Cabinet of Ministers ___ November 2020
Decree No.____

LATVIA'S NATIONAL ENERGY AND CLIMATE PLAN

2021–2030

Riga, 2020

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ABBREVIATIONS

RE	Renewable energy
RES	Renewable energy sources
UN	United Nations
BEMIP	Baltic Energy Market Interconnection Plan
CO_2	Carbon dioxide
DH	District heating, which is a set of heating sources, heating transmission and distribution networks, and users of thermal energy that generate, convert, transmit, distribute, and consume thermal energy in a coordinated way (Energy Law)
CSB	Central Statistical Bureau
NRT	Natural resources tax
EDG2020	Energy Development Guidelines 2016–2020
EC	European Commission
EAAI	Emission Allowances Auctioning Instrument
MoE	Ministry of Economics
EnU	Energy Union
EEOS	Energy efficiency obligation scheme
ERDF	European Regional Development Fund
EU	European Union
ESF	European Social Fund
ESCO	Energy service company
EV	Electric vehicle
ETS	European Union Emissions Trading System
EUROSTAT	Statistical Office of the European Union
EEA	European Environment Agency
LTRS	Long-term renovation strategy
MoF	Ministry of Finance
F-gases	Fluorinated greenhouse gases
APRAP2030	Action Plan to Reduce Air Pollution 2019–2030 (under development)
HPP	Hydroelectric power plant
GDP	Gross Domestic Product
MoES	Ministry of Education and Science
CEP2020	European Council Presidency Conclusions of 2 May 2007
CEPF2030	European Council Conclusions on 2030 Climate and Energy Policy Framework of 24 October 2014
CF	Cohesion Fund
PCI	Project of Common Interest
CCFI	Climate Change Financial Instrument
LTESL2030	Long-Term Energy Strategy of Latvia 2030 — Competitive Energy for the Society
SDSL2030	Sustainable Development Strategy of Latvia 2030
LIFE	European Union funding programme for the environment
LLU	Latvia University of Life Sciences and Technologies
MoW	Ministry of Welfare
NDPL2020	National Development Plan of Latvia 2014–2020
NDPL2027	National Development Plan of Latvia 2021–2027 (under development)

LPACC2030	Latvian Plan for Adaptation to Climate Change until 2030
LALRG	Latvian Association of Local and Regional Governments
REAPRL	Action Plan of the Republic of Latvia in the Field of Renewable Energy for Implementing the Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC by 2020
LH	Local heating, which is a heat supply system owned by an autonomous producer, the State, or local government institutions, which provides thermal energy for personal needs and for other consumers of energy, to whom the thermal energy is distributed and supplied from the heating source with or without a distribution pipeline system (Energy Law)
UL	University of Latvia
MFF2027	Multiannual Financial Framework for 2021–2027
CM	Cabinet of Ministers
NIPG2020	National Industrial Policy Guidelines 2014–2020
NGO	Non-governmental organisations
MPC	Mandatory procurement component
R&D	Research and development
R&I	Research and innovation
CSCC	Cross-sectoral Coordination Centre
TSO	Transmission system operator
VAT	Value added tax
GHG	Greenhouse gases
MoT	Ministry of Transport
PUC	Public Utilities Commission
VOT	Vehicle operation tax
MoEPRD	Ministry of Environmental Protection and Regional Development
WPP	Wind power plants
NRP	National research programme
LULUCF	Land use, land-use change and forestry
MoA	Ministry of Agriculture

INTRODUCTION

Latvia's National Energy and Climate Plan 2021–2030 (hereinafter referred to as "the plan") is a document for the long-term planning of energy and climate policy laying down the basic principles, goals and action lines of Latvia's national energy and climate policy for the next ten years, as per the outlined long-term lines of development.

The Plan was drafted in accordance with Cabinet Order No 210 of 7 May 2019 on the Government Action Plan to implement the declaration on the intended activities of the Cabinet of Ministers led by Arturs Krišjānis Kariņš"[1] (task number assigned in the declaration – 062, Activity number 62.1). The Plan should be implemented primarily by complying with economic development, energy and climate targets.

The drafting of the Plan is provided for in EU legislation, namely Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (hereinafter referred to as Regulation 2018/1999), with Regulation (EU) 2018/1999 stipulating which information should be included in the Plan (Articles 3-12 of Regulation 2018/1999) and what it should contain (Annexes I and III to Regulations 2018/1999).The Plan thus fully takes on board the conditions of Regulation 2018/1999 and the provisions of paragraph 6 of Cabinet Regulation No 737 of 2 December 2014 on development planning document drafting and impact assessment rules taking into consideration the conditions defined in this Cabinet Regulation for the policy planning document (plan).

The long-term vision of the Plan is to promote the development of a sustainable economy in a viable, competitive and safe way.

The long-term objective of the Plan is to **promote the development of a climate-neutral economy by improving energy security and public welfare in a manner which is sustainable, competitive, cost efficient, safe and based on market principles.**

In order to implement the objective it is necessary:

1) to promote the efficient use of resources and their self-sufficiency and diversity;
2) to ensure a considerable reduction in the consumption of resources, in particular fossil and unsustainable resources, and a simultaneous transition to the use of sustainable, renewable and innovative resources ensuring equal access to energy sources to all community groups;
3) to stimulate the development of research and innovation that contributes to the development of the sustainable energy sector and mitigation of climate change.

[1] https://likumi.lv/ta/id/306691-par-valdibas-ricibas-planu-deklaracijas-par-artura-krisjana-karina-vadita-ministru-kabineta-iecereto-darbibu-istenosanai

Fig 1 key reads:

Long-term objectives of the plan: research and innovation -> improving resource efficiency + resource self-sufficiency and diversity + reducing consumption of fossil and non-sustainable resources + use of sustainable and innovative resources = developed and climate-neutral economy

Figure 1. Energy and climate policy directions until 2030

<u>The following action lines have been defined to achieve the objectives of the plan:</u>

1. Improving the energy performance of **buildings**;
2. Improving energy efficiency and promoting the use of RES technologies in the **heating and cooling** and **industry**;
3. Promoting the use of negative emission technologies in **electricity generation**;
4. Promoting economically justified **self-generation** and **self-consumption of energy**;
5. Improving energy efficiency, promoting the use of alternative fuels and RES technologies in **transport**;
6. Energy **security, reducing** energy **dependency**, full integration of energy **markets** and modernisation of **infrastructure**;
7. Improving the efficiency of **waste** and **wastewater management** and reducing GHG emissions;
8. Efficient use of resources and reduction of GHG emissions in **agriculture**;
9. Sustainable use of resources and reduction of GHG emissions and **increasing** carbon sequestration **in the sectors of land use, land-use change and forestry**;
10. Promoting the reduced use of **fluorinated greenhouse gases (F-gases)**;
11. 'Greening' of the **tax system** and improvement of friendliness to energy efficiency and RES technologies;
12. **Public information, education and awareness raising**.

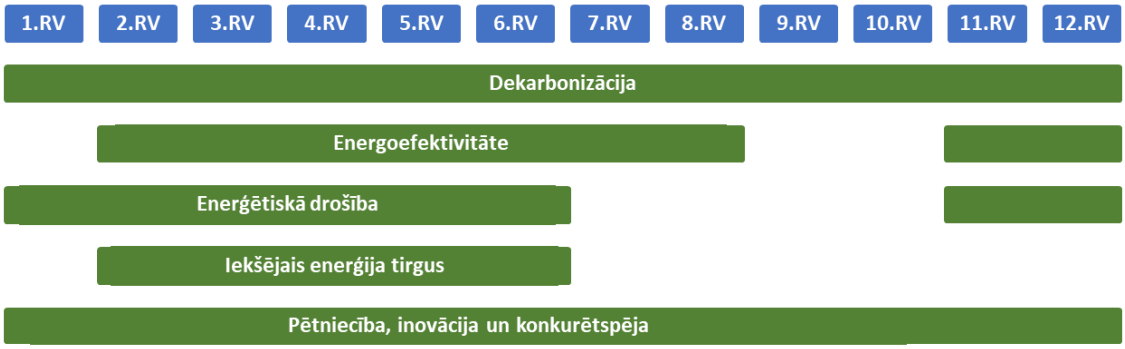


Figure 2. Link of the action lines defined in the Plan with EnU dimensions (and their objectives)

Fig 2 key reads:

Carbon removal

Energy efficiency

Energy security

Internal energy market

Research, innovation and competitiveness

1. OVERVIEW AND PROCESS FOR ESTABLISHING THE PLAN

1.1. Executive summary

1.1.1. Context of the Plan

At EU level, the development of the Plan, its contents, national targets, objectives and contributions for reaching the EU objectives, information and data, as well as performance indicators to be included in the Plan are governed by:

- CEPF2030[2];
- The conclusions of the Transport, Telecommunications and Energy Council of 26 November 2015 on the Governance System of the Energy Union[3];
- Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (hereinafter referred to as Regulation 2018/1999)[4].

Plans are drawn up in every Member State, including Latvia, to meet the objectives set by the EU or international commitments entered into:

- commitments for 2030 made within the Paris Agreement under the UN Framework Convention on Climate Change (hereinafter — the Convention) regarding climate change mitigation — reduction of GHG emissions and greater carbon sequestration in all sectors — to reduce the total EU GHG emissions by at least 40 % compared to 1990 by 2030 in a cost effective way.
- the EU Roadmap for Moving to a Competitive Low Carbon Economy in 2050[5] — the EU is committed to achieving an internal reduction of EU Member State emissions by 80–95% by 2050 compared to 1990 levels in order to be a competitive economy with low carbon dioxide emissions.
- A Clean Planet for all — A European Strategic Long Term Vision for a Prosperous, Modern, Competitive and Climate Neutral Economy[6] — the EU is committed to achieving greenhouse gas emissions neutrality by 2050 according to a net-zero GHG emissions principle where the total amount of GHG emissions generated is compensated by capturing the CO_2 generated or the use of specific technologies prevents the escape of GHG emissions.
- KEPS2030.

[2] http://data.consilium.europa.eu/doc/document/ST-169-2014-INIT/lv/pdf
[3] http://data.consilium.europa.eu/doc/document/ST-14459-2015-INIT/lv/pdf
[4] https://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:32018R1999&from=EN
[5] https://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:32018R1999&from=LV
[6] https://eur-lex.europa.eu/legal-content/LV/TXT/HTML/?uri=CELEX:52018DC0773&qid=1575363669558&from=LV

The Plan is a framework document for long-term planning laying down main action lines for the change of the approach of the economy and society to ensure the fulfilment of the objectives defined in the plan and to provide the necessary contribution to the implementation of EU and international commitments.

The implementation of the plan will require joint investments which will ensure a positive impact on the development and sustainability of the Latvian economy. An important result of the implementation of the plan is improvement of energy security and getting closer to energy independence, as well as to ensure that the funds used in the country are shifted from funding of imports to financing of local production. The energy policy measures included in the plan will contribute significantly to local energy production using zero-emission technologies, thus having a positive effect on energy prices while ensuring an improvement in energy efficiency for energy consumers. This is supposed to reduce public energy spending. The plan mainly includes support and promotion measures, avoiding, as far as possible, prohibition measures and avoiding measures that could impair the quality of life of citizens —environmental condition, living conditions and quality of life (social situation).

1.1.2. Strategy for all dimensions of the Energy Union

The plan covers objectives of all the dimensions[7] of the EnU, as well as policies and measures required to reach them. Discussions on the EU structural funds available to EU Member States continue, including on the contributions from the CF for the 2021–2027 programming period and the scope of support. In Latvia, the allocation of the EU structural funds (ERDF, ESF and CF) for the programming period 2021-2027 is planned to be based on NDPL2027, so the source of funding referred to in the Plan for support of the programmes for which the funding is intended to be raised is indicative.

1.1.3. Main targets of the Plan

The plan includes targets for all dimensions of the EnU, where many of the numerical targets are set by EU legislation, such as the GHG emissions reduction target, the target for the share of RES in energy consumption in transport, the share of advanced biofuels and biogas in energy consumption in transport, the interconnection target, whether EU legislation makes it obligatory to set targets, including specific conditions applying to the targets. Table 1 includes the main targets of the Plan, but detailed targets of each dimension of the EnU are defined in Chapter 3 of the Plan.

Table 1. Policy outcomes and main performance indicators of the dimensions of the EnU in the EU and Latvia

Policy outcome in each dimension of the Plan	**EU**		**Latvia**		
	Target value		**Actual value**	**Target value**[8]	
	2020[9]	**2030**[10]	**2017**	**2020**	**2030**
1.1. GHG emission reduction target (% compared to 1990)	-20	-40	-57	-	**-65**
1.1.1. Non-ETS activities (% compared to 2005)	-10	-30	+7	+17	-6

[7] Article 1(2) of Directive 2018/1999

[8] regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, italic font is used for the indicative targets to be defined in the Plan, bold font is used for the binding targets to be defined in the plan

[9] CEP2020 and subordinated EU legislation or CEPF2030

[10] CEPF2030 and subordinated EU legislation

Policy outcome in each dimension of the Plan	EU		Latvia		
	Target value		Actual value	Target value[8]	
	2020[9]	2030[10]	2017	2020	2030
1.1.2. LULUCF accounting categories (million t)[11]	-	0	-	0	**-3.1**
1.1.3. Transport energy life-cycle GHG emission intensity reduction (%)	6	6	0.8	6	**≥6**
1.2. Share of energy produced from RES in gross final energy consumption (%)	20	32	39	40	**50**
1.3. Share of energy produced from RES in gross final energy consumption in transport (%)	10	14	2.5	10	**7**[12]
1.4. Share of advanced biofuels & biogas[13] in gross final energy consumption in transport (%)	-	3.5	0	-	3.5
2.1. Mandatory national target — cumulated final energy savings (Mtoe)	-	-	0.45	0.85	**1.76**
2.2. Building renovation target (total renovated m^2)	-	-	398,707	678,460	**500,000**
3. Share of imports in gross national energy consumption (incl. bunkering) (%)	-	-	44.1	44.1	**30-40**
4. Interconnection capacity (% of total generation capacity)	10	15	**60**	10	**60**
5.1. Investment in R&D (% of GDP)	3	-	0.51	0.7	**>2**
5.2. Global Competitiveness Index (position in the world)	-	-	42	-	higher than 42

The measures and principles set out in the Plan are based on full introduction and implementation of the 'polluter pays' principle provided for in the Treaty on the Functioning of the European Union. The 'polluter pays' principle means practices whereby creators of pollution should shoulder the costs of managing it in order to prevent harm to human health or environment. Pollution is mostly caused by the end consumer, since satisfaction of consumer demand stimulates supply, which in turn causes pollution. Consumers should therefore also be responsible for the costs of administration of pollution – containment, reduction and prevention of harm to human health or the environment. However, consumers should also have the right to accurate information on the costs relating to administration of pollution. Therefore, the 'polluter pays' principle means that every resource, including energy, consumer and producer, regardless of legal status or social status, is responsible for any kind of emission or pollution resulting from the consumption of the resources in question or from the production of that resource for own consumption or sale to other consumers, and is entitled to be told how those administration costs are applied and used.

[11] GHG emission reduction and CO_2 removal target in LULUCF accounting categories in 2030

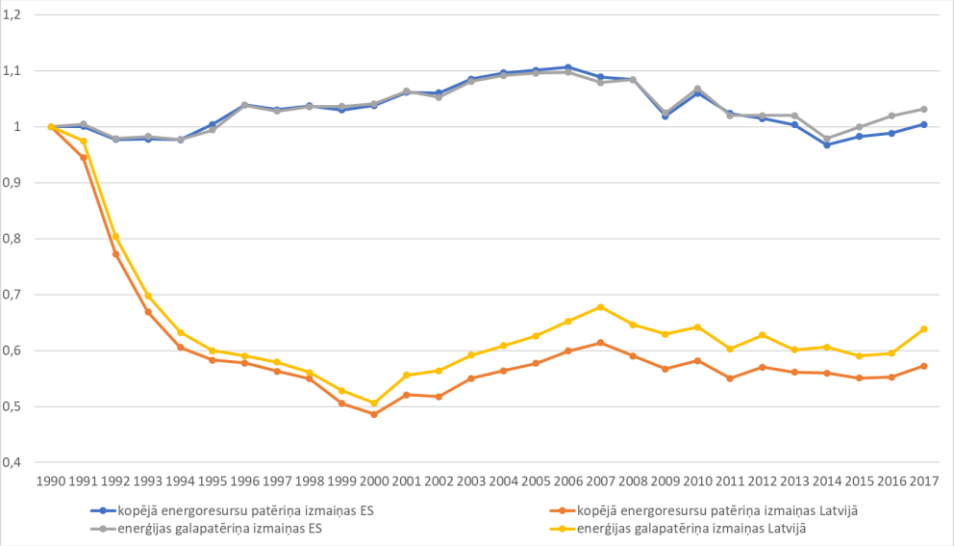
[12] The target can be reached by setting an obligation for fuel suppliers, within the scope of which it is allowed to use advanced biofuel and/or biogas, which is produced from the raw materials listed in Annex IX to Directive 2018/2001, electricity obtained from RES, hydrogen obtained from RES, processed carbon fuels, as well as other biofuels or biomass fuels which are not produced from food or animal feed crops

[13] Advanced biofuel & biogas should be produced from the raw materials listed in Part A of Annex IX to Directive 2018/2001, for example, animal manure, sewage sludge, straw, different waste, etc.

1.2. Overview of current policy situation

1.2.1. Context of the Latvian energy system

At EU level, the energy policy for 2050 is defined in the EC Communication Roadmap for moving to a competitive low-carbon economy in 2050[14]. The energy policy for 2030 in its turn is defined in the EC Communication Clean Energy For All Europeans[15]. With regard to planning the development of Latvia the Plan is subordinated to SDSL2030[16] and NDPL2027.



Key reads:

Changes in total consumption of energy resources, EU

Changes in final energy consumption, EU

Changes in total consumption of energy resources, Latvia

Changes in final energy consumption, Latvia

Figure 3. Total energy sources consumption and final energy consumption changes in EU and Latvia (1990 = 1)[17]

Energy is one of the sectors that contributes directly to the economic growth of the country and forms a significant part of the total costs in some industries, especially manufacturing. The most important factor for industry growth has been and will continue to be the lowest possible sustainable energy price, which includes security and quality. Development of the energy sector requires significant investment, to attract which a stable and predictable investment environment is needed. At the same time, energy, including industry and transport, is one of the sectors fully affected by consumer demand, whilst the consumer is responsible for ensuring that the sector's costs stay competitive.

Key to fig 4reads:

[14] https://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:52011DC0112&from=LV
[15] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1485341914564&uri=CELEX:52016DC0860%2801%29
[16] http://polsis.mk.gov.lv/documents/3323
[17] data source: EUROSTAT

Below column 1:

Total energy consumption mix, EU

Fossil fuel,

Nuclear energy

Below column 2:

Total energy consumption mix, Latvia

Liquid fossil fuel

RES

Below column 3:

Final consumption energy mix, EU

Gaseous fossil fuel

Waste (non-RES)

Below column 4:

Final consumption energy mix, Latvai

Below colum 5:

Final consumption of energy resources, EU

Industry

Households

Services

Below column 6:

Final consumption of energy resources, Latvia

Transport

Agriculture, forestry

Other

Figure 4. Total consumption of energy sources in Latvia and the EU and final energy consumption, final energy consumption of Latvia and the EU in sectors in 2017 (%)[18]

In Latvia, unlike elsewhere in the EU, RES and liquid fossil heating / motor fuel dominate primary energy consumption, and the share of RES in final energy consumption in Latvia is much higher than elsewhere in the EU. In final energy consumption by sector, Latvia does not differ significantly from the EU structure, the highest share in Latvia being for households and agricultural, forestry and fisheries activities.

1.2.2. Current energy and climate action policies and measures

Development of the plan and of its background policies and measures, is governed by a number of items of EU legislation, the main ones being:

[18] Data source: EUROSTAT

- Regulation 2018/1999;
- Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (hereinafter — Directive 2003/87/EC);
- Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community' s greenhouse gas emission reduction commitments up to 2020 (hereinafter — Decision No 406/2009/EC);
- Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (hereinafter — Regulation 2018/842);
- Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU (hereinafter — Regulation 2018/841);
- Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (hereinafter — Directive 2009/28/EC);
- Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast version)[19] (hereinafter — Directive 2018/2001);
- Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (hereinafter – Directive 2012/27/EU);
- Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency[20] (hereinafter — Directive 2018/2002);
- Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast) (hereinafter — Directive 2010/31/EU);

There are currently a number of policy planning documents (including informative reports) in force in Latvia related to energy and climate change mitigation issues with objectives concerning energy and climate change mitigation, as well as policies for reaching these targets.

1) SDSL2030 lays down the following objectives in the context of the plan:

- to ensure energy independence of the country by increasing self-sufficiency of energy and integrating in the EU energy networks;

[19] https://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:32018L2001&from=EN
[20] https://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:32018L2002&from=EN

- to be the EU leader in the preservation, increase, and sustainable use of natural capital;
- to preserve the originality of Latvia — the diverse natural and cultural heritage, typical and unique landscapes.

SDSL2030 includes targets for GHG emission reduction, the share of RES and energy intensity, as well as innovation goals for 2030.

2) NDPL2020[21] lays down the following objectives in the context of the Plan:

- To ensure sustainable use of the energy resources required by the national economy by promoting the availability of a market for the resources, decrease of the energy intensity and emission intensity in certain sectors, and increase of the proportion of RES in the total consumption, while focusing on competitive energy prices.
- To maintain the natural capital as the basis for sustainable economic growth and promote its sustainable use while minimising natural and human risks to the quality of the environment.

NDPL2020 includes targets for the national GHG emission intensity, the share of RES, energy consumption, and energy independence, as well as agricultural, forestry, and waste management goals for 2020.

3) LTESL2030[22] lays down the following objective in the context of the Plan:

- Competitive economy with a sustainable energy sector and increased security of energy supply.

LTESL2030 includes optional and non-binding targets for the use of RES, energy and energy sources, and the share of imports for 2030.

Annex 1 of the plan includes detailed information about the connection of the plan with policy planning documents of Latvia (including informative reports) and provides detailed information about their objectives in the context of the policies of the plan and the main measures for reaching these objectives.

1.2.3. Key issues of cross-border relevance

The key measures implemented in the context of the plan are related to the interconnections of the Baltic energy market, common energy market and energy security.

In cross-border terms it is also important that the Baltic States coordinate the measures that influence not only the compatibility of infrastructure and electricity, but also the flow of energy sources (fossil energy sources, as well as biomass and biofuels[23]) between the Baltic States.

In the context of carbon removal it is extremely important to establish and maintain a common (harmonised) view on decarbonisation options in the Baltic States and a common approach to implementing decarbonisation measures. However, using a common approach to implementing decarbonisation measures might be difficult due to the different situation in the Member States, especially in terms of the energy structure and the main sources of GHG emissions: Latvia has the highest share of GHG emissions from non-ETS activities

[21] http://polsis.mk.gov.lv/documents/4247
[22] http://polsis.mk.gov.lv/documents/4849
[23] biofuels mean liquid or gaseous fuel for transport produced from biomass (Articles 2(28) and (33) of Directive 2018/2001). Biofuels are considered RES, if this meets the sustainability criteria defined in the EU legislation

among the Baltic States (second highest EU), with agriculture and transport dominating in the area of GHG emissions from non-ETS activities, while Estonia is among the top EU Member States with the lowest share of GHG emissions from non-ETS activities and the highest emissions from transport. The share of Lithuania's GHG emissions from non-ETS activities and their structure with the largest contribution from transport and agriculture is more similar to Latvia than Estonia. Nevertheless, transport is one of the major sources of GHG emissions from non-ETS activities in all three Baltic States. Coordinated activities should therefore be implemented to reduce emissions particularly from the transport sector.

1.2.4. Administrative structure of implementing national energy and climate policies

A Cabinet Order on the National Energy and Climate Council was approved at the meeting of the Cabinet of Ministers of 26 November 2019, setting up this council to ensure coordinated, integrated and sustainable State policy for resolution of energy and climate matters. The Council is headed by the Prime Minister, and includes 8 ministers and 24 industry representatives.

Competences of sectoral ministries are laid down in ministerial statutes[24], which are approved by the Cabinet of Ministers (as Cabinet regulations).

Development of the policy for the use of RES, promotion of energy efficiency, as well as energy security and internal energy market is the responsibility of MoE, however, sectoral ministries also implement resource efficiency improvement promotion measures in their sectors. The policy for reduction of GHG emissions, including CO_2, is drafted by MoEPRD in cooperation with MoE, MoT, MoA and other sectoral ministries, and MoEPRD coordinates implementation of this policy. The authority responsible for education and science is MoES, while MoE and MoEPRD are responsible for matters related to innovation and competitiveness. The responsibilities under the Latvian policy planning documents currently in force are set out in Annex 1 to the Plan.

1.3. Consultations and involvement of national and EU entities and their outcome

During drafting of the plan (draft and final versions), the conditions included in it (global vision, objectives, thrust and measures) were effectively discussed with the public at a number of events devoted to the plan's general direction and measures, along with events dedicated to the plan in general, with planning regions and municipalities, as well as representatives of sectors and non-governmental organisations. The comments and recommendations received have been evaluated and incorporated into the Plan, as far as possible, in cooperation with all the stakeholder ministries.

The draft plan was also evaluated by several non-governmental organisations. The CEE Bankwatch Network[25] proposed a more ambitious use of RES and improving energy efficiency, as well as developing appropriate policies and measures to achieve these ambitions. It also proposed reviewing the measures to reduce GHG emissions in the event of waste incineration not being supported, and it is worth noting that although a gradual reduction in the final consumption of natural gas is envisaged, there is no target for gradual termination of the use of fossil heating fuel.

[24] https://likumi.lv/doc.php?id=207119; https://likumi.lv/doc.php?id=74746; https://likumi.lv/doc.php?id=74749; https://likumi.lv/doc.php?id=79100; https://likumi.lv/doc.php?id=228051

[25] https://bankwatch.org/wp-content/uploads/2019/03/NECP-in-8-CEE-countries-1.pdf

A study by the Ecologic Institute and Climact for the European Climate Foundation[26] ranked Latvia 11th out of the 28 EU Member States and took stock of the trend towards increased public involvement, and the draft plan also includes detailed information on policies and measures and the total Latvian GHG emissions reduction target set in the Plan for 2030. However, the minimum level of reduction of non-ETS GHG emissions for 2030 non-ETS activities, as well as the lack of information on the phase-out of energy subsidies and the termination of fossil energy use came in for criticism. The CAN Europe study[27] shows that Latvia does not have a transparent and systemic RES use promotion support policy, and states that the plan contains an objective to use non-fossil gas, whilst simultaneously failing to include a de goal for phasing phase out fossil gas or analysing its potential and what this means for investments in terms of infrastructure (storage and transportation).

1.3.1. Involvement of the Saeima and Cabinet of Ministers of the Republic of Latvia

On 26 June 2018, CM approved an informative report on drafting the National Energy and Climate Plan[28], which set out the basic components and timeframe of the plant, along with the principles governing its development and responsibilities for preparing information. The Plan drafting coordinators are MoE and MoEPRD, while the Ministry of Foreign Affairs, MoF, MoES, MoW, MoT, MoA and CSCC are also involved. The submission of the draft Plan to the EC was approved by the Cabinet at its meeting of 18 December 2018 (meeting minutes No.60 §96). In accordance with the Latvian development planning system, the draft plan needs to be announced at the Meeting of the State Secretaries and approved by the Cabinet.

In 2019, the draft plan was reviewed in several commissions of the Parliament of the Republic of Latvia – the Saeima Commission for Sustainable Development and the Saeima Commission for European Affairs. The Saeima Commission for European Affairs proposed to primarily develop tax burden reduction solutions for residents who have taken energy efficiency improvement measures and who promote self-consumption, and it also asked to submit specific and detailed solutions on the proposed increase in taxes, if any, and an opinion was provided. Energy efficiency and competitive pricing for energy sources, as well as the need to prevent legislative obstacles to the development of off-shore wind parks, have been mentioned as priorities. Latvia should also support the ESCO system more actively and include in the Plan conditions on how to reduce the high dependency on Russian gas supplies, which can be achieved through diversification of natural gas supply sources, as well as through the development of new interstate connections. The Saeima Commission for Sustainable Development was of the opinion that the RES targets set by Latvia could not be achieved in the light of the decisions adopted with regard to the abolition of the MPC system, and proposed including in the plan specific conditions for achieving the Latvian RES targets without the existing support mechanisms (by developing other types of RES), and including the impact assessment for these measures, it also being pointed out that the draft plan did not clearly define the objectives with regard to ensuring the competitiveness of electricity prices, a proposal also being made to include a definition of price competitiveness and to assess the impact of all proposed measures on electricity prices throughout the entire period of the Plan.

[26] https://europeanclimate.org/wp-content/uploads/2019/05/Planning-for-Net-Zero.-Assessing-the-draft-NECPs.pdf

[27] http://www.caneurope.org/docman/climate-energy-targets/3477-time-to-pick-up-the-pace-insights-into-the-draft-national-energy-and-climate-plans/file

[28] CM meeting protocol decision "Informative report "On Drafting of the National Energy and Climate Plan"" (CM protocol No.30 §50 of 26 June 2018)

1.3.2. Involvement of local and regional authorities

In 2018, active cooperation was ensured with the Riga planning region within the scope of the project "Putting Regions on Track for Carbon Neutrality by 2050" (C-TRACK-50). Similarly, the topical issues regarding the development of the Plan and the involvement of local governments required for fulfilling the conditions to be included in the Plan was discussed with the representatives of planning regions of Latvia.

The conditions, action lines and measures included in the Plan were presented in the Latvian Association of Local and Regional Governments, at the meeting of partners of the Co2mmunity project of the Interreg Baltic Sea Region Programme 2014-2020 of the Riga planning region, at the action group meeting of the Interreg Europe project "Financial Instruments for Promoting the Use of RE (FIRESPOL)".

1.3.3. Consultations with stakeholders, social partners, engagement of civil society

On 31 August 2018 and on 31 October 2018, the details of drafting of the Plan were presented to the Energy Committee of the National Economy Council established by the Ministry of Economics[29]. In the course of 2018, there were also consultations with undertakings and sectoral associations from different sectors on the measures for the achievement of the targets proposed in the draft plan, where overall no critical objections against the measures were received from representatives of sectors, while the proposed improvements in measures and proposals for additional measures were taken into account as far as possible. In 2018, the draft plan was presented at several conferences: "Energy 2018", "Heat Production Economy in a Sustainable Country" and "Energy and Climate Challenges of the Nordic and Baltic States. Mobility and Circular Economy".

The Ministry of Economics organised a major conference for a broader, namely the National Energy and Climate Plan 2021–2030: Energy Development and Climate Change Mitigation on 26 November 2018 (with about 100 participants), where discussions focused on all the dimensions of the plan and where all the participants had the opportunity to make suggestions, express opinions, and comment on the issues. Presentations and the video recording from the conference is available on the Web page of the Ministry of Economics[30].

The first version of the plan was published on the Web page of the Ministry of Economics on 17 September 2018 to ensure public participation. The second version of the plan was published on the Web page of the Ministry of Economics on 5 November 2018.

In 2019, extensive information activities on the updated draft plan continued without generally any critical position regarding the direction of the measures included in the Plan, including by presenting the Plan to the Latvian Association of Local and Regional Governments, the Agricultural Organization Cooperation Council, in the panel discussion of the Vidzeme planning region "From Sun to Electricity", at the "Lampa" conversation festival, at the conference "Can Business Afford Not to Be Energy Efficient Today?"

Updated versions of each chapter of the plan were published on the website of the Ministry of Economics in June and September 2019, giving the public sufficient time to prepare and

[29] The Energy Committee of the National Economy Council was established according to Sections 6.11, 7.2, and 17 of the CM Regulation No. 271 of 23 March 2010 "Statute of the Ministry of Economics" and Section 12 of the Statute of the National Economy Council of the Ministry of Economics No 1-7-32 of 9 November 2012

[30] https://em.gov.lv/lv/par_ministriju/notikumu_kalendars/21866-konference-nacionalais-energetikas-un-klimata-plans-2021-2030gadam-energetikas-attistiba-un-klimata-parmainu-mazinasana

submit their opinions. Members of the pubic were able to submit their opinions until 20 October 2019. A conference was also held in 2019 to present the plan more widely.

The opinions of members of the public have been summarised and published on the website of the Ministry of Economics[31], where notice was given that the public's opinion had been taken on board in the plan.

1.3.4. Consultations with other Member States

Latvia had its main discussions with regard to the preparation of the plan and definition of the measures included in the plan with other Baltic countries and Baltic Sea countries.

At the Meeting of the Baltic Ministers for the Environment on 23–24 May 2018, ministers and experts shared ideas and experience about the development of the plan and the conditions for decarbonisation for the purposes of climate change mitigation to be included in the plan. On 30 October 2019, at the Meeting of the Baltic Ministers for Environment, representatives of delegations of the three countries shared their experiences in the drafting of the plan, and during discussions participants also pondered long-term strategies for the reduction of GHG emissions and potential targets for progress towards climate neutrality in 2050.

During 2018, energy matters were discussed within the Baltic Council of Ministers' Committee of Senior Energy Officials, where experts discussed issues relating to cross-border cooperation in the energy sector and exchanged opinions on the conditions for future regional cooperation during the drafting of the plan and also within the framework of the implementation of the plan in order to discuss regional consultations of the plan and future cooperation opportunities within the framework of the dimensions covered by the plan, and to discuss specific measures included in the plan whose implementation had a regional impact. Several times during 2019 (for example, on 6 February, 18 April, 29 August, 30 October), Latvian, Lithuanian and Estonian experts exchanged opinions on updating the plan and the action lines and measures included therein within the scope of the Baltic Council of Ministers' Committee of Senior Energy Officials. Experts from the Baltic States also met several times to discuss possible intergovernmental measures in the field of RES, such as wind energy development or transport energy matters.

1.3.5. Iterative process with the EC

Latvia submitted the draft plan to the EC on 28 December 2018. In January 2019, Latvian representatives met the EC on the matter of the initial EC's recommendations with regard to the draft plan and possible ways of improving it, which Latvia has fully taken into account. Latvian experts also work together with EC experts on policies and measures needed to meet the RES and energy efficiency targets.

On 18 June 2019, the EC published the Commission recommendations on the draft integrated National Energy and Climate Plan of Latvia covering the period 2021-2030 (C (2019) 4414, {SWD (2019) 265 final}). On 27 November 2019, Latvia published a justification for taking into account the EC recommendations[32].

The final version of the plan submitted by Latvia will be evaluated by the EC, taking into account Article 13 of Regulation 2018/1999, in particular as regards the adequacy of the

[31] https://em.gov.lv/lv/nozares_politika/nacionalais_energetikas_un_klimata_plans/
[32] https://em.gov.lv/lv/nozares_politika/nacionalais_energetikas_un_klimata_plans/

proposed contribution to the achievement of the EU objectives and in order to assess whether the EC recommendations have been taken into account.

1.4. Regional cooperation in preparing the plan

1.4.1. Regional cooperation in preparing the plan

Latvia participates in a variety of regional cooperation formats in the field of climate and energy (in the context of the Paris Agreement and the climate and energy policy), including:

- The Baltic Assembly[33];
- summit meetings of Prime Ministers of Baltic States;
- the Baltic Council of Ministers (BCM);
- EU Strategy for the Baltic Sea Region (EUSBSR) and Baltic Energy Market Interconnection Plan (BEMIP);
- The Nordic Energy Research programme.

Although intensive coordination in energy policy matters in the Baltic States takes place at the level of senior officials of BCM, wider regional cooperation is also linked to countries such as Finland, Sweden, Poland, Denmark and Germany.

In the EU context, regional cooperation takes place in the format of BEMIP, covering infrastructure planning and helping to increase and make efficient use of financial resources, including the Connecting Europe Facility, which supports cross-border energy projects, thus further improving cooperation in the Baltic Sea region. A number of projects are being implemented to improve the security of electricity and gas supply in the Baltic region and to ensure efficient market development. The most important regional project is the synchronisation of the Baltic electricity grid with the European electricity grid. In the meantime, there is a number of other important projects to ensure the efficient functioning of the market, such as joint interconnections, as well as the modernisation of Inčukalns Underground Gas Storage Facility (hereinafter — Inčukalns UGSF), etc.

The Baltic States discussed with each other the preparation of their plans within the framework of the BCM. Several meetings of senior officials took place in the second half of 2018 and in 2019 with regard to the plan as a whole and with regard to the possible policy measures that could be implemented jointly:

- Meeting of the Committee of Senior Environmental Officials in Vilnius on 26.04.2018, introduction of climate measures;
- BMC meeting of Environmental Ministers in Vilnius on 23-24.05.2018, introduction of climate measures;
- Nordic and Baltic Energy Conference on 29 September 2018;
- BCM Meeting of Senior Energy Officials on 30.10.2018 and 29.08.2019;
- Nordic and Baltic Energy Conference on 24–25 October 2019.

Regional consultations identified regional opportunities for cooperation in the field of RES and their technologies, particularly as regards possible joint development of offshore WPPs, taking into account maritime spatial planning considerations, which allow joint projects to be

[33] cooperation between parliaments of Estonia, Latvia and Lithuania

developed on the Latvian-Estonian border and on the Latvian-Lithuanian border. The Baltic States have included regional offshore wind parks with a maximum capacity of 800 MW in the list of policies and measures to be implemented. The study of the wind energy potential of the Baltic Sea estimates that the total offshore wind power capacity identified in the Baltic Sea[34] exceeds 93 GW and that the Baltic Sea has a potential of 187 wind power units, with a capacity of 500 MW each, including respectively:

- Estonia: 14 wind parks with a capacity of 7 GW and annual energy production of 26 TWh
- Latvia: 29 wind parks with a capacity of 15.5 GW and annual energy production of 49.2 TWh
- Lithuania: 9 wind parks with a capacity of 4.5 GW and annual energy production of 15.5 TWh.

1.4.2. Regional cooperation in implementing the plan

Presently, regional cooperation is implemented with regard to the regional gas market, synchronisation with the European continental electricity grid, electricity and gas interconnection projects, as well as Inčukalns UGSF. Regional cooperation on the implementation of the Rail Baltic project and the development of the EV charging network, which is carried out in all EU Member States in the transport sector. Cooperation with other countries is already in place to ensure the convenient use of EV charging networks for foreign representatives within the EU. Consequently, there are prerequisites for the possibility of moving between EU Member States using EVs. Similarly, regional cooperation to reduce agricultural GHG emissions is carried out in accordance with Directive 91/676/EEC[35] (on nitrogen emissions) or the Action Plan to Reduce Air Pollution (on ammonia emissions).

The Baltic States agreed that regional cooperation could be extended to the areas of energy efficiency and the development of RES, which are particularly relevant to the transport sector, including:

- biomethane production and market development;
- coordination with regard to biofuel requirements (admixture of biofuels and tax-related matters);
- coordination regarding possible road tolls (in Latvia – road use tolls) or road tolls for trucks.

In addition, potential regional cooperation could be extended to include the cooperation of national EV charging networks at the Baltic level and to include agricultural and forestry sectors (for example, amelioration, soil quality measures, etc.), taking into account the potential transboundary impacts of agricultural, forestry or fisheries activities.

The planning and implementation of the long-term energy and climate policy and measures (by 2030 or 2050) could be improved or implemented in the required quality, with the possibility of sharing experience and knowledge with other EU Member States, particularly in the field of reduction of carbon emissions, and promoting energy efficiency, as this could help Latvia to choose the most appropriate instruments and actions for the achievement of specific objectives.

[34] https://op.europa.eu/en/publication/-/publikācija/9590 cdee-cd30-11e9-992f-01 aa75ed71a1/language-en
[35] https://eur-lex.europa.eu/legal-content/LV/TXT/HTML/?uri=CELEX:31991L0676&from=LV

In order to plan and implement measures in the field of RES, energy efficiency and climate, the Baltic States will continue to cooperate within different working groups and measures, namely:

- Cooperation of the Baltic region in the field of security initiated by TSOs of the Baltic States (Elering, AST, Litgrid);
- BRELL (Belarus, Russia, Estonia, Latvia and Lithuania) system;
- Regional Gas Market Coordination Group and UAB GET Baltic;
- Activities of the International Energy Agency (Estonia is an IEA member, Lithuania is the IEA accession country);
- Nordic Energy Research Programme for Baltic Science Cooperation projects and the exchange of PhDs.

2. PRESENT SITUATION AND FORECASTS

2.1. Macroeconomics

2.1.1. Current situation

Latvia continues to suffer a decline in its population. . Since the beginning of 2010, the population has decreased by 200 000, and provisional calculations indicate it was 1 920 000 at the beginning of 2019. The rate of decline was 0.7% in 2018 compared with 2.2% in 2010. Latvia has a population density of just 30 persons per 1 km^2. In 2018, when the number of deaths (natural movement) exceeded the number of births, the population of the country fell by 9 400, and by 4 900 as a result of long-term migration. Since 1991, the natural increase of the Latvian population has been negative. In 2018, just over 68% of the population lived in urban areas

In 2018, GDP at current prices increased to EUR 29.5 billion, compared with EUR 23.9 billion at constant prices in 2010, whilst the economy grew by 4.8 % between 2017 and 2018.

