sustainable energy use and production and contribute to decarbonisation. 78

Mapping of go-to areas

As part of the REPowerEU plan, the Environmental Agency has mapped additional areas on land land, the suitability of which was subject to natural studies with the support of the European Union's NextGenerationEU funding. In line with the target set in Estonia's recovery and resilience plan, suitable areas with an estimated capacity of 1000MW were mapped79. National land areas were put at the disposal of developers by means of a public auction, so that they could be included in the planning process, leading to the identification of the most suitable planning solution for the wind farm. The exact additional wind energy capacity available in the areas of the State land will depend on the outcome of the planning process.

75 Co2mmunity_handbook.pdf (trea.ee)
76 Active consumers in the energy system of the future. Developments to 2040 – Development Monitoring Centre
77 LOV workshops | Energy desks
78 https://eisea.org/
79 Fisher mapping: https://keskkonnaportaal.ee/et/tuuleenergeetika-arendamiseks-taiendavate-alade- mapping. Auctions of mapped areas: https://rmk.ee/uudised/uudis/algas-enampakkumine- for wind power areas on national land/, https://rmk.ee/uudised/uudis/tuulealade-oksjonil-laekus-pakkumisi-17-arendusalale/,for wind turbines

In addition, as part of the latest amendments to the Renewable Energy Directive, renewables go-to areas will be designated by 2026 at the latest. According to the draft law transposing the Directive, go-to areas are onshore areas whose suitability for wind energy development has been assessed in the planning process, including by carrying out a strategic environmental assessment, and which are not subject to both the exclusions contained in the Directive and in the draft law, such as significant impacts on Natura 2000 sites or protected areas, major migratory routes, etc. Given that ambitious targets are set for renewable electricity production, solar energy targets are met under market conditions and wind energy potential is still largely untapped in Estonia, go-to areas are designated for the development of wind energy onshore.

Public energy use

The public sector's electricity consumption accounts for around 12 % of Estonia's total consumption. The public sector buys electricity through different institutions. Local authorities account for the highest share of public consumption (46.1 %) (Table 2.5).

Table 2.5 Share of public expenditure on heat and electricity in 2023.

Subsector	Intensities
Municipalities	46 %
Central government state budget institutions	19 %
Municipal SAs, ASBLs, VAUs	16 %
Central government SAs, VUs and other entities	11 %
Persons governed by public law in the central	7 %
Central Government Public SAs, ASBLs, VAUs	0 %
Social security funds	0 %
Other public entities	0 %
Total:	100 %

The central purchasing body of the central government for electricity is the State Kinnisvara AS (RKAS). With a view to the gradual transition of the public sector to renewable energy consumption, the State Kinnisvara AS carried out a joint procurement of renewable electricity for all areas of government in 2022 to contribute to the target. The aim of the tender was to take the central government's consumption close to shop for80 renewable energy by implementing a long-term renewable power purchase agreement. As a result of the tender, the public sector would have used renewable electricity under a 10-year fixed electricity price contract. The call for tenders launched in 2022 failed as the tender conditions did not meet expectations. Due to the high prices, developers were not prepared to submit bids at the fixed price cap. The renewed tender was launched in 2024. As a result of the tender, State Kinnisvara AS purchases a total of 35 GWh of renewable electricity per year in the years 2025 to 2026 to cover the consumption of buildings in its portfolio, which represents almost 45 % of the annual consumption of the buildings in the portfolio.

The tender resulted in a two-year contract until 2026 at a price of EUR 83.25/MWh. The contract price is similar to the average electricity price in 2024, but the volume of energy procured, the duration and the start date of the contract did not encourage the construction of new generation capacities. The experience gained from the pilot procurement carried out will allow the public sector to further procure renewable energy in the future.

2.2.Energy efficiency dimension

1. The elements set out in Article 4(b)

80 Rohehange | State Real estate (rkas.ee)

According to Article 4(b) of Regulation (EU) 2018/1999, the NECAP 2030 document shall include:

- the overall objective of energy efficiency;
- cumulative end-use energy savings from 2021 to 2030;
- indicative milestones for the renovation of buildings by 2030, 2040 and 2050;
- total surface area of central government buildings to be renovated in 2022-2030.

Estonia's final energy consumption per capita in 2023 was at the EU average level among the EU Member States, ranking 15 (2020 = 12). For primary energy consumption, we are moving towards targets, position 9 (2017 =7, 2020 =8, 2022 =6), but still higher than the EU average primary energy consumption (see Figures 2.4 and 2.5).

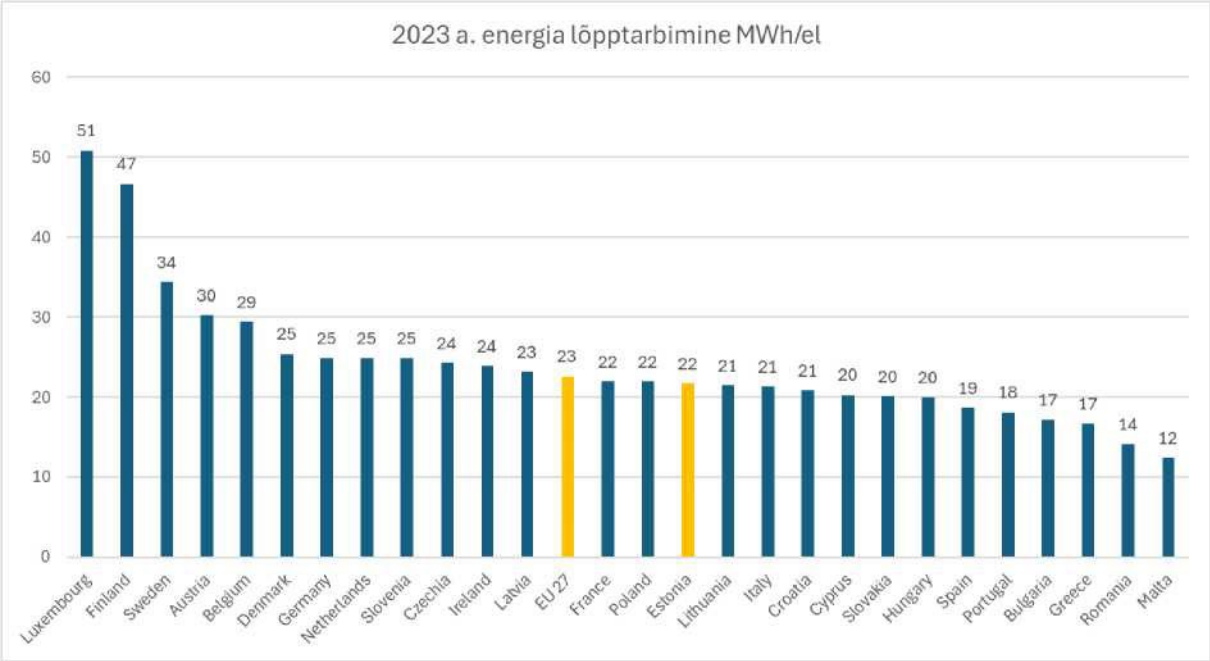


Figure 2.4 Final energy consumption per capita in the EU Member States in 2023 (based on Eurostat data).

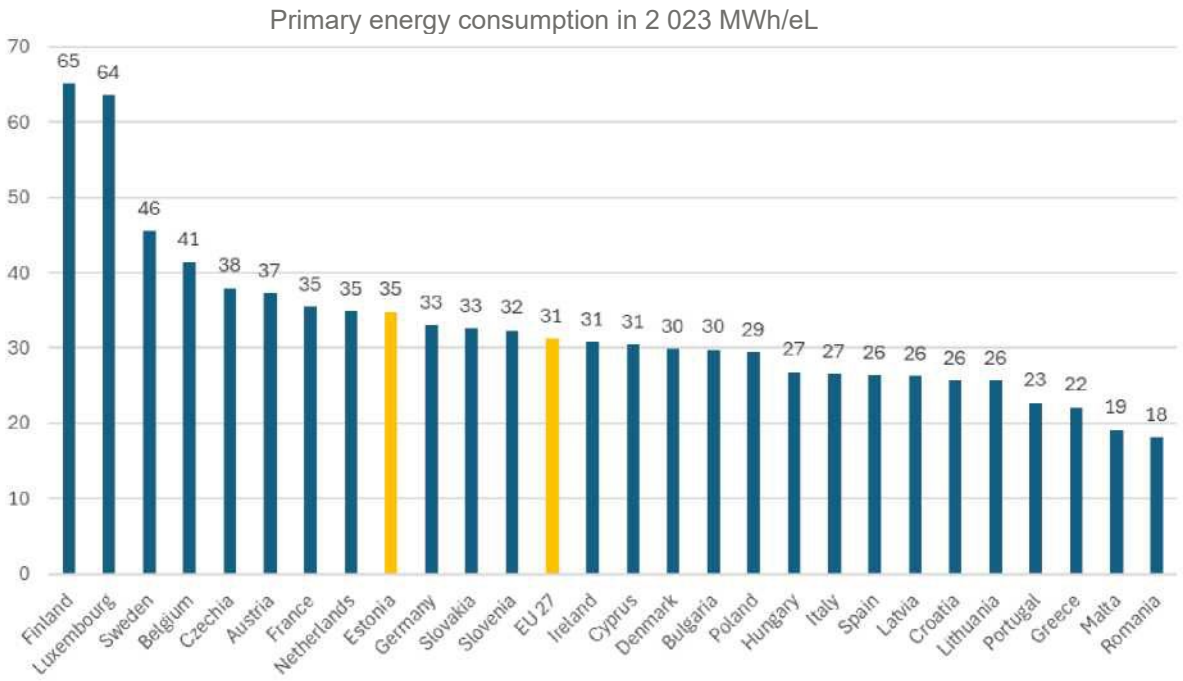


Figure 2.5 EU Member States' primary energy consumption per capita in 2023 (based on Eurostat data).

Most of Estonia's electricity consumption continues to take place in labour-intensive sectors. Figure 2.6, published by Odyssee-Mure below,81 showsthat the issue is not so high energy consumption, but comparable GDP, which is still growing, Estonia is still an emerging economy.

81 Odyssee-Mure. Final consumption by sector (EU countries, 2019), https://www.odyssee-mure.eu/publications/efficiency-by-sector/overview/final-energy-consumption-by-sector.html

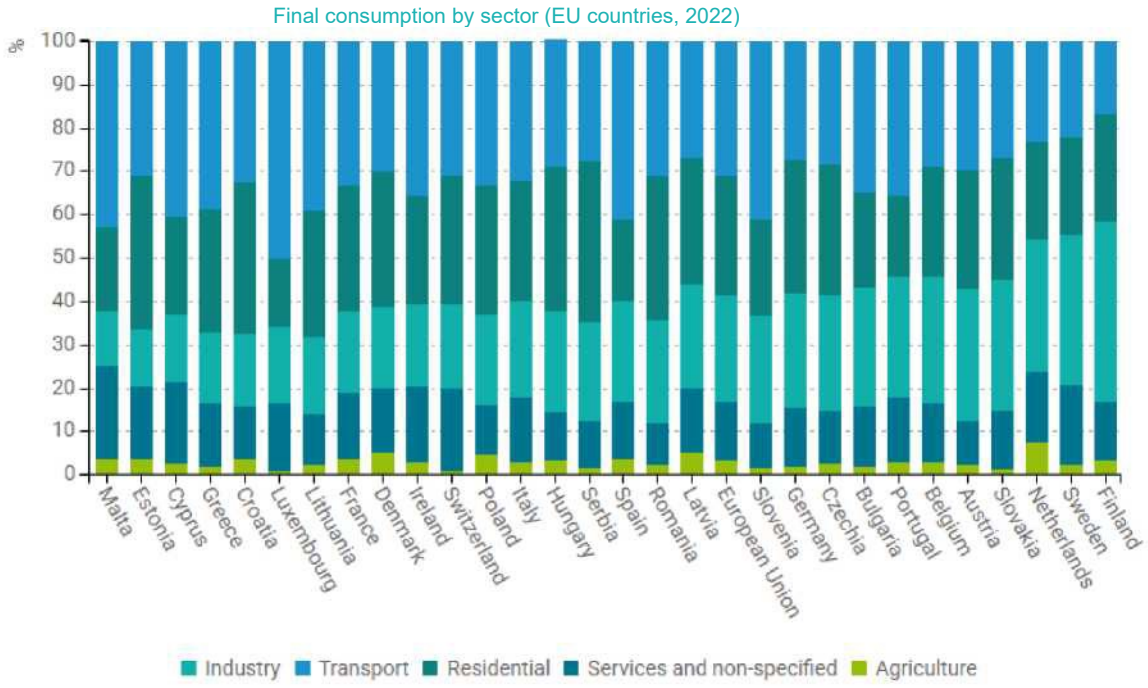


Figure 2.6 Share of different sectors in EU countries' energy consumption 2022 [82]

Overall energy efficiency target

Each Member State must contribute fairly to the EU's overall energy efficiency target set in the Energy Efficiency Directive, according to which the EU's primary energy consumption in 2030 must not exceed 993 Mtoe and/or the EU final energy consumption must not exceed 763 Mtoe. To this end, the Member State must set its own indicative contribution to the EU energy efficiency target (hereinafter 'the *overall energy efficiency*target').

ENMAK 2030 describes primary energy consumption, final energy consumption and energy intensity in 2030 as expected results from the implementation of the measures of the development plan (see Tables 1.2 and 1.3 of ENMAK 2030). According to ENMAK 2030, the expected primary energy consumption is 203 010 % lower than in 2012, the final[83]energy consumption is 32 TWh (115 PJ) and the energy intensity of the Estonian economy is EUR 2 MWh/1000 of GDP2012.

As regards energy efficiency, the European Council conclusions of October 2014 on the EU 2030 climate and energy policy framework(a) [84] were based on the European Commission's communication[85]describing the different levels of Europe's 2030 primary energy consumption and the potential impacts of achieving these levels. In the context of the evolution of the EU's energy efficiency target, it is most appropriate for national energy policy to focus on primary energy consumption as a whole and to base its overall energy efficiency target on primary energy consumption in 2030. Other possible bases for setting the overall energy efficiency target are final energy consumption, energy savings in primary or final energy consumption in

82 Final energy consumption by energy sector in EU | ODYSSEE-MURE
83 In 2012, according to EUROSTAT, Estonia's gross inland energy consumption was 256 PJ in 2012, i.e. according to ENMAK 2030, primary energy consumption in Estonia can be up to 230 PJ.
84 European Council (23-24 October 2014) – Conclusions, https://data.consilium.europa.eu/doc/document/ST- 169-2014-INIT/et/pdf
85 COM(2014) 520 final, Energy efficiency and its contribution to energy security and 2030 climate and an energy policy framework,"https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1528977372755&uri=CELEX:52014DC0520

2030 and energy intensity.

The EU Governance Regulation requires Member States to take into account in their overall energy efficiency target EU measures in the Energy Efficiency Directive, additional national measures to achieve energy efficiency at Member State and EU level and may take into account other factors affecting primary and final energy consumption in a Member State. These other factors may include, for example:

- cost-effective potential for energy savings in the future;
- changes in gross domestic product;
- changes in energy imports and exports;
- changes in the country's energy balance, evolution of carbon storage capacities;
- efforts made in the past to achieve energy efficiency.

In view of these factors, Estonia set the target of keeping final energy consumption at current levels (~29 TWh) and reducing primary energy consumption by up to 14 % compared to a peak of 7 years ago, supported by energy saving measures planned for 2030 (2018: — 70.42 TWh, Figure 2.7). Reworded
Following its entry into force, the Energy Efficiency Directive (EU 2023/1791) will lead to a more ambitious target of ~36 TWh for primary energy consumption, i.e. a 35 % reduction in primary energy consumption. The current forecast does not show this, which is why Estonia will have to make strong efforts and work to reduce the share of fossil fuels. The impact of Russia's war of aggression and the energy crisis in Ukraine does not contribute to this, as energy from oil shale increased in 2022

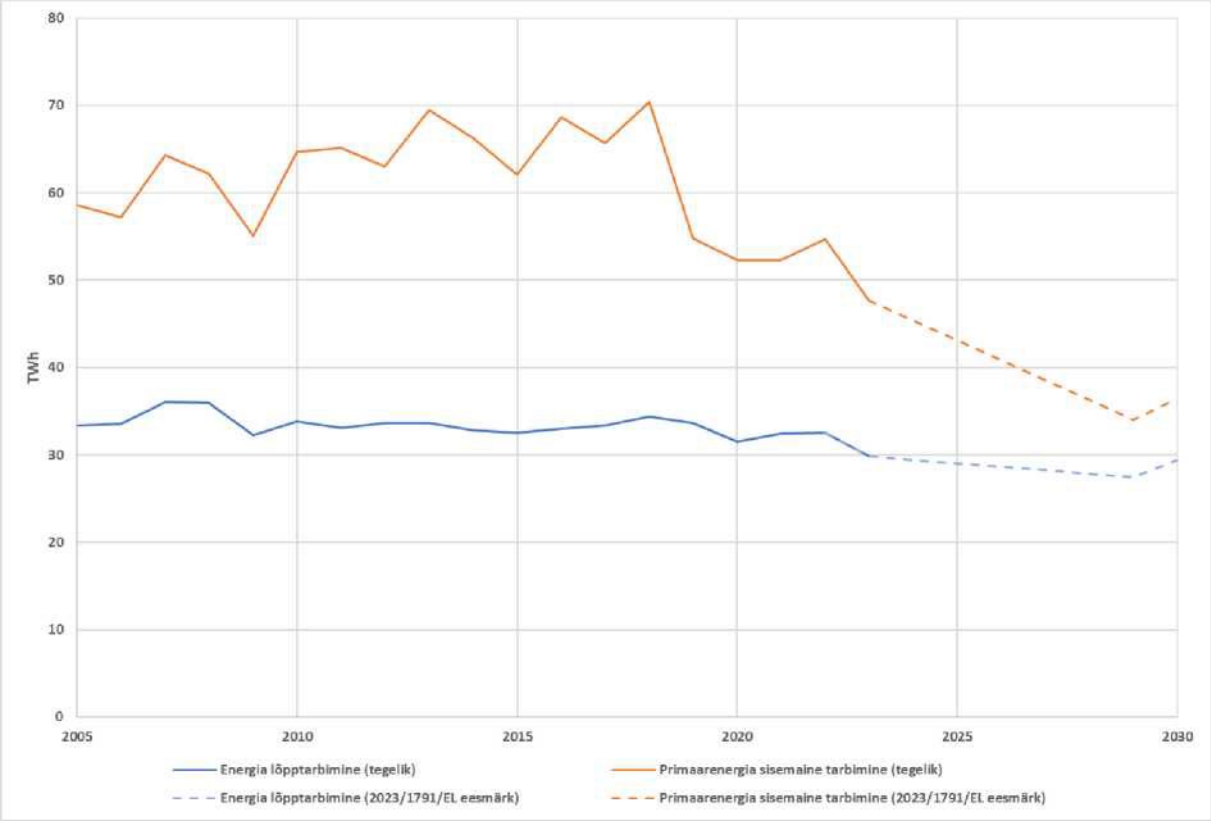


Figure 2.7: Estonia's actual final energy consumption and its final energy consumption linked to the (EU) 2023/1791 targets, as well as the inland consumption of primary energy up to 2030.

Cumulative end-use energy savings in 2021-2030

Article 4 of the Energy Efficiency Directive ((EU) 2023/1791) requires each Member State to set an indicative energy savings contribution based on final energy consumption. Each year between 2021 and 2030 energy savings are to be further achieved at 1.3 % (2024-2025), 1.5 (2026-2027), 1.9 % (2029-2030) of the 2017-

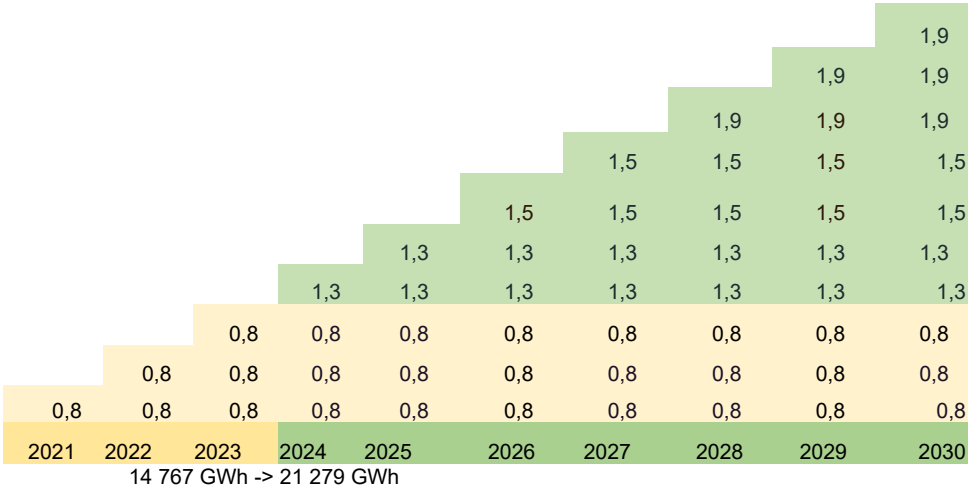
2019 average final energy consumption. The achieved energy savings must be cumulative, i.e. the amount of savings achieved in previous years must be maintained throughout the period.

The calculation of the required cumulative energy savings is given in Table 2.6.

Table 2.6 Cumulative energy savings required for 2021-2030

Indicator	Value	Remarks
Final energy consumption in 2017, TJ	120 038	Source of data: Eurostat table Simplified Energy Balances or nrg_bal_s 86
Final energy consumption 2 018 TJ	123 790	
Final energy consumption in 2019, TJ	121 189	
Average final energy consumption, TJ	121 672	2017-2019 average final energy consumption
Required annual energy savings, TJ	967 (0.8 %) 1571 (1.3 %) 1812 (1.5 %) 2296 (1.9 %)	0.8 %, 1.3 %, 1.5 %, 1.9 % of average final energy consumption
Total number of cumulative milestones in the period	55	Taking into account the principle of cumulation, the period 2021-2030 can be seen as 55 individual components with milestones where each share has an equal energy saving target its for the period corresponding
Energy savings required for 2021-2030, TJ	76 604	See Figure 2.8
Required energy savings in 20212030, GWh	21 279	1 GWh = 3.6 TJ
Primary energy reduction 2013-2030, TWh	36	reduce primary energy consumption by up to 35 % compared to the peak of recent years (2013-69.4 TWh), see also page 36

Different methodologies can be applied to calculate the required cumulative energy savings under the EED. However, the implementation of these methodologies does not change the amount of cumulative energy savings required between 2021 and 2030.



86 Simplified energy balances https://ec.europa.eu/eurostat/databrowser/bookmark/a08acb54-9baa-4e17-8653-bce41446ec9a?lang=en

Figure 2.8 Consideration of the principle of cumulative energy savings for the period 2021-2030.

Total surface of public buildings to be renovated in 2022-2030

Pursuant to Section 5 of the Energy Management Organisation Act, 3 % of the total net area of buildings occupied by central government in which the central government uses more than 250 m² and which does not meet the minimum energy performance requirements must be brought into conformity each year. Under the revised Energy Efficiency Directive, the 3 % renovation obligation extends to all public bodies' buildings.

As of 1 January 2024, the total useful floor area of buildings with a total useful floor area over 250 square metres used87 by the central government on the territory of the Republic of Estonia was 1815713m². Of which 960 017 m² were compliant and the buildings in force in 2022:
the area not meeting the minimum energy performance requirements was 835 310 thousand m². The increase in central government space compared to previous years has occurred in particular in the area of defence and security.

As of 1 May 2024, local authorities own a total of 6 681 897 m² of building area in 9791 buildings. 34 % of buildings with at least energy class C, or ~2 271 844 m². By 2 030.589434 m² of municipal buildings will have to be renovated.

The new Energy Efficiency Directive 2023/1791 modifies the definition of the public sector and extends the obligation to renovate buildings not only to central government but also to local authorities, hospitals, universities, etc. The baseline is 1 January 2024 for the stock of public bodies' buildings with a total useful floor area of more than 250 square metres, with indoor climate control, and which do not meet the minimum energy performance requirements (class C). 3 % of the total floor area of the base year shall be reconstructed each year. Based on the inception impact assessment, public bodies occupy ~3800 buildings with a total floor area of ~6 550 000 m², of which 3 % is ~197 000 m².

87 Ministry of Finance data – Portfelli overview | Ministry of Finance

Summary

Estonia's energy efficiency targets are set out in Table 2.7.

Table 2.7 Estonia's energy efficiency targets for 2030

ENMAK 2030 target: 2. More efficient use of primary energy: Estonia's energy supply and consumption is more sustainable	
Title of the objective	**Objective**
Overall energy efficiency objective: primary energy consumption in 2030	≤ 230 PJ 88
Cumulative end-use energy savings in 2021-2030	21 279 GWh
Final energy consumption	120 PJ
Total surface area of central government buildings to be renovated in 2021-2030	296 185 m 2

According to the projection of primary energy consumption, primary energy consumption in 2030 is likely to be somewhat lower than the ENMAK 2030 target, provided that we are able to achieve cumulative end-use energy savings (at least 21.28 TWh). According to the recast of the Energy Efficiency Directive, the indicative primary energy consumption limit calculated in 2024 is very ambitious for Estonia at 36 TWh and at 29.4 TWh for final energy consumption by 2030. Therefore, the ambitions of ENMAK 2030 are not sufficient to meet the new targets.

ii. The indicative milestones for 2030, 2040 and 2050, the domestically established measurable progress indicators, an evidence-based estimate of expected energy savings and wider benefits, and their contributions to the Union's energy efficiency targets as included in the roadmaps set out in the long-term renovation strategies for the national stock of residential and non-residential buildings, both public and private, in accordance with Article 2a of Directive 2010/31/EU

The long-term renovation strategy for buildings (REKS) was submitted to the European Commission on the basis of the Energy Organisation Act and ENMAK 2030 in 2020. The main objective of the strategy is the complete renovation by 2050 of the building stock built before 2000. The updated milestones stem from the new version of the EPBD, which requires the submission of a detailed final document from the national renovation plan to the European Commission by 31 December 2026.

Table 2.8 Estimated building reconstruction volumes (mln m^2) until 2050.

Breakdown of renovation volumes in REKS up to 2050 (area m m^2)							
Period of time	**20212025**	**2026-2030**	**20312035**	**20362040**	**20412045**	**20462050**	**TOTAL**
Private houses	0,4	0,95	1,9	3,1	3,9	3,8	**14**
Multi-dwelling buildings	2,2	3,2	4	3,9	3	1,8	**18**
Private non-residential	0,84	1,8	3,2	4,2	4,1	2,9	**17**
LOV Buildings	0,68	1,4	1,3	0,48	0,07	0	**4**
Central government	0,2	0,24	0,23	0,15	0,07	0,02	**0,9**
Breakdown of renovation volumes in REKS up to 2050 (area m m^2)							
Total	**4,4**	**7,6**	**10,6**	**11,8**	**11,1**	**8,5**	**53,9**

88 ENMAK 2030 target

This document does not address the indicative milestones of the Building Renovation Strategy for 2040 and 2050. The 2040 and 2050 targets are set out in the National Building Renovation Plan foreseen by the renewed Energy Performance of Buildings Directive in 2024, replacing the REKS. The national renovation plan will provide a comprehensive overview and trajectories on building renovations and the reduction of energy consumption of the building stock, and will be completed by the end of 2026.

ENMAK 2030 sets out targets and measures for the renovation of buildings. These targets can be achieved by producing more renewable energy in buildings. As a result of the implementation of ENMAK 2030 actions, the results are expected as described in Table 2.9.

Table 2.9 ENMAK 2030 targets and measures for the renovation of buildings

ENMAK 2030 target: 2. More efficient use of primary energy: Estonia's energy supply and consumption is more sustainable		
ENMAK 2030 action	**Barometer**	**Indicative target**
2.4.	The share of small residential buildings in the total building stock with an energy performance class of at least C or D.	≥ 40 %
2.4.	The share of multi-dwelling buildings as a share of the total building stock with an energy performance class of at least	≥ 50 %
2.4.	Non-residential buildings as a share of the total building stock with an energy performance class of at least C.	≥ 20 %

iii. Where applicable, other national objectives, including long-term targets or strategies and sectoral targets, and national objectives in areas such as energy efficiency in the transport sector and with regard to heating and cooling

ENMAK 2030 comprehensively addresses energy consumption in transport and district heating, including cogeneration. ENMAK 2030 also attaches importance to the modernisation of street lighting and energy savings in manufacturing plants. The use of oil shale in Estonia's energy economy has a significant impact on efficiency. One of the strategic objectives of the National Development Plan 2016-2030 for the use of lignite89 (hereinafter referred to as *PAK 2030*), approved by the Riigikogu on 16 March 2016, is to increase the efficiency of the use of oil shale and to reduce the negative environmental impact. Measures to improve energy efficiency in different sectors aim to achieve the indicative targets described in Table 2.10. below.

In order to achieve clean transport, it is necessary to support the uptake of new fuels, such as (green) hydrogen, and the testing and, where possible, deployment of other new technologies that contribute to energy saving and environmental conservation. At EU level, there is a need to support the development and deployment of hydrogen and other renewable gaseous fuels technologies and make hydrogen technologies more accessible and competitive. In order to be technologically mature and more competitive, hydrogen must also be used for bus, rail and maritimetransport90.

The transport and mobility development plan envisages a transport energy consumption of 8.3 TWh by 2035, of which the share of renewable energy must be at least 24 %. A balanced shift towards environmentally friendly modes of transport, i.e. the share of public transport, cycling and pedestrians, should be 55 % by 2035, including 60 % in urban areas. The baseline in 2020 was 38 %.

Table 2.10 Sectoral targets for energy efficiency

National Development Plan for 89 oil shale 2016-2030
https://www.riigiteataja.ee/aktilisa/3180/3201/6002/RKo_16032016_Lisa.pdf#
90 Transport and Mobility Development Plan 2021-2035 (mkm.ee)

ENMAK 2030 target: 2. More efficient use of primary energy: Estonia's energy supply and consumption is more sustainable		
ENMAK 2030 action	**Barometer**	**Indicative target**
1.1	4. Electrical capacity of additional cogeneration plants producing a district heating network established between 2020 and 2030, MW_{el}	25 MW_{el}
2.2	1. Transport requirementsfor the use of91 passenger cars compared to 2010, % increase	growth ≤ 5 % (2030)
2.3	2. Fleet fuel consumption in 2030 does not exceed the 2012 level	≤ 8.3 TWh
2.6	1. Reduction of heat losses in district heating by 2030 (compared to 2012), TWh	0.1 TWh
2.8	1. Energy savings in manufacturing companies, GWh/y	460 (in 2023)
2.8	2. Number of renovated street lighting points	22000 (in 2023)
Strategic objective of the 2030 Plan		
2.	1. Energy efficiency of shale oil production, %	more than 76 % (to be specified in 2025)

The measure for the renovation of the depreciated and inefficient thermal pipelines has achieved a total energy saving of 72.4 $GWh/_y$ as of 2021.92

The projected primary energy savings for the period 2021-2030 amount to 241.15 GWh, plus savings achieved in the previous period, totalling 424.52 GWhcumulatively93.

2.3. Energy security dimension

i. The elements set out in Article 4(c).

The crises of recent years, including the ongoing Russian military aggression in Ukraine, have affected the energy security of the European Union as a whole. The Estonian country has taken and is taking steps to increase its resilience to potential crises and hybrid threats.

Regulation (EU) 2022/103 of the European Parliament and of the94 Council2 obliges Member States whose territory does not have the necessary storage facilities to store at least 15 % of their annual gas consumption in storage facilities located in other Member States. The establishment of Estonia's strategic natural gas reserve is based on an order of the Government of the Republic on the establishmentof the State's operational stock95, which requires 1 TWh of gas to be kept in stock. **Estonian Assets Centre continuously owns 1 TWh of gas stock held**

Inčukalns storage facility (Lätis). 96 This amount of gas corresponds to approximately 27 % of Estonia's average gas consumption in 2024. In 2022, consumption was in the order of 5 TWh, but in 2023 it was 3.42 TWh and a similar order of magnitude is expected in the coming years.

91 Transport demand makes it possible to monitor changes in the volume of passenger car movements and thus to estimate the extent to which different measures have contributed to the overall reduction of car use and forced movements. Baseline 2010 is 6 100 million passenger-kilometres

92Impact of EU structural measures on the achievement of national energy targets (2021).pdf (Ministry of Climate.ee)

93Impact of EU structural measures on the achievement of national energy management objectives (2021).pdf Analysis and studies in the field of energy and minerals | Ministry of Economic Affairs and Communications (mkm.ee)

Regulation (EU) 2022/1032 OF94 THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 June2022 https://eur-lex.europa.eu/legal- content /ET/TXT/HTML/?uri=CELEX:32022R1032&from=EN

95 The establishment of a national operational reserve. RT III, 24.05.2022. https://www.riigiteataja.ee/akt/302082022003?leiaKehtiv

96 Stock of natural gas. https://varudekeskus.ee/riigi-tegevusvarud/kutusevarud/maagaasivaru

In 2022, the Government of the Republic took a decision in principle to increase Estonia's energy security and mitigate the risks of rapid abandonment of Russian gas, resulting in the **construction of LNG reception capacity in Paldiski in autumn 2022, for which a quay and gas installation was built for** LNG reception and transmission to the gas network. On 30 November 2022, the mechanical readiness for the reception of a floating LNG terminal was achieved. The network connection to connect the floating LNG terminal in Paldiski completed at the end of 2022 provided an additional connection point with a design capacity of 81.2 GWh/day. The increase in reception capacity will directly contribute to ensuring the security of gas supply in case gas supply problems arise in Estonia or in the region97.

Solidarity arrangements ensuring security of gas supply have been concluded in Estonia with the Republic of Finland and the Republic of Latvia, which are directly connected to their gas system. The purpose of the agreements to be concluded is to provide a framework within which, in the event of non-availability of the gas market, the parties may request assistance from the other party in ensuring the supply of gas and provide it to the other party. In addition, a Memorandum of Understanding (MoU) with the Republic of Latvia has been concluded in May 2023, with the aim of agreeing on the conditions for the use of the Paldiski hammer quay in the event of an emergency and, if necessary, the production of a floating LNG terminal.

The obligation to conclude such agreements follows from Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 (OJ L 280, 28.10.2017, p. 1–56) concerning measures to98 safeguard the security of gas supply (hereinafter referred to as 'the Regulation') and from the European Commission Recommendation (EU) 2018/177 of 2 February 2018 on key elements to be included in technical, legal and financial arrangements between Member States for the implementation of the solidarity mechanism pursuant to Article 13 of Regulation (EU) 2017/1938 of the European Parliament and of the Council concerning measures to safeguard the security of gas supply (OJ L 32; 6.2.2018, pp. 52-64) for the implementationof the solidarity mechanism under99 Article 13 of the Regulation
key elements to be included in technical, legal and financial arrangements between Member States aimed at mitigating the impact of a serious emergency and ensuring that gas reaches solidarity-protected customers, given the need to respect the principles of solidarity in order to ensure the security of gas supply in the Union.

According to Article 4(c) of Regulation (EU) 2018/1999, the NECAP 2030 document shall provide information on the milestones or targets:

- security of supply, i.e. diversification of energy sources and imports from third countries;
- increasing the flexibility of the energy system;
- in case of difficulties in supplying the energy source(s).

The following is an overview of the sectoral targets for the different energy system components.

Flexibility in the electricity system

The adequacy and flexibility of the electricity system, including its increase, is ensured in conjunction with the Electricity Market Act and the legislation enacted on the basis thereof. In accordance with the Electricity Market Act in force in Estonia, the network operator (including the transmission system operator) develops the network in its catchment area in such a way as to ensure that it is possible to provide network services to connected customers in accordance with the legislation and the terms of the licence;

manufacturers, line managers and other network operators, taking into account their reasonable needs, and connect to the network a proper electricity installation of a market participant located in their catchment area. When developing the network, the system operator shall respect the need for security of supply, efficiency,

97 Elering AS. Estonian gas transmission network ARENGYKAVA 2023- 2032. https://elering.ee/sites/default/files/2023-03/Estonia%20Gas%C3 %BCdeliverC3 %B5rgu%20Development plan%202023-2032.pdf
98 (EU) 2017/1938 https://eur-lex.europa.eu/legal-content/ET/TXT/?uri=CELEX:32017R1938
99 (EU) 2018/177 https://eur-lex.europa.eu/legal-content/ET/TXT/?uri=CELEX:32018H0177&qid=1634040201782

market integration and the availability of flexibility services, taking into account the results of the studies carried out in these areas.128 Moreover, in addition to what is provided for in European Union legislation,it is essential to further promote participation in demand response in all electricity markets, which is why activities to develop a single market model for DSR for all markets and the removal of regulatory barriers to promote storage are taking place. Since 2025, Baltic system operators have opened the market for frequency reserves.

In order to ensure electricity system adequacy and to develop the flexibility of the energy system, ENMAK 2030 shall be guided by measures 1.1 of the security of supply sub-target. (Developing electricity generation) and 1.2 (Electricity and efficient transmission) (see Table 2.11 and Section 2.4.3).

Table 2.11 Targets for electricity system adequacy and flexibility of the energy systeml126

ENMAK 2030 target: 1. Security of supply: Continuous energy supply is ensured in Estonia		
ENMAK 2030 action	**Barometer**	**Indicative target**
1.1.	Share of fuel-free energy sources (solar, wind, hydro) in final electricity consumption, %	> 25 % (2030)*
1.1.	Total electrical capacity of cogeneration plants producing a district heating network, MW_{el}	> 600 (2030)
1.2	Average total duration of unscheduled or faulty interruptions in the distribution network in minutes per consumption site per year, minutes	&90 (2030)
1.2	Amount of energy not delivered in the transmission	&150 (2030)

*Renewed renewable energy trajectories will have a fuel-free share of > 70 % in 2030.

Security of supply in the electricity system

Measures 1.1 of ENMAK 2030 sub-target for security of supply shall be used as a basis for ensuring the security of the electricity system. (Developing electricity generation) and 1.2 (Electricity and efficient transmission) (see Table 2.12 and Section 2.4.3).

Table 2.12 Targets to ensure security of electricity supplyl126

ENMAK 2030 target: 1. Security of supply: Continuous energy supply is ensured in Estonia		
ENMAK 2030 action	**Barometer**	**Indicative target**
1.1.	Availability of local electricity generation capacities to fulfil the N-1-1 100criterion	Fulfilled (2030)
1.1.	Share of fuel-free energy sources (solar, wind, hydro) in final electricity consumption, %	> 25 % (2030)*
1.1.	Electrical capacity of cogeneration plants producing a district heating network, MW_{el}	> 600 (2030)
1.1.	Share of imported fuels in electricity production	& 50 %
1.1.	Share of domestic electricity in open market conditions	> 60 %
1.2	Average total duration of unscheduled or faulty interruptions in the distribution network in minutes per consumption site per year, minutes	& 90 (2030)
1.2	Amount of energy not delivered in the transmission	& 150 (2030)
1.2	Availability of the country's external connections, %	96 % (2030)

100 N-1-1 is an accidental deactivation of one element of the electrical system when any element significantly affecting the operation of the electrical system is in the process of maintenance or repair. https://elering.ee/sites/default/files/2023-05/elering_vka_2022.pdf

1.2	Construction of new 330 kV lines (Sindi-Riga and Sindi-	Established (2020)
1.2	Estonia is connected to a synchronous area managed in the European Union	Connected (2025, February)

*Renewed renewable energy trajectories will have a fuel-free share of > 70 % in 2030.

Investments under the Baltic synchronisation project (see section 2.4.2) will also contribute to the resilience of the electricity system, which will help eliminate capacity constraints in the grid, increase the readiness of external connections and increase the flexibility of the electricity system to rapid changes in electricity generation. In the event of a reduction in the production of oil shale electricity (phasing out of direct combustion), new generation capacities and connections with neighbouring countries will ensure security of electricity supply.

In order to ensure security of supply of the electricity system, Estonia has established a regulatory basis for the use of the capacity mechanism in case of problems with the reliability standard. In accordance with the principles of Article 25 of Regulation (EU) 2019/943 and Section 14([1]) of the Network Code on the Operation of the Electricity System, there must be no more than eight hours of constraint and the average amount of energy not delivered must not exceed 4.5 GWh. The reliability standard shall be assessed in the Pan-European Electricity System Capability Analysis (ERAA) as well as by the Electricity System Manager, which examines whether it has been met in the next 10 years. In order for the necessary generation capacity in Estonia to remain in place in 2030, capacity willing to exit the market should be included in the strategic reserve already in 2027. 101 ERAA 2024 shows that there will be 17.5 limitation hours in 2028, which is twice the reliability standard allowed in Estonia. 102

The key issue in the coming years will be the maintenance of 1 000 megawatts of power in the Estonian electricity system. Since 2030, the TSO has estimated the need for controlled capacity at 1 200 MW. As long as new controlled capacities have not been built, existing ones must be maintained. While it is possible to cover the need for existing capacities in the coming years, in the longer term, the addition of new ones needs to be supported by additional measures, as market-based capacities are unlikely to generate sufficient volumes. To ensure this, two important initiatives are underway: the establishment of a strategic reserve by 2027 and the possible implementation of the Isles Reserve already in 2026. 103

In addition to the ENMAK 2030 targets described in the tables above, it is necessary to ensure compliance with the electricity interconnection requirement (specifically in Chapter 2.4.1).

Gas system

Under the Natural Gas Act, the system operator is responsible for ensuring the security of the gas system. The system operator shall have the obligation to ensure the security of supply and balance of the gas system at all times in accordance with the contracts concluded. The system operator shall develop the gas system on the basis of known demand and a forecast thereof, including known new entrants. In doing so, the N-1 criterion(104i)of the infrastructure standard must be complied with at all times.

The security of supply of the gas system is reflected in ENMAK 2030 security of supply sub-target 1.3 (Securing gas supply).

Table 2.13 targets for gas system and market development and diversification of gas supply.

ENMAK 2030 target: 1. Security of supply: Continuous energy supply is ensured in Estonia

101 Security of Supply Report 2024 (Elering)
102 ENTSOs, ERAA 2024
103 Security of Supply Report 2024 (Elering)
The 104 N-1 criterion is the assessment of the situation where one of the largest connections for the supply of gas is interrupted. If, in the event of interruption, it is possible to reorganise deliveries in such a way that there is no disruption of the equipment, the N-1 criterion is met.

ENMAK 2030 action	Barometer	Indicative target
1.3.	1. Compliance with the infrastructure standard (N-1)	Fulfilled
1.3.	2. Share of the largest source of supply in gas supply	70 % (2030)
1.3.	3. Market share of the largest gas seller	&32 % (2030)
1.3.	4. Meeting the standard for security of supply	Fulfilled (2030)
1.3.	5. Gas market concentration (HHI105)	&2000 (2030)

In order to reduce the likelihood of factors affecting the security of gas supply and to ensure preparedness to deal with large-scale gas supply disruptions, the minister responsible for the sector approves **every two years a plan for dealing with disruptions of gas supply in Estonia and a preventive action plan to reduce risks to** the security of gas supply (based on Regulation (EU) 2017/1938). The latest plan was approved in 2023.

In terms of security of gas supply, it is important to have sufficient sources of supply in the region and sufficient gas infrastructure. The Klaipeda and Inkoo terminals, but there is the capacity to bring the terminal to Paldiski as there is a quay and the corresponding infrastructure. The regional gas market ensures security of supply – Estonia and Latvia are part of a single gas balance zone, the aim is to also include Finland and Lithuania, to extend the uniform tariff zone of EE, LV, FI and to add LT and PL. Estonia maintains a strategic natural gas reserve of 1 TWh. Gas consumption was 3.4 TWh in 2023 and 3.7 TWh in 2024, and consumption volumes are estimated to be in the same order of magnitude in the following years. The volume of strategic gas stocks managed by the EVK is 1 TWh and corresponds to 30 % of the forecasted demandt for the new annual consumption period106. The EVK stores strategic natural gas reserves in the Inčulkans underground storage facility in Latvia.

ii. National objectives to increase the diversification of energy sources and energy supplies from third countries and the resilience of regional and national energy systems.

Estonia's dependency on energy imports has been one of the lowest among the EU countries in the past, but for natural gas and motor fuels Estonia is highly dependent on imports. While a number of different supply channels can be used for motor fuels, the possibilities for the supply of natural gas are more limited. As a result, the ENMAK 2030 document sets out the targets for the diversification of gas supply described in Chapter (i).

Estonia's natural gas consumption accounts for less than 10 % of the energy balance. The consumption of natural gas in heating, industry and transport of buildings is decreasing, but its role in electricity generation to cover peak hours and reserves remains (in the case of the construction of additional gas plants or the privatisation of the Kiisa emergency power plant, consumption may increase). As part of the diversification of energy sources, Estonia has started producing biomethane from local raw materials. In 2025, Estonia is working on a national roadmap for biomethane/biogas, which plans to set national targets for the production and use of sustainable biogas/biomethane.

iii. National targets for reducing energy import dependency from third countries, where relevant, in order to increase the resilience of regional and national energy systems

In order to maintain low import dependency, it is necessary to maintain the high contribution of domestic fuels (including fuel-free energy sources) to the energy balance. An overview of targets has been

105 HHI – Herfindahl-Hirschman Index, which varies between 0..10000 and is obtained by adding the squares of the market share ofeachindividualgasdistributor. The higher value characterises the increased dependence of the gas market on a single gas vendor. In the case of HHIlt;2000, there are 7 gas sellers in Estonia, the largest of which has a market share below 32 %.

106 Stock of natural gas. https://varudekeskus.ee/riigi-tegevusvarud/kutusevarud/maagaasivaru

integrated into chapter i. The import of pipeline gas and LNG purchased for injection into the gas system from Russia has been banned in Estonia since 31 December 2022 pursuant to Government of the Republic Regulation No 93.

iv. National objectives related to increasing the flexibility of the national energy system, in particular through the deployment of domestic energy sources, consumption capacity[107] and energy storage.

The flexibility of the electricity system is described in chapter 2.3.i.

As a result of the energy crisis, EU Member States, including Estonia, have implemented a number of electricity saving measures. EU member states agreed to reduce natural gas consumption by at least 15 %. The development of the Estonian natural gas infrastructure will also be influenced by future gas consumption. Since 2022, the consumption of gas in Estonia has decreased. Estonia's strategy does not envisage any further reduction in gas consumption, as sufficient gas consumption is important for the sustainability of the gas infrastructure. The decrease in electricity consumption in 2024 compared to 2021 was around 7.8 %, with domestic consumption including network losses of 9.0 TWh in 2021 and 8.3 TWh in 2024, respectively. Gas consumption was 5.0 TWh in 2021 and 3.8 TWh in 2024. Estonia's gas consumption decreased by 24 % in 2022, by 32 % in 2023 and by 24 % in 2024 compared to 2021.

Table 2.14 Inland consumption of natural gas and electricity with grid losses in Estonia between 2016 and 2024, TWh (Source: Elering).

Year	Consumption of natural	Inland electricity consumption including grid losses (TWh)
2016	5,4	8,4
2017	5,2	8,5
2018	5,2	8,7
2019	4,8	8,6
2020	4,4	8,4
2021	5,0	9,0
2022	3,8	8,5
2023	3,4	8,2
2024	3,8	8,3

2.4. Internal energy market dimension

2.4.1. Electricity interconnectivity

1. The level of electricity interconnectivity set by the Member State for 2030.

The electricity interconnection target of the Member States of the European Union shall be at least 10 % per year.

At least 15 % by 2020 and 2030[108]. **Estonia's electricity interconnection level is above the EU targets of 63 %.** Compared to the rest of the European Union, 14 countries have exceeded the 15 % target by the beginning of 2025, 5 countries will be 10-15 % at the level of connectivity, and 8 countries will have connectivity levels below 10 %.

Cooperation between Member States is critical in increasing electricity interconnections. Member States

107 In English *demand response*

108 European Commission. Communication on strengthening Europe's energy networks. https://ec.europa.eu/energy/sites/ener/files/documents/communication_on_infrastructure_17.pdf

should base their level of connectivity on three minimum criteria:

a) electricity exchange price differential between regions, Member States or price areas & EUR 2/MWh;
b) trans-national transmission capacity > 30 % of peak consumption;
c) trans-national interconnection capacity is > 30 % of renewable energy generation capacity.

Estonia's figures 2024:

a) Cross-country transmission capacity ratio to cruise demand: 142 % (125 % in 2023) – for a peak load of 1 599 MW in 2024 and an average transmission capacity of 2 276 MW;
b) Cross-border transmission capacity ratio to renewable generation capacity: 104 % (2 023 186 %) based on 2 314 MW of renewable capacity installed in Estonia;
c) Cross-border transmission capacity ratio to generation capacity: 79 %;
   Performing power in 2024: 2 877 MW (Source: ENTSO-E transparency platform)
   Transmission capacities in 2024: 2 276 MW (source: Elering Security of Supply Report)
d) Average electricity exchange price difference at the Estonian-Finland border 2024: average price EUR 87.2/MWh, Latvia EUR 87.4/MWh and Finland EUR 45.5/MWh, i.e. a109 difference of EUR 2.2/MWh with Latvia and EUR 43.5/MWh with Finland.

Based on these figures, the price difference between Estonia and Finland was higher than EUR 2/MWh in 2024, i.e. transmission capacity was not sufficient to create a uniform price. Part of the price difference is undoubtedly due to cable breakage and out-of-work, but prices would be more even between regions if an additional submarine cable EstLink3 between Estonia and Finland is built.

Interconnection capacity in EE->LV is on average 1 215 MW, LV->EE average 12 560 MW, between EE-FI in both directions 1 016 MW. The ENTSO-E analysis (ENTSTO-E System Needs Study or TYNDP) has estimated that, from 2025 onwards, the price difference between Estonia's and Finland's price areas exceeds EUR 2/MWh in all scenarios, which also demonstrates the need for an additional interconnection between Estonia and Finland.

109 Nord Pool | Day-ahead prices (nordpoolgroup.com)

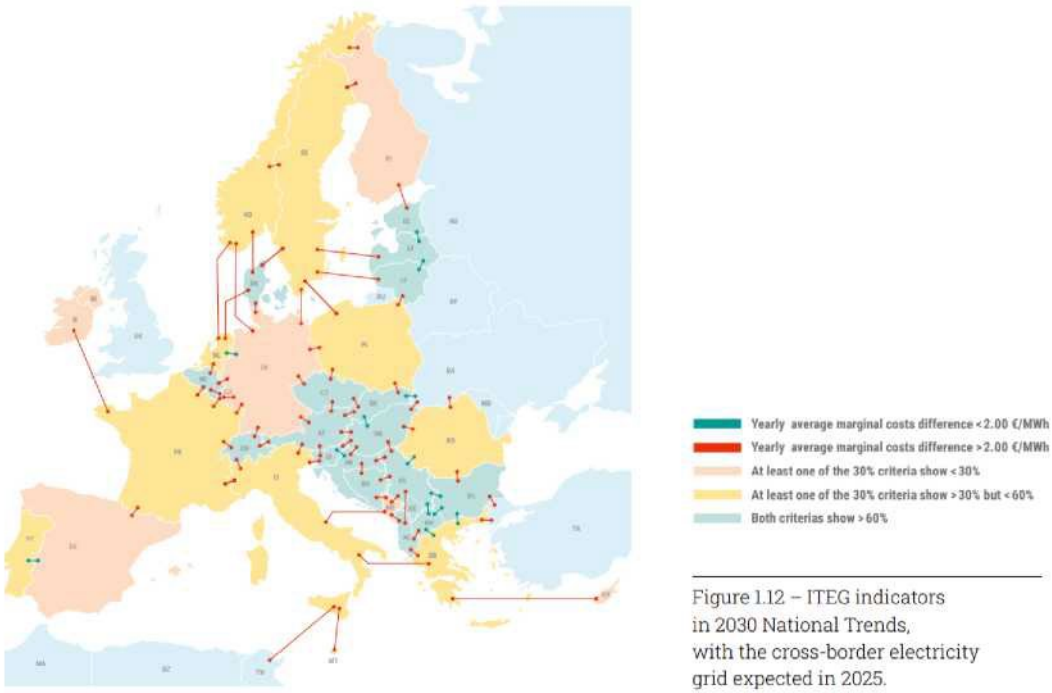


Figure 1.12 – ITEG indicators in 2030 National Trends, with the cross-border electricity grid expected in 2025.

Figure 2.9 Compliance with the electricity interconnection criteria in 2030 in the National Energy scenario regimel 110

The successful synchronisation of the Baltic States' electricity system with the synchronous area under EU law in February 2025 is one of the most important energy policy milestones in Estonia and the other Baltic States and has a major impact on the long-term development of the electricity grid. In the **context of the synchronisation project, interconnections between the Baltic States have been strengthened, among others, and the project will also contribute to increasing the interconnection of the Polish electricity grids111.**

2021. in spring 2011, the Estonian and Latvian transmission system operators concluded an agreement to jointly analyse the best possible solutions for the construction of an additional or fourth transmission line with a transmission capacity of 7001000 MW, and subsequently the Government of the Republic launched in February 2024 the State specific plan and strategic environmental assessment for the fourth electricity interconnection between Estonia and Latvia. The establishment of a specific plan is planned for 2026.

In 2020, Elering, together with the other system operators along the Baltic Sea (Fingrid Oyj, Rooti Affärsverket Svenska Kraftnät, Denmark Energinet SOV, 50Hertz Transmission GmbH in the northern part of Germany, AS Augstprieguma tīkls and Litgrid AB in Lithuania) signed a Memorandum of Intent to start working together to develop a common offshore energy network.

2022. in June 2005, the Estonian and Finnish electricity system operators Elering and Fingrid signed a Memorandum of Understanding in which they agreed to launch a joint operational process for the construction of the third Estonian-Finland electricity interconnection (EstLink 3) with a planned direct current interconnection capacity of 700 MW, and the new connection could be expected to start in 2035. Estlink 3

The 110 National Trends scenario takes into account the plans set out in the Member States' development plans. https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/public/system-needs-report.pdf

111 ENTSO-E Project 170 – Baltics synchro with CE. Interconnection targets. https://tyndp.entsoe.eu/tyndp2018/projects/projects/170

has been added to the TYNDP and PCI lists. An application for a building permit has been submitted. 112

2.4.2. Energy transmission infrastructure

i. Key electricity and gas transmission infrastructure projects and, where appropriate, modernisation projects necessary to achieve the objectives related to the five dimensions of the Energy Union Strategy.

The biggest objective of the Estonian electricity system so far was the synchronisation of the Baltic States' electricity system into the band subject to European Union law by 2025, and this project was successfully implemented in February 2025. The Baltic synchronisation project has been on the*list of Projects of Common Interest*(PCIs) of the European Union since 2013 and has carried out activities in Estonia, Latvia, Lithuania and Poland. In cooperation with other Member States and recognised external partners, it is important to develop offshore wind farms as potential projects of common European interest.

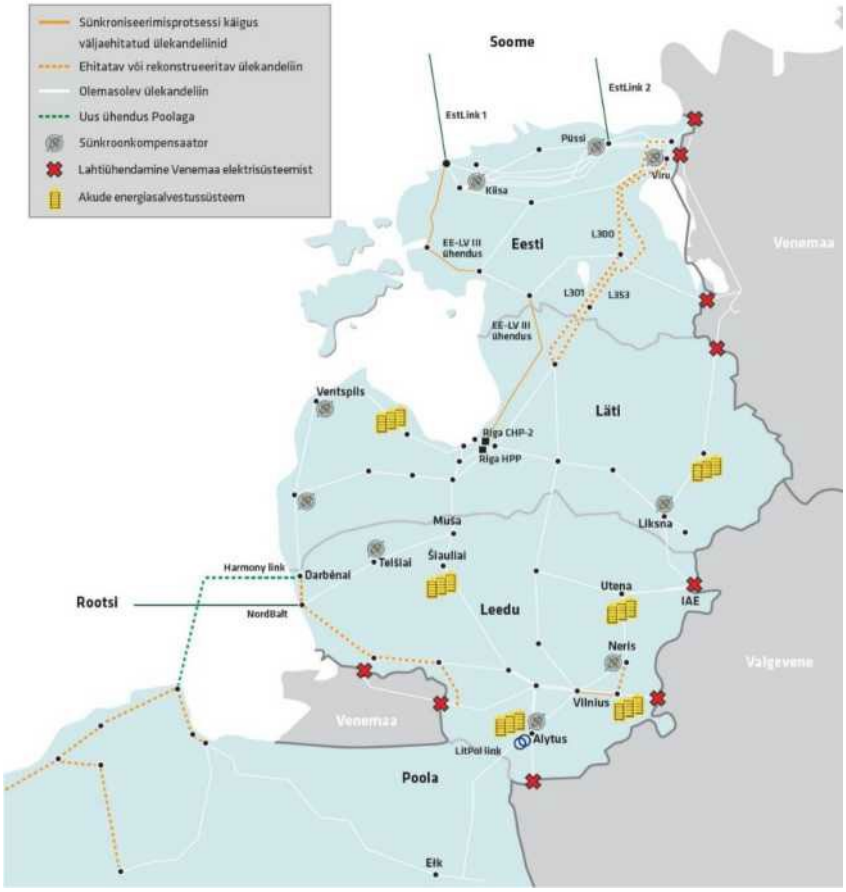


Figure 2.10 Synchronisation of the Baltic States' electricity system in the continental Europeanfrequency band113.

112 Security of supply report prepared by Elering -https://elering.ee/sites/default/files/2022-12/elering_vka_2022_pages.pdf

113 Synchronisation https://elering.ee/sunkroniseerimine

The activities to be carried out under the Estonian electricity grid synchronisation project are set out in Table 2.15 below. The project will be carried out in cooperation between the Baltic States and Poland. A detailed overview of the project status and activities can be found on the ENTSO-E website t115 describing theproject.