Table 2. Latvia's GDP and value added indicators[36]

Gross domestic product at current and constant prices		
	2017	2018
Gross domestic product – total (million EUR)		
at current prices	27,033	29,524
at constant 2010 prices	22,778	23,864
Per capita (EUR)		
at current prices	13,926	15,328
at constant 2010 prices	11,734	12,389
Value added structure and changes by type of activity in 2018 (%)		
	2018 (current prices)	2017/2018 (constant prices)
Total value added	100	4.2
Agriculture, forestry and fishing	3.7	3.4
Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities	16.1	1.7
Construction	7.1	21.9
Wholesale and retail trade, repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities	25.4	3.5
Information and communication	5.5	13.0
Financial and insurance activities	3.7	-7.3
Real estate activities	12.0	2.9
Professional, scientific and technical activities; administrative and support service activities	7.8	3.8
Public administration and defence, compulsory social security activities;	15.7	3.3

[36] CSB

education; health and social work activities		
Arts, entertainment and recreation; other service activities; activities of households as employers	3.0	2.3

In December 2018, compared to December 2017, consumer prices increased by 2.6 %, the price of goods increasing by 2.3 % and the price of services by 3.1 %. In December 2018, producer prices increased by 5.4 % compared to December 2017. In December 2018, the level of producer prices in Latvian industry increased by 5.4 % compared to December 2017. The increase in prices in the manufacture of wood, products of wood and cork, excluding furniture, as well as trade and production of electricity, steam supply and air conditioning supply, trade of gas through mains has the biggest effect. Manufacture of electrical equipment has the biggest lowering effect.

2.1.2. Indicative development projections

The macroeconomic long-term development forecasts for 2030 drafted by the Ministry of Economics in 2018 was used as a basis for modelling[37] energy development scenarios.

3Table. Changes in macroeconomic indicators in the baseline scenario[38] until 2030[39] (%, average in the period)

	2017	2020	2025	2030
Population (millions)	1.986	1.884	1.759	1.638
Private consumption (at constant 2010 prices) (billion EUR)	13.266	16.158	18.386	20.339
GDP (at constant 2010 prices) (billion EUR)	21.328	25.230	28.564	31.599

According to demographic forecasts, the population of Latvia will continue to decline in the medium and long term. Moreover, the working age population will decline faster than the total number of inhabitants. The main reason for population decline in medium and long term will be ageing population, which will result in an increasing gap between birth and mortality rates. The forecast of the number of houses and residential areas is based on demographic forecasts, and forecasts of parameters characteristic of the sectors (average residents per household, average floor area per dwelling).

GDP forecasts until 2030 do not provide for a significant reallocation of the share or range of main economic sectors compared to the current situation. The share of the commercial services industry might increase by one percentage point by 2030. The share of IT, construction (incl. as a result of energy efficiency improvement measures) and industry in the national economy are also set to increase. At the same time, the share of agriculture, transport, financial services and public services sectors might decline somewhat. On average, manufacturing maintains a faster growth rate in the medium and long term compared with the national economy. Relatively rapid growth is also expected in the largest manufacturing sector — wood processing. The development of sectors that tend to be focused on the internal market (e.g. food industry, printing) will primarily be affected by

[37] The methods used to analyse and forecast the development of energy systems and GHG emissions are included in Annex 6 to the Plan

[38] **The scenario included in the Plan is a scenario that combines 'implemented policies and measures' and 'approved policies and measures', as well as partially includes 'planned policies and measures'.** All the measures related to the support programmes of EU structural funds are 'planned policies and measures', as funding for these measures will be allocated only after approving the Plan in Latvia (redistribution of the funding to EU Member States will take place only in 2019).

[39] MoE

domestic demand. Non-metallic mineral production will be closely linked to construction trends. No considerable decrease in any of national economy sectors or significant growth of any other sector are expected in the period until 2030. The expected changes in the energy system mainly affect the transport sector, where transition from fossil fuels to alternative fuels as the energy source is expected. It is also expected that the amount of energy produced and consumed will increase to ensure the implementation of decarbonisation measures, e.g. mobility of the transport sector, as well as to provide the necessary interconnection capacity.

Annex 3 to the Plan includes information about the main policies included in the baseline scenario of forecasts and their main implementation measures.

2.1.3. Global energy trends, international fossil fuel prices, price of emission allowances, changes in technology costs

Trends in the prices of energy sources hav e a major impact on energy consumption. Modelling is done on the assumption that each type of energy source will be available in a sufficient amount to meet the energy demand in the period considered, whilst procurement and transport prices are forecast rather than established.

The MARKAL-Latvia model is used for the analysis of development scenarios of the energy system. The model used is a demand driven dynamic optimisation model, i.e. all sectors of final energy consumption are provided with energy by optimising the described energy-environment system to address energy services. MARKAL-Latvia is a bottom-up optimization model and therefore prices of various technologies are an important input parameter when calculating different outcomes using the model.

Various internationally recognised sources (databases of models used in the EU, technology catalogue of the Danish Energy Agency, etc.) were used as a basis for prices of technologies (investments, fixed and variable prices of operation and repair), data being adjusted in individual cases to suit Latvia's circumstances.

Modelling of the energy system considers all existing taxes with the respective rates and assumptions about their development in the future. The EC forecasts for the price of emission allowances in EU ETS until 2050 are also taken into consideration in the calculation of projections. When updating prices of emission allowances, the EC envisaged that the price of emission allowances will be EUR 23.3 per allowance in 2025, which is less than the price of EUR 24-25 per allowance in 2019 and the price of EUR 34.7 per allowance in 2030.

2.2. Decarbonisation

2.2.1. GHG emissions and carbon sequestration[40]

2.2.1.1. Current situation of the total GHG emissions

According to the 2019 GHG inventory for 1990–2017[41] (hereinafter — 2019 GHG inventory) and a rough GHG inventory for 2018[42], Latvia's total GHG emissions from 1990 to 2017 and

[40] The data of 2018 are approximate GHG inventory data (excluding total approximate CO_2 equivalent emissions and removals from land use, land use changes and forestry in accordance with Article 17 of Commission Implementing Regulation 749/2014) and were calculated based on preliminary statistical data. They have not been verified or approved by experts of the EC and the Secretariat of the UNFCCC. In this section, the approximate GHG inventory data for 2018 are included for approximate description of the situation in 2018.

[41] https://unfccc.int/documents/194812

[42] https://cdr.eionet.europa.eu/lv/eu/mmr/art08_proxy/envxta4zg

2018 fell by 56.9 % and 55.1 % respectively, while in the period from 2005 to 2017 and 2018 Latvia's total GHG emissions fell by 0.7 % and 3.4 % respectively.

Latvia's total GHG emissions were 11,325.3 kt of CO_2 eq. in 2017 and approximately 11,800.2 kt of CO_2 eq. in 2018.

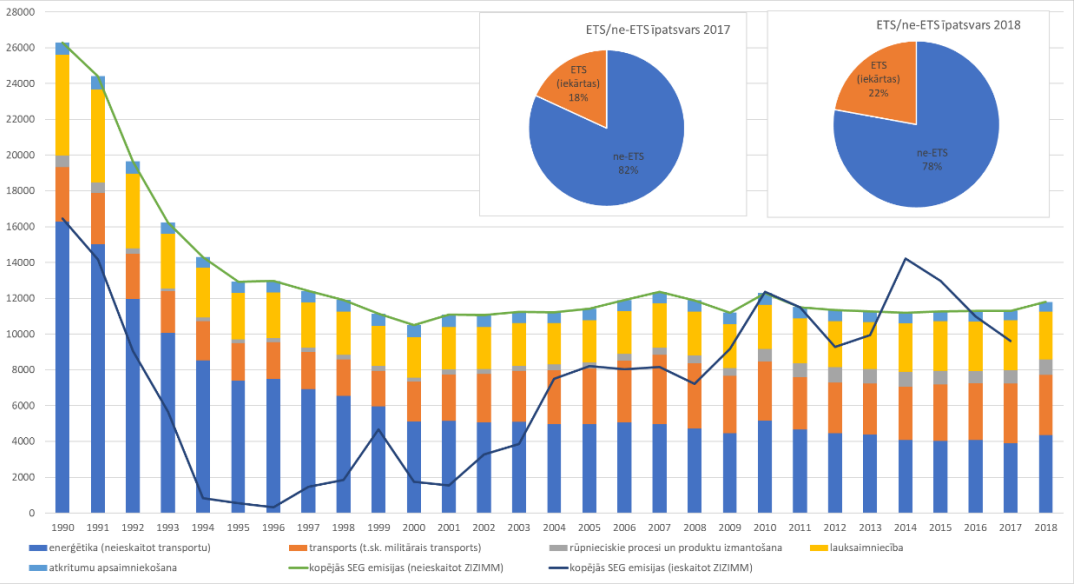
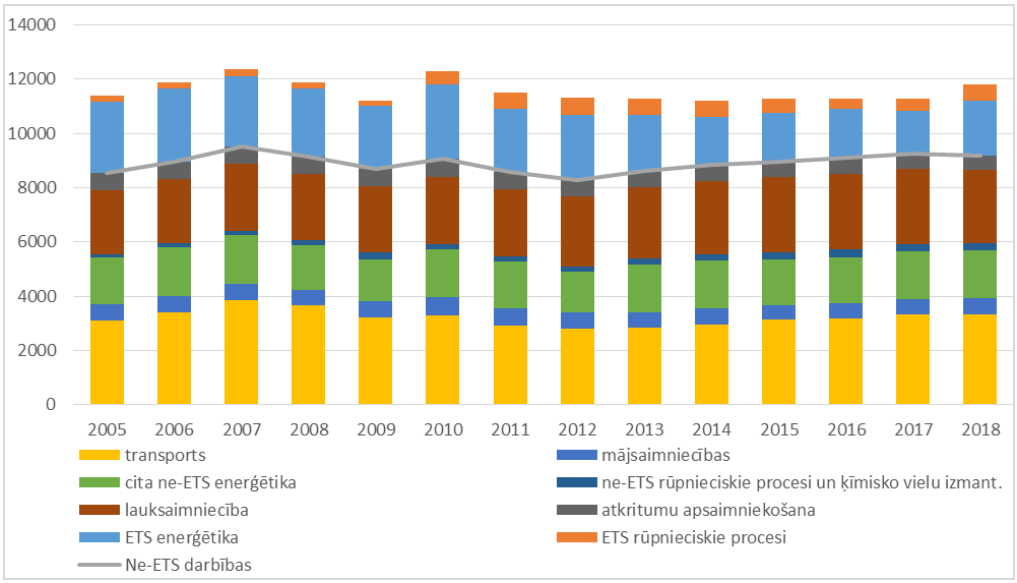


Figure 5. Latvia's total GHG emissions (including and not including LULUCF) from 1990 to 2018 and share of ETS/non-ETS GHG emissions in 2017 and 2018 (kt of CO_2 eq.)

2.2.1.2. Current situation in reducing emissions from ETS and non-ETS activities

In 2017, GHG emissions from non-ETS activities dominated Latvia's total GHG emissions, accounting for 81.9 %[43]. The estimated share of GHG emissions from non-ETS activities compared with Latvia's total GHG emissions in 2018 was smaller at 77.8 %. The amount of GHG emissions produced by ETS operators in Latvia was already 2049.8 kt of CO_2 eq. in 2017 and 2612.6 kt of CO_2 eq. in 2018, or 18.1 % and 22.1 % of Latvia's total GHG emissions respectively.



[43] Non-ETS activities subject to Decision 406/2009/EC. Calculation of GHG emissions was done using the EC formula – total GHG emissions minus amount of CO_2 emissions verified by EU ETS operators minus local aviation CO_2 emissions.

Figure 6. GHG emission trends from non-ETS and ETS activities from 2005 to 2018 (kt of CO_2 eq.)

Key to fig 6 is missing and should read:

Transport,

Other non-ETS energy

Agriculture

ETS energy

Non-ETS activity

Households

Non-ETS industrial processes and use of chemical substances

Waste management

Non-ETS industrial processes

The development of GHG emissions from non-ETS activities suggests an 8.4 % increase in emissions between 2005 and 2017 and a 7.38 % increase between 2005 and 2018. Compared with 2005, ETS operators in Latvia reduced their GHG emissions by 28.19 % in 2017 and by 6.7 % by 2018.

Table 4. 2017 share of GHG emissions from non-ETS activities in Latvia (% change)

	Share in 2017 (%)		Changes (%)	
	Total GHG emissions	**GHG emissions from non-ETS activities**	**2005-2017**	**2016-2017**
ETS sector	**18.1**	**-**	**-28.2**	**-6.7**
ETS energy	14.0	-	-39.6	-13.2
ETS industrial processes	4.1	-	104.1	25.2
Non-ETS activities[44]	**81.9**	**100**	**8.4**	**2.0**
non-ETS energy	**49.9**	**61.0**	**3.8**	**4.0**
transport	29.3	35.8	6.9	4.8
households	5.1	6.3	-1.6	4.2
other non-ETS energy	15.5	18.9	0.20	2.6
non-ETS industrial processes and the use of chemical substances	**2.4**	**2.9**	**192.3**	**-5.6**
agriculture	**24.6**	**30.0**	**16.7**	**0.6**
waste management	**5.0**	**6.1**	**-10.2**	**-5.9**
TOTAL			**-0.7**	**0.3**

2.2.1.3.Current situation in ensuring CO_2 removals

According to 2006 IPCC Guidelines, the LULUFC category is divided into six land use categories: forest land, cropland, grassland, wetlands, settlements, and other land. The

[44] GHG emissions were calculated using the EC formula – total GHG emissions of the state minus amount of carbon dioxide emissions verified by EU ETS operators minus local aviation carbon dioxide emissions in accordance with 406/2009/EC.

LULUFC sector in Latvia includes emissions and CO_2 removals from the categories mentioned above divided into smaller sub-categories: lands that have not changed their type of land use in the last 20 years and lands that have changed their type of land use in the last 20 years. The category 'other land' includes lands that are not managed and do not contain a considerable amount of organic carbon, therefore emissions from these types of land are not reported. The LULUFC sector also includes emissions from wood products.

According to the 2019 GHG inventory, the LULUFC sector overall was not a source of GHG emissions in 2017 (CO_2 removals were bigger than the amount of GHG produced in the entire sector), with total CO_2 removals of the LULUFC sector in 2017 amounting to -1706.8 kt of CO_2 eq., compared with -9828.9 kt of CO_2 eq. in 1990. The reduction of CO_2 removals is related to increased logging, larger amount of deadwood, and smaller increase of living biomass in forest lands, which is determined according to the data of the National Forest Monitoring collected by the Latvian State Forest Research Institute "Silava". Total CO_2 removals fell by 82.63 % in the period from 1990 to 2017. The reduction in CO_2 removals in the LULUCF sector is related to increased logging (more than twofold) due to forest age structure and the increase in the share of grown and overgrown forest changes. Transformation of forest lands into residential areas and the transformation of naturally afforested lands into croplands and grasslands by returning them into agricultural management also contributes significantly to increased GHG emissions.

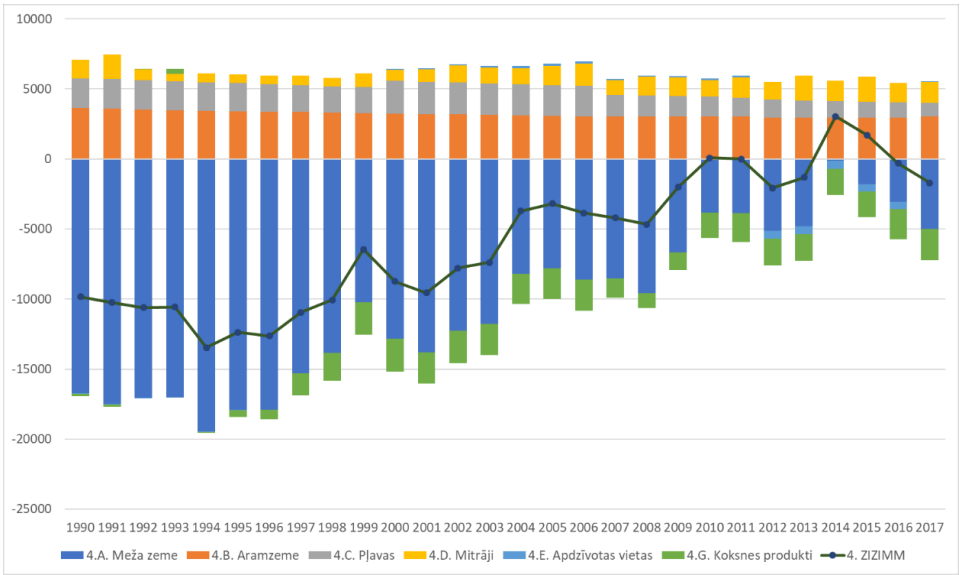


Figure 7. Actual GHG emissions and net CO_2 removals of the Latvian LULUCF sector 1990–2017 (kt of CO_2 eq.)

Change of land use to arable land relates mainly to removing wood biomass from naturally afforested agricultural land where agricultural activity was suspended in 1980s and 1990s. The increase of living biomass in forest land that does not change its type of land use and in afforested land is still bigger than carbon losses due to commercial logging and natural formation of deadwood, so the total stock of living biomass in forest land continues to grow.

Forest management and use of forest products is an important contribution to implementing the climate policy of Latvia and meeting international GHG emission reduction commitments of Latvia, and promotes the use of local energy sources that are more efficient and better for the environment.

2.2.1.4. Indicative development projections [45]

It is estimated in the baseline scenario that the amount of GHG emissions from non-ETS activities will decrease to 75 % of the total amount of GHG emissions by 2030. The total amount of GHG emissions from non-ETS activities is estimated to fall by 7 % between 2005 and 2030. In 2030, most emissions are expected to come from transport (32 %), agriculture (39 %) and non-ETS energy (including industry, services, households, agriculture, forestry, 22 %).

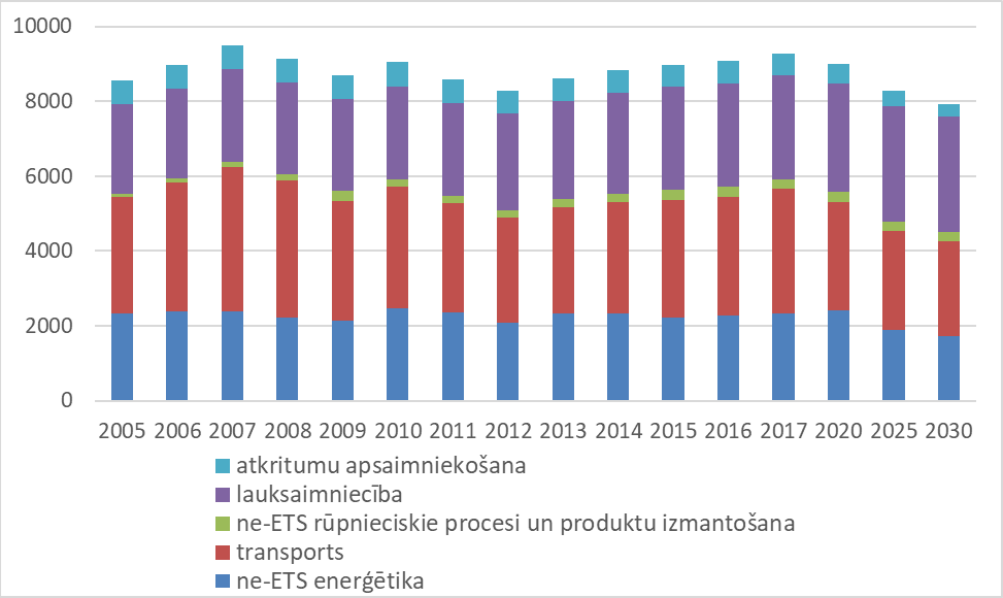


Figure 8. Indicative projections of non-ETS GHG emissions in Latvia until 2030[46] (kt CO_2 eq.)

Key should read:

Waste management

Agriculture

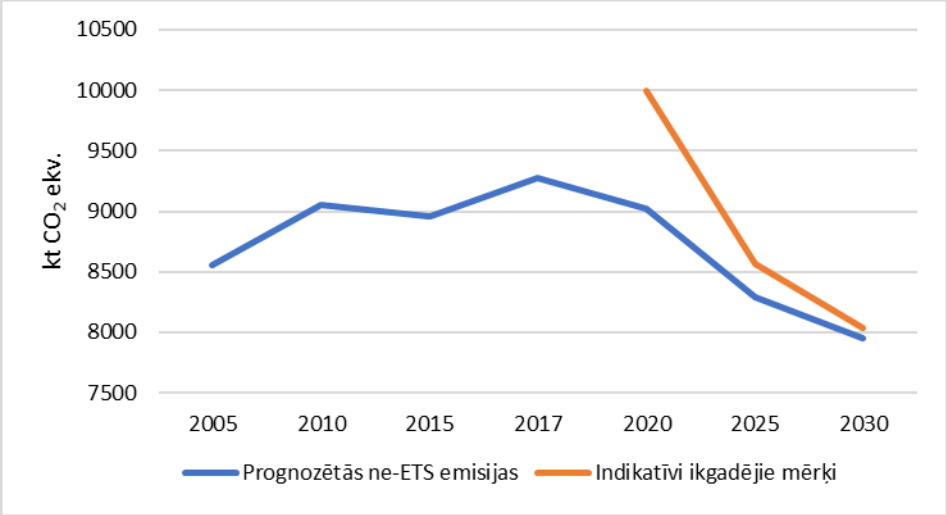
Non-ETS industrial processes and product use

Transport

Non-ETS energy

According to the baseline scenario projections, the amount of GHG emissions from non-ETS sectors in 2030 will be 7944 kt of CO_2 eq., which is 94 kt of CO_2 eq. or 1.1 % less than the indicative GHG target for 2030 (8038 kt of CO_2 eq.).

[45] development projections are indicative and may change
[46] Calculations of GHG emissions made by MoEPRD



Missing key should read:

Forecase non-ETS emissions Indicative annual targets

Figure 9. Actual GHG emissions from non-ETS activities (until 2018) and indicative projections of GHG emissions[47]

Total GHG emission projections of the energy sector in the baseline scenario provide for continuation of the initiated measures of the existing policy (RES policy and energy efficiency policy) until 2030.

The reduction of GHG emissions in the sector is mostly affected by replacement of fossil fuel with biomass in district heating, as well as the implementation of energy efficiency measures (mainly renovation of residential and public buildings) in households and the services sector. These energy efficiency measures for GHG emissions in the combined households, commercial and public sectors may fall by 135 kt CO_2 eq, by 2030 compared with 2017. Transitioning from fossil fuel to the use of biomass in the energy transformation sector, mainly in district heating, will reduce emissions by about 80 kt CO_2 eq. by 2030, compared to 2017. At the same time, no measures for wider use of RES are provided for in electricity generation.

The main source of GHG emissions in the transport sector is road transport with approximately 90 % of the total emissions from the sector. Although it is predicted that mobility rates (passenger turnover and freight turnover) will increase by 2030, fuel consumption will decrease due to the replacement of passenger cars used in Latvia with more efficient and environmentally friendly vehicles. Reduction of GHG emissions in addition to the improvement of average fuel consumption in internal combustion cars is also related to wider use of alternative (natural gas and EV) and RES fuels (biofuel and biogas). In addition, provision is also made for a reduction in GHG emissions in the transport sector under the railway electrification project. The total reduction in GHG emissions in the transport sector estimated for 2030 is approximately 793 kt CO_2 eq. compared to 2017.

ETS emissions of the Energy sector are estimated to fall by approximately 595 kt CO_2 eq. or 22.7 % in 2030 compared to 2005, but non-ETS emissions will fall by approximately 1167 kt CO_2 eq. or 21.5 %.

[47] MoEPRD

Total GHG emissions in the agricultural sectors are expected to increase in the period from 2020 to 2030. In 2030, total GHG emissions of the agricultural sector will increase by 30.1 % (718 kt CO_2 eq.) and 11.5 % (320 kt CO_2 eq.), compared with the emissions of 2005 and 2017, respectively. A considerable increase in emissions in 2030 is expected in the farm animal enteric fermentation processes and agricultural soil sectors. In 2030, emissions from soil-based agriculture will constitute 58.9 % of total emissions of the agricultural sector, and 32.5 % in enteric fermentation. CH_4 emissions from enteric fermentation will increase by 16.2 % in 2030, compared to 2017. The population of ruminant livestock is an important parameter affecting enteric fermentation CH_4 emissions. The population of cattle generates over 90 % of CH_4 emissions in enteric fermentation sectors. The number of dairy cows in 2030 will increase by 0.8 % compared to 2017. Projections also show an increase in the number of cattle by 28.7 % in 2030 compared to 2017, which will also promote an increase in enteric fermentation CH_4 emissions.

Projections show that manure management CH_4 emissions will increase by 36.9 % in 2030 compared to 2017. Most of the working data for calculating CH_4 emissions from manure management come from the population of livestock (cattle, pigs and poultry in the main), and the widespread animal manure management system. The concentration of farmed animals in large holdings prioritising urine or liquid manure management systems will increase emissions, because CH_4 emission factors in manure management sector are higher in liquid fertilizer systems compared to a solid manure storage or anaerobically processed manure.

In 2030, agricultural soils will account for 95.1 % of agricultural N_2O emissions. Primary activity data for the calculation of estimated N_2O emissions from agricultural soils, include amounts of unused inorganic and organic nitrogen fertilisers, areas of agricultural crops, as well as area of cultivated organic soils. Whilst the calculated amounts of synthetic nitrogen fertiliser relate to the scheduled increase in areas under cereal, organic farming will decrease.

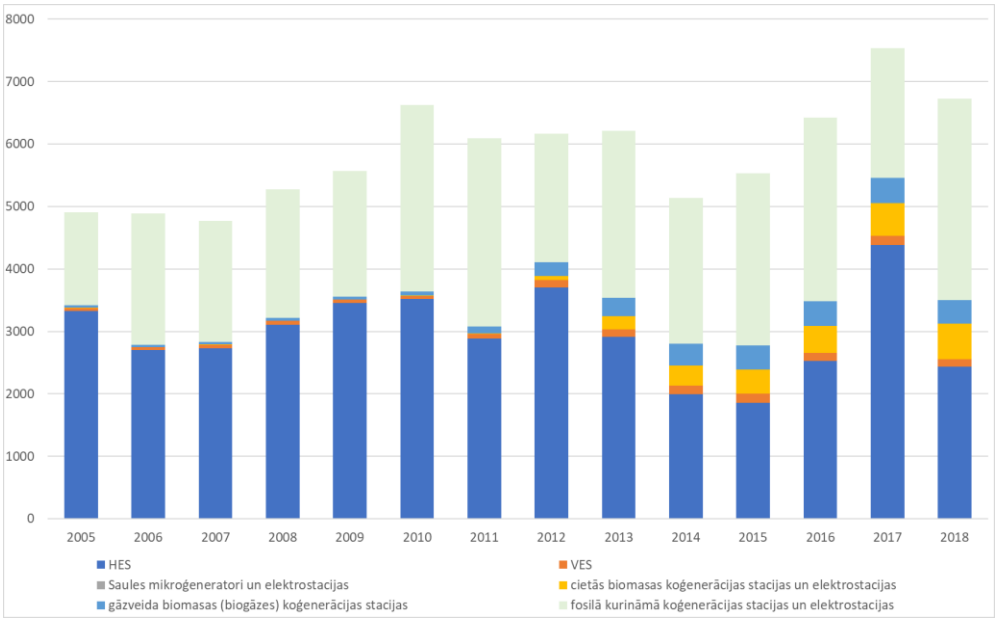
In the waste management sector, non-ETS GHG emissions gradually reduce from 565 kt CO_2 eq. in 2017 to 326 kt CO_2 eq. in 2030. Disposal of solid waste is the largest source of GHG emission in the waste management sector, accounting for71.4 % of the total GHG emissions in the sector in 2017. However, the share of the sector of solid waste disposal is expected to generate 44.4 % of GHG emissions in the baseline scenario of the waste management sector in 2030. The fall in emissions from waste disposal will ensure a reduction in the amount of waste disposed with a corresponding increase in waste treatment (including composting). The wastewater treatment sector is the source of CH_4 and N_2O emissions. In accordance with the calculated projections, GHG emissions from the wastewater treatment sector will increase from 113 (in 2017) to 122 kt CO_2 eq. (in 2030). The changes in GHG emissions in the wastewater sector are based on macroeconomic forecasts. The contribution of this sector to the waste management sector is expected to increase from 20.0 % in 2017 to 37.3 % in 2030. In 2030, in the sector of solid waste disposal, emissions are expected to fall by 61.9 % and 64.1 % compared with the period 2005-2017. Although a considerable reduction is also expected in the wastewater management sector (some 43.1 % down on) 2005, emissions would increase by 7.7 % in 2030 compared with 2017.

2.2.2. Renewable energy

2.2.2.1. *The existing situation in the use of renewable energy*

The total consumption of RES in Latvia was approximately 77 PJ in 2018, which is an increase of 25.6 % compared to 2005. The total consumption of wood fuel has increased by 27 % since 2005 and has reached 62.6 PJ in 2018. Wood fuel (firewood, wood residues, woodchips, wood briquettes, wood pellets) is the most widely used RES, and its consumption continues to increase every year reaching 80.4 % of the total RES consumption in 2018. From 2017 to 2018, there was a significant increase in consumption of biofuel – by 198.6 %, as well as solar energy and municipal waste (their RES share).

In 2018, Latvia produced 6725 GWh of electricity, 3499 GWh of which was renewable energy, with the share of renewable energy produced decreasing by 35.9 % compared to 2017. Last year, cogeneration plants produced 4170 TWh of electricity, 22.6 % of which were produced from RES (gaseous biomass (biogas) and solid biomass cogeneration plants). Electricity produced at solid biomass power plants and cogeneration plants increased from 319 to 570 GWh and at gaseous biomass (biogas) cogeneration stations – from 350 to 374 GWh over five years. In 2018, generated primary electricity fell by 43.6 % compared to 2017, with HPPs falling by 44.5 % and WPPs by 18.7 %. Last year, HPPs produced 2432 GWh and WPPs produced 122 GWh. The decrease in electricity production last year was most affected by the low output of HPPs, which is explained by the unusually dry and long summer period with low levels of water in water bodies and a low inflow of water into the Daugava.



Missing key should read:

Left column, top to bottom:

HPP

Solar microgenerators and electriciy plants

Gas biomass (biogas) cogeneration plants

Right colum:

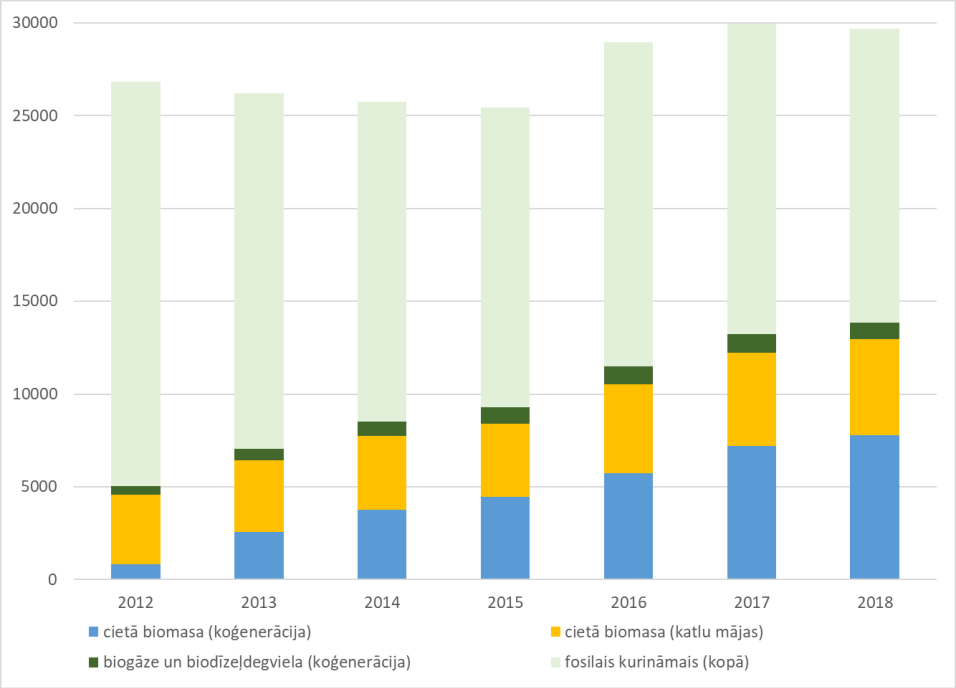
WPP

Solid biomass cogeneration plants and electricity plants

Fossil fuel cogeneration plants and electricity plants

Figure 10. The amount of electricity produced from RES (and fossil fuel) in Latvia in 2006-2018 (GWh)[48]

In 2018, DH and LH produced 8247 GWh of thermal energy in Latvia, 46.7 % of which were produced using RES, where solid biomass (wood fuel) dominated in absolute terms (93.5 %) in 2018. The use of RES in DH and LH has increased almost threefold since 2012. The consumption of wood fuel by households (individual heating) reached almost 80 % in 2018.



Missing key should read

Solid biomass (cogeneration) Solid biomass (boiler houses)

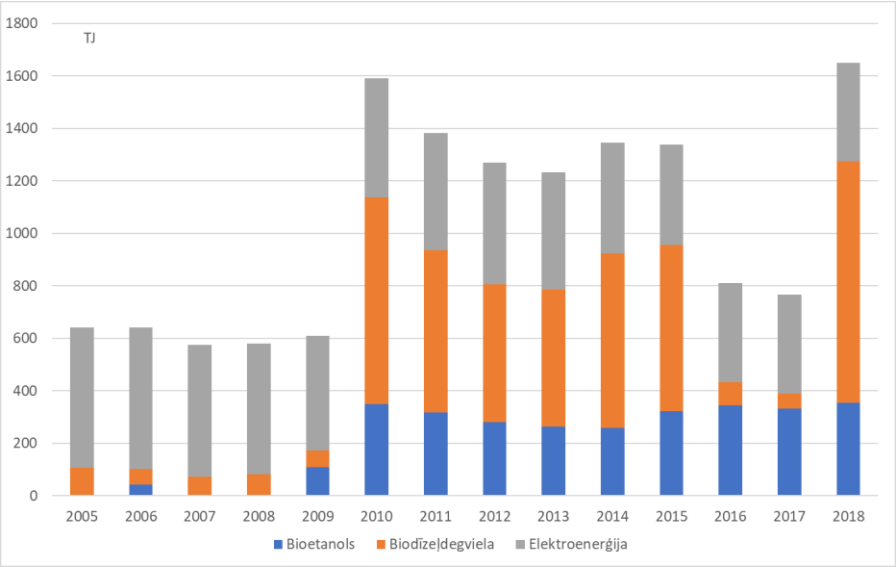
Biogas and biodiesel fuel (cogeneration) Fossil fuel (total)

Figure 11. The amount of DH, LH thermal energy produced from RES (and fossil fuel) in Latvia in 2006-2018 (TJ)[49]

Only 3.06 % or 1.65 PJ of the total amount of energy consumed in transport was RES and electricity in 2018. The use of RES in transport has increased 2.5 times compared with 2005 and consumption peaked in 2018 – an increase of 6 % compared with 2010.

There is a legal requirement as of 1 October 2009 to add 5 % of biofuel to fossil fuels. 95 RON petrol can be sold only with bioethanol in the amount of 4.5–5 % vol. of the total volume of petrol, but this requirement does not apply to kerosene for aviation , or to 98 RON petrol. Diesel can be sold only with biodiesel from rapeseed oil of 4.5–7 %vVol. of the total volume of the mixture or with paraffinised diesel from biomass of at least 4.5 % vol. of the total volume of the mixture. This requirement does not apply to diesel sold from 1 November to 15 April or diesel used in the engines of ships of maritime transport fleets and aviation transport engines.

[48] Data source: CSB
[49] Data source: CSB



Key reads:

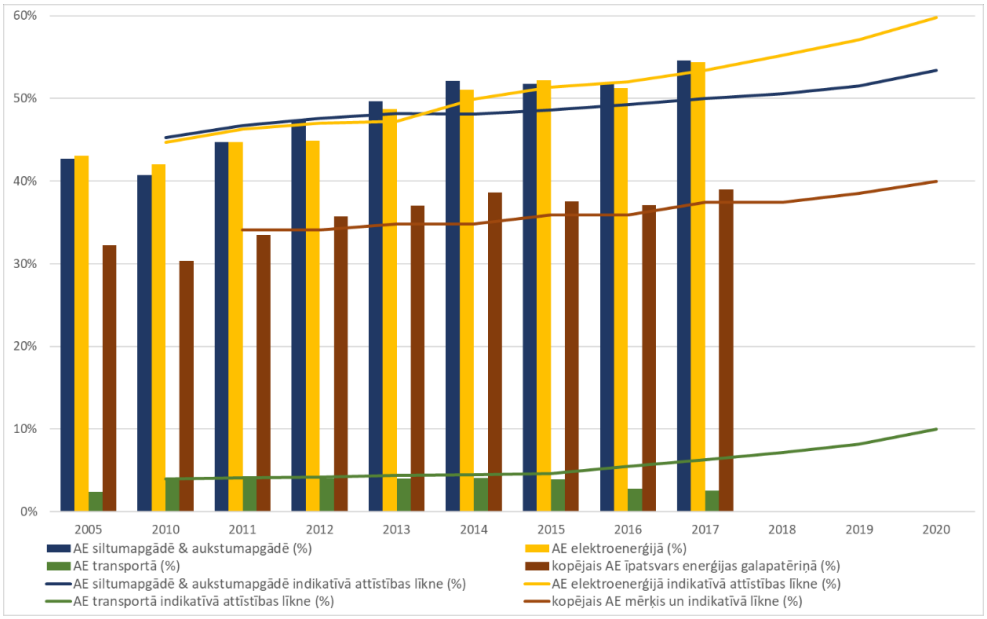
Bioethanol, biodiesel fuel, electrical energy

Figure 12. Use of renewable energy in transport 2005–2018 (TJ)[50,51]

As at 1 July 2019, Latvia had 658 EVs in technical order, 518 of which are electric cars and 19 buses or trucks, and this number has increased by 37.4 % compared to 1 July 2018.

2.2.2.2. Fulfilment of the 2020 target of the share of RE of Latvia

The share of RE in the total final energy consumption was 39 % in 2017, an increase of 20.9 % over 2005. Considering the reduction of the total final energy consumption, the share of RE remained above the indicative curve for reaching the 2020 target.



Key reads, LH column:

RE in heating and cooling, %

[50] Data source: CSB

[51] In order to calculate the share of used of RES in transport, the use of electricity is included as RES only to the extent RES is used in electricity, for example, if the share of RES in electricity is 54 %, then only 54 % of electricity used in transport are considered to be RES used in transport

RE in transport, %

Development curve of RE in heating and cooling

Development curve trend of RE in transport

RH column:

RE in electricity generation (%)

Total share of RE in final energy consumption (%)
Development curve of RE in electricity generation

Development curve of share of RE in final energy consumption

Figure 13. Share of RE in the final energy consumption of Latvia in total and by sector and fulfilment of the RE target and the indicative development curve of RE (2005–2017)[52]

With regard to the sectoral goals of RE share it can be concluded that in 2017 Latvia has exceeded the indicative development curves of RE share in district heating and cooling and the RE share in electricity defined in REAPRL[53], whilst in 2017 Latvia had already exceeded the RE share target for 2020 for district heating and cooling defined in the REAPRL plan for 2020, though Latvia needs to increase this share by another 5.5 percentage points to reach the RE share in electricity for 2020. However, in order to meet the EU target for the share of RE in transport, Latvia has to increase the share by another 7.5 percentage points.

Progress in the fulfilment of targets for energy produced from RES for Latvia is assessed every two years pursuant to Article 22(1) of Directive 2009/28/EC[54] by preparing a report about the progress in the fulfilment of EC targets[55].

2.2.2.3.*Indicative development projections*

The baseline scenario predicts that, considering the current policy, the existing support for producing electricity from RES is gradually decreasing. Under this condition and assumptions about the prices of fossil energy and costs of technologies (using RES and fossil fuels) up to 2030, the share of RES estimated in the baseline scenario will have fallen well short of 40%, at just 37% in 2030.

[52] CSB, EUROSTAT
[53] https://ec.europa.eu/energy/sites/ener/files/documents/dir_2009_0028_action_plan_latvia.zip
[54] Directive 2009/28/EC
[55] https://www.em.gov.lv/files/nozares_politika/EMZino_AER_030518.pdf.

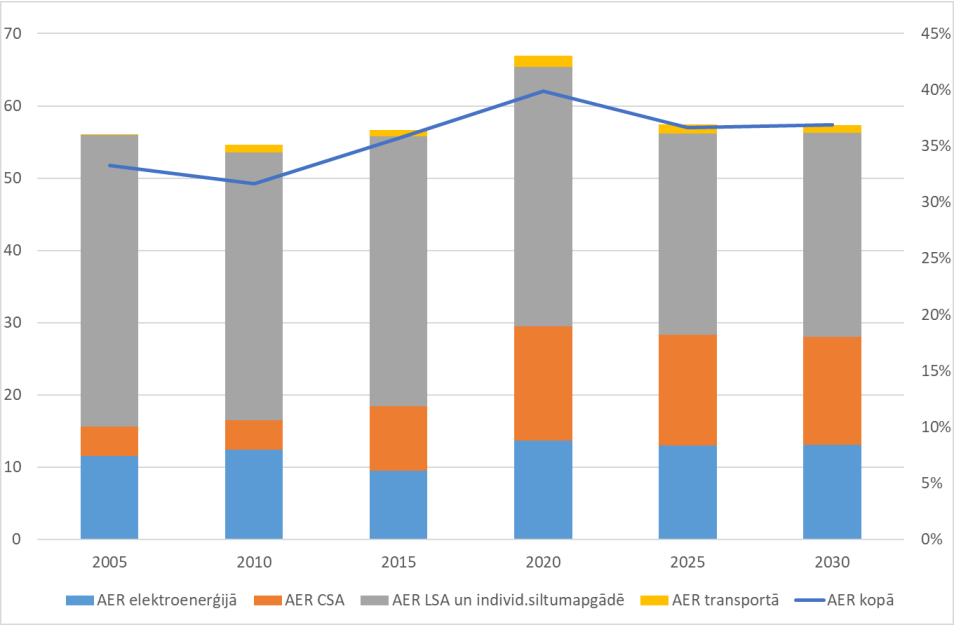


Figure 14. Share of RE in the final energy consumption (right axis – %) and indicative development projections of the share of RE until 2030 (left axis – PJ)[56]

Taking into account existing policies and implementation measures, and as yet undetermined policy with regard to the promotion of the use of RES, projections in the baseline scenario suggest that the total RES share in the Latvian energy balance in 2020 has been reached.

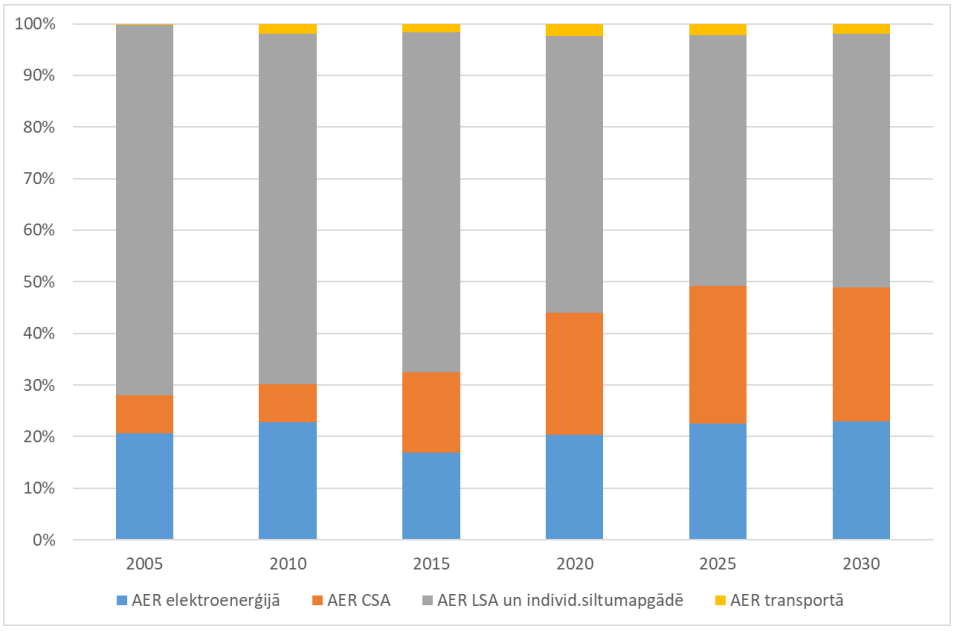


Figure 15. Indicative development projections of the division of the share of RE until 2030[57] (%)

According to the baseline scenario, after 2020 there will be a minimal increase of contributions of RE in electricity and transport towards the overall RE target, but the contribution of RES in LH will increase considerably, while the contribution of RE in LH and individual heating will decrease. The reason for this trend is that the share of RE in LH and the share of individual heating mainly depends on the consumption of biomass and other

[56] IPE
[57] IPE

types of RES by households, services, and industry. Final energy consumption in households and in the services sector reduces according to the baseline scenario, so the contribution of the share in the total consumption of RE also falls.

2.3. Energy efficiency

2.3.1. Current energy consumption

Total primary energy consumption[58] was 196.9 PJ[59] in 2018. In the period from 2011 to 2016, total primary energy consumption saw a declining trend, however, the total primary energy consumption constantly increased in 2016-2018, and the increase in the period has already reached approximately 9.5 %.

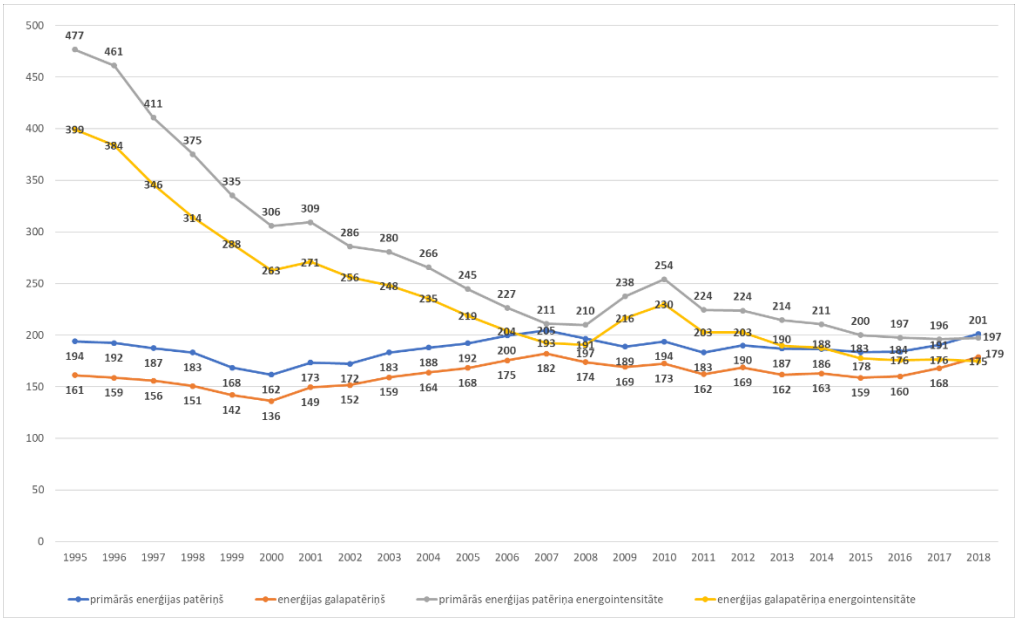


Figure 16. Primary energy consumption and final energy consumption, energy intensity of primary energy consumption and final energy consumption 1995-2018 (PJ)[60]

In 2018, 58.1 PJ were consumed for generation of thermal energy and electricity (in the transformation sector) and 44.7 PJ of energy were produced (29.7 PJ of thermal energy and 15.0 PJ of electricity), which is 9.6 % more compared to 2017. Hot and dry weather considerably affected the ability of HPPs to produce the necessary amount of electricity, which prompted an increase in natural gas consumption in the transformation sector, resulting in a 5.2 % increase in the share of natural gas in the sector compared to 2017. Latvia mainly uses a fossil energy source – natural gas – to produce thermal energy and electricity in the transformation sector (cogeneration units and boiler houses): 81 % in 2010, 53.7 % in 2017, and 59.0 % in 2018. The share of RES consumed by the transformation sector increased by 5.4 percentage points in five years and reached 40.5 % in 2017. This is an important indicator considering that RES used in the transformation sector are local energy sources: wood fuel, biogas and other types of biomass.

The final consumption of energy sources was 174.55 PJ[61] in 2018, which is 9.1 % more than in 2016. The largest consumers of energy sources in 2018 were the transport sector (31 %),

[58] Within the meaning of Directive 2012/27/EC (and Directive 2018/2002) (within the scope of the definition defined in the directive)
[59] CSB
[60] Data source: EUROSTAT, CSB

households (28.8 %) and industry (22.8 %). Compared to 2017, in 2018 an increase in the final consumption of energy sources was observed in transport (+3.3 %), industry (+13.3 %) and households (+2.9 %), while a reduction in consumption of energy sources was observed in agriculture and forestry (-3.6 %) and business and public sector (-2.7 %).

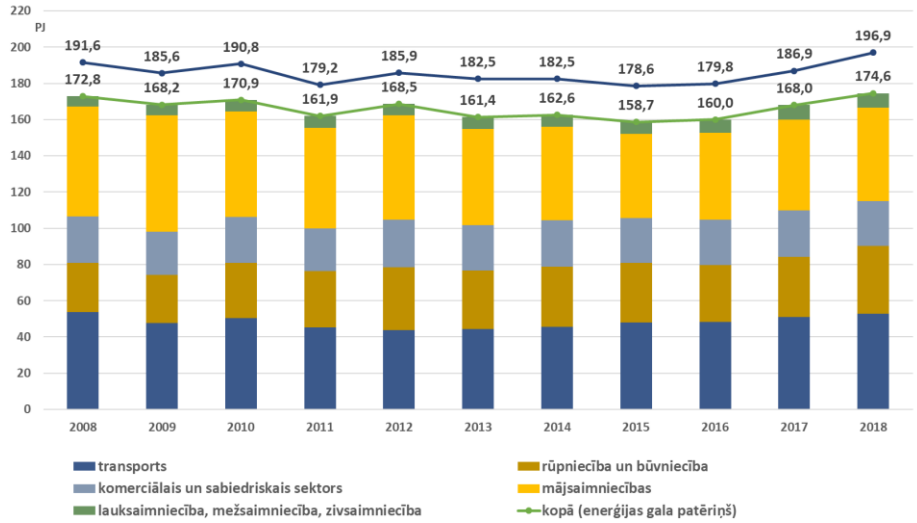


Figure 17. Final energy consumption of Latvia by sectors in 2008-2018[62]

Key reads:
Transport

Commercial and social sector

Agriculture, forestry, fishing

Industry and construction

Households

Total (final energy consumption)

In the space of five years, the total consumption of energy sources in industry has increased by 12.8 %, reaching 37.6 PJ in 2018. The largest consumption of energy sources in 2018 was in manufacturing of wood, wooden and cork products – 20.7 PJ or 50.4% of the final consumption of energy sources in industry. Energy consumption in this sector increased by 5.5 % in comparison with 2017 as a result of higher consumption of wood pellets. The largest reduction of consumption of energy sources in 2018 was registered in manufacture of basic metals (-7.9 %) in comparison with 2017.

The consumption of energy sources by households was 51.5 PJ in 2018, which is 2.9 % more than in 2017. The structure of consumption of energy sources in households has not changed substantially in the recent years — wood fuel has been used predominantly. The consumption of natural gas has increased significantly (+9.3 %) and the consumption of coal has decreased (-32.7 %) in comparison with 2017.

Over five years, the consumption of energy sources in transport has increased by 16.4 % and has reached 52.8 PJ in 2018. This constitutes approximately one third of Latvia's

[61] Within the meaning of Directive 2012/27/EC (and Directive 2018/2002) (within the scope of the definition defined in the directive)
[62] Data source: CSB

consumption of energy sources, and is based almost entirely on imports of petroleum products, because the share of electricity and biofuel in transport is comparatively small. Diesel is the main energy source used in transport with a share of 64.3 % in 2018. Diesel is an important source of fuel for freight transport, which is an important economic sector in Latvia considering its geographic location. Diesel is a very important resource for the development of the agricultural industry. An increase in the share of consumption of liquefied gas has been observed in transport in recent years, though the consumption of liquefied natural gas in the total energy balance has fallen by 5.2 % compared with actual indicators in 2017. Petrol consumption of cars has fallen by 10.6 % over five years and reached 7.7 PJ in 2018, which was 4.1 % less than in 2017. The main reason for the increase in fuel consumption in road transport was an increase in the number of passenger cars (even higher increase in kilometres covered by passenger cars) and an increase in the number of registered passenger cars in 2014-2018 by approximately 7 % per year.

In 2017-2018, the highest increase in transport energy consumption was observed in inland navigation (42.2 %), international air transport (9.5 %, due to an increase in air passengers), and rail transport (7.8 %, promoted by a 12.5 % increase in cargo transportation) . On the other hand, a reduction in transport energy consumption was observed in inland air transport and transport by pipeline.

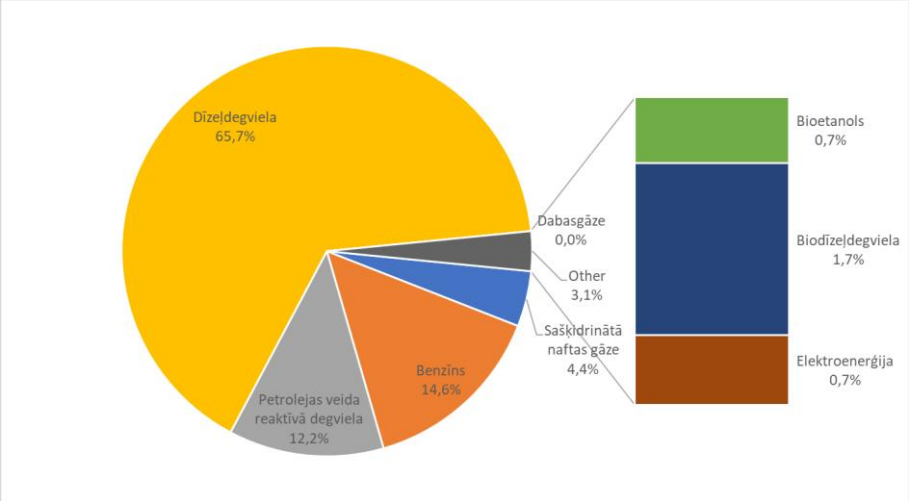


Figure 18. Share of energy consumption in transport in 2018 (%)[63]

Missing pie chart key should read, clockwise from “Diesel”, “natural gas, “other”, “LPG”, “petrol”, “jet kerosene”,

Right hand block reads, top to bottom:

Bioethanol,

Biodiesel fuel

Electrical energy

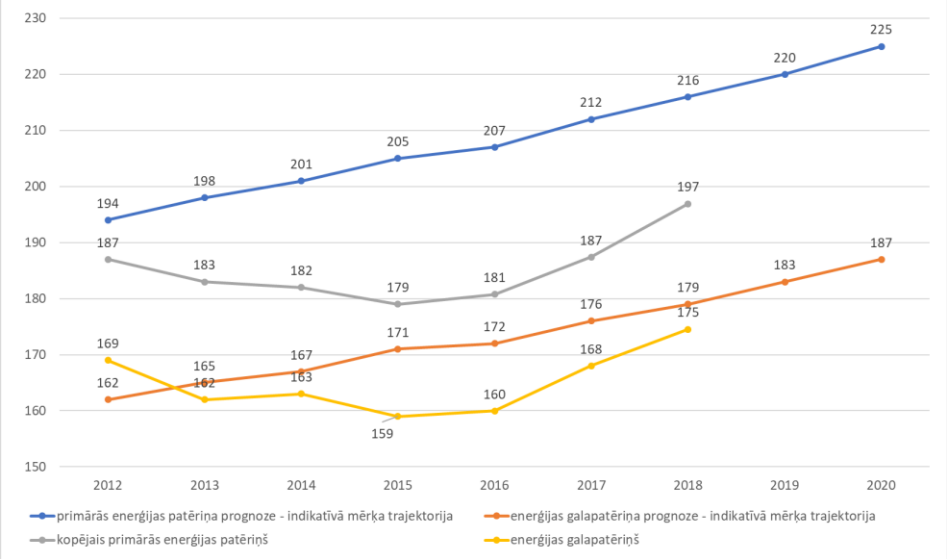
With continuous development of the sector, international air transport in 2018 had the second largest energy consumption in energy after road transport with a share of 11.9 % in transport energy consumption, but railway transport was the third largest transport energy consumer with 4.8 % of the total energy consumption in transport. By implementing the

[63] CSB

railway electrification project transition from diesel propulsion to electric propulsion, which will allow use to be made of more energy efficient locomotives and significantly reduce the use of fossil energy sources (estimated reduction – up to 45,126 t CO2 per year), making rail transport more environmentally friendly.

2.3.2. Progress in fulfilling the 2020 energy efficiency targets of Latvia

The analysis of actual primary energy consumption and final energy consumption trends until 2017 suggests that they are in line with fulfilling the optional target of Latvia for 2020.



Key should read, LH column:

Primary energy consumption forecast – trajectory of indicative target

Total primary energy consumption

RH column:

Energy final consumption forecast – trajectory of indicative target

Final energy consumption

Figure 19. Estimated and actual primary energy consumption and final energy consumption (under Directive 2012/27/EU) for 2012–2020 (PJ)[64]

The cumulative energy savings attained between 2014 and 2017 as a result of implementing alternative measures for improving energy efficiency until 2020 are 5 227 GWh, or 53 % of the mandatory cumulative target (9 896 GWh).

2.3.3. Current potential for the application of high-efficiency cogeneration and efficient DH and cooling

In accordance with the requirements of Article 14 of Directive 2012/27/EU, Latvia has carried out a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling and a cost-benefit analysis pursuant to Directive 2012/27/EU[65]. The assessment led to the following results:

[64] https://ec.europa.eu/energy/sites/ener/files/documents/lv_annual_report_2019_lv.zip
[65] https://www.em.gov.lv/lv/nozares_politika/energoefektivitate_un_siltumapgade/zinojumi_eiropas_komisijai/

1) The overall share of cogeneration in DH in Latvia is high — 72.6 %. Moreover, some of the regional DH systems in Latvia have almost reached the maximum share of cogeneration in heat production and a high share of renewable energy in the overall fuel structure in 2017 (e.g. Jelgava with 97 % output in cogeneration mode and 85 % of the fuel in the form of renewable energy). As a result of the analysis of the potential it was concluded that there is no potential for increasing the share of RES at national level in DH, while it was identified that in certain cities (Daugavpils, Liepāja, and Jūrmala) it would be necessary to introduce high-efficiency cogeneration in district heating but a more in-depth financial analysis is required in each specific case, and at the same time calculations should be based on market prices of electricity and thermal energy.

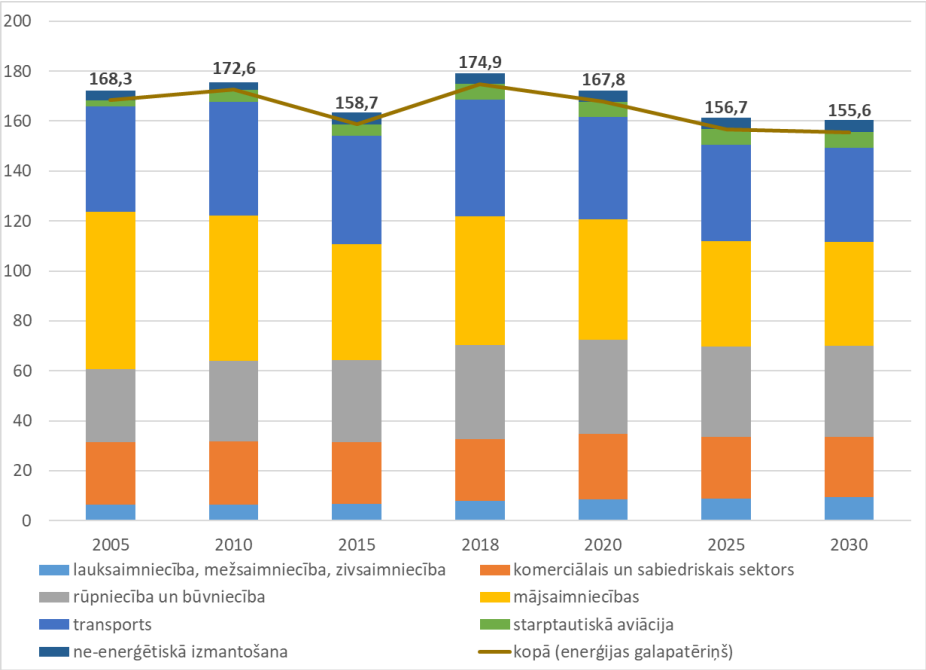
2) Compared to individual heating solutions, DH has the highest energy efficiency level due to higher share of efficient cogeneration. At the same time, DH requires significant investments in infrastructure and involves high operating and maintenance costs. Energy losses in the network also reduce the efficiency of DH. These conditions make DH economically viable only in territories with comparatively high density of heat demand.

Heating density in the territories analysed mostly shows sufficient heat demand for the expansion of the existing DH to be viable for the economy in general. The biggest potential for centralised heating is in the household sector. However, DH demand from households and industries is limited, as the majority prefer individual heating solutions for economic reasons.

3) In order to realise the centralisation potential in DH, it is necessary to create economic incentives to final consumers so that the heating costs in DH do not exceed the costs for alternative individual heating solutions. Such incentives include measures to achieve the reduction of heating tariffs in the DH system, including the need to attract EU funds for investments in establishing new regional DH networks and renovating the existing (old) networks in municipalities where the existing or planned intensity of the heating network exceeds 2 MWh/m. Optimisation of operation and maintenance processes of DH operators and review of the related costs is also necessary.

2.3.4. Indicative development projections

The final energy consumption forecasts calculated using the macroeconomic forecast and the assumptions used in modelling provide that also in 2030 main final energy consumption sectors will be industrial and construction, transport and household sectors, which will consume 23.5 %, 24.2 % and 26.7 %, respectively, in total final energy consumption. The business and public sector will consume 15.6 %, but the share projected in agriculture, forestry, and fisheries is expected to be 6 %.



Key should read, left to right, top to bottom:

Agriculture, forestry, fishing

Industry and construction

Transport

Non-energy use

Commercial and social sector

Households

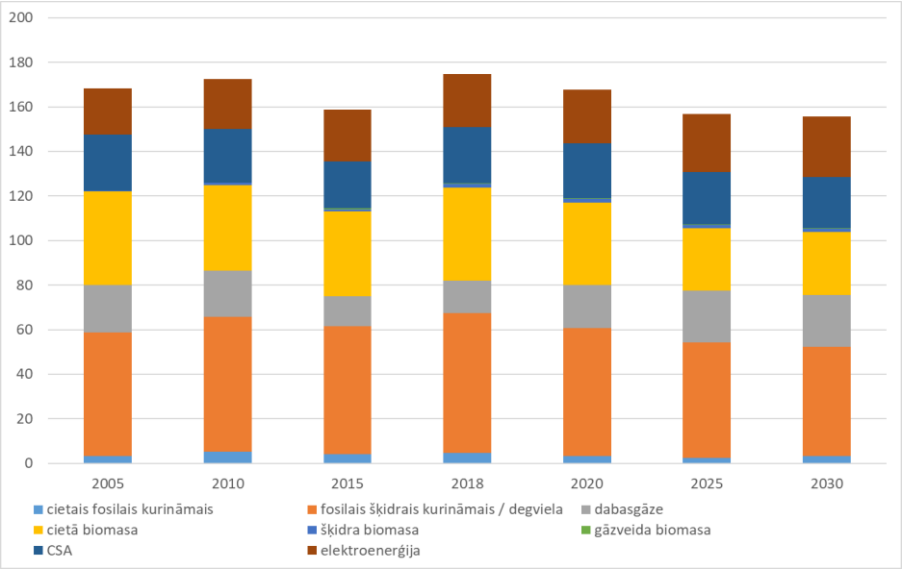
International aviation

Total (final energy consumption)

Figure 20. Final energy consumption projections broken down by sectors until 2030[66] (PJ)

The most important increase in energy consumption in 2030, compared to 2018, is expected in agriculture, forestry, and fisheries – 17.8 %, while a reduction in final energy consumption is expected in other sectors. The total energy consumption in 2030 is approximately 11 % smaller than in 2018.

[66] IPE



Missing key should read, left to right top to bottom:

Solid fossil fuel

Solid biomass

MSW

Fossil liquefied fuel

Liquid biomass

Electrical energy

Natural gas

Gaseous biomass

Figure 21. Final energy consumption projections broken down by types of energy until 2030[67] (PJ)

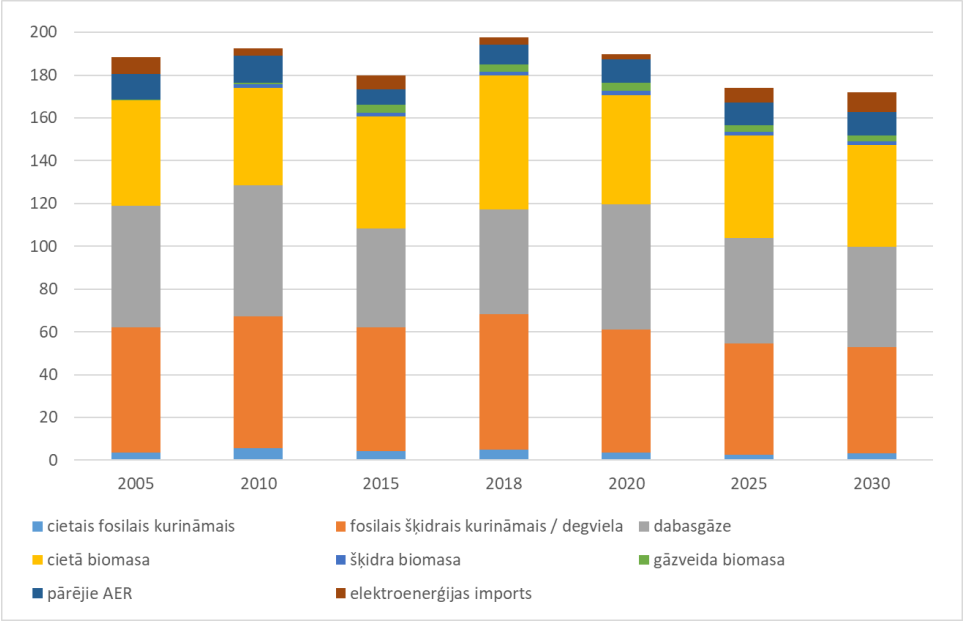
It should be noted that the share of electricity and natural gas in total final energy consumption will increase by more than 5 percentage points by 2030. The increase in natural gas consumption is ensured by its wider use in road transport. At the same time, considering the increase of energy efficiency of cars and wider use of electric vehicles, the share of fossil liquid heating fuel / motor fuel consumption will reduce by approximately 6.7 percentage points.

Based on the calculated final energy consumption projections, the most optimal solution for final consumption in the baseline scenario (minimum total system requirements), where the calculated primary energy consumption in 2030 is approximately 12.9 % less than in 2017, and no significant changes are expected in the structure of primary energy types in 2030 compared to 2017. Consumption of solid biomass and liquid fossil heating fuel / motor fuel reduces most, but consumption of biofuel, biogas and other RES increases. The main reason for this reduction is decreased final energy consumption in households, services, business / services sector, and transport. The biggest reduction is observed in consumption of fossil heating fuel, gaseous biomass and solid biomass – by 33.9 %, 27.5 % and 23.6 %, respectively, which is explained by reduced fuel consumption in industry, household and transport, but the biggest increase will be in liquid biomass, which is used in transport, and

[67] IPE

other non-biomass RES, which is explained by growing use of zero emission RES technologies in domestic energy generation.

No significant changes are expected in the structure of primary energy types, where the dominant types of heating fuel / motor fuel are natural gas and liquid fossil heating / motor fuel. The share of biomass in total consumption will fall by 6.5 percentage points, but the share of liquid fossil heating fuel / motor fuel by 5.9 percentage points.



Key should read as in previous figure.

Figure 22. Primary energy consumption projection until 2030[68] (PJ)

The results of the modelled baseline scenario show that planned energy efficiency measures save 5.3 PJ of energy in 2030. This means that final energy consumption would be 5.3 PJ higher without these measures.

The results of the modelled baseline scenario show that planned energy efficiency measures with final energy consumers and save 7.2 PJ in energy transformation and transportation sectors in 2030. This means that primary energy consumption would be 7.2 PJ higher without these measures.

2.3.5. Cost-effective minimum level of requirements for buildings

Minimum energy efficiency requirements for part of buildings and elements of buildings were increased in Latvia back in 2014. Changes and clarifications[69] made to the construction standard entered into force on 1 January 2020 and focus on the improvement of the quality of projects and thus improvement of physical construction parameters of buildings.

5Table. Minimum permissible level of energy performance of buildings for new buildings, buildings to be reconstructed or renovated

Period of acceptance of	for residential buildings	For non-residential buildings[70]

[68] IPE

[69] Cabinet Regulation No 280 of 25 June 2019 on Latvian construction standard LBN 002-19 "Calorimetry of building enclosures"

[70] The types of buildings listed in Sub-Paragraphs 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7., 6.1.8 and 6.1.9 of Cabinet Regulation No 383 of 9 July 2013 "Rules of energy certification of buildings")

construction design documentation for buildings		

	multi-dwelling buildings	one- and two-dwelling buildings	Buildings owned and managed by the State or municipalities and where State or municipal institutions are located	Other non-residential buildings
Minimum permissible level of energy performance for new buildings[71]				
Until 31 December 2016	≤ 70 kWh/m^2 per year	≤ 80 kWh/m^2 per year	≤ 100 kWh/m^2 per year	≤ 100 kWh/m^2 per year
From 1 January 2017 to 31 December 2017	≤ 60 kWh/m^2 per year	≤ 70 kWh/m^2 per year	≤ 90 kWh/m^2 per year	≤ 90 kWh/m^2 per year
From 1 January 2018 to 31 December 2018	≤ 60 kWh/m^2 per year	≤ 70 kWh/m^2 per year	≤ 65 kWh/m^2 per year	≤ 90 kWh/m^2 per year
From 1 January 2019 to 31 December 2020	≤ 50 kWh/m^2 per year	≤ 60 kWh/m^2 per year	nearly-zero-energy buildings	≤ 65 kWh/m^2 per year
From 1 January 2021	nearly-zero-energy buildings	nearly-zero-energy buildings	nearly-zero-energy buildings	nearly-zero-energy buildings
Minimum permissible level of energy performance of buildings for buildings to be reconstructed or renovated[72]				
From 21 November 2015 to 31 December 2020	≤ 90 kWh/m^2 per year	≤ 100 kWh/m^2 per year	≤ 110 kWh/m^2 per year	≤ 110 kWh/m^2 per year
From 1 January 2021	≤ 80 kWh/m^2 per year	≤ 90 kWh/m^2 per year	≤ 90 kWh/m^2 per year	≤ 100 kWh/m^2 per year

The construction standard provides for the procedure of designing of energy efficiency of structural elements and connections of external building enclosures for new buildings, buildings to be reconstructed and renovated, as well as for new heated premises equipped in buildings, where the temperature of 8° C and higher is maintained during the heating season. In order to avoid placing restrictions on various structural solutions and architectural configurations or the wishes of the designer, during reconstruction of buildings, regulatory thermal transmittance values have been removed from the current construction standard. It is important to reach kWh/m^2 heating consumption and maximum permissible U values. Maximum permissible U values are shown in the standard for the purposes of restricting building of structures that are very poor and unsafe from and thermal and technical point of view, which may lead to different types of problems during operation. In

[71] Minimum permissible level of energy performance of buildings, assessment of energy performance of new buildings. The permissible level (class) of energy performance of energy performance of buildings does not apply to new buildings, if the application of respective requirements is not technically or functionally possible or if the cost-benefit analysis of the service life of the respective period indicates losses

[72] Minimum permissible level of energy performance of buildings, assessment of energy performance of buildings to be renovated and reconstructed

the context of maximum values, the use of the k coefficient is not so critical, because kWh/m^2 is defined and maximum U values are provided only to keep the level of security of structures. The permissible U value for windows and balcony doors has been reduced.

The requirements for the minimum permissible level of energy performance of buildings, the assessment of energy performance for heating in renovations and reconstructions will be stepped up as from 2021, because:

1) Directive 2010/31/EU provides that the State encourage renovated buildings to be nearly zero-energy buildings;

2) the building decarbonisation target should be reached by 2050;

3) the current requirements for reconstructions and renovations in kWh/m^2 was much easier to reach as H_{TR} (with regard to the buildings with an area of at least 1000 m^2 and the indicator be reached up to 60 kWh/m^2 per year (the minimum permissible level for heating consumption)).

Therefore, by bringing in experts in the respective area, it is necessary to evaluate the efficiency of indicators and compliance with different types of buildings and to improve the construction standard regulation if necessary.

6Table. Maximum permissible values of thermal transmittance factors URM W/(m2 × K) and ψRM W/(m × K) of the structural element and the linear thermal bridging

Structure	Residential buildings, retirement homes, hospitals and kindergartens	Non-residential buildings	Production buildings
	U_{RM} value, W/(m^{2}K)	U_{RM} value, W/(m^{2}K)	U_{RM} value, W/(m^{2}K)
Floor:			
contact of floor and wall with the ground	0.2	0.25	0.35
floor with unheated basement floor or floor with ventilated crawl space	0.3	0.35	0.40
External walls:			
external walls	0.23	0.25	0.30
walls in traditional log buildings without integration of a thermal insulation layer in the wall	0.65	0.65	0.65
Roofs and covers contacting outdoor air	0.20	0.23	0.25
Outer doors and gates	1.80	2.00	2.20
Windows and balcony doors	1.10	1.10	1.30
Thermal bridging, ψ_{RM}	0.20	0.20	0.35

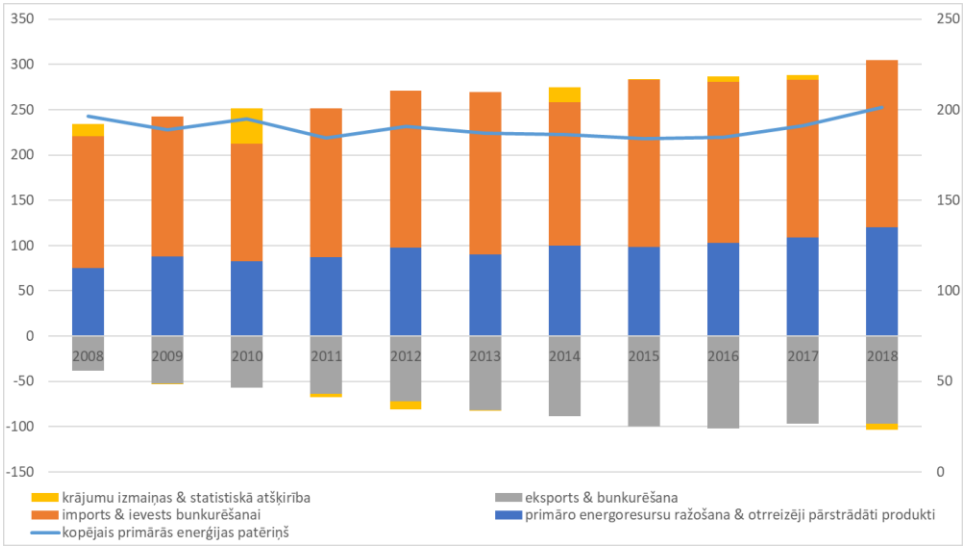
2.4. Energy security

2.4.1. Current situation

In 2018, different biomass heating / motor fuels – solid biomass, gaseous biomass and liquid biomass (biofuel), as well as electricity dominated in generation of energy sources in Latvia.

Solid fuel (peat) is also produced in Latvia in small amounts, while lubricants were produced from petroleum products as an energy source. Petroleum products and biomass (solid, liquid and gaseous biomass) were consumed in equal amounts in primary energy consumption in 2018, while gaseous fossil heating/motor fuel was consumed by one quarter less than biomass. Petroleum products (imported petroleum products in transport consumption) dominate in final energy consumption in 2018, the second largest consumed heating/motor fuel in Latvia in 2018 was biomass (solid, liquid and gaseous biomass). Furthermore, the final consumption of thermal energy and electricity in Latvia in 2018 was lower and almost equal to each other.

Energy security is best described by how much energy Latvia can produce itself (within the country) and how much energy needs to be imported, as well as the number of sources the energy is imported from.



Key should read:

Changes in inventories and statistical discrepancy

Imports and inputs for bunkering

Total primary energy consumption

Export and bunking

Production of primary energy resources and re-processed products

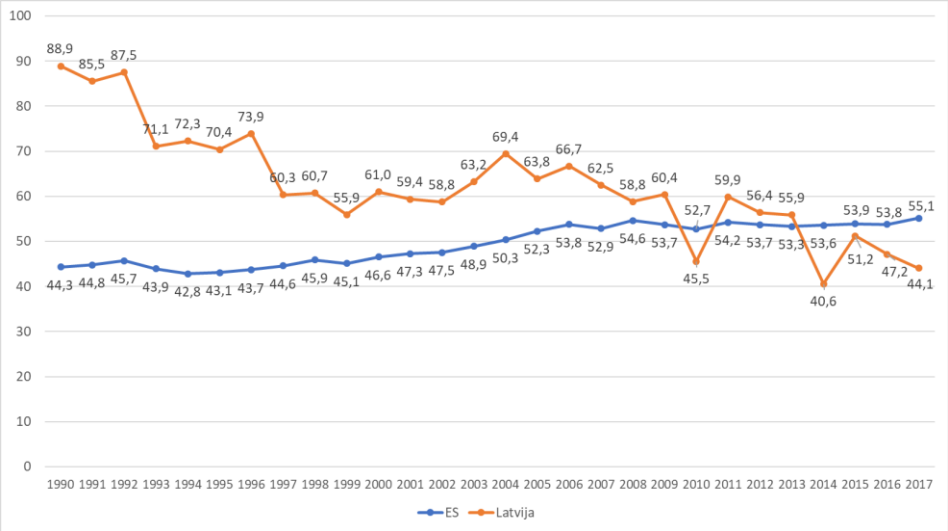
Figure 23. Latvian structure of production and consumption of energy sources, imports and exports of energy sources in 2017 (TJ)

Latvia significantly decreased its energy dependency[73] in the period from 1990 to 2017 – 50.4 % (31 % reduction in the period from 2005 to 2017). However, 44.1 % of the primary energy consumption in Latvia came from imported energy in 2017. Energy dependency in Latvia is currently lower than in the EU in general (55.1 %) and has decreased despite the increase of the total primary energy consumption in the recent years. An improvement in energy dependency indicators may be explained by the increase in the share of use of RES,

[73] energy dependency shows how much a country is dependent on energy imports to meet its energy needs. This indicator is calculated by subtracting energy exports from imports and dividing the result by the total energy consumption. This indicator can be calculated for any energy product.

and by the opening of the electricity and gas market, which fostered entry of new market players into the market and at the same time reduced energy dependency on Russia.

In 2017, Latvia's energy dependency was 88.5 % for solid fossil fuels, 100.12 % for petroleum products, and 101.9 % for natural gas, which is explained by the fact that none of these types of fuel is extracted in Latvia (except lubricant, peat and peat briquettes). At the same time, it should be mentioned that Latvia does not use all the gas imported for consumption immediately, but stores part of the gas in Inčukalns UGSF to provide not only Latvia, but also neighbouring countries with natural gas deliveries in the winter season. Latvia does not use all the imported amount of liquid petroleum products, but exports part of them.



Key read:

EU Latvia

Figure 24. Energy imports in Latvia and EU 1990–2017 (%)[74]

In 2017, Latvia generated 101 % of the country's electricity needs due to unusually high water levels in the Daugava and the output of HPPs. 16 % less electricity was imported, but 9 % more electricity was exported through the Latvian transmission system in 2017 compared to 2016. As in 2016, the balance of electricity produced and consumed in Latvian was negative with electricity imported into the Latvian transmission system significantly exceeding electricity exported from the Latvian transmission network. Similarly, Latvia's electricity consumption exceeds the total amount of electricity produced in Latvia, in 2018 local electricity producers covering less than 88% of Latvia's electricity consumption

Table 7. Electricity imports and exports of Latvia 2016–2017 (MWh)[75]

	2016 (GWh)	2017(GWh)	2018(GWh)	Changes(2017-2018)
Electricity imported into the Latvian transmission network	4828.354	4072.912	5173.682	27%
Electricity exported from the Latvian transmission network	3794.883	4137.077	4264.801	3.1%
Electricity balance of Latvia	-1033.47	+641.66	-908.88	1516.5%

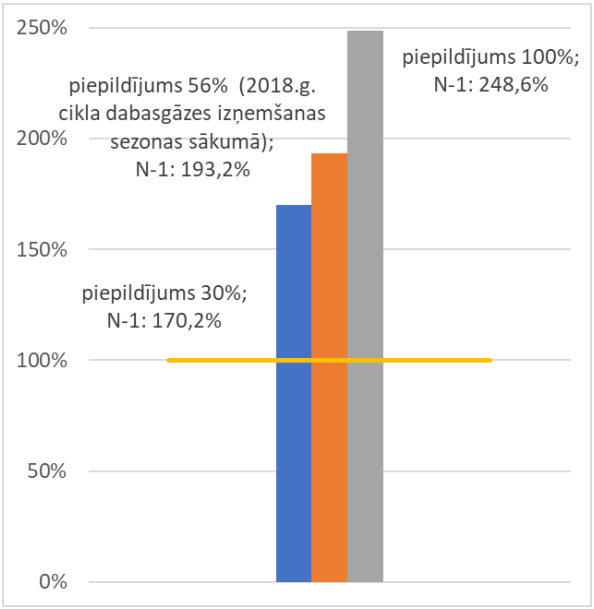
[74] EUROSTAT
[75] Source: AS 'Augstsprieguma tīkls'

	(shortfall)	(surplus)	(shortfall)	(shortfall)
Electricity consumption of Latvia	7264.728	7282.17	7410.215	1.8%
Total amount of electricity produced	6231.257	7346.336	6501.335	-11.5%
Coverage of consumption of the country using local generation (%)	85.77	100.88	87.7	13.15 (percentage points)

16 % of the total electricity imports in the Baltic States were imported into Latvia from third countries in 2018. The Baltic States imported 982.5 GWh of electricity from third countries in the first half of 2018 (from January to June). Electricity imports from third countries reached 776.4 GWh in total in 2017, which is a 16 % down on 2016. However, electricity exported from the Latvian transmission network increased by about 9 % over 2016. An important component of the current operational setup is the BRELL (Belarus, Russia, Estonia, Lithuania, Latvia) agreement concluded between the transmission system operators of the Baltic States, Russia, and Belarus, which provides for a mutual assistance of energy system operators of the countries operating in a synchronous system and, among other things, cooperation in maintaining emergency reserves totalling 500 MW or 100 MW for each member country.