Timeline of synchronisation projects until 2025:

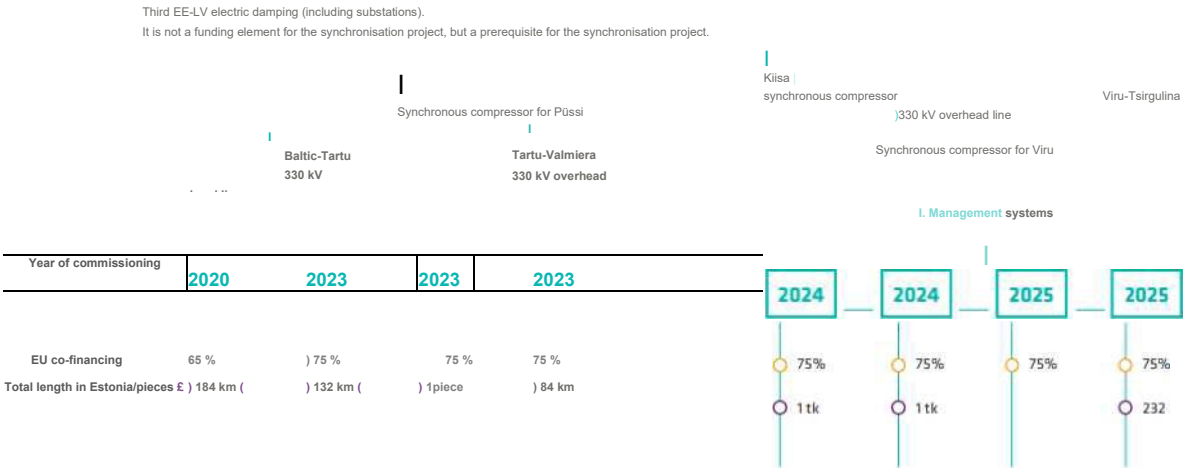


Figure 2.11 Timetable for synchronisation

Table 2.15 activities of the synchronisation project in Estonias115

Name of the investment	PCI number	Volume of investment, EUR	Time
L386 Kiling-Nõmme-Rga	4.2.1	8	2020
L735 Harku-Sindi	4.2.2	72	2021
L300 Baltic-Tartu	4.8.2	46	2023
L301 Tartu-Valmiera	4.8.1	30	2023
L353 Viru-Csirgulina	4.8.4	80	2025
Installation of synchronous compressors (Kiisa and Viru)	4.8.23	37	2024
Estonian electrical system management systems	4.8.9	69	2025
Total		**342**	

The synchronisation project will contribute to the following dimensions of the EU Energy Union Strategy:

- Energy security, solidarity and trust;
- A fully integrated internal energy market;
- Climate action – decarbonisation of the economy;
- Research, innovation and competitiveness.

Estonia's electricity system also needs to prepare to strengthen interconnections between West Estonia and Saarte due to the addition of large capacities from the development of offshore and onshore wind farms. In view of the future perspective, it is also useful for the LAs to consider including in the zoning plan a guideline for planning onshore infrastructure sites related to activities at sea (e.g. wind farm cable connections)

118 synchronisation https://elering.ee/sites/default/files/2021-06/Elering_Synkroniseerimise- Broz%CC%8Cyyr_A5_8lk_2 %20sheet_20.01.2021.pdf

through the process. Consequently, by 1 January 2021, Elering AS built a 330/110kV high-voltage overhead line in Western Estonia Harku-Lihula-Sindi, increasing transmission capacity of approximately 600 MW. This

was one of the largest national infrastructure projects, where up to 1 000 MW of wind farms can be integrated.

Gas system

The Estonian natural gas transmission network consists of 976.3 km of pipeline network, 4 gas metering stations where gas volumes entering the transmission network are measured and gas quality is determined, 36 gas distribution stations with pressure reduction from the transmission network, quantity measurement, odourisation and ensuring the agreed consumption regime, and 1 gas regulatory station (Kiili GRJ), which allows parts of the transmission network to be operated at different operating pressures. Also, the Balticconnector pipelines are measured at the Sili GRJ, but the Gril GRJ does not directly qualify as a gas metering station. On the Estonian side, the Paldiski gas metering station will providea two-way measure of the amount of gas passing through the Balticconnector114.At the beginning of 2020, the Balticconnector connecting the Finnish and Estonian transmission networks was completed with a length of 39.7 km. The introduction of Balticconnector made it possible to reconcile the Finnish-Estonia-Latvia market areas, traded today on the GET Baltic gas exchange. Lithuania also plans to join the market area.

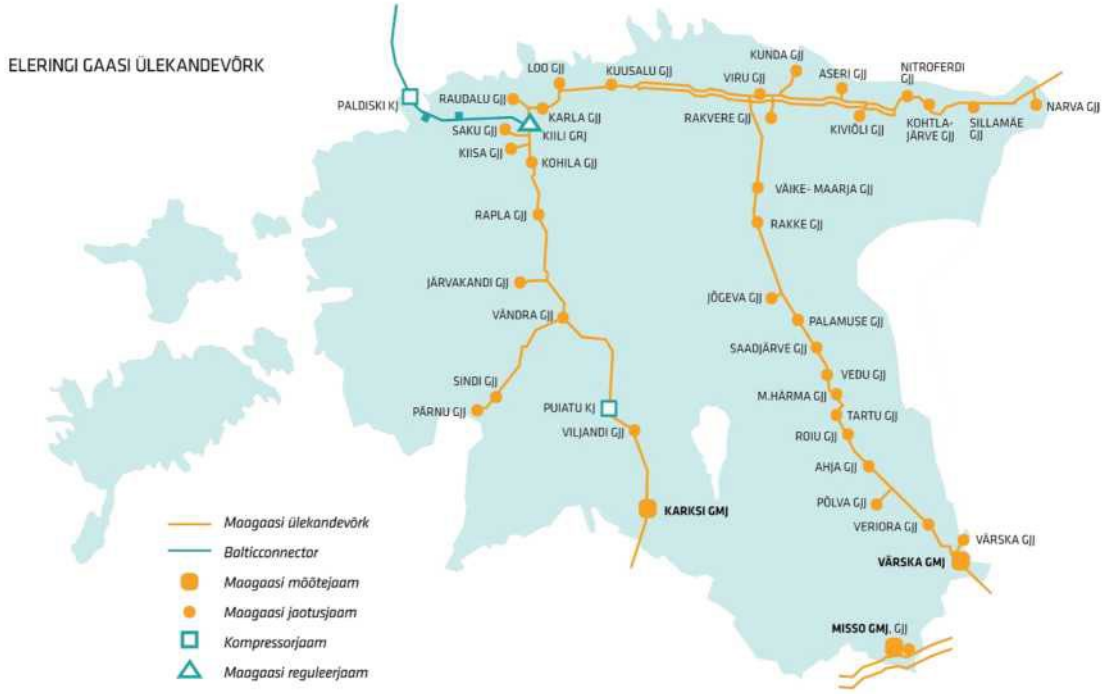


Figure 2.12 Gas transmission network (Elering)

At the end of 2022, the grid connection was completed to connect a potential liquefied natural gas (LNG) floating terminal to the transmission network. On 10 March 2023, the State acquired the LNG berth in Paldiski. The set-up transmission network and hauling quay will increase the security of the area and allow for the reception of a floating LNG terminal where necessary.115

Development of the114 Estonian gas transmission network 2023- 2032 https://elering.ee/sites/default/files/2023-03/Estonia20 %Gas transmission network%Development Plan202023-2032.pdf

115 The State acquired the Paldiski LNG quay from private operators together withthe port facility https://www.espa.ee/et/riik-omandas- from private presidencies-Paldiski-LNG bei-co-assemblage

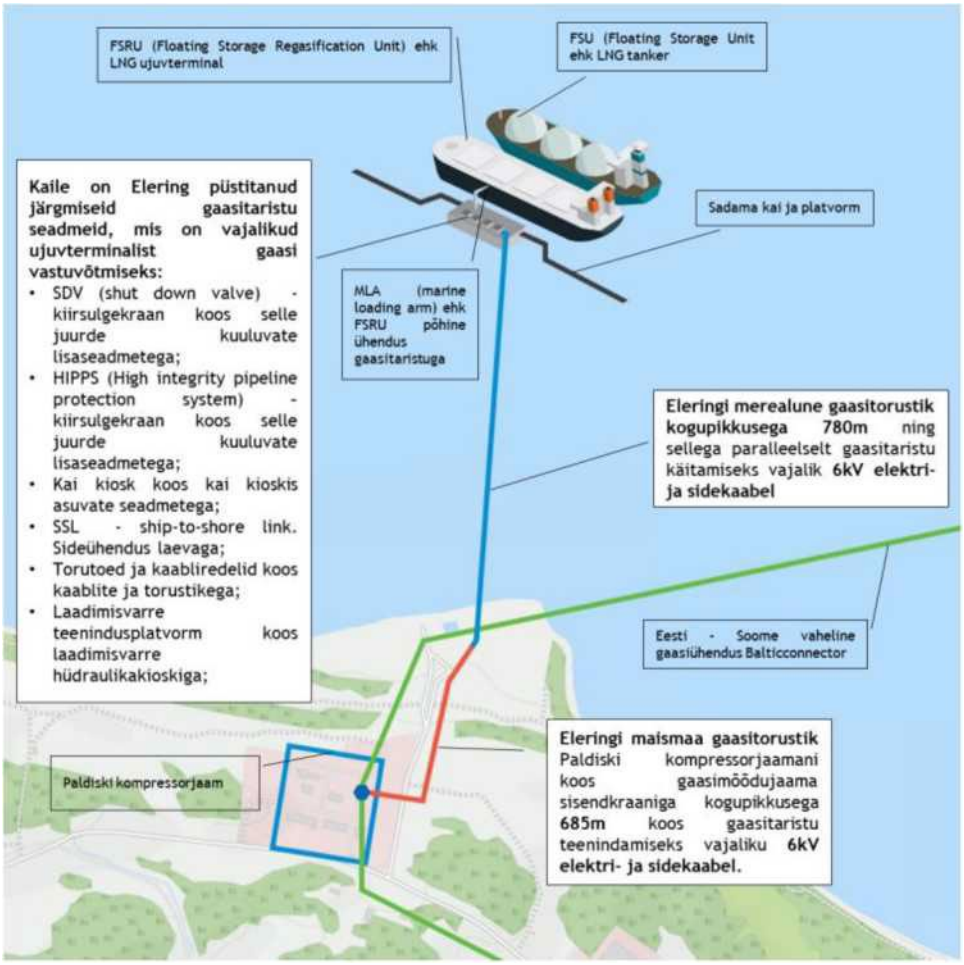


Figure 2.13 Paldiski FSRU connectorm 116

The security of supply in Finland and the Baltic gas markets is increased by the Inkoo LNG terminal that started operations in Finland in 2023. In Estonia, a port with FSRU reception capacity was completed in Paldiski, which also increases the security of supply in the region.

ii. Where applicable, the main infrastructure projects planned other than the project of commoninterest117.

Integration and synchronisation of the Baltic States' electricity grids with European networks, including the following projects of common interest:

4.8.1 Interconnection between Tartu (EE) and Valmiera (LV) – in construction (end 2023)

4.8.2 Internal line between Balti SEJ and Tartu (EE) – in construction (end 2024)

4.8.3 Interconnection between Tsirgulina (EE) and Valmiera (LV) in the permit-granting process (end 2025)

4.8.4 Internal line between Viru and Tsirgulinea (EE) – in the permit-granting procedure (end 2025)

4.8.23 Synchronous capacitors providing inertia, voltage stability, frequency stability and short-

116 Estonian Gas Network Development Plan 2023-2032https://elering.ee/sites/default/files/2023-03/Estonia%20Gas%C3 %BCloading%C3 %B5rgu%20Development plan202023-2032_0.pdf

117 In accordance with Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009 (OJ L 115, 25.4.2013, p. 39)

circuit power in the energy systems of Lithuania, Latvia and Estonia (end 2025)

4.8.9 Further infrastructure aspects of the synchronisation of the Baltic States' electricity system with the European networks

Estonia has supported the deployment of biomethane and the establishment of refuelling points aimed at increasing the use of renewable gases in the transportsector118.

With the support of the European Technical Support Instruction (TSI) and led by Estonia, a regional gas network decarbonisation study has been prepared with the help of the three Baltic States and theSoom119. The main solution for decarbonisation is to maximise the use of the biomethane resource. Estonia values biomethane in achieving the TE target in the transport sector for the period 2023-2035. A continuation of an earlier support measure is underway to encourage the transition of public services, waste transport and civil protection services to biomethane and to support the establishment of refuelling stations.

European gas system operators have come up with *the initiative of European Hydrogen Backbone* (EHB), to which Elering has joined by Estonia. The aim of the initiative is to analyse the need for and potential of a pan-European hydrogen infrastructure. Based on analyses carried out in 2021, five logical hydrogen supply corridors emerged in 2022 that could transport energy from Europe's external countries to a centre of high energy demand. Hydrogen supply corridor in line with the EHB vision:

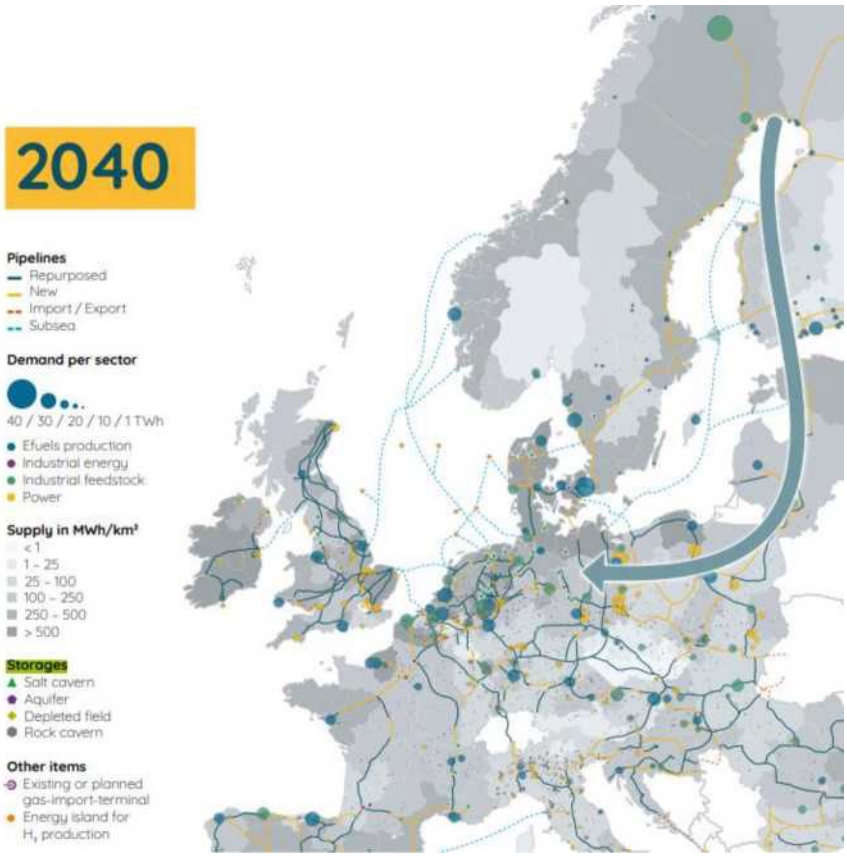


Figure 2.14 EHB visionated hydrogen supply coupidor 120

2.4.3. Market integration

i. National objectives related to other aspects of the internal energy market, including a timetable for

118 Biomethane production and consumptionhttps://www.kik.ee/et/toetavad-tegevused/biometaani-tootmine-ja-tarbimine

119 Gas Network Decarbonisation Study 2022 | Energy Actions

120 Five hydrogen supply corridors for Europe in 2030https://ehb.eu/files/downloads/EHB-Supply-corridor-presentation-Full-version.pdf

their achievement.

Electricity system

The objectives and metrics for market integration and aggregation are defined in the Estonian Energy Development Plan 2030 (ENMAK 2030)121. The development plan sets an indicative target of 96 % for the readiness of external connections in 2030. Estlink 2 has been outward on several occasions in recent years. On 26 January 2024, the Estlink 2 submarine cable was broken and the cable was brought back into operation on 4 September 2024. On 25 December 2024, the Estlink 2 submarine cable broke out as a result of external force (due to the anchor of the ship), which is expected to be operational again in June 2025. The following projects have been launched to protect submarine cables: Seahunt and Merikarhu. The navy is a pilot project for the development of critical energy infrastructure monitoring infrastructure. Merikarhu is a planned project with Finland and Sweden to increase the repair capacity of the undersea infrastructure through the creation of multifunctional vessels (addition of additional repair equipment to an existing ship).

Table 2.16 Targets and metric for market integration and aggregationd126

ENMAK 2030 target: 1. Security of supply: Continuous energy supply is ensured in Estonia		
ENMAK 2030 action	**Barometer**	**Indicative target**
1.2	3. Availability of the country's external connections, %	96 % (2030)
1.2	6. Estonia is connected to a synchronous area managed in the European Union	Connected (2030)

In addition to the development of electricity infrastructure, both the transmission system operator (Elering AS) and the largest distribution system operator (Elektrilevi OÜ) are engaged in development projects to encourage the uptake of flexibility services in the Estonian electricity system (e.g. H2020 project EU-SysFlex; Launch of the Baltic single market for balancing services as of 1 January 2018). These activities are facilitated by the fact that **since 1 January 2017 all Estonian electricityless bijads have been equipped with remotely readable meters in accordance with the Regulation of the Government of the Republic "Netherlands Rule" established on thebasis of the Electricity Market Act.** The integration of gas markets is reflected in ENMAK 2030 security of supply sub-target 1.3 (Securing gas supply)

Table 2.17 Targets for gas system and market development and diversification of gas supply

2030 target: 1. Security of supply: Continuous energy supply is ensured in Estonia		
ENMAK 2030 action	**Barometer**	**Indicative target**
1.3.	1. Compliance with the infrastructure standard (N-1)	Fulfilled
1.3.	2. Share of the largest source of supply in gas supply	70 % (2030)
1.3.	3. Market share of the largest gas seller	32 % (2030)
1.3.	4. Meeting the standard for security of supply	Fulfilled (2030)
1.3.	5. Gas market concentration (HHI122)	&2000 (2030)

The integration of the Estonian gas market with the other Baltic and Finnish gas markets is in process since 2016, when the relevant ministries, system operators and regulators of the Baltic States and Finland are working towards the creation of a single gas market. The parties are grouped together in a cooperation group aimed at achieving harmonised market rules and a common price for gas injection into the gas system

Government 121 of the Republic. Estonia's Energy Development Plan until 2030. https://www.mkm.ee/sites/default/files/enmak_2030.pdf

122 HHI – Herfindahl-Hirschman Index, which varies between 0..10000 and is obtained by adding the squares of the market share ofeachindividualgasdistributor. The higher value characterises the increased dependence of the gas market on a single gas vendor. In the case of HHIlt;2000, there are 7 gas sellers in Estonia, the largest of which has a market share below 32 %.

(Estonia, Latvia, Lithuania + Finland). One of the most important tasks in the regional gas market is the abolition of gas transmission charges at national borders. The aim is to ensure that there is no gas transmission charge between Lithuania, Latvia, Estonia and Finland. Only the price of gas in the region (one-size-fits-all) and the gas flow output price (at the discretion of each country) remain. In 2020, the common Estonian-Latvia balance sheet zone was launched, with a single set of rules and common standard terms of the balance sheet agreement. The aim is also to integrate Finland and Lithuania into the common zone. A joint Estonian-Latvia Finnish tariff area has also been established. Balticum, together with Finland, has committed to expanding the FINESTLAT market area to include Lithuania's common tariff zone, but negotiations on common tariff zone rules and cost-sharing principles are still ongoing and it is not yet clear when the joint Baltic-Finland tariff area could work.

ii. Where applicable, national targets for electricity system adequacy and flexibility of the energy system for renewable energy generation, including a timeframe for the achievement of those targets.

The adequacy and flexibility of the electricity system for the production of renewable energy are ensured in conjunction with the Electricity Market Act and the legislation enacted on the basis thereof. In accordance with the Electricity Market Act in force in Estonia, the network operator (including the transmission system operator) develops the network in its catchment area in such a way that it is possible to consistently provide network services in accordance with the legislation and the terms of the licence to customers, generators, line holders and other system operators connected to the network, taking into account their justified needs, and to connect to the network the proper electricity installation of a market participant located in its catchment area. Under the **Electricity Market Act, household customers can also start producing electricity for self-consumption and selling surpluses to the grid from 2007.** In order to connect a generating installation with a net capacity of more than 15 kW to the network, the market participant shall be obliged to pay a deposit to the system operator or to provide a guarantee from a financial institution. The guarantee shall be returned to the market participant or shall be counted towards its subscription fee only if the market participant has started generating electricity to the generation facility covered by the connection application within the prescribed period or if the request for subscription was not processed. Otherwise, the security shall not be returned. The prescribed period is one year for the installation of solar panels, three years for the installation of offshore wind farms and two years for other technologies. The electricity generation technology included in the request for connection shall not be modified. Producers that have not started production under a connection agreement or are no longer producing in accordance with the network contract shall pay a fee to the system operator in respect of the capacity of the non-available generation connection. The funds paid shall be used by the network operator to cover the investment costs of increasing the capacity of its network. It is also possible to receive support for electricity produced from renewable energy sources. The target is to reach a 100 % share of renewable electricity by 2030. When developing the network, the system operator shall take into account the need to ensure security of supply, efficiency and market integration, taking into account the outcome of the studies carried out in these areas123. Under the **Electricity Market Act, the network operator must submit its network development plan for the next 10 years to the Competition Authority at least every two years**. In the development plan, the network operator must, inter alia, set out the planned investments for the next five to ten years and an action plan to find solutions in the areas of concern. The Competition Authority may request amendments to the network development plan. The Competition Authority has paid particular attention to improving the quality of the network service in areas where this has so far been the greatest concern. Electricity distribution invested EUR 115.8 million in reliability in 2023, with the current network charge securing EUR 34 million for investments. For the period 2022-2026, the State plans to assist the grid company in carrying out grid improvements to accelerate the development of new renewable

123 The Riigikogu. Electricity Market Act. https://www.riigiteataja.ee/akt/125012017002?leiaKehtiv

interconnection capacities and to improve the climate-proofing of the grid by EUR 38 million. In the case of connection to the grid or changes to the conditions of consumption or generation, the electricity producer has so far had to pay all the costs necessary to connect generation capacity or modify existing generation conditions, including the construction of new electrical installations and the conversion of existing electrical installations.124 A legislative amendment was launched in summer 2023 to introduce a concept for the ex-ante grid development that would allow network operators to develop the grid forward-looking, thus accelerating the integration of renewable energy into the grid and thereby meeting Estonia's climate targets. **Major DSOs such as Electricity125 and Elering 126 shall prepare a Ten-Year Network Development Plan(TYNDP) every two years. In addition, the transmission system operator Elering AS shall report on an annual basis on security of supply.127**

Table 2.18 Ensuring electricity system adequacy and flexibility of the energy systems126

ENMAK 2030 target: 1. Security of supply: Continuous energy supply is ensured in Estonia		
ENMAK 2030 action	**Barometer**	**Indicative target**
1.1.	2. Share of fuel-free energy sources (solar, wind, hydro) in final electricity consumption, %	> 25 % (2030)*
1.1.	4. Electrical capacity of cogeneration plants producing a district heating network, MW_{el}	> 600 (2030)
1.2	1. Average total duration of unscheduled or faulty interruptions in the distribution network in minutes per consumption site per year, minutes	&90 (2030)
1.2	2. Amount of energy not delivered in the transmission	&150 (2030)

*Renewed renewable energy trajectories will have a fuel-free share of > 70 % in 2030.

The target compliance metrics guide grid operators to make the necessary investments and develop solutions to integrate renewable energy more effectively into the Estonian electricity system. A good example of such innovation is the e-Gridmap map application developed by the Estonian Transmission System Operator (Elering AS), which shows the available capacity on an annual basis in the electricity grid owned by the company, thereby enabling renewable energy producers to plan their projects more efficiently.

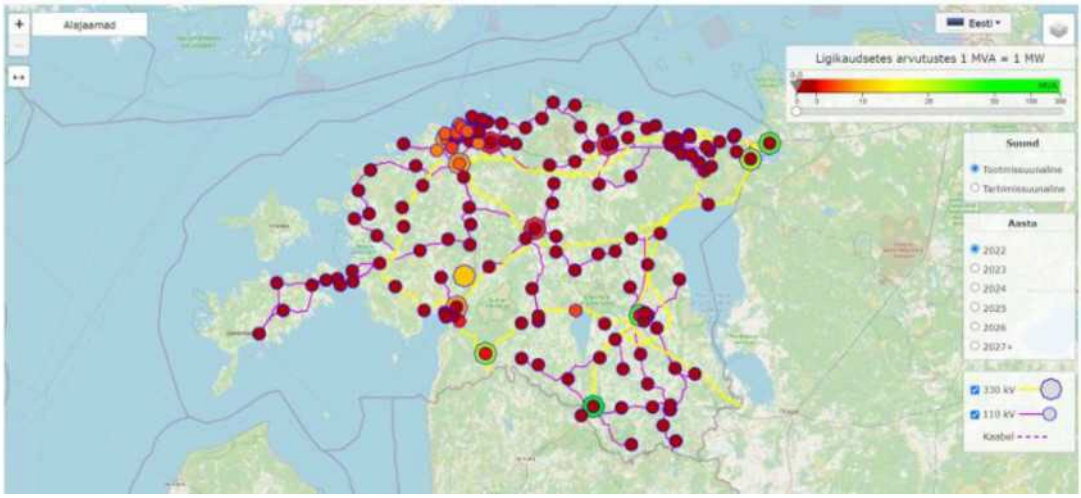


Figure 2.15 Appliance of Elering AS free connection capacity maps 128

Government 124 of the Republic. Network Code. https://www.riigiteataja.ee/akt/116022016014?leiaKehtiv
125 Network Development Plan for Electricity until 2035: https://elektrilevi.ee/et/ettevottest/tutvustus/arengukava
126 Life Network Development Plan until 2033: https://elering.ee/node/2069
127 Security of supply reportsand | Elering conferences
128 Elering AS. A free connection map application. Connection capacity application e-Gridmap | Elering

The synchronisation project (see chapter 2.4.2) will also contribute to increasing the capacity to integrate renewable energy by removing bottlenecks in the electricity system throughout the Baltic.

iii. Where applicable, national objectives to ensure that consumers participate in the energy system and benefit from self-generation and new technologies, including smart meters.

As of 1 January 2017, all electricity consumers in Estonia had smart meters which store and transmit to the central database (data warehouse – e.elering.ee) at least hourly data. Consumers have free access to their data. Consumers will also be able to give access to data to a service provider of their choice. From the beginning of 2025, the system operator shall ensure that at least the metering point of the transmission network, the border measurement point, the power generating equipment with a net power greater than 15 kW and the consumers with a master fuse greater than 200 A are equipped with a measuring device that measures the amount of electricity taken from the grid and injected into the grid at 15-minute intervals. Since 2031, all meters have been moved to the 15-minutemeasurement129.

iv. National objectives with regard to ensuring electricity system adequacy, where applicable, as well as for the flexibility of the energy system with regard to renewable energy production, including a timeframe for when the objectives are to be met

As described in point 2.4.3 (ii).

v. V. Where applicable, national objectives to protect energy consumers and improve the competitiveness of the retail energy sector

Not applicable. Crisis measures described in section 2.3.

2.4.4. Energypoverty 130

1. Where applicable, national objectives with regard to energy poverty, including a timeframe for when the objectives are to be met

Estonia's current national development documents do not consider energy poverty as an independent issue. Households' livelihoods are considered holistically at both national and local government level. The Wellbeing Development Plan 2023-2030 aimsto 131 reduce poverty and aims to reduce the absolute poverty rate to ≤ 2.2 % and to reduce the at-risk-of-poverty and social exclusion rate to 21 % by 2030.

In order to transpose the requirements of the **Energy Efficiency Directive (EU 2018/2002), Article 7 of the Energy Efficiency Organisation Act was supplemented in 2019 by further specifying the arrangements for tackling energy poverty.** In order to achieve the energy efficiency targets through different measures, the preparation of renovations or similar measures should take into account whether and how the energy purchase risk group and those affected by energy poverty can be involved in energy efficiency measures so that they can also benefit from measures to improve the energy efficiency of housing.

When transposing the Directive, energy poverty linked a person affected by energy poverty to subsistence support, which means that the number of recipients of subsistence support is equal

Network Code on the Operation of the129 Electricity Systemhttps://www.riigiteataja.ee/akt/112052021004
130 *Energy poverty*
131 Welfare Development Plan 2023 -2030https://www.sm.ee/heaolu-arengukava-2023-2030

to the number of people affected by energy poverty. For the purposes of the Social Welfare Act, a person affected by energy poverty is a person living alone or a family who has received at least one subsistence allowance in the last six months and whose income per family member for the preceding month does not exceed the minimum wage.

The share of Estonians132living below the absolute poverty threshold (or an estimated minimum subsistence figure i) fell to 2.7 in 2023 (3.5 % in 2022), but is still higher than three and four years ago. The absolute poverty threshold increased from 303,38 to EUR 338,23 per month for a single-person household. The increase was driven by the increase in consumer prices, and in particular by the cost of a minimum food basket (EUR 127,99 in 2022, EUR 148,21 in 2023) and an increase in housing costs (EUR 134,73 in 2022, EUR 146,18 in 2023).

The number of different households receiving subsistence support increased slightly between 2022 and 2023 (3.3 %, 106677 in 2022, 110233 in 2023 (including repeat applicants)), but the number of unique household members decreased from 47831 in 2022 (3.7 % of the population) and 37031 in 2023 (2.7 % of the population), meaning that households in need have become smaller in terms of their number of members. It is important to note that the subsistence ceiling increased in July 2022, allowing more people to benefit from the benefit, and beneficiaries of temporary protection also affected the number of beneficiaries of subsistence support.

Between 2023 and 2024, there has been a decrease in both the number of households supported and the number of household members, with 15562 households receiving support in 2024, with a total of 27844 household members. 34 % of households were beneficiaries of temporary protection. A total of 2 % of the population received support.

The current Energy Efficiency Directive aims to improve the situation of natural persons and households in economically precarious situations who are unable to participate in energy saving measures without additional support. To achieve this, among the measures necessary to comply with the general energy saving obligation, the list of which is approved by the Government of the Republic, policy measures must be assigned to natural persons, households or providers of services aimed at them who are in a situation of economic uncertainty in order to alleviate energy poverty.

Energy saving measures with priority for lower incomes:

- **Home support for families rich** in children improves the living condition of low-income householdswith children133.
- **Support for the renovation of small and multi-dwelling buildings** improves the energy efficiency of residential buildings and, in the case of multi-dwelling buildings, supports all members of an association of apartments in carrying out energy-saving works. The higher rate of support is in those regions where the value of the property is lower. As real estate value and residents' incomes in a given area are quite well correlated, support measures through the principle of regionality will also reduce the energy poverty of residents who are beneficiaries of the support.
- Case **-by-case investment support for the development of a local authority housing** fund. The support will improve the availability of rental housing for households who are unable to acquire a dwelling or rent it on the rental market, including the socio-economically less insuredperson134.

132 https://www.stat.ee/et/avasta-statistikat/valdkonnad/heaolu/sotsiaalne-torjutus-ja-vaesus/arvestuslik- Minimum subsistence

133 Home allowance https://kredex.ee/et/kodutoetus

Conditions for granting case-by-case investment support for the development of a 134 local authority housing fund and the procedurehttps://www.riigiteataja.ee/akt/124012023007?leiaKehtiv

Data from the Energy Poverty Advisory Hub do135 not seem very problematic for Estonia. For example, in 2 021.2 % of households faced a challenge in securing heating, compared to an EU average of 6.9 %. Energy bill arrears account for 4.1 % of households, compared to 6.4 % on average in the EU. Following European Energy Poverty Observatory statistics, the share of energy payments by136 Estonian families in terms of income is very close to the EU average (16.3 %), i.e. 16.2 %. The only issue is cooling, where keeping the dwelling cooler is more problematic than in many other countries (Estonia 23.3 % compared to the EU average 19.2 %). Overall, Estonia is slightly better than the EU average in terms of energy poverty.

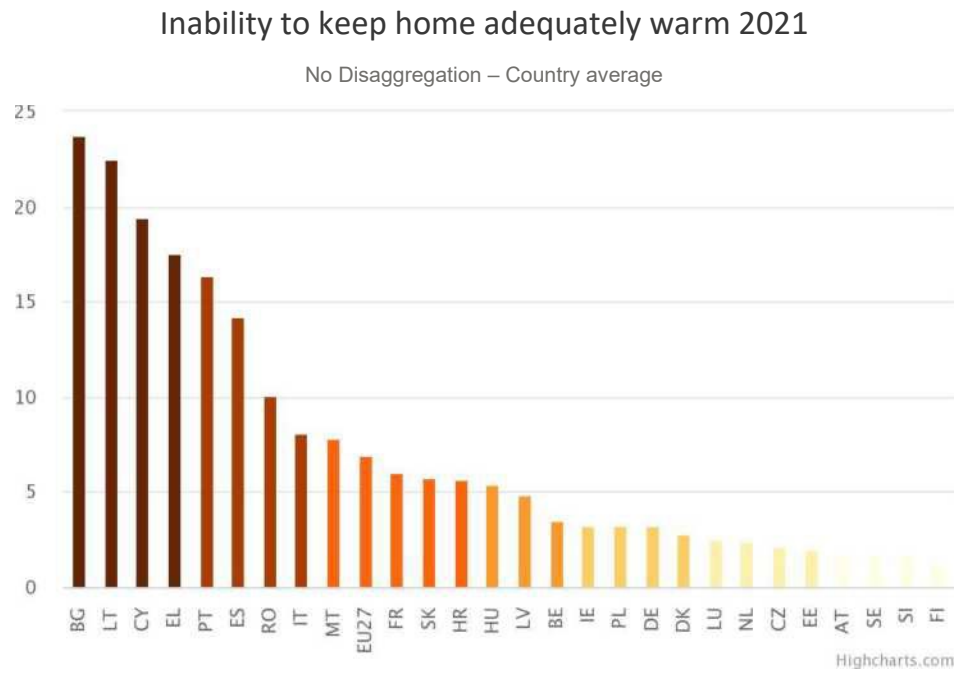


Figure 2.16 Capability to keep home adequately warm – situation in the EU by household in2021 137

2.5.Research, innovation and competitiveness dimension

I. national funding and other targets for public and, where available, private research and innovation related to the Energy Union and, where appropriate, a timeframe for their achievement.

According to the **Estonia 2035 Action Plan**, Estonia must contribute to increasing productivity and international competitiveness by developing entrepreneurship innovation and R & D capabilities. **New innovation services and support for all stages of development of enterprises and technologies** will contribute to this, such as market monitoring of new technologies and advice on intellectual ownership, new business models and creativity skills, reorganisation of applied research support, R & D investments by state-owned companies.

The R & D & I and Entrepreneurship Development Plan 2021-2035 (TAIE Development Plan) was approved by the Governmentof the138 Republic on 15 July 2021. The TAIE Development Plan brings together in a single document the targets and orientations for R & D, innovation and business development for the next

135 National indicators https://energy-poverty.ec.europa.eu/observing-energy-poverty/national-indicators_en

136 European Energy Poverty Observatory. Member State Reports on Energy Poverty 2019, https://energy-poverty.ec.europa.eu/system/files/2021-09/EPOV%20member%States%20report%20on%20energey%20poverty%202019.pdf

137 National indicators https://energy-poverty.ec.europa.eu/observing-energy-poverty/national-indicators_en

138Presentation of the TAIE Development Plan | TAIE

15 years. The **TAIE Development Plan aims to increase the well-being of Estonian society and the productivity of its economy, in synergy with Estonian research, development, innovation and entrepreneurship, providing competitive and sustainable solutions to the development needs of Estonia and the world.** The development plan sets the following specific objectives:

1. Estonia's development relies on knowledge-based and innovative solutions.
2. Estonian science is of high quality, effective and diverse.
3. Estonia's business environment fosters entrepreneurship and the emergence and growth of knowledge-intensive entrepreneurship, the creation and export of higher value-added products and services, and investment in all Estonian regions.

The targets for the metrics of the TAIE Development Plan are, inter alia:

- The planned financing of TA in the national budget as a share of GDP is ≥ 1 % by 2035 (2019=0.75 %)
- Private TA spending level of 2 % of GDP by 2035 (2019=0.86 %)
- Position in the European Innovation Scoreboard is an innovation leader by 2035 (2019-2022 Estonia was moderately innovaator139)

The focus areas of TAIE, i.e. areas of R & D & I and entrepreneurship that meet Estonia's development needs and opportunities, are key to achieving the objectives of the Development Plan. **Priority development means that the focus areas of the Estonian economy will be increased**, including in terms of exports and development needs, and that the R & D needed to do so will be further supported by the State.

TAIE's focus areas are covered by corresponding roadmaps:

- digital solutions in every area of life,
- health technologies and services,
- valorisation of local resources;
- smart and sustainable energy solutions,
- a vibrant Estonian society, language and cultural space.

The overall focus area of smart and sustainable energy solutions is to: with the support of R & D, innovation and entrepreneurship, Estonia produces energy in a climate-neutral manner, makes Estonia's energy use more efficient and resource-efficient and contributes to the security of energy supply.

The roadmap for the focus of smart and sustainable energy solutions140 agreed that science-based forms of energy production that do not harm our environment would need to be developed most. Wind energy solutions, biofuels, etc. For example, energy storage and load management solutions need to be developed, as well as transmission networks that help easily store and use energy, for example when energy prices are very high or when energy shortages occur. This concerns e.g. the development of smart energy grids, batteries, etc. Equally important are energy consumption solutions that help make energy use more efficient and sustainable, e.g. in transport and construction. In order to find science-based solutions that are relevant to the needs addressed, the Roadmap agreed that there was a strong need to support the uptake of research results in the field of energy, e.g. through knowledge and technology transfer, basic and applied research, the development of research orientations, joint activities between businesses and researchers, the sharing of knowledge and experience between researchers and entrepreneurs, the provision of research and development services, international cooperation, etc. There is also a need to develop assessment and testing possibilities and environments for emerging solutions to be tested outside laboratory conditions on a larger (industrial) scale and in a real-life environment. It is crucial to ensure the follow-up and recruitment of scientists and engineers involved in the field. In addition, there is a need to encourage wider cooperation

139 EIS 2022 – RIS 2021 | Research and Innovation (europa.eu)
140 Smart and sustainable energy solutions | TAIE

between research institutions, businesses and the public sector, to boost start-up and growth, investment and exports.

The roadmap was approved for aperiodof 3-4 years, after which it will be renewed to take account of developments in the sector. Developments in this area will be monitored and evaluated regularly and will allow for changes to be made to the roadmap as well as to the sector's activities and funding. On the basis of the roadmap, the HTM and MKM design support measures for the development of energy solutions, complemented by general research and business finance measures such as research grants, research infrastructure grants, business grants, etc., for which there are no priority areas. The renewal of the roadmaps using the entrepreneurial discovery process and the mid-term evaluation of the TAIE Development Plan are underway, with a forecast validation of the updated roadmaps in Q1 2026. The progress of the focus areas is monitored every year under the leadership of the HTM and MKM, and monitoring reports can be found: https://taie.ee/taie-fookusvaldkondade-seire

Estonia is one of the countries with the lowest resource productivity in theEuropean Union141 andis therefore contributing to reducing the resource and energy intensity of the economy, including on the basis of the Roadmap.

Current sectoral development plans to improve competitiveness through R & D & I:

- **142 According to the 2023-2027 Common Agricultural Policy Strategic Plan of the European Union, a number of R & D institutions are active** in the field of agriculture and food, with a high level of vocational and higher education, providing the ground for the emergence of new research solutions and innovation cooperation. R & D, knowledge transfer (including advice) and innovation contributing to the competitiveness of the sector; the State provides grants for this, but the budget does not cover all needs and the conditions for support measures have often been rigid. R & D and education are good in agriculture, but the level **of R & D in relation to climate and agriculture is uneven and there are few pilot projects**. The soil map is unupgraded, databases on different soil data are not integrated into a comprehensive system, and research and education in the field of soil are insufficient. Financial capacity to invest in R & D & I is low for companies. **The specific objective is to increase the competitiveness and market orientation of farms, with a particular focus on research, technology and digitalisation**. Participation in the EIP will contribute to strengthening research and knowledge transfer cooperation and learning from other countries' experiences. Public support for innovation needs to be flexible, simple and efficient. A comprehensive and flexible knowledge transfer and advisory system must be developed, ensuring that the latest independent scientific and technological information is delivered to the manufacturer and processor. Cooperation shall aim to facilitate the implementation of European Innovation Partnership (EIP) projects and innovation cooperation between applicants and R & D and R & D institutions, thereby improving the position of rural enterprises in the value chain, increasing climate and resource efficiency and mitigating resilience to market and production risks, while preserving biodiversity and the specificities of natural and climatic conditions. In order to develop and implement the best environmentally friendly production and processing practices, there will be cooperation with both Estonian and foreign R & D institutions and experts, EIB projects will be supported both in Estonia and in external cooperation. To support innovation cooperation, the development vouchers can be used to co-operate with the R & D institution (possibility to use it to pre-test the idea of a larger innovation collaborative project, create some smaller-scale innovative solutions, etc.). It is also planned to make use of the so-called AKIS (AKIS=Agricultural Knowledge and Innovation System) which is free to choose whether it will be used for advisory services, training, use of a scientific expert or a combination of these options.
- **The Farm Carbon Footprint Tool was finalised at the end of 2023**.

141 Eurostat Resource productivity [CEI_PC030]
142 European Union Common Agricultural Policy Strategic Plan 2023-2027 | Ministry of Rural Affairs (agri.ee)

- **Axis 7 of the Agriculture and Fisheries Development Plan until 2030 includes research and innovation and knowledge transfer activities supporting the achievement of objectives in the fields of agriculture and fisheries**. A well-functioning system of research and innovation and knowledge transfer, as well as the promotion and application of new technologies, including digital technologies, will be central to improving the competitiveness and attractiveness of the rural economy, creating a positive image and improving society's understanding of the nature of modern production. The benchmark is that the amount of R & D funding in the field should be EUR 25 million in 2030 (2018=EUR 5 million). The aim is to develop an innovation support system that includes product development and innovation in the wider private and public sectors. The ecosystem-based approach to fisheries management focuses more on R & D and innovative solutions to catch, grow and valorise biological resources, which in turn provides an opportunity to export higher value-added products. The share of healthy stocks is 65 % in 2030 (2019=45 %).

- According to the **National Waste Management Plan 2023-2028**, Estonia has a high potential for innovative recycling solutions in the form of R & D institutions. Innovation, research and development will be used to prevent food waste. In accordance with the hierarchy of waste management, waste generation must be avoided as a matter of priority. Waste prevention contributes to a more efficient use of resources in the economy and reduces negative impacts on the environment and human health resulting from the use of natural resources and waste management. Waste prevention also helps to reduce economic costs (e.g. by reducing waste of food and other essential resources and materials). Increasing resource efficiency and thereby reducing waste generation will help companies create new economic opportunities, improve productivity, reduce costs and increase competitiveness.

- The overall objective of the updated version of the **Estonian Forest Development**Plan 2025-2035 is that Estonian forestry is sustainable – activities to achieve this have been planned and described through three sub-objectives:
  1. Forestry contributes to the survival of forest ecosystems and their biodiversity, mitigates climate change and adapts to the impacts of climate change.
  2. . The forest sector is economically competitive.
  3. . Forestry is inclusive and respects social and cultural values.

The development plan will support the development of a strong, innovative and responsible economy by developing and enhancing the capacity to better valorise the benefits of the forest ecosystem, including wood. To this end, favourable conditions will be created for business R & D, deployment of new technologies and innovation. New business models and operational mechanisms will develop a support system for private forest owners and develop the effective use of other (non-wood) forest ecosystem benefits. This will ensure that forests are better healthy, productive and resilient to climate change. It also aims to improve the condition of forest habitats. As forests are part of our environment, the development plan focuses on promoting inclusion and empowering actors. Between 2011 and 2020, an average of EUR 477000 per year was spent on R & D in the wood sector in Estonia. Over the same period, the number of R & D employees in the sector has increased from 21 full-time employees in 2011 to 28 in 2020. In 2023, 26 full-time researchers and engineers were employed in the wood and furniture industry. However, it has been easier for companies to commission the necessary research from foreign research companies with laboratories and a corresponding scientist. It may take longer to obtain a solution from Estonian universities, as it is only necessary to obtain equipment to solve a specific problem, to equip the laboratory and sometimes to prepare specialists. However, Estonian small firms often have no financial means to commission research and development work. There has been a knowledge gap over time in the area of high-tech processing of wood as a resource, with few companies active in this area and relying mainly on foreign knowledge. However, progress has been made in this direction in recent years. For example, the University of Tartu has taken a number of steps to establish core competences for biotechnological and chemical processing of wood in cooperation with large multinational companies (e.g. Novo Nordisk, Graanul Invest). In addition, Estonian companies and research institutions have actively participated in European R & D projects, focusing on new

technologies and the valorisation of wood components. A rather exceptional and positive example is the EUR 5.9 million VEHICLE project launched under the EU's Horizon 2020 research and innovation programme, which also involves Fibenol from Estonia among eight European companies. As part of this project, a testing plant for the production of Imaverre lignin and wood sugars was set up, which reached production in the second quarter of 2023. Fibenol is also involved in a number of international R & D projects, such as WOODCELL (Circular Bio-based Europe Joint Undertaking, just under EUR 17 million) and COUNTLESS (EUR 7 million) focusing on the valorisation of lignin and wood sugars. It is also possible to support the development of this type of cooperation with other wood-sector companies in different networks from the European Union through the development activities carried out by the Estonian Research Agency and the EIS. Projects in the field of the forest and timber industry have also been launched through EU structural support programmes for the 2014-2020 EU budget period for research, development and scientific promotion. For example, the Restore Programme has been launched to support business-driven R & D in the valorisation of timber, food and subsurface resources to foster the development of research groups in these fields, the growth of sectoral specialists and development cooperation between businesses and research institutions. As it is very important to find and develop new technologies to improve the valorisation of wood, one of the focus of the programme will be research on decoupling and chemical valorisation. The subsequent TemTA (thematic R & D programmes) and the Mobilita 3.0 programme (supporting T & A internationalisation: interconnection with the international knowledge market) research projects for wood valorisation were funded by public funding amounting to EUR 8.04 million in 2024. Most of them concerned specifically the chemical valorisation of wood.

- According to the **Transport and Mobility Development Plan 2021-2035**, in order to keep up with technological developments and manage change successfully, **a transport technology roadmap for R & D, its financing and the principles of procurement and regulation of transport services must be drawn up**. We will introduce self-driving public transport if it is more cost-effective than traditional public transport, and if continuity and competitiveness of the service are ensured to serve, inter alia, suburbs. We will support R & D in this regard. We will develop a solution to make more effective use of public transport by using shared last mile transport to serve basic public transport routes. Through R & D, we will support research and technology testing and, where possible, applications for completely new types of transport solutions (e.g. Hyperloop, unmanned air traffic). Innovation and added value generated by companies linked to the rail sector must also be encouraged by implementing new business lines and technologies. Railway companies have great potential for the uptake of different digital developments and processes. In order to be able to make the knowledge-based decisions needed to meet the objectives, public actors involved in the design of the transport system must have the capacity to interpret, adapt and implement world best practice for Estonia, involving, where appropriate, research organisations. In order to enable the development of science-based solutions, an optimal amount of raw data of sufficient quality must be used. Also show the budget for R & D.

- The overall objective of the **2030 Energy Development Plan (ENMAK 2030)** is to ensure, inter alia, that the competitiveness of the economy grows: provide consumers with a market-based price and access to energy supply that is in line with the European Union's long-term energy and climate policy objectives, while contributing to the improvement of Estonia's economic climate and environmental situation and to increasing its long-term competitiveness. In order to contribute to the implementation of ENMAK 2030, energy research and development (R & D) funded every four consecutive years, as decided in the context of the 'State Budget Strategy 2019-2022' approved in spring 2018, amounted to EUR 1.6 million, i.e. EUR 400000 per year. The **2019-2022 ENMAK TA programme carried out 25 studies and analyses, supported the Baltic-North Energy Research Programme, carried out activities related to local authorities** (analysis of options for energy savings and renewable energy sources, Workshops Programme "Climate Change and Energy Management in Local Government", Local Authorities Wind and Solar Handbook),**upgraded the portal's energy starts.eee, modelling energy management scenarios, drawing up a "long-term strategy for building renovation".**

- **The long-term strategy** for the renovation of buildings requires the development of technological solutions to increase the volume of renovation. Assuming that the capacity of new buildings remains

at the same level, it is very difficult to increase the volume of renovations in the order of 5 times with the technologies currently in use. There is not enough labour to cover a rapid increase in volumes. In addition to labour challenges, new technological solutions also allow processes to be accelerated and the increase in construction costs due to increased demand to be reduced. Prefabrication could first be used for renovating standard buildings (e.g. apartment buildings). In larger cities, such as Tallinn and Tartu, there are many apartment buildings that were constructed in the Soviet era by residential construction combines on the basis of standard designs. Use of prefabrication would allow the renovation process to be automated and accelerated and ensure better quality. Use of **virtual tools would help to reduce the time spent on preparing energy labels and energy audits and therefore also the costs.** Current energy labels and energy audits are generally presented as documents in PDF format, which are not machine-readable and cannot therefore be easily used for analysis. In the environment, which is part of the Building Registry, audits could be linked to the data of the Building Registry and the energy use data entered in the audit would be automatically usable by the system for analysing the bigger picture of the energy use of buildings. **Simplified digital tools for building owners** would allow building owners to think of the primary options themselves without incurring any costs. Research and Development allows the quality to be improved and the processing of data collected about buildings to be automated, the problem of labour shortages to be alleviated, productivity to be increased and the total cost of renovation to be reduced. **Development of state registries** improves the monitoring of renovation activities. The main bottleneck of preparing the renovation strategy was the lack of data. **Mapping** of decision-making processes provides the opportunity to understand why and when property owners decide to start renovation work. The **development of strategic spatial planning** makes it possible to achieve the application of good public space principles to building renovations. **Analysis of the wider impacts of renovation** of buildings. A more detailed analysis should be carried out of the economic impacts of building renovation measures, the impact of climate warming on the potential energy savings of buildings, the impact of building renovation measures on achieving climate neutrality, broad-based innovative solutions. implementation options, impact of the renovation of buildings today

the sustainability of district heating areas and the price of the service; and the results of pilot projects carried out in other countries and the potential for transferring international practices. **Development of technical expertise** allows to renovate with sustainable, healthy and real energy savings, which do not come at the expense of the interior climate. Having guidance materials and expertise allows designers and construction workers to know what is expected from them and contractors to develop economical and affordable standard solutions. To date, more than 10 doctoral theses have been defended on the topic of renovation of buildings and the results are well-implemented.

In line with the EPBD, a national renovation plan will be prepared instead of a long-term renovation strategy for buildings and a first version will be submitted to COM by 31.12.2025 at the latest. The final version shall be submitted no later than 31.12.2026

ii. National 2050 targets for the promotion of clean energy technologies, where available, and, where appropriate, national targets, including long-term (2050) for the deployment of low-carbon technologies, including the decarbonisation of energy- intensive andcarbon -intensive industrial sectors and, where appropriate, related $CO_{2transport}$ and storage infrastructure technologies.

A long-term vision for Estonia's climate policy, sectoral and cross-cutting policies, setting a clear pathway for climate change mitigation, was agreed at national level by the Development Document "Basic Frameworks for Climate Policy to 2050". According to the *General Principles of Climate Policy until 2050* adopted by the Riigikogu in February 2023, Estonia will be a competitive, climate-neutral country with a knowledge-based society and economy by 2050. A high-quality and species-rich living environment is ensured, and the readiness and ability to adapt to climate change is ensured in order to reduce the adverse effects of climate change and make the best use of the positive impacts. According to the first economy-

wide policy guideline, Estonia is developing an attractive environment, in particular for the development of innovative technologies, products and services that reduce greenhouse gas emissions. It will also encourage their export and global implementation to address global challenges related to climate change.

Encourage the uptake of low-carbon technologies and efficient use of resources, favour research, development and innovation pathways that promote the development of energy-efficient technologies. **The GHG emission reduction expected to be achieved by the existing measures in 2025 (Annex III) is expected to reduce GHG emissions from industrial processes and product use by 205 591 % by 1990 compared to 1990. The** largest decrease is due to the reduction of HFC emissions in the industrial processes sector. Most equipment containing cold R-404A (the installation and maintenance of which has been prohibited since 2020) should be phased out by 2035, as well as most old multi-component (split-type) air conditioners and heat pumps.

Compliance with EED compliance measures (energy audit for large companies) will also facilitate the deployment of renewable energy. Large companies have the obligation to carry out an energy audit every four years to identify opportunities for energy savings and to encourage small and medium-sized enterprises to follow their example. The supervision of energy audits of large enterprises (2022=146 companies) is carried out by Consumer Protection and Technical SurveillanceAMe143. Energy efficiency can be achieved in industry through the introduction of more efficient equipment, e.g. the replacement of electric motors and drives, process automation.

Estonia's recovery and resilience plan boosted, inter alia, the deployment of renewable electricity generation equipment in industrial sites and in areas bordering an industrial site through support for connection to the distribution or transmission network in total of more than 28 MW.

Estonia aims to use 14 % of renewable fuels in transport by 2030, some of which are planned to be covered with biomethane. The total consumption of transport fuels in Estonia exceeds 9.1 TWh, almost two thirds of which are diesel and the rest petrol**.** To this end, the country is developing a biomethane market by creating the necessary conditions for the achievement of the target. The support will accelerate the expansion of biomethane consumption in Estonia, with the aim of enabling final consumers to consume biomethane at the price of natural gas, while ensuring market-based production intensification and investment security in this sector in order to switch to market-based biomethane production in mid-2024. The supported biomethane is produced by 5 companiest144. Availability of renewable energy (connection), sufficient transmission capacity between generation and consumption facilities (connection of offshore wind farms to mainland including e.g. Ida-Viru).

At the end of 2024, gas system operators from Finland, Estonia, Latvia, Lithuania, Poland and Germany successfully completed the ex ante feasibility study of the Nordic-Baltic Hydrogen Corridor. The study will define the basic conditions for the deployment of a hydrogen corridor aimed at transporting renewable hydrogen between these six countries. The location of the route in Estonia will be determined in the future as part of the specific national plan. On the basis of the results of the ex ante feasibility study, the gas system operators intend to start a feasibility study next, including a detailed technical analysis of the project and a commercial and economic assessment. In April 2024, the European Commission confirmed that the Nordic-Baltic Hydrogen Corridor has been included in the list of PCIs as part of the Baltic Energy Market Interconnection Plan for Hydrogen (BEMIP Hydrogen).

In March 2023, ministers endorsed the Estonian hydrogen roadmap, which outlines the actions needed for the development of the hydrogen market in Estonia. The roadmap aims to outline today's state of play and themes in which the role of hydrogen in achieving climate goals, improving the competitiveness of the economy and decarbonising different sectors can be defined. A roadmap for the promotion of

143 Energy efficiency of buildings | Consumer Protection and TechnicalRegulatory Authority https://www.ttja.ee/ariklient/ehitised- construction/energy risk

144 Support for biomethane | Elering

sustainable biogas/biomethane production in Estonia and CCU/S will also be finalised in 2025, setting strategic targets for Estonia to develop these areas in Estonia.

iii. Where applicable, national objectives with regard to competitiveness

The specific objective of the TAIE Development Plan is to: Estonia's business environment fosters entrepreneurship and the emergence and growth of knowledge-intensive entrepreneurship, the creation and export of higher value-added products and services, and investment in all Estonian regions. The benchmarks for competitiveness-related metrics are:

- Nominal labour productivity is 110 % of the EU-27 average by 2035 (2019=78.7 %);
- The place in the European Innovation Scoreboard will be the Innovation Leader by 2035 (2019-2022 Estonia was moderatelyinnovaato r145);
- Exports of goods and services amount to EUR 43 billion in 2035 (2020=EUR 19 billion).

3. POLICIES AND MEASURES

3.1. CO_2reduction dimension

3.1.1. GHG emissions and removals

1. I. Policies and measures to achieve the target set under Regulation (EU) 2018/842 as referred in point 2.1.1 and policies and measures to comply with Regulation (EU) 2018/841, covering all key emitting sectors and sectors for the enhancement of removals, with an outlook to the long-term vision and goal to become a low emission economy and achieving a balance between emissions and removals in accordance with the Paris Agreement

The **draft law on a climate-proof economy** sets cross-sectoral and sector-specific targets (as of May 2025) to ensure a smooth trajectory towards climate neutrality by 2050. Sectoral targets will be set for the energy, industry, buildings, transport, agriculture, waste and land use sectors.

In April 2017, Estonia's long-term climate policy development document entitled **'Basic principles for climate policy up to 2050'** was approved by the Estonian Parliament*(hereinafter* 'PPL 2050'). GHG 2050 is a vision document setting a long-term GHG emission reduction target and policy guidance to ensure preparedness and resilience for adaptation or response to climate change. The principles and guidelines set out in this document must be taken into account when updating and implementing cross-sectoral and sectoral strategies and national development plans. The main economy-wide and sectoral policy guidelines and principles set out in KPP 2050 that contribute to the achievement of the objectives referred to in section 2.1.1 are set out in the Annex to this document (see Policy Guidelines and Principles in Annex II – CP 2050). Detailed guidance descriptions can be found in KPP 2050 documentt146.

In March 2022, a proposal was submitted to the Riigikogu to raise the fundamentals of climate policy until 2050 in Estonia's long-term objective of reducing greenhouse gas emissions by 80 % by 2050, in line with Estonia's long-term strategy 'Estonia 2035', to achieve a climate-neutral country by 2050 and to remove the intermediate targets for 2030 and 2040 to be agreed in the sectoral law. The Estonian Parliament approved the amendment to KPP2050 on 8 February 2023 (see Table 2.2).

12. on 17 May 2021, the Estonian Parliament adopted the Estonian long-term strategy **'Estonia 2035**', which sets out five long-term strategic objectives, which are value-based objectives and as a basis for the country's strategic choices, and to which all Estonia's strategic development documents contribute to its

145 EIS 2022 – RIS 2021 | Research and Innovation (europa.eu)
146 Fundamentals of climate policy until 2050https://kliimaministeerium.ee/kliimapoliitika-pohialused-aastani-2050

implementation.

In 2021, the US and the EU launched **a global agreement on methane**, to which Estonia also joined. The initiative aims to reduce methane emissions globally by at least 30 % by 2030 compared to 2020 levels.

The Parties shall, inter alia, allow:

- Take national measures to achieve the target, including all possible reductions in the energy and waste sectors and seeking to reduce emissions in the agricultural sector
- Introduce a higher-level IPCC inventory methodology
- Publish and keep up-to-date information on policies and measures – Action Plan

The European Union published its **methane action plan** in November 2022. The Ministry of the Environment started the consolidation of policies and measures in autumn 2022, which plans to move forward after the legalisation of the national climate targets.

In spring 2024, the Council of the European Union gave its final approval to the proposal on monitoring and reducing methane emissions in the energy sector. The proposal introduces new requirements for the oil, gas and coal sectors to measure, report and verify methane emissions at the highest standard.