Latvia meets the energy security target with existing measures and existing technologies, because Latvia has the Inčukalns UGSF with a total operational capacity of 24,219 GWh, which ensures regional gas supply stability for customers in Latvia, Estonia, northeast Russia and Lithuania. The functioning of the natural gas system in the event of one facility in the system failing is assessed and prepared according to the methodology described in 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, which takes into account the N-1 principle[76] or the operational failure in the single largest natural gas infrastructure. N-1 allows an assessment to be made of the level of protection of natural gas consumers or the security of the natural gas infrastructure in a given territory as a percentage by taking into consideration various parameters of the natural gas system.

[76] N-1 is a theoretical calculation that describes the ability of the technical capacity of the gas infrastructure to satisfy total gas demand in the calculated area in the event of disruption of the single largest gas infrastructure during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years.



Key should read:

Coverage 56% (at start of exceptional natural gas season 2018)

Coverage 30%l N-1: 193.2%

Coverage 100%; N-1: 248.6%

Figure 25. Result of the N-1 calculation[77] depending on the actual capacity of Inčukalns UGSF in 2018[78]

The N-1 value is directly proportionate to filling of Inčukalns UGSF. In accordance with Regulation 2017/1938, the value exceeds the minimum set in the Regulation in both situations, and it can be concluded from their calculation results that the security of natural gas supply in Latvia is high, because it significantly exceeds the 100 % specified limit, standing at 248.6 %.

2.4.2. Development projections

The electrical network synchronisation project is expected to be completed by 2025, because in 2018 the Baltic States signed a joint document on synchronisation of electrical networks of Baltic States with continental Europe with Poland and EC, which intends to ensure synchronisation of Latvian, Estonian and Lithuanian electrical networks with the continental Europe and thus ensure closer integration into the European market, more intensive competition, improved energy security, reducing the Baltic States' historic over-dependence on Russia.

A single (Finland-Latvia-Estonia) natural gas market will start operating on 1 January 2020, when the natural gas pipeline "Balticconnector" will be completed connecting Estonian and Finnish natural gas markets. This process will involve establishing an interconnection between the natural gas transmission systems of Finland and Estonia that will allow Finland to join the regional market of the Baltic States, whilst the transmission connection between Lithuania and Poland will provide access to other natural gas markets in Europe and significantly decrease the dependency of the region on the leading natural gas supplier. The

[77] According to Regulation 2017/1938, N – 1 ≥ 100 %
[78] Source: JSC Conexus Baltic Grid (http://www.conexus.lv/uploads/filedir/parvades_operatora_zinojums_2018.pdf)

importance of Inčukalns UGSF is expected to increase in the period up until 2030 due to the single natural gas market, which will promote interest in the use of the Inčukalns UGSF.

2.5. Internal energy market

2.5.1. Electricity interconnectivity

2.5.1.1. Current interconnection level and main interconnections

The wholesale price of electricity at the electricity stock exchange is affected not only by scheduled and unscheduled repair works in the transmission network, but also scheduled and unscheduled repaired works at power plants, as well the availability of hydro resources in Scandinavian countries and in Latvia.

It is important to mention the total net capacity of the transmission network (NTC), which is 1,000 MW for the Latvian and Estonian interconnection (in the direction from EE to LV). It should be added that this is one of interconnections, where overload is observed. In turn, the capacity of the Lithuanian and Latvian interconnection (in the direction from LV to LT) is 1,234 MW.

The latest interconnections — the NordBalt submarine power cable between Lithuania and Sweden with a total capacity of 700 MW and the LitPol-link interconnection between Lithuania and Poland with a total capacity of 500 MW — increase the total interconnection capacity of the energy system of the Baltic States with other EU countries from the previous 1,000 MW to 2,200 MW.

Table 8. Established interconnections, their average transfer capacity in 2018 and changes[79]

Interconnections[80]	Average Transfer capacity[81] (%)	Changes (2017-2018) (percentage points)	Lowest recorded monthly transfer capacity (%)	Highest recorded monthly transfer capacity (%)
LV → LT	31	2	12.7	56.1
EE → LV	54	-13	38.5	79.4
LBI → LT	15	-12	20.1	92.7
LT → LV	2	0	1.5	19.9
PL → LT	20	-12	13.2	70.5
LT → PL	48	9	10.3	57.7
SE → LT	63	-9	0.0	91.5
FI → EE	18	-19	6.5	47.8

Imports to the Baltic States from third countries are only possible via the Nord Pool Spot[82] (NPS) Lithuanian-Belarusian import area (LBI). The amount of electricity imported from third countries in 2018 was 2,558,187 MWh, which was by 229 % more in comparison with 2017 (776,395 MWh). In accordance with the NPS information, in 2018 Sweden exported 2,930,002 MWh to Lithuania through the NordBalt cable, while Poland exported 721,839 MWh through LitPol-link. The average transfer capacity of the NordBalt cable was

[79] Source: AS 'Augstsprieguma tīkls'

[80] LV-Latvian bidding area, LT-Lithuanian bidding area, EE-Estonian bidding area, FI-Finnish bidding area, SE4-Fourth Swedish bidding area, LBI-Lithuanian-Belorussian import bidding area

[81] Transfer capacity = total monthly commercial flow kWh / total monthly net transfer capacity kWh (NTC).

[82] Nord Pool Spot is a Nordic electricity stock exchange, where the electricity price for the Latvian bidding area based on market principles

60 % in 2018, which was a reduction of 3 percentage points compared to 2017. The average transfer capacity of the LitPol-Link interconnection in the direction from Poland to Lithuania was 29 %, which was an increase of 7 percentage points compared to the previous year. In turn, the transfer capacity of LitPol-Link from Lithuania to Poland was 39 %, which was a reduction of 8 percentage points compared to the previous year.

In 2018, the transfer capacity of the Estonia – Latvia interconnection was 56 %, which was a reduction of 2 percentage points compared to the previous year. The highest recorded monthly transfer capacity of the Estonian – Latvian interconnection was 79.4 % (September), but at the time, when Latvia had enough local production and less demand for electricity imports from Estonia, the transfer capacity of the interconnection reduced to 38.5 % (December) on average of the net transmission capacity available. The total net transmission capacity was 6,689,093 MWh in 2018.

In the Latvian electricity system, there are no grid overloads, which would restrict free access to the electricity system, so any producer of electricity who has concluded an electricity sales contract has access to the electricity system without restrictions, and this access is guaranteed. All the generated electricity, regardless of the method of its acquisition, is provided with equal opportunities to access the grid.

2.5.1.2. Fulfilment of the interconnection capacity expansion requirements

According to the EC, the electricity interconnectivity level of Latvia (forming part of the Baltic countries) in 2017 was 23.7 %. The interconnection level for Latvia in 2018 was calculated using several formulae and without taking into account interconnection capacities with third countries (only ES DV interconnection capacities)[83]:

a) ratio of the incoming (import) interconnection capacity (total) to peak capacity (demand);

b) ratio of the outgoing (export) interconnection capacity (total) to peak capacity (demand);

c) ratio of the incoming (import) interconnection capacity (total) and installed RES capacity;

d) ratio of the outgoing (export) interconnection capacity (total) and installed RES capacity;

e) ratio of the incoming (import) interconnection capacity (between LV and other EU MS) to peak capacity (demand);

f) ratio of the outgoing (export) interconnection capacity (between LV and other EU MS) to peak capacity (demand);

g) ratio of the incoming (import) interconnection capacity (between LV and other EU MS) and installed RES capacity;

h) ratio of the outgoing (export) interconnection capacity (between LV and other EU MS) to installed RES capacity.

Table 9. Data used for determining the electricity interconnection level of Latvia in 2018 (MW)

Parameter used	2018

[83] https://ec.europa.eu/commission/sites/beta-political/files/energy-union-factsheet-latvia_en.pdf; https://ec.europa.eu/energy/sites/ener/files/documents/report_of_the_commission_expert_group_on_electricity_interconnection_targets.pdf; https://ec.europa.eu/energy/sites/ener/files/documents/2nd_report_ic_with_neighbouring_countries_b5.pdf

Parameter used	2018
electricity production capacity installed	2986.18
incoming interconnection capacity (import) (ICI)	1750
outgoing interconnection capacity (export) (ICO)	1550
peak capacity (maximum demand in 2018) (PJ)	1255
RES capacity installed (RESI)	1829.18
incoming (import) interconnection capacity (between LV and EU Member States) (ICI-LV)	900
outgoing (export) interconnection capacity (between LV and EU Member States) (ICO-LV)	1300

The calculation of the transfer capability for the Baltic States does not take into account trading with Russia, and the calculation includes only interconnections Estonia-Finland (1000 MW), Lithuania-Sweden (700 MW) and Lithuania-Poland (500 MW). The scheduled desynchronization from the BRELL network in 2025 means the transfer capability to Russia/Belarus/Kaliningrad is set at 0 MW for 2030.

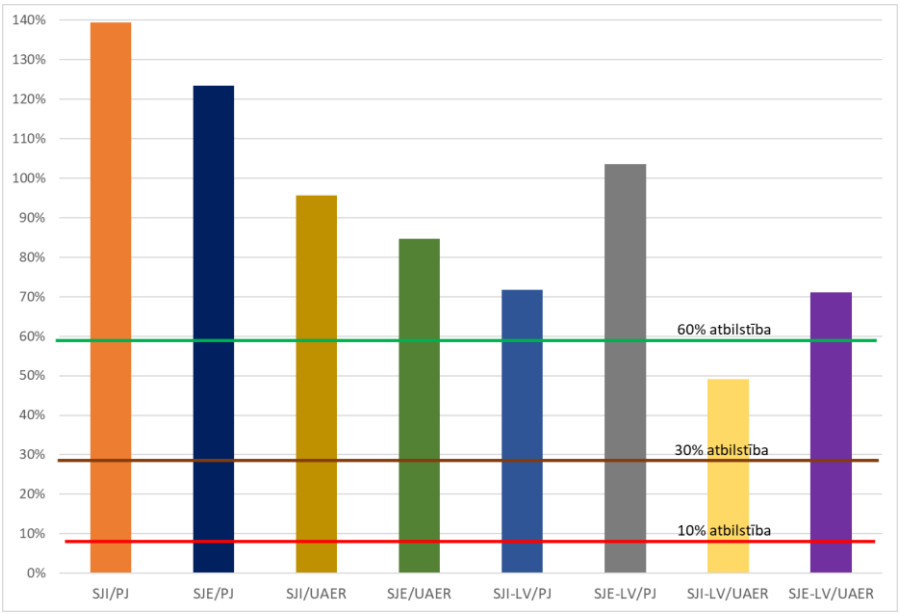
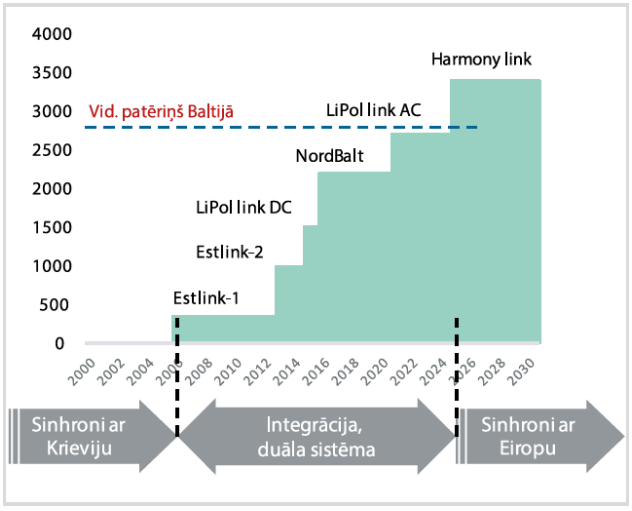


Figure 26. Electricity interconnectivity level of Latvia in 2018

Taking into account interconnection capacities of the Baltic States with other EU MS, it can be concluded that the level of the LV interconnection exceeds 85 % in all indicators. Furthermore, if we take into account only Latvian interconnection capacities with other EU MS (Estonia and Lithuania), then the interconnection level in Latvia in the lowest indicator (ratio of import interconnection capacity and RES capacity installed) is 49 %, so Latvia should give thought to how it can improve this indicator to the 60 % recommended by the EC[84]. Latvia is planning to improve this indicator with the Latvia – Estonia third interconnection project (330V electricity transmission high-voltage line among substations in Estonia and Latvia) implementing the project until 2020. In this way, it intends to increase the maximum

[84] The EC group of interconnection experts recommends MS with <30 % in any of the indicators to urgently study additional capabilities of interconnections and report on an annual basis to high-level regional groups and the Infrastructure Forum on the results of such a research. Any project helping MS to reach the threshold of 30 % should be submitted for inclusion in the Ten-Year Network Development Plan and later PCI lists. MS with >30 %but <60 % in any of the indicators are asked to study and develop additional interconnection projects. Such projects will have to consider the possibility of applying for inclusion in TYNDP and later PCI lists.

transfer capability of the Latvian-Estonian cross-section in the direction to Estonia by 500 MW and in the direction of Latvia by 600 MW.



Key should read:

Within graph: “average consumption in the Baltic”

Below graph:

Sychronise with Russia, Integration, dual system, Synchronise with Europe

Figure 27. Development of the Baltic interconnection capacity with the European electricity system (MW)

2.5.2. Energy transmission infrastructure

2.5.2.1. Key characteristics of the existing transmission infrastructure for electricity and gas

The main features of the transmission network are the number of step-down substations and high voltage distribution points in a specific territory, which are in turn characterised by the specific demand for electricity capacity there, and a relevant network of transmission lines (330 kV and 110 kV), which meets energy supply security and cost-effectiveness criteria. Based on these criteria the transmission network is rated as close to optimal with a potential for development. The electricity transmission network currently consists of 330 kV lines with a total length of 1,346.43 km and 110 kV lines with a total length of 3,893.54 km, 25,330 kV transformers, and 248,110 kV transformers with the total installed capacity of 9,020.5 MVA. To making servicing of the transmission network more efficient, operational organisation units are broken down based according to the territorial principle into:

- 13 groups of substations – for operation of 330/110 kV substations and distribution points – Salaspils, Krustpils, Daugavpils, Viskaļi (Jelgava), Brocēni, Grobiņa, Valmiera, Gulbene, Rēzekne, Sloka, Ventspils, Riga – Right bank and Left bank, with one base substation in each group;
- 6 line districts – for operation of 330/110 kV transmission power lines – Riga district, Krustpils district, Daugavpils district, Brocēni district, Grobiņa district and Valmiera district.

The 330 kV network of the Latvian energy system is a middle stage of the energy system of the Baltic countries between its northern and southern parts. There is double-way feed in all 330 kV substations, except Daugavpils. The 110 kV network has a ring schematic. Most of 110 kV substations have two transformers and double-way feed.

Key reads, left to right, top to bottom:

330 kV line

110 kV line

330 kV cable line

110 kV cable line

330 kV substation

110 kV substation

110 kV substation managed by other legal entities

HPP

WPP

Figure 28. Schematic of Latvian 330 kV and 110 kV electrical networks[85]

The natural gas transmission system of Latvia is connected to the natural gas transmission systems of three neighbouring countries: Estonia, Russia and Lithuania. The connection with Estonia technically allows natural gas to flow only from Latvia to Estonia, while the connections with Lithuania and Russia allow such flows in both directions. The overall annual load of all natural gas interconnections is low and does not even reach 50 % of the theoretically available capacity; however, at certain times of demand, natural gas transmission system interconnection capacities may reach 100 % of available capacity. The Inčukalns UGSF, which serves as a guarantee of stability of regional security, becomes the main source of natural gas in the heating season for meeting the consumption needs in Latvia.

[85] Source: AS 'Augstsprieguma tīkls'

Latvia's sole natural gas TSO manages a distribution pipeline system which is 1,188 km in length, covers the entire national territory and supplies natural gas to the local distribution network via 40 gas distribution points. Inčukalns UGSF allows to store up to 2.3 billion m^3 or 24.22 TWh of natural gas.

The main natural gas supply route for Latvia's consumers of Latvia are long-distance gas pipeline networks from the Yamal–Europe natural gas pipeline in the Tver Oblast in Russia via Saint Petersburg and Pskov to Estonia and Latvia. In general, the long-distance natural gas pipeline networks in the Baltic States are well developed and their capacity to ensure stable supplies is facilitated by Inčukalns UGSF. However, there are significant restrictions ion its use: for example, the connection between the Estonian and Latvian natural gas systems does not ensure the physical transfer of natural gas from Estonia to Latvia due to the lack of required equipment (but there are virtual bidding point transactions), while the capacity of the transmission connections of Lithuania and Latvia is insufficient to cover peak natural gas consumption and ensure that the natural gas is pumped into Inčukalns UGSF. At the same time, the Latvian-Estonian will be completed in 2020.

Figure 29. Natural gas transmission system in Latvia[86]

The EU in general is still highly dependent on natural gas supplies from third countries. Except for Lithuania and Estonia, Latvia's natural gas supply system is not directly connected to any other systems of the EU Member States. Along with the opening of Klaipeda Liquefied Natural Gas Terminal, however, there is physical access to natural gas not only from Russia but also from other countries. At the same time, it is noteworthy that the interest of Latvian and Estonian traders in the Klaipeda liquefied natural gas terminal and its use has tailed off since May 2019 owing to the tariffs of the transmission system set by the Lithuanian regulatory authority for exit from Lithuania to Latvia.

AS 'Sadales tīkls' is responsible for providing electricity distribution system services and acting as distribution system operator in Latvia. It is also responsible for the distribution system infrastructure necessary for restoration, maintenance and operation of the network, covering 99 % of users with its services in 2017.

[86] http://www.conexus.lv/uploads/filedir/parvades_operatora_zinojums_2018.pdf

2.5.2.2. Projections of network expansion requirements

In order to ensure the safe operation of the Latvian electricity system and the effective functioning of the electricity market, and in order to prevent the ageing of equipment, the Latvian TSO is reconstructing and modernising high voltage substations and electricity distribution points, and , in the light of development trends in electricity systems in both Latvia and neighbouring countries, is evaluating and deciding on the development of the Latvian electricity transmission system interconnection, as well as on the need to reinforce and modernise the internal network. The electricity transmission network is developed in accordance with the Latvian electricity transmission system development plan[87] and the Europe's Ten-Year Network Development Plan[88].

Between 2020 and 2029, the following projects are to be implemented for the development of the Latvian and Baltic electricity network:

- Third electricity interconnection between Latvia and Estonia;
- Electricity transmission network connection "Riga CHPP-2 – Riga HPP";
- Reconstruction of existing Estonia – Latvia 330 kV interconnections;
- Synchronisation of the Baltic States with European transmission networks and decoupling from the Russian united electricity system.

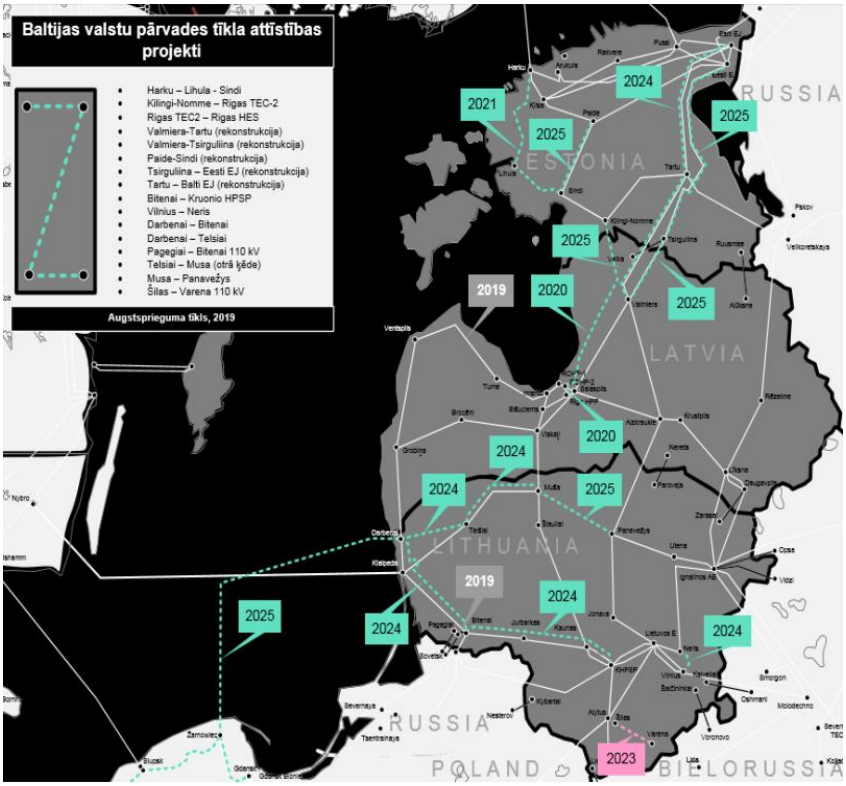


Figure 30. Projects of the Baltic States according to the development plans of the TSOs of the Baltic States

Gas supply systems of the Baltic States are not connected to the single EU natural gas transmission network. In order to remedy this situation, 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

[87] http://www.ast.lv/content/elektroenergijas-parvades-sistemas-attistibas-plans
[88] http://tyndp.entsoe.eu/

amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009, the Eastern Baltic Region has been defined as one of EU's priority corridors.

In the period from 2020 to 2029, the following projects are to be implemented for the development of the Latvian and Baltic natural gas network:

- Construction of the Estonia – Latvia interconnection (Balticconector) (will come into operation on 1 January 2020);
- Improvement of the Latvia – Estonia interconnection (Karksi) (the project will be completed in 2020);
- Improvement of operations of the Inčukalns UGSF (the project will be completed by 2025);
- Improvement of the Latvia – Lithuania interconnection (the project will be completed by 2023);
- Construction of the Poland – Lithuania interconnection (GIPL) (the project will be completed by 2022).

Figure 31. Natural gas infrastructure projects planned in the Baltics[89]

2.5.3. Electricity and gas markets, and energy prices

2.5.3.1. Current situation of electricity and gas markets

Latvia's natural gas consumption is about 1.4 billion m^3, while a reduction in consumption has been observed in the last ten years (consumption was 1.66 billion m^3 in 2008). The reduction of the Latvian natural gas market has several objective and positive reasons — different energy efficiency measures, including modernisation of boiler houses and reduced losses in energy supply, especially heating, as well as diversification of energy sources, namely, successful use of local RES (for example, an increase in the share of woodchips), for example, in heating. This also enhances Latvia's energy security, making it less dependent on energy imports. The potential benefit of a regional market for Latvia is its geographic location, which creates opportunities for natural gas transit from south to north, as well as the technical capacity of Inčukalns UGSF when used as a market instrument.

[89] http://www.conexus.lv/uploads/filedir/pso_zinojums_2018.pdf

Latvia's electricity consumption is 7.4 TWh. There have been changes in the structure of total consumption of energy sources in recent years – as consumption of natural gas decreases in the processing sector, the share of RES in total consumption of energy sources increases due to the increase in produced electricity in hydropower plants and wind power plants[90]. At the same time, amounts of generated RES electricity fluctuate according to external factors. High rainfall and an associated high inflow of water into the river Daugava in 2017, the consumption of RES energy increased by 5.6 %, while under filled reservoirs and low water levels in water bodies, including the Daugava, were characteristic of an unusually dry and hot summer period in 2018. Therefore, HEP generation fell by 43.6 % in 2018. Thus, in 2018, most of electricity generated locally (37 % of final consumption) was produced in the processing sector (62 %), namely at cogeneration plants, and the remainder (38 %) in HPPs and WPPs (9.2 PJ).

2.5.3.2. Present situation in energy prices

In 2017, a considerable drop in electricity prices was observed in Latvia –3.91 % compared to the average price in 2016, making the average electricity price in 2017 34.68 EUR/MWh. The price reduction in Latvia was mainly the result of the first full year of operation of Nord Balt (after the testing period). It significantly reduced the amount of unplanned outages and maintenance, which in turn allowed wholesale prices of electricity in the Latvian bidding area to move closer to the level of wholesale prices in the Nordic countries. Meanwhile, in 2018, the average stock exchange price of electricity in the Latvian bidding region increased by 43.9 %, rising to 49.90 EUR/MWh.

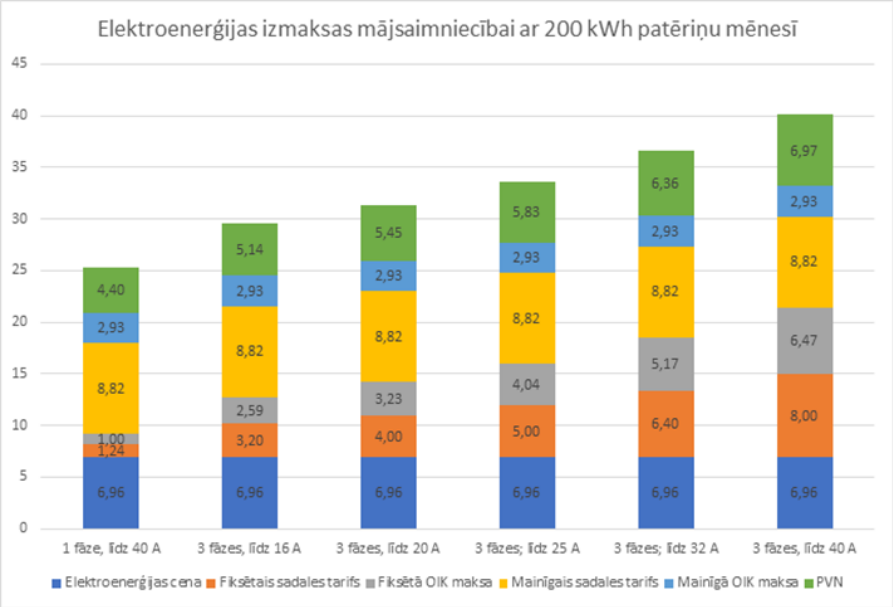


Figure 32. Electricity costs for a household consuming 200 kWh a month[91]

The cost items forming the final electricity tariff in the consumption group with 200 kWh per month for household users show that the fixed connection fee created the biggest difference in costs, thus demonstrating the importance of an effective connection, which has been particularly emphasised in recent years. Also if consumption of a household is, for example, only 200 kWh per month, then it would be unwise to have a 3-phase connection with 40 ampere capacity, which not only promotes maintenance of impractical capacity, but

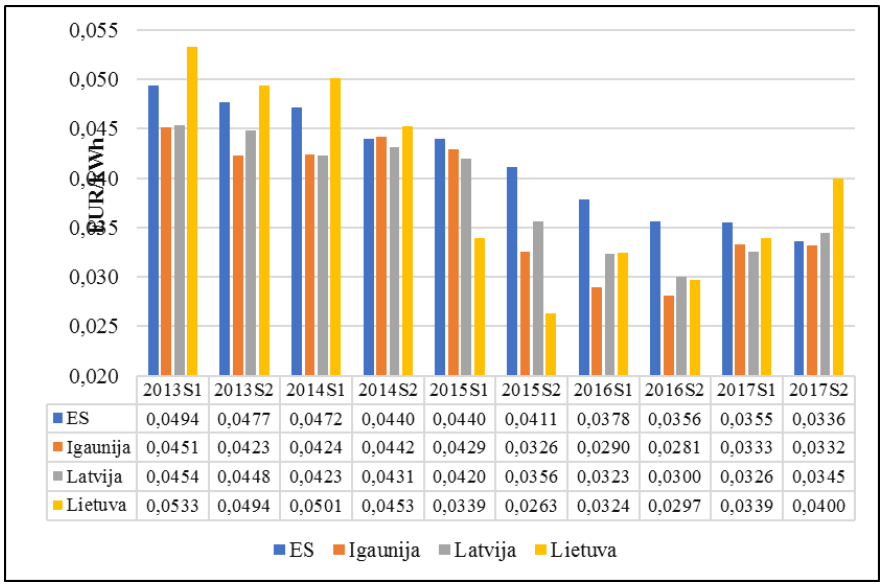
[90] CSB

[91] The calculation is based on the average Nord Pool electricity price — EUR 0.0348/kWh

also increases consumer costs by 60 %. Since 2016, the tariffs of services of the distribution system of AS 'Sadales tīkls' provide that the specific amount for ensuring an electricity connection should also be paid by electricity users who do not consume electricity, making all users pay a tariff consisting of a fixed fee for a connection and a variable price depending on electricity consumption. This is a major contribution to the efficient use of the electricity network, because electricity users have conducted evaluations of their connection capacities and have reduced their capacity if necessary, thus optimising their electricity costs.

The average price households in Latvia paid for natural gas in 2013-2017 was EUR 0.0456/kWh, which is slightly more than in Estonia but less than in Lithuania and EU overall with an average sales price during that period of EUR 0.0659/kWh.

Wholesale prices of natural gas apply to system users that consume more than 25,000 m^3 of natural gas a year. Natural gas prices for large non-household consumers in Latvia are generally lower than the EU average. The average price the large consumers in Latvia paid for natural gas in the period from 2013 to 2017 was EUR 0.0456/kWh, which is slightly more than in Estonia (EUR 0.0433/kWh) but less than in Lithuania (EUR 0.0469/kWh) and EU overall with the average wholesale price in the period from 2013 to 2017 of EUR 0.0659/kWh.



	2013S1	2013S2	2014S1	2014S2	2015S1	2015S2	2016S1	2016S2	2017S1	2017S2
ES	0,0494	0,0477	0,0472	0,0440	0,0440	0,0411	0,0378	0,0356	0,0355	0,0336
Igaunija	0,0451	0,0423	0,0424	0,0442	0,0429	0,0326	0,0290	0,0281	0,0333	0,0332
Latvija	0,0454	0,0448	0,0423	0,0431	0,0420	0,0356	0,0323	0,0300	0,0326	0,0345
Lietuva	0,0533	0,0494	0,0501	0,0453	0,0339	0,0263	0,0324	0,0297	0,0339	0,0400

Key reads:

EU, Estonia, Latvia, Lithuania

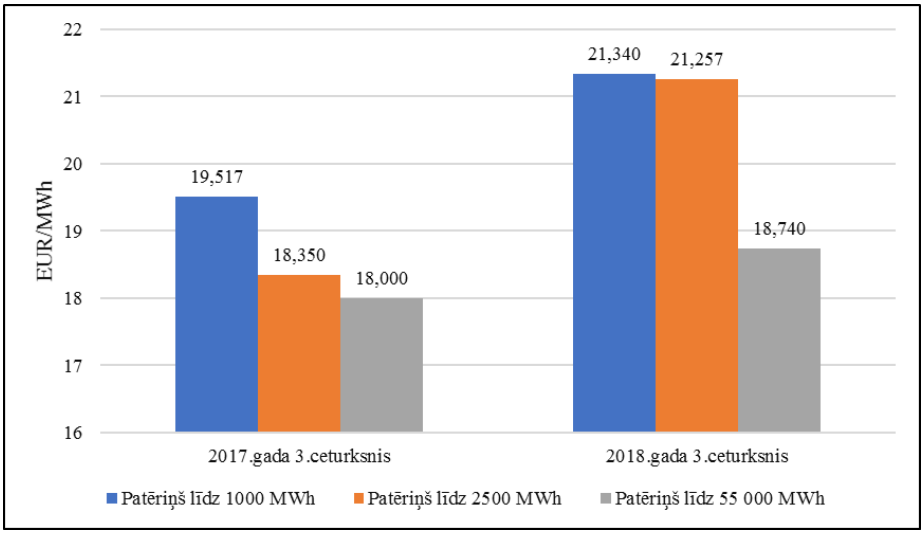
Figure 33. Changes in the price of natural gas for non-household consumers, EUR per kWh (bi-annual)[92]

Latvia closed 2017 with one of the lowest wholesale prices of natural gas in the EU, at EUR 17.11 per megawatt hour (in Q4 2017), which was the lowest price across the Baltic Sea region[93]. However, the average sales price of natural gas in 2017 was EUR 2.60/MWh higher than in 2016 (14.51 EUR/MWh). The wholesale price of natural gas on the German market area Gaspool in August 2018 was EUR 5.20/MWh higher than in August 2017, while on the Dutch trading point Title Transfer Facility (TTF) the price increased by EUR 4.73/MWh. In

[92] http://ec.europa.eu/eurostat/data/database

[93] https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_q4_2017_final_20180323.pdf

2018, the wholesale price of natural gas continued to gradually grow until November, where the highest wholesale price of 2018 – EUR 26.29 per megawatt hour – was reached. Contrary to projections, a decline has since started and in September 2019 the average *Gaspool* wholesale price was EUR 9.64 per megawatt hour.



Key reads:

Consumption up to 100 MWh, consumpion up to 2500 MWh, consumption up to 55 000 MWh

Figure 34. Indicative average sales prices of natural gas and price ranges in procurements for legal persons[94]

2.5.3.3. Development projections

Since the electricity consumed in Latvia is purchased from the Nord Pool wholesale market, the electricity market of the Baltic States and Nordic countries is highly developed. In 2018, the electricity price in Nordic States and the Baltic States rose significantly within the space of a year along with the overall global increase of energy prices (oil, natural gas, coal) and the increase of the emission allowance price. Since 2017 the prices have increased by 88 % in the Nordic countries, by 52 % in Estonia, and by 58 % in Latvia. Although the electricity price continued to increase in January 2019, a decline has been observed since February both compared to the previous year and the previous month, relative to the reduction in prices of natural gas and coal. The market price of electricity may well remain at the same level in 2020. However, this will depend on the weather conditions in both the Scandinavian countries and Latvia. TSO has developed an electricity and electric power balance projection, as well as an electricity consumption projection with at least three scenarios[95].

The wholesale price of natural gas in future will depend on many interrelated factors, including fluctuations of natural gas wholesale prices on exchanges and geopolitical developments around the world.

2.5.4. Energy poverty and energy availability

The EC's Energy Poverty Observatory defines energy poverty is a special type of poverty related to a number of adverse effects on human health and well-being, e.g. respiratory and

[94] https://www.iub.gov.lv/lv/iubsearch/q/dabasg%C4%81ze/
[95] http://www.ast.lv/sites/default/files/editor/PSO_Zinojums_2018.pdf

heart disease and mental health influenced by low temperatures and stress related to gas, heating, and electricity bills that people cannot pay. Energy poverty has an indirect impact on various quality-of-life indicators defining the well-being of households and people, including health, environment, and productivity[96]. Furthermore, the European Economic and Social Committee has defined energy policy as finding it difficult or impossible to ensure adequate heating in the dwelling and to access other essential energy services at a reasonable price. This concept has not been defined in Latvia's development planning document and laws as of yet.

In order to evaluate the scope of energy poverty, the Energy Poverty Observatory proposes reviewing a number of indicators – the share of households having utility bill debts; the share of households whose absolute energy consumption is less than half of the average indicator for that country; the share of households whose share of energy consumption in income is twice as high as the national average; the share of households that could not afford heating due to lack of money. Presently, the latest statistical data are available only for the indicator 'the share of households that could not afford heating due to lack of money', which the Plan sets as the main indicator in the energy poverty indicator.

In 2017, lack of money meant that heating was unavailable for 9.7 % of dwellings EU – 7.8 %) of inhabitants or 11.6 % of all households, but in 2018 this indicator had fallen to 7.5 % (EU – 8 %) of the Latvian inhabitants or 9.8 % of all Latvian households[97]. This indicator has generally improved since 2005, though it significantly worsened in the period from 2009 to 2013 due to the global economic downturn. This share in Latvia is a special problem of a social nature, in particular for the households living in social houses/apartments. In 2018, 15.7 % of the population were living below the poverty threshold and 18.4 % of households below the poverty threshold could not afford heating[98]. Moreover, the situation is different if certain types of households are analysed — some types of households differ considerably from the EU-28 figure.

Table 10. Households that could not afford heating due to lack of money *(%)*[99]

	1-person households (of all inhabitants)		1-person households (AROP[100])		1-person households >65y. (of all inhabitants)		1-person households >65y. (AROP)		Two adults with two dependent children (AROP)		Two adults with three dependent children (AROP)	
	LV	**EU**	**LV**	**EU**	**LV**	**EU**	**LV**	**EU**	**LV**	**EU**	**LV**	**EU**
2016	20.1	10.9	27.8	19.3	22.6	10.5	34.5	20.6	15.8	17.6	28.4	21.7
2017	16.8	10.7	23.8	19.7	19.6	10.7	27.8	20.3	23.5	16.8	26.8	18.4

Also, if we look at other potential energy poverty indicators, then delays in the supply of utilities in Latvia in 2018 were observed in the case of 11.6 % of all inhabitants.

The support in addressing housing issues shows the number of recipients of the housing allowance, the average amount of the housing allowance, and the resources spent for this purpose. Housing allowance was granted to 93 700 inhabitants (4.8 % of the total population) in 2017 and to 83 00 inhabitants (4.3 % of the total population) in 2018. The

[96] https://www.energypoverty.eu/about/what-energy-poverty

[97] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_mdes01&lang=en; https://data1.csb.gov.lv:443/sq/32931

[98] https://data1.csb.gov.lv/pxweb/lv/sociala/sociala__nabadz_nevienl__matnenodr/MNG010.px/table/tableViewLayout1/; https://data1.csb.gov.lv/pxweb/lv/sociala/sociala__nabadz_nevienl__matnenodr/MNG020.px/table/tableViewLayout1/

[99] The table includes types of households differing from the EU-28 average by more than 4 percentage points.

[100] At risk of poverty

average amount of the housing allowance for one person was EUR 177 in 2017, and EUR 180 in 2018. The municipalities spent EUR 16.5 million on housing allowances in 2017, and EUR 14.0 million in 2018.

Energy poverty reduction solutions are developed by implementing the NRP "Energy" project[101] "Sustainable Energy Infrastructure and Market", within which the energy poverty situation in Latvia is evaluated, the energy poverty definition is being developed, including development of energy poverty criteria for Latvia, and, based on the developed criteria, the social groups at risk of energy poverty are identified. This project is expected to end in 2021, and its results will be incorporated into the updated plan of 2022-2023. Similarly, the Latvian Association for Protection of Consumer Interests in cooperation with the Jelgava Real Estate Administration participates in the international project STEP, which defined energy poverty criteria based on the experiences of other countries, and solutions for prevention of energy poverty are being sought.

The approach to prevention of energy poverty in Latvia mainly focuses on social policy. When necessary, municipalities should ensure the minimum level of income for all households, and they may also provide a housing allowance to all households, which includes costs of electricity and heating. Moreover, central government provides financial support to individual vulnerable population groups to allow them to pay for electricity.

Poor households may benefit from some general energy policies. EEOS stipulates that electricity suppliers should reach a known energy saving by informing consumers about energy efficiency and promoting energy efficiency improvements. The 'Live Warmer' measure is an agreement signed by different stakeholders in the public and private sector to promote energy renewal in cooperation and provision of information to households.

2.5.5. Current division of price components

PUC observes the basic principle defined in the Law on regulators of public utilities when determining the tariff for natural gas supply services: the tariffs should be determined such that the tariff payments made by the users are economically justified costs of service provision and ensure profitability of public services. The draft tariff includes only the costs applying to the provision of the specific service and that are economically justified. PUC determines the methodology for calculation of natural gas transmission, storage, distribution services and the natural gas transmission service tariff, the natural gas storage service tariff and the natural gas distribution system service tariff are determined in accordance with it.