It is important for air quality improvement and climate policy to continue monitoring methane emissions measurements and emissions, including improved monitoring and reporting, to contribute to reducing methane emissions both domestically and internationally.

One of the most important tools for verifying the effectiveness of GHG and air pollutant emission reductions is the assessment of GHG and air pollutant levels through real-world measurements, and the analysis of the resulting data across sectors and the overall environmental movement of GHG and air pollutants – emissions of GHG and air pollutants into ambient air, dispersion in the atmosphere, precipitation and movement in soil and water. It is also important to assess the impact of these pollutants on the ecosystem as a whole and on human health. Such a complex assessment will make it possible to explain more clearly to society the importance of implementing GHG and air pollutant abatement measures and the need for investment, by valuing what is known and understood. There is a need to address these issues and establish a link between an increased number of years of healthy life and improved air quality. It is therefore important to continue with the development of the GHG and air quality monitoring network. In addition, the capacity to monitor and assess GHG emissions needs to be strengthened to ensure the establishment of a reliable inventory of GHG and air pollutant emissions verified by real-world measurements. It is important to develop coherence between the air quality monitoring network and the verification process of the GHG inventory in order to increase the quality and reliability of data. An integrated approach to GHG and air pollutants supports better coordination of climate and air policies, optimises resource use and allows for a coherent assessment of multiple environmental impacts.

When the GHG projections were updated in 2024, Estonia’s specific definitions of existing and planned measures were revised and which measures are considered to be part of the projections scenario with existing and which additional measures. As an inter-ministerial agreement, existing measures (adopted and implemented) are considered in the context of GHG projections: Measures approved/decided by the government or another national institution (including in the State Budget Strategy (hereinafter RES) and/or in the State Budget (hereinafter RE), in the implementation plans for the strategic development plans (including in case of (co-)financing of measures or activities from sources other than the State budget and/or the budgets of local authorities (hereinafter referred to as “local authorities”) under the implementation plans and where this has been the case for the co-financing providers) and in the programmes in the performance areas.

For the type of measure ‘economic incentives’, the measure has, or is to be confirmed in the near future, a so-called ‘conditionality regulation’ of the measure (i.e. at least a draft containing the main criteria and the scope of such measures).

Measures that do not involve financial support (e.g. renewal/restriction of standards, rules, requirements, requirements in cases where it is clearly planned and known to be in progress) are also considered as existing measures; advice or information (including the preparation and promotion of guidance material) in cases where someone (a particular entity, body or organisation) is or has decided to do so.

In addition to the government, government agencies and/or local authorities, there may also be "existing" measures, e.g. in a professional association, an umbrella business organisation, a municipal-town association or a non-governmental organisation. Such measures are partly reflected in GHG projections through agreed baseline parameters (baseline parameters to be re-agreed during each GHG projection process).

As an inter-ministerial agreement, additional measures (so-called "planned measures") are considered in the context of GHG projections:

- Planned actions from development plans for performance areas (including those that do not have a decision on the specific volume of funding or temporal scope) or there is an input for amending the development plans for performance areas.
- Targets reflected in the different draft directives (in case those responsible for the negotiation of the draft directives consider that they are very likely to be agreed/accepted/entered into force as such).
- Impact assessments of policies and measures carried out on the basis of input agreed with the relevant ministries (including information on relevant studies/strategies).

No scenario for projections with additional measures was prepared in 2025, as discussions on a draft law on a climate-proof economy proposing additional measures were ongoing in parallel to the preparation of the projections.

A detailed list of existing policies and measures contributing to the objectives set out in Chapter 2.1.1 can be found in Annex III.

The existing measures mapped have been agreed for the implementation of the different development plans.

The implementation of existing measures would lead to a total reduction in GHG emissions of around 30 % over the period 2005-2030 in the areas covered by the plan (See Table 3.1)

Table 3.1 Greenhouse gas emission reductions by sector under the existing measures scenario from 2005 to 2030.

2005, GHG emissions Mt CO2eq (incl.	Areas	2030 GHG emissions Mt	Change (%)
14,4	**Energy (incl. HOONED)**	5,1	—64,42
2,2	**TRANSPORT**	2,2	—0.96
1,2	**AGRICULTURE**	1,6	29,74
—2,4	**LULUCF**	2,2	191,33
0,6	**WASTES**	0,2	—57.5
0,7	**INDUSTRIAL PROCESSES**	0,2	—75.79
16,7	**Total (incl. LULUCF)**	**11,6**	**—30,71**

A number of measures are in the process of being implemented, with simultaneous effects in several sectors. For example, several measures in the Common Agricultural Policy (CAP) Strategic Plan 2023-2027 contribute to reducing emissions from both agriculture and LULUCF and energy categories. Such activities shall focus, inter alia, on promoting resource efficiency in agricultural production and soil protection.

Policies and measures to achieve the ESR target

Compared to the list of measures in REKK2030 submitted in 2019, the updated version of REKK2030 has updated the list of measures following the end of previous development plans, the adoption of new development plans and the revision of the national definitions of ‘existing measures’ and ‘planning measures’. Please find below the overview of the trends to be supported and implemented in the country to meet the objectives of the JJM, a detailed list of measures can be found in Annex III.

Supply of electricity

The **Electricity**Market Act regulates the generation, storage, transmission, sale, export, import and transit of electricity and the economic and technical management of the electricity system. The law lays down the principles of the functioning of the electricity market, based on the need to ensure an efficient supply of electricity at a reasonable price, in accordance with environmental requirements and consumer needs, and a balanced, environmentally friendly and long-term use of energy sources. It provides that an electricity undertaking is to encourage the consumer to carry out activities aimed at saving electricity.

The electricity supply measures that have the greatest impact on the reduction of greenhouse gas emissions are linked to the Electricity Market Act. It has led to the deployment of more renewable energy and electricity generation based on high-efficiency cogeneration. In addition, the law contributes to increasing the share of solar and wind energy in electricity generation (see Annex III for more details). Supported actions that directly or indirectly contribute to the implementation of existing actions shall also be implemented. These include, for example, investments in compensatory measures in north-east Estonia, acquisition of radars for aerial surveillance, pre-development activities for offshore wind farm, green public procurement, and reinforcement of the electricity grid.

Measures to support renewable energy

A number of measures are being implemented to support Estonia’s renewable energy target, including encouraging biomethane production, deploying hydrogen technologies, accelerating the deployment of renewable electricity and creating a Green Fund (see Annex III for more details).

Measures in the heat production sector

The Law on district heating regulates activities relating to the production, distribution and sale of heat in the district heating network and connection to the district heating network.

In recent years, the district heating sector has undergone a continuous transition to renewable energy sources. An increasing number of boilers and cogeneration plants have switched to renewable fuels, and according to 2023 data, the share of renewable energy and residual heat in district heating was around 75 %, of which 93 % have become an efficient district heating label.

Existing measures with the highest greenhouse gas reduction impact relate to the renovation of depreciated and inefficient heat pipelines, the renewal of district heating boilers and fuel switching, and the replacement and renovation of domestic heating systems (see Annex III for more details).

Energy consumption in buildings

Housing and energy are closely interlinked as the energy needs of buildings represent a significant part of Estonia’s energy balance. In 2022, the energy consumption of buildings accounted for 53 % of Estonia’s total balance, which is why improving energy efficiency in the residential and tertiary sectors plays an important role in reducing greenhouse gas emissions.

The policies implemented in Estonia to improve energy efficiency are increasingly leading to the deployment of energy-efficient buildings and the renovation of existing buildings to reduce energy dependency and

greenhouse gas emissions in the residential sector. When making buildings more energy efficient, renewable energy solutions must be used wherever possible, in accordance with the principle of cost-effectiveness.

Directive (EU) 2018/844 of the European Parliament and of the Council, which amended Directives 2010/31/EU on the energy performance of buildings and 2012/27/EU on energy savings, has a major impact on greenhouse gases in the buildings sector by setting minimum energy requirements and limits on the total energy consumption of buildings. In Estonia responsible for buildings energy efficiency implementation of the Directive Ministry of Climate, reporting obligation the provisions are: transposed the Construction Code. **Construction Code (2015)** supports sustainable development and ensuring the safety, proper functioning and usability of the built environment, supported by the **Regulation on minimum energy performance requirements for buildings (2019**).

In 2020, the government approved a **long-term renovation strategy for buildings (REKS)**, the main objective of which is to renovate all pre-2000 buildings in Estonia by 2050. The strategy outlines the long-term vision for the renovation of buildings and the activities and their volume needed to achieve the objective. On this basis, Estonia plans and develops the necessary supporting measures for the building sector.

The measures to reduce greenhouse gas emissions in the building sector with the greatest impact relate to the renovation of public buildings (including municipalities and the public), private households and multi-dwelling buildings (see Annex III for more details).

Energy efficiency

The Energy Organisation Act lays down measures to achieve the national energy efficiency target, principles for the promotion of renewable energy and requirements and obligations to improve energy efficiency in both the public and private sectors.

The Product Conformity Act defines the competence of the authorities involved in market surveillance and provides that the Consumer Protection and Technical Regulatory Authority conducts state supervision of the compliance of household appliances, heaters and systems with energy efficiency, energy labelling and ecodesign requirements.

In addition to the building renovation measures discussed in the previous sections, additional energy saving measures relate to reducing energy consumption in industry, replacing halogen lighting with LED lighting in street lighting and in public spaces (see Annex III for more details).

Support measures have also been implemented that directly or indirectly support the implementation of existing measures, such as subsidies to industrial companies to carry out energy and resource audits, a pilot energy storage programme, the introduction of resource-efficient green technologies, energy taxes to support the sustainability of local production, and changes in business models so that the products of Estonian manufacturing companies meet the environmental and climate neutrality objectives and are competitive on export markets.

Measures in the transport sector

The main strategic development document for the transport sector in Estonia is the Transport and Mobility Development Plan 2021-2035, the main focus of which is to reduce the environmental footprint of the means of transport and the transport system in order to contribute to the achievement of the climate objectives by 2050. In order to manage behavioural changes in people, greater attention must be paid to the “polluter pays” principle in the future, including taxation of fuels according to their specific emissions and energy content. The development plan also calls for the deployment of low-carbon fuels in all modes of transport.

In the transport sector, greenhouse gas emissions are reduced mainly through policies and measures that can be divided into four categories:

1) supporting the reduction of forced movements and transport needs;
2) developing access to sustainable modes of mobility;
3) increasing the share of energy-efficient vehicles;
4) increasing the share of lower-emission fuels.

The Liquid Fuel Act lays down the principles and procedures for the management of liquid fuels, liability for breaches of the law and the organisation of state supervision with a view to ensuring the collection of taxes and the quality of the most used motor fuels. Under Paragraph 2([1]) of that law, the share of biofuel or biomethane, hydrogen or electricity for final consumption in the total energy of petrol, diesel, biofuels and electricity released for consumption in road transport must be at least 7.5 % as a weighted average of the six-monthly average value of the fuel vendor or the holder of a licence to import fuel.

As road transport accounts for the largest share of greenhouse gas emissions from the transport sector, many measures are specifically aimed at reducing greenhouse gas emissions from road transport. Measures in the transport sector with the highest greenhouse gas reduction impact are related to increasing the share of biofuels (including electricity) in private and public transport, developing public transport, changing modes of travel, as well as reducing driving times to reduce the use of private cars.

Actions contributing to a sustainable transport system aimed at the development of cycling and footpath infrastructure, supporting the use of active and accessible modes of transport and improving connections with public transport services

Measures targeting rail transport and domestic shipping will also be implemented. For rail, the focus is on electrification and the replacement of diesel-fuelled ferries in domestic shipping with alternative fuels (electricity/hydrogen) ferries (see Annex III for more details).

Measures in the industrial processes and product use sector

Emissions from the industrial process and product use sector (the so-called IPPU sector) are regulated by the obligation of the manufacturing industry to implement the Best Available Techniques (BAT) (as laid down in the **Industrial Emissions Act (THS)** and the Industrial Emissions Directive 2010/75/EU). The objective of the Industrial Emissions Act is to achieve a high level of protection of the environment as a whole by minimising emissions of pollutants to air, water and soil and generation of waste in order to avoid adverse effects on the environment. In addition, the THS designates industrial activities with a high environmental risk, lays down requirements for their operation and liability for non-compliance, and sets out the organisation of state supervision.

The plant must comply with the BAT requirements. The THS requirements include emission limit values (ELVs) and when environmental permits, monitoring and emission reduction measures are issued through the implementation of BAT. This does not lead to additional emission reductions, as all production plants are obliged to comply with BAT in their operations.

In the IPPU sector, the main measures affecting greenhouse gas emissions relate to Regulation (EU) 2024/573 on fluorinated greenhouse gases (F-gases) and to Directive 2006/40/EC on emissions from mobile air-conditioning systems (MACs).

The F-Gas Regulation (EU) 2024/573 aims to reduce fluorinated greenhouse gas emissions and achieve the European Union’s climate neutrality objective by 2050 by replacing high-GWP refrigerants with low GWP refrigerants and other alternatives such as natural refrigerants. In order to achieve the objective, the placing

of plant-pure F-gas on the EU market through a quota system will begradually reduced so that, by 2050, plant-pure gas will no longer be placed on the EU market. In addition, the Regulation provides for bans on the placing on the market of certain equipment and maintenance bans for existing equipment, obligations for maintenance companies and maintenance (certification) obligations and obligations to recover gases from decommissioned equipment.

Directive 2006/40/EC prohibits, from 1 January 2017, the sale of new EU type-approved passenger cars, long-distance cars and vans with air conditioning systems containing refrigerant with a global warming potential greater than 150. Estonia has not introduced significantly stricter requirements than those laid down in Regulation 517/2014 and Directive 2006/40/EC.

Measures in the agricultural sector

The development of the agricultural sector and the implementation of the various targeted measures are mainly governed by the Common Agricultural Policy (CAP) Strategic Plan 2023-2027 (confirmed on 11.11.2022) and the Development Plan for Agriculture and Fisheries until 2030 (Gap 2030). In addition, there are some measures from the Estonian Rural Development Programme 2014-2020 (RDP 2014-2020), which are still applicable as the funding for the implementation of the measures will run until 2024.

The CAP Strategic Plan 2023-2027 contains four specific objectives, which also include climate-related measures:

1. **Contribute to climate change mitigation and adaptation, including by reducing GHG emissions and leveraging carbon removals, and promote sustainable energy. This specific objective covers the following identified needs:**
   - favour environmentally sustainable production, investment, solutions based on the circular bioeconomy; and
   - increase carbon sequestration in soils and protect soil organic carbon stocks.
2. **Promote sustainable development and efficient management of natural resources such as water, soil and air, including by reducing dependence on chemicals. This specific objective covers the following identified needs:**
   - continued support for land improvement investments;
   - to contribute to the use of agricultural practices that preserve surface water and groundwater;
   - neutralisation of acidic soils;
   - encouraging the development and deployment of green technologies;
   - development of environmental advice;
   - implementation of the requirements and measures stemming from the programme for the reduction of air pollutant emissions; and
   - maintenance of soil fertility.

3. Contribute to halting and reversing biodiversity loss, enhance ecosystem services and preserve habitats and landscapes.

4. Improve the response of Union agriculture to societal demands on food and health, including high-quality, safe and nutritious food produced in a sustainable way, reducing food waste, as well as animal welfare and the fight against antimicrobial resistance. This specific objective covers the following identified needs:

- increasing organic production in organic farming by reducing the processing of organic products as conventional products;
- diversity of crop and horticultural crops grown, presence of varieties suited to local conditions; and
- improve animal keepers' knowledge of herd health in general.

The measures of the CAP Strategic Plan 2023-2027 estimated to have the highest greenhouse gas reduction impact are set out in Annex III.

The Agriculture, Food and Rural Programme 2024-2027 includes measures to help reduce GHG emissions. The programme measures support the development and competitiveness of the Estonian agriculture and food industry, food safety and security, balanced development of rural and coastal areas, and good rural areas in general. The programme also contributes to animal welfare, to maintaining healthy soils and to maintaining a clean environment and biodiversity.

Estonia's recovery and resilience plan supports increasing the production and uptake of sustainable biogas and biomethane. The production of biomethane from manure of animal origin reduces methane emissions in the manure management category in the agricultural sector.

In terms of environmental impact, the Organic Farming Act (2007) plays an important role in the agricultural sector's legislation, as it lays down requirements for carrying out activities in the field of organic farming, which are not laid down in European Union regulations, as well as the basis and scope of State supervision of the person engaged in organic farming and the liability for non-compliance with the requirements laid down in that legislation. On the basis of this law, a number of secondary legislation has also been issued to regulate aspects of organic farming.

The measures implemented to reduce nitrogen losses from agriculture, such as those based on the Nitrates Directive, have reduced nitrogen emissions to the aquatic environment, with an indirect positive impact on the reduction of GHG emissions. The Water Act, introduced in 1994 and updated on several occasions since then, in particular with regard to EU accession, is important for the implementation of the Nitrates Directive. Good agricultural practice and the Government of the Republic Regulation on water protection requirements for fertiliser, manure and silage storage facilities have been established (repeatedly amended). The Water Act (2019) is one of the main pieces of legislation on which the Estonian River Basin Management Plan's Programme of Measures 2022-2027 is based. Additional measures to promote water protection in agriculture are mainly based on the CAP and its measures.

Measures in the waste sector

The Waste Act (2004) lays down waste management requirements in order to prevent the generation of waste and the risks to health and the environment arising from waste, including measures to increase the efficiency of the use of natural resources and to limit adverse effects and to gradually reduce the landfilling of waste suitable for recycling or other recovery. The law also covers the organisation of waste management, including the basis and scope of state supervision.

In December 2023, the Minister for Climate approved the new State Waste Management Plan 2023-2028, whose activities aim to ensure the sustainable development of the country in line with informed production and consumption, avoiding as much as possible waste generation and encouraging reuse. All this must be consistent with well-designed and effective waste management, which ensures effective separate collection, recycling and other recovery of waste and the disposal of waste that is safe for humans and the environment. It is important that measures implemented in waste management work and support sustainable resource use, reduce the environmental impact of waste and thus ensure a cleaner living environment. Key orientations for the development of waste management have been agreed. The National Waste Management Plan (WMP) approaches the three main pillars of the way forward, outlining the status quo for each theme and further planning activities on this basis, taking into account the situation described above and the guidance from the strategic documents, including amendments to the Waste Framework Directive.

The new national waste management plan has three main pillars/strategic objectives:

- Sustainable and informed production and consumption and promotion of waste prevention

and reuse;
- Enhancing safe material circulation;
- Taking into account and reducing the impacts of waste management on both the human environment and the natural environment as a whole.

In 2021, Estonia's food waste prevention plan aimed at reducing the generation of food waste and food losses throughout the food supply chain, i.e. primary production, food processing and manufacture, retail and wholesale food distribution and other forms of supply, as well as catering and households, was finalised. This will ensure savings on natural resources, economic resources and the burden on the social system.

Circular Economy

The circular economy aims at decoupling economic growth from the use of primary raw materials by creating a circular production and consumption system with the lowest possible losses. The transition to a circular economy requires changes across the entire product value chain, from product design to new business models and consumption patterns. For new and existing products, the main focus is on the design of the whole life cycle, with a focus on a sustainable choice of materials (avoidance of hazardous substances: or reduction', quality (the long lifespan of the product;
repair option), supply chain optimisation (priority of local raw materials) and reuse and reuse (components separation; and recycling feasibility). In addition to smart
R & D, eco-innovation, technological development, the collaborative economy also play an important role in design.

The circular economy is a cross-cutting principle, so business-to-business cooperation and international agreements are essential, creating significant opportunities for new markets and partnerships. The role of the state in the transition to a circular economy is to create favourable conditions for the implementation of circular economy principles and remove barriers. For the circular economy to reach its full potential, systemic thinking and changes in the whole socio-economic system are needed to achieve real changes in consumption, production, planning, policy, lifestyle, culture and values.

The circular economy has a direct contribution to reducing GHG emissions through, for example, more resource efficient production and consumption, product lifetime extensions, innovative business models that reduce dependency on primary raw materials or waste management and the development of recycling, reducing the need to produce new products and materials.

In 2022, the Ministry of the Environment completed a whiteframework for the circular economy147, which outlines the possibility of reaching a circular society with challenges and possible solutions in the field.

The White Paper sets out six principles for the transition to a circular economy:

- Resources are used responsibly and demand-driven, resource use is planned and waste generation is minimised.
- The business models of Estonian companies are sustainable and circular.
- Estonia has the expertise and experts to implement the circular economy, as well as cooperation between different sectors and sectors.
- Workable digital solutions to support the circular economy have been put in place and high-quality data to monitor the situation has been ensured.
- The circular economy is well coordinated at national level and a circular legal and economic environment has been created for all sectors.

147 https://ringmajandus.envir.ee/sites/default/files/2023-02/Ringmajanduse%20valge%20raamat.pdf

- Environmental conscious thinking and environmental behaviour are well established.

The Circular Economy Programme supports the implementation of circular economy solutions through the Environmental Investment Centre.

The Ministry of Regional and Agriculture has developed a roadmap for the circular bioeconomy. It defines the main lines of action for the development of the circular bioeconomy in Estonia and the actions needed for development in the short (2023-2027) and long-term (until 2035) and provides the basis for the preparation of regional circular bioeconomy roadmaps. The latter build on local bio-resources, the needs and opportunities of communities and municipalities and translate activities into innovative local initiatives and forms of cooperation that support the growth and vitality of the added value of the regional bioeconomy.

The Circular Economy Programme supports the implementation of circular economy solutions through the Environmental Investment Centre. The objective of the Circular Economy Programme is to support environmental management, waste, subsurface, chemicals and related research, resource efficiency, circular economy principles, prevention of waste and emissions and reduction of the environmental impact of activities, awareness-raising on the circular economy and the development and wider use of sustainable consumption and production solutions.

Policies and measures to progress towards the LULUCF target

In the area of land use, land use change and forestry (LULUCF), carbon stock change is estimated for the following land use categories: forests, agricultural and grassland, wetlands (including peat-producing areas), settlements and other land. Greenhouse gas emissions and removals from LULUCF are mainly influenced by the age structure of forests, management practices on forest and cropland (including logging volumes), deforestation, organic soil cultivation and the extraction and use of horticultural peat, as well as long-term carbon storage in timber products. Thus, the future role of the LULUCF sector as a sink or source of GHG depends mainly on the maintenance of forest land and reducing deforestation, forest management activities to increase forest storage and carbon sequestration capacity in the long term, as well as the use of organic soils and horticultural peat, and cropland and grassland cultivation methods. It is also crucial to promote wood valorisation in a way that allows increasing long-term carbon sequestration into durable products such as building materials, furniture and wood chemistry.

The Forest Act lays down the legal framework for the management of Estonian forests. The main objective of the Forest Law is to ensure the conservation and sustainable management of forests as an ecosystem. The Forest Act includes a reforestation measure aimed at contributing to the recovery following forest logging or natural disasters. Under the Forests Act, the forest owner is obliged to ensure that the forest is reforested no later than five years after logging or a natural disaster. Support for rapid post-harvest reforestation contributes to consistent carbon sequestration on forest land, thereby maintaining the level of GHG sequestration in Estonian forests.

The State also supports private forestry by providing training and investment grants to private forest owners and agricultural advisors to enhance the economic, ecological, social and cultural value of the forest. Voluntary protection of noble habitats in private forests is also encouraged and rewarded.

The Ministry of Climate is preparing a draft Forest Development Plan 2025-2035 and a programme for its implementation. The aim of the development plan is to ensure the sustainable management of forests, taking into account social, economic, climate change, environmental and cultural aspects. Sustainable forest management refers to the use of forests in a way that ensures the diversity, productivity, regeneration, viability and potential of their biota and enables them to continue to perform all their functions without damaging other ecosystems. The Government of the Republic of Estonia has set out that the stock of economic forests must not be reduced and has agreed that forest management and wood valorisation as a

whole must ensure that the forestry sector is a carbon sink. Estonian wood must be valued to the maximum extent and final products must have the maximum carbon sequestration capacity.

The following planned policies in the draft FDP have an impact on the LULUCF sector:

1. Adapting forestry to climate change – the measure aims to increase the carbon sequestration and storage of forests in order to mitigate climate change and increase the resilience of forests to climate change;
2. Improving the biodiversity status of forest ecosystems – forest management takes into account biodiversity, environmental and climate objectives;
3. Increasing the competitiveness of forestry – the aim is to ensure higher productivity, quality and good health of forests;
4. Better wood valorisation – the forest and timber industry encourages and supports more efficient and resource-efficient use of wood.

The Forest Act is currently in the process of renewal in Estonia.

Since 2024, the **Environmental Charges Act** includes a forest land deforestation fee payable for the right to deforestation of forest land. The rate of the tax and the methodology for its calculation shall be laid down by order of the minister responsible.

The **aim** of the subsurface law is to ensure that the subsurface is used in a sustainable and economically viable manner, while reducing, as far as possible, environmental disturbances. Under the law, the holder of a mining licence is obliged to rehabilitate the extracted land. The purpose of the restoration is to reconstitute the land for former or new use. The main directions for restoration are the conversion of land into forest land, water bodies, other land of recognised value or land that can be consumed. It aims to re-use the extracted land for a new purpose. The implementation of the subsurface objectives (e.g. elimination of legacy effects from mineral extraction, information and training) will be supported through the negotiation of the Waste Plan 2023-2028 and the Circular Economy Programme. The operational waste management plan has two strategic objectives: (2) increasing safe material circulation and (3) taking into account the impacts of waste management on both the human and the natural environment as a whole. Support is provided for activities that do not fall under the obligation to clean up the subsurface law.

The main objectives of the **Nature Conservation Act** are the promotion and conservation of biodiversity, the preservation of the natural environment of cultural or aesthetic value and the promotion of the sustainable use of natural resources. The law also provides for the implementation of compensatory measures in Natura 2000 sites. **The Nature Conservation Act is currently in the process of renewal in Estonia**.

In order to contribute to the preservation of Estonia's semi-natural communities, an **Action Plan on Heritage Nieders (2021-2027)** has been drawn up. By 2027, the objective is to conserve at least 50 000 hectares of heritage. The planned activities include continued funding for the maintenance of semi-natural communities and the restoration of new habitats, taking into account the coherence and species conservation aspect.

The Environmental Protection and Use Programme 2024-2027 builds on sectoral development plans. The programme aims to ensure the protection and sustainable and efficient use of the environment and biodiversity. The LULUCF sector is particularly affected by biodiversity conservation activities and forest developments.

The European Structural and Investment Funds and the LIFE programme have supported a number of projects to conserve and restore Estonia's protected habitats and heritage and restore water levels in depleted peatlands and degraded humid habitats.

A number of activities to support private forestry and to conserve heritage meadows and Natura 2000 sites are (co-)financed through the Common Agricultural Policy. The objectives set out in **Estonia's CAP**

Strategic Plan 2023-2027 include contributing to climate change mitigation and adaptation by reducing GHG emissions and enhancing carbon sequestration and promoting sustainable and efficient management of natural resources.

As part of the process of drafting the Climate-proof Economy Act, the Ministry of Climate is assessing the impact of the implementation of additional measures and the volumes needed to move progressively towards removals to enable the fulfilment of the commitments made as a state, while ensuring the competitiveness of economic sectors and preserving biodiversity.

ii. Regional cooperation in this area, where appropriate.

A network of experts on GHG inventories and projections between the three Baltic States has been set up with the aim of increasing the quality of the various GHG reports through the sharing of knowledge and experience.

There was a closer cooperation project between LULUCF experts from the Baltic States. Integration of climate change policy into sectoral and regional policies (03.2021-02.2023). One of the objectives of the project was to develop a common plan for improving greenhouse gas inventories in the Baltic States in the field of LULUCF and to establish a joint research programme for its implementation. In addition, Estonian LULUCF experts participate in the lead committee of the LIFE project “Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland”.

iii. Without prejudice to the applicability of state aid rules, financing measures, including Union support and the use of Union funds, in this area at national level, where applicable

European Union support and Union funds have been and are planned to be used in, inter alia, the following existing and complementary measures (an exhaustive list can be found in annex 13 to the REKK2030 progress report):

Synchronisation of the Baltic States’ electricity system with the Continental European synchronous area
Increasing the share of biofuels in transport
Spatial and land-use measures in cities to increase energy savings in transport and improve the efficiency of the transport system
Additional spatial and land-use measures in cities to increase energy savings in transport and improve the efficiency of the transport system
Development of railway infrastructure (including the construction of Rail Baltic)
Renovation of public and commercial buildings
Renovation of private dwellings and multi-apartment buildings
Further renovation of public and commercial buildings
Additional renovation of private houses and multi-dwelling buildings

3.1.2. Renewables

iv. Policies and measures to achieve the national contribution to the binding Union-level renewable energy target for 2030 and following the trajectories referred to in Article 4(a)(2) and, where relevant or available, the elements set out in point 2.1.2, including sector-specific and technology-specific measures 153.

Estonia’s renewable energy trajectory results from national renewable energy targets that are more ambitious than those set out in the Directives ((EU) 2018/2001 and (EU) 2018/1999) agreed at European Union level, with an overall EU target of 42.5 % + possible 2.5 % and a national target of 65 %. National renewable electricity target

[153] When designing these measures, Member States shall take into account the end-of-life and modernisation potential of existing installations.

is 100 % of gross final consumption of electricity and thus electricity is also the main locomotive for increasing the share of renewable energy.

Indicative activities for the development of renewable electricity generation capacity:
2024 Renewable electricity capacity ~1500 MW (1 210 MW for solar, 697 MW for onshore wind, 150 MW for biomass cogeneration)
2025 National defence altitude restrictions will disappear on a large part of Estonia's land. Announcement of auctions for onshore wind farms. The regulation to boost the electricity storage market enters into force.
2030 Renewable electricity capacity up to 4 500 MW (soil farms 2 850 MW, solar ~1500 MW, biomass 150 MW)
2030+ Possible offshore wind farm completion

ENMAK 2030 describes the different measures to achieve the renewable energy targets outlined in the development plan. The following measures of ENMAK 2030 are the most direct contributors to the increase in the use of renewable energy:

- Measure 1.1 Development of electricity generation;
- Measure 1.5 Effective production of heat;
- Measure 2.1 Increase the uptake of alternative fuels in transport;

In Chapter **1, Failure! No reference source can be found. The following measures are being implemented to achieve the** objectives described, the detailed description of which is given in Annex III to this document.

v. where appropriate, specific regional cooperation measures and, optionally, an estimate of the excess amount of energy from renewable sources that could be transferred to other Member States in order to achieve the national contribution and trajectories as set out in point 2.1.2.

In the field of onshore wind energy in Estonia, first steps have been taken by developers to strengthen cooperation with Latvia through joint projects. For example, an application for an onshore wind project under the Connecting Europe Facility (CEF) has been approved by OÜ Utilitas as of summer 2023. The aim is to plan and build wind farms on Estonian territory and their output would go directly to the Latvian grid. To date, it is not yet possible to say whether this project will materialise. In May 2023, German and Estonian system operators 50 Hertz and Elering signed a joint intention agreement to explore the possibility of building a submarine cable between the two countries called Baltic WindConnector (750 km 2 GW of submarine cables) and Estonia is launching an analysis to assess its socio-economic benefits in summer 2024.

The aim of maritime spatial planning is to agree on the use of Estonian marine space in the long term in order to promote the maritime economy and contribute to the achievement and maintenance of good environmental status in the marine environment. The established sea basin planning serves as a basis for the various decisions authorising the use of marine space, both for ministries and agencies, and also provides a basis for economic operators, investors, local authorities and coastal communities to plan their activities.

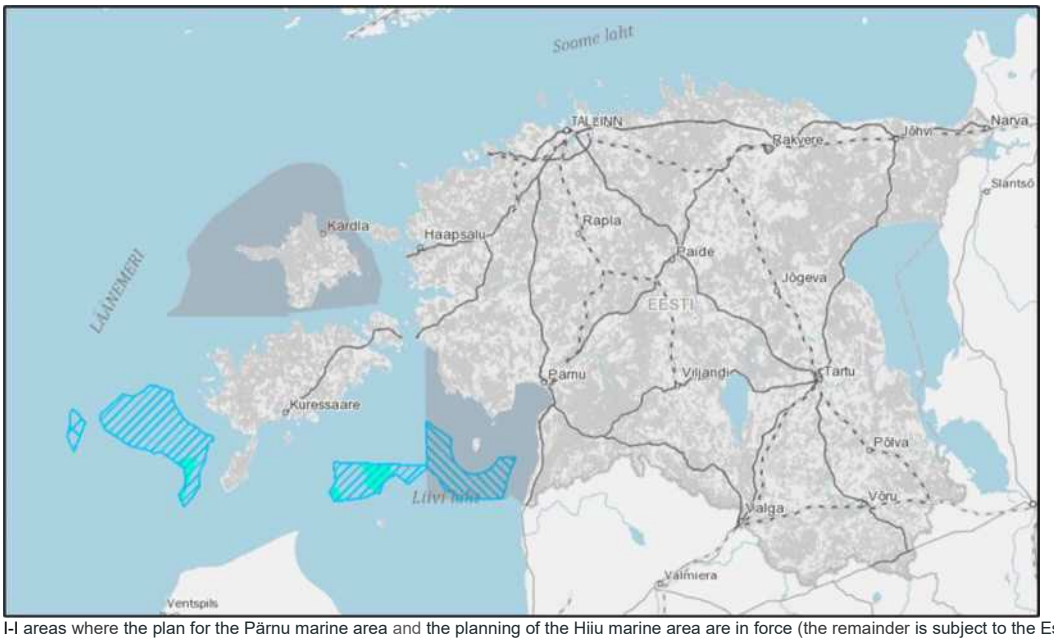
Estonia's marine area is almost as large as the land area. Although the marine space is large, its use is small, but it is increasing over time, with increasing pressure for the wider protection of one of the natural values through the EU Biodiversity Strategy etc. In terms of energy and economic terms, its potential is huge and its use would make a major contribution to Estonia's development and GDP growth. Wind

energy potential in the Baltic Sea is in the order of 93 GW.

In Estonia, there are two existing maritime plans for wind energy, with a total of 2 439 km 2 areas suitable for wind energy development. Under suitable conditions, offshore wind farms in the order of 15-17 GW can be built in the wind energy areas established by the plans. In order to realise the potential, cooperation between the public and private sectors is necessary, successful implementation of EIAs for building permits, simplification of permit-granting procedures, favourable connection costs, etc.

The following plans are in force in Estonian marine waters:

1. Estonia's maritime spatial plan has established areas suitable for wind energy development (see Figure) for an area of **1783 km^2** representing 4.5 % of Estonia's total maritime area. Of these, 225 km^2 are reserve areas for wind energy (historically intensive trawl fisheries) that can be deployed from 2027, when the process and studies carried out in the remaining areas suitable for wind energy development have shown that it is not possible to develop sufficient offshore wind farms in these areas. The innovation area (88 km^2) is primarily reserved for floating turbines. Possibilities have been created for planning electric cables in the maritime building permit procedure. The plan establishes the basic location of cable corridors in wind energy development areas within the planning area. An alternative location to a cable corridor may be found for the development of wind farms at the building permit stage if it does not result in significant adverse impacts on wildlife and negative impacts on Natura 2000 sites.
2. The Pärnu Marine Plan has established areas suitable for wind energy development in an area of **656 km^2** (see Figure). Possibilities have been created for planning electric cables in the maritime building permit procedure. The layout does not specify the location of the power cables for connecting the wind turbine parks to the onshore transmission network. The location of the power cables depends on the specific location of the wind farm, the connection conditions, the natural and technical circumstances and circumstances which are only known during the development process. Therefore, precise technical solutions and the location of power cables will be provided by the project.
3. The planning of the Hiiu marine area is valid in the sea area around Hiiumaa, but it does not regulate wind energy (see figure), asthe Supreme Court ruling of 8 August 2018 in case No 3-16-1472 annulled the plan for wind energy production areas because of shortcomings in the Strategic Environmental Assessment (SEA) carried out when the plan was prepared, including the Natura impact assessment. In order to determine whether it is, in principle, possible to plan wind energy areas in Hiiu sea basin and how these areas are connected to the onshore transmission network, an analysis of the 'Prior Regional Analysis for the Planning of Wind Energy Areas in Hiiu Sea Area' was carried out.



I-I areas where the plan for the Pärnu marine area and the planning of the Hiiu marine area are in force (the remainder is subject to the Estonian sea area plan)

Wind energy areas in Estonia's maritime spatial plan (1783 km^2&

I ----- 1 wind energy area ---------- 1 wind energy innovation area ---------- 1 Wind Energy Resen Area

Pärnu Maritime Planning Wind Energy Area (656 km^2):

—J wind energy area

Figure 3.1 A scheme for the validity of plans in wind energy areas.

The development of Estonian maritime spatial plans is linked to the development of transnational projects.

One of the projects related to the promotion of maritime spatial plans is ELWIND. **ELWIND is a joint Estonian-Latvia pre-development of an offshore wind farm, which includes a specific maritime area in the economic and/or territorial waters of Estonia and Latvia and an electricity interconnection between the two countries**. The total wind capacity planned for the project is approximately 7000-1 000 MW. The implementation of the project started in September 2020 with the signing of a Memorandum of Understanding between the Estonian-Latvia Ministries of Economy. The project will establish a close link between Latvia and Estonia by strengthening technological, energy and economic cooperation.

The planning of a complementary transnational electricity interconnection Estonia-Latvia IV aiming at ensuring security of supply as part of a cooperation project will allow for additional support from the European Union's support for cross-border renewable energy and infrastructure projects (Connecting Europe Facility, CEF) for the implementation of the project.

In addition, there are offshore wind farm projects being developed by economic operators in the Estonian marine area. **Building permit procedures have started for 11 offshore wind farms and one single turbine.** There are two existing maritime spatial plans in Estonia (Estonian marine area and Pärnu sea area), with a total of 2 439 km² of suitable areas for wind energy development (6.8 % of Estonia's total marine area). As of May 2025, twelve building permit procedures (estimated total capacity of 11 690 MW) have been launched and one building permit procedure (estimated total capacity of 900 MW) will be launched in June 2025. The exact total capacity to be built is clear in the building permits. One building permit procedure for the offshore wind farm (Saare Wind) has been completed and a building permit has been issued, two offshore wind farm projects in the Gulf of Riga Eesti Energia AS Riga and the Utilitas Liivi-Saare offshore wind farm have now entered the final stage of environmental impact assessment and have the greatest potential to become European projects of common interest.

In addition, **one pumped hydroaccumulation power plant (hereinafter referred to as PHEJ) with a total**

capacity of 500 MW is under development in Estonia and the potential for producing renewable energy from biomass is under development. In view of Estonia's desire to build new electricity generation capacities, in particular on a market-based basis and through the implementation of flexible cooperation mechanisms, as well as Estonia's desire to increase energy security, in particular through the construction in Estonia of domestic electricity generation capacity based on the use of primary energy resources or fuel-free, the realisation of projects complying with the above principles will be supported.

A national plan "Estonia 2050" is under preparation, which addresses the following tasks in the field of energyin line with the e154 planning baselines:

1. The energy network (including connections with foreign countries in the light of security of supply and energy exports), also towards Central Europe; provision of electricity transmission networks, including for the development of island offshore grids and for security of supply of islands; giving priority to hybrid parks and brownfields in renewable energy;

154 https://www.riigiplaneering.ee/sites/default/files/documents/2024-01/LS%20ja%20KSHP_detsember23.pdf district cooling, mapping of biogas production options, heat management) defining spatial guidelines, taking into account developments in decentralised so-called smart grids, the infrastructure needed for electric vehicles and the need for climate proofing.

2. Definition of spatial needs and principles for energy storage options, including the so-called hydrogen economy.

3. Define guidelines for the spatial development of business on the basis of energy-intensive business development opportunities arising from renewable and distributed energy, taking into account the wind farms envisaged in the LOV plans.

4. In case of a positive decision on the development of a nuclear power plant, determination of spatial development principles for the plant as an infrastructure site of national importance and for final nuclear fueldeposition 148

vi. Specific measures on financial support, where applicable, including Union support and the use of Union funds, for the promotion of the production and use of energy from renewable sources in electricity, heating and cooling, and transport

The ENMAK 2030 document describes the different measures to achieve the renewable energy targets outlined in the development plan. The following measures of ENMAK 2030 are the most directly contributing to the increase in the use of renewable energy:

- Measure 1.1 Development of electricity generation;
- Measure 1.5 Effective production of heat;
- Measure 2.1 Increase the uptake of alternative fuels in transport.

In order to achieve the objectives described in Chapter 2.1.2, the measures described in Annex III to this document will be implemented.

Among other things, renewable energy support is planned through auctioning (technology neutral)

Table 3.2 Timetable for announcement of auctions

Year in which the auction was announced	Auction volume
2019	5 GWh
2020	5 GWh

148 The site selection of a nuclear power plant shall be carried out by means of a specific national plan.

2021	540 GWh
2023	650 GWh
2025*	up to 2 000 GWh

Under the leadership of the Ministry of Climate, it is planned to identify the necessary bottlenecks to increase the production and uptake of biogas and to provide for further investment grants for the deployment of biogas outside the transport sector.

In addition to the measures set out in Annex III to this document, which are of a financial or regulatory nature, other activities are also implemented in Estonia which can be classified as support measures for renewable energy.

In order for new renewable electricity generation capacities to emerge in Estonia, in addition to financial support measures, it is necessary to provide developers with state support and solutions to potential problems. For example, barriers to the development of wind energy are mainly related to national defence and environmental constraints, opposition from local populations and the resulting development risks. Cooperation between different ministries and authorities will be pursued to alleviate these bottlenecks.

Application of the Regulation based on Article 122 of the Treaty on the Functioning of the European Union (TFEU) speeding up permit-granting processes for renewable energy projects.

At the end of 2022, the Council of the European Union developed a regulation laying down a framework to accelerate the deployment of renewable energy. The Regulation is directly applicable, but the Member States have been given discretion to apply certain provisions, which means that national law must specify the manner and extent of the implementation of those provisions. The application of the provisions provides for the possibility of designating the planning, construction and operation of renewable energy projects and associated networks as an overriding public interest and public safety and health activity. The Regulation also provides for the possibility, in certain cases, of omitting an environmental impact assessment. Legislative amendments to implement overriding public interest and compensatory measures were adopted in 2024, considering, inter alia, that the amendments to the Renewable Energy Directive in the RED III package also provide for both an overriding public interest presumption and the possibility of applying compensatory measures in the procedure for renewable energy projects. As a result of the amendments, renewable energy installations can be set up in areas of overriding public interest, which under other EU law should be excluded and allowed even if the impact cannot be mitigated, i.e. through the implementation of compensatory measures.

Nature conservation restrictions and mitigation. The creation of any production site in the natural environment has an impact, but it is important to bear in mind that nature protection constraints and established nature protection areas should not automatically exclude the production of renewable energy on the site. It is important to find so-called compromise areas. It is also important to encourage a system of mitigation measures and/or financial compensation.

Looking for opportunities to move the transport sector to renewable energy

In view of the ambitious renewable energy targets and the end of the sale of new combustion engine vehicles in 2035, it is important to find alternatives to increase the share of renewable energy in the transport sector. Therefore, analysing the need for additional measures to meet the 26 % renewable energy target (14.5 % GHG reduction) is also a cross-cutting action.

Guarantees of origin

Guarantees of origin play an important role in proving the origin of energy, in particular in the transport sector,

but also in the consumption of energy by businesses. Guarantees of origin are also a way to prove renewable energy consumption in the context of ESG reporting. In 2 024.3398 GWh of electricity from renewable sources was produced, of which 2 892 GWh were issued with corresponding certificates of origin. Certificates of origin shall be issued by the transmission system operator.

Table 3.3 Number of production facilities and their capacities entered in the TSO's register of guarantees of origin on 15 May 2025.

Technology	Number of production	Total Power (MW)
Wind energy	42	692
Solar	6484	651
Hydropower	19	6
Biogas	3	2

Technology	Number of production equipment	Total Power (MW)
Biomass	20	397

Future work will be made to ensure that guarantees of origin can also be issued for renewable fuels of non-biological origin, heat and fossil energy.

Energy solutions for the future

With regard to clean energy technologies, the private sector plans to build **pump hydropower plants** in Paldiski (500 MW) in Estonia149. There is a growing trend in technological developments contributing to climate neutrality.

For example, the private sector plans to start extracting heat from seawater to cover the loads of district heating and to build a **heat pump for this purpose in the maritime area**, which would significantly reduce the use of natural gas in the district heating network in Tallinn and Maardu.

Ensuring that sufficient controlled capacities are available, to which electricity storage technologies contribute, is essential. Estonia plans, in particular through market-based measures, to promote the entry of storage into the market, including by removing the market barriers stemming from the legislation. A pilot **energy storage programmem has also been launched150to** support electrical storage (the pilot programme is being implemented).

The increasing share of uncontrolled renewable capacities in the electricity system makes it important to balance these capacities with demand response, storage and controlled capacities. Ambitious renewable energy targets also create the need to promote DSR and storage technologies. In addition to integrating renewable energy into the grid and stabilising the price of electricity, demand management and storage enable the use of excess renewable electricity production to produce it later in the grid and delay grid developments. Discussions and analyses so far and examples from other Member States have led to the conclusion that one possible **market model to promote DSR is a market model with centralised settlement** whereby data exchange and financial settlement, including the calculation of compensation, are centralised in the hands of the central body, which, based on examples from other countries, is the system operator (Elering in Estonia).

The **Baltic system operators started the market for frequency reserves in** 2025, i.e. the Baltic frequency reserve market is jointly procured with the three Baltic States. In order to ensure that each country has access to the necessary amount of frequency reserves, a certain amount of transmission capacity is also booked on routes between the Baltic States for the frequency reserves. More specifically, the Roadmapfor151 themarket for frequency reserves on the Eleringwebsite152.

vii. Where applicable, the assessment of support for electricity from renewable sources carried out pursuant to Article 6(4) of Directive (EU) 2018/2001.

Under Section 59[4] (1) of the Electricity Market Act (ELTS), a subsidy is paid to the electricity producer in order to achieve the 2030 target for electricity generation from renewable energy sources (100 %). The State has a 2030 target set by the Energy Organisation Act. While in 2017 the national target for the share of renewable electricity in inland electricity consumption under ENMAK 2030 was set at 30 % in

149 Paldiski receives another type of power plant https://majandus24.postimees.ee/6139227/paldiski-saab-teistsorti-

150 Development of pilot projects for energy storage facilities https://kik.ee/et/toetatavad-activities/Development of Energy Storage Equipment-Pilot Projects

151 Market for frequency reserves https://elering.ee/sagedusreserve-turg

152 Baltic Balancing Roadmaphttps://elering.ee/sites/default/files/2022-10/Baltic_Balancing_Roadmap_update_19102022_0.pdf

2030, based on specified projections and trajectories for renewable energy production, the target set by the Energy Organisation Act is 100 %.

The **Estonian support scheme was amended in June 2018 when the previous direct support was replaced by an auction-basedscheme153.** The current support scheme allows the country to find electricity producers in a flexible and cost-effective way, whose production contributes to the national renewable electricity target. The proposal to be submitted to the Riigikogu of the Government of the Republic for the setting of targets and the mechanisms for achieving the objectives enables the State to find the most appropriate way to achieve the objectives. The State shall periodically carry out analyses of changes to the principles of the electricity market and auctions and, if necessary, propose to the Riigikogu to amend these mechanisms.

No renewable energy support will be paid for generating installations built since 1 January 2021. In the future, the payment of grants has taken place on a competitive basis in the context of auctions, in order to ensure a fixed minimum rate of return on sales for producers. As of 2 024.3100 GWh of renewable energy was produced in Estonia and, as of the end of 2 024.1320 GWh of additional electricity produced from renewable energy sources is under construction as a result of the auctions for renewable energy.

Taking into account the ENMAK 2030 target (100 % RES-E), an additional 8 700 GWh/y of renewable electricity will need to be put on the market between 2023 and 2030. According to the Electricity Market Act, the Government of the Republic organises auctions if the State does not meet the target for electricity produced from renewable energy sources. The auction shall be awarded to the person offering the lowest rate of aid.

The Ministry of Climate is operational in 2024. — Conditions for the next renewable electricity auction in 2025 with a view to launching a new auction in 2025.

viii. Specific measures to set up one or more contact points, improve administrative procedures, provide information and training, and facilitate the introduction of power purchase agreements (PPAs) 154

A common digital entry point will be established on the basis of the EHRI for the processing of renewable energy projects. The joint contact point shall bring together the information needed by the applicant for the completion of the offshore wind farm building permit, construction, use and environmental protection permit procedures, enable the necessary procedural authorities to be involved in the project process stream and ensure that procedural deadlines are respected.

Under the Electricity Market Act, the connection conditions for connection to the grid have been simplified for a power generating installation with a capacity of less than 15 kW using a renewable energy source. The connection to the network of a generating unit with a power of up to 15 kW or on a multi-dwelling building does not require the payment of a deposit. Similarly, an electricity generator does not need a licence if the net capacity of the generating installation is less than 1 MW.

In the context of long-term electricity supply contracts (PPA), the system operator may procure the electricity (loss electricity) purchased to offset network losses on the basis of PPA up to 50 % of the projected loss of electricity. Electricity purchased under a long-term supply contract must come from renewable energy sources. If the network operator wants to enter into a long-term contract for more than 50 % of the amount of electricity lost, further analysis must be carried out and agreed in advance with the Competition Authority.

153 Electricity Market Act-State Gazette

154 A summary of the policies and measures under the enabling framework to be applied by Member States pursuant to Articles 21(6) and 22(5) of Directive (EU) 2018/2001 to promote and*facilitate the uptake of power purchase agreements*.

In Estonia, renewable energy installations are primarily built through spatial planning. In order to speed up the planning, the terms of the local authority's special plan and national special plan were amended.

The amendments to the Planning Act provide the possibility for wind farm developments to abandon the second stage of the plan, i.e. to draw up a detailed solution. The use of such a mitigation requires a more detailed approach in the first phase of the plan, so that the design conditions for the wind farm can be issued immediately thereafter.

An important addition to the Planning Act provided for the possibility to submit applications for a building permit and to launch an auction procedure for competing applications to initiate the building permit procedure, even before the establishment of the State's specific planning plan. For the winner of the competition, this amendment will ensure that, when carrying out a specific national plan, account is already taken of the fact that a specific sea basin has been subject to a building permit procedure and that it is included in the national special plan as an offshore wind farm area.

Impact assessments, the involvement of experts, etc. Changes were also important in the planning phase. In particular, a standardised environmental impact assessment (EIA) programme will be established, requirements for EIA lead experts will be relaxed. Another important change was that wind blades may extend into a no-construction zone.

ix. Assessment of the necessity to build new infrastructure for district heating and cooling produced from renewable sources

The measure to upgrade district heating boilers and existing inefficient heat pipelines will continue in 2021-2027. The study "Estonia's transition to carbon-neutral heating and cooling by 2050" assesses the operational plans and investment needs to achieve a carbon-neutral heating andcooling economy155.

The first district cooling plant has been set up in the district heating boiler in Tsellulosis in Tallinn, Tallinn, which started providing cooling services for the surrounding buildings in autumn 2019. The district cooling pipeline is also currently being built on the Metropolitan Campus and in the future the district cooling network will cover the Tallinn city centre areaa156. There are two district cooling plants in Tartu – the 13 MW district cooling plant in the city centre and the 5.4 MW district cooling plant in Aardla, and the total length of the district cooling pipelines is 2.9 km. Tartu and Pärnu district cooling sources are river water and solarelectricity157.

The Roosna-Allik geothermal pilot plant produces around 1 200 MWh/a. 158 The potential of geoenergy has been assessed in five pilot areas in Tallinn, Viims, Maardus and various cities in north-easternEstonia159.

x. Where appropriate, specific measures to promote the use of energy from biomass

The most direct contribution to the deployment of new biomass resources is ENMAK 2030 Action 2.1 "Increasing the uptake of alternative fuels in transport." Furthermore, the measures included in the table of measures in Annex III to the document will contribute to increasing the uptake of biomass.

Biomass energy production must take into account sustainability criteria for biomass, the waste hierarchy, sustainable forest management principles while preserving natural diversity. The use of forest biomass in heat production is projected to be in the same order of magnitude (~9000 GWh), which is also the case

155 Heat and cooling studies | Energy Actions
156 District cooling – Utilitas
157 From district cooling https://gren.com/ee/kaugjahutusest/
158 Roosna-Allik gets a cheap room heater at a depth of 500 metres (postman.ee)
159 Summary of the geothermal potential mapping study | Energy Actions

for the amount of wood used for energy purposes (~4.5 million tm; assuming 1 tm = 2 MWh). On the[160] basis of the report on technical assistance of the amendments to the Renewable Energy Directive, it can be concluded that **compliance with the sustainability criteria for timber supply in Estonia is presumably ensured by compliance with the legislation (Forestry Act, Nature Conservation Act, EU Timber Regulation)** and thus timber collected from Estonian forests in accordance with legal requirements is presumed to meet the sustainability criteria. Nevertheless, Estonia needs to implement the long-term carbon capture and storage target more effectively than hitherto. The relevant discussions and policy orientations will come from the adoption of the Plan for the Future Economy.

The sustainability requirements and criteria for biomass are laid down in Section 32^3 of the Energy Management Organisation Act and energy producers have the possibility in Estonia either to use a voluntary scheme recognised by the European Commission or to establish an internal control mechanism. In the latter case, in order to **demonstrate compliance with the sustainability requirements and criteria for biomass, the economic operator must collect origin information for the different categories of biomass fuels produced from biomass sourced in Estonia to demonstrate that the biomass complies with the sustainability criteria and requirements** (introduced by Ministerial Order 16.07.2023[161]).

3.1.3. Other elements of the dimension

I. Where relevant, national policies and measures affecting the EU ETS and an assessment of how they complement and affect the EU ETS.

Estonia is the largest contributor to and influencer of the EU's greenhouse gas emission allowance trading system (EU ETS) in the production of electricity and liquid fuels from oil shale. Given the current environmental requirements and climate objectives, oil shale power generation units produce only a certain amount of liquid fuels from oil shale and use production by-products and residual heat to produce electricity. The profitability of oil shale production depends primarily on world oil prices, but also on EU ETS unit costs and local environmental charges, and is affected by the depreciation of equipment. International fuel quality requirements (e.g. sulphur limits) are also an important driver. At the same time, companies in the oil shale sector are reshaping their production. The light fraction is expected to produce an increasing number of chemicals (light naphta, LPG, reformate and hydrotreated heavy fractions) in the future, which will be an important raw material for the chemical and material industries. Such activities are also less significant in terms of greenhouse gas emissions.

In order to ensure a long-term balanced use of oil shale, the National Development Plan 2016-2030 for the use of oil shale has been in place since 2016, which identifies the directions for the use of oil shale as a national strategic indigenous energy source. Their planning shall include an assessment of the use of shale oil and gas, taking into account economic, social, security and environmental aspects.

In addition to the developments in the oil shale industry (including more efficient use of oil shale), excise duties on electricity and fuels and environmental charges have an impact on emissions reductions.

Excise duties

The[162] fuels subjectto excise duty are unleaded petrol, leaded petrol, aviation gasoline, kerosene, diesel, special purpose diesel, light fuel oil, heavy fuel oil, oil shale fuel oil, motor liquid gas and motor natural gas,

160 Technical assistance for the preparation of guidance for the implementation of the new bioenergy sustainability criteria set out in the revised Renewable Energy Directive – Publications Office of the EU (europa.eu)

161Environmental requirements for liquid fuels, sustainability criteria for biofuels, bioliquids and biomass fuels, procedures for monitoring and reporting the compliance of liquid fuels with environmental requirements and methodology for determining greenhouse gas emissions savings from the use of biofuels, bioliquids and biomass fuels-Official

162 Alcohol, Tobacco, Fuel and Electricity Excise Duty Acthttps://www.riigiteataja.ee/akt/120062019003

coal, lignite, coke and oil shale, LPG, natural gas, fuel-like product, liquid combustibles and biofuels. Biogas, including biomethane, is exempt from excise duty. In order to ensure the competitiveness of energy-intensive users, excise differences have been introduced in Estonia. Applications for authorisation to exempt energy from excise duty may be submitted by electro-intensive undertakings with intensive gas consumption. In order to apply for a permit, the operator's energy management system shall comply with standard EVS-EN ISO 50001. The current rate of excise duty on electricity for electro-intensive undertakings authorised to exempt energy from excise duty is EUR 0.5 per MWh of electricity. The preferential rate of excise duty on natural gas for an undertaking with intensive gas consumption authorised to exempt energy from excise duty is EUR 11.30 per 1 000 m 3 of[natural gas].

The use of specialised diesel below the normal rate is allowed for agriculture. Special purpose diesel used for commercial fishing shall be exempt from excise duty.

Environmental charges

Another fiscal measure that has an impact on emissions in Estonia is environmental charges. The purpose of environmental charges is to prevent or reduce potential damage related to the use of environmental resources, including the use of natural resources, discharges of pollutants and disposal of waste, to direct the use of natural resources more efficiently, to compensate for environmental emergencies and to generate revenue for the State from exploiting it.

Environmental charges are set on the basis of environmental protection needs, the economic and social situation of the country and, where provided for by law, the value generated by natural resources. It is also based on the environmental controversy and the purpose and type of environmental use.

All companies subject to an integrated environmental or environmental permit have to pay a pollution charge for emissions into the ambient air. According to the Regulation of the Minister for the Environment, environmental permits are, inter alia, mandatory for companies that own or operate (solid, liquid or gaseous) combustion plants with a rated thermal input equal to or greater than 1 MWth when firing fuel (unless the combustion plant operates less than 500 operating hours per year, the combustion plant must be registered). By way of exception, the CO2 pollution charge is payable only by heat companies within the meaning of the Law on district heating. From 1 July 2024, the CO2 pollution tax has been set at EUR 25/t until that time, from 2009 onwards, EUR 2/t. Furthermore, as of 1 July 2024, no pollution tax is levied on heat companies whose installation is part of the European Union's greenhouse gas emission allowance trading scheme for their respective activities.

The pollution charge applies when sulphur dioxide (SO2) or other inorganic sulphur compounds, nitrogen oxide (NOx) or other inorganic nitrogen compounds, ammonia (NH3), fine particles (PM10), non-methane volatile organic compounds, heavy metals and their compounds, mercaptans, hydrogen sulphide, carbon monoxide (CO) and carbon dioxide (CO2) are emitted into the ambient air from a stationary emission source. The pollution charge does not apply to methane and fluorinated greenhouse gases (HFC, PFC and SF6).

The Environmental Charges Act also provides for the possibility of replacing the pollution charge (including CO2 pollution tax) with environmental investment by companies. The pollution charge shall be replaced if the polluter implements, at its own cost, environmental protection measures which reduce the amount of pollutants or waste by at least 15 % compared to the period before the investment.