[101] https://www.em.gov.lv/lv/nozares_politika/valsts_petijumu_programma_energetika_/konkurss_ilgtspejiga_energetikas_infrastruktura_un_tirgus_/

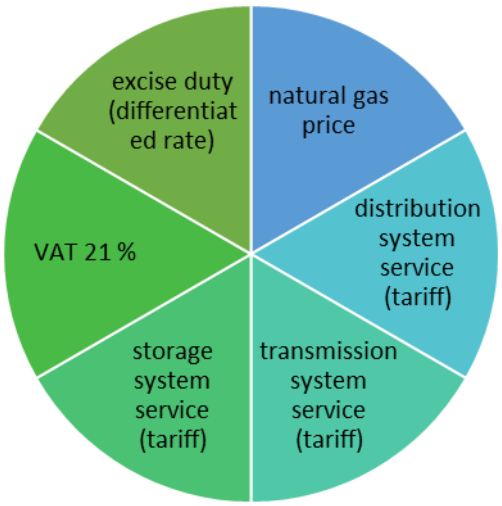
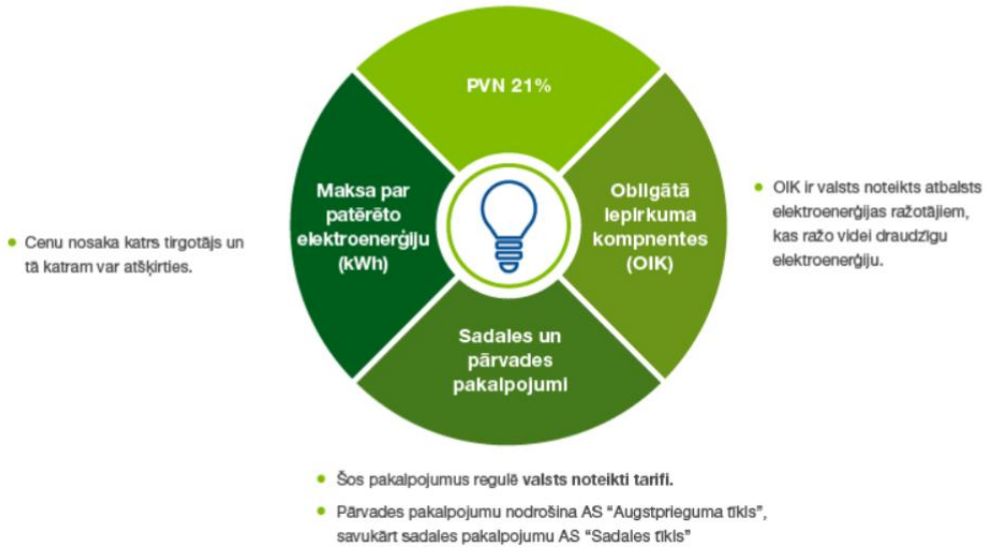


Figure 35. Division of price components for the final natural gas consumer[102]

The wholesale price of electricity is one of the components in the final electricity price, where the final price also included transmission and distribution system service, MPC and VAT. The costs (tariffs) of services of the transmission system operator and the distribution system operator in Latvia are approved by PUC. The transmission service and the distribution service is only one of the items in the bill and is determined using a differentiated tariff. The tariff (distribution and transmission services) may consist of: fees for delivery of electricity; fees for provision of electricity; fees for the current of the input-output device; fees for permitted load.



Pie chart reads from top, clockwise:

VAT 21%, OIK (Obligatory procurement component is the State aid for electricity producers who produce environmentally friendly energy)

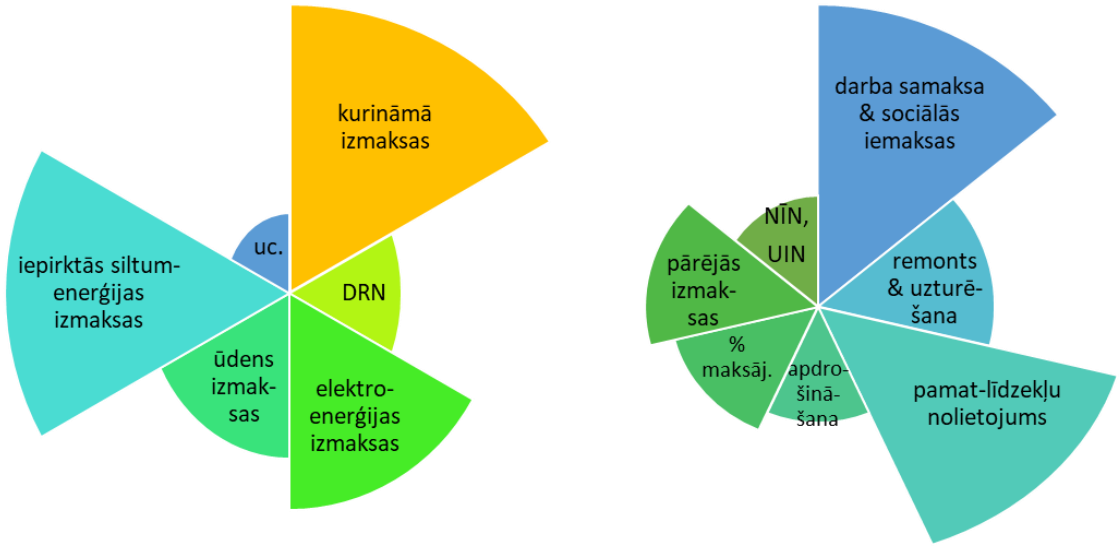
Distribution and management services (these services are regulated by State-set tariffis. Management services are provided by As prieguma tikls and distribution services by AS Sadales tikls

[102] Source: AS 'Latvijas gāze'

Fee for electrical energy consumed (the fee is set by each operator and may vay)

Figure 36. Division of price components for the final electricity consumer[103]

In the heat supply sector, regulated services include the production of thermal energy, the transmission and distribution of thermal energy, and the trading of thermal energy. Trading of thermal energy is regulated up to the so-called 'proprietary border' with the user, usually the point of entry of the heating network into the building. The use of thermal energy in a building is not a regulated service. The thermal energy supply service is regulated if the total volume of thermal energy is more than 5000 MWh/year. However, small heat supply systems are not regulated to avoid any additional administrative burden on heat supply undertakings and thus not to increase heat supply and tariffs.



Key to LH diagram reads, clockwise from top:

Fuel costs, DAT, electricity costs, water costs, bought in heading costs, etc.

RH diagram reads, clockwise from top:

Remuneration for work and social contributions, repairs and maintenance, use of basic funds, insurance, % due, other costs, NIN, UIN

Figure 37. Distribution of components of variable costs (left side) and constant costs of tariffs of thermal energy (right side)[104]

End tariffs of thermal energy vary across populated areas, and these differences determine the conditions of provision of the services – selected technological solutions of the thermal energy system, compactness of the heating system and its technical condition, as well as geographical and other peculiarities of each populated area (landscape, development density, number of heating user, etc.) and the number of inhabitants in the populated area. Costs of service provision that are necessary to provide the service depend on these conditions. Most of the total final tariff of thermal energy consist of fuel costs or costs of

[103] Source: AS 'Sadales tīkls', except other small distribution system operators

[104] Source: PUC

The image does not reflect real proportions, but demonstrates the scope of impact of tariff components

purchased thermal energy and fixed costs, which include payment for work, depreciation of fixed assets and other costs. Other costs are comparatively small.

Final prices of fuel in all EU Member States are built based on a similar principle, where the price consists of three basic components – fuel purchase price, state duty and taxes, retailer's costs. The purchase price of fuel is formed by components like oil and fuel prices, foreign currency fluctuations, geopolitical situation, climatic situation, quality requirements, as well as demand. State duties and taxes include excise duty, state duty for maintenance of security reserves and value added tax. In turn, retailer's costs cover adding of different fuel admixtures, company maintenance and development costs, they include maintenance of the filling stations and personnel costs.

2.5.6. Description of energy subsidies

According to the information provided by the EC energy subsidies are:

- Tax expenses (exceptions and reductions, tax credits);
- Direct transfers (grants, soft loans);
- Indirect transfers (capacity mechanisms).

2.5.6.1. Tax and duty expenses

Excise duty

The purpose of the excise duty is to restrict consumption of goods, which are harmful for the environment and human health. Presently, excise duty applies to petroleum products and natural gas. Excise duty does not apply to coal and other fossil fuels, as well as peat. At the same time, natural resources tax should be paid for fuel. Presently, different excise duty rates apply to petroleum products and natural gas depending on the purpose of their use.

Table 11. Excise duty rates for natural gas and petroleum products in 2019 (EUR)

	applicable excise duty rate	excise duty rate from 01.01.2020
for the use of natural gas as a heating fuel (per 1 MWh)[105]	1.65	1.65
for the use of natural gas as a motor fuel (per 1 MWh) [106]	9.64	9.64
for the use of natural gas as a heating fuel in industrial and other industry related processes, for operation of technological equipment for pre-processing of agricultural raw materials and for ensuring technologically necessary climate in the premises for industrial production and pre-processing of agricultural raw materials (per 1 MWh)	0.55	0.55
unleaded petrol (per 1000 l)	476	509
unleaded petrol with added ethyl alcohol (bio 5 %) (per 1000 l)[107]		
unleaded petrol with added ethyl alcohol (E 85)[108] (per 1000 l)[109]	142.8[110]	152.7[111]

[105] applies based on the highest calorific value
[106] applies based on the highest calorific value
[107] Ethyl alcohol obtained from agricultural raw materials and dehydrated (with alcohol content of 99.5 % Vol.) and absolute alcohol content forms at least 5.0 % Vol. of the total product volume

	applicable excise duty rate	excise duty rate from 01.01.2020
leaded petrol (per 1000 l)	594	594
diesel (per 1000 l)	372	414
diesel bio (5%-30%(per 1000 l))[112]		
diesel with bio admixture of at least 30% (per 1000 l))[113]		
biodiesel (per 1000 l)[114]	0	0
kerosene (per 1000 l)	372	414
fuel oil (heating oil) (per 1000 l)	15.65	15.65
fuel oil (per 1000 l)[115]	372	414
petroleum gas and other gaseous hydrocarbons (per 1000 kg)[116]	244	285
marked fuel (per 1000 l)	56.91	56.91
marked fuel (bio 5%) (per 1000 l)	21.34	21.34
diesel for farmers[117] (per 1000 l)[118]	55.8	62.1

Differentiated rates of excise duty may also be considered energy subsidies with regard to heating or motor fuel, which are subject to lower excise duty rates compared to other types of heating or motor fuel.

The Law on Excise Tax provides that those petroleum products shall be exempt from excise duty, which are delivered and used:

- for other purposes (as a raw material rather than as a motor or heating fuel);
- aircraft and ships, which are not used for private leisure and recreation;
- for production of electricity or in combined equipment, which produces electricity and thermal energy;
- in the process of chemical treatment, adding coke used as a heating fuel
- dual-use;

The Law on Excise Tax provides that EUR 0 rate of excise duty applies to:

[108] the tax for 1000 litres is calculated in the amount of 30 % of the rate for unleaded petrol
[109] Ethyl alcohol obtained from agricultural raw materials and dehydrated (with alcohol content of 99.5 % Vol.) and absolute alcohol content forms at least from 70.0 to 85.0 % Vol. of the total product volume
[110] absolute alcohol content from 70 to 85 % Vol.
[111] absolute alcohol content from 70 to 85 % Vol.
[112] biodiesel or rape seed oil forms 5 to 30 (not inclusive) % Vol. of the total volume of petroleum products
[113] biodiesel or rape seed oil forms at least 30 % Vol. of the total volume of petroleum products
[114] biodiesel, which was fully obtained from rape seed oil, and rape seed oil, which is sold or used as heating or motor fuel
[115] fuel oil with colorimetric index of less than 2.0 and kinematic viscosity of 50° C is smaller than 25 mm²/s, its substitute products and components
[116] if delivered for the use as a heating fuel – EUR 0
[117] the tax for 1000 litres is calculated in the amount of 15 % of the rate for diesel
[118] diesel (gas oil) and such diesel (gas oil) with added biodiesel obtained from rape seeds and used in accordance with the type, goals and conditions defined in Section 18 of the Law on Excise Tax (for production of agricultural products, for treatment of agricultural land, as well as for treatment of such forest or bog land, where cranberries or blackberries are cultivated and for treatment of land under fish ponds, if minimum income from agricultural production are ensured) and are marked

- biodiesel, which was fully obtained from rape seed oil, and rape seed oil, which is sold or used as heating or motor fuel;
- petroleum gases and other gaseous hydrocarbons, if they are delivered to the persons, which use them as heating fuel or has in furnaces and other equipment rather than as a fuel.

Value added tax

Reduced VAT rate (12 %) applies to individual coke fuel deliveries, if its actual consumer is an inhabitants, who purchases and consumes coke heating fuel for the needs of a household, and to delivery of thermal energy, if its actual consumer is an inhabitant, who purchases and consumes thermal energy for the needs of a household.

VAT does not apply to the importation of gas through a natural gas system or any network connected to such a system or fed in from a vessel transporting gas into a natural gas system or any upstream pipeline network, of electricity or of heat or cooling energy import through heating or cooling networks.

NRT

NRT is applied for emissions of different air pollutants or emitting of GHG emissions into the atmosphere. The NRT rate is applied to each specific air pollutant or GHG. NRT for CO_2 emissions does not apply to the equipment, which are included for combustion of EU ETS and biomass and peat.

Coal, coke and lignite (brown coal) which are used for production of electricity, as well as production of heating and electricity in the process of cogeneration, as well as for sale of coal, coke and lignite (brown coal), if the selling person has a licence for production of electricity or licence for production of heating and electricity in the process of cogeneration is subject to EUR 0 NRT rate.

VOT

In accordance with the Law on the Vehicle Operation Tax and Company Car Tax the tax should be paid every year by persons, who own, hold or possess or have a registered vehicle in Latvia (excluding tractor equipment, such trailers and semi-trailers, the full weight of which does not exceed 3500 kg, trams, trolleybuses, off-road vehicles, snow motorcycles, mopeds and bicycles) or a vehicle subject to a tax shall get transit licence plates.

VOT is not paid for:

- a single passenger car, motorcycle, tricycle or quad bike registered as owned, held or run by a disabled person;
- the vehicle, which has been or is registered in ownership, holding or possession of a representation of a diplomatic, consular or international organisation, which has diplomatic or consular privileges and immunity;
- the vehicle, which is written down or is written down along with other registration activity;
- the vehicle, which has been or is registered as an emergency vehicle;
- the vehicle, which is registered as a property is a natural person, for time since death of this natural person until its owner changes or possessor is registered;

- the vehicle for which the status of a historical vehicle has been or is registered or which has been or is registered as a sports vehicle;
- such a vehicle which by construction uses energy from the electricity stored in the vehicle or driving force storage units as the only mechanical driving force (for example, a battery, a condenser, a fly-wheel or a generator);
- a passenger car, the owner, holder or possessor of which or the spouse of such a person has a dependent disabled child;
- the vehicle, which has been deregistered by the insolvency administrator of the vehicle owner for alienation in Latvia or removal from Latvia, or in a vehicle, which is deregistered temporarily by delivering licence plates;
- a vehicle registered as owned, held or run by a member of headquarters of allied forces or their dependents, of this person is not a citizen or permanent resident of Latvia.

VOT relief of 50 % shall apply:

- to vehicle (except an emergency vehicle), the owner, holder or possessor of which is an institution subordinated to the Ministry of the Interior;
- to vehicle (except an emergency vehicle), the owner, holder or possessor of which is an institution subordinated to the Ministry of Defence or National Armed Forces;
- to vehicle (except an emergency vehicle), the owner, holder or possessor of which is an institution of municipal police;
- to a large family for one vehicle registered in its ownership, holding or possession.

VOT of 25 % of the VOT rate shall apply:

- to a producer of agricultural products, an agricultural service co-operative society and a recognised aquaculture (pond farm type) farm – for a goods vehicle, which is intended by construction for the transportation of different goods, and a trailer or semi-trailer, which is intended by construction for the transportation of different goods, observing special conditions;
- to the vehicles with which a natural person or legal person included in the database of recipients of the Rural Support Service payments carries out own-account carriages, observing special conditions;

The total amount of VOT and CCT reliefs on which information is available, was EUR 14.3 million in 2017, which was by EUR 3.8 million or 36.4 % more than in 2016.

Electricity tax

According to the Electricity Tax Law, electricity used for the carriage of goods and public carriage of passengers, including on rail transport and in public carriage of passengers in towns, as well as household users shall be exempt from tax.

The electricity delivered or EU or other foreign representatives or organisations is exempt from the tax*:*

- in the context of diplomatic or consular relations;
- for international organisations, which have been recognised as such by the public institutions, where such organisations are located, as well as members of these

organisations in accordance with international conventions establishing these organisations or agreements of their home countries;

- armed forces of any member states of the North Atlantic Treaty Organization, except the member state collecting the electricity tax, as well as armed forces mentioned in Article 1 of Council Decision 90/640/EEC of 3 December 1990, for consumption of these armed forces and civil staff accompanying them, or for the needs of kitchens or canteens of these armed forces;
- for consumption in accordance with the agreements concluded with foreign countries, which are not EU Member States, or international organisation, unless such an agreement has been permitted or approved with regard to exemption from value added tax.

For the electricity supplied to persons for provision of street lighting services, the tax is calculated using the zero euro rate per megawatt hour.

The total amount of the exemption from the electricity tax was EUR 2.6 million in 2017, which is 0.01 % of GDP. In 2017, the amount of the exemption from the electricity tax was 56.5 % of actual income from the electricity tax (EUR 4.6 million).

2.5.6.2. Direct transfers

One project applying to fossil energy sources with regard to reconstruction and renovation of production buildings extending the economic activity of a peat management company in manufacturing has been implemented so far within the EU funds aid programmes promoted by the MoE.

2.5.6.3. Indirect transfers

In accordance with the Electricity Market Law, state aid is provided in Latvia for production of electricity from RES or in cogeneration and undertakings receive a fee for the capacity installed in the cogeneration stations in a mandatory procurement. Mandatory procurement is a state support mechanism for producers of electricity, which provides for funding from payments of end users of electricity. All Latvian end users of electricity subject to the mandatory procurement component cover the costs of mandatory procurement according to their electricity consumption, which is included in the final price of electricity in addition to the market price of electricity, the distribution and transmission and the value added tax.

Table 12. Aid over the market price received within the scope of the mandatory procurement mechanism in 2018

Received type of aid	2018/year
fee for the capacity installed at a cogeneration station	**37,718,743**
production of electricity in cogeneration	**24,943,462**
production of electricity at biogas plants	**43,444,604**
production of electricity at biomass plants	**41,086,552**
production of electricity at HPPs	**5,172,712**
production of electricity at WPPs	**6,530,299**

Any Latvian undertaking, which receives the guaranteed payment for installed electrical capacity, in accordance with the set restriction among other things use peat as a resource for acquisition of energy. The amount of peat used at the power plant in 2018 amounted to approximately 6 % of the resources used for acquisition of energy for the energy value.

2.6. Research, innovation and competitiveness

2.6.1. Current situation in research, innovation and boosting competitiveness and in the technology sector

Current R&I and industry policies support R&I activities in different areas, however the development and implementation of clean technologies is not supported in a targeted way for the purposes of reaching specific energy efficiency and decarbonisation targets.

Research capacity, i.e. the number of scientific employees (scientists, technical and service staff) in Latvia (full-time equivalent – FTE) in 2017 was 5378, which was 0.62 % of the total number of employees in Latvia, which is almost twice less than the EU average (1.39 %) (EUROSTAT, 2017). Out of the total Latvian scientific staff (FTE) approximately 1000 or 18 % are involved in research in priority areas of the Energy Union[119] – energy, construction, climate, environmental engineering technologies.

In comparison with the 50 countries registered in the European Patent Office, in 2018, Latvia was ranked 39th with 6.2 patent applications per 1 million residents based on total patent activity indicators depending on the population. In the period from 2014 to 2017, 11 or 17 % of the patent applications of 63 Latvian residents registered with the European Patent Office[120] related to smart energy and clean technologies (Engineering technologies, lighting, heat supply; Electricity; Mechanics, materials, and other engineering technologies). Patents registered for innovative biomass combustion equipment, biofuels, wind and solar energy technologies.

Taking into account current development trends, global challenges and potential opportunities of the industry towards production of high value added products, NIPG2020 has set the goal to promote the structural changes of economy in favour of production of goods and services with higher profitability, including the increase in the share of industry, modernization of industry and services and a broader range of exports.

Several new initiatives have been started and implemented for fostering the innovation and business discovery process:

- promotion of development of the start-up system – updating the regulation, support of a one-stop-shop agency for start-ups, incl. support for participation in international industry conferences and bilateral meetings with investors; ensuring the availability of risk capital funding, reliefs – start-up visas – to attract highly qualified young employees from third countries, which offers simplified conditions for receiving an EU blue card;
- State capital companies innovation platform – created in 2018 as a cooperation platform for the implementation of inter-branch innovation projects for the purposes of promoting an increase in investments of Latvian State capital companies in research and development in order to create new innovative and export-capable products and services. The platform was created by the Ministry of Economics in close cooperation with CM, CSCC and 4 most active state capital companies 'Latvenergo', 'LMT', 'Lattelecom', 'Latvijas valsts meži'.

[119]National Information System of Research Activity (NISRA), Registry of Persons Elected in Academic Positions in Scientific Institutions, (data as at 08.08.2019.) **Error! Hyperlink reference not valid.**
[120] European Patent Office, https://www.epo.org/

- establishment of the Latvian Innovation and Technology Support Fund – the possibilities of establishing the fund have now been evaluated with a view to developing a single research and innovation management and technology transfer ecosystem.

At the same time, measures under various aid programmes are helping improve the export capacity of companies and promote the entry into new export markets – support for undertaking to participate in international exhibitions using individual stands in foreign countries and in conferences, seminars abroad by means of stands, to participate in trade missions o foreign countries, to take part in visits by senior Latvian officials to foreign countries organised by IDAL, to man national stands organised by IDAL, to organise business travel events in Latvia, and to assess the conformity of production facilities and products.

2.6.2. Measures to promote the implementation of innovative technologies

The development of the sector of clean technologies is directly related to R&I capacity – human capital and public and private sector investments in R&I.

The most important measures funded by EU structural funds, which are aimed at the development of new technologies and innovations, knowledge and technology transfer, commercialisation of research results, creation of products and services with higher added value and improvement of competitiveness of companies, including in energy efficiency and decarbonisation areas, are: *the practical research programme, competence centres, technology transfer programme and cluster programme*.

The practical research programme is aimed at the implementation of research and technology development projects aimed at commercialisation. The implementation of 118 projects started on 1 January 2019, 17 or 14 % of which are being implemented in areas relating to smart energy.

Eight competence centres are up and running under the *competence centres* measure, including the "Competence Centre of Smart Engineering Systems, Transport and Energy"[121], which provides support to experimental and industrial research. Implementation of a total of 191 projects had been started in all competence centres by 31 December 2018. By 31 December 2018, 174 studies had been completed and the products created as a result of them are being manufactured or are expected to be manufactured in the very near future. 149 economic operators received support to introduce new products and technologies.

The purpose of the *technology transfer system* is to promote knowledge and technology transfer and commercialisation of research results. 41 projects for the development of a feasibility study and a commercialisation strategy had been approved by the end of 2018 under the programme, 24 of which were supported for commercialisation of research results. In parallel, the cooperation of research organisations with undertakings is being promoted, with scouts from the Department of Technology being involved in the process. Technology scouts know research organisations, their staff and the services they provide. Scouts in research organisations identify potentially marketable research projects and help develop them. Currently, IDAL has seven technology scouts: one at the University of Latvia, one at the Riga Technical University and five in the following sectors: bio economy, smart energy, biomedicine, smart materials, information and communication technologies.

The *cluster programme* is implemented for the purposes of promoting cooperation between undertakings and research, education, municipal and other institutions operating in

[121] Competence Centre of Smart Engineering Systems, Transport and Energy, http://www.vitekc.lv/

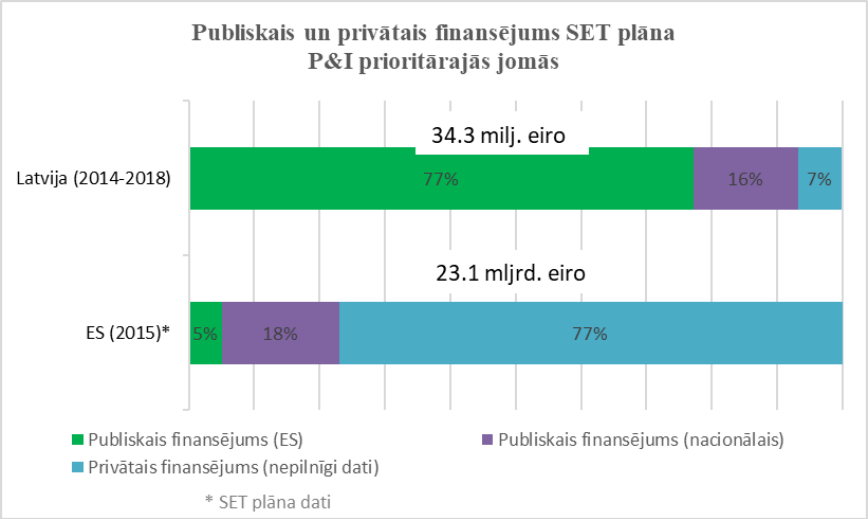
interrelated industries, a national economy niche, a group of products or services or a value chain, or a region at local and international level with a view to improving the capacity of undertakings to create products and services with high added value and to promote their export capacity. 14 clusters are receiving support under the programme, two of which operate directly in the field of clean technologies (Cleantech and Green and clean technology cluster).

Funds to assist 36 innovative energy efficiency and RES smart technology by means of demonstration projects were granted by the end of 2018 within EAAI covering both direct reduction of GHG emissions and indirect reduction of GHG emissions as a result of project demonstration and the multiplier effect. Indirect GHG reductions are very important, as reaching climate targets requires gradual, comprehensive and significant changes in the economy and people' s lifestyles. Demonstration projects, e.g. in the tender "Reduction of Greenhouse Gas Emissions — Low Energy Consumption Buildings", attract public attention and encourage an increasing number of people to, if not transition to low energy consumption buildings, at least implement energy efficiency measures, with a significant investment multiplier effect in terms of the further reduction of GHG emissions in the building sector.

In the waste management sector the plan is to provide funding for recycling biodegradable waste by using anaerobic digestion technology for producing biogas, thus also ensuring recovery and efficient use of methane through implementation in the 2014–2020 programming period. For the development of the internal energy market to strengthen internal energy security and for reduce the use of fossil energy sources, projects for waste recovery with energy recovery for infrastructure development are being implemented.

2.6.3. Current expenditure

The development of the Latvian R&I system has been considerably delayed by low levels of funding for research – the target indicator set in the National Reform Programme of Latvia for the Implementation of the EU 2020 Strategy[122] for investments in R&D for 2020 is 1.5 % of GDP, while investments in R&D have not reached 0.7 % of GDP in the last 5 years, which is a significant obstacle to the development of R&I in any economic sector. At the same time, compared to the EU average trend, Latvia has a considerably high share of public funding contributions and a small amount of private sector investments in the R&I energy area.



[122] http://polsis.mk.gov.lv/documents/4294

Figure 38. Investments of the public and private sector in clean energy technology R&I in Latvia compared to total EU investments

Key should read:

Public and private funding in R&I priority fields under the SET plan

Latvia (2014-2018) EUR 34.3 billion

EU (2015) EUR 23.1 billion

Public funding (EU), public funding (national), private funding (partial data_

- * SET plan data

3. NATIONAL OBJECTIVES AND TARGETS

The plan defines energy and climate policy targets and target indicators arising from EU laws, the conditions for determining which are defined in EU laws or are defined or can be defined in Latvian policy planning documents or laws. Chapter 3 of the plan sets targets and target indicators for EnU dimensions.

3.1. Decarbonisation

3.1.1. GHG emissions and CO_2 sequestration

Since Latvia is a member of the EU and the UN, its climate objectives are in line with EU climate policy objectives, as well as the international climate policy — the Convention, Kyoto Protocol, and Paris Agreement[123].

At EU level, there is a common GHG emission reduction target that is divided into two parts: activities covered by the ETS and activities not covered by the ETS (non-ETS activities). Common EU targets for the period from 2021 to 2030:

- ETS operators have to reduce the total GHG emissions in the EU by 43 % in the given period (compared to the GHG emissions of these operators in 2005).
- the total non-ETS GHG emissions have to be reduced by 30 % in the given period (compared to GHG emissions from non-ETS activities in 2005).

Enforcement of the target is the responsibility of the EC. In order to meet this target, conditions for the operation of ETS and the responsibilities of ETS operators have been approved by EU legislation. GHG emission reduction measures for ETS operators have been established in a coordinated way in Directive 2003/87/EC and the development and implementation of these measures is ensured by the EC together with the EU Member States by complying with the requirements and conditions laid down by Directive 2003/87/EC. Latvian economic operators also participate in the ETS.

The GHG emission reduction target from non-ETS activities (hereinafter — non-ETS target) is redistributed among all EU Member States, including Latvia. The target for each EU Member State and conditions for its fulfilment for the period from 2021 to 2030 are laid down by Regulation 2018/842. Latvia has to ensure a GHG emission reduction from non-ETS activities by 6 % in the period from 2021 to 2030 compared to the GHG emissions from non-ETS activities in 2005. The target for the entire period is divided into binding annual targets.

The commitments for GHG emission reduction and CO_2 removals from LULUCF activities have been set for each EU Member State, including Latvia. The target and conditions for its fulfilment for the period from 2021 to 2030 are laid down by Regulation 2018/841.

The transport energy life-cycle GHG emission intensity reduction target is set in Article 7a of Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC , which lays down that, as from 31 December 2020,each Member State must ensure that its fuel suppliers reduce the intensity of energy life-cycle GHG emissions for supplied for final consumption in transport by at least 6 % compared to the baseline standard of 2010. Sustainable biofuel – biofuels and biomass fuels produced from food and animal feed crops (first generation biofuels) and advanced biofuels, alternative fuels, electricity – should be used to meet this target.

[123] https://unfccc.int/sites/default/files/english_paris_agreement.pdf; https://unfccc.int/sites/default/files/resource/docs/2015/cop21/eng/10a01.pdf; https://likumi.lv/doc.php?id=288575

Table 13. Latvia's targets for GHG emissions and CO_2 removals and their performance indicators

Policy outcome in the sub-dimension of GHG reduction and CO_2 removals of the decarbonisation dimension	Actual value	Target value	
	2017[124]	**2020**	**2030**[125]
total reduction of GHG emissions			
% to 1990	-57	-	**-65**[126]
Mt CO_2 eq.	11.3	12.13	**9.2**
GHG emissions from non-ETS activities[127]			
% to 2005	+8.4	+17	-6
Mt CO_2 eq.	9.3	10	8
GHG emissions from ETS activities			
% to 2005	-28.2	-21	-
Mt CO_2 eq.	2.0	2.3	-
LULUCF accounting categories[128] (million units)[129]	**-**	**-**	**3.1**[130]
Transport energy life-cycle GHG emission intensity reduction (%)	0.8	6	≥6

3.1.1.1. Latvia's targets for GHG emission reduction from non-ETS activities for 2030 and annual objectives for 2021–2030

Annual non-ETS targets for Latvia for the period from 2021 to 2030 will be set only in 2020-2021 by using the latest available verified GHG inventory data for 2005, 2016, 2017, and 2018 by adopting the EC implementing act referred to in Article 4 of Regulation 2018/842. The annual GHG emission reduction specified in the Plan is therefore indicative. However, considering the EC recommendations and Article 4(a)(1) of Regulation 2018/1999, Latvia has to calculate the binding annual emission allocations for 2021 to 2030 according to the formula provided for in Regulation 2018/842.

Table 14. Indicative binding non-ETS targets calculated by Latvia for 2021–2030[131]

	amount of GHG emissions from non-ETS activities used in the calculation (tonnes)[132]	**emission allocation in 2020**[133]	**annual emission allocations for 2021-2030**[134]	
			Method 1	**Method 2**

[124] https://unfccc.int/documents/194812

[125] Regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, bold font is used for the binding targets to be defined in the Plan

[126] Informative report "Latvian strategy for reaching climate neutrality by 2050"

[127] Pursuant to Article 5, 7, 10 and 11 of Regulation 2018/842

[128] GHG emission reduction and CO_2 removal target in LULUCF accounting categories in 2030

[129] Pursuant to Article 12 of Regulation 2018/841

[130] Regulation 2018/841; Regulation 2018/842

[131] The values provided in the table are indicative, because the verified GHG inventory data for 2005, 2016, 2017 and 2018 submitted in 2020 will be used for calculations

[132] The calculation of GHG emissions from non-ETS activities has been carried out using the EC formula – total GHG emissions of the state minus amount of carbon dioxide emissions verified by EU ETS operators minus local aviation carbon dioxide emissions. Data sources: https://unfccc.int/documents/194812; https://cdr.eionet.europa.eu/lv/eu/mmr/art08_proxy/envxta4zg

[133] https://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:32017D1471&from=EN; https://eur-lex.europa.eu/legal-content/LV/TXT/HTML/?uri=CELEX:32013D0634&from=EN

[134] Calculated in accordance with the 2 calculation methods referred to in the 2nd sentence of Article 4(2) of Regulation 2018/842: linear trajectory, starting on the average of its greenhouse gas emissions during 2016, 2017 and 2018 and ending in 2030, and linear trajectory starting 1) at five-twelfths of the distance from 2019 to 2020; 2) in 2020, whichever results in a lower allocation for that Member State

2005	8,551,545			
2016	9,087,543			
2017	9,271,016			
2018	*9,183,069*			
2020		9,991,829		
2021			9,002,091	9,066,334
2022			8,895,020	8,952,125
2023			8,787,949	8,837,916
2024			8,680,878	8,723,707
2025			8,573,807	8,609,497
2026			8,466,736	8,495,288
2027			8,359,665	8,381,079
2028			8,252,594	8,266,870
2029			8,145,523	8,152,661
2030			8,038,452	8,038,452

3.1.1.2.Accounting of GHG emissions and removals in the LULUCF sector from 2020 to 2030

Commitments and GHG emission and CO_2 accounting rules in the LULUCF sector for EU Member States for the period after 2020 are laid down by Regulation 2018/841. According to Article 4 of Regulation 2018/841, Latvia, making use of the provided flexibilities, shall ensure that the amount of GHG emissions accounted according to the accounting rules laid down in the Regulation does not exceed the amount of CO_2 removals accounted in the land accounting categories specified in Article 2 of Regulation 2018/841: afforested land, deforested land, managed cropland, managed grassland, managed forest land, managed wetland (accounted from 2026). The accounting of GHG emissions and CO_2 removals is performed according to Regulation 2018/841 by calculating changes in the amount of GHG emissions and/or CO_2 removals measured against the reference levels laid down by Regulation 2018/841, except afforested lands and deforested lands, as these land accounting categories are accounted using the 'gross-net' approach, i.e. no reference level is set and the accounting includes GHG emissions and CO_2 removals over the entire period. The LULUFC target is expected to be reached within the following LULUFC land use categories – cropland, grasslands and afforested forest. At the same time, there are plans to study and implement solutions focusing on the reduction of emissions affected by organic soils in the LULUFC sectors.

Table 15. Latvian target indicators for LULUFC accounting categories for 2021–2030

	2021-2025	**2026 – 2030**
Wooded area	Accounted GHG emissions do not exceed accounted GHG removals	Accounted GHG emissions do not exceed accounted GHG removals
Deforested land		
Managed forest land (*Forest reference level*)		
Managed cropland		
Managed grassland		
Managed wetland		

3.1.1.3. Other binding objectives in this category and other national objectives and targets

NDPL2020 lays down the target for the intensity of GHG emissions (tonnes of CO_2 eq. per LVL 1,000 of GDP) for 2020 and 2030, which is 1,13 and 1,07 t CO_2 eq./LVL 1,000 of GDP.

LPACC2030[135] sets as the main overarching goal – to reduce vulnerability of Latvia's people, economy, infrastructure, buildings, and nature to the effects of climate change and promote the use of opportunities created by climate change. LPACC2030 does not include quantified targets with regard to the aspects of ensuring adaptation to climate change.

3.1.2. Renewable energy

At EU level, a common binding 2030 target for all Member States for RE in the total final energy consumption is established in Directive 2018/2001[136], — a 32 % share of RE in the total final energy consumption in the EU (including electricity, heating, and transport) with national targets for 2020 as the baseline (as of 2021, the share of RE in the final energy consumption cannot be lower than national targets for 2020). All EU Member States have to determine their national contributions to the common EU target.

Table 16. Latvia's targets for RE and their performance indicators[137]

Policy outcome in the sub-dimension of RE of the decarbonisation dimension	**Actual value**	**Target value**				
	2017	**2020**	**2022**	**2025**	**2027**	**2030**
Share of renewable energy in the final energy consumption (%)[138]	39.01	40	**41.8**	**44.3**	**46.5**	**50**
indicative share of RE in production of electricity (%)	54.36	*59.8*				*>60*
indicative share of RE in production of thermal energy and cooling energy (%)[139]	54.58	*53.4*	*55.2*	*56.08*	*56.69*	*57.59*
Share of renewable energy in the final energy consumption in transport (%)[140]	2.5	10	-	-	-	**7**
share of advanced biofuels and biogas in the final energy consumption in transport[141] (%)	0	-	0.2	1.0	-	3.5

Taking into account Article 5(1)(e) of Regulation 2018/1999, Latvia has taken into account the following significant aspects when developing its contribution:

[135] http://polsis.mk.gov.lv/documents/6507

[136] https://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:32018L2001&from=EN

[137] Regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, italic font is used for the indicative targets to be defined in the Plan, bold font is used for the binding targets to be defined in the Plan

[138] Indicative values of the target indicators in 2022, 2025, 2027 have been determined in accordance with the conditions included in Article 4(a)(2) of Regulation 2018/1999

[139] Minimum indicative values of the target indicators in 2022-2030, have been determined in accordance with Article 23(1) and (2) of Regulation 2018/2001. **The values will be recalculated in 2021, taking into account the indicative share of RES in production of thermal energy and cooling energy in 2020, because the value of 2020 should be used as a reference value in the calculation in accordance with Article 23(1) of Directive 2018/2001**

[140] Minimum target value defined in Article 25 of Directive 2018/2001

[141] from modern biofuels and biogas obtained the amount of energy obtained may be counted twice, if they were obtained from raw materials specified in Parts A and B of Annex IX of Directive 2018/2001, where the scope of use of the raw materials specified in Part B is limited to 1.7 % (without double counting) from the final energy consumption in transport (by energy amount)

- Latvia has to ensure permanent capacity to provide energy security and balancing of systems, and because of its geographic location may require a significant amount of additional capacities during the colder months of the year for production of thermal energy.
- Latvia has to ensure the interconnection capacity of Latvia and take into consideration the demand for more electricity of the neighbouring countries with which the interconnections are established. The law developed by the Lithuanian Ministry of Energy and approved in October 2018, by which, when the Astravets Nuclear Power Plant starts operating, which is planned for the beginning of 2020, trading of electricity by the Baltic States with third countries will be limited, means the reduction of capacity in all Baltic States and very probably will increase the need for higher production of electricity.
- Latvia should consider the growing local demand for electricity promoted by the electrification measures included in the plan, and by improving energy security Latvia should be able to improve self-sufficiency of electricity produced by it.
- There was already a share of RE in energy production in Latvia in 2016-2017 (third highest in the EU) and a substantial further increase will be difficult to reach. The share of RES in electricity, heating and cooling in Latvia exceeds 50 %.

3.1.2.1.Sectoral share of RE in 2021–2030

Latvia has set the minimum permissible annual share of RES in the final energy consumption for the period from 2021 to 2030 as at least 40 %.

A separate target in the electricity sector has not been set in the EU legislation. For the period until 2030 Latvia is planning to increase the share of RES in electricity to reach at least 60 %.

In the heating and cooling sector, Latvia is planning to ensure the annual average increase defined in Article 23(2)(c) of Directive 2018/2001 until 2030 – to increase the share of RES in heating and cooling by at least 0.55 % per year.

In the transport sector, Latvia is planning an increase in the share of RES by at least 7 % in 2030 securing this by the use of advanced biofuels and biogas and by promoting the use of electricity in transport. At the same time, Latvia is planning to ensure that the share of advanced biofuels in 2022 constitutes 0.2 % of the total share of RES in the transport sector, increasing this to 3.5 % in 2030.

3.1.2.2.Trajectories of the use of RES technologies

Latvia is planning to increase the share of RES in production of electricity by increasing installed capacity of wind generators and solar photovoltaic components, taking into account the capacity of Latvian electricity transmission networks, which currently allows an increase in the volume of electricity transferred to networks by 800MW. Latvia is not planning to increase biomass and biogas capacities for production of electricity.

Latvia is planning to increase the share of RES in heating and cooling by modernising the installed capacities of biomass use equipment, increasing the capacity of installed heat pumps and cold pumps, as well as increasing the use of solar energy in production of thermal energy.

Latvia is planning to increase the share of RES in transport by making it obligatory for fuel suppliers to sell energy obtained from RES, whilst simultaneously promoting the production

of biomethane and its consumption in public transport, as well as continuing to develop the opportunities to use other zero-emission fuel types. In addition to railway electrification, Latvia is planning to continue more rapid development of electrical mobility as a solution for mobility, energy efficiency and RES targets.