Through the environmental fees received, the State has financed environmental projects (including the replacement of fossil fuel boilers with boilers for renewable fuels, renovation of district heating systems, etc.) through the environmental programme of the SA Environmental Investment Centre for the last 20 years.

Measures in the electricity generation sector

The following measures with a significant impact have been implemented in Estonia in the past and will

have a significant impact on Estonia's CO_2 emissions up to 2030:

1) In the period 2004-2005, two dust boilers in Narva power plants were replaced by blocks of fluidised bed boilers (2x215 MW); and
2) In 2011, the construction of an additional fluidised bed boiler unit (with a capacity of 300 MW) started:

   Auvere oil shale-based power plant. The investment cost was around EUR 640 million. The plant was launched in 2015 and completed in 2018. The new power plant is designed so that 50 % of the fuel input used can be biomass.

In the long term, it is important to ensure that sufficient controlled power is available in the electricity system. Estonia has historically been dependent on oil shale electricity, but the transition to renewable energy means phasing out oil shale electricity. In 2023, the total oil shale-based capacity was 1 330 MW. The withdrawal means the exit of today's shale blocks from the market, leading to their gradual closure. For example, in 2024, Eesti Energia preserved the Baltic CHP bloc. At present Eesti Energia has an obligation to keep oil shale blocks in operation until 2027 because of the owner's expectations. According to today's estimates, closures can take place as follows:

- 3-4 additional blocks (with a total capacity between 700 MW and 850 MW) are likely to close in 2027;
- there will be around 494-660 MW until 2035, the fate of which will depend on policy decisions and market profitability.

II. Policies and measures to achieve other national targets, where applicable

Adaptation to climate change

Adaptation and action to climate change are slowly but consistently becoming a horizontal issue in Estonia, helping to link all relevant sectors and administrative levels to adaptation action. Adaptation to climate change has been included as a horizontal topic in a number of sectoral development documents and development plans, as well as in the national long-term development strategy "Estonia2035". The underlying principles of the national long-term development strategy 'Estonia 2035' agree that Estonia must ensure a high-quality and species-rich living environment, preparedness and ability to reduce adverse impacts caused by climate change and to make the best use of the positive impacts.

This is achieved by aiming for a cross-cutting deployment of solutions contributing to the green transition and supporting planning in cooperation with local authorities to mitigate climate change, reduce and adapt to climate change, enhance and preserve biodiversity, diversify the living environment, promote green living and visitor environments.

The Climate-proof Economy Act under development in Estonia aims to set out principles and objectives for climate mitigation and adaptation (as of May 2025). Local authorities or associations of municipalities will be required by law to draw up energy and climate plans setting quantitative greenhouse gas emission reduction targets that contribute to the achievement of national greenhouse gas emission reduction targets and climate adaptation targets, together with an action plan to achieve these targets. As of spring 2 025.73 % of local authorities have developed their own energy and climate plans. The Climate-proof Economy Act intends to introduce, inter alia, a regulation for the preparation of a climate change adaptation monitoring report and a regular obligation to produce a climate risk report...

Continuous development of environment and weather monitoring information systems will support the preparation of municipalities for climate change. Several municipalities have taken into account the risks posed by climate change in local development plans, as well as in the renovation of water, sanitation and other routes, and in the preparation of detailed and zoning plans.

The overall objective of the 'Development of Adaptation to Climate Change to 2030' (KOHAK), adopted in 2017, is to reduce Estonia's vulnerability to climate change through an action framework and to become

ready and capable of addressing the impacts of climate change at local, regional and national level. In addition, the development plan includes eight specific objectives directly based on the vulnerability of the priority areas, describing them and formulated accordingly. Their implementation is supported by climate change adaptation measures included in the implementation plan of the development plan, together with the activities, results and costs (see Table 3.4). The objectives, measures and actions related to adaptation to climate change are to be reviewed, updated and incorporated into a new sectoral strategy paper of the Ministry of Climate. The general trend in the country is to reduce the drafting of separate development documents to ensure better cooperation and integrated management of the sectors. The implementation of the objectives will be carried out through sectoral action programmes resulting from the objectives set out in the strategic development documents, e.g. in the environmental performance area “Plan for the protection and use of the environment” and relevant programmes of other ministries.

Since the entry into force of the COURT, COURT has integrated adaptation objectives and measures in the priority areas to increase resilience to climate change impacts in sectoral development documents, which map the main challenges and risks and set out actions and measures to mitigate those risks.

In the energy sector, according to COURT, the impact of climate factors on the efficiency of energy consumption occurs in several ways. For example, poorly built building structures are poorly heated, and as wind speeds increase, buildings’ heat losses are also increasing. On the other hand, indoor cooling needs are increasing during higher summer temperatures. The sharply increasing consumption of electricity due to heating or cooling, with very cold and very hot weather conditions, can lead to overloads and power cuts. Power cuts are also caused by thunderstorms and storms, and resulting overvoltage can cause damage to electrical equipment that is not removed from the mains. Thus, efficient or sustainable use of energy helps to reduce the risk that additional burdens resulting from extreme weather events have a negative impact on energy infrastructure and system. In accordance with the specific objective of energy and security of supply, climate change should not lead to a reduction in energy independence, security, security of supply and the usability of renewable energy resources, and should not lead to an increase in the level of final consumption in line with the objectives of the Energy Union. The activities of the measure on energy independence, security of supply and energy security are closely linked to ENMAK 2030, increasing energy independence, security of energy supply and energy security, both now and in the event of increased weather conditions and possible extreme weather events, both at national and regional level. According to ENMAK 2030, the main challenges for adapting to climate change in the energy sector are to increase the share of the climate-proof grid, reduce the malfunctioning of distribution networks and make them weather-proof, which is also in line with the Energy Union’s objective of providing affordable, secure and sustainable energy for Europe and its citizens and is implemented through the Energy and Mineral Resources Programme under ENMAK 2030, which sets out electricity grid and distribution network reinforcement programmes to increase production capacity and adapt to climate change (e.g. storms). The programme will strengthen the electricity grid and increase renewable energy production capacity. ENMAK 2030 climate adaptation measure is the share of the climate proof grid in the distribution network, which stood at 44 % in 2012, with a target of 75 % in 2030.

According to the Transport and Mobility Development Plan 2021-2035, adaptation to climate change in the transport sector requires the development of port defence facilities and the financing of dedicated projects. In addition, the aim is to reduce the environmental footprint of transport infrastructure and adapt to climate change in line with the KICAK, with attention also to climate adaptation in the promotion of infrastructure to ensure the trafficability of gravel roads in spring and road safety in winter. Other impacts of climate change on transport infrastructure must also be taken into account. The Transport and Mobility Programme 2024-2027, drawn up on the basis of the Transport and Mobility Development Plan, provides for the following climate adaptation activities:

- Development and maintenance of water transport infrastructure for the period 2021-2027 developing port facilities and waters in the ports of AS Saarte Lind to adapt to climate change;
- The development and maintenance of road transport infrastructure, which will serve as a basis for upgrading the monitoring system for road weather stations, contributing, inter alia, to the EU’s specific objective of promoting a sustainable, climate-resilient, intelligent, secure and multimodal

trans-European transport network (TEN-T) and the policy objective 'Connected Estonia'.
- An urban environment conducive to green mobility, which also contributes to the specific objective No 3 of 'Greener Estonia': "promote a sustainable, climate-resilient, intelligent, secure and multimodal trans-European transport network and multimodal mobility at national, regional and local level".

In the area of health, according to the Population Health Development Plan 2020-2030 (RTA), it is important to take energy-saving principles into account when developing health infrastructure and thereby mitigate the effects of climate change. At the same time, it should be borne in mind that vulnerable people are the most vulnerable to climate change (e.g. storms and floods during winter and hot periods during summer) as they may lack the means and network to buffer the immediate effects of climate change on them or to mitigate climate risks. As a result, extreme weather events can exacerbate inequalities in society. The implementation of the RTD's objectives is mainly carried out through the 'Environment for Health Programme'. The health impacts of climate change are particularly felt in children, the elderly and chronically ill, as well as in people with multiple health problems at the same time. Climate change has led to extreme weather events, such as long and intense heatwaves, which increase health risks, especially in cities where very high temperature areas occur due to thermal island effects. In order to control the formation of heat islands, it is necessary to ensure both sound planning of the living environment and the abundance of natural green areas, which in turn reduce noise and air pollution. As the increase in heat waves is one of the main future climate risks in Estonia, areas of risk of heat islands have been mapped to better prevent heat island effects and a corresponding heat island map application has been created. An assessment of the health impacts of climate change and the development of necessary mitigation measures are planned for the period 2024-2027. In addition to the above, attention will also be paid to the quality of drinking water in the context of a changing climate.

In the area of internal security, according to the Internal Security Development Plan 2020-2030, climate change requires more attention to be paid to preventing large-scale fires, monitoring their occurrence and minimising the economy and speed of fires that have occurred. As climate change affects the escalation of extreme weather conditions, including floods and storms, and can also lead to widespread crises, preparing for such crises will become more important for citizens and the country. It is therefore important to pay more attention to climate change adaptation and mitigate the risks it may pose. To this end:
- increase society's readiness to take climate change into account and reduce it the risks they may pose;
- prepare for disasters caused by increasing extreme weather conditions and their consequences; for disposal.

The objectives set out in the Internal Security Development Plan will be met through a dedicated sectoral programme, whose main challenges for improving climate adaptation capacity are to ensure the resilience of rescue work and to build capacity (including in relation to climate change and security needs) to respond to floods and collapses, to eradicate storm damage, to forest firefighting, to improve capacities for demining and chemistry, and to strengthen preparedness to respond to a large-scale rescue event at sea and the associated rescue operation at sea.

for effective planning and management. In this context, the Flood Hazard Map application is helpful for flood management and quicker response.

As the agricultural sector is a climate-vulnerable sector, the ' Agriculture and Fisheries Development Plan 2030' and the'Common Agricultural Policy Strategic Plan 2023- 2027' (CAP) also elaborate on the impacts of climate change and the measures and actions needed to mitigate the impacts. Farmers are increasingly affected by climate change and the resulting adverse weather conditions, which is why more and more attention needs to be paid to risk management instruments that secure producers' incomes against market and production risks. Various risk management measures and harvest insurance help mitigate extreme weather conditions, excesses and droughts and the resulting loss of yields. Projected climate change also affects the primary sectors of the bioeconomy through infrastructure and transport. Estonia's future climate scenarios up to 2100 are expected to increase floods and drought periods in Estonia, to increase onshore

erosion and put at risk shore installations, and to prepare for major storm damage. The duration of the ice and snow cover and the level of seawater and inland waters are also affected. So in the agricultural sector, we need to prepare for more frequent forest fires, storms and floods, as well as new plant pests and alien species. Climate change can also have positive effects, such as increasing summer tourism seasons, increasing wind energy, growing new crops and increasing opportunities for eco- and IT innovation. 28 % of the CAP Strategic Plan budget (EUR 446 million) is dedicated to Specific Objectives 4 to 6, which contribute to climate change mitigation and adaptation, promote sustainable development and the efficient management of soil, water and other natural resources, biodiversity, ecosystem services, habitats and landscapes. The CAP's main climate adaptation activities are:

- V4.5 Encouraging land improvement investments that mitigate weather risks;
- V4.6 Ensure adaptation to climate change in crop production;
- V6.4 – Maintenance of biodiversity in private forests;
- V9.11 – Diversity of crop and horticultural crops, varieties suitable for local conditions presence;
- KK2.1 – Investments in forest adaptation to climate change (productive investments).

The CAP's climate adaptation metrics are:

- R.16 Percentage of farms receiving CAP investment support that:
  contribute to climate change mitigation and adaptation and to the production of renewable energy or biomaterials;
- R.27 Environmental sustainability and climate change mitigation and adaptation objectives
  number of activities supporting achievement in rural areas;
- R.30 Commitments supporting the conservation of forests and the management of ecosystem services
  share of forest land.

In the field of education and research, the'EducationDevelopment Plan 2021-2035' and the 'Estonian R & D, Innovation and Entrepreneurship Development Plan 2021-2035' address climate change adaptation . According to the Education Development Plan, the objectives of adaptation to climate change in education are to raise societal awareness of climate change mitigation and adaptation at all levels of education. Societal vulnerability and adaptation to climate change are strongly influenced by the level of science and education in a country that determines the level of preparedness and assessment of climate change. According to the Estonian R & D, innovation and business development plan, R & D & I is essential to overcome the challenges facing society and to increase societal well-being and cohesion, including in the context of climate change mitigation and adaptation.

Table 3.4 Sectoral overview of vulnerability to climate change and climate change adaptation action

Theme and objective	Vulnerability	Sector 3 Adaptation Actions
1. Health and rescue capacity. Improved rescue capacity and people's ability to protect their health and property have reduced the negative impact of climate change on health and the living environment.	The main vulnerabilities in the area of health are mainly driven by the capacity and readiness of health systems to adapt to changing climates and extreme weather events (continuous medical treatment); residents sensitivity and inequality, the proportion of vulnerable people (elderly, children, chronically ill) and the existence and functioning of alert systems. For rescue capacity, vulnerability depends on mass (floods; forest and wildfire) from emergency accident notification procedures, people's learned help and rescue and public once for securing disturbance.	1.1. Development of information, monitoring and support systems and development of action plans to improve and mitigate the management of health risks arising from climate change
		1.2. Building Rescue Capacity
2. Land use and planning The risks of storm, flooding and erosion have been mitigated, the thermal island effect has been mitigated, the climate resilience of the population has been increased by choosing the best solutions for land use and its planning.	Climate risks materialisation land use dependent on maintenance of drainage systems or unmaintained omissions, also their natural amortisation. Main the risks posed by climate change; and amplifying exceptional in cities exposed to weather events, where people's life is planned for limitedareas of land with specific land use, environments and urban landscapes. Vulnerability of Estonian cities with regard to climate change, depends on: in particular, population processes such as depopulation and ageing, a decline in unemployment; but also ASC spatial polarisation; and Hariumaa County	2.1. Raising awareness of the impacts and risks of climate change in land use, urban management and planning, developing planning methodologies for risk areas, and streamlining the regulatory framework
		2.2. Flood risk management and development of green spaces and urban green areas for climate risk management
3. The natural environment A changing climate ensures the diversity of species, habitats and landscapes, as well as the favourable status and integrity of terrestrial and aquatic ecosystems, as well as the provision of socio-economically important ecosystem services in sufficient scale and quality.	Natural environment to the environment, are maximum vulnerability all eco-systems (rural ecosystems, freshwater ecosystems, marine environment) and integrity and ecosystem services volume and quality sensitivity to hydrological (including ice and snow) mode change and biological site specialists are the most vulnerable in terms of diversity.	3.1. Preserving biodiversity in changing weather conditions
		3.2. Prevention, control and management of invasive alien species in a changing climate
		3.3. Ensuring the favourable status of communities and diversity of landscapes and organising nature conservation in a changing climate
		3.4. Stability, favourable condition, functions of terrestrial ecosystems and habitats,

Theme and objective	Vulnerability	Sector 3 Adaptation Actions
		ensuring resources and diversity in a changing climate
		3.5. Monitoring the status of bodies of surface water due to changes in temperature and hydrological regimes, the structure of biota communities, the external and internal load of substances and minimising climate risks
		3.6. Minimising the negative impacts of climate change to achieve a healthy marine environment and preserving biodiversity
		3.7. Ensuring sufficient scale and quality of socio-economically important ecosystem services, taking into account climate risks
4. Bioeconomy The sustainability of the bioeconomy sectors relevant to Estonia is ensured through climate-conscious planning for agriculture, forestry, water, fish, recreational management and peat extraction.	Agriculture, forestry, water, fish, recreational management and peat mining climate-informed planning (changes in hydrological regime and medium temperature climbing non-accounting) puts at risk the sustainability of key bioeconomy segments for Estonia.	4.1. Ensuring food supply in a changing climate through the development of land improvement systems, increasing the competitiveness of agriculture and knowledge creation and transfer
		4.2. Ensuring the productivity and viability of forests and their diverse and efficient use in a changing climate
		4.3. Ensuring the sustainability of fish stocks and the well-being (income) of those living in fisheries in a changing climate
		4.4. Diversifying tourism and increasing visitors' satisfaction
5. Economy Best use by economic agents	The relative slowness of climate change and the responsiveness and adaptability of Estonian companies to external changes ensure low vulnerability of the economy, even if adaptation	5.1. Mitigating the risks of climate change for households

Theme and objective	Vulnerability	Sector 3 Adaptation Actions
the opportunities and risks of climate change.	consists of the cessation of activities in areas significantly affected by climate change or a significant change in its nature. Vulnerabilities will increase if the economy as a whole is unable to take advantage of the new opportunities brought by climate change.	5.2. Encouraging entrepreneurship taking into account the effects of climate change
6. Society, awareness and cooperation Citizens understand the risks and opportunities of climate change.	Society vulnerability and adaptation change affecting significantly the level of understanding of the risks and opportunities involved and the level of science and education in the country. The most vulnerable to climate change are under-reported; vulnerable, poor people in socio-economic situation and with lower social capital.	6.1. Enhancing risk management and ensuring that staff in state and local authorities have the capacity to mitigate climate change risks 6.2. Supporting the adaptation of pre-primary, general and recreational schools, environmental education centres and vocational training institutions to the impact of climate change 6.3. Ensuring up-to-date and comprehensive information on climate change, including the transfer effects of global climate change on Estonia 6.4. Contributing to international cooperation on mitigation and adaptation and to the development of a strong international climate policy
7. Infrastructure and buildings The impact of climate change does not result in a reduction in the availability of essential services or in the energy efficiency of buildings.	Extreme weather events increase in frequency testing the entire transport system where several fact matched may entail unpredictable risks and near misses. Modes of transport in comparison are most more vulnerable road transport and movement of people through infrastructure-related disruptions, risk of slipping; uncoated secondary roads load capability decrease and light traffic due to safety-related changes. Unknown direction are 21st century the second halfway the vulnerability of transport technologies and fuels as a whole.	7.1. Ensuring safe driving, freight transport and access to vital services in changing weather conditions 7.2. Ensuring the resilience of buildings, energy efficiency and comfortable indoor climate for people in changing weather conditions
8. Energy and security of supply Climate change does not reduce energy independence;	Largely for the oil shale industry based on energy independence and security of supply, which depend on in particular: domestic availability and availability of energy resources and energy (electricity, heat and fuels)	8.1. Renewable energy resource usability and consumers' energy and

Theme and objective	Vulnerability	Sector 3 Adaptation Actions
—security, security of supply and the usability of renewable energy resources and the increase in final primary energy consumption.	for production necessary production capacity adequacy is generally low in vulnerability to climate change projected by the end of the century. Renewable energy sources such as biomass are more vulnerable to oil shale due to the seasonal nature of stockpiling and the need for interim storage.	provision of heat supply in changing weather conditions

Low carbon transition initiatives

The analysis of options for the deployment of low GHG emission technologies was prepared at the initiative of the Ministry of the Environment in 2021:

- The project for the analysis of options for minimising GHG emissions from the Estonian oil shale industry at Tallinn University of Technology “Climate Change Mitigation through CCS and CCU technologies”, the main objective of which was to assess the suitability of different carbon capture technologies and to develop scenarios for the application of these technologies in the Estonian oilshale industry163;
- The aim of the Estonian hydrogen resource deployment analysis was to identify the potential and deployment capacity of green and blue hydrogen production, distribution and consumption in Estonia, and to map opportunities, bottlenecks, market barriers and threats for the future, including by highlighting and assessing potential business projects. The analysis focuses on the period 2020-2030164.

In addition, a roadmap for the decarbonisation of energy intensive industries, including financial instruments for its realisation, is under preparation in the Ministry of Economic Affairs and Communications.

165 Part of Estonia’s renewed recovery plan, endorsed by the Council of the European Union on 16 June 2023, is the **acceleration component of the green transition, which** aims to **accelerate the green transition in Estonia’s recovery from** the coronavirus crisis, to contribute to the actions of the ‘Estonia 2035’ development strategy and thus to support the development of green technologies in their context by starting wider systems for societal change. The component consists of two reforms and six supporting investments, achieving the necessary quality expertise, building up R & D & I capacities, increasing resource efficiency, introducing new business models, developing the capital market and business environment, and advancing in the uptake of green hydrogen technologies. Activities will look at the green transition as comprehensively as possible and aim to address key market failures through smart investments to trigger technological and behavioural leaps, change in economic thinking and increased competitiveness of companies. The estimated RRF contribution to support the green transition of companies is EUR 225,18.

COMPONENT 2: Reforms and investments in the green transition of companies:

Reform 2.1: Green transition of enterprises

Investment 2.2: Green skills to support the green transition of enterprises

Investment 2.3: Green technology development programmes

Investment 2.4: Changes in the business model of manufacturing companies

Investment 2.5: Deployment of resource-efficient green technologies

163 “Climate change mitigation through CCS and CCUtechnologies”see https://www.ttu.ee/projektid/climmit/
164Final report onthe analysis of the HYPERLINK "http://h2est.ee/eesti-vesinikuyhing/strateegia/Eesti" Estonianv. hydrogen resource uptake analysis– hydrogen resources-use-analysis.pdf (sei.org)
165 https://www.rtk.ee/toetused-taotlemine/taaste-ja-vastupidavusrahastu-rrf/eesti-taastekava

Investment 2.6: Green Fund

Investment 2.7: Promoting the deployment of complete hydrogen technologies.

Investment 2.8: Security of supply investment support measure

Fair transition

In Estonia, the 'Territorial Just Transition Plan'173 approved by the European Commission in October 2022 sets out a just transition plan and measures. The scheme also provided for the use of the European Union Just Transition Fund (JTF) with a focus on Ida-Virumaa in Estonia, which has been a hub for the oil shale industry for decades (described in more detail in Chapter 2.1.1., paragraph (ii)).

The term 'just transition' has a specific meaning developed in the Estonian context in recent years: a just transition takes place in Ida-Virumaa and includes measures co-financed by the EU to mitigate the negative socio-economic impacts of the transition to a climate-neutral economy in that region. However, in its 2022 report 174, the expert group set up under the Steering Committee on Green Policy of the Government of the Republic pointed out that 'just transition' should be interpreted more broadly: in addition to just transition topics in Ida-Virumaa, the expert group focused on broader socio-economic impacts of climate policy across Estonia, i.e. beyond Ida-Virumaa.

Despite not being directly associated with the concept of "just transition", Estonia is already taking into account regional specificities when developing support measures today (including energy efficiency measures in multi-dwelling buildings, the rates of support are differentiated according to the average property price in the region). In the short term, the Social Climate Fund, to be set up, will also contribute to further mitigating the socio-economic impacts of achieving climate objectives across Estonia, with the necessary plan to be submitted to the EC in summer 2025, with an implementation period from 2026 to 2032.

In any case, Ida-Virumaa remains the target area for the EU Just Transition Fund in Estonia for the 2021-2027 budgetary period. However, the transition to climate neutrality is a long-term process that goes beyond 2029. Given the scale of the challenge that Ida-Virumaa is facing, it is also necessary to continue to support Ida-Virumaa from other national and European instruments in addition to the resources of the JAF.

According to the 2023-2027 Action Programme of the Government of the **Republic, attention is planned to build storage capacities in proportion to renewable energy. As regards oil shale mining, the aim is to favour the depletion of mineral resources in existing mines rather than opening new mines**.

iii. Policies and measures to achieve low emission mobility (including electrification of transport)

A zero-emission vehicle subsidy round of EUR 9 million was opened in February 2023 to support both the purchase of electric cars (including hydrogen fuel cell) and electric bikes. The objective of the support measure is to increase the share of vehicles used in Estonia using electricity from renewable energy sources and to contribute to wider environmental conscious choices in the business sector and by private individuals. An amendment to the Zero-Emission Vehicles Regulation entered into force in January 2025, changing a number of previous conditions, including extending support to second-hand electric cars and offering additional support for a demolished car.

173 Just Transition Plan | Just Transition Fund (idavirufond.ee)

174 Report of the Expert Group on Green Policy: https://valitsus.ee/media/4870/download The budget for the action

was already exhausted in March of the same year (2025) and the purchase of a bicycle with around 1728 M1 and N1 and 237 boxes was supported. The expected impact of unconsumed petrol and diesel fuel and the dozens of ICE cars at the end of their lifespan on the reduction of CO_2 emissions is expected to be around 26 000 tons over a period of 4 years. At the same time, owners of electric vehicles acquired by means of the subsidy also compulsorily acquire renewable energy certificates for the same amount of energy consumed on the road. Renewable energy certificates prove the use of renewable energy in the energy system balance sheet in different areas.

The measure to boost the uptake of biomethane aims to increase the use of biomethane through the creation of at least three public biomethane injection points. It is important to support the decarbonisation of the gas network in order to create opportunities for replacing fossil natural gas with renewable gases on the gas transmission network.

iv. Where applicable, national policies, timelines and measures planned to phase out energy subsidies, in particular for fossil fuels

An overview of the energy subsidies used in Estonia is summarised in Chapter iv. The most significant of these are related to the consumption of fossil fuels, in particular support for diesel used in agriculture with a lower excise duty rate, also under the Electricity Market Act, support for high-efficiency cogeneration from peat or oil shale processing ewe gas is provided. No modification of these two measures is planned, as the reduced rate of excise duty on diesel supports the competitiveness of agriculture and the State does not have the objective of encouraging the additional market entry of fossil fuel cogeneration plants.

The **overall objective of ENMAK 2030, approved by the Government of the Republic in 2017, is to provide consumers with a market-based price and availability of energy supply** that is in line with the European Union's long-term energy and climate policy objectives, while contributing to the improvement of Estonia's economic climate and environmental condition and to increasing long-term competitiveness. Based on the amendments made in 2022 to the Energy Organisation Act, renewable energy represents at least 65 % of national gross final energy consumption, at least 100 % of gross final consumption of electricity, at least 63 % of gross final consumption of heat and at least 14 renewable energy used in road and rail transport by 2030 % of total energy consumed in transport. Renewable energy production
for cultivation, the current support scheme ended in 2020 and 2021-2025 is under supply of renewable electricity, which should gradually reduce the need for fossil fuels, including in electrification of other sectors (increasing use of heat pumps, electric vehicles).

3.2. Dimension energy efficiency

This chapter describes the planned policies, measures and programmes implementing the indicative national energy efficiency target for 2030 and other objectives in accordance with point 2.2, including the measure and instruments (including financial) designed to promote the energy performance of buildings. The ENMAK 2030 document describes the various measures aimed at achieving one of the two sub-objectives of the Development Plan: Estonia's energy supply and consumption is more sustainable and its quantification metrics. The following measures of ENMAK 2030 are the most directly contributing to energy efficiency:

- Measure 2.1 Increase the uptake of alternative fuels in transport;
- Action 2.2 Reduction of demand for motorised individual transport;
- Measure 2.3 Efficient vehicle fleet;
- Measure 2.4 Increase the energy efficiency of the existing building stock;
- Measure 2.5 Increase the expected energy efficiency of new buildings;
- Measure 2.6 Effective thermal energy transmission;
- Action 2.7 exemplary for the public sector; and

Measure 2.8 Energy savings in other sectors.

i. I. Energy efficiency obligation schemes and alternative policy measures under Articles 7a and 7b and Article 20(6) of Directive 2012/27/EU and to be prepared in accordance with Annex III to this Regulation

In order to achieve the objectives described in Chapter 2.2, taxation of energy carriers and measures in the final consumption sectors will be implemented. Estonia has not implemented an energy efficiency obligation scheme but has opted for alternative measures that take into account energy incapacity where possible (Article 10 of (EU) 2023/1791, respectively).

The taxation of energy carriers is subject to VAT and excise duties on fuel and electricity, see also Chapter (i). The following measures are implemented to improve final energy consumption, as set out in Annex III to this document. Current measures do not currently assess or monitor energy poverty separately. The obligation to assess and monitor energy poverty came with the new Directive (2023/1791/EU), which is due to be transposed into national law in October 2025.

ii. Long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, including policies, measures and actions to stimulate cost-effective deep renovation and policies and actions to target the worst performing segments of the national building stock, in accordance with Article 2a of Directive 2010/31/EU

The long-term renovation strategy forbuildings [166] was drawn up on the basis of the Energy Union Regulation EU 2018/1999 and submitted to the European Commission in 2020. The main objective of the strategy is the complete renovation by 2050 of the building stock built before 2000.

In 2022[167], a research development project was launched to renew and implement the objectives of the long-term strategy for the renovation of buildings in Estonia and to address the green transition in terms of energy efficiency and climate proofing of buildings. The project partners are 17, the leading partner is the Ministry of Climate. The project is co-financed by the European Climate, Infrastructure and Environment Executive Agency (CINEA) through the LIFE IP (Integrated Projects) sub-programme for environment and climate action projects. The total budget is around EUR 16.3 million, of which EUR 9.5 million is the European contribution. The LIFE IP BUILDEST project runs until 2028.

iii. Description of policies and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers to the use of energy performance contracting and other energy efficiency service models[168]

The development of the energy services market is regulated by Sections 31 and 32 of the Energy Organisation Act. In developing the energy services market, the Ministry of Economic Affairs and Communications (MKM), in cooperation with the SA Environmental Investment Centre (KIK), the Development Fund and SA KredEx, has analysed the potential of the energy services market and potential market barriers. There are also several roundtables on energy services. In 2019, the topic of Energy Performance Contracts (EPCs) was mainly addressed to provide assistance to the public sector in the procurement of energy services, a corresponding guidance material and a model contract were prepared. An outreach event on this topic also took place in February 2019 for various actors. Thus, the objectives set out in Section 31 of the Energy Organisation Act are met in close cooperation with stakeholders.

166 https://ec.europa.eu/energy/sites/ener/files/documents/ee_building_renov_2017_et.pdf
167 BUILDEST https://kliimaministeerium.ee/buildest
168 In accordance with Article 18 of Directive 2012/27/EU.

Several instruments have been developed by the State (SA KredEx, KIK) to help finance energy efficiency projects. For example, SA Kredex offers various subsidies to both apartment associations and private individuals for the reconstruction of houses. More detailed information is published on their website, as well as the name of specialists in the renovation of a multi-dwelling building169.

The Ministry of the Environment implements the measure 'Resource efficiency of enterprises', which, inter alia, develops the energy services market. The resource efficiency measure also supports the procurement of public energy services. The measure consists of four activities: raising awareness, training specialists, carrying out audits/resources analysis andinvesting170.

Several companies are active in the Estonian energy services market, such as Adven171, Fortum172, AU's energy service OÜ173, Eesti Energia174, etc. These websites provide information on energy performance contracting and the projects carried out.

iv. Other planned policies, measures and programmes implementing the indicative national energy efficiency target for 2030 and other targets in accordance with point 2.2 (e.g. measures to promote the exemplary role of public buildings and energy-efficient public procurement, measures to promote energy audits and energy management systems175, information and training measures forconsumers 176 and other measures to promote energyefficiency177).

Exemplary role of public buildings

In order to fulfil the exemplary role of public buildings, measures are being implemented to renovate public buildings (descriptions in Annex III to this document).

According to Section 5 of the Energy Management Organisation Act, a central government real estate energy saving coordinator organises that 3 % of the total useful floor area of buildings occupied by the central government is renovated each year. The Ministry of Finance currently performs the role of coordinator for energy savings in central government real estate. Under the new recast Energy Efficiency Directive, the 3 % renovation requirement extends to all public buildings, including, for example, buildings of local authorities. The renovation of the buildings of local authorities is already mentioned as one of the measures to achieve the overall energy saving obligation target (see Annex III.)

Table 3.5 Renovation rate of central government buildings.

Year	Execution	%
2014	17 000	1.50 %
2015	56 321	6.20 %
2016	30 740	3.00 %
2017	40 700	5.20 %
2018	30 222	3.90 %
2019	22 549	2.50 %

169 Technical consultants. https://kredex.ee/sites/default/files/2021-04/Technical_Consultants_home page15042021.xls
170 Circular Economy. https://ringmajandus.envir.ee/
171 Energy efficiency https://adven.com/ee/lahendused-toostusele/energiatohusus/
172 Fortum, Products and Services. https://www.fortum.com/products-and-services
173 Energy service http://energiateenus.ee/
174 Energetic products. https://www.energia.ee/et/tark-tarbimine/kokkuhoid
175 In accordance with Article 8 of Directive 2012/27/EU.
176 In accordance with Articles 12 and 17 of Directive 2012/27/EU
177 In accordance with Article 19 of Directive 2012/27/EU.

2020	9 471	1.10 %
2021	18 681	2.20 %
2022	8 436	1.00 %

Promoting energy-efficient public procurement

Energy-efficient public procurement is a key measure that focuses on the energy efficiency first principle (EED Article 3, (EU) 2023/1791). The promotion of energy-efficient public procurement in Estonia is based on the Energy Sector Organisation Act. Section 6 of the Act lays down the obligation for central government bodies to purchase only products, services and buildings with high energy efficiency. More specific requirements are laid down in the Government of the Republic Regulation 'Energy Performance Requirements for Products, Services and Buildings purchased by CentralGovernment'178. A "Strategic Principles for Public Procurement" was adopted in autumn 2023 – where energy efficiency is highlighted both under green procurement and under RRF measures.

In addition, through the sharing of best practices, the Ministry of Climate must encourage public authorities, including those at regional and local level, to follow the example of central government and purchase only products, services and buildings with high energy efficiency. Specific activities to this end will be carried out on a project-by-project basis.

From a circular economy perspective, GPP isimportant179. The main objective of these procurements is to reduce the negative environmental impact of products and services from production, use and disposal, i.e. throughout the life cycle of the product/service. In this way, risks to human health and the surrounding environment can be reduced. Green products and services are not only environmentally friendly products and services, but also high-quality, energy- and resource-efficient, produced from reusable or recycled material, eco-innovative, etc. It is important that the environmental impact of the product or services and the whole life cycle of the product or services are taken into account when sourcing.

Energy audits

Section 28 of the Energy Organisation Act (EnKS) deals with the obligation for large undertakings to carry out regular energy audits. Under Section 28(1) of the EnKS, an undertaking other than a small and medium-sized enterprise or a distribution system operator or a transmission system operator must conduct an internal energy audit every four years, based on Article 8 or Article 11 of the Energy Efficiency Directive 2012/27/EU of the European Union.

According to the law, a large enterprise is defined as an enterprise with more than 250 employees and where at least one economic indicator is fulfilled: it has a turnover of more than EUR 50 million and/or an annual balance sheet of more than EUR 43 million. Under the new Energy Efficiency Directive (from autumn 2026), companies with total energy consumption above 10 TJ (2.77 GWh/y) and companies with a total energy consumption of more than 85 TJ (23.6 GWh/y) will be obliged to implement a standard for energy management systems (e.g. ISO 50001). The list of large companies is drawn up and published on its website by the energy savings coordinator, the Ministry of Climate. The purpose of drawing up and publishing the list of large undertakings is both to inform large undertakings and to assist the Consumer Protection and Technical Regulatory Authority (ECTRA) in the organisation of supervision.

The minimum requirements for energy audits are laid down in Regulation No.76 of the Minister for Economic Affairs andInfrastructure '180Minimum requirements for energy audits', adopted on 22 December 2016. The regulation is in the process of being updated with the transposition of the new Energy

Energy performance requirements for products, services and buildings purchased by 178 central government. https://www.riigiteataja.ee/akt/110032017016

179 Green public procurement. https://envir.ee/ringmajandus/ringmajandus/keskkonnahoidlikud-riigihanked

180 Minimum requirements for energy audits. https://www.riigiteataja.ee/akt/123122016003

Efficiency Directive. The number of large companies has fluctuated around 120 to 150 years, with 30-40 audits per year spread over four years, ensuring a consistent workload for both energy auditors and ECTRA supervision. It also ensures a reasonable price for energy audits when the workload is homogeneous.

Table 3.6 Number of energy audits submitted by large companies since 2020.

Year	Number of energy audits submitted
2020	23
2021	18
2022	32
2023	33

Minimum requirements also provide an estimate of the areas where energy is consumed. Two areas can be identified – production processes or the energy needed for enterprises' main activities (which accounts for the largest share of ~35 000 GWh/y), followed by the energy consumption of buildings (~3000 GWh/y, including lighting). The obligation to carry out an energy audit for large companies is linked to the energy and resource efficiency measure proposed by the Ministry of the Environment during the ongoing period of EU structural funds. This measure aims to lay the foundations for future resource efficiency gains in industry and targets small and medium-sized enterprises in particular. The measure consists of four activities:

- awareness raising;
- training of specialists,
- carrying out audits, i.e. analyses of resource use; and
- investment.

Replacement of pipelines

The reduction of the diameter of district heating pipelines and the installation of priority insulated pipelines are eligible for support under measure EN3 for the development of heat management. 2021-2027 will continue to support projects to renovate boiler equipment and heat pipelines. Only the replacement of boiler equipment will be eligible for support under the 2025 call. Still supported projects are likely to be built in 2027, but funding decisions are very likely to be taken in 2025

v. where relevant, a description of the policies and measures promoting the role of local energy communities in contributing to the implementation of the policies and measures referred to in points (i), (ii), (iii) and (iv).

Under the recast of the Renewable Energy Directive EU 2018/2001, renewable energy communities must be promoted. A renewable **energy community is a legal entity whose primary purpose is to provide environmental, economic or social community benefits to its shareholders, shareholders or members or to the local areas in which it operates, rather than financial profits** (Article 2). Renewable energy communities shall have the right to:

a) produce, consume, store and sell renewable energy, including through renewables power purchase agreements;

b) share, within the renewable energy community, renewable energy that is produced by the production units owned by that renewable energy community, subject to the other requirements laid down in this Article and to maintaining the rights and obligations of the renewable energy community members as customers;

c) access to all suitable energy markets in a non-discriminatory manner, either directly or through aggregation (Article 22).

Cooperative cooperation is common in Estonia, e.g. apartment associations, consumer cooperatives, forest cooperatives, agricultural cooperatives. For example, local communities will be able to benefit from the planned subsidies for building renovation and heat management measures, in particular through the association of apartments. All the above-mentioned cooperative activities can also be installed today for renewable energy production facilities and do not have to designate themselves as a renewable energy community. The projects that have taken place so far to involve consumers in energy production have shown that the emergence of **local energy communities in Estonia requires raising awareness, fixing the community problem that cooperative activities seek to address, finding frontrunners and providing no advisoryservices181. Building a renewable energy community requires knowledge of relevant technologies and very good expertise in the functioning of the electricity market – in the same place, a project can be profitable or loss-making, depending on how the project is structured.**

Experience with the programme of 10 energy cooperatives with 10 potential energy cooperatives (including 7 municipalities) between 2014 and 2015 showed that a certain population density, experience of cooperative cooperation, availability of fuel-free and other renewable energy sources and suitable energy technologies, the ability to reconstruct buildings and the ability to sell energy to the grid are prerequisites for forming an energy community in Estonia. 8 to 9 years have passed since the programme was carried out, and the electricity market has become more open, regulation has been improved, but cooperative activities compete with 'normal' businesses. Technologies are more favourable, electricity prices and extra costs (network charges, etc.) have increased, making the PV panel project reasonably cost-effective (estimated). While a community has sufficient financial resources to realise a renewable energy project together, according to the definition of an energy community, profit-making must not be the primary objective – so the community needs a value-based problem that is being tackled together for the community – this does not mean that cooperative activities must not be profitable.

The definition of a community creates a challenge and forces frontrunners to familiarise themselves with the needs of the community in depth, map possible solutions and specifically explain why working together is beneficial to all parties. The alternative is to group together under the legal body of OÜ, KÜ, TÜ, etc., without restrictions on making a profit.

Banks play a role in activating cooperative energy production. However, banks have a high risk sensitivity due to a lack of sound experience. Similarly, profit is not the primary objective of banks and, according to the definition of energy in the community, profit. However, the high-interest capital absorbs a relatively large part of the revenue generated by, for example, the solar power plant installed by an apartment association and thus makes the activity unattractive.

Reducing societal inequalities could be one of the deliverables for the creation of energy communities. For example, to improve the livelihood of vulnerable households, a community park has been created, where participation is possible without major investment, but household energy costs can be eliminated. A household in distress or borderline with basic needs is technically, financially or mentally incapable of transporting or managing such a project for the project. Therefore, in order for a community energy project to be successful, it is necessary to ensure the success and sustainability of the project, whether through the participation of a local authority or otherwise. In Estonia, in defining the role of energy communities and defining them as energy cooperatives, the European Federation of Renewable Energy Cooperatives has taken as a starting point the182 practice of the EuropeanFederation of Renewable Energy Cooperatives. Estonian legislation does not define energy communities or energy cooperatives separately, but their activities overlap with the forms set out in the Commercial Code, i.e. renewable energy communities can operate as limited liability companies within the meaning of the Commercial Code and also as a public limited company. An energy cooperative is defined here as a community activity whose main purpose is to

181 See also energy cooperativeshttps://energiatalgud.ee/index.php?title=Energia%C3%BChistud

182 REScoop https://www.rescoop.eu/

produce, distribute and sell electricity and heat for self-consumption to its members through their own facilities, i.e. also to minimise energy costs through a collective activity of the community that generates and distributes electricity and heat centrally to its members to cover self-consumption. Civic renewable energy production means decentralised renewable energy production owned (at least 50 %) or operated by citizens, local initiatives, communities, local authorities, philanthropic or non-governmental organisations, farmers, cooperatives or small and medium-sized enterprises that create local value that can remain in the region.

The potential of Estonian energy cooperatives and socio-economic meadowswere 183 assessed in 2015 as part of the mentoring programme for energy cooperatives. **The greatest energy potential for energy cooperatives is in multi-dwelling buildings and public buildings that are not located in district heating areas or are located in district heating network areas with low consumption density. The potential of** local cooperative electricity generation with solar panels amounts to a total of 30 GWh/a (3 % of the annual electricity needs of buildings if the price of the investment is lower than the price of purchased electricity). **Local generation of electricity for the existing local distribution system has a positive impact by allowing a few percentage points to increase grid capacity**. In addition, there is potential for wood-gasification with cogeneration of energy of 22 GWh/y. Wind energy production potential does not coincide with the location of multi-dwelling buildings and public buildings in Estonia. The share of local electricity production would be 0.33 % of the final electricity consumption of all buildings. Buildings with heating cooperative potential account for 8-10 % of the final heat consumption of all buildings.

The potential of communities in energy production can be harnessed in particular at local level. More than 9200 cities184 have joinedthe Global Covenant of Mayors for Climate and Energy, including Tallinn, Tartu, Rakvere, Jõgeva, Kuressaare, Rõuge and Võru from Estonia. The Pact requires reducing $CO_{2\text{emissions}}$ from urban territory by 40 % by 2030, making cities carbon-neutral by 2050 and improving resilience to the impact of climatechange185186. In the context of the Horizon 2020 project 'Energy Roadmaps – R4E', a roadmap for Tallinn Energia was drawn up. Various international energy community projects are run by TartuRegion[Energiaagentuu in Estonia,] e.g. Interreg Co2mmunity, Horizon 2020 PANEL 2050 and SmartEnCity.

The Ministry of Climate, together with various interlocutors such as the Estonian Association of Cities and Municipalities, Research Institutions, NGOs, has organised Community Energy Round Tables for all interested parties over the past three years to support the development of the sector and to clarify the need to remove the various obstacles. Two projects were launched by NGOs, together with R & D institutions and municipalities, in order to bring more clarity to the development of community energy in Estonia and eventually to establish real energy cooperatives.

vi. Measures to develop measures to exploit the energy efficiency potential of gas and electricityinfrastructure 187

The use of the energy efficiency potential of gas and electricity infrastructure is governed by188 Section7 of the Energy Management Organisation Act, which obliges transmission and distribution system operators to identify measures to improve the energy efficiency of their network, the necessary investments and a timetable for their deployment and to report them to the energy savings coordinator. Paragraphs 3 and 4 of that section provide that the cost of energy efficiency measures is to be taken into

183 Estonian Development Fund 2015 report on POTENTSIALI AND SEALAND for energy cooperatives https://energiatalgud.ee/img_auth.php/1/13/Eesti_Arengufond._Energia%C3%BChistute_potentsiaali_ja_sotsiaalmaja
commercial_m%C3 %B5ju_anal%C3 %BC%C3 %BCS._2015.pdf

184 Global Covenant of Mayors for Climate and Energy https://www.globalcovenantofmayors.org/our-cities/

Decision of185Tallinn City Councilfile:///C:/Users/Irje.Moldre/Downloads/04.04.2019_otsus_59%20(1).pdf

186 TREA. www.trea.ee

187 In accordance with Article 15(2) of Directive 2012/27/EU.

188 The Riigikogu. Law on the organisation of the energy sector. https://www.riigiteataja.ee/akt/129062018074?leiaKehtiv

account when setting network charges for network operators. Network charges shall not impede the overall efficiency of the gas or electricity system, including energy efficiency, improvements, demand management, market participants' participation in the balancing market or the procurement of additional services. The actions of ENMAK 2030 contribute most directly to unlocking the energy efficiency potential of electricity infrastructure.

Table 3.7 Measurement of measures to exploit the energy efficiency potential of electricity infrastructured126

Objective: Security of supply: Continuous energy supply is ensured in Estonia		
Measure No.	**Barometer**	**Indicative target**
1.2	1. In the distribution system unplanned perhaps faulty interruptions average total length minutes per place of consumption per year, minutes	&90 (2030)
1.2	2. Amount of energy not delivered in the transmission network, MWh	&150 (2030)
1.2	4. Share of weathertight grid in the distribution	75 % (2030)

In addition to the overview of related measures in the Energy Sector Development Plan presented in the table above, important measures to improve the energy efficiency of electricity grids are the installation of remotely readable meters for all consumers (completed on 1 January 2017) and the optimisation of the connection of consumers to the grid (see further description below). In Estonia, remotely readable meters are fitted to all consumers.

Of the distribution networks, in terms of final consumption, Elektrilevi OÜ has the largest sales volume, with a market volume of 86.5 % in 2021. The share of electricity OÜ's network losses in the total volume has shown a steady decline, remaining 4 %roots in recent years189.

Further improvements in the efficiency of electricity grids can be achieved through the reduction of the underutilisedgrid190. Unserviced lines and substations increase losses and significantly reduce the efficiency of the system.

In the transmission network, the magnitude of losses depends, inter alia, on the amount of energy transferred, cross-border trade in energy, and the distribution of power flows in the interconnected energy system and the resulting transit and weather conditions (air humidity, rainfall). In 2021, the core network had losses of 1 097 GWh, or 5.1 %.191

The potential to increase the energy efficiency of the gas network lies in nodes that use energy.

The energy consumption of the gas system consists of three major components: electricity consumption, gas self-consumption and gas chaos. The energy efficiency potential of the gas network and possible measures have been analysed in the 2020 report on improving the energy efficiency of the Estonian gas system192.

So far, the following measures have been implemented under the Gas LossReduction Programme193:

189 Page 14 Financial Year_Report_2023_4a93f7b27a.pdf
190 Electricity network. https://energiatalgud.ee/Elektriv%C3%B5rk?category=163
191 Electricity and gas market report 202, Competition Authority -https://www.konkurentsiamet.ee/et/ametist-contacts/reports
Improving the energy efficiency of the192 Estonian gas system, KPMG - https://energiatalgud.ee/sites/default/files/2022-05/Gas %C3 %BCsteemi%20 %C3 %B5husus%%20 %20 %29.pdf
193 Estonian Gas Network Development Plan 2023-2032, Elering -https://elering.ee/sites/default/files/2023-03/Estonia%20Gas%C3 %BCloading%C3 %B5rgu%20Development plan202023-2032_0.pdf

- Upgrade of measuring equipment at gas metering stations;
- Replacement of outdated meters in GJJs;
- Realisation of the measurement error correction function of the gas meterin quantity conversion meters;
- Activities to match the metering range of the gas meter with the amount of consumption;
- Specification of the methodology for calculating gas losses from maintenance and repairs;
- Set the operating parameters of the measuring lines of gas distribution stations over as wide a range as possible in order to prevent small gas flows from flowing through the measuring line in reserve.
- •

In accordance with Section 212(1) and (3) of the Natural Gas Act, the system operator (Estonia Elering AS) prepares an annual ten-year network development plan for gas transmission and publishes it on its website194. The development plan shall set out measures to ensure sufficient capacity and security of supply of the gas system over the next ten years. The latest gas transmission network development plan builds on the country's ambitions for a neutraldecarbonisation of electricity and heat by 2040. By then, alternative hydrogen infrastructure and biomethane and synthetic gas value chains are still developing and, given the risks associated with the completion of various large infrastructure projects and technological developments, Estonia's objective of maintaining the gas grid until 2050 needs to be addressed in order to mitigate energy security risks, thus providing investors with certainty about investment decisions for new appliances using gaseous fuels. Losses in the gas transmission network were 13.81 GWh in 2021 and 15.58 GWh in2022195. In 2023, the gas transmission network lost a total of 25.3 GWh, and the increase in losses was caused by a loss of the BalticConnector's maritime pipeline (with a loss of 7.8 GWh).

vii. Regional cooperation in this area, where appropriate.

Estonia participates in the Baltic Sea Energy Market Interconnection Working Group on Energy Efficiency. The Committee of Senior Energy Officers of the Baltic Council of Ministers will also address energy efficiency issues as appropriate. These co-operation formats are described in chapter (ii).

viii. Financing measures, including EU support and use of EU funds in this area at national level

Measures related to energy efficiency and reduction of emissions in buildings and transport are set out in Annex III.

— In accordance with Regulation (EU) 2021/1060 of the European Parliament and of the Council of 16 May 2024**, the Social Climate Fund (Social Climate Fund) will be launched as of 2026, in the run-up to the launch of the EU Emissions Trading System (EU ETS II) targeting buildings and road transport in particular.** The SKF is a new fund that can be used to support activities to reduce GHG emissions, increase energy efficiency and promote the use of renewable energy in the heating and cooling of buildings and road transport. According to the forecast at the end of 2022, Estonia's total SFF funding will be available for the period 2026-2032 of around EUR 186 million.

In Estonia, the use of SSF funds is planned in the long-term strategic planning process, by analogy with planning the use of EU funds for the 2021-2027 budget period under the coordination of the Ministry of Finance, taking into account synergies and synergies between the various public co-financing activities. The aim is to achieve the most favourable interplay of SKF resources with other State-supported activities and

194 Gas transmission network development plan: https://www.elering.ee/gaasiulekandevorgu-arengukava
195 Electricity and gas market report 202, Competition Authority -https://www.konkurentsiamet.ee/et/ametist-contacts/reports

measures.

The planning of the use of SSF funds is based on relevant sector-specific strategy papers (some of which are in the process of being renewed or under preparation as of March 2023) and the indicative budget allocation between measures was decided at the beginning of SSF planning in the process of the country's fiscal strategy. Before submitting the SRF plan to the EC, it will be reconfirmed by the Government of the Republic.

3.3. Energy security measure (e)196

i. Policies and measure(d) related to the elements set out in point 2.3197.

The key principles for energy security in Estonia have been established by the Estonian Parliament on the basis ofthe198' Estonian security policy' adopted in 2017. The foundations of the 2017 security policy are also underpinned in turn by the fifth framework document, the 2023 'Bass of SecurityPolicy199', which describes the changing security environment. Energy security, which is a strategic challenge for Estonia, is primarily linked to economic security and vital services. Estonia aims to achieve and maintain full energy independence from the Russian Federation and to diversify its energy portfolio. Sufficient controlled capacity shall be secured to reduce risks to the security of electricity supply. Estonia is strengthening its electricity systems together with Latvia and Lithuania; once the process is completed, the Baltic States will be able to disconnect from the systems of the Russian Federation and Belarus in order to connect to the mainland European electricity system.

The basis of security policy requires Estonia's economic model to be sustainable, competitive and future-proof. This is done by increasing the share of renewable energy in the energy balance and implementing a strategically managed green transition in Estonia. Estonia aims to produce the same amount of renewable electricity as the total annual consumption in 2030. Estonia is also developing innovative technological solutions in parallel that could also be offered to democracies, including the development of future minerals for energy production and the green transition. Estonia ensures secure supply chains and transparency of foreign investment in priority areas.

Estonia's long-term development strategy "Estonia 2035" highlights200 the **transition to climate-neutral energy production as one of the necessary changes, while ensuring energy security. The transition to a** climate-neutral and good air quality energy generation requires consideration of alternatives and choices. According to the development strategy, energy security and security of supply resilience must be ensured both during and before the transition to climate-neutral energy production. According to the development strategy, a solution that takes into account security, environmental protection and the interests of the population must be found in order to increase renewable energy. The document also highlights openness and support for new solutions such as offshore wind. In order to move away from oil shale production, during the transition period, support will be given to alleviating the socio-economic impacts of shale electricity production, and a service and investment package for Ida-Virumaa will be developed and implemented to help people, businesses and local authorities in the region benefit from the changes and

196Policies and measures shall reflect the energy efficiency first principle.
Consistency shall 197be ensured with the preventive action and emergency plans under Regulation [as proposed by COM(2016) 52] concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010, as well as the risk preparedness plans under Regulation [as proposed by COM(2016) 862] on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC.
198 Estonian
security policy foundationshttps://www.riigiteataja.ee/aktilisa/3060/6201/7002/395XIII_RK_o_Lisa.pdf#
199 Security policy foundations (2023).
https://www.kaitseministeerium.ee/sites/default/files/eesti_julgeolekupoliitika_alused_est_22.02.pdf
200 Development strategy 'Estonia 2035'https://valitsus.ee/media/4022/download

ensure a just transition to the new economy. In addition, the development strategy highlights that energy security and security of supply issues require attention for energy infrastructure.

Estonia's 'Internal Security Development Plan 2020-2030' 201 does not address energy security directly, but highlights the changing nature of security threats, such as hybrid threats, which may also affect Estonia's energy security. According to the Internal Security Development Plan, internal security needs to continue to be taken into account in the development of different policy areas, including hybrid threats. Strengthening state resilience, capabilities to counter cyberattacks, strategic communication, critical infrastructure protection and improving the resilience of critical services will play an important role in addressing hybrid threats, including mitigating the risks of hostile influence. **202 Under Section 36of the Emergency Act, essential services are the supply of electricity and natural gas**. Critical energy infrastructure under the European Housing Directive 2008/114/EUnit 203 is electricity and natural gas related infrastructure.

Cybersecurity

The action plan of the 'Estonia 2035' long-term development strategy204 highlights key principles for ensuring cybersecurity in society. These include ensuring the cybersecurity of the digital society, including systematic and consistent assessment of cybersecurity risks, renewing their management measures to ensure security and trust in cyberspace, and developing capabilities to manage cyber incidents and crises (including the development of common EU procedures).

Requirements to ensure cybersecurity are laid down in theCybersecurity Act205. The Cybersecurity Act imposes obligations on service providers, including providers of essential services (supply of electricity and natural gas). By operation of law, the service provider must implement permanent security measures to prevent or mitigate the impact of a cyber incident on the resilience of the service or on the security of the system. In addition, the service provider is obliged to carry out a risk analysis and to ensure that a description of the implementation of the security measures is in place and up-to-date. The eGovernment Academy is developing a Cybersecurity Index, which ranks **Estonia's third place in cybersecurity in the world, after Belgium and Lithuania, in May2023206.** This position demonstrates Estonia's readiness and systemic approach to cybersecurity.

The Ministry of Economic Affairs and Communications in Estonia coordinates the development of cybersecurity policies and the implementation of the strategy and the corresponding cooperation between public authorities and the wider community. At strategic level, coordination takes place through the Cybersecurity Council of the Government of the Republic Security Commission. In addition to the State Chancellery and ministries, the Estonian Information System Authority, the Consumer Protection and Technical Regulatory Authority, the Estonian Internet Foundation, the Estonian Information Communications Foundation, the Enterprise Estonia and KredEx, and Startup Estonia are the organisations contributing to ensuring cybersecurity in Estonia207.

Digitalisation increasingly involves traditional industrial sectors, including energy. Therefore, cyber-attacks or failures of information systems may be one of the risks of significant blackouts alongside storm damage and damaged trees in the future. In 2021, there was no lack of energy from the transmission network caused by cyber incidents. The activity of Elering AS, the electricity system operator, aims to ensure that, for these reasons, energy would not be provided in the future. Elering has carried out a number of cybersecurity-enhancing development projects over the past year, increasing situational awareness and reducing the

201 Internal Security Development Plan 2020- 2030. https://www.siseministeerium.ee/media/748/download
202 Emergency Act. RT I, 03.03.2017. https://www.riigiteataja.ee/akt/117052020003?leiaKehtiv
203 Council DIRECTIVE 2008/114/EC. https://eur-lex.europa.eu/legal-content/ET/TXT/HTML/?uri=CELEX:32008L0114 & from=EN
204 Estonia 2035 Action Plan. (28.04.2022). https://valitsus.ee/media/4771/download
205 Cybersecurity Act. RT I, 22.05.2018. https://www.riigiteataja.ee/akt/122052018001?leiaKehtiv
206 Cybersecurity Index https://ncsi.ega.ee/country/ee/
207 Cyber securityhttps://www.mkm.ee/digiriik-ja-uhenduvus/kuberturvalisus/riigi-kuberturvalisuse-tagamine

impact of data leaks and attacks. In addition, Elering has improved its internal procedures and requirements to better respond to the challenges of a changing world. Over the coming years, the security of critical information systems, monitoring of computer networks and processes related to the construction and management of critical infrastructure are planned to be improved.

Electricity system

For the development of managed capacities, the following indicative actions will be taken in the coming years:
2025 Service for Isleability and procurement of Elering 150-500 MW frequency reserves
2027 activation of the Capacity Mechanism as a strategic reserve
2028-2029 Completion of additional controlled capacity of up to 500 MW (e.g. gas power plants) as a result of the procurement of the Eling frequency reserves
2030+ The network has at least 1 200 MW of controlled capacity

The development of the electricity grid will include the following activities in the coming years:
2024 Initiation of the preparation of the 4th Community National Specific Plan for Estonia-Latvia (expected establishment 2026)208. Draft electricity grid connection acceleration proposal, 3 synchronous compressors installed. Preparation of the offshore network development plan.
2025 synchronisation with the Central European band. Reform of the connection to the core network
The **2030** electricity grid has a total capacity of up to 5 500 MW.
2030+ 4th interconnection Estonia-Latvia and 3 rd interconnection Estonia-Finland (under planning, analysis)

The possible options for the introduction of controlled power into the Estonian electricity system are outlined in Figure 3.2 below.

By 2030, the Estonian electricity system will have around 1 000 MW of storage and DSR will participate in all electricity markets.