3.2. Energy efficiency

3.2.1. Contribution of Latvia's energy efficiency to the energy efficiency target of the EU

The table below includes energy consumption volumes calculated in accordance with definitions of Directive 2012/27/EU (and Directive 2018/2002):

- primary energy consumption means gross domestic consumption of energy sources, excluding non-energy uses;
- final energy consumption is all the energy supplied to industry, transport, households, services and agriculture excluding deliveries to the energy transformation sector and the energy industries themselves.
- energy savings mean an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption

Table 17. Latvia's targets for improving energy efficiency and their performance indicators[142]

Policy outcome in the energy efficiency dimension	**Actual value**[143]	**Target value**	
	2017	**2020**	**2030**
optional target — primary energy consumption			
PJ	187.41	225	*165 – 170*
GWh	52,056.9	62,500	*45,833 – 47,222*
ktoe	4,331	5374.03	*3,940.96 – 4,060.38*
optional target — final energy consumption			
PJ	168.01	187	*145 – 149*
GWh	46,668.06	51,944.44	*40,277.8 – 41,388.9*
ktoe	4,012.73	4,466.4	*3,463.27 – 3,558.8*
mandatory national target — cumulative end-use energy savings[144]			
PJ	18.8	35.6	**73.7**
GWh	5,227.0	9,898.89	**20,472.02**
ktoe	449.44	850.9	**1760.28**

In accordance with Article 6(2) of Regulation 2018/1999, Latvia has taken into account the following significant aspects in developing its contribution:

- Latvia has to ensure permanent capacity to provide energy security and balancing of electricity systems, and because of its geographic location Latvia may require a significant amount of additional capacities during the colder months of the year;
- Latvia has to ensure the interconnection capacity of Latvia and take into consideration the demand for more electricity of the neighbouring countries with which the interconnections are established. The law developed by the Lithuanian Ministry of

[142] Regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, italic font is used for the indicative targets to be defined in the Plan, bold font is used for the binding targets to be defined in the Plan

[143] EUROSTAT, CSB

[144] calculated based on EUROSTAT data

Energy and approved in October 2018, under which, when the Astravets Nuclear Power Plant starts operating, which is planned for the beginning of 2020, trading of electricity by the Baltic States with third countries will be limited, means the reduction of capacity in all Baltic States and will increase the need for higher production of electricity;

- Latvia should consider the growing local demand for electricity promoted by the electrification measures included in the Plan, and by improving energy security should be able to improve self-sufficiency of electricity produced by it.

The Latvia's mandatory energy efficiency target – the cumulative end-use energy savings over the entire period – is determined by Article 7 of Directive 2012/27/EU, which also establishes a method for calculating the total cumulative savings. Directive 2012/27/EU provides that Latvia has to ensure new savings of 0.8 % of the annual final energy consumption annually by calculating these savings as the average over the three years before 1 January 2019.

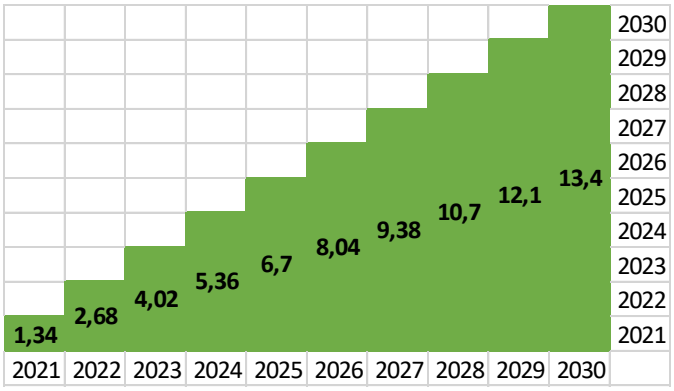


Figure 39. Theoretical calculations of the mandatory target of cumulative final energy consumption savings 2021–2030 (PJ)[145]

3.2.2. Long-term renovation strategy, optional milestone

As things stand, pursuant to Directive 2012/27/EU, the Latvian target for 2020 is the annual 3 % target for renovation of floor area of central government buildings, and Latvia is proposing to continue meeting this target up until 2030. Latvia has still not calculated the maximum projection for the total renovated floor area.

In the period up to 2030, Latvia is proposing to reduce average specific heat consumption in buildings for heating up to 120 kWh/m^2/year.

Table 18. Latvia's targets for the energy efficiency policy and their performance indicators

Policy outcome in the sub-dimension of energy performance of buildings of the energy efficiency dimension	**Actual value**	**Target value**[146]	
	2017	**2020**	**2030**
3 % of the floor area of central government buildings renovated each year (total renovated m^2)	398,707[147]	678,460[148]	**500,000**[149]

[145] 2016-2017 – EUROSTAT, 2018 – CSB

[146] Regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, italic font is used for the indicative targets to be defined in the Plan, bold font is used for the binding targets to be defined in the Plan

[147] https://ec.europa.eu/energy/sites/ener/files/documents/lv_annual_report_2019_lv.zip

[148] Maximum projection for the period from 2014 to 2020, because the target changes annually. The total target until the end of 2017 is 392,010 m^2.

[149] Maximum projection for the period from 2020 to 2030.

Policy outcome in the sub-dimension of energy performance of buildings of the energy efficiency dimension	Actual value	Target value[146]	
	2017	2020	2030
specific heat consumption in buildings for heating (kWh/m^2/year)	-	150	*120*

According to Article 2(a) of Directive 2010/31/EU, Member States have to update and submit their long-term strategies to the EC together with the final version of the plan, which is to be submitted to the EC by 31 December 2019. There is however a derogation from this condition for the Latvia's first long-term building renovation strategy that can be submitted to the EC by 10 March 2020. **Therefore the Latvian Long-Term Strategy for Renovation of Buildings is not included in this plan and will be submitted within the deadline limit laid down by Directive 2010/31/EU.**

3.2.3. Other national objectives

NIPG2020 defines the purpose of the Latvian Guidelines on National Industrial Policy as to promote structural changes in the economy for the benefit of producing goods and services with higher added value, including increasing the role of industry, modernising industry and services, and developing exports of more complex goods with higher added value, which may therefore be promoted by a successful energy efficiency improvement policy, which may promote the achievement of energy efficiency targets, ensuring reorientation of energy-intensive sectors.

3.3. Energy security

SDSL2030 set the energy dependency reduction target for 2030 as less than 50 % of imported net energy sources in gross domestic energy consumption (plus bunkering), which matches the target included in LTESL2030 – to reduce imports of energy and energy sources from the existing third country suppliers by 50 % compared to 2011.

Table 19. Latvia's targets for improving energy security policy and their performance indicators

Policy outcome in the energy security dimension	Actual value	Target value	
	2017	2020	2030[150]
Share of imports in gross national energy consumption (incl. bunkering) (%)	44.1	44.1	**30-40**
Share of imports from third countries in gross national energy consumption (incl. bunkering) (TWh)	17.7	-	**14.1**
Options to purchase natural gas from various sources (*number of sources*)	>2	≥1	**>2**

Ensuring and improving energy security is also resolved by increasing the share of RES and improving energy efficiency in order to considerably reduce the need for energy sources (local or imported), but other used energy sources would be RES of different technologies and sources as much as possible.

3.3.1. For diversification of energy sources and supply from third countries

With regard to the targets for diversification of energy sources, Latvia's goal is to significantly increase the installed capacities of wind and solar technologies, as well as the capacity of heat pumps, where this volume is currently insignificant, the goal also being to develop the use of compressed natural gas (CNG) and liquefied natural gas (LNG) in

[150] Regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, bold font is used for the binding targets to be defined in the Plan

transport and to start production of biomethane for its further use in transport or in production of electricity / thermal energy.

With regard to the goals for diversification of energy supplies from third countries, Latvia has already performed electricity and natural gas market opening measures and has diversified suppliers of these resources.

Although 100 % of petroleum products consumed in Latvia are imported and 78 % of petroleum products are consumed in transport (only two of all the countries importing petroleum products are third countries), Latvia's goal is to continue to secure the maximum number of suppliers of petroleum products.

3.3.2. Reducing energy imports

EDG2020 lay down the energy independence (net energy imports/gross domestic energy consumption including bunkering) target for 2020 — 44.1 % share of energy imports in gross domestic energy consumption.

Latvia's energy dependency on imported energy sources can be seen to be falling — from 55.9 % in 2013 to 44.1 % in 2017. It can therefore be considered that Latvia is meeting its 2020 and 2030 targets through the implementation of current policies and measures. Therefore, Latvia has set the goal of continuing to reduce energy dependency as the goal for reducing energy dependency.

LTESL2030, for its part, lays down an optional and non-binding target for 2030 — to reduce energy imports from the existing third country suppliers by 50 % compared to 2011 when energy imports from countries outside the European Economic Area amounted to 28.2 TWh. It means that the respective imports cannot be larger than 14.1 TWh by 2030.

3.3.3. Increasing the flexibility of the energy system

The goal in the period until 2022 is to develop national legislation for the operation of aggregators by prescribing rights and obligations of aggregators, payment for their services, and relations between aggregators and other participants of the system and market operators. This would promote the capacity of balancing the system and its flexibility.

The operation of aggregators in Latvia is not possible without smart meters installed and available for the consumers. Under the electricity metering modernisation plan of AS 'Sadales tīkls', the plan is to install smart meters for all customers of AS 'Sadales tīkls' by 2022 (covers 99 % of consumers). The data readout system of smart electricity meters is protected by using multi-layer access principles, and all its layers use data encryption methods, thus excluding any possibility of the name, surname, or address of a specific user being identified in the data exchange process.

3.4. Internal energy market

Table 20. Latvia's targets for the internal energy market and their performance indicators

Policy outcome in the internal energy market dimension	Actual value	Target value	
	2017	2020	2030[151]
Interconnection capacity (% of total generation capacity)	50-80	10	**60**
Energy poverty reduction target (%)	7.5	-	**<7.5**

[151] Regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, bold font is used for the binding targets to be defined in the Plan

3.4.1. Electricity interconnectivity

EDG2020 lay down the target for infrastructure connectivity in the electricity market (the ratio of interconnection capacity to total generation capacity expressed in percentage terms for 2020 at 10 %. CEPF2030, for its turn, lays down the target for 2030 at 15 %.

In accordance with the current situation, the Latvian interconnection level in 2017, which has been calculated using at least eight formulae, reaches at least 50 % (as much as 80 % depending on the formulae used in the calculation), it is therefore believed that Latvia has already reached the set interconnection target. Latvia sets the target for 2030 to increase this interconnection level, i.e. to ensure that Latvia's interconnection level for 2030 is at least 60 %.

3.4.2. Energy transmission infrastructure

Interconnections between Member States in the Baltic Sea Region and reinforcing internal grid infrastructures accordingly is intended to prevent isolation of the Baltic States and to foster market integration inter alia by working towards the integration of renewable energy in the region. In the period until 2025, the implementation of the following projects has been set as the goal for improvement of electricity transmission infrastructure:

- *Integration of the electricity networks of the Baltic States and their synchronisation with European networks*;
- *Estonia – Latvia third interconnection* – Kilingi-Nõmme (Estonia) – Riga CHPP-2 (LV) interconnection to increase the transfer capability by 500/600 MW between Estonia and Latvia in a normal operation mode and by up to 300/500 MW in an isolated operation mode;
- *Interconnection Tartu (Estonia) - Valmiera (LV) and interconnection Tsirgulina (Estonia) - Valmiera (LV)* in order to completely remove transfer capability limits between Estonia and Latvia also after 2020, as well as to increase the total transfer capability via the Baltic States by 600 MW.

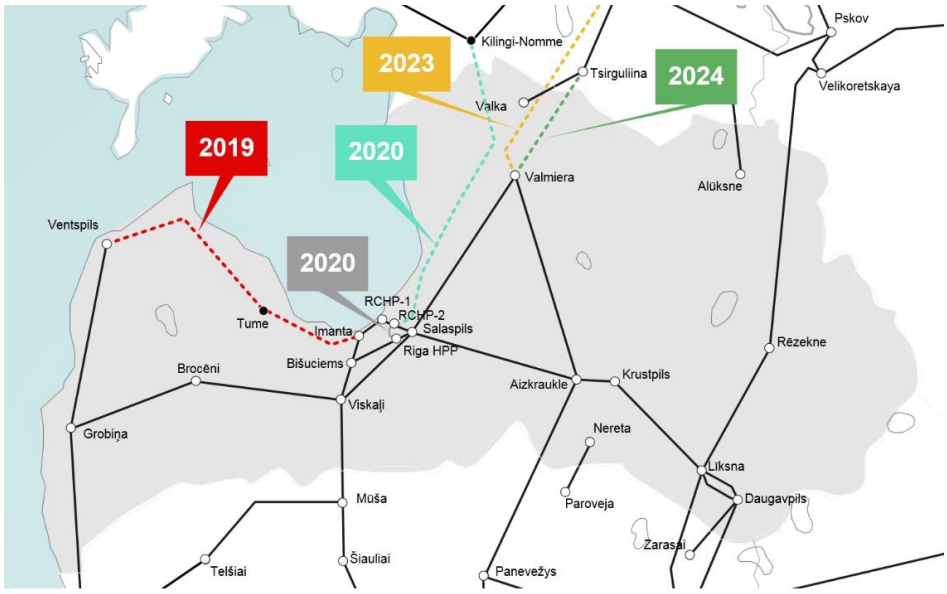


Figure 40. The existing high voltage infrastructure network and planned projects[152]

In addition to the listed energy transmission interconnection projects, thought is being given to the idea of building an interconnection between Latvia and Sweden, taking into account that Latvia is the only country among the Baltic States that does not have interconnections with Nordic countries or other EU countries outside the Baltic States region. The planned interconnection capacity is 700 MW. Presently, the Latvian transmission system operator has evaluated several versions of routes and approximate costs.

With regard to the modernisation of state's internal electricity production capacities, the goal of Latvia to implement the Pļaviņas HPP spillway project in order to increase the current capacity of the HPP spillway in order to address the calculated possible negative consequences and danger of maximum potential flooding for the security of reservoir dams.

The natural gas sector has a number of infrastructure projects to promote market liquidity and ensure security and stability of gas supply in the region. In the period from 2020 to 2029 the following significant projects for the development of the Latvian and Baltic natural gas market:

- The Estonia – Finland interconnection (Balticconector) is considered to be one of the most significant projects in the gas supply sector in the Baltic Sea region, and this is a precondition for creating the joint regional gas market of the Baltic States and Finland;
- Improvement of the Latvia – Estonia interconnection (Karksi) to ensure gas flows in the single Baltic gas market after the implementation of the Balticconnector project enabling Finnish traders to store natural gas in the Inčukalns UGSF;
- The modernisation of the Inčukalns UGSF in order to extend operations of the storage facility to make it retain its functionality after pressure in the Baltic transmission system increases.
- The Poland – Lithuania interconnection (GIPL), which will ensure diversification of natural gas supply routes and sources.
- Increasing the capacity of the Latvia – Lithuania interconnection, which would allow management of higher volumes of gas between Latvia and Lithuania, including after the implementation of the GIPL project;

Latvia aims to continue to realise investments in natural gas infrastructure development also when the current infrastructure projects are completed.

3.4.3. Market integration

Since Latvia has an open electricity and natural gas market, although undertakings and households may freely choose the most suitable electricity and gas traders, there are no plans to set other goals for integration of the internal electricity and gas market. Nor are specific goals being set for the integration of the internal fuel market (transport energy), because this market has not been and is not integrated.

As for the internal thermal energy market, Latvia has set itself the goal of evaluating it's the possibilities of opening this up, although even under the current setup several thermal energy producers may operate in the single thermal energy supply system operator licence operation zone, and these manufacturers may propose that the system operator buy the heat they produce for the agreed price.

[152] http://www.ast.lv/sites/default/files/editor/Gada_parsk_2017_parakstits_Final_print_arvaku_.pdf

3.4.3.1.Other aspects of the internal energy market

Until 2018, electricity users continued to optimise the connection capacity — the efficiency of using the connection capacity has increased by an average of 7.5 %. Since May 2016, when PUC approved changes in the tariffs of AS 'Sadales tīkls', more than 42,000 new applications for changing the connection capacity have been received and over 14,000 users with a consumption of 0 to 120 kWh/year have terminated their contracts. 1,473 users have used the opportunities of the transition period to introduce tariff changes and have completely or partially restored the capacity for a total of 123,398 kW. The service of reducing the connection capacity is free of charge.

3.4.3.2.Non-discrimination of RES members

There are no specific prohibitions for any specific technology or type of RE in Latvia, but there are restrictions regarding the location of the technologies and their compliance with environmental, biodiversity, societal, or territorial conditions.

3.4.3.3.Consumer's participation

AS 'Sadales tīkls' is continuing to install smart electricity meters as part of the development of a smart grid based on digital technologies. A gradual expansion of the smart grid will reduce the costs of servicing and maintenance of electricity meters and ensure that the information on consumption, load, and interruptions in the electricity grid is available quickly, at any time, and from any location.

For the benefit of consumers, in 2016 Section 30^1 of the Electricity Market Law introduced an electricity net payment system[153] for micro generators, and it has been in force since 1 January 2014 for all households that produce electricity for own consumption using RES. RES consumers use micro generators to produce electricity. A micro generator is an electricity generator and related protection and conversion devices (inverter) for producing alternating current with the electric current of up to 16 amperes intended to be installed in the electrical installation of the customer for parallel work with a low-voltage distribution network. It corresponds to the power of 3.7 kW in a single-phase network and 11.1 kW in a three-phase network. Since 2012, the Ministry of Economics has issued about 600 permits for introducing new electricity generators, mostly micro generators with a power from 0.0035 MW to 0.01 MW.

3.4.3.4.Adequacy of the electricity system

There are no plans to bring into operation any new base power plants by 2028 and no decisions about implementing any major power plant projects (including with regard to the increase of the base electric power) in the Baltic States by 2028 were taken by the end of 2018. However, it is possible that high capacity wind park projects with the installed capacity over 200 MW or more might be implemented in Latvia in the coming years.

3.4.3.5.Protection of energy consumers

Since electricity is no longer subsidised for all energy consumers after the liberalisation of the electricity market, the most vulnerable part of the society requires support in order to reduce the possible negative impact of increased prices. In the period until 2030, there are plans to continue the implementation of support for protected users in the previous amount, but also taking into account the measures implemented for reforming the MPC.

[153] the net system for electricity is a procedure by which payments are made for electricity consumed and by which the distribution system operator clears accounts for the electricity consumed by the user who produces electricity from RES for own needs, and electricity which has been transferred to the network of the distribution system operator

According to Section 33.[1](1) of the Electricity Market Law, a protected user[154] has the right to receive the electricity trade service of a protected user, and vulnerable population groups are offered a certain amount of electricity at a reduced rate:

- poor or low-income families (persons), as well as families taking care of a child with disability, and persons with group I disability – 100 kW for a subsidised price of EUR 0.03758 per kilowatt hour each accounting period (calendar month);
- large families — 300 kWh for a price of EUR 0.03758 per kWh each accounting period (calendar month).

The fixed MPC and the distribution system service fee are also offset depending on the connection capacity.

3.4.4. Energy poverty

Latvia has pledged to reduce the indicator 'share of households that could not afford heating due to lack of money' by 2030, ensuring that this share is lower than the EU average indicator. Therefore, the target for 2030 for the indicator 'share of households that could not afford heating due to lack of money' is to ensure that this indicator in Latvia is less than 7.5 %.

At the same time, energy poverty conditions and targets should be set and reviewed in line with the conditions and goals of protection of energy consumers.

3.5. Research, innovation and competitiveness

SDSL2030 includes a vision of innovation and a transition to the creation of low-carbon goods and services with high energy intensity, the use of RES and development of technologies, and identifies the need to develop cooperation of research institutions and companies in the field of RES, however, no specific goals, action lines or support measures are defined for the development of P&I and technologies in specific priority areas.

3.5.1. Research and development and innovation

In the period from 2021 to 2027, there are plans for a targeted support for the development and implementation of R&I climate technologies, in particular within the scope of implementation of the Smart Specialisation Strategy (*Research and Innovation Strategies for Smart Specialisation – RIS3)* and NIPG2020 thematic strategic ecosystems[155].

One of the most significant preconditions for the development and implementation of new technologies and innovative products and services are investments in R&D. The indicative target indicator of NDP2027 for investments in R&D is planned at the level of 2 % of GDP in 2027, which is provisionally projected also as a target indicator for 2030. In the 2021-2027 programming period it is necessary to invest at least 25 % of total investments in R&D in the development and implementation of climate technologies, and for the achievement of climate targets, in particular supporting R&D activities for increasing energy efficiency, the transition to RE, measures related to adaptation to climate change and prevention of climate

[154] a protected user is a poor or low-income family (person), a large family or a family (person) that takes care of a child with disability, or a person with group I disability who uses electricity in his or her household for his or her own needs (for final consumption)

[155] Strategic ecosystems will be shaped as basic elements of the national research and innovation system, which will be developed by creating a targeted link between education, research and business activities and creating a proper financial system and regulation.

related risks, as well as measures in the field of water management, agriculture, forestry and waste management.[156]

Table 21. Latvia's targets for the research and development policy and their performance indicators

Policy outcome in the research, innovation and competitiveness dimension	Actual value	Target value	
	2017	2020	2030[157]
Turnover of innovative products (% of total turnover)	46.5[158]	-	>14
Share of enterprises active in innovation (% of all enterprises)	30.5[159]	-	>40
Share of high technology sector exports (% of total annual exports)	10.2	-	>15
Global Competitiveness Index (position in the world)	42	-	<40
Investment in R&D (% of GDP)	0.51	0.7	**> 2**
Investments in R&I for the achievement of energy and climate objectives (% of total investments in R&I)	-	-	at least 25
Public funding[160] investments in R&I for the achievement of energy and climate objectives (% of total investments in R&I)	19	-	at least 25
Requested public foreign funding in R&I in the field of climate, energy and transport (% of total funding raised by LV)	24[161]	25%	25%

One of the main challenges of Latvia in the new 2021-2027 programming period is increasing productivity, which is closely related to production optimisation, technological upgrades and greater investment in R&D and R&I.

The plan defines potential priority action lines in RIS3 for energy:

- Innovative solutions in the field of RES technologies, incl. for production and use of biomethane, hydrogen and modern biofuels, smart use of biomass before combustion, use of solar energy in transport.
- Innovative solutions for energy storage, integration and smart transmission.
- Innovative solutions in the field of energy efficiency and sustainability of buildings, including development of heat insulation materials and technologies, creation of materials with high resource efficiency and energy efficiency and development of production technologies.

3.5.2. Promoting clean energy technologies for 2050

No specific R&I objectives or target indicators have been set in existing policies for the development of clean technologies and innovation focusing on improvement of energy efficiency and decarbonisation. Four out of 6 SET-Plan priorities in which R&I should be developed are of particular relevance to Latvia.

[156] https://ec.europa.eu/commission/sites/beta-political/files/communication-euco-mff-oct2019_en.pdf
[157] Regular font is used for already applicable targets, which are set out in binding EU legislation, other Latvian policy planning documents or legislation, bold font is used for the binding targets to be defined in the Plan
[158] Volume in 2016 (https://data1.csb.gov.lv/pxweb/lv/uzn/uzn__inovac/ING021.px/table/tableViewLayout1/)
[159] In the period from 2014 to 2016 (https://data1.csb.gov.lv/pxweb/lv/uzn/uzn__inovac/ING051.px/table/tableViewLayout1/)
[160] Funding from the EU structural funds and national budget
[161] Data about the period from 2014 to 2019 (Horizon 2020)

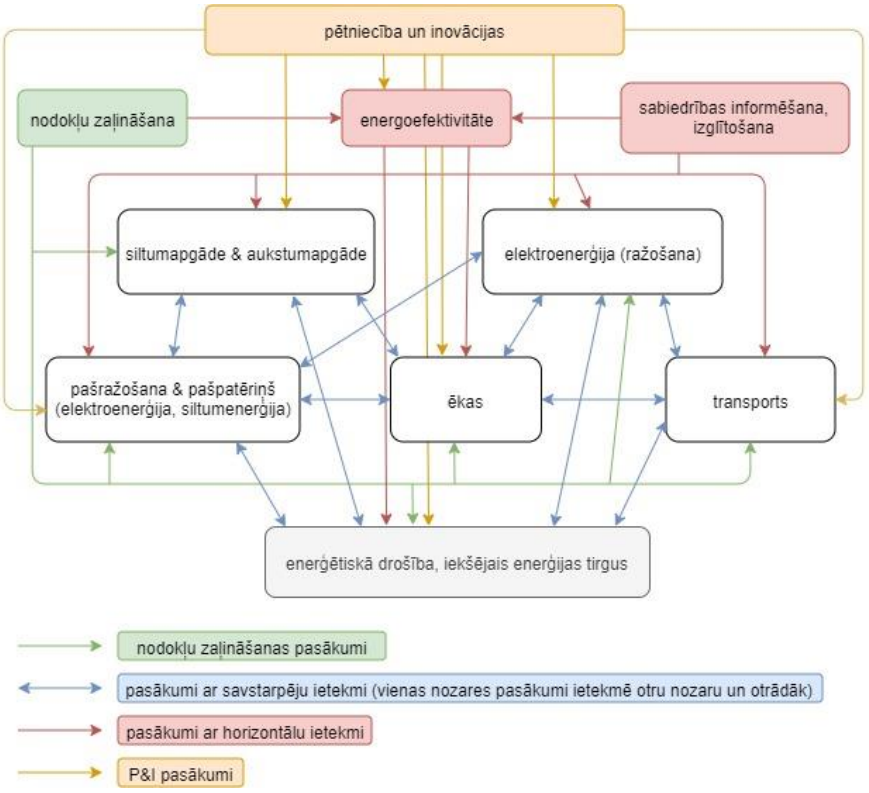
Table 22. Latvia's investments in SET-Plan priorities (share of investment in total R&I investments in the field of energy)

SET-Plan priorities[162]	Actual value	Target value
	In the period from 2014 to 2018	In the period from 2021 to 2027
RE	10%	*15%*
Smart energy systems	26%	*20%*
Energy efficient systems (residential buildings and industry)	28%	*38%*
Sustainable transport	15%	*20%*
Carbon capture and storage	0%	*2%*
Safe nuclear energy	0%	*0%*
Energy management and market	20%	*5%*

[162] Latvia's R&I priorities in the period from 2014 to 2018 are marked in green

4. POLICIES AND MEASURES

Impacts of measures have been evaluated for aspects falling within the scope of the plan, with several horizontal areas defined: energy efficiency, greening of taxes, R&I and public information, education and raising awareness, and partially horizontal measures – energy security and internal energy market, as well as sectoral measures – production, transmission and consumption.



Key to fig 41: if these are viewed as 9 horizontal rows, they read, top to bottom:

1. Research and innovation
2. Green taxation, energy efficiency, informing and educating public
3. Heating and cooling, electrical energy (generation)
4. Own production and own consumption (electrical energy, heating), housing, transport
5. Energy security, internal energy market
6. Tax greening measures
7. Mutually beneficial measures (measures by one sector benefit another and vice-versa)
8. Measures with a horizontal impact
9. R&I measures

Figure 41. Mutual impacts of areas of the Plan

The plan (Chapter 4 and Annex 4) emphasises horizontal measures, which cover several action lines, so they were not included in any specific action line, for example, energy efficiency improvement measures such as the implementation of the ‘energy efficiency first’

principle, reviewing of EEOS, measures promoting the use of biomethane , which covers the agricultural sector, transport and electricity / thermal energy production activities, or the creation and implementation of the systems of guarantees of origin in several activities, the creation of financing mechanisms or participation in financial mechanisms. R&I as horizontal measures are implemented in different sectors and fields to positively affect several action lines included in the plan at the same time. The plan also includes several action lines where the measures being implemented have an impact on several other action lines. In the plan, these action lines or measures are summarised as horizontal measures (Chapters 4.1-4.4). To resolve sectoral issues, the plan has set several action lines for a specific sector or activities that affect several other sectors or activities, however no horizontal effects have been inferred (Chapters 4.5-4.13). Prior to the implementation of the measures defined in the plan a risk assessment for alternative solutions should be conducted.

The summary of additional measures defined in the plan, which respects the reporting format prepared by the EC, has been published on the website of the MoE[163].

[163] https://em.gov.lv/lv/nozares_politika/nacionalais_energetikas_un_klimata_plans/

4.1. Energy efficiency

Status quo

Latvia's energy policy provides that energy efficiency is one of the main policy instruments allowing costs to be reduced and the level of energy supply security increased by reducing energy consumption. Latvian legislation includes requirements for ensuring the rational use and management of energy sources to foster sustainable economic development. Although Latvia has committed to reach the mandatory cumulative final energy consumption target, by 2018 Latvia had fulfilled 54% of its annual target.

In Latvia, the EEOS scheme has been introduced in stages or periods, namely 2014-2017 and 2018-2020, the obligation to cooperate with its end customers in the field of energy efficiency having been imposed only on electricity retailers. According to the electricity sales data of 2018, the scheme includes as responsible parties 14 electricity retailers, which fulfil their energy saving obligation mainly by informative and educational measures, as well as measures for improving energy efficient lighting. By the end of 2017, Latvia had concluded only two voluntary agreements, because even though regulations allow the competent Ministry to provide support to energy audits and individual energy efficiency improvement measures in accordance with individual agreements, no funding was ear marked for these.

As things stand, large enterprises and large electricity consumers should introduce a certified energy management system or conduct an energy audit on a regular basis, as well as the three energy efficiency improvement measures recommended in the energy audit report with the highest energy saving or economic return. The higher energy savings in enterprises have been achieved as a result of equipment replacement and more efficient use of transport and up until 2020 enterprises will have had access to support programmes for the implementation of energy efficiency measures in manufacturing enterprises.

At present, municipalities and public institutions have the right to use ESCO (PESCO) and to conclude energy efficiency service contracts[164], however, the investments made within the scope of the contract are considered a public debt with an impact on the fiscal area, although the basic principle of the ESCO (PESCO) model does not create additional budgetary expenses for the municipality, because private investments are repaid from the energy savings achieved. However, if an institutional unit in the general government sector concludes an energy efficiency contract without observing the statistical accounting conditions of the European System of Accounts (hereinafter referred to as ESA), then such a contract has an impact on the general government budget balance, where a private partner's capital investments are considered general government budget expenses and the general government sector debt.

Target status quo by 2030:

[164] in accordance with the annual state budget law municipalities do not have the right to assume long-term liabilities in accordance with Section 22 of the Law on Municipal Budgets, with the exception of the liabilities: 1) to ensure the autonomous function of municipalities for up to five years for purchasing of necessary services, computer equipment, communication and other office equipment; 2) to ensure long-term social care and social rehabilitation services; 3) for the implementation of investment projects referred to in the law on the annual state budget; 4) for the implementation of public and private partnership projects accepted in accordance with the procedure laid down in the Public-Private Partnership Law.

- *The 'energy efficiency first' principle has been fully incorporated into development and policy planning, and into the investment planning and implementation process*
- *Achievement of the energy efficiency targets set by the State*
- *Undertakings not only ensure they are energy efficient, but also help promote the energy efficiency of their customers*
- *Society has become increasingly more aware of energy efficiency issues and there has been an increased in involvement and the desire to ensure energy efficiency in people's own lives and the day-to-day life of the community*

Benefits to society and the nation's economy

- *rational use and management of energy sources*
- *increase in competitiveness of the economy*
- *reduced costs of energy, with saving being invested in development and improvement of comfort*
- *minimisation of impact on the environment and climate change*

Main challenges

1) **inadequate consideration** of the need to improve **energy efficiency** in policy and investment planning and implementation

The 'energy efficiency first' principle has not been incorporated into the Latvian policy planning system, and only arbitrarily taken into account in investment planning. Sectoral development takes place when needed by sectors, so more efficient alternatives are often ruled out .

Given that the potential for energy efficiency and its alternatives are not evaluated when planning and implementing measures and no assessment is made of whether the measure inter alia also ensures the improvement of energy efficiency, such measures are frequently not implemented using the best available and possible techniques and technologies.

2) **inefficient implementation of EEOS and agreement** on improvement of energy efficiency

EEOS is one of policy measures which energy retailers can use to get involved in the resolution of energy efficiency matters. To discharge their obligation under the EEOS responsible parties should take measures to improve energy efficiency and achieve energy savings in buildings, equipment and the transportation of end consumers, and measures of the requisite scope should be taken in respect of consumers affected by energy poverty . Presently EEOS applies only to 14 electricity retailers, although it should apply to the largest energy suppliers without the type of energy supplied being specified. As the EEOS stands, it covers an insignificant number of energy suppliers, so the mandatory obligation to implement energy efficiency improvement measures in their activities and in the activities of their customers applies to a small number of undertakings only.

Agreements on improving energy efficiency are currently concluded on a voluntary basis, so only two such agreements have been concluded as a result of the concluding parties being actively committed to improving the situation in respect of energy efficiency. The number of concluded agreements is small, because this is voluntary and because those who conclude

the agreement do not see or have access to any additional benefits to offset the resources invested.

3) **incomplete** energy efficiency **monitoring** system

As things stand, the energy efficiency monitoring system in place is too unwieldy, and the performer of energy efficiency improvement measures has more expenses and complications from reporting than benefits from the measures themselves. The preparation and submission of reports on paper without using online reporting tools complicates preparation and submission of reports, in particular for private individuals. Nor is it mandatory (or even desirable) for all those carrying out measures to report on the energy efficiency improvement measures , this also being true of those carrying out measures without using public funding or funding provided by the EU structural funds.

Main action line (horizontal action line)

Efficient and comprehensive compliance and implementation of energy efficiency improvement in national economy sectors and society

Key actions and activities

1) Comprehensive introduction and **implementation of the 'energy efficiency first' principle** (measure H.1)

'Energy efficiency first' means considering, before approving industry planning, policy and investment decisions, whether cost-efficient, technically, economically and environmentally sound alternative energy efficiency measures, for example, cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission and distribution of energy, whilst achieving the objectives of those decisions, will ensure the achievement of the objectives of those decisions.

It is also recommended that the 'energy efficiency first' principle be incorporated into the conditions for the acquisition of funding of EU and public funds (in the measures funded within the scope of EU structural funds and other sources of public funding) and taxation measures, if applicable. Therefore, ensuring improvement of energy efficiency – efficiency of use of energy sources, reduction of use of resources – should be considered when implementing these measures.

2) Review of **EEOS** and strengthening and extension of **agreements on improving energy efficiency** (measures H.2, H.3)

In order to make the EEOS more efficient and ensure that under it stakeholders implement efficient energy efficiency improvement measures within their enterprise or with their customers, the proposal is to review EEOS after 2021 evaluating the possibility of extending the scope of the EEOS to include as EEOS stakeholders traders (including motor and heating fuel traders) whose sales account for a total of 90 % of energy sold to consumers in Latvia, including thermal energy suppliers and suppliers of motor and heating fuel – transport energy and natural gas. Doing so would include some 27 energy suppliers, 14 of which are transport energy suppliers, 3 are thermal energy suppliers, 3 are natural gas suppliers and 7 are electricity suppliers.

Practices in several European countries have confirmed that voluntary agreements are an efficient way of promoting energy efficiency and obtaining energy savings, however, the

countries provided support to enterprises or municipalities in all successful cases. Latvia has offered to act in three action lines with regard to the reinforcement of the agreement for the period after 2021:

- the proposal is to maintain the option of concluding voluntary agreement for everyone, but making agreements mandatory for specific urban areas and specific administrative territories (for example, energy intensive territories);
- the proposal is to extend the scope to include measures promoting the use of RES;
- the proposal is to make a funding programme available offering support and funding to undertakings or municipalities which have concluded agreements, support being provided for performance of measures, actions of an energy consultant and measures for promotion of energy services.

3) attraction of private investments and elimination of obstacles, creation of financial mechanisms (measures H.3, H.8, H.9)

A/S 'Attīstības finanšu institūcija Altum' (hereinafter referred to as ALTUM) will continue to develop financial instruments for financing of energy efficiency projects, including loan programmes for energy efficiency of the company and for introduction of RES projects. In order to ensure the creation and spending of targeted funding, the plan proposes creating an RES promotion and energy efficiency improvement fund, where finances from income derived from energy related activities – excise duty and NRT – might be diverted, which apply to the heating and motor fuel used for the acquisition of energy, income derived from forest land auctions and the rent of State immovable properties for construction of wind parks and the commercial exchange of State RES statistics with other countries, funds also being used for RE communities and financing RES measures in municipalities. Also, in order to promote the attractiveness of implementation of the energy efficiency improvement measures, the plan also proposes assessing the feasibility of developing energy savings trading schemes, where one participant of the system could transfer its energy savings to another participant who which has exceeded its savings targets.

4) To improve **energy efficiency monitoring** and make it more efficient (measure H.4)

The purpose of the energy efficiency monitoring system is to summarise and systematise information about all energy efficiency improvement measures performed within the scope of State and municipal policies, as well as any other information related to energy efficiency in order to control progress made towards achieving the energy efficiency target. The monitoring system currently summarises information from more than 1500 information providers about projects, as well as calculations about the measures the implementation of which has contributed to end-use energy savings.

In order to evaluate the energy savings obtained as a result of implementing energy efficiency measures, it is important to improve the existing energy efficiency monitoring system. An important task is to ensure that information providers ae able to submit information electronically. It is also necessary to improve the current energy savings calculation methods to make them easy to use in calculations and in the preparation of reports for the EC. This system should be designed to be as straightforward as possible, allowing the performer of an energy efficiency improvement measure, on completion of a measure, to report once a year on the amount of energy consumed by the household.

Related action lines

All the action lines included in the Plan

4.2. Research and innovation

Status quo

R&I is being developed in Latvia in accordance with the Smart Specialisation Strategy (RIS3) in five specialisation areas: **smart energy;** knowledge intensive bio economy; biomedicine, medical appliances, bio-pharmacy and bio-technology; advanced materials, technologies and engineering systems; and information and communication technologies.

The RIS3 specialisation area "Smart energy" includes the development of clean technologies or new materials, research and development of engineering and digital solutions for acquisition, storage and integration of RE into the energy system, improvement of energy efficiency in construction and automation and optimisation of production processes, as well as the development of alternative fuels for transport. Development of the clean technologies sector is directly related to R&I capacity, i.e. the number of researchers and highly qualified specialists and public and private sector investments in R&I. Of Latvia's total scientific community staff (FTE personnel), approximately 1 000 or 18 % are engaged in research in priority areas of the EnU[165] – energy, construction, climate, environmental engineering technologies, whereas research in the field of energy amounts to just 8 %. EUR 34.3 million or 19.8 % of the total R&I funding raised in RIS3 areas[166] were invested in R&I activities in the "Smart energy" field in the period from 2014 to 2018, thus promoting the development of competences and new technological solutions for improvement of energy efficiency, development of smart grids and improvement of management efficiency of energy systems, research and testing of alternative fuels and sources of RE acquisition. Every year, study programmes relating to the "Smart energy" field are followed by just 4.5 % of all Latvian students on average, and the observed trend is for just 50 % of the students enrolled in bachelor and master study programmes to complete their studies. The situation with doctoral students is similar. The RIS3 specialisation area "Smart energy" in Latvia has a clear applied research orientation focusing on handling pressing challenges of the industry, whilst research excellence and international visibility, recognition, cooperation and competitiveness compared with the Baltic States and EU-28 average indicators needs a considerable boost

In the public sector, research competence and capacity in the RIS3 specialisation area "Smart energy" is concentrated in 1) the Riga Technical University, 2) the Institute of Solid State Physics of the University of Latvia and 3) the LLU. In the private sector, the most important environmental, green and clean technology and new product solutions are mainly being developed in several competence centres – the Competence Centre of Smart Engineering Systems, Transport and Energy, the Competence Centre of Smart Materials and Technologies, Competence Centre of Mechanical Engineering and the Competence Centre of Information and Communication Technologies. The clusters created in Latvia, for example the Green and clean technology cluster, the Latvian wood construction cluster, the Clean technology cluster, the Smart city cluster, have a positive impact on the creation of

[165]National Information System of Research Activity (NISRA), Registry of Persons Elected in Academic Positions in Scientific Institutions, (data as at 08.08.2019.) **Error! Hyperlink reference not valid.**

[166] Research and innovation programmes funded from the state budget and EU structural funds and EU research and innovation programme "Horizon2020"

cooperation networks of undertakings, research organisations and other stakeholders, as well as the development of projects by companies in one sector, or multi-sector project, in the area of clean and green technologies.

In the period from 2014 to 2016, 30.3 % of all Latvian companies were innovative, while in the EU countries this indicator is 50.6 % on average (2014-2016; EUROSTAT). This is related to the fact that micro and small enterprises having limited capacity (funding, relevant human resources) to invest in R&I activities dominate in the total structure of enterprises in Latvia, and the fact that these enterprises lack understanding of the impact of R&I investments on competitiveness of enterprises. In all, about 50 enterprises belong to innovative companies in the RIS3 area "Smart energy" in Latvia.

Target status quo by 2030:

- *Investments in research and innovation are 2 % of GDP, including at least 25 % of the total volume are invested in research and innovation to achieve climate neutrality.*
- *Scientific personnel (FTE) in the priority areas of the Energy Union – 1 800.*

Benefits to society and the nation's economy

- *The use of innovative solutions to improve energy efficiency in all sectors of the national economy is an approach that is sustainable and the most cost efficient way of bolstering energy security.*
- *Research-based innovation is the basis for creating and implementing a more resource-efficient, zero emission technologies and higher value added products, which would not only help to reduce the negative impact on climate and environment, but would also foster export capability, cooperation opportunities and the long-term competitiveness of Latvian enterprises on a global scale.*
- *The development of the R&I system will help create the new knowledge and skills needed in the professions and job that will be created when the economic system is realigned to take account of the transition to clean energy and climate neutrality.*

Main challenges

1) **to increase research and innovation capacity in the energy area and to establish a more meaningful link between research, innovation and energy industry development priorities**

Research in thermal energy, energy efficiency, electrotechnical and bioenergy production areas, as well as research for improvement of smart grids and energy system management are developing widely in Latvia. However, in order to develop in-depth research competence and excellence focusing on the achievement of climate neutrality objectives, it is necessary to clearly define the priorities of the energy industry (and of other industries contributing to the achievement of climate neutrality objectives), where research and innovation capacity should be developed.