The following measures of ENMAK 2030 are the most directly contributing to the security of supply of the electricity system and the related objectives:

- Measure 1.1 Development of electricity generation; and
- Action 1.2 Transmission in line with the needs and efficiency of the electricity economy

In order to assess and ensure the security of supply of the electricity system, Estonia has established a security of supply standard resulting from Regulation 2019/943(EU) of the European Parliament and of the Council. The security of supply standard is set out in the network code on the operation of the electricity system, according to which the number of curtailment hours shall not exceed nine hours per year and the amount of electricity expected not to be supplied as a result of demand response and other activities to ensure security of supply shall not exceed 4.5 Gigawatt hours per year. Following a proposal by the Competition Authority, a new security of supply standard will be set in 2024 at 8 hours, i.e. less than the previous one.

Elering AS's 2024 Security of Supply Report estimates that the reliability standard could be exceeded in 2027, as oil shale electricity is no longer competitive in the electricity market and old shale production blocks are gradually closed. In order to ensure security of supply, Elering AS estimates that the capacity mechanism should be implemented in 2027, as an example of a strategic reserve.

In order to achieve the objectives described in Chapter 2.3, the following measures shall be implemented:

Support for renewable energy and support for efficient cogeneration of heat and power
Increasing the share of weather-proof grid
Synchronisation of the Baltic States' electricity system with the Continental European synchronous area

208 https://riigiplaneering.ee/riigi-eriplaneeringud/eesti-lati-neljas-elektriuhendus/eesti-lati-neljanda-elektriuhenduse

Investments in the Baltic States as part of the Baltic synchronisation project (see section 2.4.2) will also contribute to the resilience of the electricity system, which will help remove bottlenecks both in Estonia and in other Baltic States and increase the availability of external connections and the flexibility of the electricity system to rapid changes in electricity generation.

On the basis of the **Competition Authority's report, the adequacy of the Estonian electricity system has been ensured in the next decade209.** Estonia's production capacity in 2025 can be found in the table below.

Table 3.8 – Estonia's production capacity in 2025 (a)210.

Energy source	Net installed capacity MW
Oil shale	1330
Fossil gas	92
Natural gas	110
Wastes	17
Biomass	150
Hydropower	8
Wind energy (land)	682
Solar	1174
Other	20
Total	**3473**

Gas system

To ensure the security of gas supply and the related objectives, ENMAK 2030 will contribute to:

- Action 1.3 Securing gas supply.

More specifically, Chapter 2.4.2 deals with security of supply in the gas system.

District heating systems

In order to ensure security of supply in district heating systems,district heating211 plants impose obligations on heat companies. In the case of district heating systems in which heat is delivered to customers above 50 GWh/y and which are located in a local authority of at least 10000 inhabitants, the heat undertaking is a critical entity.

For very large systems with a thermal energy consumption of at least 500 GWh/y, reserve fuel capacity is mandatory to ensure the supply of heat within three days.

To improve security of supply, district heating support measures will continue to:

- Refurbishment of depreciated and inefficient heat pipelines and/or construction of new heat pipelines. The measure will result in the renovation of 67 km of depreciated thermal pipelines.
- Renovation and/or construction of district heating boilers and fuel switching. The measure will

209 Electricity and gas market report 2021, Competition Authority -https://www.konkurentsiamet.ee/et/ametist-contacts/reports

210 ENTSOE transparency platform.
https://transparency.entsoe.eu/generation/r2/installedGenerationCapacityAggregation/show

211 District Heating Act. https://www.riigiteataja.ee/akt/103032017012?leiaKehtiv

result in the renovation of district heating boilers of at least 21 MW.

Security of supply will be improved by increasing network and production efficiency and reducing the risk of failures. The price of heat is better controlled.

Liquid fuels

In order to ensure the continuous availability of liquid fuels, Directive 2009/119 EC, Implementing Directive EU2018/1581 and the Liquid Fuel Stocks Actt, as212 well as, from 19 November 2013, the International Energy Agency Agreement on the Energy Programme, are guided by the stockholding requirements and implement one of the actions of ENMAK 2030:

- Measure 1.4 storage of fuel supplies.

In accordance with the Liquid Fuel Stocks Act and international obligations, Estonia must keep the stock continuously at a level corresponding to at least 90 days of average daily net imports of energy products or at least 61 days of daily inland consumption of energy products, whichever is the greater. In addition to the amount of the general stock, the Liquid Fuel Stocks Act provides that a quantity corresponding to the quantity of national consumption of an energy product corresponding to at least 30 days in the previous calendar year must be kept in the stock in Estonia. The reserve fuel shall be composed of the following products: petrol, diesel and jet fuel.

Oil shale

The use of oil shale and the demand for oil shale products are linked to international energy and climate policy objectives. Electricity produced from oil shale is not predominantly at competitive prices in the electricity market, which calls for gradual steps to replace shale-based controlled capacities with new, more competitive plants. As long as no new stations are in place, existing ones must be maintained. It is therefore important to be ready to implement the strategic reserve and other relevant measures in Estonia. It is also important to ensure the addition of additional, secure production capacities capable of delivering fast-track regulatory services.

ii. Regional cooperation in this area

Baltic Council of Ministers

The Committee of Senior Energy Officers of the Baltic Council of Ministers regularly cooperates on energy issues in the region. Meetings at the level of senior Baltic officials are held on a rotating basis.

In summer 2022, the Baltic Regional Security Coordinator (Balti RCC) was established by the Baltic system operators. The Baltic RCC is responsible for organising the coordination of the regional activities necessary for the operation of the electricity system between the system operators. In essence, this means that RCC provides some operational planning functions that have so far been performed by electricity system operators. At present, the Baltic RCC provides the Baltic system operators with five main services (in the future, the number of services willincrease)213:

- Creation of common grid models. The main objective is to harmonise the design principles of grid models and their daily validation and aggregation into a central grid model that can be used in different robustness processes and calculations.
- Coordinated operational security analysis, including an assessment of corrective actions (e.g. counter-trade). Using a common grid model, identify possible emergency situations where the normal network service could be disrupted by modelling of network modes and actions to remove corrective actions when identifying these situations.

212 Liquid Fuel Stocks Act. https://www.riigiteataja.ee/akt/101072017019?leiaKehtiv
213 https://elering.ee/book/export/html/1177

- Coordinated regional planning of power system interruptions. Plan and evaluate system interruptions to ensure the reliability of the system in case of possible accidents.
- Regional week-ahead to at least day-ahead system adequacy forecasts and preparation of risk mitigation measures.
- Supporting the assessment of the consistency of system operators' protection plans and restoration plans during the periodic review. From 1 January 2018 until central European electricity grid synchronisation, coordinated balance sheet management is implemented in the electricity systems of Estonia, Latvia and Lithuania. Estonia, Latvia and Lithuania are considered as a single balance area, and one of the Baltic system operators is responsible for balancing the balance sheet of the entire Baltic Sea. In order to minimise the deviation of the Baltian total AC balance, the necessary amount of reserve capacity from the common bid list shall be activated. 214

Gas system

As gas system operator, Elering AS is part of the*Regional Gas Market Coordination Group* (RMCG) of the Baltic States and Finland. In addition to the relevant national system operators, the working group includes regulators and ministries responsible for the sector.

In addition, pursuant to Article 3(7) of the Gas Security of Supply Regulation (EU 2017/1938), a working group between 3B+FI countries (North Eastern gas supply risk group) has been set up to jointly prepare risk analysis and emergency prevention and resolution plans for the region. The working group shall include representatives of ministries, regulators and gas system operators.

Solid fossil fuels

Estonia has no regional and international agreements on the supply of solid fossil fuels. However, Estonia has acceded to one international agreement, which in theory may affect the supply of solid fossil fuels. TheAct on Accession to the Spitsbergen Treaty, adopted by the Riigikogu on 4 February 1930, which215ratified the 'Leping on Spitsbergen', allows Estoniancompanies216, among other economic activities, to engage in the extraction of mineral resources in Spitsbergen. Estonia does not plan any economic activity related to mining in Spitzbergen.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

The financing of the measure 'Synchronisation of the Baltic States' electricity system with the Continental European Synchronous Area' is organised by the Estonian Transmission System Operator (Elering) in cooperation with the TSOs of Latvia, Lithuania and Poland. Transmission system operators finance activities related to the development of the electricity network by means of a network charge collected from consumers, while cross-border connections are built with funds from the so-called 'bottleneck charge'. The aim is to use the European Union's co-financing to finance this action. The Baltic synchronisation project has been on the list*of Projects of Common Interest (PCIs) of the*European Union since 2013. In the past, the Estonian-Latvia 3 (330 kV connection Riga CHP 2 and Klingi-Nõmme substations and the Harku-Sindi 330 kV connection opened in 2021) have received co-funding for the implementation of the action. Project funding has been requested under the current financial period and will also be required in the next EU financial period.

214 Elering AS. Rules for securing the balance sheet. https://elering.ee/sites/default/files/attachments/Bilansi%20tagamise%20ehk%20tasakaalustamise%20eeskirjad%2001.2018.pdf

Official215 Gazette, No. 14, 18 February 1930. https://dea.digar.ee/article/AKriigiteataja/1930/02/18/4

Official216 Gazette, No. 14, 18 February 1930. https://dea.digar.ee/article/AKriigiteataja/1930/02/18/5

3.4. Internal energy market measuree 217

3.4.1. Electricity infrastructure

i. Policies and measures to achieve the level of electricity interconnection set out in Article 4, point (d)

The electricity interconnection target of the Member States of the European Union shall be at least 10 % by 2020 and at least 15 % by 2030112.

The electricity transmission infrastructure measures (see chapter 2.4.2 in more detail) are primarily aimed at synchronising the Baltic States' electricity system in the band subject to European Union law and at increasing the availability of existing external connections. Activities under the Baltic synchronisation project are taking place in Estonia, Latvia, Lithuania and Poland. Investments under synchronisation will strengthen both interconnections between countries and the national electricity transmission network. This will remove bottlenecks in the electricity system and increase the interconnection between the Baltic States and Poland. Interconnection capacity from EE to LV was 1 447 MW, LV to EE 1 259 MW, EE-FI 1 016 MW. The following actions of ENMAK 2030[4] contribute most directly to ensuring electricity interconnections:

- Action 1.2 Delivery that responds to the needs of the electricity economy and is efficient.

In order to achieve the objectives described in Chapter 2.2, the following measures shall be implemented:

Improving the quality of network services
Increasing the share of weather-proof grid
Synchronisation of the Baltic States' electricity system with the Continental European synchronous area

ii. Regional cooperation in thisarea218.

The Baltic synchronisation project will be implemented in cooperation between the Baltic States and Poland. A detailed overview of the project status and activities can be found on ENTSO-E's website (t) describing the project219 and in Chapter 2.4.2. The synchronisation project is further discussed in chapter 2.4.2.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

See previous paragraph.

3.4.2. Energy transmission infrastructure

The financing of the measure 'Synchronisation of the Baltic States' electricity system with the Continental European synchronous area' was organised by the Estonian Transmission System Operator (Elering) in cooperation with the TSOs of Latvia, Lithuania and Poland. Transmission system operators finance activities related to the development of the electricity network by means of a network charge collected from consumers, while cross-border connections are built with funds from the so-called 'bottleneck charge'. The aim is to use the European Union's co-financing to finance this action. The Baltic synchronisation project has been on the list*of Projects of Common Interest (PCIs) of the*European Union

217 Policies and measures shall reflect the energy efficiency first principle.
218 Other than the PCI Regional Groups established under Regulation (EU) No 347/2013.
219 Baltic synchronisation. https://tyndp.entsoe.eu/2016/insight-reports/baltic-synchronisation/

since 2013. In the past, for example, the establishment of the 3 rd Estonia-Latvia Community has received co-financing for the implementation of the measure. Project funding has been requested under the current financial period and will also be required in the next EU financial period. In the light of today's hybrid threats and lessons learned from Russia's attacks on Ukraine's energy infrastructure, it is necessary, after synchronisation, to increase the physical security of critical energy infrastructure, both onshore and undersea.

i. Policies and measures related to the elements set out in point 2.4.2, including, where applicable, specific measures to enable the delivery of Projects of Common Interest (PCIs) and other key infrastructure projects

The measures for the implementation of electricity system projects of common interest and other major infrastructure projects are described in section 3.3.1. Input given for the gas system in paragraph 2.4.2.

ii. Regional cooperation in thisarea220.

For electricity transmission infrastructure, all relevant information is described in section 3.4.1. Input given for the gas system in paragraph 2.4.2.

iii. If applicable, financing measures in this area at national level, including EU support and the use of EU funds

For electricity transmission infrastructure, all relevant information is described in section 3.4.1. Input given for the gas system in paragraph 2.4.2.

220 Other than the PCI Regional Groups established under Regulation (EU) No 347/2013.

3.4.3. Market integration

i. Policies and measures related to the elements set out in point 2.4.3.

Electricity system

The following actions of ENMAK 2030 contribute most directly to market integration and aggregation of the objectives set out in Chapter i:

- Action 1.2 Delivery that responds to the needs and efficiency of the electricity economy

In order to achieve the objectives described in chapter 2.4, the following measures shall be implemented:

Improving the quality of network services
Increasing the share of weather-proof grid
Synchronisation of the Baltic States' electricity system with the Continental European synchronous area

Significant investments in the Baltic States will contribute to market integration as part of the synchronisation project (see Chapter 2.4.2), which will help remove bottlenecks in all Baltic States and increase the resilience of the electricity system to rapid changes in electricity generation and consumption.

Gas system

The most important investment in physical infrastructure for gas market integration was the construction of Balticconnector in 2019. At the end of 2022, Estonia completed a grid connection to connect a potential floating LNG (LNG) terminal to the transmission network. On 10 March 2023, the State acquired the LNG berth in Paldiski. The set-up transmission network and hauling quay will increase the security of the area and allow for the reception of a floating LNG terminal where necessary. In the course of 2022, an additional floating LNG terminal was also installed in Inko, Finland. Both investments increase the security of supply in the region.

ii. Measures to increase the flexibility of the energy system for the production of renewable energy

Chapter 2 addresses measures to increase the flexibility of the energy system to produce renewable energy, such as smart grids, aggregation, demand response, storage, distributed generation, mechanisms for distribution, redispatching and curtailment, and real-time price signals, including the deployment of intraday coupling and cross-border balancing markets. These measures will be implemented to achieve the objectives set out in Chapter (ii).

Electricity system

The adequacy of the electricity system and the flexibility of the energy system will be ensured through ENMAK 2030 under measures 1.1 of the security of supply sub-target. (Implementing the development of electricity generation) and 1.2 (Electricity and efficient transmission). These measures will guide grid operators to make the necessary investments and develop solutions for a more efficient integration of renewable energy into the Estonian electricity system. A good example of such innovation is a map application developed by the Estonian Transmission System Operator (Elering AS), which shows the available capacity on an annual basis in the electricity grid owned by the company, thereby enabling renewable energy producers to plan their projects more efficiently. More specifically, Chapter 2.4.2 deals with the electricity system.

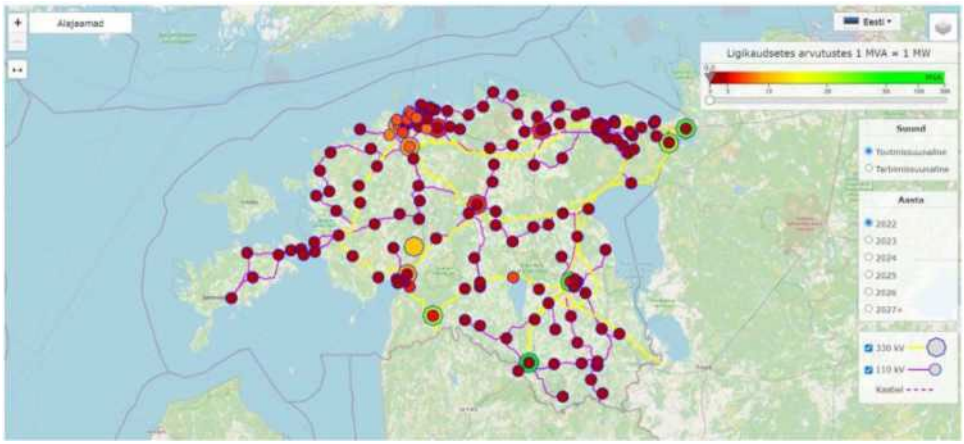
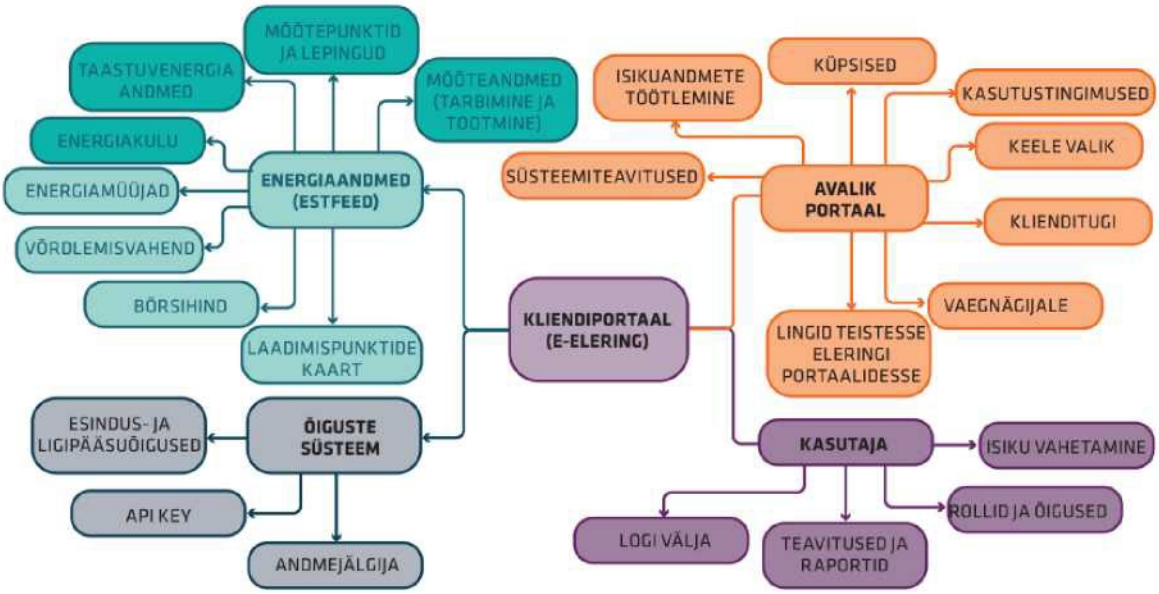


Figure 3.2 Appliance of Elering AS free connection capacity maps 221

The synchronisation project (see chapter 2.4.2) also contributes to the capacity-building of renewable energy integration by removing bottlenecks in the electricity system throughout the Baltic.

The system operator (Elering AS) has set up the Estfeed data exchange platform to develop the market for flexibility services. Estfeed allows secure messaging in the energy sector – the platform can interface with different data sources and applications that wish to use these data. Estfeed consists of a legal, software and hardware solution that manages the exchange of energy metering data between market participants, supports the process of switching electricity suppliers in the open market and allows access to metering data (e.g. to monitor and manage consumption) to software applications mandated by the consumer.222

221 Elering AS. A free connection map application. Connection capacity application e-Gridmap | Elering
222 Elering AS. Estfeed. https://elering.ee/elektrituru-kasiraamat/7-kauplemine-avatud-elektriturul/74-tarkvork-ja- Data exchange open -0



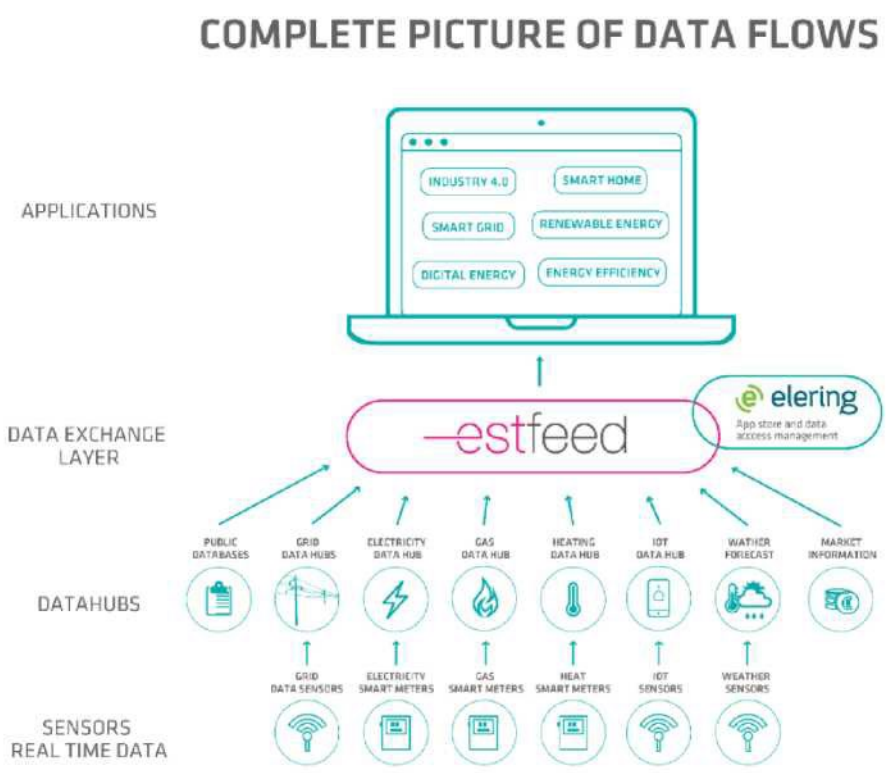


Figure 3.3 Reflection box of the Estfeed Customer Portal, including Estfeed,t[232]

The Estfeed platform is able to integrate different data sources (e.g. data from district heating and other telemeters and sensors in the future) and to provide suitable services for transforming data into valuable information for consumption management, flexibility management, auditing and comparison. E.g.:

[232] Mind map of the Elering Customer Portal. https://elering.ee/gaasituru-kasiraamat/6-kauplemine-eesti-gaasiturul-ja-Data exchange order/64-tarcvork-and-1

Gas and electricity data warehouses connected to Estfeed, Business Register, Population Register,

Foreca weather information, ENTSO-E Transparency platform for electricity.

Both the transmission system operator (Elering AS) and the largest distribution system operator (Elektrilevi OÜ) are also engaged in development projects to encourage the uptake of flexibility services in the Estonian electricity system (e.g. H2020 project EU-SysFlex; Launch of the Baltic single market for balancing services as of 1 January 2018). Flexibility has also created a need for a project such as INTERRFACE (project in progress), the main objective of which is greater coordination between TSOs and DSOs in order to facilitate the procurement of services at both transmission and distribution levels, to enable more efficient and effective management of the grid and to increase the level of demand response and renewable energy generation, while also enabling final customers to become active market participants. In 2020, the OneNet project was launched to develop a TSO-DSO coordination platform to optimise flexibility under the leadership of Elering. 223

The Baltic system operators opened the market for frequency reserves in 2025. In the Baltic frequency reserve market, the pools are jointly procured with the three Baltic States. In order to ensure that each country has access to the necessary amount of frequency reserves, a certain amount of transmission capacity is also booked on routes between the Baltic States for the frequency reserves. More specifically, the Roadmapfor224 themarket for frequency reserves on the Eleringwebsite225.

Estfeed also reflects the measurement data of the gas system (e.elering.ee). On the platform, consumers can see themselves and mandate gas sellers to see gas consumption data. For remotely readable measurement devices, the data shall be reached once a day on the platform, or once a month for locally readable meters.

iii. Where relevant, measures to ensure non-discriminatory participation of renewable energy, demand response and storage, including through aggregation, in all energy markets

The Electricity Market Act prohibits discrimination against market participants. At the request of a customer, a producer, a line holder or another system operator in its catchment area, the system operator is required to connect to the network at the connection point a proper electrical installation located in its catchment area and to change the consumption or generation conditions.128From 20 February 2018, aggregators will be able to contract with the system operator (Elering AS) the provision of regulatory services,226which means that aggregators can participate in the electricity market on the same basis as other market participants. As regards independent aggregators and energy storage, the regulation was supplemented under the EU Internal Market for Electricity Directive 2019/944. The terms and conditions for participation in demand response shall be developed by system broker Elering in cooperation with market participants and coordinated by the Competition Authority. In 2025, the Ministry of Climate supplemented the regulation to clarify tasks and rules.

Under the Natural Gas Act, the system operator has the obligation to ensure third-party access to the transmission network as provided for in Regulation (EC) No 715/2009.

Elering is developing competence to assess the capacity of the existing gas pipelines to transfer hydrogen and biomethane to a limited extent. It is already possible to transfer biomethane in the existing gas system, provided that it meets the gas quality standard of the network and is injected into the transmission network at the correct pressure. Limited hydrogen transmission capacity needs a more in-depth analysis, as hydrogen differs significantly from methane in terms of chemical properties. In addition, Elering is

223 Elering AS. Flexibility market https://elering.ee/paindlikkusturg
224 Elering AS. The market for frequency reserves. https://elering.ee/sagedusreservide-turg
225 Elering AS. Baltic Balancing Roadmap. https://elering.ee/sites/default/files/2022-10/Baltic_Balancing_Roadmap_update_19102022_0.pdf
226 Elering AS. Regulations and rules. https://elering.ee/maarused-reeglid

exploring the necessary and possible development of a clean hydrogen transmission pipeline to help achieve Estonia's and the European Union's climate policy objectives and support the competitiveness of the Estonian economy. More specifically, in the Estonian gas transmission network development plan prepared by Elering 227 and in Chapter 2.4.2.

Estonia supports the uptake of green hydrogen in the transport sector and as feedstock for the chemical industry. The measure will contribute to the launch of the hydrogen market.

iv. Policies and measures to protect consumers, especially vulnerable and, where applicable, energy poor consumers, and to improve the competitiveness and contestability of the retail energy market

Consumer protection is guaranteed in Estonia in conjunction with the Consumer ProtectionAct,228the Electricity Market Acte128, the Heating Heating Act and the Natural Gas Act. Monitoring and dispute resolution relating to the electricity market and the gas market are divided between several agencies. The Consumer Protection and Technical Regulatory Authority deals with matters relating to contractual terms and supervises the advertising and sales activities of electricity and gas companies. On the basis of the Electricity Market Act, the District Heating Act and the Natural Gas Act, the Competition Authority supervises the functioning of the market and the activities of market participants. The Technical Surveillance Authority deals with issues related to electrical safety and metering.

The Consumer Protection Act provides that the consumer has the right to:

a) demanding and receiving a good or service that complies with the requirements, is safe for the life, health and property of the consumer and is not forbidden from possessing and using;
b) obtain necessary and accurate information about the goods and services offered in order to make an informed choice and timely information on the risks associated with the good or service;
c) receive information on consumer law and consumption;
d) to receive advice and assistance when consumer rights have been violated;
e) seek compensation for the material and non-material damage suffered;
f) seek to take account of their interests and be represented through their associations and associations in the decision-making process of consumer policy.

Thus, the Consumer Protection Act lays down the general requirements to be specified in a special law (Electricity Market Act, District Heating Act and Natural Gas Act).

Under Section 90 of the Electricity Market Act, during the period from 1 October to 30 April, a consumer who is a natural person may not disconnect from the grid in a building or part of a building which is a dwelling and which is used as a permanent residence and is heated entirely or mainly by electricity or for the operation of a heating system which consumes other types of fuel wholly or mainly for heating purposes, the use of electricity is unavoidable, less than 90 days after the notification.

Paragraph 17 of the Law on district heating provides that, if the consumer has failed to pay the charge provided for in the contract concluded with the network operator, the supply of heat for heating the dwelling may be interrupted during the period from 1 October to 30 April only after 90 days have elapsed since the date of receipt of the relevant notification and the consumer has not remedied the reason for the interruption of the supply within that period. At other times, the heat company must give at least 7 days' notice of the interruption caused by the debt.

Under Paragraph 26 of the Law on natural gas, if a household customer has failed to pay the fee provided for in the contract concluded with the seller and the household customer uses the gas for heating the dwelling used as the habitual residence, the supply of gas may be interrupted during the period from 1

227 Elering AS. Estonian Gas Transmission Network Development Plan – Gas Network Development Plan | Elering
228 The Riigikogu. Consumer Protection Act. https://www.riigiteataja.ee/akt/TKS

October to 1 May only after 90 days have elapsed from the date of receipt of the relevant notification.

Moreover, the competitiveness of the electricity and gas retail market will be strengthened by both regulatory and IT developments (04.2019 network codes implemented, developments in the PAP, etc.).

Emergency measures in light of high energy prices and the COVID crisis winter 2021-2022229:

- Excise duty cuts on energy carriers to mitigate the effects of the COVID crisis;
- 50 % compensation for network charges between October 2021 and March 2022;
- Energy price compensation for households whose income is below the at-risk-of-poverty threshold.

The crises of recent years, including Russia's war in Ukraine, have had an impact on livelihoods and have drastically fuelled electricity prices. In order to mitigate the effects of the increase in energy prices on household customers, the State developed a universal service (due to the fall in the price of electricity, the universal service was terminated as of 1 July 2024)230and granted various temporary subsidies. They partially compensated household customers for electricity, gas and district heating bills issued for the energy consumed between 1 October 2022 and 31 March 2023. The subsidies were 'automatic', i.e. the energy seller itself reduces the unit price of electricity, gas or district heating on energy bills to household customers and invoices the reduced volume to the State. The universal service was discontinued as of 1 May 2024.

To mitigate high energy prices, Estonia implemented a number of measures in winter 2022-2023231, including:

- Household electricity shall be compensated from an average monthly electricity price, exclusive of VAT, in excess of 8 cents per kilowatt hour (kWh), up to a maximum of 5 cents/kWh;
- For household customers of gas, the State compensates 80 % of the part of the average monthly gas price that exceeds EUR 80/MWh, i.e. EUR 0,8264 per cubic metre, net of VAT. In doing so, a maximum of 2.6 MWh (or 251.7 cubic metres) is compensated, which is the monthly gas consumption of the average private house.
- Household customers in district heating are compensated for 80 % of the cost of heat above the price of EUR 80/MWh (excluding VAT), similar to gas.
- Implementation of the universal service. As of 1 October 2022, the State Enterprise Eesti Energia was obliged to sell electricity to household and household customers as a universal service. For small-sized enterprises, universal service was provided from 1 November until the end of 2023. Household customers had the possibility to benefit from the universal service between 1 October 2022 and the end of April 2026.232 The sale of electricity to household customers and certain other groups of consumers as a universal service was a time-bound option on the part of the State which helped electricity consumers mitigate risks and mitigate the increase in electricity prices. The universal service ended on 1 July 2024, almost 2 years earlier than planned, as electricity prices are lower than in times of crisis and people currently on universal service bear an excessive financial burden compared to low-cost stock exchange prices.

v. Description of measures to enable and develop demand response, including measures using tariffs to support dynamicpricing 233

In 2024, the central settlement model was implemented in the regulatory market and complemented by

229 Energy poverty or energy poverty. https://energiatalgud.ee/node/8916?category=1700
230 Electricity Market Act-State Gazette
231 Energy Cost Compensation https://mkm.ee/energiakulude-huvitised
232 Universal service https://www.mkm.ee/universaalteenus#mis-on-universaaltee
233 In accordance with Article 15(8) of Directive 2012/27/EU.

provisions in the Electricity Market Act, where the system operator develops the conditions for participation in demand response in the day-ahead and intraday markets. Dynamic pricing is available to the consumer. More details on the electricity market are described in section 3.4.3.(ii).

3.4.4. Energy poverty

1. If applicable, policies and measures to achieve the objectives set out in 2.4.4

Public policies related to energy poverty are covered by the Social WelfareAct234, according to which the state supports people in need with financial assistance. The municipality pays subsistence benefits to people in need, the application, calculation, award and payment of which are governed by Section 8 of the Social Welfare Act. Section 133(5) of the Social Welfare Act, entitled 'Basis of calculation of subsistence allowance', lays down the housing costs to be taken into account for the purposes of calculating maintenance allowance, inter alia (paragraphs 5 to 8):

- the cost of heat or fuel consumed for the supply of hot water;
- the cost of heat or fuel consumed for heating purposes;
- the cost of electricity consumption;
- the cost of household gas.

In order to improve living conditions, SA Kredex provides the following subsidies to235 individuals and apartment associations:

- support for the renovation of small residential buildings;
- support for the renewal of heating systems for small residential buildings;
- renovation support for apartment associations;
- home support for families rich in children:
- support for the renovation of electrical installations for a private individual or an apartment association.

As of January 2019, a municipal advisory unit was set up within the Social Insurance Board, the aim of which is to ensure, in addition to the administrative reform, the provision by local authorities of all-in-one and high-quality social welfare assistance measures for adults.

The purpose of the Advisory Unit, which has been operating within the Social Insurance Institution since 2019, is to increase the state-organised support to local authorities in the performance of social welfare tasks, to harmonise and increase the quality of assistance measures and to contribute to the development of a strong primary social welfare system for adults. The Advisory Group provides strategic, operational and case-by-case advice to local authorities.

In order to alleviate the energy poverty that may arise during the heating period, there are differences in the District Heating Act, the Electricity Market Act and the Natural Gas Act, which significantly limit the normal interruption of energy supply. According tothe Law on236 district heating and the Electricity Market Act, during the period from 1 October to 30 April, the supply of energy may be interrupted only if a period of 90 days has elapsed from the date of receipt of the notification. The Natural Gas Act establishes the same principle for the period from 1 October to1st main237.

3.5.Research, innovation and competitiveness dimension

1. I. Policies and measures related to the elements set out in point 2.5

The **TAIE Development Plan's "Smart and Sustainable Energy Solutions" road map provides a** basis

234 Social Welfare Act. https://www.riigiteataja.ee/akt/130122015005?leiaKehtiv
235 KredEx financial services – an opportunity for a more secure future
236 District Heating Act, Section 17(41)
Section 26(31) of the 237 Natural Gas Act

for supporting collaborative projects between R & D institutions and companies for the development of energy technologies.

Support measures will open in 2023 for the implementation of the respective cooperation projects. The measures cover all the focus areas of TAIE, i.e. not only the focus area of smart and sustainable energy solutions. The overall objectives of the focus area “Smart and sustainable energy solutions” are: with R & D, innovation and entrepreneurship, Estonia produces energy in a climate-neutral manner, makes energy use more efficient and resource-efficient in Estonia, and contributes to the security of energy supply.

General R & D baselines formulated with target and stakeholders to underpin the development of the field are:

- integrated consideration of the environmental footprint in technologies and solutions for energy production, storage and consumption (from component manufacturing to component utilisation);
- cascading use of bio-resources, i.e. higher value-added products are first manufactured;
- addressing issues of energy production, consumption and security of supply from the perspective of community and consumer behaviour, socio-economic and socio-cultural aspects;
- interdisciplinary cooperation and combination of competences.

The R & D & I sub-streams with higher potential are as follows:

- Development of components for wind turbine erection and wind generation, development of technology for the maintenance of offshore wind farms (e.g. development of subveerobots), development of electronic equipment and systems (e.g. solar and wind farm management solutions)
- Development of bioenergy production (e.g. solid oxide fuel cells, market development of biogas cryo-purification technology, algae-based biofuel production technology, conversion of all organic residues and waste into products through anaerobic digestion process).
- Development and piloting of cooperative models for integrated renewable energy (solar, wind, wave, geothermal) and stored energy, and development of carbon capture and utilisation technologies.
- The development of hardware and software for novel flexibility technologies (e.g. the development of green hydrogen production technologies based on solid oxide electrolysers, which also allows for capturing the potential of CO2, energetic flexibility in buildings and industrial processes, hybrid storage, pumped hydroaccumulation technology or water storage).
- Studies on flexibility in energy storage and load management in the business and public sectors, industry and households provide a more effective insight into the needs and opportunities of flexibility technologies.
- A number of devices are in use that function as energy storage (e.g. electric car batteries, electric boilers, industrial intermediate rooms, thermal mass of buildings and technical building systems), therefore system services that can drive consumption and connect these devices as flexibility service providers to the electricity grid or community-based autonomous energy solutions should also be developed.
- District-based district heating systems are supported by heat storage and all kinds of digitalised energy system developments (‘hot grids’) that would help to balance production and consumption in real time, taking into account different energy carriers.
- Applied research on artificial intelligence (AI) to better integrate it in smart grids or multi-energy networks will make it possible to increase the resilience of energy systems.
- Research and development of “smart grids” technologies will help improve the overview of processes in the energy system and the analytics of data.
- Power to X and energy storage technologies contribute to improving the capacity and reliability of the electricity system.
- The development of various electronic devices, automation and IT systems is a prerequisite for the above-mentioned R & D activities.
- Addressing issues related to the development of energy storage technologies and networks from the perspective of community and consumer behaviour, socio-economic and socio-cultural aspects

(contribution of social sciences and humanities).

- Creating and piloting cost-optimal, widely implemented energy efficiency solutions with good replication potential.
- Developing a knowledge-based monitoring system to support the achievement of the objectives.
- Research on energy use of products and services, development of components, systems and services across value chains, and piloting savings.
- Development and implementation of dynamic pricing solutions for electricity, heating and cooling.
- Development of demonstration solutions for efficient renovations for buildings, including the development of district cooling systems and heat recovery systems, the creation of building technologies for energy-saving buildings, and the creation of zero-emission building solutions.
- Smart and sustainable transport and mobility solutions (e.g. channelling traffic flows into public transport and light mobility, autonomous and connected vehicles, smart transport infrastructure, smart solutions for people's mobility and freight transport, digitalisation and automation of logistics processes).
- Addressing issues of making energy use more efficient and resource-efficient from the perspective of community and consumer behaviour, socio-economic and socio-cultural aspects (contribution of social sciences and humanities) in order to put the intended energy saving potential into practice. It is also important that making energy use more efficient and resource-efficient can save the cost of achieving climate neutrality and improve people's living environment and quality.

The sub-streams of the 'Digital solutions for every aspect of life' focus area are:

- R & D for data domain development
- R & D to boost the competitiveness of the cybersecurity sector
- Digital solutions to support business process innovation
- Science-based digital solutions for education and lifelong learning
- Sustainable digital solutions in energy, construction and transport
- R & D for electronic devices and systems enabling digital solutions

R & D on topics related to the implementation of climate and energy policies takes place primarily in universities (Tallinn University of Technology, Tartu University, Tallinn University and Estonian University of Life Sciences), but also with the support of various consultancy companies.

During the **funding period that started, e.g. Tallinn University of Technology manages two (**IT Centre of ExcellenceExcite and the Centre of Excellence for Knowledge-Based Construction ZEBE) **and participates as a partner in the work of four centres of scientific excellence. Research Centres of Excellence are funded through two actions: Support measure for centres of** research excellence through the State budget and the development of Centres of Excellence services through the Regional Development Fund**. The actions are implemented by the Estonian Research Agency.** *Centres of excellence in research*create **new ideas and innovation** by bringing together different research groups. The activities of the Estonian Centre of Excellence in Science, **headed by the University of Tartu**, "New Materials and Advanced Equipment for Energy Storage and Transformation Systems" are aimed at developing functional materials for clean and sustainable energy technologies, sensory and nanoelectronics. The activities of the Centre of Excellence are supported by the European Union Regional Development Fund. Working groups of the Centre of Excellence shall cooperate in an integrated way to develop a wide spectrum of energy sources, storage media and converters, design and synthesis the materials and components needed for this purpose, and study their physical, chemical and technological characteristics, produce and test laboratory and small series prototypes of energy sources. More generally, the aim is to develop know-how on advanced materials and equipment for innovative societies and to prepare a frame for innovative energy and materialstechnologies238.

238 Centres of Excellence (Tallinna Technical University.ee)

For policy design, the following studies related to climate neutrality have been carried out in recent years:

•Estonia's transition to a carbon-neutral heating and cooling economy by 2050
•Analysis and proposals for launching the energy storage market
•Spatial and legal analysis of the local maritime area (ordered with the Ministry of Finance)
•Analysis of the construction of wind farms on fields and mineral perspectives and ranges (separate work in North-Eastern and Central Estonia and West-Estonian regions)
•Study of wind farms (2021)
•Study on energy efficiency for citizens, businesses and municipalities
•Preliminary evaluation of the Estonian geoenergy potential and overview of available technologies, expert opinion for using these technologies in the Estonian (2021)

Estonia has been active in using the European Commission's Technical Support Instrument for policy-making and reform implementation, including **TSI-**239funded studies related to the transition to a **climate-neutral energy economy:**

- Gas decarbonisation pathways for Estonia
- Possibilities for transitioning to a climate neutral electricity production in Estonia
- Support to the renovation wave – energy efficiency pathways and energy saving obligation in Estonia
- Development of a Sustainable Finance Roadmap for Estonia

Other activities include the Local Government Workshops' programme "Climate Change and Energy Management in Local Government" in 2022.

Additional funding opportunities for climate and energy projects are the pan-European LIFE programm supporting environmental and climate projects240 and the European Union Innovation Phone supporting the uptake of innovativetechnologies241. To support innovative green technology projects, the SmartCapi Green Fund was established **in** 2022, which, as a key task, will support the availability of equity (through fund or direct investments) needed to carry out the above-mentioned projects. The primary focus of SmartCap Green Fund investment activities is to support early-stage green tech companies in Estonia with high growth potential and active in one or more strategic sectors (energy, agriculture, food, transport and logistics, materials and chemicals, and environment). In this way, SmartCap contributes to the implementation of the 'Estonia 2035' development strategy, as well as to the achievement of the environmental objectives listed in Article 9 of the EU Taxonomy Regulation.

In order to support the green transition in enterprises, Decree No 208 of the Minister of Education and Research of 30 June 2022 sets out the conditions for the provision of support in investment 1 'Green skills to support the green transition of enterprises' of the reform of the Recovery and Resilience Facility 'Green Transition of Enterprises'. The aim of the support is to create flexible learning opportunities and provide learning for the green transition in entrepreneurship, taking into account the development needs of the labour market.

In 2023, in order to support the sustainability, competitiveness and integrated development of Estonian industry, the Ministry of Economic Affairs and Communications, in cooperation with industry associations and companies, prepared a **2035 Industrial Policy** Document. Industrial policy 2035 addresses the issues of development plans (including the Estonian 2035 Development Plan, the 2050 climate targets and TAIE 2035) that require stronger attention from policy makers for the coherent development of the industry. The main objectives of industrial policy 2035 are the competitiveness of the economic environment, a balanced regional distribution of labour and entrepreneurship, the promotion of

239 TSI projects in Estonia Estonia (europa.eu)
240Pan-European LIFE programme for environment and climate projects | Environmental Investment Centre (kik.ee)
241Introduction of innovative technologies | Environmental Investment Centre (k.e.e)

digital solutions, innovation and sustainability, and the valorisation and empowerment of industry.

The Estonia 2035 Action Plan envisages the introduction of new solutions to encourage business R & D and innovation, including:

- Consolidating existing innovation services and support and developing missing ones (market monitoring of new technologies, advice on e.g. intellectual property, new business models, etc., inclusion of creativity competences, support for participation in EU strategic value chains, provision of support services supporting the legitimate use of AI or other data-driven services)
- Development of knowledge-intensive start-ups (ecosystem services with emphasis on knowledge-intensive entrepreneurship, access to risk capital)
- Restructuring of support for applied research by enterprises (including in cooperation with other countries)
- Increasing R & D investment by state companies (as part of the State's participatory policy)
- New technological solutions and advice for the implementation of the digital and green transitions in the business sector (support for digitalisation and automation (including robots), development of a unified system to advise companies to support their awareness and capabilities in areas related to the green transition)
- Ensuring cooperation between TA institutions and businesses for the economy of Estonia and its regions key focus areas (digital solutions in every area of life, health technologies and services, valorisation of local resources, smart and sustainable energy solutions)
- New technologies (e.g. crats, autonomous cars, drones) and business models (platform, digital; real-time economy) and the development of a regulatory framework conducive to the uptake of the TA
- Sources of finance for enterprises diversification and facilitating accessibility (including: enterprises operating in remote areas from centres of attraction and investments that reduce the environmental footprint of enterprises)
- Making Estonia one of the world's centres of attraction for a secure digital economy, where it is good to create and provide digital services to the world
- Development of a voluntary national carbon market framework to encourage companies to contribute to climate objectives
- Legislation supporting the green transition
- Promoting responsible business conduct
- Developing and strengthening banking and capital markets
- Development of a regional business environment in cooperation with local authorities

The creation of incentive mechanisms to increase the interest of tolerance that supports the development of **a long-term strategy for the reconstruction of buildings at local level will be implemented through activities with the project partner of the 7-year LIFE IP BuildEST** 242project, including the creation of new digital and technological solutions and demo projects, taking into account the principles of climate adaptation and circular economy, creating and raising awareness.

The project contributes to the TA in all its activities, the activities to be carried out:

a. Detailed mapping of the situation; analysis of barriers, opportunities and impacts; further development and development of new policies and measures;
b. Further development of technical solutions and development of new ones (manufacturing reconstruction);
c. Piloting renovations in different building types and innovative ways (e.g. neighbourhood learning labs);
d. Solutions to ensure the resilience of the built environment to a changing climate (e.g. stronger winds

242 https://kliimaministeerium.ee/buildest

– loads on borders, more precipitation – flood risk, etc.);

e. Solutions to minimise waste generation and environmentally conscious renovation during the Estonian Renovation Wave (construction waste = resource);

f. Smart solutions and digital tools to enhance the implementation of the long-term renovation strategy (e-construction platform – building logbook – EHR, renovation passport);

g. Building up renovation capacity and market demand (including expert training)

Impacts of the project:

- Building owners can use financial and construction information and solutions to renovate their house in a holistic way.
- Funding measures to implement REKS are in place, processes are efficient and convenient for market participants, and rules are clear. The measures developed take into account socio-economic and regional differences.
- Standardised renovation solutions create a more climate-proof and environmentally friendly building stock
- Renovation construction companies have taken over sustainable and climate proofing oriented technical solutions
- The bodies responsible for the implementation of the REKS have the necessary instructions, databases, digital tools.

ii. Where relevant, cooperation with other Member States in this area, including information on how the objectives and policies of the SET Plan are reflected in the national context, as appropriate.

Cooperation between businesses and R & D institutions is being developed through the focus areas of the TAIE Development Plan. Cooperation with other Member States takes place, for example, through the Clean Transition Partnership, where Estonian researchers have actively participated in the first call for applications.

Estonia is actively cooperating with other countries in developing the necessary science in the field in the framework of the Horizon Research Partnerships. Both the Estonian Research Agency and the MKM are members of a consortium of donors to the Clean Energy Transition (CET) Partnership. The partnership will jointly organise an annual call for proposals between 2022 and 2027 and jointly fund the best collaborative research projects from different countries. The CET Partnership is closely linked to the setting of priorities of the SET Plan and also monitors them in shaping the content of its calls for proposals. In addition, both organisations are also funding the DUT partnership, with positive energy regions as one of the subthemes.

It is important for Estonia to support innovation and green technologies in CO_2 capture (CC), storage (CCS) and utilisation (CCU) technologies in line with Do No Significant Harm (Do No Significant Harm) and taxonomy principles. We also see a need for more clarity on CCS and CCUS accounting methodologies, etc., which should also be supported by the currently negotiated carbon removal certification regulation.

iii. If applicable, financing measures in this area at national level, including EU support and the use of EU funds

Public funding for R & D in the energy sector has been uneven in recent years:

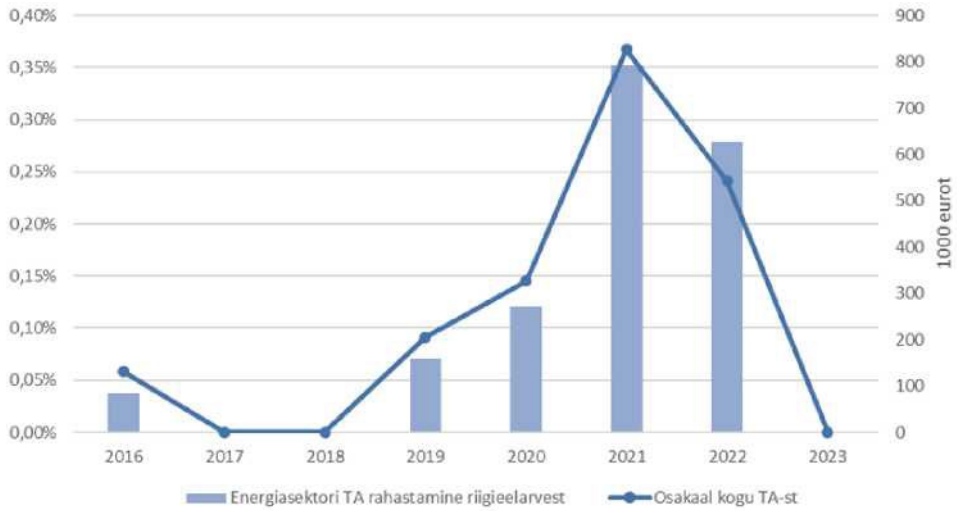


Figure 3.4 Financing of R & D in the energy sector in the state budgett243.

At the same time, spending on TA by companies in the energy sector has decreased:

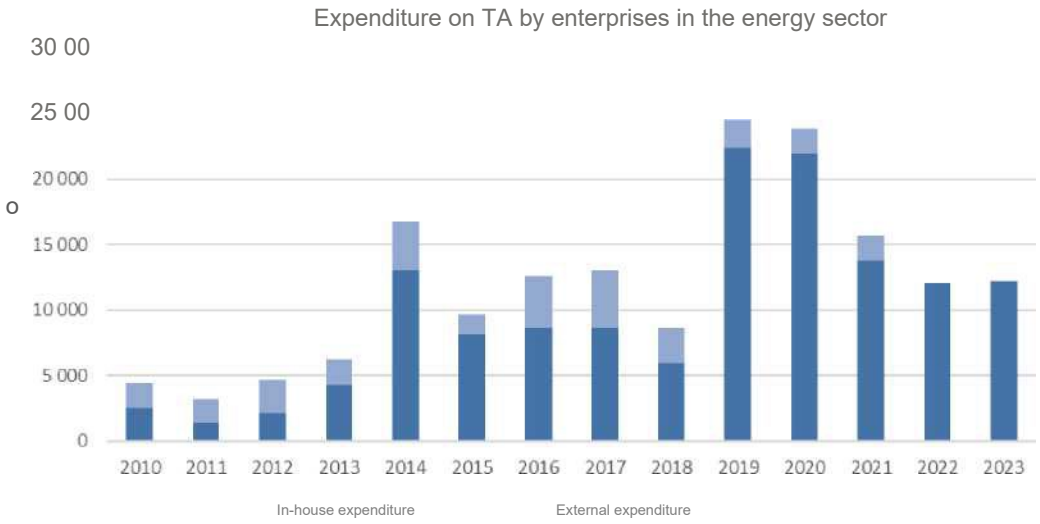


Figure 3.5 R & D expenditure (d) by companies in the energy sector249.

The financing measures are organised through the following implementing bodies:

<u>Foundation for Entrepreneurship and Innovation</u>

- Applied Research Programme (RUP)
- Development and Innovation Window
- Support for experimental development
- Business development programme
- Procurement for innovation support
- Raising corporate awareness and

<u>Measures planned by the Estonian Research Agency</u>

- Thematic TA programmes

Research Centres of Excellence Support Action

- Action on Centres of Excellence and Research Infrastructure Services
- State TI Capacity Action (RITA+)
- Institutional Knowledge Transfer Capacity Action (ASTRA+)
- Inter-sectoral mobility, including knowledge transfer doctorate (SekMo)

- Take an action for international scientific cooperation and

243 TD054: Acquaintance of R & D activities from the State budget | Socio-Economic Objective (NABS 2007) and Year www.stat.ee

249 TD024: Corporate CULTURE FOR & Development in the Business Sector www.stat.ee

mobility (Mobilitas++)

Kik and the Ministry of Climate are implementing a support scheme for green technology start-ups with the support of NextGenerationEU funds under the European Union Recovery Instrument. This consists of two parts:

1) programme of development accelerators in five focus areas;

2) application round for start-ups to support the development of prototypes and piloting of technologies. The call was open until 31 May 2024.

Until Until 2026 to be moved in Estonia **carried out a different accelerator**, aimed at different types of
focus areas and help start-ups develop green technology solutions from the idea call to investor maturity to the start-up company. Particle accelerators these include, but are not limited to: material science, resources
valorisation and chemicals reduction, energy, construction and climate proofing, mobility and logistics, and forest, soil, biodiversity and land use.

Accelerators are generally a multi-month development programme where the accelerator helps start-ups both in the technological development of their product or service and training them on business-related topics, as well as to map potential sources of funding and improve the skills needed to mobilise money. The accelerations approach the development needs of start-ups as personally as possible, with experts playing an important role, providing practical advice and supporting the journey. One important value of the accelerator is the Network.

Kik launched procurements in 2022-2024 to find the organisers of the five accelerators.

Data related to research projects can be found in the EstonianResearch250Information System. Estonia has successfully participated in applying for R & D funding for the EU's Horizon 2020 energy community. In the field of energy, several dozens of projects have been participating in projects funded by Horizon 2020 by Estonian partners in2020251.

In recent years, the volume of projects funded is as follows:

2020) in 2008, Horizon Framework Programme funding of EUR 8.5 million, including EUR 5 million, led to an additional Green Deal call

2021-2022 11 Horizon Framework Programme projects worth EUR 6.7 million and 2 projects in the Clean Hydrogen Partnership (1 + 3 partners) totalling EUR 1.2 million

2023-2024 CET partnership EUR 0.45 million

Nordic Energy Research, **Estonia, alongside Latvia and Lithuania, financed the Baltic-Nordic Energy Research Programme in 2018-2021** with a total of 9 projects (new next generation of buildings, energy sufficiency approach, heat pumps usage, smart usage of waste heat, 5th generation district heating and cooling, offshore wind energy hubs, stability of transmission grids; approach of hard to reach energy users, electrical vehicles control in distribution system, future power system, exchange of doctoral students and researchers, and reports "Heat Pump Potential in Baltic States" and "Baltic-Nordic Roadmap for Co-operation on Clean Energy Technology"252.

250 Estonia's scientific information system (etis.ee)
251 Successful Projects Successful Projects (etag.ee)
252 The Joint Baltic-Nordic Energy Research Programme – Nordic Energy Research

SECTION B: ANALYTICAL ALUS[253] [254]

4. THE CURRENT SITUATION AND EXISTING POLICIES AND MEASURES ARE INCLUDED IN THEFORECAST D[259]; [255]

4.1. Projected evolution of main exogenous factors influencing energy system and GHG emission developments

i. Macroeconomic projections (GDP and population growth).

Estonia's gross domestic product decreased by 0.3 % in 2024 compared to 2023. The table below shows the population data used for GHG projections and the actual GDP growth rate over the period 2025-2050.

Table 4.1 Projections for Estonia's population and GDP growth

Parameter	2025	2030	2035	2040	2045	2050	2055
Population, million peoplet 256	1,32	1,31	1,30	1,3	1,29	1,28	1,26
GDP growth, real growth rate of % 257	3,28	1,99	1,93	1,79	1,56	1,59	1,55

ii. Sectorial changes expected to impact the energy system and GHG emissions

The main changes affecting greenhouse gas emissions from 2021 to 2030 include:

- changes in oil shale energy. Old oil shale power plants are either depleted or subject to environmental restrictions that provide for the closure of oil shale blocks. Shale oil producers are expected to be the main users of oil shale. The shift from oil production and fuel production to chemical products will reduce CO2 emissions in oil shale-using industrial sectors.
- increased use of renewable energy (wind and solar) by electricity producers;
- in the transport sector, a significant source of greenhouse gas emissions, GHG emissions are

See Part 2 for a detailed list of parameters and variables to be reported in Section B of the 253 Plan.

254 Current situation shall reflect the date of submission of the national plan (or latest available date). Existing policies and measures encompass implemented and adopted policies and measures. Adopted policies and measures are policies and measures that have been formally decided by the government at the date of submission of the national plan and that are firmly committed to implementation. Implemented policies and measures are policies and measures that meet one or more of the following conditions at the date of submission of the national plan or progress report: directly applicable Union legislation or national legislation is in force, one or more voluntary agreements are in place, financial resources are allocated, human resources are involved.

255 The selection of exogenous factors may be based on the assumptions made in the EU Reference Scenario 2016 or other subsequent policy scenarios for the same variables. Besides, Member States specific results of the EU Reference Scenario 2016 as well as results of subsequent policy scenarios may also be a useful source of information when developing national projections with existing policies and measures and impact assessments.

256 Population projections 2020-2080: Statistical Office, https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Rahvastik.Arhiiv__Rahvastikun%C3%A4itajad%20ja%20koosseis. %20Archives/RV088

262Actual GDP growth rate (4.4.2024): Ministry of Finance, https://www.fin.ee/riigi-rahandus-ja- Tax/fiscal policy and economy/Ministry of Finance-economic forecast

influenced by the deployment of means and modes of transport generating lower emissions.

iii. Global energy trends, international price of fossil fuels, EU ETSCO_2price.

Global energy trends

According to the **World Energy Council's Energy Sustainability Index, Estonia distributed 7th place to Germany in 2023 out of 126 countries,** with Sweden and Taani[263] in the first place. Due to COVID and the war in Ukraine, domestic energy security and independence is a new global reality. The fast and fair energy transition is a complex challenge in the current context of distrust, fragmentation and polarisation. The transition to decarbonisation technologies has been overshadowed by climate adaptation and the circular economy, with sustainability of financial systems and reduced marketvolatility of[264]. In order to ensure energy sustainability, Estonia needs to be prepared to respond to different geopolitical situations and international agreements affecting energy security. The European Green Deal, adopted to address the negative effects of climate change, transforms the EU into a modern, resource-efficient and competitive economy, ensuring that:

- net greenhouse gas emissions would be net-zero by 2050;
- that economic growth is decoupled from resource use;
- No person and no place left behind

In the context of the energy crisis, in 2022 the European Commission launched the REPowerEU initiative, which aims to:

- save energy;
- produce energy in a green way;
- diversify energy sources.

International price of fossil fuels

Estonia uses the fossil fuel price projections recommended by the European Commission in the energy models implemented to prepare the greenhouse gas projections presented in this document.

Table 4.2 Price of fossil fuels used in the design of the pland[265].

International fuel prices, EUR/GJ	2022 (base year)	2025	2030	2035	2040	2045	2050	2055
Oil	16,7	12,4	13,9	15,4	15,8	17,2	19,7	23,8
Gas (NCV)	35,1	9,4	9,0	8,2	10,1	9,9	9,6	9,6
Coal	10,9	4,1	4,0	3,8	3,8	4,0	4,0	4,1

263 WEC Energy trilemma Index Tool

264 Press Release: World Energy Pulse Survey Reveals National Security Interests And Green Technology Arms Race Considered Greatest Obstacles To Energy Transition Progress | World Energy Council

265European Commission: EC_recommendations GHG projections 2025 (june update)

Carbon price of the European Union's greenhouse gas emission allowance trading system

The EU ETS CO2 price increased gradually until the endof2023. The average EU ETS allowance price at auction in 2023 was EUR 80.37/tCO2, but whenthe price also increased at times close to EUR 100 per tonne. There were a number of different reasons behind the price increase. Another important reason was the 'Fit for 55' package presented by the European Commission in 2021, which proposed to update or adopt various regulations that would help achieve the European Union's greenhouse gas reduction target of at least 55 % by 2030 compared to 1990 levels, as set out in the European Union's Climate Law. Amendments to the EU ETS Directive were also published in May 2023, stipulating that the EU ETS aims to reduce emissions from

the covered sectors by 62 % compared to 2005. Moreover, the price was affected by Russia's war of aggression against Ukraine and the ensuing energy crisis. Weather conditions and the share of renewable energy in the energy market also influence price. In the first months of 2024, the EU ETS allowance price fell sharply by EUR 50/tCO2and has gradually increased over the next months, reaching an annual average of around EUR 60/tCO_2 in June 2024. The main reason for the fall in prices was the low productivity of the industrial sector and the low demand for electricity and gas. While international agencies as well as the European Union forecast price increases in the longer term, prices are expected to remain relatively stable until 2030 at an average of EUR 70-80 in the short term.

The figure below shows the EU ETS $CO2_{price}$ forecast up to 2050 recommended by the European Commission, which has been used by Estonia in the energy models implemented to prepare the greenhouse gas projections presented in this document.

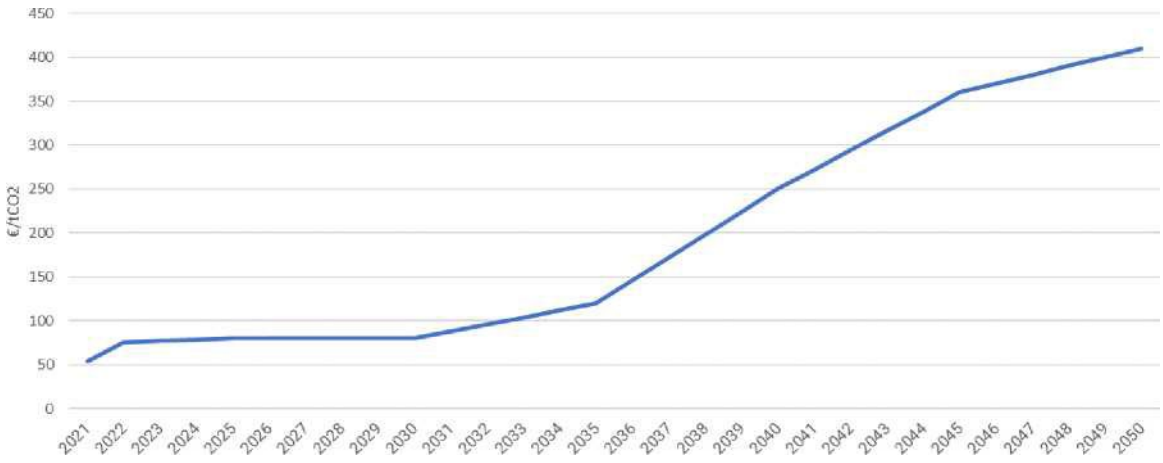


Figure 4.1 EU ETS CO2 price$_{forecast}$ 2021-2050 (Source: European Commission)

As a general trend in electricity generation, the share of renewable generation capacity such as wind, solar and biomass could be predicted to increase in the future, depending on the depreciation of technologies and the EU ETS allowance price.

The proposed trajectory for the price of EU ETS allowances is set out in the current scope of the EU ETS (electricity, industry, centralised heat, maritime transport and aviation) until 2030, which corresponds to the context of a legally binding -55 % climate target. The short-term values for 2022-2025 are estimated to be in line with the projected trajectory for international fuel prices and the 2030 value is in line with the assumption of the EU ETS allowance price in the ETS impact assessment for the period 2026-2030. The price forecast beyond 2030 is based on the assumption of achieving EU climate neutrality.

4.2. CO_2reduction dimension

4.2.1. GHG emissions and removals

i. Trends and sinks of current greenhouse gas emissions with the EU ETS and trends in effort sharing and LULUCF sectors and in different energy sectors.

In 2023, Estonia's total GHG emissions were 10.86 million tonnes CO2eq(excluding net emissions from the land use, land use change and forestry (LULUCF) sector) and 12.99 million tonnes of CO2 together with $net_{emissions}$from the LULUCF sector. Between 1990 and 2023, greenhouse gas emissions (including LULUCF) decreased by 63.2 %. The largest reduction in emissions has been observed in the energy sector.

44000

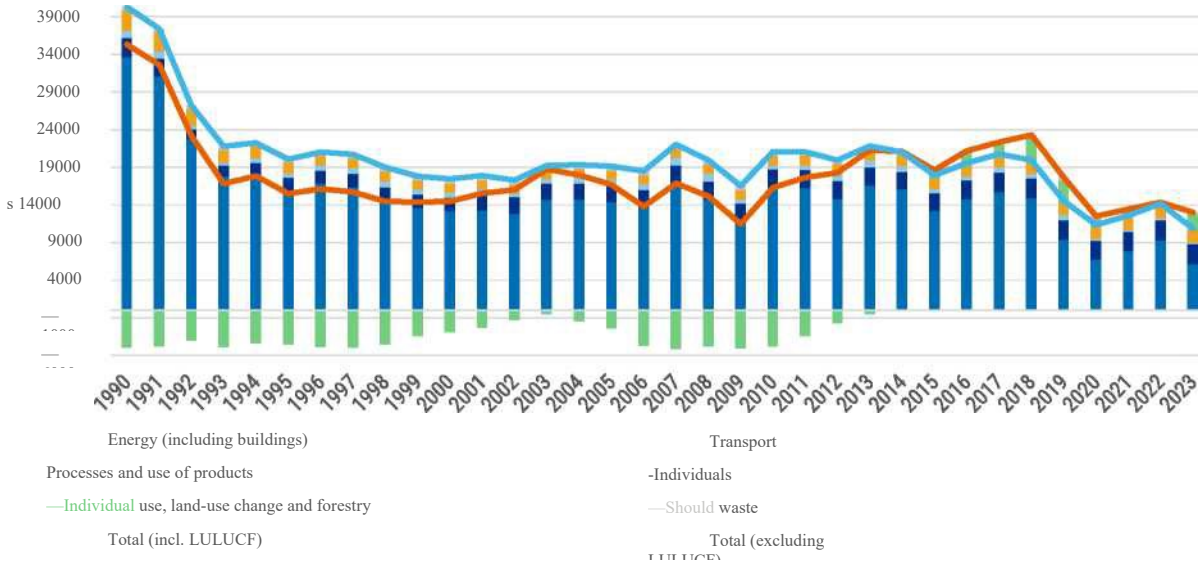


Figure 4.2 Estonian GHG emissions and removals by sector 1990-2 023 kt CO_2 eq (Source: Inventory of greenhouse gas emissions 1990-2023, 2025258)

In the context of the GHG inventory, the transport sector is reported as a sub-category of the energy sector, but for clarity, the transport sector emissions are presented separately from the energy sector in Figure 4.2. The energy sector (excluding transport) is by far the largest source of GHG emissions in Estonia. In 2023, it accounted for 56 % of Estonia's total GHG emissions (excluding LULUCF). Transport was the second largest source of emissions in 2023, with 24 %, followed by the agricultural sector, accounting for 14 % of total emissions in 2023. Emissions from waste and industrial processes and product use accounted for 3 % and 2 % of total emissions, respectively.

258 Estonia's greenhouse gas emissions inventory 1990-2023: https://kliimaministeerium.ee/rohereform-Climate/Climate policy/GHG emissions

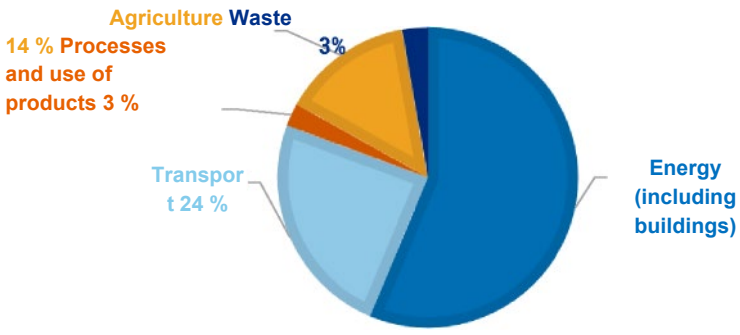


Figure 4.3 GHG emissions by sector in 2023, % (Source: Inventory of greenhouse gas emissions 1990-2023, 2025)

Greenhouse gas trends in the European Union Emissions Trading System

In 2023, the EU accounted for 99.4 % of ETS emissions from the energy sector and only 0.6 % for emissions from industrial processes and product use. $CO2_{emissions}$ from industrial processes and product use have fluctuated significantly between 1990 and 2023. The decrease in 2020 compared to 2019 was due to the cessation of clinker combustion in the cement industry in the first quarter of 2020, and in 2022 the production of lime decreased due to high natural gas prices. Emissions from heat and electricity generation under the energy sector accounted for 60.7 % of total energy sector emissions (excluding transport) in 2023.

Trouble! Estonia does not find a reference source. Estonia reports EU ETS emissions for the period 2005-2023. Emissions from shale oil production amounted to 1 763.37 kt CO2 in 2023,which was 12.8 % higher than in 2022 and represented 16.2 % of Estonia's total GHG emissions (excluding LULUCF) and 28.84 % of total GHG emissions in the energy sector (excluding transport) in 2023.

Emissions from the energy sector have historically varied mainly due to economic trends, energy supply patterns and climate conditions. GHG emissions decreased between 1990 and 1993 as a result of major changes in the structure of the economy following the collapse of the Soviet Union and the restoration of the Republic of Estonia's independence. In 2003, emissions increased mainly due to the export of electricity produced from oil shale. The marked increase in emissions between 2006 and 2007 is linked to overall economic growth and the reduction in emissions between 2007 and 2009 as a result of the overall economic downturn. Since 2009, GHG emissions have been closely linked to the volume of exported electricity, which is predominantly produced from oil shale. GHG emissions from the energy sector decreased significantly between 2019 and 2020 due to a reduction in the use of oil shale in electricity production, mainly due to the low market price of electricity and the high EU ETS allowance price. The increase in emissions in 2022 was mainly due to higher oil shale production due to high electricity prices that allowed oil shale power plants to enter the market more frequently. In 2023, emissions from EU ETS installations in the energy sector decreased by almost 38 % year-on-year due to lower electricity prices and high EU $ETS_{CO2\ unit}$ prices

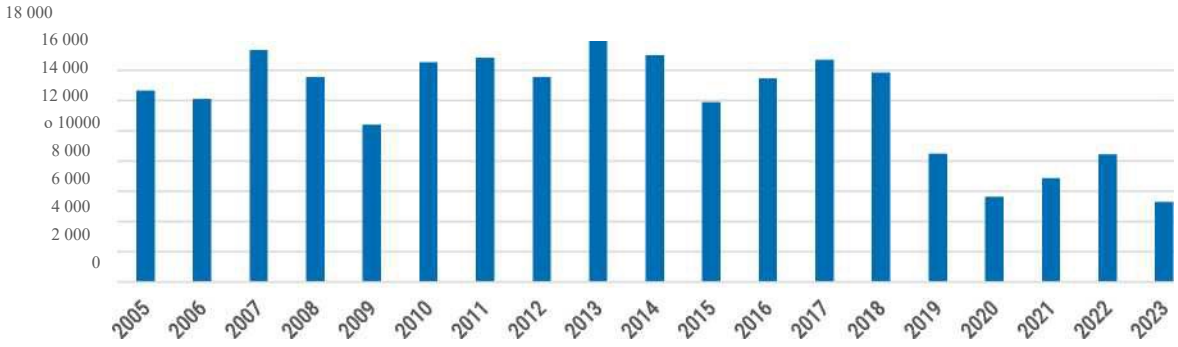


Figure 4.4 Estonian EU ETS emissions 2005-2023, $ktCO_2$ eq. (Source: Ministry of Climate, 2025)

GHG trends in sectors covered by the Effort Sharing Regulation

Transport accounted for 47.2 % of the largest greenhouse gas emissions in the sectors covered by the Effort Sharing Regulation in 2023. Emissions in the transport sector have increased by almost 3 % compared to 1990 and have increased by almost 18 % compared to 2005.

In 2020, GHG emissions decreased in all transport sub-sectors due to internal lockdowns and reduced fuel use in road transport due to the COVID-19 pandemic. In 2023, emissions from the transport sector remained at the same level as in 2022.

Emissions from the small-scale energy sector (including buildings) accounted for 15.8 % of ESR emissions in 2023. Emissions from the manufacturing and construction sectors in the energy sector have decreased by 93.4 % compared to 1990.

In 2023, GHG emissions from industrial processes and product use, remaining in the ESR scop, accounted for 4.2 % of ESR emissions. The highest GHG emissions from industrial processes and product use within the scope of the Effort Sharing Regulation were HFC emissions from refrigeration and air conditioning, 72 % of the sector's emissions (including indirectCO_2).

In 2023, total GHG emissions from the Estonian agricultural sector amounted to 1 535 kt CO 2, an almost 44 % decrease compared to 1990. In 2023, the agricultural sector accounted for 27.4 % of ESR emissions. Since August 2014, the dairy industry has been facing a decline in production volumes as a result of the economic sanctions imposed on the EU by Russia. As a result, the number of dairy cows also decreased by 12.9 % in 2023 compared to 2014, at a record low relative to the whole time series. Due to the spread of African swine fever in 2015, the number of pigs in Estonia has decreased by 23.2 % in 2023 compared to 2014. The abundance of farm animals and the decline in the use of synthetic fertilisers are also contributing to emissions in recent years – the sector is in a difficult situation since 2021, resulting in production costs exceeding profits. This, in turn, is due to the energy crisis in the EU, leading to higher prices for fertilisers, energy and feed. The growing production of biogas from agricultural raw materials is another important contributor to emissions. While this reduces methane emissions from the sub-category of manure management systems, as in addition to manure, additional bio-waste-based substrates, which are subsequently applied to the field, increase emissions of nitrous oxide from the tillage (agriculture) category. Weather conditions are also an important factor: in recent years there have been many droughts or excessive summers, so crop yields are on a declining trend. It is important to underline that the base year of the Effort Sharing Regulation (2005) is unfavourable for the Estonian agricultural sector. Indeed, the sector was depressed at that time due to past structural changes and limited investment opportunities. Following Estonia's accession to the European Union and access to Common Agricultural Policy (CAP) support, the sector was gradually recovering, leading to an increase in both production volumes and associated greenhouse gas emissions.

Total emissions from the waste sector have been on a downward trend in recent years. Emissions were 26.5 % lower in 2023 compared to the base year (1990). In 2023, the waste sector accounted for 5.4 % of ESR emissions. Emissions from solid waste disposal have decreased by 23.4 % compared to the base year and emissions from waste water treatment and discharge have decreased by 44.4 %. Emissions from the biological management of solid waste have increased by almost 456 % compared to the base year (1990).

The figure below shows Estonia's ESD/Regulation emissions for the period 20132023.

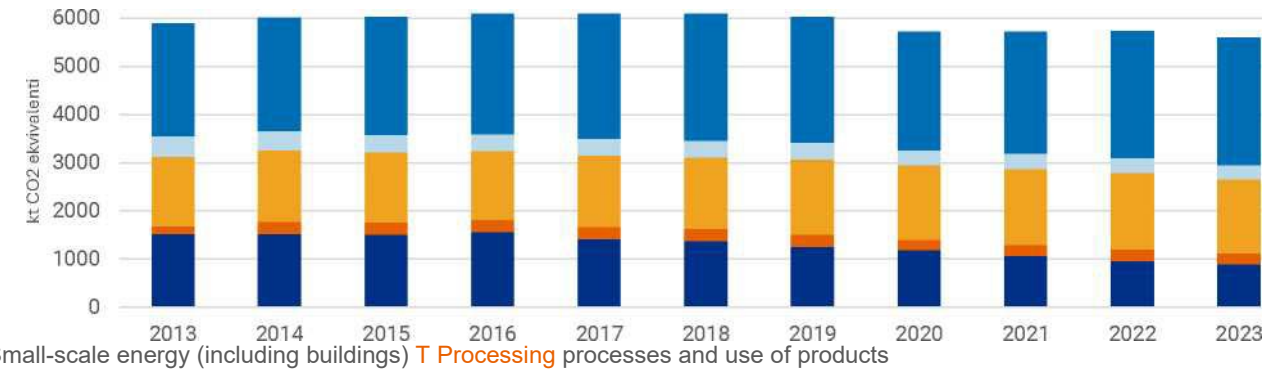


Figure 4.5 Emissions from the Estonian Effort Sharing Decision/Regulation sectors 2013-2023, kt CO_2eq.

Greenhouse gas trends in the land use, land use change and forestry (LULUCF) sector

The LULUCF sector is the only one where carbon removals are possible. In 2023, the LULUCF sector was a greenhouse gas issuer with net emissions of 2 130.79 kt ofCO_2 equivalent. In the base year (1990), 4 970.05 kt CO 2 GHGs were captured inthe LULUCF sector. The only categories that captured carbon in 2023 were wood products and, to a lesser extent, grassland. Wetlands and arable land have the highest net emissions. Greenhouse gas removals and emissions from the LULUCF sector are mainly influenced by the age structure of forests, management practices in forestry (including logging volumes) and agriculture, areas with drained organic soils and horticultural peat extraction volumes, and carbon storage in timber products.

The main carbon sink in the LULUCF sector is forest land with an area of 2.33 million, 2 ha in 2023. The net emissions of the forest land category in 2023 were497,06 kt CO2eq. Compared to 2022, emissions have increased by 2 091.82 ktCO_{2eq}, mainly due to higher logging volumes. In the longer term, the carbon balance in forestry has been influenced by a number of factors, including increased deforestation and reduced afforestation, which have led to a stabilisation of forest land. There has been an increase in the combined share of flat areas, unclearareas 259 and adolescents, as well as older forests, where net root growth is lower than in middle-aged stands. In addition, due to the age structure of forests and damage, tree mortality has increased, leading to higher emissions. Carbon stocks increased most in 2023 in the mineral soils of forest land.

Emissions in the wetland category are predominantly related to peat extraction, with less emissions from peatland soil and most of them coming from the use of horticultural peat. The degree of degradation of the horticultural peat is 15 % to 25 % according to the Subsurface Act. Exports of peat

Definitions 259 of stands development classes: Annex 3 (Notifier.ee)

products in 2023 accounted for 81.9 % of total Estonian peatproduction in t[268.] 260 261 Emissions from peat production are linked to the degree of degradation of peat, e.g. low horticultural peat degradation slowly compared to well-degradable peat used for heating. In 2 023.27167 hectares were affected by peat extraction. The amount of peat removed for horticultural use is calculated as the difference between total peat production and the production of peat for heating purposes (based on Statistics Estonia). The production of horticultural peat has increased slightly since 1990, but variability between years is high, as peat extraction depends on the weather.

Carbon sequestration in timber products is linked to harvesting volumes and higher wood valorisation also allows more wood products to be produced.

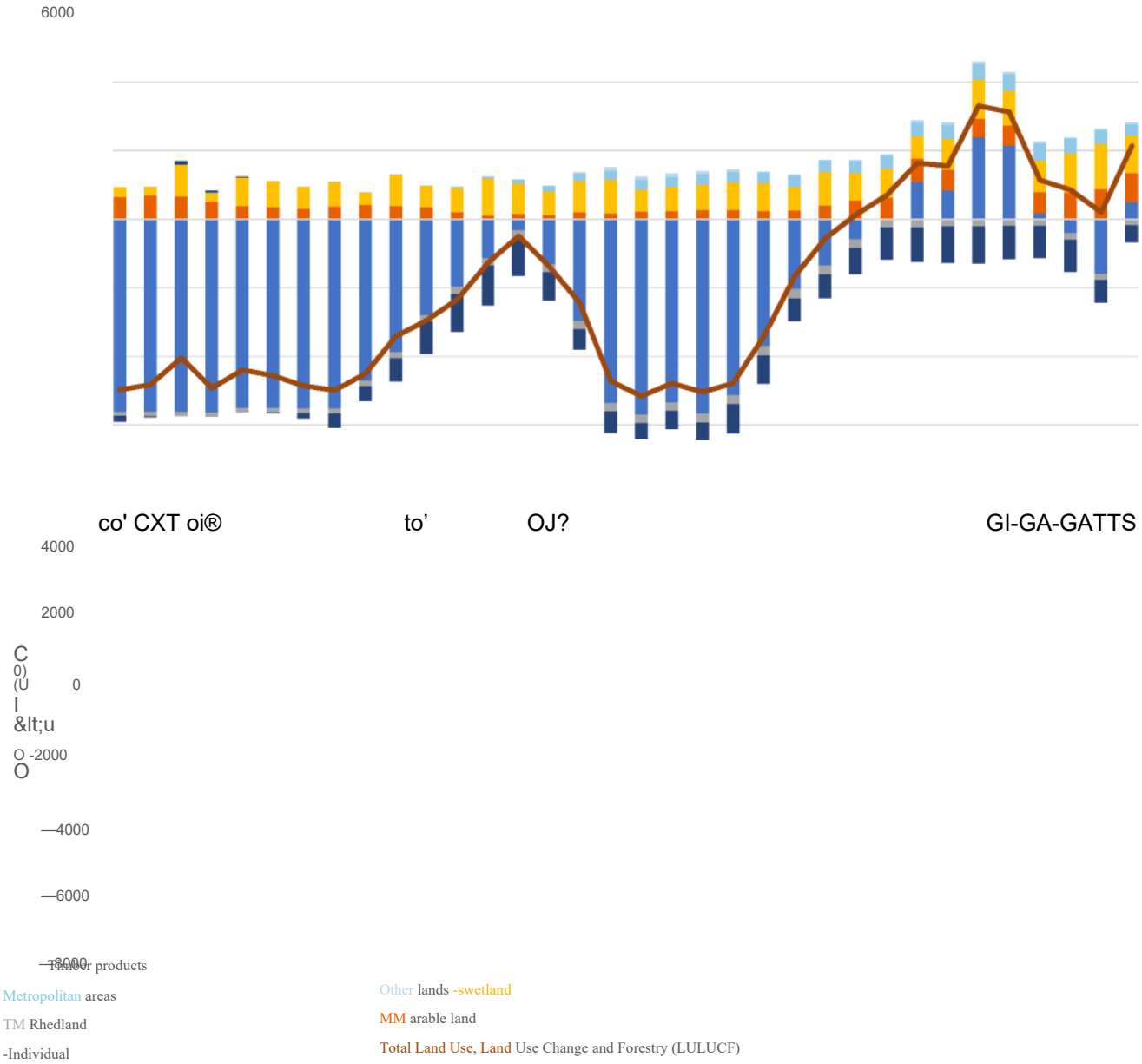


Figure 4.6 Estonian LULUCF emissions 1990-2023, ktCO2eq

ii. Projections of sectoral developments with existing national and Union policies and measures at least until 2040 (including for the year 2030)

260 https://andmed.stat.ee/et/statsql/majandus__valiskaubandus__kaupade_vk/VKK34/table/tableViewLayout2
261 https://andmed.stat.ee/et/stat/majandus__toostus/TO66/table/tableViewLayout2

The projections for GHG emissions in the scenario with existing measures (i.e. the projection takes into account, directly or indirectly, the effects of the measures implemented and/or adopted) are presented below. These projections are the same as those reported to the European Commission in March 2025 in accordance with Article 18 (3) of the Energy Union Governance Regulation.

GHG emission projections have been calculated for 2023-2055 and 2022 was used as base year (base year).

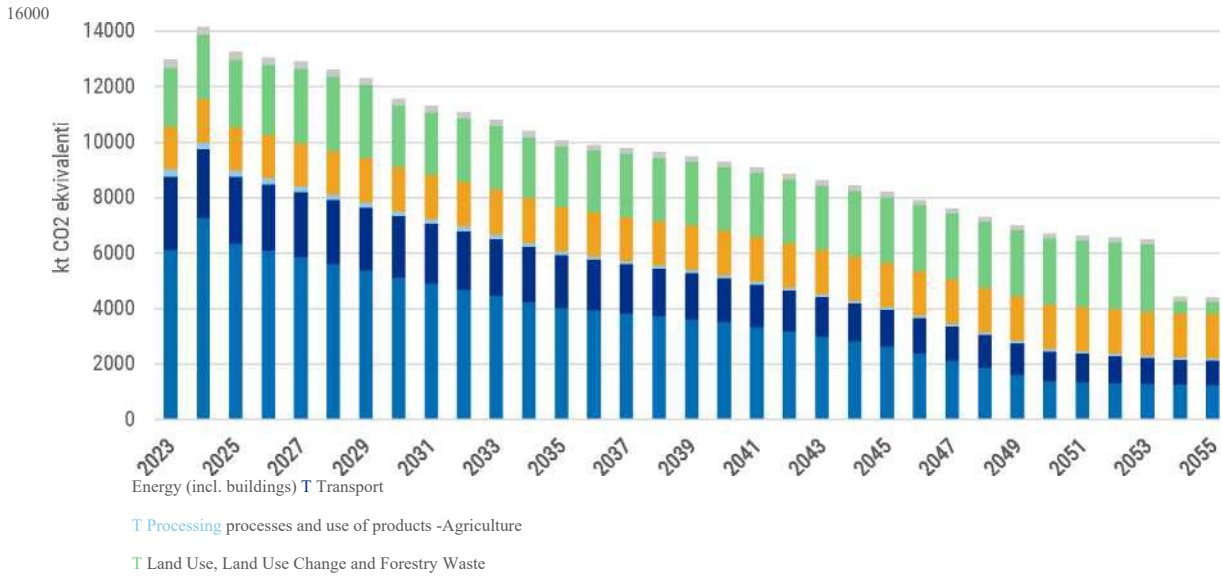


Figure 4.7 Projected GHG emissions and removals by sector with existing measures in scenario 2023-2 055 kt CO_2ev

More detailed projections by sector are presented below.

Greenhouse gas projections in the energy sector

The energy sector includes GHG emissions from the consumption and production of fuels and energy (electricity and heat). In the context of greenhouse gas projections, the transport sector is reported as a sub-category of the energy sector, but for the sake of clarity, transport emissions are presented separately from the energy sector below. The energy sector also includes the following sub-sectors: energy, manufacturing and construction, other sectors (including business and public, residential, agriculture, forestry, fisheries and fish farming and military sub-sectors) and diffuse emissions from the natural gas distribution network.

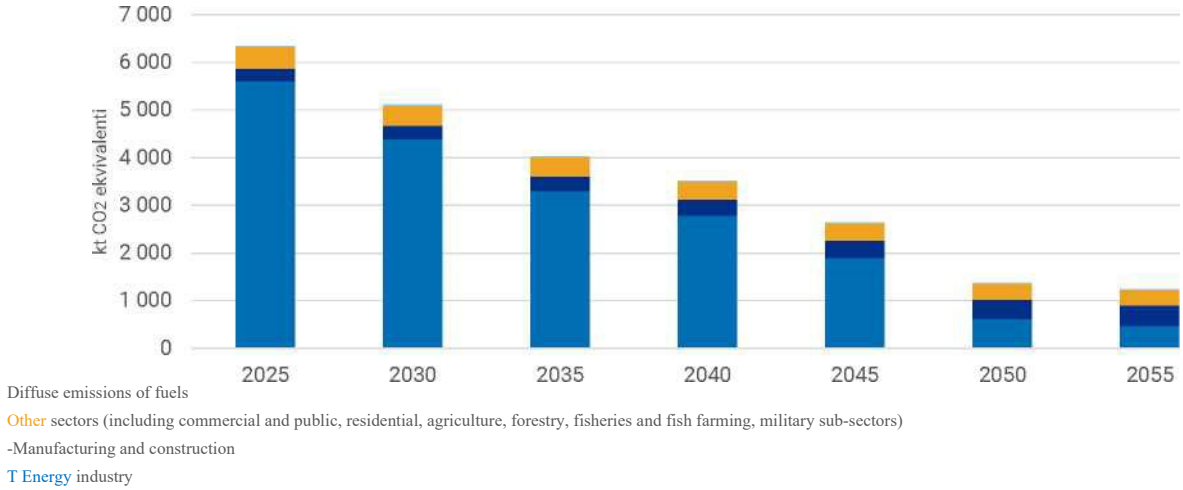


*Figure 4.8 shows the*projected GHG emissions from the energy sector (excluding transport) in the scenario with existing measures, broken down by sub-sector in Figure 4.8 J. Emissions are projected to decrease by 86.6 % by 2055 compared to 2022. The largest decline occurs in the energy industry.

The main premise for forecasting the energy industry is that the use of direct oil shale combustion in electricity production will gradually decrease and shale oil production will increase (the estimates of GHG emissions from shale oil production were calculated on the basis of input from industry companies). Oil shale gases, as a by-

product of shale oil production, are used for the production of electricity. The largest electricity producer in Estonia is Enefit Power AS, whose assets include, inter alia, the Estonian power plant and the Baltic power plant. Both use oil shale as the main fuel. Enefiti power plants are also the largest emitters of GHG emissions in Estonia. The decrease in greenhouse gas emission projections in the energy industry sector in 2023-2055 is due to the phasing out of oil shale dust in the above plants, to the continuation of more efficient technologies (the boiling layer) and to the cessation of direct oil shale combustion. Oil shale companies plan to apply CSS/CCSU technology in their installations largely between 2041 and 2050, leading to significant reductions in greenhouse gas emissions. Greenhouse gas emissions in the energy sector are projected to decrease by 94.6 % by 2055 compared to 2022.

GHG emissions from the manufacturing and construction sectors are projected to be subdivided into the iron and steel industry; the non-ferrous metals industry; chemical industry; pulp, paper and printing; the food industry; the drink and tobacco industry; non-metal minerals and other industries) will increase by 60.5 % by 2055 compared to 2022.

Emissions from other sectors (business/public, residential and agricultural/forestry/fisheries/farming, military) are estimated to decrease by 19.2 % by 2055 compared to 2022.

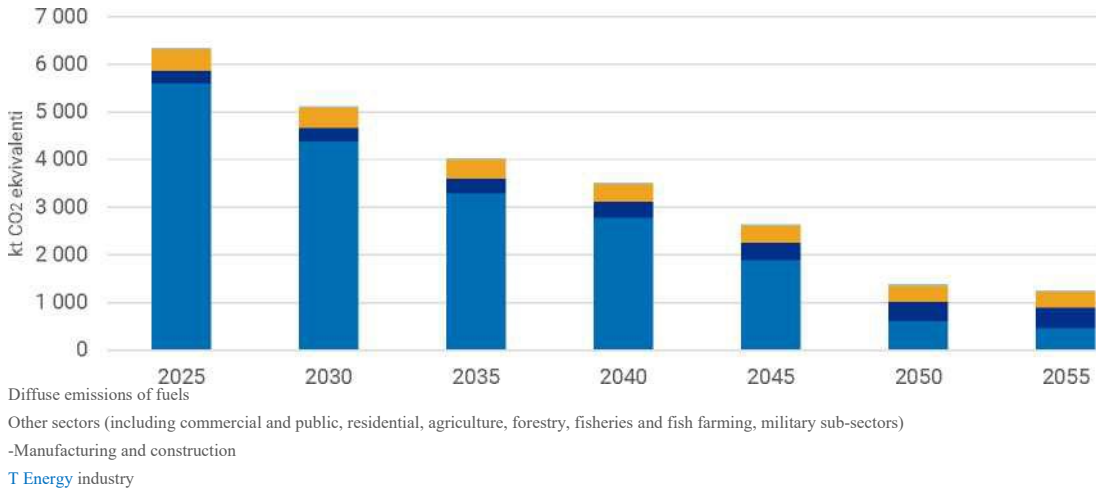


Figure 4.8 Energy GHG projections by sub-sector (excluding transport), kt CO_2 eq

Greenhouse gas projections in the transport sector

The main share of greenhouse gas emissions from the transport sector comes from road transport. In 2022, the share of greenhouse gas emissions from road transport was around 89.7 % of total greenhouse gas emissions from the transport sector.

Total GHG emissions from the transport sector are expected to decrease by around 66.3 % by 2055 compared to 2022 under the existing measures scenario. Domestic aviation emissions are expected to increase slightly between 2023 and 2055, and domestic shipping, rail and road transport emissions are expected to decrease. Most emissions are projected to decrease in the road transport sector: Emissions projected for 2055 compared to 2022
a decrease of 71.5 %. This is due to the implementation of measures to reduce the use of private cars and to shift public transport to alternative fuels. However, the biggest impact on the drastic reduction in greenhouse gas emissions is the introduction of electric vehicles on a larger scale.

It has been calculated that the new emissions trading system would lead to a very small reduction in greenhouse gas emissions in Estonia, estimated at only 0.1 %. At the same time, it would entail a significant administrative burden and a significant impact on people's livelihood and socio-economic situation. Given that Estonian people have not so far significantly changed their transport behaviour due to changes in fuel prices, the impact of this price increase on emissions is rather modest but felt on people's cost of living. Therefore, before increasing price pressure, people must first be offered realistic and workable alternatives. It is particularly important to contribute to improving the quality and accessibility of public transport, as well as to shared mobility solutions and the development of cycling and walking in urban environments.

At the same time, it should be borne in mind that Estonia's population structure is scattered and that there are many regions where there is no practical alternative to a private car today. In such circumstances, price increases may impose a disproportionate burden on rural populations who do not have access to other mobility options.

Figure 4.9 shows the projected GHG emissions from the transport sector in the scenario with existing measures by sub-sector. From the 2024 GHG inventory and the 2025 GHG projections, the emissions of off-road vehicles from categories 1.A.2.g, 1.A.4.a and 1.A.4.c are reported under category 1.A.3.e 'Other transport' (Figure 4.9 Other).

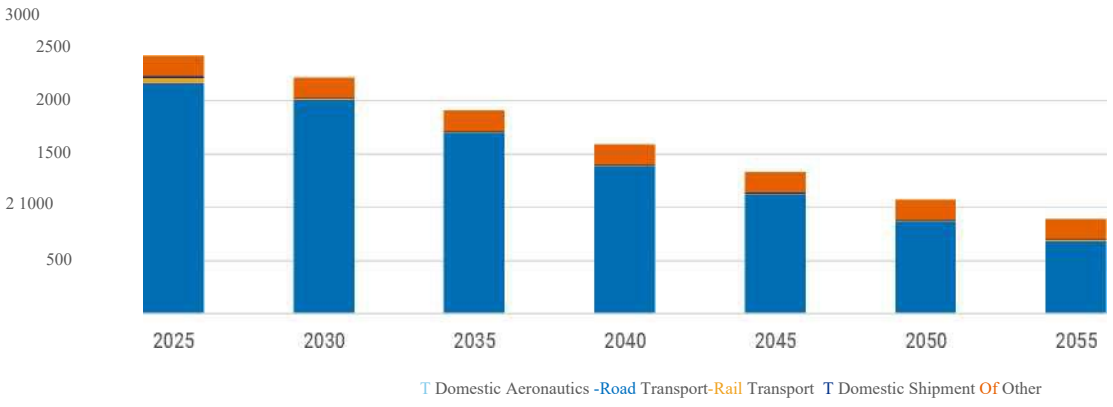


Figure 4.9 Transport GHG projections by sub-sector, kt CO_2 eq

Greenhouse gas projections in the industrial processes and product use sector (so-called IPPU)

Overall emissions from the IPPU sector are projected to decrease by 70 % between 2022 and 2055 in the scenario with existing measures. The main decrease is due to a decrease in the use of F-gases used to replace ozone-depleting substances (ODS)

Emissions from the minerals industry already decreased in 2020, when the cement industry stopped burning

clinker in kilns using the wet process, as it was no longer economically viable (production only took place in the first three months of 2020). The factory does not foresee a resumption of production. Emissions from the mineral and metal industries are projected to remain at similar levels in 2055 as in 2022.

HFC emissions are projected to decrease by 95 % between 2022 and 2055. Most equipment containing cold R-404A (the installation and maintenance of which has been prohibited since 2020) should be phased out by 2035, as well as most old multi-component (split-type) air conditioners and heat pumps. Directive 2006/40/EC has a gradual impact on HFC emissions until 2030, when most old vehicles with HFC-134a air conditioning systems should be replaced.

Figure 4.10 shows the projected GHG emissions from the industrial processes and product use sector by sub-category.

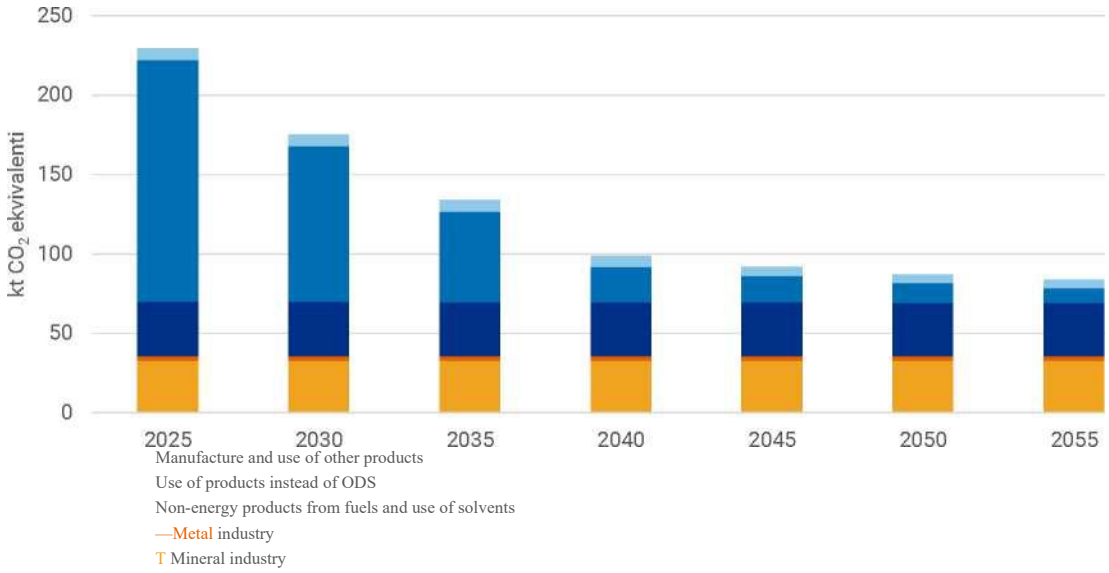


Figure 4.10 GHG projections for the industrial processes and product use sector by sub-sector, kt CO_2 eq

Greenhouse gas projections in the agricultural sector

Under the scenario with existing measures, emissions from the agricultural sector will only slightly increase by 2055 (0.8 %) compared to 2022. The upward trend in GHG emissions from the agricultural sector is due to intestinal fermentation, a slightly higher number of dairy cows and an increase in milk production per cow. In the sub-sector of manure management, emissions are projected to decrease in 2022-2055 due to the opening of new biogas production plants. In the arable soil sub-sector, emissions decrease mainly due to lower agricultural production and fertiliser use. Emissions in the lime fertiliser sub-sector are projected to decrease due to lower forecasts of use of lime fertilisers.

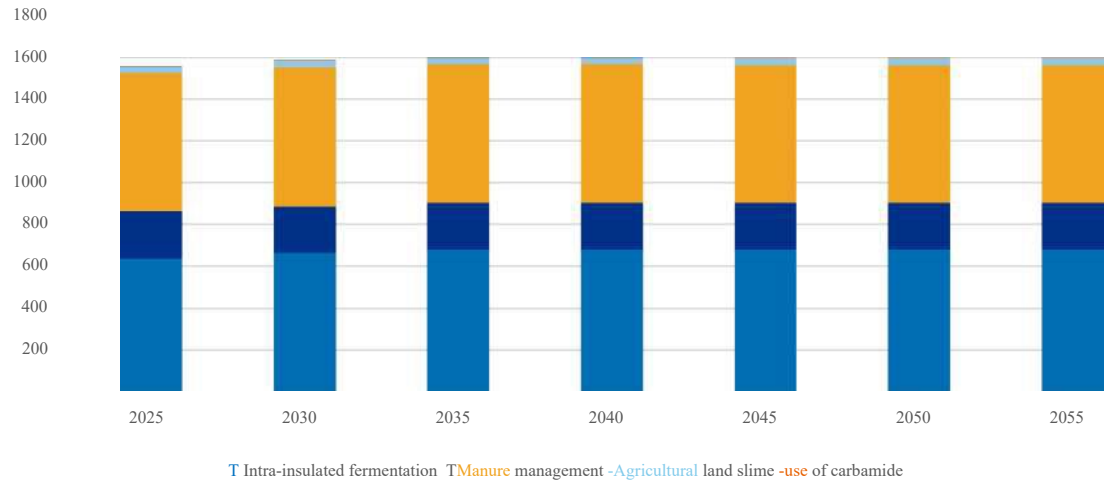


Figure 4.11 Agricultural GHG projections by sub-sector, kt CO_2 eq

GHG projections in the waste sector

Emissionsfrom the waste sector are projected to decrease by 45 % in CO2 equivalents by 2055 compared to 2022. The reduction in emissions is mainly linked to an increase in waste recovery and recycling, a reduction in the volume of biodegradable waste going to landfills. Emissions from the solid waste landfill sub-category are projected to decrease by 73 % by 2055 compared to base year emissions. The increase in GHG emissions from the biological treatment of solid waste is linked to a reduction in the volume of biodegradable waste in the total amount of solid waste landfilled. The reduction in emissions from wastewater treatment and discharge (12 % in 2055 compared to 2022) is linked to the expansion of the sewerage network and the modernisation of wastewater treatment systems in low-density settlements. Open incineration will end by 2030 and a marginal amount of waste will be incinerated without energy recovery.

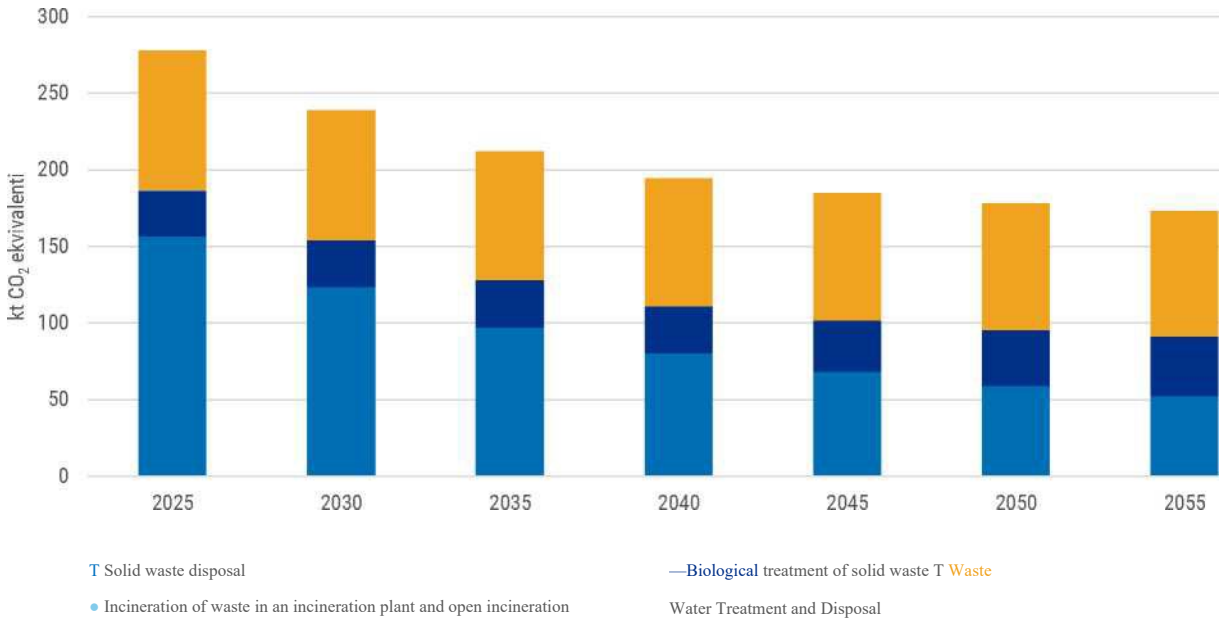


Figure 4.12 Waste sector GHG projections by sub-sector, ktCO_{2eq}

GHG projections in the LULUCF sector

With existing measures, the LULUCF sector is projected to remain a source of greenhouse gas emissions, meaning that its total emissions exceed total removals. In the scenario with existing measures, current forest-agricultural practices and logging intensity are expected to continue in the future (running volume between 9.2 and 11 million m³/year). The area estimates for the land categories were based on the assumption that land use change would continue at the average level of 2018-2 022 years, while major known planned land-use change activities such as the construction of Rail Baltic and the extension and construction of military exercise grounds were taken into account. The grassland area is declining despite the restoration of semi-natural communities (herbal meadows) (deforestation of 1 200 hectares of forest land for the restoration of heritage meadows). The projections use SMI data from 2023 based on 219.6 thousand hectares of protected forests (not including shore restricted zone protected forests) and applied half of the intensity of final logging. Protective forests in the shore restricted zone are included in the calculation of logging scenarios with the commercial forest. The area of forests to be strictly protected will remain at the same level in the forecast period of 482.5 thousand ha.

The carbon balance of forests is mainly linked to changes in total forest resources, which depend on forest age structure, management practices and changes in forest land area. The estimates of the fall-back are based on a decade-by-degree approach, i.e. the estimates used in the calculations are averaged over the decade. The increasing share of mature forests, the combined share of continuously increased flat areas, unclear areas and juveniles, and the stabilising woodland area have reduced carbon sequestration in recent years. Under the scenario (total volume of logging 11 million m³/year), total forest cover in 2053 is about 7 % lower than today.

Climate change, and in particular the current geopolitical challenges, have a significant impact on emissions from the LULUCF sector. National logging has increased compared to the pre-war period: from 9.98 million m³ in 2021 to 12.08 million m³ in 2022. This means an additional volume of around 3 million m³ for 2021-2022, corresponding to approximately 3.6 million tonnes of $CO2equivalent$ in terms of greenhouse gases. The additional logging volumes and the resulting greenhouse gas emissions also result from reduced imports.

Deforestation also has a negative impact on the achievement of the LULUCF targets. The main causes of deforestation, such as the Rail Baltic route and military exercise fields, are strongly linked to security considerations, making it difficult to avoid them.

In Estonia, the impacts of climate change are already clearly visible during the first LULUCF commitment period (2021-2025), although they are only accounted for in the second period (2026-2030) under the LULUCF Regulation. Estonia is experiencing an increase in temperature above the global average and rainfall has increased. These changing climatic conditions reduce the growth of wood biomass, while longer periods of drought cause water stress on trees and increase their vulnerability to bark beetle

attacks. As a result, carbon removals are reduced, which in turn makes it difficult to meet the LULUCF targets.

For arable land, net emissions are projected to decrease compared to current levels in the future. In particular, emissions from mineral soils will be reduced as land use and management practices for arable land are not expected to change significantly in the future, leading to a stabilisation of the soil organic carbon stock.

For the categories of settlements and other land, only emissions associated with land-use change are accounted for in the GHG inventory. The construction of the Rail Baltic route will lead to a significant increase in deforestation into settlements, while deforestation linked to the construction and expansion of military exercise squares is included in the other land category.

Most of the emissions in the wetland category come from the use of horticultural peat and peat production areas. Annual horticultural peat extraction volumes were estimated as the difference between all peat extracted and the heating peat produced, and emissions were expected to occur in the same year as the extraction. For the wetland category, peat production was expected to continue at the average level in 2019-2023 and the area of peat production areas would remain unchanged compared to 2022. As the production of peat for heating is decreasing, all extracted peat was expected to be used in horticulture as of 2035. Peat extraction sites amounted to 25.81 hectares in 2022 and the same area has been used in the forecasts. Due to the different degree of degradation of low-degradable and well-degradable peat (conservative degradation – 16 %) it can be expected that the horticultural peat will be degraded on a longer-term basis than the methodology used to calculate peat emissions in accordance with the IPCC Guidance. Thus, the emissions associated with horticultural peat are overestimated and a number of peat-related methodological developments are planned to be specified. The increase in horticultural peat valorisation, which is planned to increase by 85 % in 2035, will also contribute to the gradual reduction of emissions.

Estimates of carbon sequestration in timber products are related to estimated logging volumes, where it was assumed that the distribution of timber products corresponding to the volume of timber harvested would remain the same, i.e. production volumes were found according to the ratio of the average logging volume over the last five years to historical production, except for wood panels, which are no longer expected to be produced. Carbon sequestration in timber products will decrease by 2055. Sawn and wood panels were the largest contributors to this reservoir. The share of paper and paperboard and bleached chemothero-mechanical pulp categories and the impact on the carbon circulation are short and small, especially due to the short half-life. The contribution of wood products to carbon sequestration has been high so far and remains an important balancing factor in the balance sheet. However, there has been a decrease in removals in 2022 due to a decrease in sawn wood

production and closure of the Repo particle board plant. As of 2023, the production of particle board is projected to no longer continue.

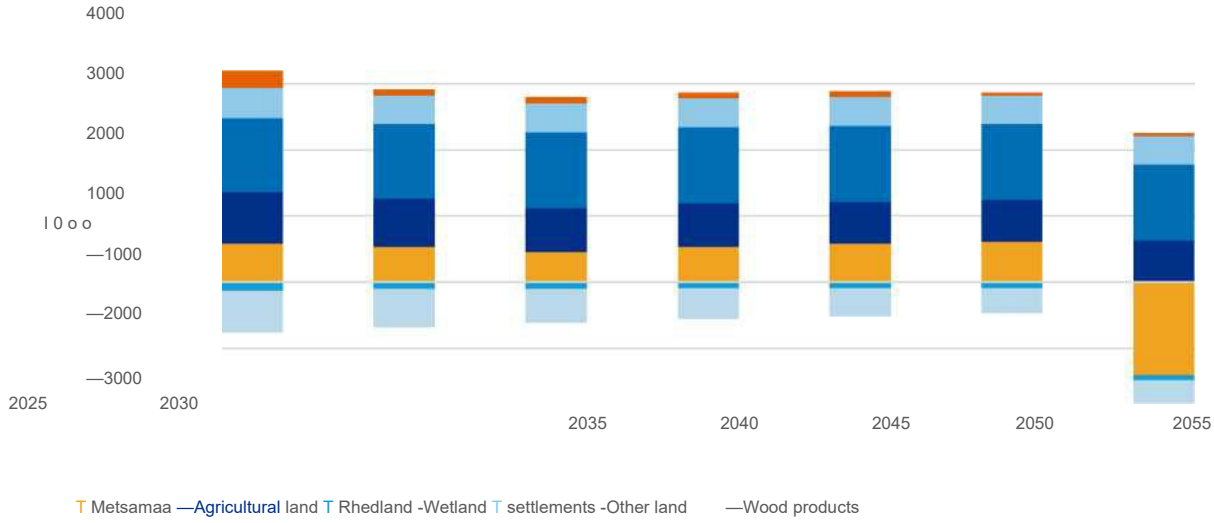


Figure 4.13 LULUCF GHG projections by sub-sector, kt CO_2 eq

**Indirect N_2O emissions from arable land (leaching) are reported as indirect emissions in the GHG inventory and therefore their emissions are not projected.*

4.2.2. Renewables

1. I. Current share of renewable energy in gross final energy consumption and in different sectors (heating and cooling, electricity and transport) as well as per technology in each of these sectors

Current situation

In 2023, according to the Eurostat SHARES model, the share of renewable energy was 41 % of gross energy consumption, including 32 % of gross electricity consumption, 67 % of gross heat and cooling consumption and 9% of gross transport consumption265.

Transport sector overview by technology:

The share of renewable energy in transport was 20 239.06 % in the year. Biofuels were the largest contributors, totalling 4.4 %, of the fuels released for consumption thanks to the obligation for suppliers of liquid fuels to include a biocomponent. The share of fuels from the first generation totalled 3.4 % of biofuels released for consumption. Biomethane accounted for 202 341 % of total gas consumption in the transport sector in the year and 100 % of biomethane is consumed in the transport sector in Estonia. Electricity accounted for 6.4 % of all renewable energy consumed in transport, while renewable electricity accounted for 2.9 %.

Overview of renewable electricity by technology:

By the end of 2023, the share of renewable electricity was 32 %, with 25 GWh of hydropower, 696 GWh of

265 SHARE of renewable energy in gross final energy consumption by sector. https://ec.europa.eu/eurostat/databrowser/view/sdg_07_40/default/table?lang=en

wind energy, 693 GWh of solar energy, 1 202 GWh of biomass and other renewable 52 GWh.266

Heating and cooling from renewable energy sources:

In 2023, the share of renewable energy in heat management accounted for around 67 % of final energy consumption. In 2023, the consumption of renewable fuels in the local heating sector was 4 942 GWh; the heat consumption from renewable energy in the district heating sector was 4 453 GWh and heat pumps produced 1 655 GWh of heat in the local heating sector. There are no national statistics on cooling energy.

Forecasts for the future

Estonia has assessed in detail the achievement of the overall renewable energy target for 2030. According to this, the share of renewable energy in gross energy consumption in 2030 is at least 65%267. By 2030, the share of renewable energy by sector shall be as follows:

- at least 100 % of final electricity consumption
- at least 63 % of final heat consumption
- on transport consumption under the Renewable Energy Directive

More detailed projections and analysis for renewable electricity, transport and cooling are described in chapter 2.1.2.

We see an additional ambition to produce renewable electricity above the share set out in the national targets. For example, energy capacity from biomass is increasing in the coming years, with 0.3 TWh of additional electricity sold to the grid and 0.7 TWh of self-generated electricity. In the case of solar energy, the national targets assume an increase in installed solar parks resulting from auctions. However, the construction of roof panels is also growing, which also increases the potential of solar energy, but it is not known to what extent. In wind energy, one of the alternatives is the possibility to meet the targets with onshore wind only, which would mean that electricity produced from offshore wind, as shown in Table 2.4, will be placed on the export market. In sum, this means that Estonia has the potential capacity to generate electricity above its 2030 consumption.

Given the increase in current trends and the increase in the uptake of heat pumps and district heating, the share of renewable energy in this sector could potentially rise to 70 % by 2030. The corresponding projections have not yet been translated into national targets, as the heat management study has only been finalised with an action plan drawn up by consultants and, on the basis of this, we will develop more precise measures to ensure that the share of renewable energy in the heating and cooling sector is actually achieved.

Projections of sectoral developments with existing national and Union policies and measures at least until 2040 (including for the year 2030)

The evolution of the renewable energy sector in 2030 and the trajectories that take into account current trends in renewable energy production and consumption are described in Chapter 2.1.2. The renewable energy trajectories for 2040 shall take into account the overall climate policy objectives set by the European Union, as well as nationally.

In the future, we can increasingly see cooperation and synergies between sectors, leading to wider deployment of renewable energy and energy savings, both at the level of primary energy production and at the level of the use of secondary energy in all sectors, in order to move towards a carbon-neutral economy.

The trends towards which the Estonian renewable energy sector is moving in 2040 depend heavily on the megatrends we can see in Europe and globally, where carbon-neutral energy production, energy saving and storage and smart consumption are the main keywords.

It is clear that fossil fuels are increasingly being replaced by renewable energy. Renewable energy is

266 Net production mix by fuel.xlsx

267 This share is calculated taking into account the agreed statistical trade transactions for renewable energy.

produced where the best geographical and climatic conditions are met, both at micro (renewable self-consumption) and at macro level. The resulting ability to see large wind and solar farms on land as well as on the high seas and water bodies, as technology evolves and lower prices, will no longer play an important role e.g. by sea depth (the use of anchored floating foundations). In order to maximise benefits and meet national targets, different countries are actively cooperating on renewable energy, in the form of joint projects, support schemes and statistical trade. The exponential development of storage technologies, the pumph hybrid accumulation power plant (PHAEJ), hydrogen as an energy carrier and accumulators will also make it possible to harmonise consumption on the grid in the 2040 perspective, as peak loads are covered by stored energy.

In order to ensure the security of electricity supply in Estonia, a combination of renewable energy generation installations and storage solutions (including seasonal storage), carbon capture, storage and sequestration technologies as well as new generation nuclear reactors (Tuginedes in the final report of the Government of the Republic's Working Group on Nuclear Energy) may be used in the future, the Riigikogu268decided on 12 June 2024 to support the preparation of the deployment of nuclear energy in Estonia269 and the establishment of an appropriate regulatory framework for it. The deployment of nuclear energy will support Estonia's 2050 climate targets and security of supply. In doing so, it is important to ensure that the deployment of nuclear energy does not undermine the expansion of renewable energy generation and storage capacities and does not delay emission reductions.

The establishment of a nuclear power plant requires extensive international cooperation, the establishment of an appropriate legal and regulatory framework, the development of competences and preparation for security and emergency preparedness. In November 2024, the mandate of the Working Group on Nuclear Energy, which was active in 2021-2023, was renewed and a Nuclear Steering Group was set up, with the main task of steering the national process to prepare for the deployment of nuclear energy, drawing up the programme roadmap and overseeing the activities to be carried out. Priority actions are the drafting of the Law on Nuclear Energy and Safety (TEOS) and submission to the Government of the Republic (expected deadline of June 2026) and the establishment of a competent nuclear regulator by 1 January 2027.

All generating equipment complying with the requirements (including connection technical conditions, environmental requirements, safety requirements, etc.) with a power generating module with a unit capacity of less than 400 MVA can be incorporated into the Estonian electricity system. Therefore, small *Modular Reactor*(SMR) is suitable for Estonia. The analyses carried out by the Nuclear Energy Working Group were technology neutral and the technology to be used needs to be selected in the location selection process, as the detailed solution to the location selection already requires very specific parameters and the entire future permit procedure and the setting of specific conditions will depend on the specific technology.

Increasingly, towards more energy and environmentally friendly solutions on the consumption side. As a result of the renovation of the building stock, buildings are becoming increasingly energy efficient and smarter. Buildings use energy-efficient solutions, including automation and control systems for technical building systems and local renewable solutions (e.g. photovoltaic panels) and use low carbon footprint solutions such as heat pumps, solar panels to produce thermal energy. When renovating buildings, ventilation systems with heat recovery shall be installed in buildings to ensure a high quality indoor climate and comfortable indoor temperature. The increased deployment of technical systems, including e.g. ventilation systems and charging infrastructure for light-duty vehicles, will lead to a certain increase in electricity consumption, but this will be offset by energy efficiency savings on heat production. Due to the increase in temperature periods due to climate change, the building sector is seeing an increasing demand for cooling energy.