2) to establish a meaningful **link between fundamental research** and **commercialisation and the introduction** of research **results**

Given the ambitiousness of the plan and the long-term objectives, it is necessary to ensure that R&I is developed to make a contribution to the achievement of climate neutrality objectives. Therefore, it is necessary to establish an effective link between research,

development of technology and innovative solutions, their commercialisation and practical implementation by developing more coordinated and target-focused cooperation between research organisations, enterprises and municipalities, including pilot research projects and demonstration projects, and providing proper financial instruments for them. Such initiatives would practically demonstrate research competences, innovation potential, cooperation cultures and a supportive institutional environment, which may directly or indirectly increase Latvia's competitiveness in terms of attracting both international cooperation partners and investors.

In order to achieve the plan's objectives , and to fulfil Latvia's ambitious long-term objectives, much greater volumes of private investment must be invested in R&I, particularly the research and development of clean energy technologies, sources of and technological solutions for acquisition of RE, the development and introduction of energy efficiency solutions and industrial research.

Main action line (horizontal action line)

R&I integration and efficient implementation for the achievement of the targets set in the plan

Key actions and activities

1) **Strengthening the contribution of R&I** to the achievement of energy and climate targets and **defining priorities** for targeted investments

The plan defines potential priority action lines in RIS3 for energy:

- Innovative solutions in the field of RES technologies, including the production and use of biomethane, hydrogen and modern biofuels, smart use of biomass before combustion, use of solar energy in transport.
- Innovative solutions for energy storage, integration and smart transmission, as well as innovative solutions for capturing and reuse of carbon.
- Innovative solutions in the field of energy efficiency and sustainability of buildings, including the development of heat insulation materials and technologies, creation of materials with high resource efficiency and energy efficiency and the development of production technologies

To achieve the plan's objectives, within R&I (1) support will be provided to the development of research, technologies and (2) for the implementation of demonstration projects and development of new technologies, solutions and user-centred products and services in the following areas:

- *Production of renewable electricity and thermal energy*, for example: research into materials and engineering technologies for the acquisition and storage of RE (in particular, solar, hydrogen energy), research into the sources and acquisition technologies for bioenergy (biomass, biogas) and ways of improving these, research into wave energy acquisition technologies.
- *Smart grids, energy storage and recovery, and integration of renewable energy in the energy system,* for example, automation of management of energy systems (electricity and heat), digitalisation and energy transformation and storage technologies, including

batteries, for automation of industrial production, self-generation of energy and development of electric mobility.

- *Energy performance of buildings*, for example, new materials, technology and design solutions for improvement of energy efficiency and heat recovery in buildings.
- *Smart mobility*, for example, alternative fuels and biofuels – hydrogen, biogas, electric drive and energy recover technologies, automated transport and intelligent transport systems, solutions for introduction and development of electric mobility, planning and design of resource-efficiency and decarbonisation oriented transport and mobility, incl. multimodal, systems.
- *Development of market models of a new type* – peer-to-peer trading, aggregation services, energy as a service, local community energy systems.

2) Development of efficient cooperation and coordination mechanisms between implementers of R&I and stakeholders **for commercialisation and implementation of research results**

To achieve the plan's objectives , as part of R&I provision will be made for aid or non-financial measures to foster mutual cooperation among undertakings, higher education institutions and research organisations, State and municipal institutions, NGOs and other stakeholders for piloting and implementation of new technologies and innovative solutions. Business growth and competitiveness depends on the ability to scientifically create and sell knowledge-intensive products and services which are in demand by self-streamlining with upstream value added global chains.

In order to foster competitiveness and develop digitalisation in business, work on digital transformation that has stated so far will continue. A more detailed plan of further actions with measures to improve competitiveness will be included in the National Industrial Policy Guidelines for 2021-2027.

Cross-border cooperation

In order to develop competence in the implementation of RIS3 and to build cooperation in the field of R&I with other EU regions, since 2014 Latvia has been part of the EU RIS3 platform[167]. It is coordinated by the Joint Research Centre created by the EC, which is functioning as an analytical, informative and cooperative platform and monitoring agency for the implementation of EC RIS3 policy.

In 2018, a cooperation agreement on cooperation in energy research was concluded between Baltic and Nordic countries for 2018-2021 with the general objective of promoting research and analysis in the field of energy in the Baltic Countries, mutual cooperation between Baltic countries, cooperation of Baltic countries with Nordic countries, and research in the Baltic and Nordic countries. This objective is expected to be achieved by implementing three main measures:

1. Promotion of mutual research projects from the Baltic States and research projects between the Baltic and Nordic States with participation of researchers from the Baltic States;
2. Cooperation between the Baltic and Nordic States with regard to doctoral studies;

[167] Joint Research centre, Smart specialisation platform, http://s3platform.jrc.ec.europa.eu/

3. Exchange of energy researchers between the Baltic and Nordic countries.

Since 2019, Latvia has been actively involved in the European Technology and Innovation Platform Bacteria Europe.

Related action lines

4.3. Public information, education and awareness raising

All the action lines included in the Plan

Status quo

Although the implementation of energy efficiency measures is well publicized in Latvia, there is still a lack of public information on and educational measures concerning the promotion of renewable energy. In terms of addressing the issue of the mandatory procurement component, the public's attitude to the use of RE is changing, because people are ready to support RE solutions if they do not impinge on their daily routines and living conditions. People are not prepared to change their daily habits to achieve a common objective. Societal habits might also be affected by frequent policy changes, and by a lack of medium- and long-term planning. There have been negative reports on the activities performed so far, and concerns about the direct costs of the changes. While the public is currently aware of the need to meet predefined targets and change daily habits, because these have been made mandatory objectives, it has not been told why these objectives were defined and why it is important to achieve them. The conclusion must therefore be that the public is not being properly informed about the implementation of energy measures, and the lack of information about the benefit to society makes people unwilling to change their daily habits and perhaps surrender some of their creature comforts for the greater good. In Latvia, the EU's energy policy is most commonly associated with competitive energy prices for the end consumer, and with the substitution of fossil heating fuel / motor fuel with RES to help reduce.[168]

Latest information suggests that climate change is the second most important problem for EU citizens, compared with fifth in autumn 2018. In Latvia, environment, climate change and energy matters rank only 11th out of 13places[169] (an increase of 2 % over autumn 2018), only Greece and Croatia placing them further down still. However, in the past year the Latvian public has become more mobilised in expressing its support for reducing climate change, for example, by getting involved in the global climate strike, and organising a number of protests linked to environmental policy that brought together several hundred young people. Latvia has already created a portal devoted to climate change issues[170] to keep the public informed about climate and latest trends and involve it in mapping the situation in general .

[168] https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/87717
[169] https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/standard/surveyky/2253
[170] http://klimatam.lv/

A major role in achieving ambitious long-term targets for GHG emissions will be played by an enabling environment, including public involvement and social transformations, so it is vital to send out clear long-term signals, provide the requisite guidance and make information available for risk assessment.

Target status quo by 2030:

- *The level of public interest in and commitment to resolving energy and climate problems have actively improved, community groups are actively implementing resource-efficient improvement projects*
- *Education about resource-efficiency and sustainable lifestyle takes place starting from pre-school education institutions*
- *The conditions for resolution of energy and climate problems are fully integrated into development planning at State and municipal level*

Benefits to society and the nation's economy:

- *improved level of education and education capacity safeguarding long-term investment in R&D and R&I*
- *an engaged and involved public takes action on air quality, resource efficiency and sustainability improvement whilst helping cut the cost of using resources*

Main challenges

1) Fragmented public information measures

Each citizen of Latvia still has an important role to play in meeting energy and climate targets, because individual's lifestyles consumption patterns and decisions affect how many resources are consumed and how much GHG emissions are generated. Society has still not fully understood that every single daily action and daily activity has an impact on the amount of GHG emissions, carbon removal, air quality, consumption of resources, because maintaining individual lifestyles leaves a carbon footprint[171]. However, reducing climate change has not yet fully entered public consciousness, which is why proposals for limiting climate change often meet with vociferous opposition. .

As things stand, even though public information measures take place fairly frequently, they are still very fragmented and tend to focus on an individual specific activity or support programme or law being drafted. Public information mainly takes place:

- when it is necessary to inform the public about the drafting of a policy planning document or development planning document;
- when publicity must be given to funding from EU structural funds or application for the allocation of this funding;
- when the public needs to be informed about the drafting of a new EU or MS law.

[171] total amount of GHG emissions for a person, event, undertaking or product generated by the use of goods and services. Measurement of the total volume of GHG emissions in a certain population, system or activity, taking into account all the relevant sources of GHG emissions, CO_2 removal and CO_2 storage within territories and time boundaries of a population, system or activity

Society must be encouraged to want to change of its own accord, to want to improve air quality itself and wish to ensure improvement of air quality, reduction of costs relating to the utilisation of resources and the improvement of the quality of life in general.

2) Inefficient and often delayed **education measures**

At present, educational institutions decide themselves whether they should and to what extent they should implement education measures for pupils and students on resource-efficiency, sustainable lifestyle, and therefore on resolution of energy and climate problems. No harmonised educational measures relating to resource efficiency and sustainability have been drawn up and deployed at national level.

There are also too few planned and specifically targeted education measures on sustainable management, and most of the educational measures carried out do not provide the expected result. The efficiency of the implementation of existing measures is neither supervised nor evaluated.

3) Municipalities uninterested and uninformed

It is precisely the municipalities and their employees who are often approached by the public for information or advice. Employees of municipalities know best about the way things stand in their administrative territory, and the municipalities are responsible for improving the energy performance of municipal buildings and developing district heating, and are in charge of laying down conditions for individual and local heating, waste and wastewater management and agricultural activities. Municipalities may also promote or hinder the use of energy sources or technologies.

However, as things stand it must be concluded that the ability of municipalities to ensure sufficient capacity and involvement of the population in the implementation of necessary measures is limited by insufficient funding, capacity and other priorities. Given the complexity of the procedure for applying for co-financing for energy efficiency improvement measures, municipalities need to provide residents with more assistance in preparing documentation and implementing procedures.

Although Latvia has many municipalities which have concluded a Mayoral Covenant [172] and have committed to implement GHG emission reduction measures, there is still a need to better inform employees of State and municipal employees on air pollution reduction and climate change mitigation policies and objectives, their synergies and contradictions, so that these employees can pass this information on to the public.

Main action line (action line 12)

Public information, education and awareness raising

Key actions and activities

1) improving **public understanding of resource-efficiency** involving the **public in energy measures** (measures 12.1, 12.2)

Given the condition about the need to implement the 'energy efficiency first' and resource efficiency objective, it is necessary to continue to improve public awareness about the need to perform energy efficiency measures in all sectors, not just measures for heat insulation of buildings. It is also necessary to improve public understanding of resource efficiency in order

[172] https://www.eumayors.eu/en/

to promote and ensure changes of habits and to promote environmentally and climate friendly lifestyles, and to improve the knowledge of consumers and professional users about energy efficiency of products. The proposal is therefore to continue the 'Live Warmer' programme, which is being implemented to involve the public more in programmes for heat insulation of buildings and to encourage people to apply for the funding available for heat insulation of buildings. The proposal is also to implement targeted and continuous information campaigns about resource efficiency and changing habits towards a green and more climate-friendly lifestyle. The proposed measures are not only a step towards more climate friendly management, but also improve the quality of life of the population.

With regard to the largest consumer of energy sources in Latvia – the transport sector, the proposal is to organise 'car-free day' programmes, not in the conventional form, but by prohibiting vehicles from entering city centres, and improving public awareness of transport energy.

The proposal is also to considerably improve the availability of information to educational institutions in order to improve knowledge of pupils and students about climate and eco-friendly lifestyles, starting with preschool institutions.

2) improving **improve knowledge of municipalities and promoting** the involvement of municipalities in promoting climate friendly development (measures 12.3, 12.4, 12.5)

Since municipalities are entitled to issue binding regulatory enactments, it is important that they are drafted based on sustainable innovation and decisions.

Municipalities play a big role in promoting the development of regions, and it would therefore be necessary to promote understanding of employees of municipalities of energy efficiency and climate change. To encourage municipalities to develop in a climate-friendly direction, they must be encouraged to introduce innovative technologies in their own work.

Related action lines

All the action lines included in the Plan

4.4. Greening of taxes

Current situation

As at 2019, the Latvian tax system includes 14 taxes, 7 of which are included in the group of environment or energy taxes: excise duty, VAT, electricity tax, VOT, NRT, customs tax, subsidised electricity tax.

In 2018, total revenues from the excise duty in Latvia was EUR 539.6 million for petroleum products, EUR 22.0 million for natural gas, revenues from electricity tax in 2018 was EUR 5.0 million, from VOT – EUR 94.3 million, from company car tax – EUR 21.5 million, from subsidised electricity tax – EUR 5.3 million, and from NRT – EUR 30.1 million[173]. Therefore, total tax revenues directly related to energy consumption and creation of GHG emissions in 2018 amounted to EUR 717.8 million, which makes up around 8 % of general budget revenue. However, it is impossible to distinguish revenues from the VAT related to energy generation and use from total VAT revenues.

[173] MoF, SRS

Reliefs /exemption from payment of the above-mentioned taxes are currently in force, and different tax rates applied (see section 2.5.6).

Target status quo in 2030:E*In essence, the 'polluter pays' principle is implemented in the tax system and the higher tax burden is on largest generators of GHG emissions;*

- *Taxes are applied in accordance with the indicator for the source of GHG emissions and in accordance with the largest consumption of energy sources and energy;*
- *Energy subsidies have effectively been phased out altogether and tax reliefs are no longer applied;*
- *Tax reliefs are granted as a prize for performed energy efficiency improvement measures or to performers of RES technology use measures, or temporarily – in order to promote the implementation of the measures for reduction of GHG emissions.*

Benefits to society and the nation's economy:

- *The tax measures foster the reduction of fossil energy and promote the transition to zero-emission energy sources and the use of zero-emission technologies, thus ensuring an improvement in air quality;*
- *Costs of energy sources have fallen as a result of reduced consumption of fossil energy sources and significant development of the use of RES technologies;*
- *No increase in the tax burden on immovable property as a result of performing energy efficiency measures or installation of RES technologies;*
- *Additional finances to the state budget to support the performance of energy efficiency measures or installation of RES technologies and other measures.*

Main challenges

1) Inefficient differencial tax **rates not reflecting the impact**

Of these taxes, it is the excise duty for the use of petroleum products and natural gas, NRT for CO_2 emissions and VOT that are the main taxes, these effectively regulating and influencing consumption of energy sources. However, although the taxes applied to the production of energy sources and consumption of energy in Latvia are reviewed and increased on a regular basis, this does not guarantee a reduction in the use of energy sources, because final energy consumption has been growing constantly in recent years.

Although excise tax is designed to restrict consumption of goods that are harmful to the environment and humans, it is not in fact applied according to the impact of the energy source on climate change. Despite the fact that diesel (with or without 30 % biodiesel admixture) is the main type of fuel used in transport – almost 73 % of the amount of the petroleum product used in transport, a comparatively higher excise duty rate is applied to unleaded petrol for vehicles (with or without 5 % of biopetrol admixture) – EUR 509/1000l compared to EUR 414/1000l of diesel[174]. At the same time, petrol for vehicles has lower CO_2 emission intensity (CO_2 emission factor expressed per one unit of energy of fuel[175]) than diesel, therefore the excise tax duty for diesel fuel (with or without 30 % biodiesel admixture) is lower than for unleaded petrol (without 5 % of biopetrol admixture), even

[174] The rates applicable starting from 01.01.2020 (https://www.vid.gov.lv/lv/akcizes-nodokla-likmes-0)
[175] http://www.meteo.lv/fs/files/CMSP_Static_Page_Attach/00/00/00/02/03/1548165912_CO2_met_2019.pdf

when calculated per unit of energy of fuel. Also annual GHG inventory data[176], which are used in determining national progress in reduction of GHG emissions and fulfilment of targets, show that unleaded petrol without or with 5 % of biopetrol admixture for petrol for vehicles has a lower CO_2 emission intensity than diesel with or without a 30 % biodiesel admixture.

On 01.01.2019, new VOT rates[177] entered into force, which depend on the amount of CO_2 emissions per g/km from vehicles first registered after 01.01.2009. For older vehicles, which were first registered on 01.01.2005.-31.12.2008 or whose CO_2 emissions are unknown, VOT is applied by summing up tax rates in accordance with full weight, engine displacement and maximum engine capacity of the passenger car. For other vehicles, mainly those manufactured before 2005, VOT for a passenger car is paid in accordance with its full weight and the VOT rates defined for these vehicles vary between EUR 38 to EUR 274, which is considerably less than for newer vehicles, for which VOT depending on the amount of CO_2 emissions per g/km may vary from EUR 0 to 756 (in addition to the above, vehicles with an engine displacement over 3500 cm^3 must pay an extra EUR 300, which is due regardless of the level of CO_2 emissions, if the engine displacement of the passenger car registered after 31.12.2008 exceeds 3500 cm^3). A comparatively large number of vehicles were still registered before 2005, and such vehicles are characterised by largest engine displacement and therefore also fuel consumption, which means that differentiation of VOT by full weight might not be the best way of encouraging them to be replaced with newer ones or with a smaller engine displacement, as has been proved by the differentiation of the VOT rate depending of the amount of CO_2 emission per g/km.

NRT for CO_2 emissions currently amounts to EUR 4.5 per ton of CO_2 emissions, although the price of an emission allowance within the EU ETS varies from no EUR 25 per emission allowance to EUR 30 per allowance (ton of CO_2 emissions).

2) **Tax reliefs and exemptions** applied to energy and GHG emission sources

Excise duty is not applied to the use of coal, lignite, brown coal, peat, because NRT is applied to some uses of these energy sources.

NRT for carbon dioxide emissions is not applied:

- to the equipment included in EU ETS (equipment with installed rated thermal capacity > 20 MW);
- combustion of biomass and peat;
- to hard coal, coke and lignite (brown coal) used for production of electricity, or to the production of thermal energy and electricity in cogeneration;
- to the sale of hard coal, coke and lignite (brown coal), if the seller has a licence for production of electricity or a licence for production of thermal energy and electricity in cogeneration.

VOT is applied taking into account the intensity of CO_2 emissions and engine displacement of each specific vehicle. This applies only to vehicles first registered after 31 December 2008, although 72 % of the vehicles registered in Latvia in 2017 were registered before 2008. It can therefore be concluded that the VOT rates for these 72 % of vehicles are considerably more

[176] The actual calculation of CO2 emissions from road transport is carried out using the COPERT 5 model (*www.emisia.com*), which ensures emission factors for fuel consumption and all the exhaust gas components included in the GHG inventory.
[177] https://www.csdd.lv/transportlidzekla-ekspluatacijas-nodoklis/likme-vieglajiem-auto-nodokla-likmes-no-01-01-2019

advantageous and smaller. VOT and company car tax reliefs amounted to 14.3 million in 2017. If the amount of relies is equivalent in 2018, then total relies might be exceed 11 % of tax revenue.

3) The tax system **does not promote the implementation of measures**

There is currently a reduced rate of VAT for thermal energy consumption, thus reducing the public's potential heating costs. Households are also exempt from the electricity tax. However, those who have performed energy efficiency improvement measures or installed zero-emission RES technologies do not get tax reliefs or exemptions, for example, a reduced rate of harmonised RET rate or PIT repayment on the basis of this. No reduced VAT rate is applied to such measures at any of their implementation stages. In the event of energy efficiency improvement measures being implemented or zero-emission RES technologies being installed, the cadastral value of the property of the performer of the measure may increase and thus RET may increase too.

Main action line (action line 11)

'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies

Key actions and activities

1) To motivate the implementation and performance of measures by **not increasing the tax burden** (measure 11.1)

The main measure that might promote an increase in energy efficiency or RES technology installation measures by not increasing the tax burden is to evaluate the possibility of reviewing RET relief tax policies pursuant to guidelines and within municipalities, account also being taken of action lines in respect of the energy and climate fields, and ensuring that owners of improved properties are subject to RET reliefs (RET relief rates).

Instructions have also been issued for evaluating the possibility of introducing a reduced VAT rate for a certain period for households signing up for energy efficiency improvement services and installing zero-emission technologies.

2) **implementation of the 'polluter pays' principle** and **suspension of** fossil fuel **subsidies** (measures 11.2, 11.3, 11.6 and 11.7, measure H.8)

The main measure for reduction of the use of fossil fuel is NRT for CO_2 emissions and emissions of air pollutants and review of the rate for use of hard coal, coke and lignite, as well as excise tax rate and their application conditions for heating fuel. There is also a proposal to apply an increased NRT rate for combustion facilities of all capacities in which only fossil heating fuel plants are newly installed, unless the boiler is installed to ensure standby and peak capacity and other than were existing boilers have been replaced with newer and more efficient boilers. It is also necessary to evaluate the possibility of applying NRT to combustion plants (except households) with a capacity of less than 0.2 MW[178]. It is also necessary to review and cancel different NRT exemptions and reliefs for the use of peat and hard coal, coke and lignite (brown coal) for production of electricity, along with the excise duty exemption for petroleum products for production of thermal energy and electricity in cogeneration.

[178] The NRT payer is defined in Section 3(1) of the Natural Resources Tax Law. In this case, it is the person, which has received a permission for performance of polluting activities of category A or B or proof of polluting activity of category C (plant with rated thermal capacity equal or higher than 0.2MW)

As NRT and excise duty apply to direct users of energy sources and these taxes do not have differentiated tax rates (for example, for households, large energy consumers, undertakings), the plan proposes conducting an extensive study into the possibilities of introducing a diversified (by consumption) CO_2 tax for energy consumption, whilst reviewing the conditions of application of the tariffs preventing the inclusion of NRT expenses in the tariff (for thermal energy and electricity).

The proposal is also to create a RES promotion and energy efficiency improvement fund, where 25 % of income derived from energy related activities – excise duty and NRT – might be diverted (this would apply to the heating fuel used to generate energy), to generate funds for supporting the measures, and there is also a proposal to evaluate the possibility of diverting part of PIT and NRT, which would be paid only for production of energy, to the budget of a specific municipality determining specific use of this income.

The plan proposes conducting an evaluation of the development and implementation of the system of application of the 'polluter pays' principle, it being necessary to evaluate the possibility of applying the CO_2 tax to energy consumption and giving thought to how to implement the principle in such a way that it is applied equally to the production of energy and the consumption of energy, with the possibility of allowing a portion of tax revenue to be channelled to specific municipalities, as they are the ones in charge of managing pollution.

3) **review of transport** energy and vehicle use **taxes** (measures 11.4, 11.5, measure H.8)

As transport is the largest consumer of energy sources and source of GHG emissions in Latvia, measures must be actively implemented in the field of transport in order to significantly promote a reduction in the use of transport energy and reduced used of vehicles. The proposal is therefore to evaluate the possibility or reviewing the conditions for applying excise duty rates, taking into account the CO_2 emission capacity (intensity) of specific transport energy. It is also proposed to introduce reduced tax rates (as low as possible) for biofuel (sustainable first generation biofuel) or advanced (alternative) biofuels and biogas, evaluating the possibility to differentiate reduced rates for the first generation biofuel and advanced biofuels and biogas. Several tax measures are also proposed as a way of promoting the use of commercial EVs and plug-in hybrid vehicles.

Furthermore, in order to promote the use of private passenger cars (except public transport), the proposal is to review VOT, in particular with regard to vehicles with large engine displacement and high CO_2 emission capacity. The possibility is also envisage of cancelling the electricity tax, when electricity is used in EVs. There is also the possibility of introducing the first passenger car registration tax for older vehicles.

Related action lines

All the action lines included in the Plan

4.5. Improving energy performance of buildings

Current situation

Transport is the largest final energy consumer – 30.3 %, while households are the second largest consumer – 29.2 %. In 2017, industry and construction was the third largest final energy consumption sector – total consumption by this sector was 5.4 % higher than in

2016.[179] Buildings mainly use solid biomass – 41.5 %, district heating – 30.5 % and natural gas – 8.9 %, and the total consumption of energy sources and amount of GHG emissions in households increases year on year.

The energy consumed by the buildings sector constitutes 40 % of the total energy balance, so the buildings sector includes a considerable potential in the achievement of common energy efficiency targets. The building stock[180] together comprises 1.37 million buildings with a total area of 204.7 million m^2. The stock is divided into two parts – residential buildings and non-residential buildings. Residential buildings include 367.9 thousand buildings with a total area of 90.1 million m^2 (45 % of the area) and non-residential buildings include 1007.2 thousand buildings with a total area of 114.64 million m^2 (55 % of the area), 33 thousand of which are buildings for production.

Most existing buildings have a high consumption of energy sources and considerably lower thermotechnical properties than currently available technologies can provide. The average energy consumption for heating[181] for all types of buildings is 138-139 kWh/m^2 per year: for different types of one-apartment buildings – 139 kWh/m^2 per year; for multi-dwelling buildings – 137 kWh/m^2 per year; for office buildings – 145 kWh/m^2 per year; for buildings of educational institutions – 147 kWh/m^2 per year; for buildings of medical institutions – 154 kWh/m^2 per year; for hotel and restaurant buildings – 116 kWh/m^2 per year; for buildings of sport institutions – 132 kWh/m^2 per year; for wholesale and retail buildings – 102 kWh/m^2 per year, for other types of buildings – 185 kWh/m^2 per year. In the sector of public buildings[182] (according to the definition of a central government building[183]) there are 1 245 buildings with an average thermal energy consumption for heating amounting to 126 kWh/m^2 per year. The list included in Article 5(5) of Directive 2012/27/EU, from which the annual 3 % renovation norm should be calculated, includes 863 buildings with an average thermal energy consumption of 140 kWh/m^2 per year, 120 of which are planned to be renovated in the 2014 – 2020 programming period of the EU structural funds.

In the period from 2009 to September 2019, a total of EUR 235.27 million was invested in renovation of multi-dwelling buildings, including funding from EU structural funds of EUR 106.45 million, renovating 838 buildings and ensuring average energy consumption for heating of 95.61 kWh/m^2 per year. During this period, buildings owned, managed and used by 15 public institutions were renovated for a total funding of EUR 7.42 million, including the funding from EU structural funds amounting to EUR 6.09 million EUR and state budget funding of EUR 1.08 million ensuring average energy consumption for heating of 66 kWh/m^2 per year, and energy efficiency improvement measures were also performed in 12 production buildings for a total funding of EUR 4.73 million, including funding from EU

[179] CSB

[180] Data of the system of the Immovable Property State Cadastre provided by the State Land Service on 1 January 2017.

[181] Summary of the Register of Energy Certificates of Buildings of the Construction Information System as at 5 September 2019

[182] The list of public buildings summarises data about the building in ownership, possession and use of public institutions with a total are above 250 m^2, data about energy consumption in 2017: https://www.em.gov.lv/lv/nozares_politika/majokli/eku_energoefektivitate/no_direktivas_2012_27_es_par_energoefektivitati_izrietosas_prasibas/

[183] The definition of central government buildings is defined in CM order No.587 of 2 December 2013 "On the Conception on Incorporating the Provisions of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC into National Law

structural funds of EUR 1.32 million, after the implementation of projects the thermal energy consumption for heating varies from 22.92 kWh/m^2 up to 161.34 kWh/m^2 per year ensuring average thermal energy consumption of 96.72 kWh/m^2 per year.

Target status quo in 2030:

- *The average thermal energy consumption of the building stock for heating is > 30% less than 2020;*
- *At least 2 000 multi-apartment residential buildings and at least 5 000 private houses with zero-emission RES technologies installed, or with renovated DH connections;*
- *Improved energy performance of State and municipal buildings assured;*
- *A complex long-term solution for improvement of energy performance of the residential stock has been developed and implemented.*

Benefits to society and the nation's economy

- *Lower consumption of energy sources in buildings makes for lower utility bills, and improved solvency of the population as result*
- *By renovating or reconstructing buildings, the environment in the buildings is improved, the longevity of buildings is increased, the level of comfort in the buildings has been improved and the value of the immovable property has increased*
- *Renovations or reconstructions of buildings provide new jobs in the construction sector increasing state budget income, as well as promote the development of innovation and technologies.*

Main challenges

1) **outdated building stock** with particularly low level of energy efficiency

The majority of the buildings not renovated currently meet the requirements of class E and F buildings in accordance with building classification requirements, so gradual renewal of these buildings with an improvement of their energy performance is pressing. Around 10 % of all residential buildings were constructed after 2003, while only 3 % of the total share of residential buildings were constructed after 2003, when the new requirements of construction standards with regard to enclosures of buildings entered into force – construction standard 002-001 "Calorimetry of building envelopes"", which have set significantly higher thermal technology requirements for building envelopes, so all buildings designed and constructed after 2003 should meet higher thermal technology requirements

Energy efficiency improvement measures should not only address the problems of implementation of the building renovation / heat insulation problems, but should also ensure construction of new residential buildings and ensure that these buildings meet the highest requirements of energy performance of buildings. Also, given the size of the Latvian economy and the number of inhabitants, there are currently major problems in ensuring the requisite capacity in the construction sector and ongoing stability of costs.

2) lack of public **interest** in energy efficiency improvement measures

Unfortunately, there is a lack of public interest in becoming involved in energy efficiency measures and ensuring heat insulation or complex renovation of personal property, although public interest in taking energy efficiency improvement measures is very much

being encouraged by, , for example, the 'Live Warmer' information campaign. Red tape often puts the public off, i.e the need to draw up documentation and approach multiple contacts to receive support funding from the EU structural funds. There is also a need to seek the consent of residents of most, organise meetings, educate people and explain measures. In many cases, therefore, implementation of energy efficiency measures is prevented by lack of interest, ignorance and unwillingness to participate on behalf of the general public.

People's unwillingness of the population to get involved in energy efficiency improvement measures is also related to low solvency, high utility debts, including heating, payments and high interest rates, which considerably reduce the efficiency of costs of energy efficiency measures.

3) **insufficient raising of** private **investment and obstacles to the** promotion of **ESCO / PESCO**

Although work on the improving and implementing State aid programmes for industry will continue beyond 2021, in order to reach the national energy efficiency targets, private investments in the implementation of energy efficiency solutions in manufacturing and other industries are also necessary.

As obstacle to the promotion of ESCO (PESCO) and the implementation of ESCO (PESCO) projects in the public sector are the conditions for posting long-term loan liabilities (and the liabilities taken on under energy efficiency service agreements), because liabilities of municipalities, including the liabilities undertaken under the agreements, are entered in on the balance sheet of the municipality and have an impact on the State budget and on the fiscal space. If an institutional unit in the general government sector concludes an energy efficiency contract without observing the statistical accounting conditions of the ESA, then such a contract has an impact on the general government budget balance, where private partner's capital investments are considered general government budget expenses and the general government sector debt. It should also be borne in mind that energy efficiency projects and their agreements should be drafted in accordance with EEOS conditions and should be fiscally neutral in accordance with EEOS conditions. The public sector does not have any experience in the preparation and implementation of ESCO procurements and no guidelines for the preparation and of ESCO projects and organisation of procurements are available. At the same time, ESCO requires long-term financial resources (for at least 20 years), including a mechanism for repurchasing the ESCO cash flow, and these are significant factors for companies in Latvia for developing ESCO business and being able to offer energy efficiency services to the buildings sector. The conditions of the funding raised for ESCO should ensure an opportunity to anticipate loan-related costs, because owners of buildings pay a fixed rate for the service provided over the entire effective period of the agreement, assuming only the variations in the EURIBOR index. It should also be noted that refinancing of assumed ESCO liabilities is a problem for ESCO development in terms of the availability of financing for improving the energy performance of multi-apartment houses.

Main action line (action line 1)

Making buildings more energy efficient

Key actions and activities

1) to promote the **reduction in consumption of energy sources** in public buildings, residential buildings and municipal and public buildings, as well as in production **buildings** (measures 1.1, 1.2, 1.3, 1.6)

In accordance with Article 5(1) of the Directive 2012/27/EU, a Member State is obliged to renovate each year 3 % of the total floor area of direct public administration buildings. The Plan provides that the existing energy efficiency improvement programmes for buildings will continue in 2021, where support to multi-apartment buildings for performance of energy efficiency measures has been provided since 2009. The plan also provides for the raising of private investment for energy efficiency improvement projects (developed ESCO market), which will allow a general increase in the funding available for renovation of buildings. It is also important to support energy efficiency measures in the sector of municipal buildings and the plan provides for the possibility of carrying out reconstructions or renovations of existing buildings, including renovations of individual or local heating systems, and purchasing/installing plants generating heating and electricity using RES using public funding beyond 2021.

The plan does not make it obligatory to carry out energy efficiency improvement measures in buildings, where owners of buildings or parts of buildings will have to voluntarily agree and decide on taking the measures, and if necessary, take on financial liabilities to implement measures.

The plan also provides for further implementation of energy efficiency improvement measures and measures promoting the use of RES in industry and other undertakings, providing for modernisation of the existing production capacities by installing more energy efficient equipment for production and processes related to production, as well as the organisation of production buildings and areas, including the replacement of internal and external engineering networks and engineering systems in the production area with more energy efficient ones.

2) to ensure the implementation of energy efficiency improvement measures **in private houses and built complexes with a small number of buildings** (measures 1.4, 1.5, 1.6)

Hitherto, private houses and individual complexes have been supported by the State to a limited extent. However, since private homes in Latvia are on average considerably less efficient than multi-apartment buildings, beyond 2021 it will be necessary to support energy efficiency improvement measures in private houses, and at the same time the proposal is to set a mandatory condition for installing zero-emission RES technologies in these buildings during the implementation of energy efficiency improvement measures. Since implementers of these measures are private individuals, it will be necessary to simplify the application procedure by introducing online aid application, on a first-come-first-served basis along with supporting documentation, unless Latvian legislation provides otherwise. Potential beneficiaries would have be able to use municipal energy consultants or the RES one-stop agency for administrative support. As far as is possible, the co-payment diversification rules will have to be refined, taking into account the value of the property in which the measures are taken and the solvency of the population, and as far as the replacement of heating installations is concerned, existing air quality in the territory.

3) To ensure **long-term solutions** for reducing energy consumption in the Latvian residential stock and to raise the necessary additional investments (measures 1.7, 1.8)

The plan aims to create a long-term solution for the residential building stock with a quantifiable target by 2050. The plan provides for appropriate studies and the development of a long-term solution for the energy efficiency improvement complex for the residential stock, the plan being supplemented/updated with a solution found in 2023.

Given the lack of experience in the public sector in the preparation and implementation of ESCO procurements, guidelines must be developed for the preparation ESCO projects and organisation of tenders for the public sector, and there are also plans to draw up public guidelines for the preparation of contracts and organisation of tenders for energy efficiency services. There is also a plan to develop a fiscally neutral model contracts (on the impact of the draft contract on the general government budget balance and debt in consultation with EUROSTAT, subject to confirmation that the draft contract is to be accounted for in the balance sheet of the private partner), which ensures that private investments invested in ESCO projects are not booked in as public debt. At the same time, it is necessary to ensure that municipalities and public authorities can accept long-term commitments (up to 20 years) when an ESCO project is implemented. However, in order to build practical experience related to ESCO projects in the public sector and to create greater awareness of both the feasibility of the projects concerned, it is necessary to combine both public and private investments. ALTUM will continue to develop financial instruments for financing energy-efficiency projects, including a loan programme for enterprises. Thought is also being given to developing the ESCO market by addressing market failures, since commercial banks do not offer long-term financing to providers of energy efficiency services under long-term conditions. The ESCO market could also be developed by incorporating the possibility of implementing energy efficiency projects directly with ESCO.

Related action lines

1) Improving energy efficiency and promoting the use of RES technologies in heating and cooling, and industry (action line 2), because improvements in this line have an impact on the financial aspects of final consumers, the primary energy and GHG assessment for buildings.

2) Promoting economically justified self-generation, self-consumption of energy and RE communities (action line 4), because improvements in this line have an impact on the financial aspects of final consumers, the primary energy and GHG assessment for buildings.

3) Energy security, reducing energy dependency, full integration of energy markets and modernisation of infrastructure (action line 6), because the reduction in the use of imported energy sources improves Latvia's energy security and reduces energy dependency.

4) 'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies (action line 11), because improvements in this line affect the financial aspects of final consumers, contribute to energy efficiency in general.

5) Informing, education and awareness-raising of the public (action line 12).

4.6. Heating and Cooling

Current situation

In Latvia, heating is provided using DH, LH and individual heating. Municipalities organise heating in their administrative territories in accordance with the autonomous function allocated to them under law.

In 2018, more than 633 boiler houses and 175 cogeneration plants supplied heat in Latvia together producing 8247 GWh of thermal energy, including 5892 GWh produced by cogeneration plants[184]. The total length of heating networks in Latvia is approximately 2 000 km, 238 km of which will be renovated (both reconstructed and refurbished) in 2007-2020 using co-financing from EU structural funds, with a total investment of EUR 198.63 million, including EU co-funding of EUR 85.4 million. Therefore, there is still the need to refurbish heating networks, and connect new users to district heating rather than local heating plants. Average heat losses in heating transmission and distribution networks totalled 11.7 % in 2018. Most DH systems were built more than 25 years ago, which means that their individual sections function with big losses. For example, heat losses are as high as 14 % in Jēkabpils, and 15.7 % in Daugavpils.

In the period until 2020, EU structural funds provided support for the promotion of energy efficiency and the use of local RES in district heating, providing support for 104 projects that have invested in the installation of a storage system, investments in the heating generation source and investments in the renovation of heating pipes.

There are no centralised trigeneration plants in Latvia. Traditional conditioning equipment is used to cool premises, which, like any energy device, creates an additional load on urban infrastructure and, in the case of local solutions, creates unnecessary ecological load in addition to CO_2 emissions, fumes and noise.

Target status quo in 2030:

- *DH systems have been developed that are complex and economically sound and which increasingly use RES technologies (in particular zero-emission technologies);*
- *Increased number of connections to and users of DH and LH;*
- *Individual heating has been made more efficient, with increased use of RES technologies (in particular zero-emission);*
- *Increased use of central and individual cooling.*

Benefits to society and the nation's economy:

- *the performance of DH systems has significantly improved ensuring continuous heating supply at appropriate costs and reduced with heating costs for consumers*
- *sustainable and efficient operation of local and individual heating systems has been ensured, improving air quality and comfort for the population,*
- *the impact of heating generation on climate change has reduced and the decarbonisation of heating and cooling is promoted.*

Main challenges

1) **outdated** existing DH system **capacities and heating networks**, **connection of new consumers**

[184] https://data1.csb.gov.lv/pxweb/lv/vide/vide__energetika__ikgad/ENG100.px/table/tableViewLayout1/ https://data1.csb.gov.lv/pxweb/lv/vide/vide__energetika__ikgad/ENG130.px/table/tableViewLayout1/

Latvia is third in Europe after Iceland and Lithuania by percentage of population connected to DH. Since it is assumed that the average service life of a heating boiler is 10 to 15 years (boilers with a longer service life have heat losses and their efficiency ratio decreases with each year of operation), over 60 % of boilers currently installed in boiler houses have been operating for more than 15 years. It has been observed during the EU structural fund 2014-2020 programming period that the efficiency of boilers is reduced after just 7 years of use (boilers that have been used from 7 to up to 24 years are being replaced). The faster implementation of energy efficiency improvement measures in DH is hampered by the lack of investment, the limited capacity of municipalities to take out loans, and the slow rate of capital turnover. For these reasons, inefficient plants are still being operated in municipalities, leading to increased fuel consumption and the inability to supply heat in the required quality. By renovating a complex system (production – transmission – consumption) the energy production process can be optimised and losses of thermal energy in transmission systems can be reduced.

Although high numbers of the population connected to DH in Latvia, trends in active population decentralisation and an increase in private construction and in individual heating systems are currently observed.

2) inefficient and insufficient use of **RES in heating**

One of Latvia's energy challenges is high dependency on imported energy sources, Latvia being particularly dependent on both gaseous heating fuel / motor fuel[185], liquid heating fuel / motor fuel[186] and solid fossil heating fuel / motor fuel[187]. As things stand, consumption of solid biomass dominates in heating and cooling. Wood biomass is the most important local fuel used in Latvia in DH and LH, but especially in individual heating (almost exhaustively). The share of energy produced from RES in heating and cooling has increased from 40.7 % in 2010 to 54.6 % in 2017. The number of boiler houses using wood biomass as heating fuel increased from 241 in 2010 to 306 in 2018, and the installed thermal capacity has increased from 597.6 MW to 994,2 MW, respectively. On the other hand, use of solid biomass in households (individual heating) accounts for nearly 80 % of the energy sources used in households.

In heating and cooling, zero-emission technologies are used in very small quantities, very few solar collectors or heat pumps being used for individual and local heating. Similarly, the use of electricity as a thermal energy source is negligible – in 2018, only 0.1 % of all thermal energy generated in Latvia was produced using electricity.

3) non-existent district and local **cooling**

Although the average annual air temperature and the average summer season air temperature have increased significantly in Latvia as a result of climate change, there is virtually no centralised cooling in Latvia and currently refrigeration (cooling) in Latvia is provided using air refreshing systems filled with fluorinated gases. Between 2005 and 2017, GHG emissions from the consumption of fluorinated gases increased by a factor of almost 3.5. District cooling is a simple, safe and comfortable closed cycle process that causes the least ecological damage.