268 (https://kliimaministeerium.ee/sites/default/files/documents/2023-12/Nuclear energy%20t%C3 %B6 %C3 %B6r%C3 %BChma%20l%C3 %B5ppReport.pdf
269 https://www.riigiteataja.ee/akt/315062024003

In the transport sector, there is an exponential electrification of both road and rail transport. Alternative fuels replace fossil fuels. As regards the obligation under the Alternative Fuels Infrastructure Regulation (AFIR), an alternative fuels policy framework was proposed by the end of2024 and270the policy framework will be presented by the end of 2025. Thanks to convenient public transport and the increased use of light roads and light means of transport, cities become essentially car-free, leading to a comfortable and cleaner urban environment.

4.3. Dimension energy efficiency

i. Primary and final Energy current consumption in the economy; and in sectors: (including industry, housing, services and transport).

According to Statistics Estonia, primary energy consumption in 2023 amounted to 192 PJ (53.3 TWh) and final energy consumption was 107 PJ (29.7 TWh). The structure of final consumption is described in the graph below. The transport sector has steadily increased compared to the past. The energy consumption of business and public services increased in the meantime, showing a decrease in 2023. Household energy consumption has tended to remain at similar levels over the years. Industry's energy consumption has been almost one and a half times lower compared to 2010 vs 2021, while value added has more than doubled in current prices. The share of total value added has decreased by two percentagepoints271.

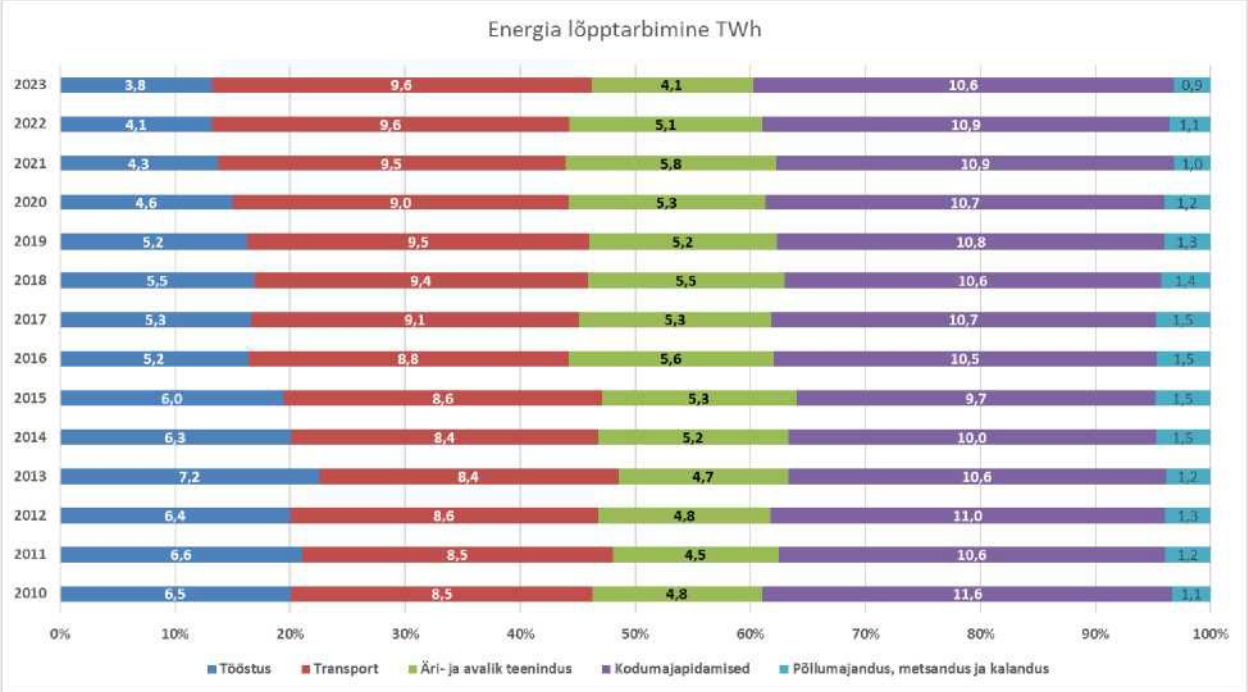


Figure. 4.14 Structure of final energy consumption in 2010-2023 (Statistics Bureau table KE0240)

ii. Current potentia for the use of high-efficiency cogeneration and efficient district heating andcooling272.

In 2 022.97 % of the heat consumed by the Estonian district heating networks met the criteria for efficient district heating. In the same year, cogeneration accounted for 43 % of the heat produced in the district heating network and the vast majority of this cogenerated heat met the criteria for high-efficiency cogeneration. Higher capacity cogeneration blocks mainly burn chipwood (Tallinn, Tartu and Pärnu), oil shale, oil shale products (Ahtme, Sillamäe) and waste (Iru). Smaller capacity cogeneration units fall into two categories: wood chips are burned by small towns CHP plants and various industrial cogeneration

270 Estonia 2024. Draft National Policy Framework.pdf
271 Statistical office data table RAA0042
272 In accordance with Article 14(1) of Directive 2012/27/EU.

plants, which can use both turbines and engines burning land or biogas. Industrial cogeneration plants powered by turbines, mainly burning ewe gas or black alkali, which is a residue of the paper industry.

The district cooling sector has not been widely confirmed in Estonia, but Estonia's first district cooling system was already built in Tartu (13+ 5.4 MW), then in 2019 the district cooling plants in Pärnu (7 MW) and Tallinn (10 MW) started works. As promising regions, the city centres of Tallinn and Tartu have been identified in the development plans so far. In 2020, electricity produced by cogeneration plants accounted for 27.7 % of the total electricity produced (most of which is based on local wood chipping).

The study "Estonia's transition to a carbon-neutral heating and cooling economy by 2050" estimated the cooling demand to be around 700 GWh by 2030. This need is mainly due to the cooling needs of commercial buildings.

The cost-effectiveness of district cooling must be assessed on a regional basis according to real needs and the suitability of suitable technologies must be assessed.

iii. Projections for primary and final energy consumption in each sector until at least 2040, including 2030, taking into account existing energy efficiency policies, measures and plans referred to in point 1.2(i)[273].

Inland primary energy consumption (fuels used in Estonia + imports – exports) is planned to be significantly reduced to 36.5 TWh/y by 2030; i.e. up to 48 % compared to the peak in 2016). Final energy consumption must decrease to 29.4 TWh/y. In terms of final consumption, no significant changes in the distribution of consumption between sectors are projected, i.e. the achievement of the primary energy consumption reduction target depends in particular on developments in the oil shale sector, on the domestic use of wood fuels and on the use of transport fuels.

273 This reference business as usual projection shall be the basis for the 2030 final and primary energy consumption target which is described in 2.3 and conversion factors.

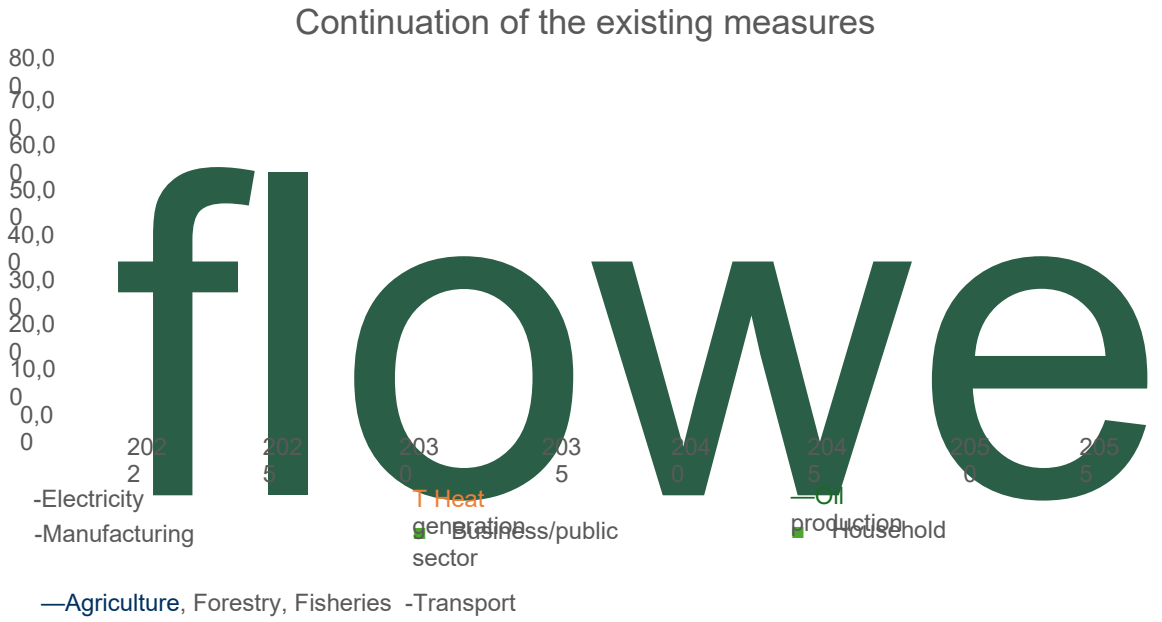


Figure 4.15 Forecast of inland primary energy consumption by sector up to 2050, TWh [274]

IV. Cost-optimal levels of minimum energy performance requirements resulting from national calculations, in accordance with Article 5 of Directive 2010/31/EU

Cost-optimal levels of minimum energy performance requirements have been identified in a study commissioned by the Ministry of Economic Affairs and Communications and finalised in 2018 entitled 'Analysis of cost-optimal minimum energy performance levels in buildings'. The results are summarised in the tables below. When analysing the table, the weighting factors for energy carriers, of which the weighting factor for renewable fuels is 0.65, shall also be taken into account; for efficient district heating 0.65; 1.0 for natural gas and 2.0 for electricity.

Cost-optimal energy performance figures for new buildings are given in the table below. For comparison, cost-optimal energy efficiency figures for 2011 and 2017 and a proposal to update the NZEB requirement by 2024 are included.

Table 4.3 Cost-optimal energy performance figures for new and existing buildings, unit: kWh/(m^2·a)

Building	2011 cost – optimal kWh/(m^2 a)	2017 cost – optimal kWh/(m^2 a)	**2022 cost – optimal** kWh/(m^{2}a)	*2024. NZEB energy class A kWh/(m2a)
Small residential		79	**107**	120
Small residential	140	87		
Lying house		71	**80**	90
Multi-dwelling building	145	103	**92**	100
Office building	140	93	**83**	95

* Proposal for 2024

274 Estonian Environmental Research Centre forecast, author's calculations, N.B.: Graph WEM forecast/baseline scenario, i.e. *With Existing Measures*

Table 4.4 Cost-optimal energy performance figures for substantially renovated buildings and a proposal to update the NZEB requirement for renovation by 2024.

Building	2017 cost-optimal kWh/(m^2 a)	**2022 cost-optimal** kWh/(m^2 a)	*Nearly zero energy in kWh/(m 2a) for major renovation in 2024
Small residential	160	**170**	180
Multi-dwelling building[1]	150	**125-130**	135
Office building	160	**140**	150

[1] higher value applies to gas heating * Proposal 2024. Year

4.4. Energy security dimension

- . Current energy mix, domestic energy resources, import dependency, including relevant risks

Estonia's consumption structure of its main energy sources in 2023 is illustrated by the graph below

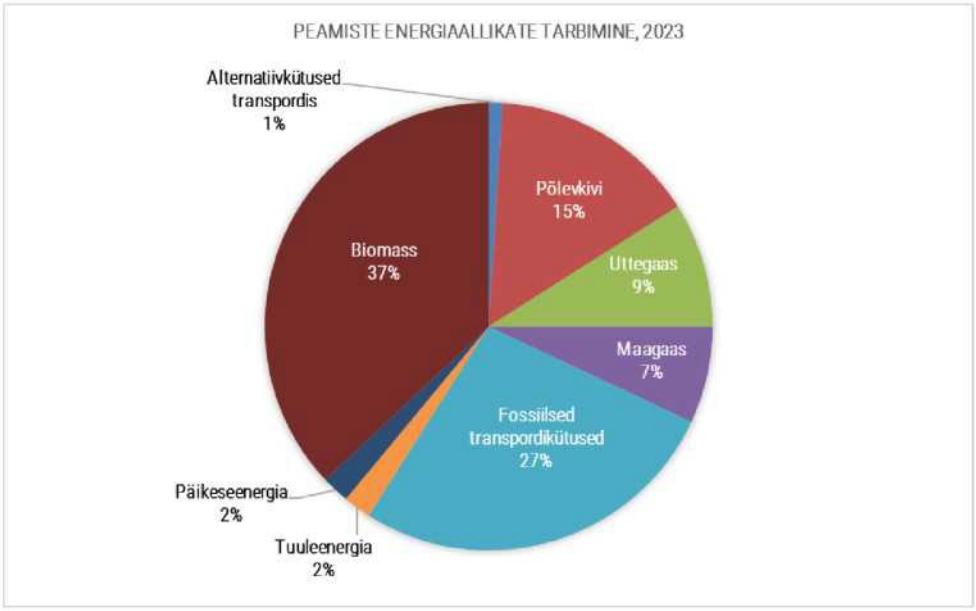


Figure 4.16 Breakdown of main energy consumption in 2023 (source: Estonian Environmental Research Centre)

The table below shows, inter alia, the breakdown of renewable electricity.

Table 4.5 Electricity Iproduce e[280] andconsume e[281]

Network entered electricity manufacturing, GWh	2018	2019	2020	2021	2022	2023	2024
Non-renewable energy	8 918	4 501	2 580	3 734	4 964	2 303	1 963
Renewable energy, including:	1 665	1 946	2 230	2 597	2 623	2 618	3 399
biogas	37	40	29	18	6	3	1
biomass	951	1 139	1 231	1 519	1 372	1 202	1 199
wind	591	692	824	731	664	969	1 164
water	19	22	27	25	22	25	30
sun	13	54	119	305	560	693	1 005
biodegradable waste	55	51	56	50	45	49	45
Total production:	**10 583**	**6 447**	**4 810**	**6 332**	**7 587**	**4 921**	**5 361**
Imports:	3 053	4 861	7 367	7 332	7 183	7 660	5 553
Export:	4 950	2 704	3 723	4 703	6 172	4 355	2 656
Inland consumption with network losses	8700	8600	8400	9000	8500	8200	8260
Output as a share of consumption:	122 %	75 %	57 %	70 %	89 %	60 %	65 %

The energy dependency ratio is visible in the figure below.

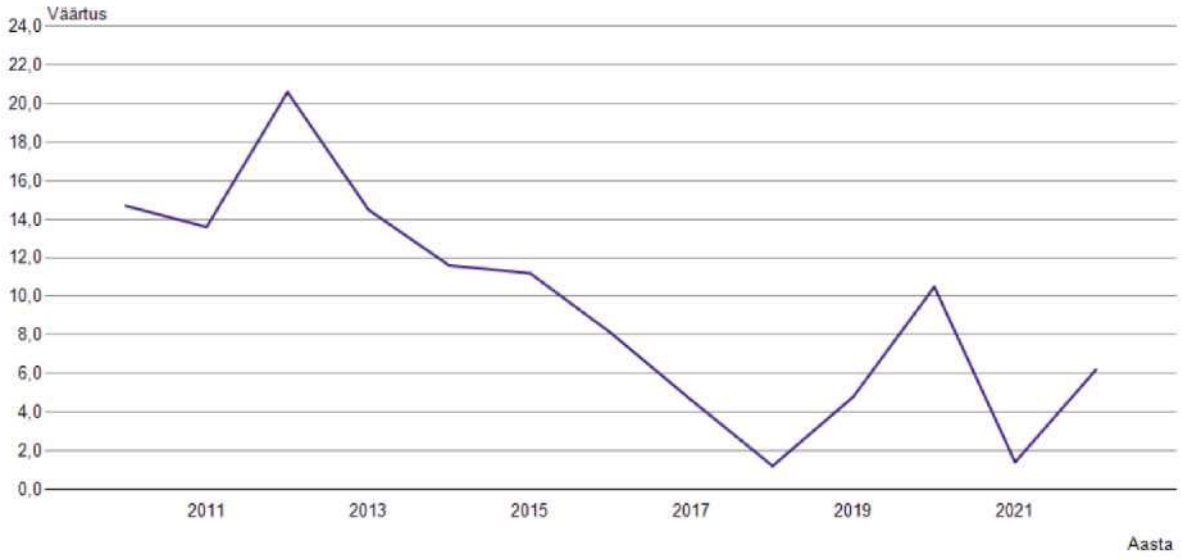


Figure 4.17 Energy dependency rate % (KE36 www.stat.ee)

The vast majority of Estonia's primary energy needs are met by domestic energy sources. Thanks to oil shale, renewables and peat, Estonia has the lowest energy dependency rate in the European Union at 6.2 % in 2022 (see upper figure)275276277. However, in the near future, this share is due to:

275 Production and forecast | Elering
276 KE0230: Energy balance | Year, Indicator and type of fuel/energy. Statistics database
277 Energy Import dependency. https://ec.europa.eu/eurostat/databrowser/view/NRG_IND_ID/default/bar?lang=en

the competitiveness of oil shale electricity production is likely to be reduced.

The increase in domestic renewable energy production mitigates the increase in the energy dependency rate.

Despite a good overall picture, all liquid motor fuels consumed in Estonia, as well as natural gas, are imported. As a result of the energy crisis and high natural gas prices, the consumption of natural gas in Estonia has decreased significantly.

- I. Forecasts of developments under existing policies and measures at least until 2040 (including for 2030).

Estonia's primary energy consumption (fuels and imports) will change significantly over the coming decades, with the share of domestic renewable fuels increasing.

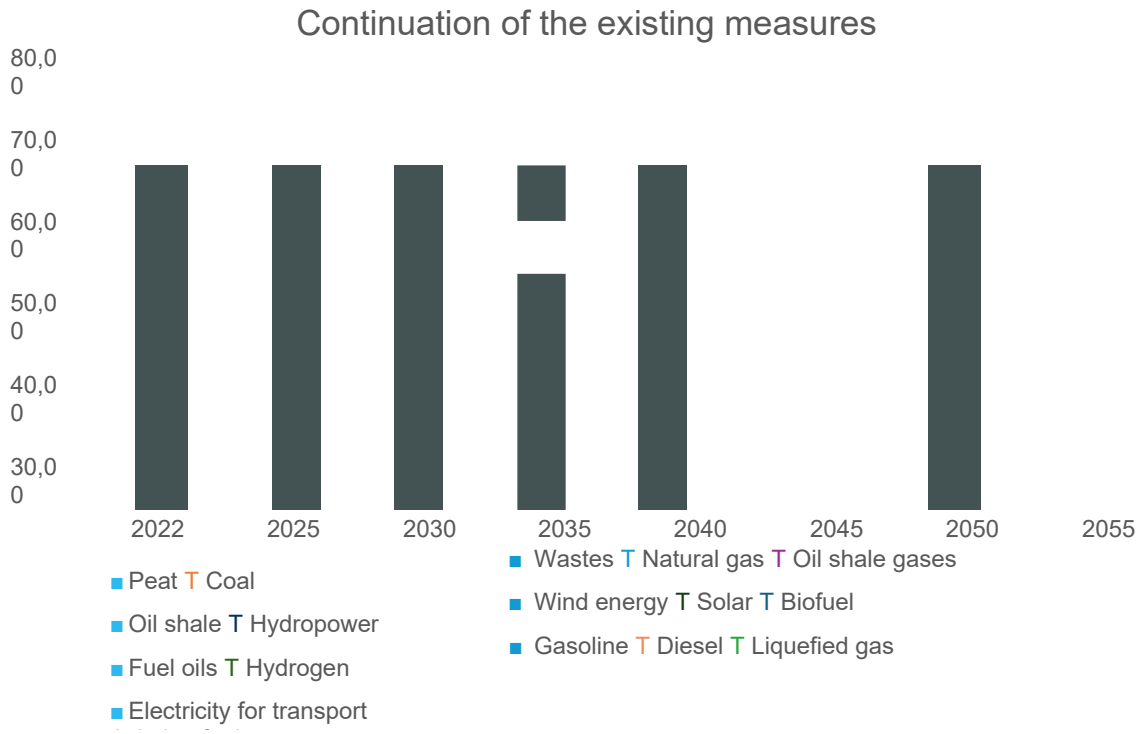


Figure 4.18 Forecast of primary energy consumption up to 2055 (so-called WEM forecast) 278

4.5. Internal energy market dimension

4.5.1. Electricity interconnectivity

iii. The level of electricity interconnection and the maininterconnections279.

Chapter 2.4.1 deals with electricity interconnections.

278 Estonian Environmental Research Centre forecast, author's calculations

With 279 reference to overviews of existing transmission infrastructure by TSOs.

The existing electricity transmission infrastructure will be addressed in the following annual analyses:

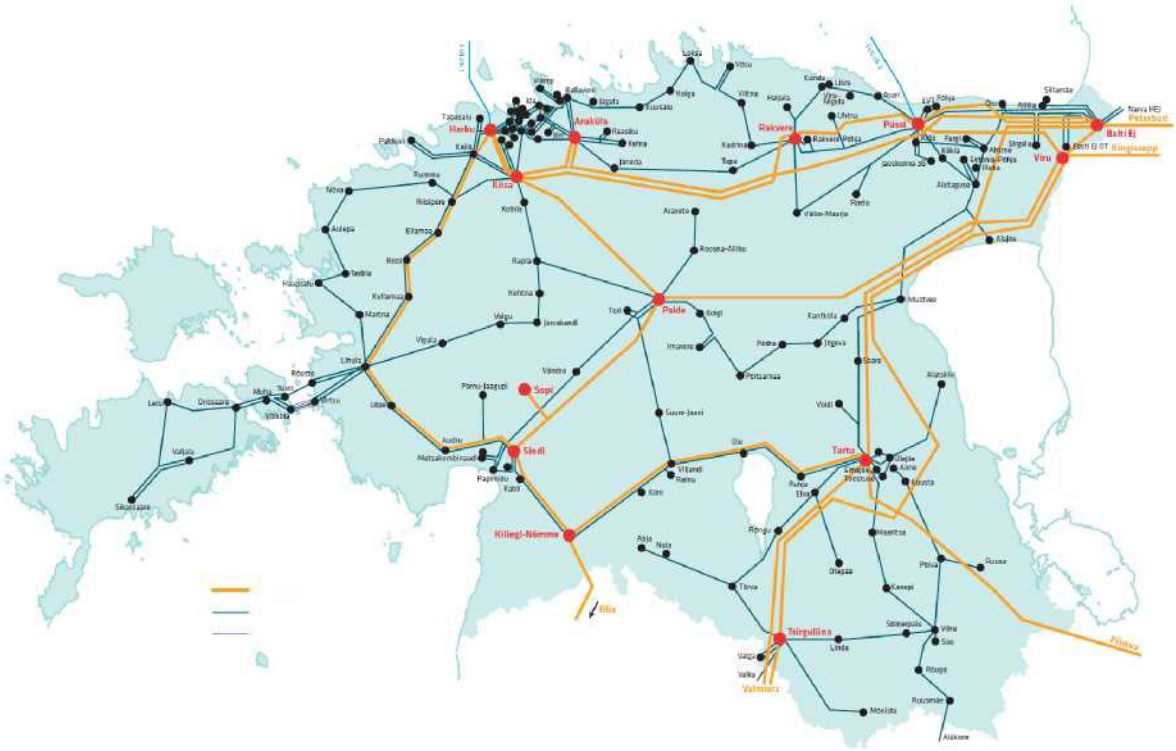
1. Elering AS. Estonia's Electricity Security of Supply Report. Security of supply reports and conferences | Elering
2. Competition Authority. Report electrical and gas market Estonia. https://www.konkurentsiamet.ee/et/ametist-kontaktid/aruanded

iv. Forecasts of interconnection expansion needs (including for 2030)280.

Chapter 2.4.1 deals with electricity interconnections.

4.5.2. Energy transmission infrastructure

The main characteristic of the existing electricity and gas transmission infrastructure is281 282 283 284(d). In Estonia, there is one transmission system operator (Elering AS) which is also the system operator. The total number of transmission lines owned by the TSO (110 kV to 330 kV) is 5 135 km and the substations



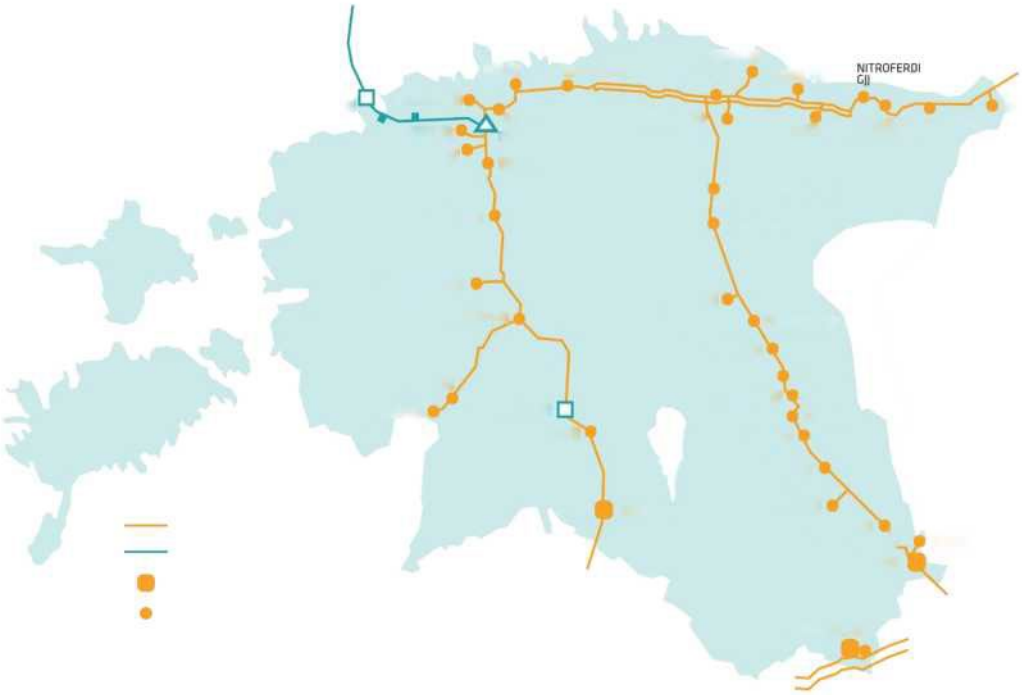
156.28[7288]

With 280 reference to national network development plans and regional investment plans of TSOs.
With 281 reference to overviews of existing transmission infrastructure by TSOs.
282 Elering AS. Map of electricity transmission network. https://elering.ee/elektri-pohivorgu-kaart
283 Elering AS. Lines owned by Elering. https://elering.ee/eleringile-kuuluvad-liinid
284 Elering AS. Map of the Estonian core network. https://elering.ee/elektri-pohivorgu-kaart

Figure 4.19 Estonian electricity system

The existing electricity transmission infrastructure will be addressed in the following annual analyses:

1. Elering AS. Estonia's Electricity Security of Supply Report. https://elering.ee/varustuskindluse- Reports and conferences
2. Competition Authority. Report electrical and gas market Estonia. according to the https://www.konkurentsiamet.ee/et/ametist-kontaktid/aruanded Natural Gas Act, the Estonian gas system is a single transmission system operator, which is also the system operator. The gas system and the electricity system have one system operator, Elering AS. The Estonian gas system is a dead-end system – gas is introduced from three entry points, but no bilateral flow of gas



from Estonia can take place.

The Estonian gas system is part of the regional gas system and the gas market and is physically connected to the Russian, Latvian and Finnish gas systems, and through the Lithuanian-Polish gas connection GIPL

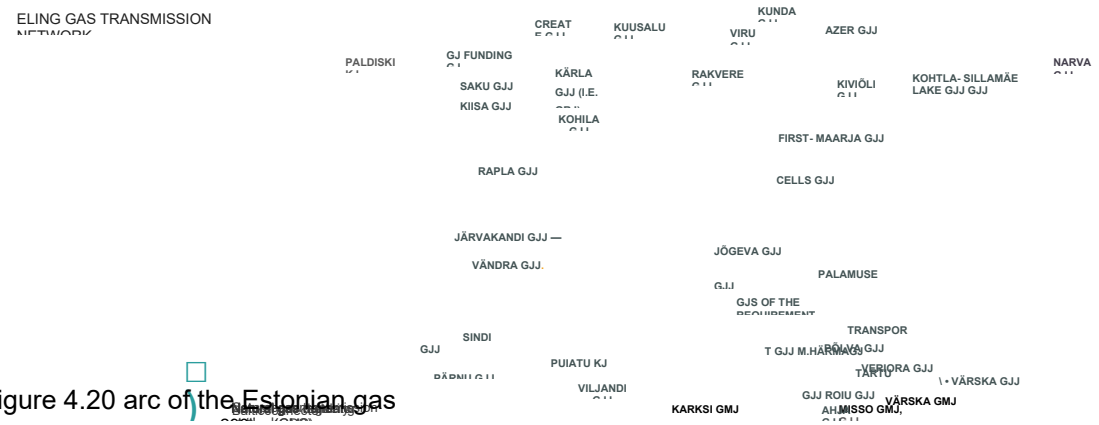


Figure 4.20 arc of the Estonian gas

(*Gas Interconnector Poland-Lithuania*), Baltic and Finland have been connected to the Central European Gas System since 2022. Although the Estonian system is physically connected to Russia through the Narva and Värska interconnection points, as of 1 January 2023, there will be no Russian natural gas supply via the gas network to Estonia. In the direction of Latvia, through the Karksi gas metering station ($^{7.0}$ m m/day), the Russian connection through Narva and Värska is 0 million^{m} /day and Finland through the Balticconnector (5.4 m m$^{/}$ day). The total interconnection capacity is therefore 12.4 m m$^{/}$ day. There are no gas storage facilities, LNG terminals or compressor stations in the Estonian gas system. The highest consumption of natural gas in the last 20 years was 6.7 million$^{m^3}$ (from 19 January 2006). Thus, from a technical point of view, the N-1 criterion of the gas system is ensured by the construction of the Balticconnector and the reconstruction of the Karks gas metering station (≥ 100 %). Total

[290] Elering on https://elering.ee/gaasisusteem has

HYPERLINK "https://elering.ee/gaasisusteem" 977 km of pipelines in the gas system (including Balticconnector), four gas metering stations, 36 gas distribution stations and one gas regulator. The list of gas system pipelines is given in the table below.

Table 4.6: Pipeline of the Estonian gas system. 285

Piping	Length [km]	Nimimeter [mm]	Maximum working pressure	Age in service [a]
Vireši – Tallinn	203	700	49,0	30
Vändra – Pärnu	50,2	250	54,0	16
Tallinn – Jõhvi D38	97,5	200	≤ 30,0	69
Tallinn – Jõhvi D38	148,3	500	≤ 30,0	59
Kohtla-Järve – Narva	46,1	350/400	≤ 30,0	67
Irboska – Värska GMJ	10,1	500	48,0	47
Värska GMJ – Tartu	75,8	500	39,5	47
Tartu – Rakvere	133	500	30,6	44
Irboska – Inčukalns	21,3	700	50,3	38
Clip – Riga	21,3	700	50,3	50
Balticconnector onshore Pipeline	53,4	700	54,0	3
Balticconnector maritime piping	38,5	500	80,0	3
Branch lines	76,9			
Total	**977**			

The Estonian gas system is connected through Latvia to the Lithuanian and Polish gas systems and via Balticconnector to the Finnish gas system.

Figure 4.21 Estonian Gas System Map (ENTSO-G)

285 Estonian Gas Network Development Plan 2024-2033 (https://elering.ee/maagaasi-ulekandevorgu-arengukava)

The gas system peak load forecast and consumption are shown in the graphs below.

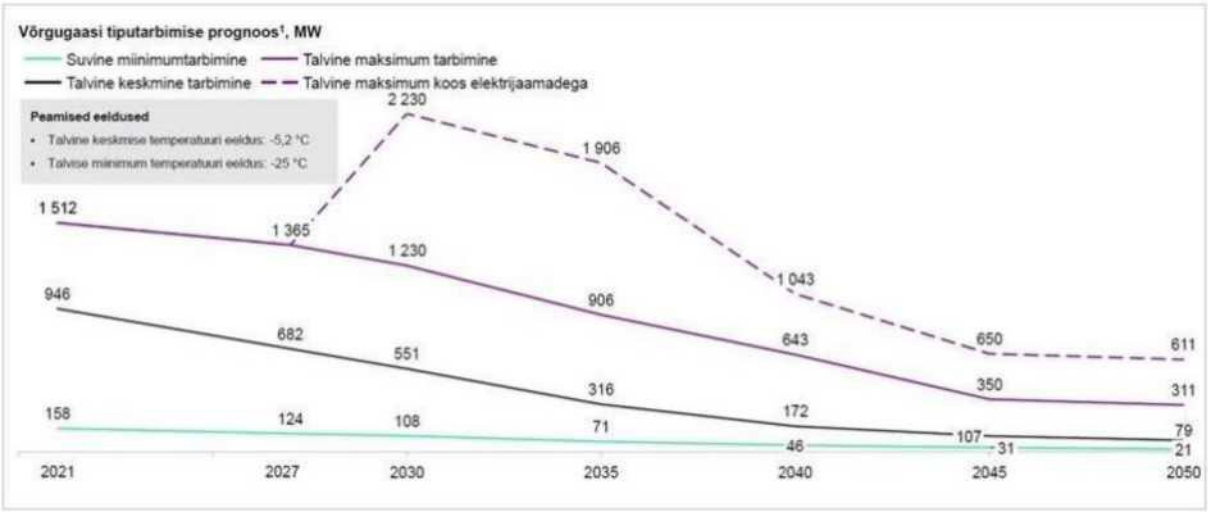


Figure 4.22 Forecast of grid gas peak consumption.

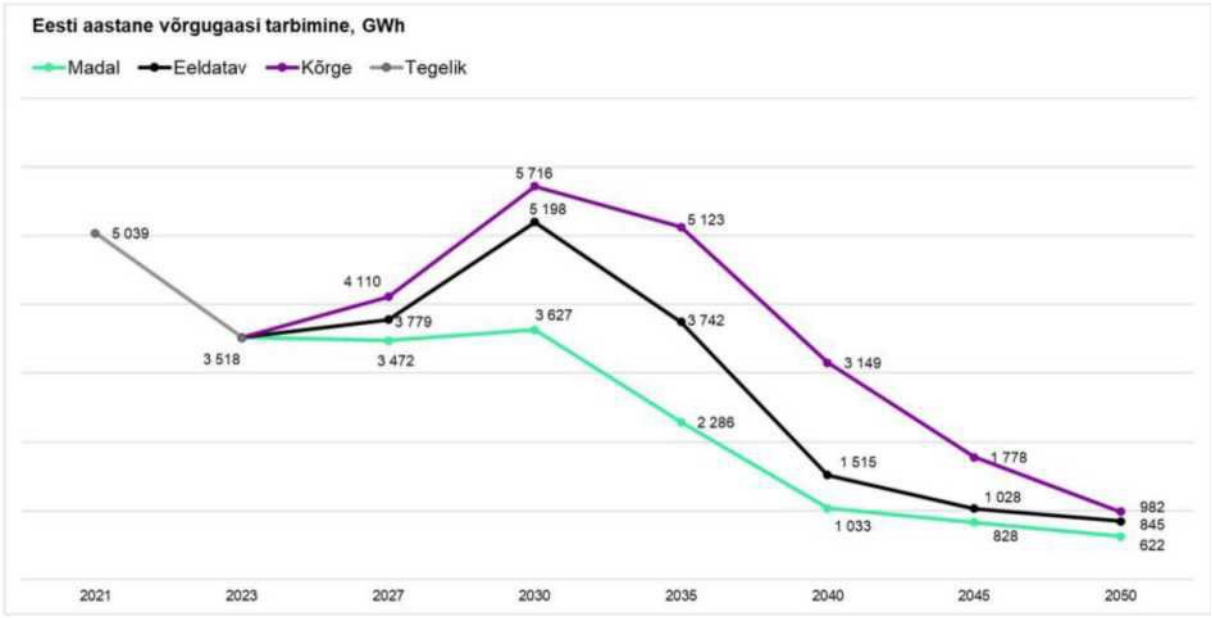


Figure 4.23*: Estonia's annual grid gas consumption (includes possible gas plant expansion by 2030)*[286]

The gas system development plan prepared by the system operator ispublicly available[287]. The Competition Authority prepares an annual overview of the functioning of the gas market for the European Commission[288].

v. projections of the need for extension of interconnections until at least 2040 (including 2030)[289].

Electricity system

The activities of the Estonian electricity transmission system operator (Elering AS) in maintaining the Estonian electricity system and making the necessary investments to ensure security of supply derive directly from the Electricity Market Act, the Network Code and the development plans for the electricity and

286 Microsoft Word – Estonian Gas Network Development Plan 2025-2034
287 Elering AS. Natural gas transmission network development plan. https://elering.ee/maagaasi-ulekandevorgu-arengukava
288 Reports and evaluations | Competition Authority
With 289 reference to national network development plans and regional investment plans of TSOs.

energy sector.

Elering's investments are based on the followingobjectives290:

1) supporting security of supply;
2) supporting the development of the electricity market (external connections);
3) provision of capacity to allow for new connections and increased loads;
4) halting the obsolescence of the network;
5) improving reliability (voltage quality and interruptions);
6) increasing the efficiency of the establishment, reducing losses;
7) new customers joining (consumers, producers).

Investments shall be planned in advance in the network development plans for at least 10 years. The 2022-2031 core network development plan sets out four main development perspectives:

Investments in the synchronisation of the continental European band

As part of the synchronisation with the continental European band, the third 330 kV connection between Estonia and Latvia has now been completed and the reconstruction of the North-South 330 kV overhead lines is under way. The project is planned to be completed by the end of 2025. The synchronisation took place in February 2025.

Cross-border network investments

Planning is in the process of establishing the third interconnection between Estonia and Finland and the fourth interconnection between Estonia and Latvia, as well as a project to develop the Baltic Sea Sea Network.

Strengthening the electricity grid in Western Estonia and islands – investments from the recovery package

Network investment programme to increase the volume of distributed and renewable electricity in Western Estonia and islands foresees investments in 110 and 330 kV electricity grids

Network developments within Estonia

These are investments to ensure the reliability, capacity and efficiency of the electricity grid and to stop the obsolescence of the grid.

A more detailed list of planned investments can be found on Elering AS's website: https://elering.ee/investeeringud-2023-2032

Gas system

The Estonian gas system operator Elering AS prepares the gas transmission network development plana periodically for the next 10 years291. The budgeting of investment plans included in the development plan involves validating different investment projects and carrying out a justified selection of investment projects. The choice is made on the basis of the principle that, in a context of scarce resources, it is primarily necessary to invest in sites that deliver the greatest socio-economic benefits to society.

These benefits may be expressed:

- reliability of energy supply;
- better functioning of energy markets;
- Increasing the efficiency of Elering's operations;
- better customer service.

290 Elering AS. Electricity market manual. https://elering.ee/elektrituru-kasiraamat/3-eesti-elektrisusteem/33-electrification long -term planning/331

291 Elering AS. Estonian gas transmission network development plans | Elering

In the case of investments in regulated assets, the following inputs, analyses and studies shall be accounted for: (a) network development

- network development plans, ENTSO-G ten-year development plans, Estonian energy policy development plans, Elering and customer development plans, other studies.

The investment qualifies if the investment builds a new network element (e.g. pipeline, gas distribution station, gas metering station, etc.) due to insufficient transmission capacity or the need to ensure reliability under the Quality Requirements Regulation. Recent major investments included the construction of the Balticconnector gas pipeline between Estonia and Finland and related ancillary projects such as the metering point at the Estonian-Latvian border and the construction of a compressor station. Project completed in 2021

4.5.3. Electricity and gas markets, energy prices

i. Current situation of electricity and gas markets, including energy prices

In April 2010, the electricity exchange Nord Pool AS (NP) started operations in Estonia. In 2010, the electricity market was 28.4 %. As of 1 January 2013, the electricity market opened up to everyone, i.e. all electricity customers with a valid network contract can choose the appropriate electricity vendor and electricity price package.

Thanks to the interconnection between Estonia and Finland *EstLink 1* and *EstLink 2* and the interconnection between Lithuania and Sweden from *NordBalt*, the Baltic States' electricity system has been strongly integrated with that of the Nordic countries (Denmark, Norway, Sweden) and guaranteed access to a single European electricity market.

In 2023, Estonia produced 4 933 GWh of electricity (net production), a decrease of 34.5 % compared to 2022 and 4 156 GWh of electricity exported from Estonia in 2023, a decrease of 32.3 % compared to 2022. Electricity production and exports decreased, in particular, due to the situation in the market, where electricity prices have decreased several times compared to 2022 and market access for oil shale power plants has decreased. Estonia imported 7 406 GWh of electricity in 2023, with an increase of 4.8 % compared to 2022. Electricity consumption was 6 974 GWh in 2023, with a decrease of 3.6 % compared to 2022. Network losses in Estonia's electricity system amounted to 1 209 GWh in 2023, 1.5 % less than in 2022. Table 4.7 shows the change in Estonia's electricity balance between 2022 and 2023 ats[298].

Table 4.7 Electricity bilanss[299]

Electricity balance, GWh	2021	2022	2023	Change 2023/2022 %
Net production	6 332	7 587	4 933	—34.5
Imports	7 332	7 183	7 406	4,8
Consumption	7 884	7 142	6 974	—3,6
Losses	441	1228	1 209	—1,5

[298] Competition Authority's Electricity and Gas Market Report 2023

[299] Product production and forecast |Elering (*https://elering.ee/toodang-ja-prognoos*), other data KE0230: Energy balance | Year, Indicator and type of fuel/energy. Statistics database

Electricity balance, GWh	2021	2022	2023	Change 2023/2022 %
Exports	4 703	6 172	4 159	—32,3

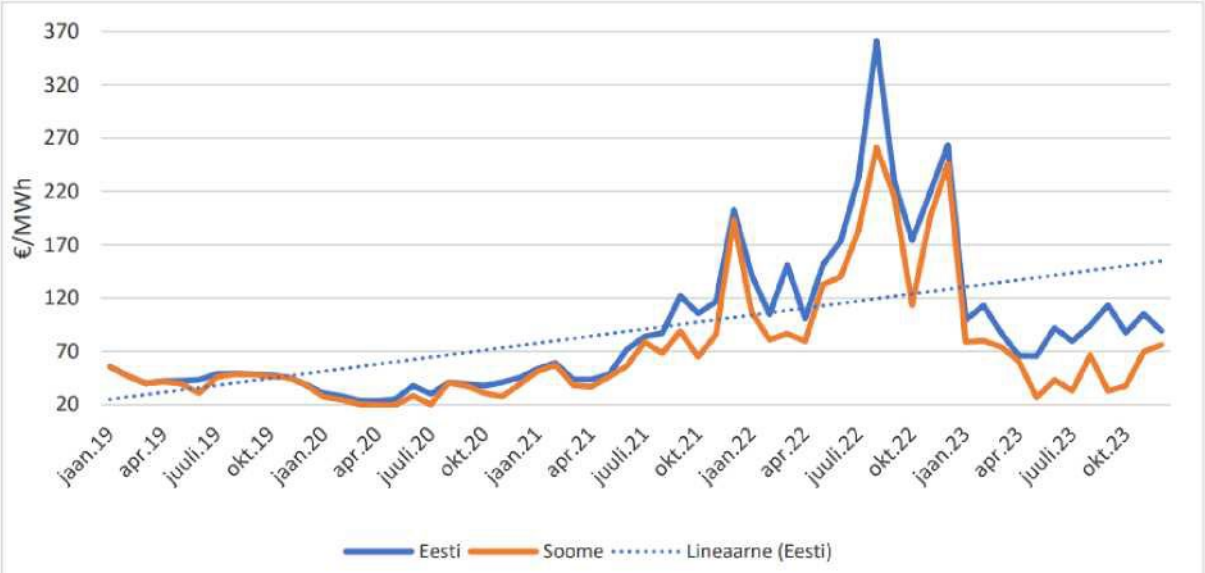


Figure 4.24 Average prices for the Estonian and Finnish price zones of Nord Pool Spot January 2020-October 2023

The above graph shows that electricity prices in Estonia and Finland have historically been relatively similar since the start of EstLink 2 in December 2013, which allowed sufficient transmission capacity between Estonia and Finland (1 016 MW) for some time. A larger gap in electricity prices has only emerged since 2020. Price differences between Estonia and Finland have been mainly due to interruptions between EstLink 1 and EstLink 2 when transmission capacity between Estonia and Finland has decreased. The reduction in production capacity in Estonia has led to a shortage of transmission capacity between Estonia and Finland and has led to price differentials, as this has meant that the demand for imports from Finland to Estonia has often been higher than the interconnection capacity.

Figure 4.25 below shows the electricity price in the Estonian price area on the NP power exchange over the years and Tables 4.84.10 show comparisons between the volumes of electricity traded and the prices of the region's price areas.

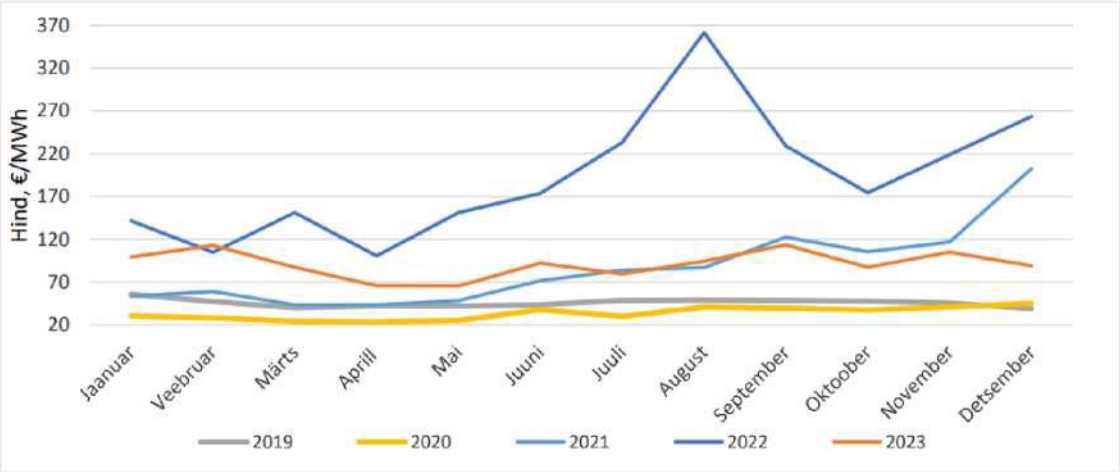


Figure 4.25 Average exchange price of electricity (exact numbers available on Nord Pool Spot website)[300]

Table 4.8 The amount of electricity traded in the NP price zone.

Indicator	Units	2023	2024	% Change
Consumption	TWh	4,91	5,12	4,28
Manufacturing	TWh	8,07	7,95	—1,49

The total amount of electricity sold on the day-ahead (Elspot) market in 2021 was 5.28 TWh, 59 % higher than the one sold in 2020, and the total amount of electricity purchased was 7.94 TWh.

Table 4.9. Quantities traded on the intraday market in the NP Estonian price zone

Price area	Average price EUR 2023/MWh	Average price EUR 2 024	% Change	Maximum price EUR 2 023/M	Maximum price EUR 2 024/M	Minimum price EUR 2 023/M	Minimum price EUR 2 024/M
NP Finland	56,47	45,57	—19,30	777,18	1896	—500	—19,96
NP Estonia	90,78	87,27	—12,73	777,18	1896	—60.04	—20,01
NP Latvia	93,89	87,43	—12,57	777,18	1478,91	—56,55	—19,96
NP Lithuania	94,44	87,34	—12,66	777,18	1478,91	—56,55	—19,96

All consumers who have a valid network contract will be able to choose their own electricity vendor. In 2023, 3 new balance managers, Centrica Energy Trading A/S, Energynet Finland OYja pure.energy GmbH, were added to the Estonian market, so there were 15 balance managers in Estonia at the end of 2023. In addition, Elering AS is also registered as balance manager for the purchase of network losses and for the sale of electricity during the emergency power plant tests. The competition between balance managers is illustrated by Figure 4.30. Eesti Energia AS has the largest market share in terms of consumption portfolios at 55 %. In terms of production portfolios, Eesti Energia AS also has the largest share at 68 %.

In 2023, the switching rate of electricity sellers was 7 % for household customers and 16 % for commercial customers. Compared to 2022, the activity of both household and commercial consumers in the electricity market has increased. This is due to the high volatility of electricity prices. There was also an increase in the number of active electricity sellers.

300 Nord Pool | Day-ahead prices (nordpoolgroup.com), see and ERR: https://www.err.ee/1609164847/eesti-ja-Displayed electricity-borm price receipts for 2020-2020

A simplification for the exchange of electricity sellers from the beginning of 2023. As a result of the modernisation of the network code on the functioning of the electricity market, electricity customers with a network contract will be able to switch electricity vendors more quickly than before. Whereas, under the previous legislation, the expiry of an existing electricity contract and the entry into force of a new electricity contract had to wait until the beginning of the new month and the intention to change the seller had to be notified at least 7 days before the change of the month, otherwise the process could last for up to 37 days, it is now possible to change the seller within 14 days. Elering AS has made corresponding changes to its data exchange platform to allow sellers to carry out an accelerated process.

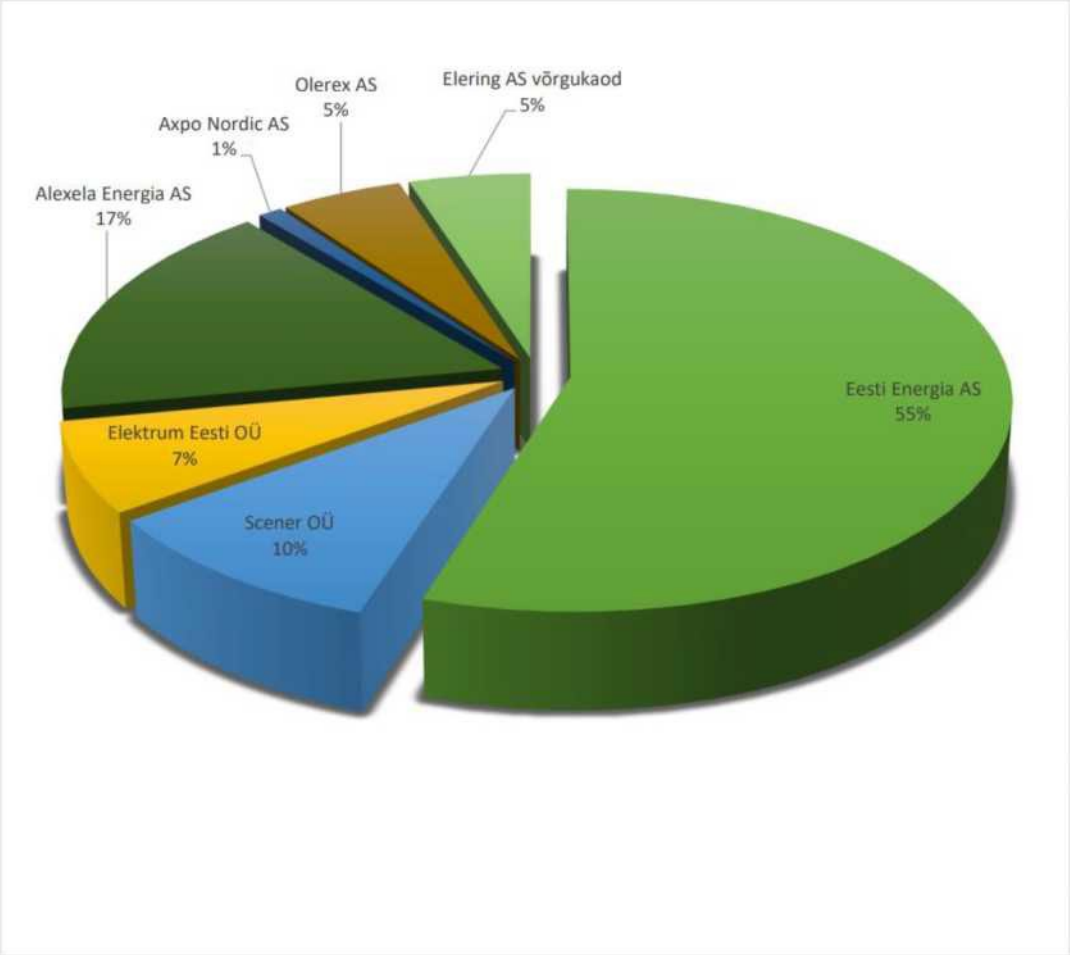


Figure 4.26 Breakdown of market shares between balance managers by consumption in 2023 (Competition Authority)

The Estonian gas market has been open since 2007. Since 2015, Elering AS has been the independent system operator for the Estonian gas system. In the past, the Estonian gas system was a dead-end system, receiving natural gas from Russia and Lithuania (re-gasified LNG). In 2020, Finland was also connected to the Balticconnector submarine gas pipeline system. In 2022, the gas interconnector between Lithuania and Poland, GIPL, became operational, so the Baltic-Finland gas system is now also connected to the Central European gas system. Until the first half of 2022, the beginning of the Ukrainian war, higher volumes of gas used in the region and also in Estonia were imported from Russia and LNG imports via Lithuania were rather small. However, in the course of 2022, the region's gas supply was reversible and Russian pipeline gas was completely abandoned. Since 1 January 2023, imports of Russian gas into Estonia have also been prohibited by law. LNG is now the main source of supply of gas in the region. In the course of 2022, an additional floating LNG terminal was also installed in Inko, Finland. A quay was installed in Paldiski, Estonia, for the reception of a floating LNG terminal and, if necessary, it is possible to bring the terminal located in Inko to Pladiski. In 2021, most of the natural gas imported into Estonia originated from Russia and entered the Estonian gas system either directly via the Värska point or through the Latvian system from Karks. As natural gas of

LNG origin transferred to the terminal of Klaipeda enters Estonia through Karks point, it is difficult to accurately identify the full proportion of Russian gas from the total gas consumed.

The table below shows an overview of the balance sheet of the Estonian gas system.

Table 4.10 Gas Balance in Estonia, GWh (Competitiveness att296)

Gas balance	2020	2021	2022	2023'
Total gas entering the transmission network	12 977,92	11 371,20	11 514,21	10803,72
Gas entering the transmission network at border crossing points (without transit)	12 977,92	11 371,20	11 514,21	10803,72
Karksi GMJ	10100,65	10 525,57	10 512,13	5722,69
Värska GMJ	2 876,22	776,37	400,71	0,00
Narva GMJ	0	0	0	0,00
Misso GMJ	1,05	1,24	1,07	0,91
Balticconnector	0	68,03	600,30	5080,11
Total gas exits from the transmission system	12 961,99	11 359,98	11 501,46	10779,53
Inland transmission service	4 480,13	5 074,56	3 776,77	3435,29
Losses in the transmission system	6,14	13,81	15,58	25,36
Exports	8 481,22	6 276,94	7 721,66	7337,34
Karksi GMJ	10,46	3,11	324,90	4075,12
Balticconnector	8 470,76	6 273,83	7 396,76	3262,23

1 Balticconnector was not operational between 8.10.2023 and 22.4.2024 due to a failure.

Since the beginning of July 2017, a gas exchange was launched in Estonia and between the Baltic States and, from 2020, also between Finland, natural gas can be traded regardless of the country in which the seller or buyer of the gas is located. The gas market, which includes the Baltic States and Finland, is managed by UAB GET Baltic. The launch of the single gas market was made possible by the agreement of national gas system operators to implement an implicit auction for the allocation of*cross*-border gas transmission capacity, where the price of gas in cross-border transactions also includes transmission capacity. For example, an Estonian market participant may buy gas from Lithuania without having to organise the transport of gas from Lithuania to Latvia and from there to Estonia.

Sales volumes on the Estonian gas market have been steadily decreasing over the last decade.

As of 2023, there are 63487 natural gas consumers on the Estonian retail market, of which 49021 are household customers. Over the last year, the number of consumers in the retail market has increased by 2 %. Household consumers show an increase of almost 2 % in 2023 compared to 2022, but consumption has decreased by 8.7 %. The number of non-household consumers has increased by 1.7 % but, like household consumers, the volume has decreased by 7.5 %.

The total number of DSOs is 23 (total network length 2 298 km). In total, 62 persons are active suppliers in the household retail market, 16 active suppliers. Most sellers sell gas in their network area. The largest market share is 61 %.

In the wholesale market, 8 companies operate as balance managers in Estonia. The largest balance manager accounts for 73.26 % of the supply volume.

296 Electricity and gas market report 2023 Electricity and gas market reports | Competition Authority

ii. Projections of development with existing policies and measures at least until 2040 (including for the year 2030)

Electricity and gas prices as energy carriers develop in the respective markets (e.g. Nord Pool power exchange for electricity). Estonia implemented measures to alleviate electricity, gas and heat prices for consumers in winter 2022-2023. Measures to compensate energy carriers had a temporary effect. In 2022, the possibility for consumers to purchase electricity at the price of the universal service was introduced. As a result of the fall in the price of electricity, the universal service was terminated as of 1 July 2024297. The forecasts for the fuel and ETS prices underlying the GHG forecast are set out in Annex Ia.

4.6.Research, innovation and competitiveness dimension

i. The current situation of the low-carbontechnology sector and, to the extent possible, its position on the global market (this should be analysed at European and/or global level).

Estonia was the first OECD country to invest in venture capital in green start-ups as a share of GDP between 2016 and 2020.

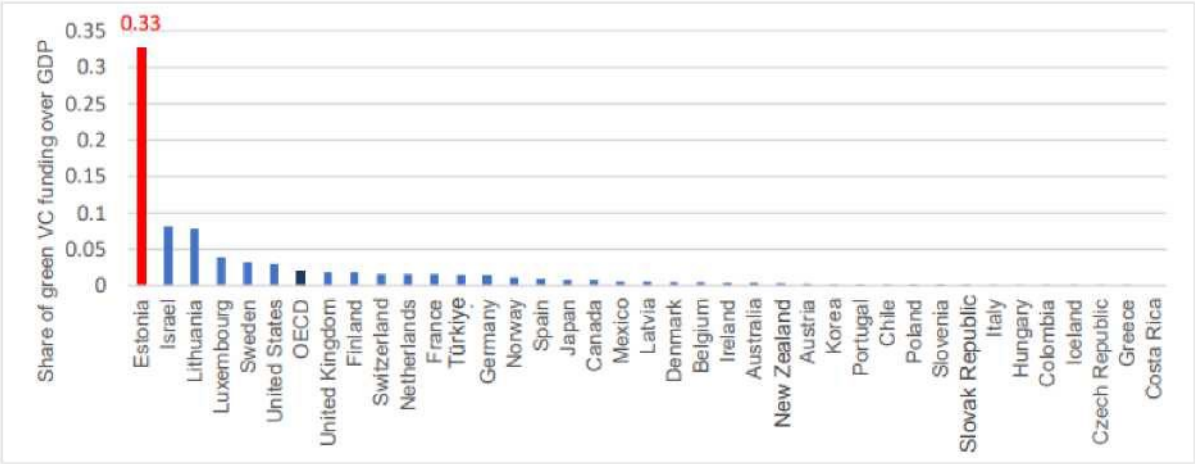


Figure 4.27 Share of venture capital investments by green start-ups as a share of GDP in 2016-2020 298

Of all venture capital investments, investments in green start-ups in Estonia accounted for 67.19 % (OECD average 7.53 %).

297 Electricity Market Act-State Gazette

298 OECD calculations based on OECD Start-up database, Factsheet Green start-ups and Venture Capital Investment: Estonia

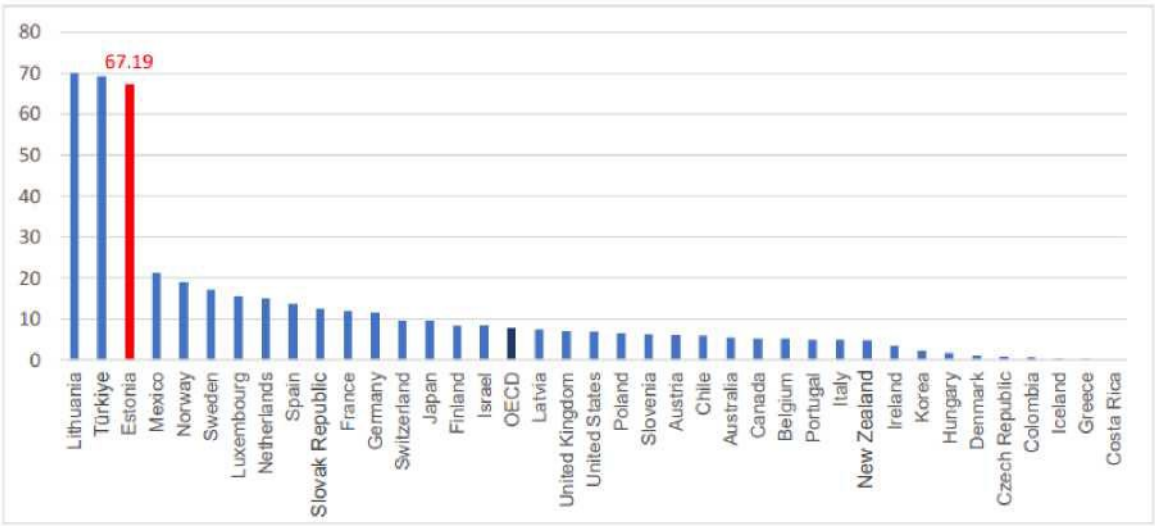


Figure 4.28 Share of total venture capital investments in green start-ups in 20162020299300.

In particular, the Estonian green start-up ecosystem has focused on batteries and low-carbon mobility.

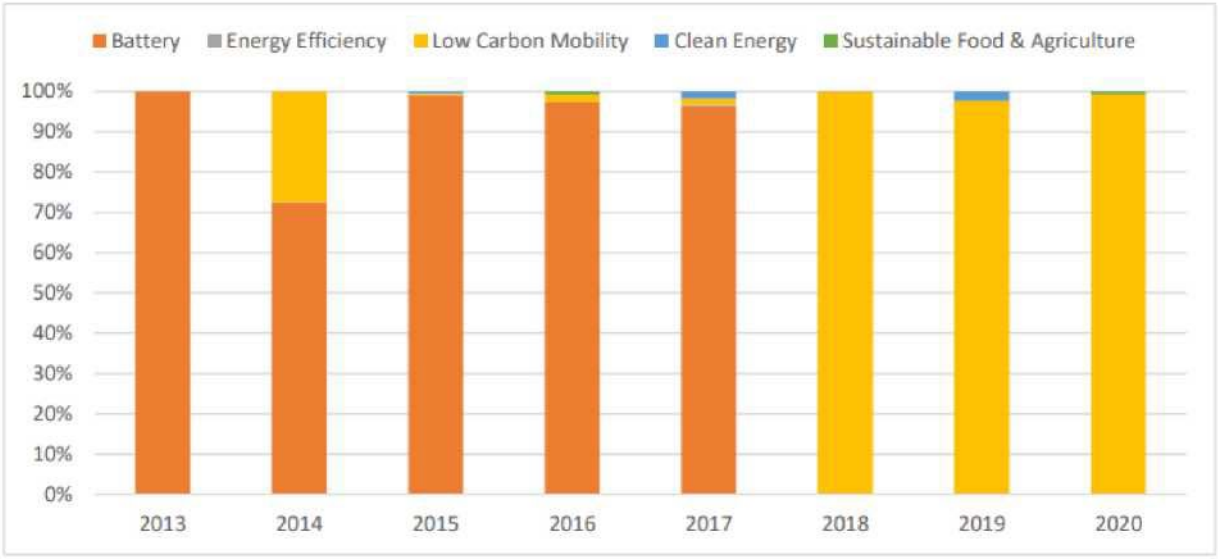


Figure 4.29 Sectoral share of venture capital greeninvestments in[305].

Digital start-ups' venture capital investments in green sectors are higher than the OECD average in Estonia, except for energy efficiency.

299 OECD calculations based on OECD Start-up database, Factsheet Green start-ups and Venture Capital Investment: Estonia

300 OECD calculations based on OECD Start-up database, Factsheet Green start-ups and Venture Capital Investment: Estonia

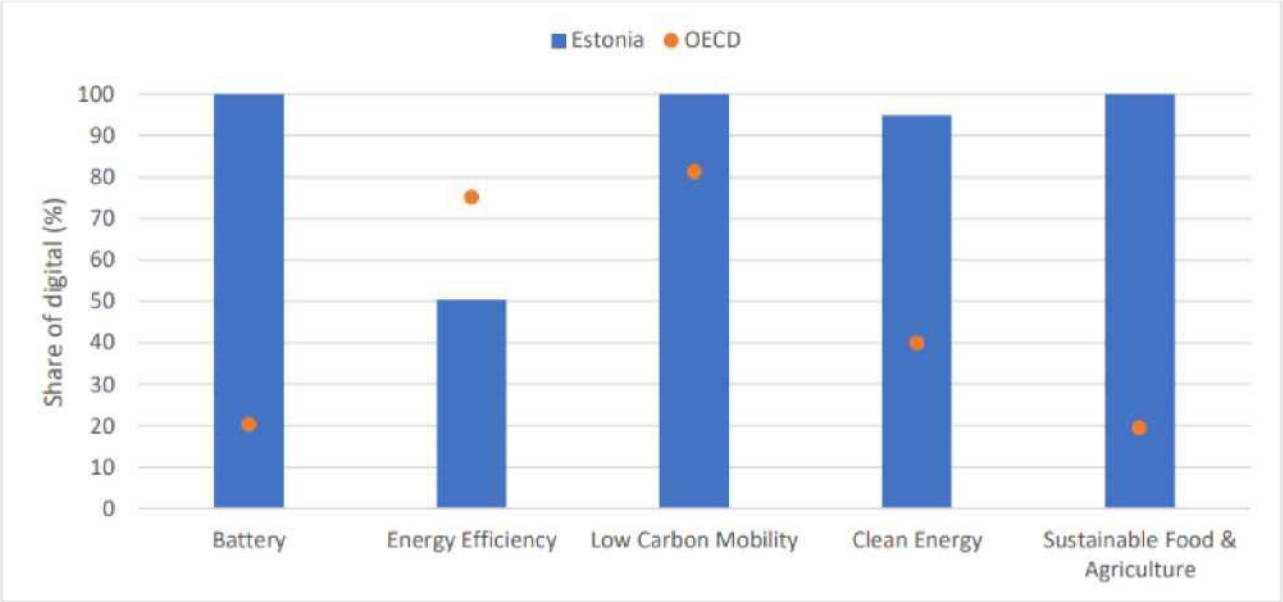


Figure 4.30 Breakdown of green venture capital investments in digital start-ups[306].

According to current knowledge, there are no suitable geological conditions for CO2 storage inEstonia301302. As a result of the project 'Climate Change Mitigation Opportunities for Carbon Capture and Utilisation in Industry', which ended in 2021, it was considered that it was technically possible to gradually move towards climate neutrality also by adapting existing technologies used in the oil shale industry, but this might not be financially viable:

- Absorption and oxygen combustion would be the most suitable technologies for CO2 capture in the near future in the oil shale industry.
- Newer technologies can be more efficient but are not ready to be used on an industrial scale.
- According to current knowledge, the best place for storing potentially captured CO2 is under the North Sea.
- At present, only a small part of the amount of CO2 generated worldwide could be used.
- The implementation of CO2 capture would make it possible to make the carbon footprint of electricity produced in power plants negative.
- Oxygen combustion can be applied in an oil shale boiler without major changes.
- The cost of capturing and cleaning CO2 would also be so high in the most favourable scenario that its implementation in the Estonian oil shale industry (at least on the basis of today's EU ETS prices) would not be expected to be economically viable.
- Cost-effective options for the use of potentially captured CO2 in Estonian industry were not clearly identified, and transport to the North Sea for storage would be a solution.
- The capture of CO2 in the oil shale industry and storage under the North Sea is not economically viable under current conditions and its public support is questionable and requires further analysis compared to other energy production alternatives.
- The study did not reveal a cost-effective, large-scale use of the technologies currently reaching high readiness levels of CO2 potentially captured by the oil shale industry in Estonia.
- The application of CO2 capture technologies is technologically possible, but requires further handling of the captured CO2.

301 OECD calculations based on OECD Start-up database, Factsheet Green start-ups and Venture Capital Investment: Estonia

302A.Shogenova et al. 2009 Possibilities for Geological storage and mineral trapping of industrial CO_2 emissions in the Baltic regionhttps://www.sciencedirect.com/science/article/pii/S1876610209006894?via%3Dihub#aep-abstract- id15

- It remains for the State to decide whether considerations of security of supply and reducing price fluctuations or other externalities not included in this study justify supporting and/or obliging the capture of CO2 in the oil shale industry.
- The main conclusion of the study is that gradual progress towards climate neutrality is also technically possible by adapting existing technologies used in the oil shale industry, but this may not be financially viable.

ii. The current costs of public and, where available, private research and innovation for low-carbontechnologies and the current number of patents and researchers.

The number of scientists and engineers per 100000 inhabitants has never been as high as today.

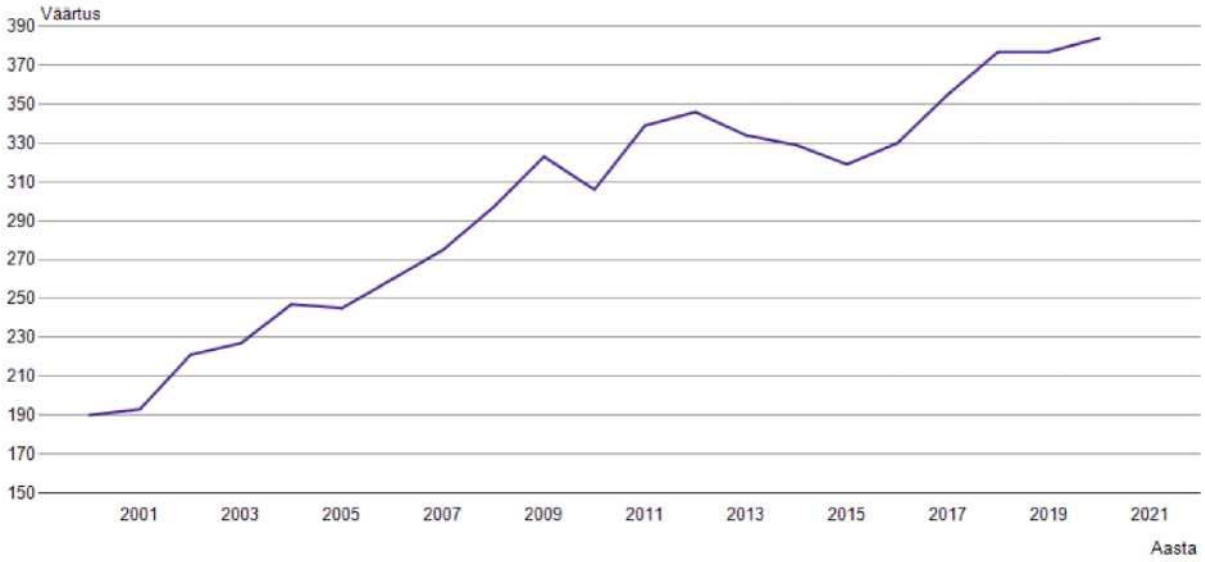


Figure 4.31 Number of researchers and engineers per 100000 inhabitants (SN10: sustainable Development Indicators www.stat.ee).

The Estonian Scientific Information System (ETIS) provides data on research projects carried out (including privately funded research projects). The Estonian Electricity Industry Association has analysed Estonian energy R &D303: According to the ETIS portal, 156 R & A projects in the field of energy (CERCS classification T140 Energy) with a total funding of around EUR 22 million have been registered in the portal since the beginning of 2016. Publicly funded research and mobility grants amounted to around EUR 3.5 million, with a total contribution from the domestic private sector of around EUR 4.8 million. Of course, most money has been mobilised from the Horizon 2020 programme, in the order of EUR 11 million. In this respect, the Estonian public sector has been flagged as a donor for 9 projects, totalling approximately EUR 358 thousand. The most mentioned works are Tallinn University of Technology (151 cases), Tartu University (25) and Estonian University of Life Sciences (10 times). Enefit Energia Production AS and Elering AS have been the largest contributors of companies to energy companies. As regards the works, it appears that the most large-scale projects relate to oil shale technology. Also, larger-scale projects have mostly been funded by Horizon 2020 and smart specialisation programmes. There are approximately 2000 companies in the energy sector. As regards applied research, the analysis refers to the development of technologies, e.g.:

List OF 303 AFFAIRS AND ESTABLISHED IN THE ESTABLISHMENT AND ESTABLISHED IN THE ESTABLISHMENT FOR ESTABLISHING FOR MEETING AND ESTABLISHED IN THE MEETING OF THE MEETING AND ESTABLISHMENT IN THE MEETING OF THE MEETING AND THE ESTABLISHMENT FOR THE MEETING OF THE MEETING AND ESTABLISHING MEETING IN THE MEETING OF THE ENERGY AND ESTABLITIES 2022LAGE-Verga-Long-long study Lorem

- Skeleton, by one project will result in the development of a supercapacitor a charging system enabling buses on an urban line to be loaded quickly from stop to stop.'
- The e-Pavement OÜ project will create a smart road surface solution that will enable: install various electronic components in the road surface in a weathertight manner and produce the electrical energy necessary to power them (PV) using solar radiation.
- The objective of the Eleon AS project is to develop and install the Eleon 5+ SCG test turbine and to carry out all necessary tests and certification of the wind turbine model, which is a prerequisite for final validation of the wind turbine model and for the serialisation.

Estonia has received the highest share of funding in the field of energy through H2020, with a total of 55 projects attracting more than EUR 23.2 million from calls. The most successful participant was Tallinn University of Technology (14 projects, including two coordinated projects), followed by the Tartu Regional Energy Agency (11 projects, including one to be coordinated), five projects were partnered by Elering AS, four projects were followed by the University of Tartu (including one to be coordinated). Support was given to biogas technologies from different raw materials, the involvement of communities in the development of distributed energy, the development of cross-border electricity grids and the achievement of carbon neutrality in cities. Solutions to district heating problems were sought, a new generation of materials was addressed, etc. In the field of energy, the Tallinn Technical University of Technology, coordinated by the Institute of Electrical Energy and Mechatronics, also paid for the smart network project SMAGRINET. In short, Smagrinet is the European Union Network Knowledge Competence Centre, which aimed to collect and transfer knowledge of the smart grid. 9 organisations from six EU countries participate in SMAGRINET. The project coordinator and lead partner was the Institute of Electrical Energy and Mechatronics of Tallinn University of Technology. The project is now over and it can be said that there is now a competence centre for smart network in Estonia and that knowledge of the smart network is being further developed, which is crucial in view of developments in the sector.

iii. Splitting the current price elements that make up the three main price components (energy, grid, taxes).

Electricity

Final electricity prices depend to a large extent on the level of voltage at the connection point. Network service prices depend on the voltage level of the connection point – higher voltage at the connection point means a lower investment cost for the system operator. Therefore, the price of the higher voltage network service is lower than the price of the lower voltage network service. On this basis, Estonian consumers can be divided into three in terms of the final price of electricity: household customers (low-voltage connected consumers), industrial consumers (consumers connected at a voltage of 110 kV) and large consumers (consumers connected at a voltage of 330 kV). Low-voltage and up to 63 A customers, to which household customers also qualify, will have the price of a network service without VAT of up to 9.98 cents/kWh in 2025, depending ontheir consumption304. In 2022, industrial consumers who are connected to the 110 kV network had an average network price excluding VAT of up to 1.2 cents/kWh 305 and large consumers connected to the 330 kV network had 0.662 cents/kWh net of VAT.

The components of the final price of electricity for household customers in 2023 are presented in the table below.

Table 4.11 price components by household customer 2023 (Source: CompetitionT[311])

Price components	Units	Consumer

304 Network packages – Electricity distribution
305 Elering AS. Network service. Price list and standard terms | Elering

Network service (basic rate)	EURcent/kWh	6,40
Price of electricity without network service	EURcent/kWh	9,479
Electricity excise duty	EURcent/kWh	0,1
Support for renewable energy	EURcent/kWh	1,13
Total excluding VAT	**EURcent/kW**	**17,01**
VAT 20 %	EURcent/kWh	3,40
Household price including VAT	**EURcent/kW**	**20,41**

Excise duties on electricity in Estonia are largely the same for all consumers – EUR 1/MWh, which has been in force since 1 May 2020, instead of the previous rate of EUR 4.47/MWh. In addition, the country has introduced a lower rate of excise duty for electro-intensive consumers, i.e. consumers with electro-intensive content of more than 20 % and whose energy management system complies with ISO 50001. Such consumers are subject to a lower rate of excise duty of EUR 0.5/MWh.electro-intensive content of more than 20 % and whose energy management system complies with ISO 50001. Such consumers are subject to a lower rate of excise duty of EUR 0.5/MWh.

Another important component of the final electricity price is the renewable energy fee used to finance the national support scheme for electricity produced from renewable energy sources. Given that the largest producers of electricity from renewable energy sources started to exit the support scheme as of 2021, a significant reduction in the remuneration for renewable energy is expected in the near future. In addition, the State has made the support scheme for electricity produced from renewable energy sources subject to auctions, which in turn significantly reduces the pressure on the remuneration of renewable energy.

Natural gas

Estonia's gas consumption has decreased significantly in recent years. The main reason is the decrease of gaseous fuels in electricity and heat production due to the relatively high and sometimes unstable final price of natural gas. The largest part of the final gas price is the price of gas as a product. This is followed by national taxes and network charges.

In the retail market, the natural gas undertaking sets the selling price of gas on the basis of the purchase price of the gas (from the importer or supplier) and the selling margin. The components of the final gas price in 2023 for household customers are 63 % for gas, 17 % for network services, 17 % for VAT, and 4 % for excise duties. Gas excise duty is largely the same for all consumers, but a lower rate of excise duty has been introduced for gas intensive consumers. From May 2020, excise duty on natural gas in Estonia was temporarily reduced (until 30 April 2022) to EUR 40/k00 m^3 due to the COVID-19 crisis, compared to EUR 63.31/thm^3 in 2019. A lower rate of excise duty can be applied to a person whose gas intensity is at least 13 % and whose energy management system complies with ISO 50001. In this case, the rate of excise duty on gas is EUR 11,30 per thousand m^3.

iv. Description of energy subsidies, including for fossil fuels

Among the measures in this plan (see Annex III), there are no financial support measures for the deployment of fossil fuels. Regulation (EU) 2018/1999 does not provide for a definition of energy support, but according to recital 20 of the Regulation, Member States may refer to the concept of energy support from international organisations. According to the OECD, energy subsidies are defined as measures the existence of which makes energy cheaper or more consumed in a market segment than in a functioning energy market without intervention.

Energy subsidies were available to natural and legal persons for two heating seasons in 2021/2023. In the heating periods 2021/2022 and 2022/2023, support measures were implemented for business and household customers to compensate for the high energy price for a total of EUR 282 million.

Table 4.12 2021/2022 the actual cost of support measures for commercial and household customers during the heating period.

2021/2022 expenditure (thousands of EUR)	(Including VAT)
Support to reduce the impact of high final electricity prices (Oct-March)	112 985
Support to reduce the impact of high final gas prices (January-March)	29 89
Support to reduce the impact of high final prices for district heating (February-March)	13 54
Vulnerable households measure (Oct-April)	13 00
TOTAL	**169 431**

Table 4.13 Support measures for household consumers from October 2022 to March 2023.

2022 Oct – March 2023 cost (thousand EUR)	(Including VAT)
Electricity	59 969
Gas	28 377
District heating	24 402
TOTAL	**112 748**

Subsistence allowance

People in difficulty have access to a subsistence allowance, which takes into account the household's housing costs, including the cost of heat or fuel used for heating, when calculating subsistence benefits. The application, calculation, award and payment of subsistence benefits are governed by the Social Welfare Act. Local authorities shall determine by law the conditions under which housing costs are to be calculated. By decree, a local authority may set limits on costs, including, for example, the maximum rate of energy costs. Energy poverty issues are further addressed in chapters 2.4.4 and (i).

The basis for calculating the subsistence allowance is the net income of a person living alone or all members of the family for the preceding month, the housing costs payable for the current month and the subsistence limit. As of 1 June 2022, the subsistence limit for a person living alone or the first member of the family is EUR 200 per month. Each minor member has a subsistence limit of EUR 240 per month. The subsistence limit for the second and subsequent adult members of the family is EUR 160 per month. A beneficiary of a subsistence allowance whose family members are minors shall be entitled to an additional social benefit of EUR 15, paid by the local authority from national funds, together with maintenance support.

The amount of the subsistence limit is set by the Riigikogu in the State budget. It shall be calculated for any person living alone or for the first member of the family for each financial year.

Exemptions and reductions in the rate of excise duty

In Estonia, solid fuels used as heating fuels in households (coal, peat factory, firewood, etc.) are not subject to excise duty. The main fuel used by households in Estonia is wood and wood-based fuels, which, according to Statistics Estonia, accounted for 85.5 % of fuels used for heating in households (natural gas 13.3 %) in 2021. Since wood and wood-based fuels are not taxed in any sector in Estonia, the exemption from excise duty on wood and wood-based fuels does not qualify as energy subsidies.

Despite the exemption from excise duty on fossil fuels used in households, the quantities of solid fossil fuel used by natural persons are modest. According to Statistics Estonia, in 2017 fossil solid fuels accounted for 0.5 % of the fuels used for heating in households.

Energy subsidies for legal entities

Estonia has gradually reduced energy subsidies for legal entities. An overview of fossil fuel subsidies for legal entities is summarised in the table below. In 2023, the preferential excise duty rate on dedicated diesel accounted for 92 % of fossil fuel subsidies. The renewable energy levy supports renewable electricity production through auctions, with the aim of producing consumption by 2030, and this is not included in this table and other renewable energy subsidies are not included in this table (see section 5.3 for energy subsidies).

Table 4.14 Amounts of *subsidies for fossil fuels in* 2020-2023.

Energy subsidy, thousand euros	2020	2021	2022	2023
Total subsidies for fossil fuel use	**35 840**	**34 521**	**44 172**	**41 248**
More favourable rate of excise duty on dedicated	29 052	29 957	40 000	38 000
(Excise supply) Electricity and fuel (grounds) used for the production of electricity and electricity used to maintain high levels of electricity production	1 769	1 071	1 099	686
Fuel for mineralogical processes	1 568	1 200	835	651
Fuel excise duty exemption for fishers	1 451	981	1 160	1 125
Excise duty relief for a company with intensive gas consumption	945	910	762	503
Electricity excise duty rebate for electro-intensive businesses	874	272	240	192
Electrical energy used for chemical reduction and for electrolytic, metallurgical and mineralogical processes	141	100	76	63
Natural gas used for the operation of the natural gas system	40	30	30	28

5. IMPACT OF PLANNED POLICIES AND MEASURES HINDAMINE 306

5.1. The impact of the planned policies and measures under point 3 on the energy system and greenhouse gas emissions and sinks, including a comparison with projections with existing policies and measures (as described in Section 4).

i. I. Projections of the development of the energy system and GHG emissions and removals as well as, where relevant of emissions of air pollutants in accordance with Directive (EU) 2016/2284 under the planned policies and measures at least until ten years after the period covered by the plan (including for the last year of the period covered by the plan), including relevant Union policies and measures.

No scenario for projections with additional measures was prepared in 2025, as discussions on a draft law on a climate-proof economy proposing additional measures were ongoing in parallel to the preparation of the projections. Therefore, in order not to influence or presume the outcome of the adoption of the Climate-proof Economy Act, no scenario with additional measures was prepared in 2025.

Projections for the evolution of air pollutant emissions under Directive (EU) 2016/2284.In early 2019, the European Commission received a national programme for the reduction of emissions of certain atmospheric pollutants for 2020(the so-called WAM Programme), which provides an overview of the potential and potential for further reducing emissions of pollutants into the ambient air from stationary and mobile emission sources in Estonia. Estonia submitted the updated programme to the European Commission by 1 April2023307.

ii. An assessment of synergies between policies (between existing and planned policies and measures within a single policy dimension and between existing and planned policies and measures within different dimensions).

This section must establish a solid understanding of the impact of energy efficiency/saving policies on the size of the energy system and reduce the risk of failure of energy supply investments.

Cut in CO2 emissions

In order to meet the objectives set by the Effort Sharing Regulation, it is important to focus the planning of activities on the most efficient use of measures, e.g. by increasing support for measures already in operation or also by looking at the possibilities of grouping measures together when planning measures.

The main objectives of the measures implemented or planned in the transport sector are to increase vehicle efficiency and reduce the demand for public transport. The main focus of the Transport and Mobility Development Plan 2021-2035 is to reduce the environmental footprint of the means of transport and the transport system in order to contribute to the achievement of the climate objectives by 2050. In order to manage behavioural changes in people, greater attention must be paid to the “polluter pays” principle in the future, including taxation of fuels according to their specific emissions and energy content. The development plan also calls for the deployment of low-carbon fuels in all modes of transport.

iii. Assessment of interactions between existing policies and measures and planned policies and

306 Planned policies and measures are options under discussion and having a realistic chance of being adopted and implemented after the date of submission of the national plan. The resulting projections under section 5.1.i shall therefore include not only implemented and adopted policies and measures (projections with existing policies and measures), but also planned policies and measures.

307 https://kliimaministeerium.ee/energeetika-maavarad/valisohk/ohusaasteainete-vahendamise-programm

measures, and between those policies and measures and Union climate and energy policy measures

Estonia's national activities (environmental, climate and energy) are guided by EU environmental, climate and energy policies and the related legal framework. In the context of the preparation of sectoral development plans, national sectoral objectives and the national measures necessary to achieve them shall be defined. Sectoral development plans shall be subject to a strategic environmental assessment.

5.2. Macroeconomic and, to the extent possible, health, environment, employment and education, skills and social impacts of the planned policies and measures set out in point 3

The measures of the NECK 2030 are largely planned by existing development plans, the implementation of which is expected to be subject to an environmental impact assessment308under the Environmental Impact Assessment and Environmental Management System Act (e). The NEC 2030 measures are expected to have a positive environmental impact compared to the situation if they were not implemented. The potential negative effects of the measures can be mitigated in the implementation of the NECTP 2030. The environmental impacts expected from the proposed measures in NECQ 2030 are described in the table below.

Table 5.1 Expected environmental impacts of the proposed NECMM 2030 measures

Proposed measures	Impacts
Further refurbishment of depreciated and inefficient heat pipelines	In energy, an increase in the use of wood fuels would have a significant impact on biodiversity due to the growing need for logging, while the burning of wood fuels would result in the health effects of local and local heating PM2.5. Proposed measures as a result more efficient, lower fuel and emission heating solutions will be achieved. At the same time, emissions in ambient air may increase if more controlled and high district heating boilers are replaced by many local boilers. The action can create favourable ground for new solutions for development perhaps innovation. Reducing the use of imported fossil fuels in fuel switching has a positive impact on energy security. If district heating is replaced by fuel-free local heating, the environmental impact of this replacement on ambient air
Renovation of district heating boilers and fuel exchange	

308 Environmental Impact Assessment and Environmental Management System Act. https://www.riigiteataja.ee/akt/112122018045

Proposed measures	Impacts
Promoting sustainable driving	The impact of transport on biodiversity is lower compared to electricity and heat management and planned the measures will result in reduced use of fuels, GHG and air pollutants, etc. emissions. Declining air pollution (fine particles) marginally reduces the risk of heart and lung disease, which in turn increases healthy life time (including working time) and minimises pressure on healthcare expenditure. Increased energy security by reducing dependence on imported fuel for cars based on oil. In addition, the number of accidents is reduced in a sustainable way driving promotion; road user charges and tyre measures expenditure on vehicle repairs
Time-based road user charges for heavy-duty vehicles	
National ferry modification climate-neutral	
Reconstruction of local authority buildings	Building reconstruction decreases building at the same time, the need for fuels and emissions from their combustion are reduced by up to half of the energy needs for heating. At the same time, ventilation systems, heat pumps; smart-home solutions etc when installed, the electrical energy requirements of the building. Renewable energy, high-efficiency cogeneration and security of supply measures are energy measures to cover growing electricity needs. Building stock measures will result in an increase in the energy efficiency of the Estonian building stock, an improvement in the quality of the buildings' indoor climate and, through it, human health (people spend 80-90 % of the time indoors), the lifetime of the buildings, the usability and the value of the property. The measure will have marginal positive health effects (reducing the risk of heart and lung diseases), which will increase healthy life years (including healthy working years) and minimise pressure on health expenditure (reducing the need for heat production, thus also reducing emissions to ambient air from fuel combustion). Reducing the use of imported fossil fuels and local fuels; of which: local renewable energy sources increasing deployment will have a positive impact on
Central buildings reconstruction	
Renovation of housing buildings	

According to the 2020 long-term renovation strategy for buildings, the renovation of buildings is a regional, social and long-term measure that shapes the living environment, and building renovations must take into account not only a direct reduction in the energy use of buildings but also other important factors:

- **Energy poverty** is not currently a widespread problem in Estonia. European Energy Poverty Observator on the basis of in 2016 with heating of dwellings problem 2.7 % on the basis of in 2016 with heating of dwellings problem 2.7 % households (EU average = 8.7 %) and energy bill arrears represent 7.9 % of households (EU

average = 8.1 %). When planning the complete renovation of the existing building stock, it should be borne in mind that some households are unable to carry out the renovation. Renovation of a building requires the owner to make a financial contribution even if there are support measures available and households with lower incomes are not able to provide that. Households in an economically precarious situation need additional allowances to participate in energy saving measures. There is also a need for in-kind support, as people have different organisational capacities.

- There are very different ways in which **accessibility** is addressed in buildings. Building users are changing and therefore renovation must take into account that the building is accessible to all sections of the population (parents with bogies, children, elderly people, people with disabilities). In order to ensure public spaces and buildings accessible to all and to raise awareness of accessibility, the Chancellery has started working on accessibilitycells309.

- In **the case of declining cities, the principles of population and infrastructure development in the zoning plan and the need for densification of urban centres must be taken into account**. According to a doctoral thesis defended in the Tallinn University of Technology in 2019, shrinking local governments should above all focus on the quality of life of their residents and attractiveness of urban space is important for achieving this goal. Abandoned and underused buildings affect people's lives in their neighbourhood, as they have a strong negative symbolic value. Therefore, in shrinking towns, buildings should above all be renovated in the town centre (defined with zoning) and sustainable residential areas planned in the zoning.

- Renovation of buildings plays an important role in designing **good public spaces.** Without taking account of the whole, when approaching each building separately, the architectural outcome of renovated buildings located in the same area may become a 'wipe deck'. In order to ensure a regional architecture and to develop a good public space, municipal general plans and architectural guidelines for the renovation of buildings in different areas are necessary.

- **Increased deployment of local renewable energy combined with the renovation** of buildings. The installation of solar panels for electricity production is the most suitable technical solution in a dense environment. In buildings previously without ventilation systems, where mechanical heat recovery ventilation systems are installed in the course of renovation, the renovation will generally result in an increase in electricity consumption – due to the electricity consumption of installed sensors, automation, ventilation (unless originally heated with electricity). The increase in electricity consumption due to ventilation systems can be set off by producing electricity locally using solar panels. For example, in private dwellings, where renovations result in the replacement of existing residential heating by a heat pump, the $CO2_{emissions}$ of the building will increase as the existing zero-emission wood fuel is replaced by high-emission electricity. The increase in electricity use can be set off by installing solar panels. Overall, however, energy consumption in the building decreases.

- **In order to ensure the safety of buildings, renovation makes it possible to bring buildings into line with modern safety requirements**. The post-design life cycle of a majority of buildings has either ended or coming to an end, which has created an immediate need to repair their load-bearing structures (such as balconies and shelters). According to a study carried out by the Technical Surveillance Authority in 2012 and 2 013.53 % of the balcony structures of the 26 buildings surveyed had serious deficiencies. Only 16 % of balconies met all of the requirements. In addition to structures, the electrical systems and water and sanitation piping of buildings require safety upgrades. When renovating buildings, attention must also be paid to the fire safety of the building (fire doors, building services system penetrations, gas equipment safety, shutdown of installed ventilation systems in the event of a fire, etc.). Work required to ensure the safety of the building must be considered eligible in support measures. For instance, installation of fire doors, replacement of indoor air-dependent gas water heaters with a centralised hot water supply

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system and automation required for ensuring fire safety.

- **In order to ensure regional balance, in the case of national measures supporting reconstruction, priority must be given to areas outside the Tallinn region**. If support measures are distributed on similar market conditions, they are concentrated in more capable areas, which exacerbates the uneven development of regions. Scenario(d) of the Estonian regional economy, drawn up by the Development Monitoring Centre, points310 out that, in order for the regional economy to function, there must also be changes in the living environment in the regions, namely the reconstruction and renewal of the housing stock and the availability of high-quality office space. In addition to giving an advantage to regions outside the capital in support measures, extra measures, such as state guarantees for home loans and renovation loans outside larger cities and greater inclusion of the local government level in measures supporting renovation of buildings, should be taken.

- The **renovation of buildings also has a significant impact on the energy sector**. The use and import of fossil fuels and sales volumes of district heating companies will diminish. The need to invest in new energy production capacities will reduce. Buildings requiring less energy also allow for harnessing the potential of renewable energy solutions and distributed energy and an increase in energy independence and the security of the energy supply.

In agriculture, the effects of CAP Strategic Plan interventions have been assessed. The CAP Strategic Plan will continue to provide a wide range of environmental payments to support biodiversity conservation, sustainable and rational use of environmental resources, climate change mitigation activities, etc. The proposed interventions will contribute to the development of greener farming. Examples include continued support for environmentally friendly management, support for organic production, maintenance of permanent grassland, eco-schemes, payments for soil and water protection, promotion of biomass and renewable energy production, support for non-productive investments under various interventions, etc. It was concluded that CAP Strategic Plan interventions generally have neutral or positive externalities on different environmental elements (biodiversity, surface and groundwater, landscape, soil, outdoor air, climate) and positive effects on the socio-economic environment.

5.3. Overview of investment needs

i. I. existing investment flows and forward investment assumptions with regard to the planned policies and measures

Table 5.2 Estimates of investments needed for REKK 2030 and estimates of grants-investments decided

310 Estonia-Regional-Economic Scenarios-2035.pdf (National Assembly.ee)

Dimension	Estimates of needed investments 2025-2030	Decided subsidies and investments 2025-2030
Decarbonisation	Investment needsex-ante assessment Climate-proof resulting from $CO_{2\text{reduction}}$ the Economics Act development process ongoing made of the proposals and to be published in the REKK once the law enters into force.	In accordance with Energy Union governance Regulation (EU) 2018/1999: existing improved projections of greenhouse gas emissions/removals (so-called WEM) projections of anthropogenic greenhouse gas emissions by sources and removals by sinks for which: greenhouse gas (GHG) emissions reduction or against the development of the energy system taken and implemented policies and measures State of soil. At the beginning of 2025, according to the Ministry of Climate, there are: CO_2 emissions reduction in Dimension total support for contributing measures (including: EU structural funds, RRF, CAP funds, The CEF, From the Modernisation Fund (MF), EU ETS from auctioning revenues supported measures) a total of EUR 3.09 billion (including the construction of Rail Baltic). The implementation of the JJM commitments is targeted at EUR 3.05 million[319]nLULUCF commitments of EUR 40 million. Of which volume of support add beneficiaries of the majority of measures own
Energy efficiency	THIRTEENTH 2030. year objectives to be filled in: energy efficiency studyneeds[around] EUR 13.3 billion, including EUR 5 billion from the public sector	From From 2025 year are around EUR 100 million in support for the renovation of residential buildings from the 2021-2027 budget period SF and RRF. ETS auction revenues from (incl uding: From the Modernisation Fund) buildings

[319] Added amounts for energy efficiency measurement

320 Support to the renovation wave – energy efficiency pathways and energy saving obligation in Estonia | Energy Performance Surveys

Dimension	Estimates of needed investments 2025-2030	Decided subsidies and investments 2025-2030
		more funding decisions than funding sources don't. REKS in view of the targets, there is a shortfall of around EUR 1.1 billion in support for 20252030. Energy efficiency to increase industrial and in the agricultural sector, approximately EUR 195 million is allocated in waste water treatment,
Energy security	Gas infrastructure developments EUR 108 million, creationof311a nuclear programme of EUR 35 million, studiesshow that312the cost of transitioning to climate-neutral electricity generation is up to EUR 14.2 billion and the transition to a climate-neutral heat management is	Recovery plan recording and security of supply subsidies EUR 30 million. Structural funds for the 2021-2027 budgetary period directed EUR 50 million for the development of district heating infrastructure.
Internal energy market	External investment decision to be carried out 2027 (estimated cost of EUR 1.5 billion, including EstLink 3 313 and EstLat 4314), ex-ante estimate of the cost of developing an undersea electricity grid No more know, cost ofdecarbonisation of the gas network prognosis	Electricity transmission network development plans planned investments EUR 905 million, planned to apply for grants EU CEF energy fraction.
Research, innovation and competitiveness	The Clean Energy Transition Eur 0.450 million is directed to the Partnership.	Green technologies development; studies and innovation, channelled EUR 36 million from RRF and EUR 100 million through green corporate fund, EU ETS auction revenues 71 million EUR (together IPCEI a measure). To support smart and sustainable energy solutions: 19 million EUR. Support for knowledge transfer and advice in the agricultural sector 30

311 Backup payment rate for gas, network charges, structural instruments
Final report of the312 Nuclear Energy Working Group, p. 46 Nuclear Energy Working Group | Ministry of Climate
313 TYNDP 2022 Project Collection (tyndp2022-project-platform.azurewebsites.net)
314 TYNDP 2022 Project Collection (tyndp2022-project-platform.azurewebsites.net)
315 Gas Network Decarbonisation Study 2022 | Energy Actions

In order to achieve the country's objectives and implement the measures in the NECP for this purpose, a combination of contributions from the private, public and non-profit sectors must continue to be pursued. This has been **done for many years. A large number of policies and measures are implemented with public budget support, including both non-repayable support (where part of the total investment is covered by the beneficiary's own contribution) and financial instruments co-financed through the national budget. This includes the use of EU structural funds, the Just Transition Fund, the Recovery and Recovery Facility, the CAP Strategic Plan, the Connecting Europe Facility and other funds, alongside national tax revenues, as well as EU ETS auctioning revenues from the national budget and the Modernisation Fund (see Table 5.3 for more details). Of the financial instruments, the Green Fund for Enterprises (with the support of the RRF) is the most dedicated to energy and climate objectives. The EU Technical Support Instrument (TSI) resources have also been used to develop scenarios towards the climate-neutrality objective. In addition to investments, it is essential to find and negotiate appropriate changes to the legal framework, requirements and standards, to improve the availability of data and information, which would contribute both to monitoring the current situation and to monitoring the progress towards the desired changes and, where necessary, to renewing support measures and financial instruments; also contribute to the availability of advice and expertise, including on market terms and with partial support. Estonia has also moved from the current system of renewable energy subsidies to the choice of the most advantageous solutions through auctions in order to encourage the market uptake of renewable energy production capacities in recent years. The combination of different types of activities can contribute to the awareness, prioritisation and smart combination of activities and techniques needed to move towards the objectives, which in turn helps to prevent and reduce overall investment needs.**

To finance support measures and financial instruments contributing to energy and climate objectives, Estonia combines various funds from the EU budget, trading revenues from the European Union Emissions Trading System (EU) and other national budget resources, in addition to which the vast majority of the measures also contribute to the implementation of the activities with the own contribution of the promoters. While the EU's 2021-2027 budgetary period will be used to achieve the 2030 energy and climate targets, initial proposals for negotiations will be made on the legal framework, priorities and distribution between targets and funds for the next budgetary period starting in 2028. In the summer of 2011, i.e. as of spring 2025, no outlines are yet available for support opportunities in 2028 and beyond alongside national budget revenues.

The table below provides an overview of the size classes of the main EU funds for the 2021-2027 budgetary period and the EU Emissions Trading System (EU ETS) revenues that are intended to contribute to Estonia's energy and climate objectives (EU ETS trading revenues from 2025 onwards have been based on a projection as of March 2025, with the actual revenue volume potentially significantly different from this due to the recent significantly increased variability in the economic environment). In addition to these sources, actions targeting the 2030 targets will be implemented e.g. under the sub-programmes of the National Environment Programme. In addition, the overview table does not take into account the use of funds for the next EU budget period starting in 2028 (due to the inadequacy of the underlying information). At the same time, it is important to encourage action towards energy and climate objectives not only through actions specifically aimed at them, but also through other actions and measures supported by the State and local authorities, e.g. through appropriate threshold and/or project selection criteria, target group definition, etc. The conditions for support measures must be developed, inter alia, on the basis of the principles of Estonia 2035, including ensuring that the measures contribute to the objective in a way that supports regional balance. The longer-term goal is increasingly to make 'regular' investments, taking into account the energy and climate objectives and related considerations, without the need for separate additional investments.

*Table 5.3 – Climate pop rate and indicative volume (Ministry of Finance) of the proposed EU fiscal framework funds for the 2021-2027 period and the EU ETS trading*revenue (Ministry of Finance), May 2024.

Source	Volume of Indikatii vne, current prices s (EUR million)	Minimumrat e of climate pan use (%), Europe The Commission 's methodolog	Climatepan use indicative volume (support part) (EUR million)	Total Volume of Indikatii vne of Climate pine (EUR	Actual planned rate of climate contribution
Structural instruments:					
ESF	534	*0 %*	0	0	(0 %)
ERF	1 702	*30 %*	601	1 200	44 %
CF	780	*37 %*	512	632	63 %
Just Transition Fund (JTF)	354	*100 %*	354	550	100 %
ReactEU (I and II), 2020-2023	207	*25 %*	53	53	26 %
Recovery and Resilience Facility (RRF), including: REPowerEU Complement	953	*37 %*	567	567	59 %
Social Climate Fund (SKF)	186	*100 %*	186	248	100 %
Agricultural policy tools: CAP: strategic Plan					
CAP: strategic Plan total, of which: direct payments+EAFRD+EAGF	1 448		446		0 %
CAP 2021-2022 top-ups (2014+ RDP extension)	643		215		0 %
EMFF/EMFF	97	*30 %*	43		44 %
EU 'central funds' (the actual amount of support depends on the success of the					
CEF: Transport	350..50 0	100 %	350..500		100 %
CEF: Energy	80..100	60 %	80..100		
Horizon **Europe:** research-Development – Innovation Framework Programme	100	35 %	35	35	
In addition, some of the activities funded by other EU programmes:					
LIFE, internal security field 3 programmes, European Internal Market Programme, Digital Europe Programme,			30		
Total 2021-2027 EU funds*:			***3 800***		
(indicative annual average volume)			***543***		

Source	Volume of Indikatii vne, current prices s (EUR million)	Minimumrat e of climate pan use (%), Europe The Commission 's methodolog	Climatepan use indicative volume (support part) (EUR million)	Total Volume of Indikatii vne of Climate pine (EUR	Actual planned rate of climate contribution
* The structural instruments (ERDF, CF, CF) take into account both the EU contribution and the Estonian own contribution (national co-financing and beneficiary self-financing), i.e. the volume of climate-contribution investments resulting from the support measures is higher than the volume of external support in current prices. The own contribution of the beneficiaries to support from other sources is not taken into account due to the high degree of uncertainty.					
Sources related to the EU carbon trading system (EU ETS):					
So-called carbon trading revenues (under the existing EU ETS): As of March 2025, based on the 2025-2027 forecast	*1 892*	50 % (up to 2023), 100 % (since 2024)	*1 422*		
Modernisation Fund (MF)	*537*	100 %	*537*		
So-called carbon trading revenues (to be generated under the new EU ETS under the ETS) as of March 2025: including Klim	*126*	100 %	*126*		
Total 2021-2027 (EU funds, CO2 trading proceeds)*:			***5 885***		
* The structural instruments (ERDF, CF, CF) take into account both the EU contribution and the Estonian own contribution (national co-financing and beneficiary self-financing), i.e. the volume of climate-contribution investments resulting from the support measures is higher than the volume of external support in current prices. The own contribution of the beneficiaries to support from other sources is not taken into account due to the high					

More information on the specific objectives and actions to be supported can be found on the EU structural instruments and the Just Transition Fund https://www.rtk.ee/toetusfondid-ja-programmid/euroopa-liidu-selected resources/2021-2027 grant period; On the Recovery and Recovery Facility the Resilience Facility (RRF) | State Support Centre; On theproposed use of the EU common agricultural policy instruments in the CAP Strategic Plan 2023-2027https://www.agri.ee/euroopa-liidu-uhise-, the CAP Strategic Plan 2023-2027 and the plan for the use of the European Maritime, Fisheries and Aquaculture Fund (EMFAF) https://www.agri.ee/euroopa-merendus-kalandus-ja-vesiviljelusfond-2021-2027; On the use of EU ETS trading proceeds funds and the use of the Estonian part of the Modernisation Fund in the fiscal strategy of the country https://www.fin.ee/riigi-rahandus-ja-maksud/riigieelarve-ja-eelarvestrateegia/riigi-budgetary strategy.

At the same time, the needs for progress towards the 2030 targets and targets are significantly higher than those of the public sector, therefore their use is particularly important to stimulate and leverage private and third sector activities and contributions. It is also of great importance that commercial banks and (international) development banks, both commercial banks and (international) development banks, increasingly prioritise the soundness of activities and projects, their consistency with the criteria set in

different frameworks

, etc. when making credit available. The rather sharp increase since 2021 and the relatively high prices of (fossil) energy, despite fluctuations, have led, among other things, to a reduction in payback times for projects improving energy efficiency and promoting renewable energy production, consumption and storage, which has also improved the availability of investment finance for such projects and boosted private investment.

As of early May 2025, a Climate-proof Economy Act is under preparation, in the process of drafting the proposals for Estonia's 2030 targets, both on greenhouse gas emissions and removals and on energy efficiency and renewable energy, have been discussed with working groups and partners. As part of the process of preparing the draft law, proposals for the necessary complementary measures and related investment needs have also been collected and pre-evaluated. Estonia will therefore provide an updated forecast of investment needs after and in line with the entry into force of the Act.

The following are examples of research results related to progress towards energy and climate objectives in different sectors, as well as forecasts and ex-ante estimates of investment needs. As these studies, forecasts and scenarios have been carried out at different times, in different ranges and under slightly different assumptions, the investment needs forecasts/ex ante estimates presented therein are not directly comparable or aggregated, but they provide an indication of the order of magnitude of the ex ante needs estimates for the different areas. Scenarios for the transition to climate-neutral energy production were modelled, the socio-economic impacts and risks were assessed, and roadmaps for the scenarios were developed in the following studies prepared by international expert groups:

Transition to climate-neutral electricity generation
Transitioning to a climate-neutral electricity generation[316], Reform/SC2020/068, European Commission funding)
Estonia's transition to a carbon-neutral heating and cooling economy by 2050
Transitioning*to a carbon neutral heating and cooling in Estonia by 205*[OBJ] national funding national funding
Roadmaps for the decarbonisation of the gas supply in Estonia
(*Gas Decarbonisation Pathways for Estonia* 317 (DG REFORM, European Commission funding)

Estonia's energy efficiency roadmaps and energy savings obligation

(*Support to the renovation wave – energy efficiency pathways and energy saving obligation in Estonia, REFORM/SC2022/067* [318]– European Commission funding)

According to the long-term renovation strategy for buildings completed in 2020, total annual volumes[of] different building categories have to be fully renovated up to 2.3 million m² per year in the years with the highest renovation activity, which represents an almost 5-fold increase compared to the current annual volumes, which can largely be achieved by adjusting the proportions of new construction and renovation in the construction sector. In 2019 prices, the total cost of the complete renovation of the building stock of 54 million m^2 would be close to EUR 22 billion and the average cost of the complete renovation over the total building stock would be 400. EUR/m^2 In the case of public buildings:
with the full cost of the renovation, the total cost of the complete renovation of the building stock would be EUR 24 billion. As of spring 2025, this order of magnitude is likely to be more than EUR 30 billion due to price increases.

316 Electricity studies | Energy Actions
317 Gas Network Decarbonisation Study 2022 | Energy Actions
318 Energy efficiency studies | Energy Actions

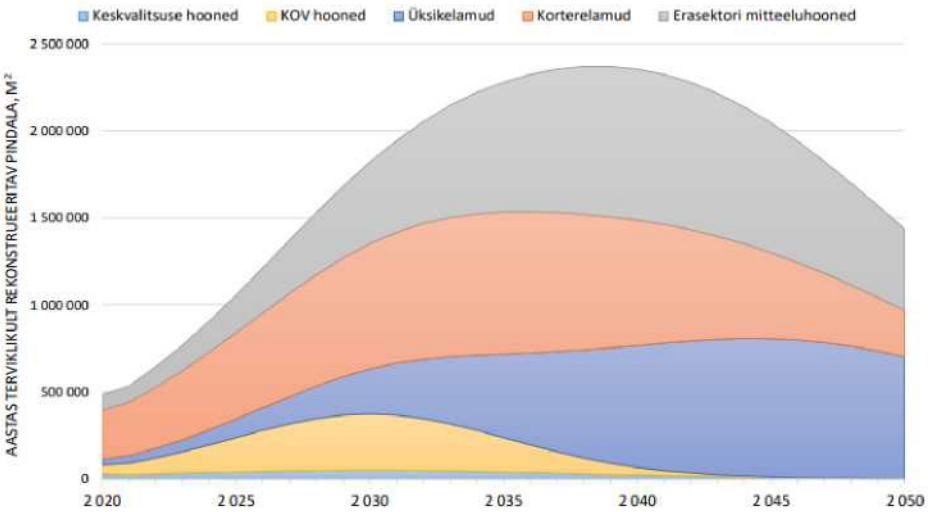

Figure 5.1 Annual reconstructed area of buildings (REKS).

Projects of common interest(PCIs) are319listed in d,320;

- Estonian pumped hydro-accumulation power plant
- Integration and synchronisation of the Baltic States' electricity networks with European networks

Additional potential projects of common interest in the future:

- Interconnection between Finland and Estonia (currently known as EstLink 3);
- Hybrid connection at sea between Latvia and Estonia [currently known as 'Elwind'
- Hydrogen interconnector between Finland, Estonia, Latvia, Lithuania, Poland and Germany [currently known as Nordic-Baltic Hydrogen Corridor]

ii. Sector or market risk factors or barriers in the national or regional context

The main risk factors for the energy economy, including the market, are continuous variables related to the balancing of unmanageable and/or weather-dependent energy sources (solar, wind, hydropower, sustainably produced biomass) and controlled capacities during peak demand, the development of flexibility mechanisms aimed at adapting energy consumption; fluctuations in fuel and CO_2 prices, the development and sufficient maturity of necessary technological solutions, storage options, etc., and increasing the affordability levels of the result of their wider deployment; continuous tightening of the requirements defined in the legal framework (including as a result of negotiations on legislative amendments at EU level, some of which are still ongoing as of March 2025), (technological developments,) the geopolitical situation and technical security of supply. Competence at different levels is an obstacle (including avoiding investments that run counter to national objectives; climate, environmental, technological knowledge gaps and insufficient dissemination) to continually cope with these variables, including digital technologies and other innovations. The implementation of most of the above measures, including related investments, requires the following conditions to be met:

- Monitoring global and local energy markets
- A stable regulatory area/Towards a more stable regulatory framework, including better predictability for future changes (including strategic planning)

319 EUR-Lex – C(2023)7930 – EN – EUR-Lex
320 Annex on the first Union list of Projects of Common and Mutual Interest – European Commission

- The existence of competences, their continuous improvement and the dissemination of awareness in the public, private and third sectors
- Promoting technology availability and technical capabilities
- Cooperation between sectors, including the exchange of experience and the search for and dissemination of best practices at all levels
- Systematic monitoring of the implementation of measures, feedback to improve their targeted performance and to achieve more synergies between actions
- In addition to national strategic development documents, government decisions (including the government action programme, the recovery and resilience plan, including the RePower EU chapter).

iii. Analysis of additional public finance support or resources to fill identified gaps identified under point ii

In Estonia, the public funds needed to progress towards the country's objectives are planned on the basis of sectoral and cross-sectoral strategic planning documents and the national budgetarystrategy process321. Therefore, Estonia does not have a separate financing plan linked to the NEC 2030 objectives.

In order to define the resources necessary for the implementation of the measures, including investments, it is necessary to:

- Setting up indicators and a platform to monitor developments in the energy market, participation in international cooperation
- Timely involvement of the sector in the application of EU legal requirements (take into account the time needed to transpose legal requirements and public consultation in the timetable for implementation of the measures)
- Organisation of training and traineeships (analysis of knowledge and training needs related to the implementation of measures), information campaigns, continuous improvement of learning programmes (periodic training needs analysis) in order to increase the competences related to the implementation of the new requirements.
- Availability of affordable technologies and workforce (periodic technology and labour analysis)
- Diversifying ways of working together
- Annual evaluation of the implementation of the measures and, where appropriate, proposals to increase the positive impact of the measures

5.4. Impact of the proposed policies and measures on other Member States and regional cooperation

This chapter shall cover the impact of planned policies and measures under point 3 on other Member States and on regional cooperation until at least the last year of the period covered by the plan, including a comparison with projections of existing policies and measures.

i. Impacts on the energy system in neighbouring and other Member States in the region to the extent possible

The achievement of the objectives of the NECPs is not expected to have significant negative impacts on the energy systems of other countries, including the Baltic States. On the contrary, e.g. synchronisation of the electricity system with Central Europe, development of the regional gas market, development of offshore wind farms have a positive impact on the region's energy supply. The electricity infrastructure measures (see section 2.4.2 for details) are primarily aimed at synchronising the Baltic States' electricity system in the band subject to European Union law. Activities under the Baltic synchronisation project

321 National budget strategy | Ministry of Finance (fin.ee)

are taking place in Estonia, Latvia, Lithuania and Poland.

Investments under synchronisation will strengthen both interconnections between countries and the national electricity transmission network. This will remove bottlenecks in the electricity system and increase the interconnection between the Baltic States and Poland. In addition, projects in the field of offshore wind and storage have a significant regional impact.

Ideally, offshore wind farms could become nature-positive by 2030322 (the negative effects should not be outweighed by irreversible effects on species, habitats, marine and coastal ecosystems over the lifetime of the project, avoiding positive effects) and should be built taking into account the principles of sustainable blueeconomy323. The locations, guidelines and conditions for the installation of offshore wind farms in Estonia are determined by maritime spatial plans and the development of offshore wind farms in Estonia is based on best practice and synergies withother countries324.

ii. Impacts on energy prices, utilities and energy market integration

In the long term, it is important to merge the Baltic countries' price areas, providing market participants with a larger market and a harmonised set of rules. At the same time, the interconnection of price areas can be done after synchronisation if sufficient connections between the current price areas are ensured. The integrated electricity system of the Baltic States also results in electricity exchange price convergence in the Baltic States: In Estonia, an electricity price of EUR 87.27/MWh in 2024 (2023=EUR 90.79/MWh, 2022=EUR 192,82/MWh), EUR 87.43/MWh in Latvia (2023=EUR 93.9/MWh, 2022=EUR 226,91/MWh), EUR 87.34/MWh in Lithuania (2023=EUR 94.4/MWh, 2022=EUR 230,23/MWh) and EUR 45.57/MWh (2023=EUR 56.5/MWh, 2022=EUR 154,04/MWh) inFinland325. It can be seen that price differences between Finland and the Baltic countries were significantly higher between 2022 and 2024 than in previous years, pointing to the need to build additional interconnection capacity between countries. The proposed electricity infrastructure measures will have a positive impact on both energy exchange prices and electricity market integration.

iii. Where appropriate, the impact on regional cooperation.

The Baltic States' electricity system synchronisation project has a huge impact on the Baltic States and Poland and has led to the need for very intensive regional cooperation. In the most important forms of cooperation in the Baltic Council of Ministers' Energy Committee and the BEMIP High Level Working Group on Synchronisation and Technical Working Groups, cooperation has intensified in recent years. Both forms of cooperation regularly monitor the implementation of the project and address the issues and problems raised.

322 Ore go-to-areas_21APRIL2023.pdf (CDN-website.com)
323 Principles for a Sustainable Blue Economy | WWF (panda.org)
324 Maritime planning | Ministry of Finance (fin.ee); https://maakonnaplaneering.ee/maakonna-Planning/onshore/Para-Sea-Country/
325 Nord Pool | Day-ahead prices

	PARAMETERS FOR GHG EMISSION PROJECTIONS
ANNEX IA	**PROJECTIONS OF GREENHOUSE GAS EMISSIONS**
ANNEX IB	**DESCRIPTION OF METHODOLOGY FOR GHG PROJECTIONS**
ANNEX IC	KPP 2050 POLITICAL GUIDELINES AND PRINCIPLES
	POLICIES AND MEASURES
ANNEX	