[185] Paragraph 3.2 in Annex A to the Regulation No 1009/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics
[186] Paragraph 3.4 in Annex A to the Regulation No 1009/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics
[187] Regulation 1009/2008

Main action line (action line 2)

Improving energy efficiency and promoting the use of RES technologies in heating and cooling and industry

Key actions and activities

1) to ensure a reduction in energy consumption and to increase the use of RES **in DH**, to ensure the **attractiveness of DH** (measures H.1, H.2, H.3, measures 2.1, 2.2, 2.5)

Improving the efficiency of the DH system and increasing the use of RES play an important role in the Plan, which would have to be ensured by replacing DH equipment with more efficient equipment while installing different RES technologies, with emphasis on zero-emission technologies. The plan also proposes banning the to ban installation of new combustion plants using only solid or liquid fossil fuels (except when this fuel is used in very limited quantities together with RES fuels).

Improvements in the efficiency of DH are driven by attracting new consumers, which should be achievable by ensuring persistently low tariffs for thermal energy supply, continuous and safe heating, as well as various possibilities for rational use of thermal energy by the final consumer. Although Latvia's population is currently shrinking and is expected to continue to decline, Latvia has the potential to develop DH and connect new consumers, in particular in areas with sufficiently dense population. There are also many areas in Riga with no heating networks[188]. It is therefore also necessary to build new highly efficient electricity transmission and distribution systems, in particular in areas with sufficiently densely located buildings and a sufficiently large population. Another way of ensuring this is the liberalisation of heating (market), which requires a detailed study.

2) to promote the use of RES and improvement of energy efficiency **in LH and individual heating** (measures H.1, H.2, H.3, measure 2.3)

The age of plants burning fuel wood used in individual and local heating exceeds 25 years and, in many cases, their owners plan to replace these plants with newer, more efficient plants. In order to ensure that the share of RES increases in the long term, it is necessary to promote energy efficiency in individual and local heating by providing support for their renewal or building, focusing on complex solutions – improving the energy efficiency of heating systems, and at the same time a full or partial shift of the technology used to RES technologies (in particular zero-emission RES technologies). Such equipment may be wood-based or there may be other types of equipment, such as heat pumps, solar collectors, wind generators, etc.

The plan also proposes banning the installation of new combustion plants using only solid or liquid fossil fuels (except when this fuel is used in very limited quantities together with RES fuels or where those plants are used as backup for maximum load or for equipment operated in the event of an emergency).

3) to ensure more **efficient use** of the heating **system** and **technologies** used, to improve the heating **market** (measures H.6, H.13, measures 2.1, 2.4, 2.5)

In order to use the most appropriate technologies in Latvia for the production and supply of thermal energy, it is necessary to carry out an assessment of the most efficient type of the specific heating system – it is necessary to assess whether LH the individual heating systems

[188] https://www.rdpad.lv/wp-content/uploads/2016/10/AIZSARGJOSLAS/6_pielikums.pdf

can be connected to DH, or whether it is possible to install zero-emission technologies for production of thermal energy and whether it is possible to install high efficiency equipment using biomass. It would also be necessary to develop solutions for restricting the number of energy supply systems connected in parallel to one site, where municipalities have strict rights to set restrictions for the number of energy supply systems connected in parallel to one site where this restriction applies to the whole area and to the supply of heat, electricity, gas.

Furthermore, in order to improve the heating market, p proposes developing solutions for improving the heating market, including the option of easing the conditions applicable to the heating market. The plan also proposes developing a study on optimisation of energy supply systems, evaluating the possibility for municipalities at their level to determine conditions with regard to the number of energy supply systems connected in parallel to one site in one territory.

Related action lines

1) Improving the energy performance of buildings (action line 1), because when less thermal energy is needed, smaller amounts of thermal energy will have to be produced, while it is also possible to ensure that buildings are connected to DH or LH during the improvement of their energy performance;

2) Promoting self-generation and self-consumption of energy (action line 4) in order to make individual heat production more effective and to promote the use of zero-emission technologies there;

3) Energy security, reducing energy dependency, full integration of energy markets and modernisation of infrastructure (action line 6), because reduced imports reduce the State's energy dependency, while measures to improve gaseous fuels contribute to the efficiency of DH and LH and enable the use of gaseous RES in DH and LH;

4) 'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies (action line 11), where the review of excise duties for fuels and NRT, the assessment of tax reliefs and gradual phasing-out of energy subsidies are defined;

5) Informing, education and awareness-raising of the public (action line 12).

4.7. Production of electricity

Current situation

The most important sources of generation of electricity in Latvia are the Riga natural gas combined heat and power plants CHPP-1 and CHPP-2 with a total installed electric capacity of 976 MW in 2018 and the Daugava cascade HPP with an installed capacity of 1536 MW. **The total installed electrical capacity in Latvia was 2915 MW in 2018, other RES power plants excluding Daugava HPP making up just 9 %** (WPPs, small HPPs, biomass and biogas cogeneration plants in similar proportions). In recent years, since the right to the State aid is no longer granted under the MP mechanism, there have been no significant changes in the deployment of RES electricity generation plants.

Thus, although a high share of installed capacity belongs to Daugava HPPs, given their fluctuating generation, which significantly depends on climate conditions, natural gas cogeneration plants still play the key role in energy supply in Latvia. In 2017, in conditions

favourable for HPPs, local generation covered 101 % of Latvia's electricity consumption , but just 87.7 % in 2018 owing to a significantly less favourable level . It follows from the above that **electricity generation** in Latvia **is characterised by low diversification of energy sources, which has a significant impact on electricity self-sufficiency and energy dependency on imported fossil sources.**

Target status quo in 2030:

- *Sufficient availability of generating capacities has been ensured and national energy dependency on imports and fossil sources has fallen*
- *The potential for generating wind energy in accordance with the available infrastructure capacity has been tapped into to a large extent, and therefore the share of RES has increased in a cost-efficient, market principles-based way*
- *The stability or reduction of electricity prices has been ensured*

Benefits to society and the nation's economy:

- *Electricity consumers are provided with stable electricity supplies, mitigating risks to supply disruptions*
- *Electricity consumers are provided with stability or reduced electricity prices, thus freeing up resources for other purposes and making business more competitiveness*

Main challenges

1) energy **security** and **availability** of generating **capacities**

According to the TSOs' assessment, over the next decade a shortage of generating capacity is expected in Latvia and in the Baltic States. Around 2300 MW or half of the generation capacity of large thermal electricity generation installations will be shut down in the Baltic States. In order to cover electricity demand, interconnections, the strengthening of the transmission network and the closer integration of the Baltic electricity system into the European electricity market will play an increasing role, but in order not to reduce the security of Latvia's electricity supply in the coming decade, it is important to ensure that Latvia's generation capacity is not diminished.

Various studies have shown that the continued implementation of the policies to achieve climate objectives will lead to increased electricity consumption. At the same time, given that most power plants will stop working after the end of the State aid period within the MP mechanism, without additional measures to boost production of electricity the amount of electricity generation capacities in Latvia may decrease.

At the same time, Latvia's electricity generation largely depends on imports of natural gas from third countries, which is considered a risk to national energy security.

2) **reduction of** electricity **costs** for society

The existing State aid mechanism for electricity production has contributed to the overall increase in electricity costs for consumers and has thus negatively affected the competitiveness and development opportunities of different business sectors, in particular industry, by reducing the resources available to increase productivity. The policy implemented in recent years has addressed the challenges of large and energy-intensive companies, while for small and medium-sized enterprises the reduction of electricity costs is an increasingly pressing problem, given that they have a higher electricity end price than

other small and medium-sized enterprises in the Baltic Sea region. At the same time, MPC costs are expected to fall after 2021. In the light of the foregoing, it is necessary to find solutions to promote zero-emission technologies to ensure that the burden of electricity costs on society is reduced.

Similarly, given the current and expected capacity shortages in the region, the projected increase in EU emission allowances and prices for natural gas, the wholesale electricity market price forecasts suggest that prices will generally grow in the Baltic region in the coming years, but their reduction may be driven by a wider increase in production of renewable electricity. On the other hand, a more diversified electricity generation structure may reduce electricity price peaks at times when the wholesale market price of electricity is high.

3) **untapped potential** for production of electricity from zero-emission technologies

Since implementation of the projects eligible for State aid under the MP mechanism has been completed, the deployment of new electricity generation capacities has long stagnated in Latvia.

At the same time, in order to ensure Latvia's energy security and to provide society with cheap and competitive energy, Latvia should ensure an increase in the share of RES, which should obviously be provided using the most cost-efficient technologies. The cost of producing electricity in onshore wind parks has decreased significantly and recent studies have shown that they are the cheapest of all types of newly installed technologies, including fossil fuel technologies, for production of electricity[189].

Project implementers have expressed interest and, in some cases, have started to implement wind energy projects in Latvia without a guarantee of additional financial support from the State, but there are increasing signs from the wind energy sector that there are many limiting factors for the rapid development of such projects, mainly related to spatial planning conditions and administrative barriers.

Similarly, large-capacity electricity generation from solar energy is currently not developed in Latvia, and Latvia might have a similar potential as other European countries where such production has developed[190].

At present, the Latvian electricity transmission system is able to accept up to 800 MW of additional new RE capacity, which is about a third of all the total electrical capacity currently installed in Latvia.

Main actions and measures (action line 3)

Promoting the use of zero-emission technologies in electricity generation.

Key actions and activities

1) promoting the use of zero-emission technologies **in market conditions** (measure 3.2, 3.3, measure H.6, H.7)

In a fundamental sense, the review and development of territorial, construction regulatory restrictions and administrative procedures are essential for promoting the use of zero-emission technologies, so that the development of relevant technologies in market

[189] see, for example: IRENA (2019), Renewable Power Generation Costs in 2018, International Renewable Energy Agency, Abu Dhabi, https://www.irena.org/publications/2019/May/Renewable-power-generation-costs-in-2018

[190] https://solargis.com/maps-and-gis-data/download/europe

conditions can take place without unnecessary national barriers. In particular, it should be ensured that the procedures for issuing permits to project developers are as simple as possible and are completed as quickly as possible, which can be achieved by establishing a single point of contact for issuing of licences to deploy RES technologies and by setting deadlines for issuing licences.

It would also be feasible to ensure the use of agricultural land and forest land of national importance for the development of wind parks, as well as to develop a procedure for the use of public forest lands, including by drafting conditions for rental and mitigation of environmental impacts.

It would be feasible to develop publicly available maps showing the potential for the development of solar and wind energy parks in the territory of Latvia, taking into account the studies carried out on various restrictions, as well as spatial planning restrictions.

In order to encourage the generation of RES electricity, it is also necessary to boost the demand for it. Therefore, following the improvement of the system of guarantees of origin of electricity, it is necessary to impose an obligation on electricity traders to indicate the share of RES electricity in electricity bills. It is also necessary to develop a regulation for the use of RES electricity purchase contracts and peer-to peer trading mechanisms. At the same time, the competitiveness of zero-emission technologies can be boosted by a judicious review of taxes on fossil fuels.

2) **raising funding** for the implementation of zero-emission projects (measures 3.1, 3.4, H.8)

An analysis of the possibilities for the development of offshore wind parks in the Baltic Sea region has identified the potential for cost-efficient electricity generation through transnational cooperation projects[191]. Therefore, in order to exploit the potential of offshore wind energy in the most cost-efficient way possible, thought is being given to implementing a project to absorb financing from the Connecting Europe Facility and PCI to establish a joint offshore wind park – infrastructure – in the Baltic States first by leveraging financing of the Connecting Europe Facility for the feasibility study of the project. Wind park territories with established infrastructure would then be leased to an undertaking in an auction / tender for the installation of facilities and generation of electricity. No other financial State or budgetary aid is envisaged for wind energy development.

Generation of solar energy is not developed in Latvia, even though this technology is one of the cheapest RES electricity generation technologies in the world, often rivalling wind parks[1]. It is therefore necessary to consider the possibility of establishing a support programme in the form of financial instruments or loans for solar electricity generation and storage facilities in order to promote a significant increase in electricity produced from solar technologies.

There are also plans to set up a RES Promotion and Energy Efficiency Improvement Fund to finance loans to project developers, and to provide, as far as possible, part of the grant for the development of a project idea and technical assistance.

3) **developing conceptual solutions** for further development of zero-emission technologies for electricity generation in Latvia (measures 3.3, 3.5)

191 https://op.europa.eu/en/publication-detail/-/publication/9590cdee-cd30-11e9-992f-01aa75ed71a1/language-en/format-PDF/source-107469700

The synchronisation of the Baltic electricity networks with continental Europe, the development of transmission infrastructure, the level of electricity market prices in the Baltic region, and whether large-scale zero-emission technology projects will be implemented in the coming years will be important for the future development of electricity generation. Therefore, individual potential further action lines can only be assessed in the coming years. For example, whether and to what extent large-scale wind park projects will be implemented in Latvia in the coming years will depend on the need to increase the capacity of the transmission system. Such an assessment should therefore be carried out along when the plan is reviewed in 2023. In addition, it is necessary to evaluate the ability of the Latvian energy system to include electricity generated by large-capacity wind parks and to analyse potentially the best techniques for balancing this capacity.

It is also necessary to follow up on how the development of wind parks in Latvia is affected by the planned removal of various barriers and to assess whether further solutions are needed, which might include additional measures to galvanize the interest of municipalities in the development of wind parks for high-capacity zero-emission technologies.

Related action lines

1) Promoting economically justified self-generation, self-consumption of energy and RE communities (action line 4), in order to promote generation of electricity for self-consumption.

2) Improving energy efficiency, promoting the use of alternative fuels and RES technologies in transport (action line 5), taking into account the need for RES electricity in electric transport.

3) Energy security, reducing energy dependency, full integration of energy markets and modernisation of infrastructure (action line 6), because electricity generation from local RES contributes directly to energy security and reduces dependency on third countries, and it is important to provide basic capacity for generation of electricity to achieve these objectives.

4) 'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies (action line 11), which would promote the competitiveness of RES technologies.

5) Public information, education and awareness raising (action line 12).

4.8. Public involvement in energy production

Current situation

Public involvement in energy production has hitherto been stimulated by the available investment aid under the CCFI programme, the NET system for electricity generation payments[192] and the EAAI financing available to municipalities in recent years, and some RES heat generation plants for self-consumption have been installed under the heat insulation programme for multi-apartment dwellings.

Though public involvement in energy production can also contribute to the achievement of the objectives set for Latvia, this impact is currently limited. Public involvement is equally essential to raise awareness of the functioning of the energy system and the role of RES in

[192] Section 30.[1] of the Electricity Market Law, see: https://likumi.lv/ta/id/108834#p30.1

achieving climate objectives, which can therefore contribute to awareness of the need for measures on a larger scale.

In addition, when assessing the need to encourage greater public involvement in energy production, it should be borne in mind that the energy produced by self-consumers replaces other energy sources. For example, in assessing the conditions inherent in Latvia's electricity supply, it can be concluded that electricity produced by own-use consumers will essentially replace the electricity generated by burning imported natural gas. In general, including the production of thermal energy for self-consumption, the installation of zero-emission technologies should be given priority, this also contributing to the achievement of air pollution reduction targets.

Currently, the majority of self-consumers have installed solar panels for electricity generation. In contrast, different types of heat pumps and solar collectors are the most popular among zero-emission heat installations.

Target status quo in 2030:

- *The population engages in energy production, more energy generation plants for own consumption are installed*
- *Public awareness of the role of RE and the functioning of the energy system has been promoted*
- *Generation and consumption of energy for own use have contributed to the efficient functioning of the energy market and energy system*

Benefits to society and the nation's economy:

- *The general public and business able to cut their own costs by producing energy for themselves*
- *The development of RE communities contributes to improving the quality of the environment and stimulates the local economy*
- *Additional jobs have been created for the provision of equipment deployment services*

Main challenges

1) **low rate of public participation** in energy production

Public involvement in energy production using zero-emission technologies is generally categorised as low and most potential self-consumers do not have access to incentive mechanisms , nor do regulations encourage initiatives aimed at own consumption.

In June 2019, 550 microgenerator connections (up to 11,1 kW) were registered in Latvia with a total installed electrical capacity of 3,23 MW, which is a negligible share (around 0.1 %) of the total electrical capacity installed in Latvia[193]. The NET system provides that households producing electricity for their own needs and transferring surplus electricity to the network may use a NET accounting system that allows units of electricity volume to be stored, payment being made only for mandatory procurement, distribution and transmission components when taking electricity from the network. In mid-2019, the NET system was used by 384 household self-consumers and had a total installed capacity of 2,12 MW. At the same time, there are households and legal entities installing plants of higher capacity for the

[193] AS 'Sadales tīkls'

production of energy for their own needs, and there are currently no incentive tools available for legal entities.

An analysis of the data on the permits issued for the introduction of new production plants sows that densest concentration of existing and potential consumers for own consumption is in and around Riga, though there are also concentrations in and around the country's main urban centres - – Ventspils, Liepāja, Rēzekne, Daugavpils, which reflects the solvency of own use consumers. At the same time, the need to encourage own use -consumers to adapt to the messages of the electricity market and to ensure the efficient functioning of the energy system should be taken into account in promoting an increase in the number of own use consumers of electricity.

2) **high initial costs** and **long pay-off period** when producing energy for self-consumption

In recent years, the cost of equipment suitable for self-consumption has decreased and has become more accessible to consumers. Electricity operators are also offering a broader range of services, including the installation of solar panels and the conditions for payment for the electricity transferred to the network, which is an indication of the general public's interest in producing electricity for own use.

However, given the cost of equipment relative to the total electricity price, the pay-off period is still relatively long. In a study of the Riga Technical University conducted in 2017, the time taken to pay off a 5.5 kW solar panel for a household using the NET system can be anything up to 26 years. However, it can be reduced by informing own-use consumers about the optimal capacities to be installed, developing alternative solutions for the current NET system, and reducing MPC costs for own-use consumers. The introduction of zero-emission solutions for heat generation is also not expected to increase significantly without additional financial incentives. Own-use-consumers should also be able to operate jointly or on a community basis, thus also promoting cost-efficient production of energy.

Main action line

Promoting economically justified own-use generation, own-use consumption of energy and renewable energy communities *(action line 4)*

Key actions and activities

1) to extend the range of persons involved in production of electricity (1.3, 4.1, 4.2, 4.3, 4.4, H.7)

In order to extend the range of persons involved in production of electricity, it is essential to provide an appropriate framework for the regulation that promotes such initiatives. For example, an assessment should be made of whether the net system might also be applied to legal entities, given connection costs and infrastructure use costs. Similarly, conditions should be developed in line with EU regulations to facilitate procedures for own-use consumers acting jointly (e.g. residents of a multi-apartment dwellings), and the need to develop a framework for RE communities. Consequently, when developing different aid measures, RE communities should be assessed and, where appropriate, included in beneficiaries.

Energy production for own needs should also be promoted in the public sector. One of the identified barriers to greater involvement of municipalities in self-generation of electricity is lack of experience in organising public procurement for the purchase of such technologies and services, and at the same time suppliers of electricity generation facilities. It would

therefore be appropriate to develop guidelines for public procurement for the installation of electricity generation plants and to assess the need to develop appropriate conditions for green public procurement.

It is also important to encourage the production of RE for own needs in rural areas. Funding should therefore be primarily encouraged for the installation of zero-emission technologies, including storage facilities, in rural holdings, thus also enabling farmers to reduce expenses related to energy costs.

2) to create **more beneficial conditions** for production of electricity for own needs (measures 1.2, 1.3, 1.5, 2.3, 4.1, 4.2, 11.1)

In order to encourage people's interest in electricity generation for own needs, the existing net system can be improved. An assessment should be made of how to transform the net accounting system or establish an alternative net payments system, which would accrue the value of the electricity transferred to the network, taking into account the hourly price of electricity.

Given the contribution own-use consumers make to promote the use of RES, it is also necessary to assess the possibility for complete cancellation of MPC for the electricity stored and received back from the network. The possibility of extending the net system to several sites of one electricity user should be assessed, thus ensuring that electricity produced on one site and transferred to the network can be used on a virtual basis at another site. In order to fully ensure the right of own-use consumers of electricity to sell surplus of electricity produced, it is necessary to develop a balanced peer-to-peer trading mechanism for different groups of sown-use -consumers of RE, and to review the tax policy conditions for electricity transactions outside the net system.

Help should be given in reducing investment in technological equipment for own-use energy consumption. This should primarily be implemented within the framework of energy efficiency measures, while at the same time supporting the installation of zero-emission technologies for both electricity and heat generation. Consequently, it should be ensured that the properties in which the measures were taken do not experience an inadequate increase the amount of property taxes. State aid measures (for example, the introduction of a reduced VAT rate) can contribute to the reduction in the amount of initial investment.

Related action lines

1) Improving energy performance of buildings (action line 1), which, together with support measures to improve energy efficiency, provides support for the deployment of RES solutions

2) Improving energy efficiency and promoting the use of RES technologies in heating and cooling, and industry (action line 2) in relation to promoting the use of RES technologies in local heating (LH) and individual heating

3) Promoting the use of negative emission technologies in electricity generation (action line 3), taken into account that this objective will also be driven by the wider use of self-consumption of zero-emission technologies

4) 'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies (action line 11), taking into account that appropriate tax policies can promote advantages of self-consumption technologies

4) Public education, education and awareness-raising (action line 12).

4.9. Transport

Current situation

In Latvia, transport accounted for 30.1 % of total final energy consumption in 2018 and 78 % of total final consumption of petroleum products. More than 92 % of the Latvian fleet consists of vehicles running on fossil fuel (petrol, diesel), while about 6 % of the vehicles registered in Latvia operate on alternative fuels (mainly LPG). Almost all fuel consumed in transport is imported into Latvia (except for some biofuels). In 2018, **energy consumption in road transport accounted for 82.6 % of the total energy resources used in transport**, 11.9 % of energy was consumed by international air transport and 4.8 % by rail transport, 0.5 % by water transport and the remaining 0.2 % by inland air transport and energy used in transport by pipeline[194][195]. Consequently, it can be concluded that road transport is the main transport sub-sector where significant steps must be taken to improve energy efficiency for the wider use of alternative fuels, including to increase the share of RES.

Transport was predominant in the balance of GHG emissions with a share of 28.5 % of total GHG emissions (not including LULUFC) in 2017 and with a 36.6 % share in n **Target status quo in 2030:**

- *More extensive use of public transport services and increased use of private vehicles, particularly in urban areas;*
- *More efficient energy use and an increase in the share of zero-emission energy, particularly alternative fuels;*
- *lower oil imports and higher consumption of RES produced in Latvia in transport.*

Benefits to society and the nation's economy:

- *Air quality in the urban environment and the well-being of the population have substantially improved reducing risks to the health of the population, improving the attractiveness of the urban environment to foreign visitors and the business environment;*
- *sustainable and efficient (simple) mobility has been ensured, reducing travel times and facilitating the mobility of goods and services;*
- *climate impacts of transport activities has reduced (a reduction in GHG emissions has been ensured).*

Main challenges

1) **old vehicle fleet** with predominance of vehicles running on diesel and petrol

Latvia has one of the oldest vehicle fleets in the EU with the average age of vehicles of 12.6 years (light vehicles – 12.9 years, trucks – 10.4 years, buses – 10.9 years) [196].

Diesel is the main energy source used in road transport with a share of 72.2 % (34,663 TJ) in 2018. The share of petrol is only 17.3 % (7,700 TJ) and LPG – 5.2 % (2,312 TJ). Compressed

[194] transmission of petroleum and gaseous products by pipeline where energy is used to ensure transmission
[195] CSB
[196] RTSD, CSB

natural gas (hereinafter referred to as CNG), liquefied natural gas (hereinafter referred to as LNG) and natural gas was consumed in small amounts – 0.0045 % (2 TJ) of the amount of energy sources used in road transport – in Latvia in 2018[197]. The CO_2 emission capacity[198] (CO_2 emission factor) of diesel is 7.3 % higher than that of petrol and approximately 16 % higher than that of LPG[199]. In turn, the CO_2 emission capacity of natural gas is 25.6 % lower than that of diesel. Moreover, the average age of diesel vehicles is higher than the average age of petrol vehicles. One of the reasons for the wide use of diesel is the national tax policy, which helps make the price of diesel more attractive compared to petrol.

2) **insignificant** consumption of **RES** and electricity in transport

In 2019, the share of energy from RES in transport was probably around 4 %[200], mainly due to the mandatory biofuel admixture requirement for petrol and diesel. On average, 1.5 % of the share of energy generated by the RES consists of electricity generated from RES, which is mainly consumed in rail transport, trams and trolley buses, but its volume is in decline.

Although Latvia has a well-developed EV charging network along the main roads – 72 EV charging stations have been created throughout Latvia, and other measures have been introduced to promote the use of EVs, such as free parking, the possibility of using public transport lanes, etc., as of 1 April 2019, only 600 EVs in technical order were registered in Latvia, including mopeds and motorcycles, of which about 470 were light passenger EVs. It can be concluded that whilst the number of EVs in Latvia is showing an upward trend – the number of EVs has increased by more than 40 % within a year (from 1 April 2018 to 1 April 2019),hey still account for just 0.07 % of all vehicles in technical order registered in Latvia.

Bioethanol is currently produced in Latvia from wheat, rye and triticale, and biodiesel from rapeseed oil. In view of the fact that first-generation biofuels are cheaper than modern biofuels, it can be assumed that fuel suppliers currently comply with minimum admixture requirements mainly by using first-generation biofuels. However, in view of the requirements of Article 25 of Directive 2018/2001, it is clear that the production of modern biofuels and/or biomethane should be of great importance in the future.

3) growing use **of private vehicles and less use of public transport**

As of 1 May 2019, around 820 thousand vehicles were insured and in technical order in Latvia, of which 78.6 % were light vehicles. On the other hand, almost 860 000 driving licences were issued and were valid in Latvia as of 1 April 2019. It can therefore be concluded that, according to statistics, almost every license holder in Latvia has one car registered. Currently, the average number of drivers per car in Latvia is between 1.6 and 1.9 persons. More than 350 cars have been registered per 1 000 inhabitants, and this number continues to increase, especially in Riga and Pierīga[201]. This leads to increasing congestion, forcing the population to spend more time on the road every day, and has a negative impact on air quality and climate change. The most common reasons cited for not using public transport services is, however, having a private or company car available[202].

[197] https://www.csb.gov.lv/sites/default/files/publication/2019-08/Nr_21_Latvijas_energobilance_2018_%2819_00%29_LV.pdf
[198] Expressed in tons of CO_2 per TJ
[199] http://www.meteo.lv/fs/files/CMSP_Static_Page_Attach/00/00/00/02/03/1548165912_CO2_met_2019.pdf
[200] In accordance with conditions of Directive 2009/28/EC (calculation methodology)
[201] Road Transport Directorate
[202] SKDS surveys, 2017–2019

Public transportation of passengers has decreased in the last five years, the 2014-2018 seeing a decrease of 12.1 % by trolleybus, 6.2 % by tram, 4 % by commuter bus and 5.2 % by rail railways. Passenger transport by trolleybus and tram is declining continuously every year. An increase in passenger transport by rail and commuter bus was observed in 2017-2018. A constant increase in the transport of passengers by air can be observed. Given declining passenger transport numbers and the continued increase of consumption of fuel by cars, it has to be concluded that private vehicles are increasingly used instead of public transport. Similarly, non-use of public transport is affected by relatively high public transport prices as well as the time spent on the road. For example, the use of public transport in Riga (in all transport modes and directions) can cost up to 50 euro per month. Where a private vehicle is used by at least two persons travelling in the same direction, public transport may become less favourable.

It can also be concluded that in recent years, for example, no new bicycle infrastructure for the safe and convenient use of bicycles has been constructed in Riga, and the capital (particularly the city centre) remains pedestrian unfriendly and does not make people want to travel by foot.

Main action line (action line 5)

Improving energy efficiency, promoting the use of alternative fuels and RES technologies in transport

Key actions and activities

1) Reducing the **use of private vehicles by optimising movement of public transport and other modes of transport** (measure H.1, measures 5.5, 5.6- 5.13)

In order to reduce the use of private vehicles, the main proposals are to improve the possibilities for using public transport, to promote the development of bicycle traffic and infrastructure, to promote an improvement in pedestrian infrastructure and to reduce the need for citizens to move in general. On the other hand, if transport is to be encouraged to move out of city centres, the conditions will have to be created for developing multifunctional logistics centres and encouraging the creation of multimodal public transport points.

The planned measures for the reduced use of private vehicles focus mainly on large cities (cities with a population of more than 20 thousand), and in particular Riga and the agglomeration of Riga, like Riga and Pierīga, taking into account the population in Riga and the municipalities of Pierīga, among others things, because around 50 % of all cars registered in Latvia as at 1 January 2019 are located in Riga and Pierīga.

2) Promoting the use of energy sources alternative to petroleum products (measure H.2, measures 5.1, 5.2, 5.3, 5.4, 5.14)

Energy efficiency in transport can be improved by ensuring the transition to different alternative fuels, mainly electricity, biofuels (including biomethane), CNG/LNG and, in future, hydrogen too. To facilitate this transition, it is necessary to implement complex measures – creating an alternative fuel infrastructure to make it possible to use alternative fuel-powered vehicles in Latvia, and at the same time promoting the purchase of such vehicles (in particular those with lower CO_2 emissions), and particularly zero-emission vehicles by both individuals and undertakings engaged in public procurement.

3) Increasing **the volume of RES** used in vehicles (measures H.5 and H.6, measures 5.1, 5.2, 5.3, 5.4)

Advanced biofuels and biogases (including biomethane) derived from a variety of waste and waste products contribute to high savings of GHG emissions with a low risk of indirect land use change. In order to ensure that, in the long term, the share of RES increases through local energy sources and in the light of available resources in the agricultural and waste sector, and existing biogas plants and investments in them, it is necessary to encourage the installation of biogas purification plants, to improve the infrastructure for biomethane use and to promote its consumption in public transport and commercial transport. At the same time, fuel suppliers will also have to continue to use first-generation biofuels, in particular to reduce the transport energy life-cycle GHG emission intensity.

Regional cooperation

Regional cooperation in the transport sector is to be carried out between the Baltic States with regard to the production and use of biomethane, the use of which can be secured by establishing a regional system of guarantees of origin, regardless of where it has been produced.

Similarly, in order to significantly reduce the burden and ease practical burdens for fuel suppliers at regional level, an agreement is possible on the equal or equivalent minimum levels for biofuels. Thus, fuel suppliers operating in several Baltic States will not be forced to adapt to the national requirements individually.

Similarly, in order to reduce cross-border refuelling problems caused by different tax rates and amounts, where refuelling is carried out in a single country and is therefore also included in the final energy consumption of that country, and the use of that fuel is credited to that country's GHG emissions balance, an agreement on equal or substantially equivalent rates of excise duty is possible at regional level for the fuel used in the country.

Related action lines

1) Improving the energy performance of buildings (action line 1), because EV charging places will be created in new buildings for the implementation of the conditions for improving the energy performance of buildings;

2) Improving energy efficiency and promoting the use of RES technologies in heating and cooling, and industry (action line 2), because the EEOS review will review the possibility of adding fuel suppliers to the EEOS;

3) Promoting the use of negative emission technologies in electricity generation (action line 3), because increasing the share of RES in electricity generation will contribute more to achieving the target of RES in transport, since only the electricity generated from RES is taken into account in achieving the target;

4) Energy security, reducing energy dependency, full integration of energy markets and modernisation of infrastructure (action line 6), because reduced imports of petroleum products reduce the energy dependency of the state, while measures to improve electricity and gaseous heating / motor fuel infrastructure contribute to the attractiveness of the use of EVs;

5) 'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies (action line 11), provision being made for a review of the VOT and excise duty rates on fuels rates;

6) Public information, education and awareness raising (action line 12).

4.10. Energy security, internal energy market

Current situation

The Latvian electricity market has been fully liberalised since 2015, and households, as well as legal users are free to choose a trader and mutually agree on an electricity price. Since 2013, electricity trading has also taken place within the framework of Nord Pool, the stock exchange of Nordic countries. Currently, 38 undertakings are active in the Latvian electricity market. The Latvian electricity market, just like the Baltic energy market, is currently connected to the common European energy market via two sea cables connecting the Estonian and Finnish power systems – Estlink I, with a transmission capacity of 350 MW, and t Estlink II, with a transmission capacity of 650 MW, while Lithuania is connected to Poland by the LitPol Link 1 interconnection with a transmission capacity of 500 MW. This has been supplemented by the Lithuania – Sweden interconnection "NordBalt", with a transmission capacity of 700 MW. At the same time, unlike other EU Member States, the electricity systems of the Baltic States operate in parallel, synchronised with the IPS/UPS[203] region rather than European electricity systems. The cross-border operation of the electricity markets of the Baltic States, Russia and Belarus is regulated by the BRELL[204] agreement concluded by the Belarusian, Russian, Estonian, Lithuanian and Latvian TSOs.

The Latvian natural gas market has been liberalised since 2017, and has given both companies and households the choice of the most appropriate supply of natural gas for their needs. Until the liberalisation of the natural gas market, Latvia had only one supplier of natural gas and only one undertaking was operational on the natural gas market. 21 undertakings operate on the natural gas market today and natural gas can also flow into Latvia from the Lithuanian liquefied natural gas terminal. Likewise, natural gas transmission and storage, as well as the distribution system have been decoupled from the historical natural gas monopoly. The main natural gas supply route for L:atvian consumers are the long-distance gas pipeline networks from the Yamal–Europe natural gas pipeline in the Tver Oblast in Russia via Saint Petersburg and Pskov to Estonia and Latvia. In Latvia, natural gas is pumped into the Inčukalns UGSF in the summer season, when the consumption of natural gas is considerably lower than in the cold season, for supply to users in Latvia, Estonia, Northwest Russia, and Lithuania during the heating season. Inčukalns UGSF is the only functioning storage facility in the Baltic States and ensures the stability of regional natural gas supply.

In Latvia, there are no harmonised restrictions on LH or individual heating, each municipality having the right to organise heating services in its territory. DH does not have a limited number of heat producers that can operate within the same licensing area of the heat supply system operator, though it is stipulated that a given operator must purchase the thermal energy produced by heat producers.

[203] Unified Energy System of Russia/Integrated energy system of Ukraine, Belarus, Kazakhstan, Kyrgyzstan, Azerbaijan, Georgia, Tajikistan, Moldova and Mongolia
[204] abbreviation |of: Belarus, Russia, Estonia, Latvia, Lithuania

In Latvia, there are no restrictions on transport energy market players or any restrictions on the ability of fuel suppliers to operate in Latvia. The transport energy market is diversified in Latvia, because although 100 % of fossil fuel is imported, it comes from several countries, the most active import markets being Russia, Belarus, Finland, Lithuania and Norway.

Target status quo in 2030:

- *The electricity networks of the Baltic States are synchronised with the European networks ensuring secure and sustainable electricity supply through a total of at least 5 European interconnections*
- *A regional natural gas market has been established between the Baltic States and Finland, including completion of cross-border natural gas interconnections, providing diversified and secure natural gas supply routes and suppliers*

Benefits to society and the nation's economy:

- *Energy security and energy independence from third countries*
- *The consumer has control over energy consumption and costs thanks to smart meters*
- *Users are interested and informed about usable efficient technologies, control their consumption of energy sources (electricity). Users avail themselves of the most state-of-the-art energy supply solutions and market products, and smart meters are used in energy accounting and consumption management to maximise market benefits.*
- *New entrants – aggregators – can effectively engage in the electricity market*
- *The protected user's service is received by all those who are entitled to it (160,000 instead of 80,000) and targeted measures are being taken to substantially reduce energy poverty.*

Main challenges

1) **energy dependency** on third countries and completely **undiversified natural gas supplies**

As things stand, the electricity system of the Baltic States is managed from third countries, which increases energy dependency on third countries and impacts on security issues, makes it difficult to exchange information with European TSOs, and limits opportunities to ensure coordinated action (e.g. regarding electrical power line outages) between the Baltic States and the rest of Europe. Internal electricity trading by Russia and Belarus, and by s other countries of the Commonwealth of Independent States, along with fluctuations and failures of their power system modes technically affect and strain the electrical transmission network of the Baltic states by limiting their ability to fully implement the EU legal framework in the electricity market, particularly in relation to the calculation and planning of capacity, overload management and network balancing. The Baltic States still depend on one dominant supplier of natural gas, which prevents energy independence and security of energy supply.

3) **undeveloped interconnection infrastructure and capacities** among the Baltic States

The developed electricity and gas transmission interconnections between Lithuania and Poland, Lithuania and Sweden, and Estonia and Finland do not provide full security of supply unless internal Baltic interconnections are developed at the same time, which would allow for increased transmission capacity. Latvia currently has an incoming interconnection with

Estonia and an outgoing interconnection with Lithuania, which might create problems, given Lithuania's decision to stop electricity coming in from Belarus.

3) Failure to solve a range of **energy poverty problems**

Only half of all identified protected users receive support to cover protected user's electricity costs, which is due to a non-automated support system. At the same time, in order to reduce energy poverty, the population receives support only for electricity used, while the support for the provision of thermal energy is sufficiently addressed by municipalities within the scope of their capabilities. However, the principle of energy poverty is based directly on the inability of people to keep their homes warm enough, so the reduction of energy poverty is more related to thermal energy consumption.

Main action line (action line 6)

Energy security, reducing energy dependency, full integration of energy markets, modernisation of infrastructure

Key actions and activities

1) Ensuring **energy security** and complete **integration of the energy market**, **to reduce energy dependency** (measures 6.1, 6.2)

Energy security can be improved and energy dependency can be reduced by ensuring:

- In the gas sector – the involvement of alternative suppliers of natural gas in the market where natural gas is supplied from as many countries as possible (EU countries or third countries), both via the natural gas transmission network and using alternative means of supply;
- In the electricity sector – more diversified types of energy sources used in electricity generation and electricity generation technologies, focusing on zero-emission technologies, while respecting the principle of technological neutrality of RES while ensuring continuous functioning of interconnections;
- In the transport energy sector – reducing the need to use imported fossil fuels by electrifying transport and diversifying the fossil fuel types used as much as possible.

There are currently no restrictions on the deployment and use of any RE technology in the territory of Latvia, but conditions are included and must be taken into account when developing transport infrastructure when creating a wind park[205]. Completed and forthcoming measures to develop and modernise the electricity infrastructure provide an opportunity for the inclusion of new RE capacities where no prioritisation of capacity inclusion has been defined.

Although internal energy markets are integrated in Latvia, Latvia will implement further energy market integration measures:

- by establishing a regional Baltic and Finnish gas market with a single gas balancing zone and a common gas transmission tariff. In order to ensure safety of gas supply and to increase gas flows, it is important to increase the capacity of the Latvia-Lithuania gas interconnection and to modernise Inčukalns UGSF.

[205] Cabinet Regulation No 240 of 30 April 2013 on general rules for the planning, use of and building on land"

- by implementing the synchronisation of the Baltic States' electricity networks with the European network, including the reinforcement of existing interconnections and the development of new interconnections, inter alia by reconstructing and modernising existing high-voltage substations and electricity distribution points within Latvia and constructing new power lines and installing the equipment necessary for safe and stable synchronisation of the Baltic States.
- By evaluating the possibility of further liberalising the heating market and introducing conditions for receiving a permission for installation of new capacities or new installations having evaluated the saturation of generating capacities in the specific territory and taking into account market functionality.

2) Modernising various aspects of **infrastructure** (measures 6.1, 6.2)

During the period covered by the Plan, the following infrastructure modernisation projects will be carried out:

- modernisation of the gas heating fuel/motor fuel infrastructure and improvement of energy efficiency, including evaluating the possibilities of adapting the natural gas infrastructure to hydrogen and other gaseous fuels, as well as drafting an action plan for the development of hydrogen infrastructure and market conditions, where applicable;
- modernisation of the electricity infrastructure and improvement of energy efficiency for the provision of a smart, digital-technology-based and efficiently managed distribution network meeting the needs of customers;
- modernisation of the Pļaviņas hydropower plant spillway;
- complete replacement of electricity meters with smart meters, which in turn will allow new entrants – aggregators[206], who will provide energy optimisation services, to operate on the market.

3) Developing solutions for reducing energy poverty (measure 6.3)

One possible solution for reducing energy poverty is to develop an effective and optimal regulatory framework for partial **support for the energy supply costs of protected users**, which would mean that a system of protected user information would be established within the framework of the State budget, which would automatically identify individuals who meet the criteria of protected users (families), thus ensuring that the protected user service is received by the maximum number of protected users, as well as ensuring that any electricity trader can supply the protected user service.

[206] An aggregator is a market operator that combines the power not consumed by several clients or the electricity produced for selling, procurements, auctions, or any regulated electricity market. In the case of an independent aggregator (one not linked to any electricity trader or other market player), the final consumer has to conclude two contracts — a supply contract with the electricity trader and a 'flexibility contract' with the aggregator. The flexibility contract ensures that the aggregator has direct access to the power and equipment of the consumer and, in case it is necessary for the market, the aggregator reduces the consumption of the user in a controlled manner to enter the market with the electricity that has not been consumed. A separate settlement mechanism governs how and whether the aggregator provides compensation to the trader for electricity savings or surplus electricity of the final consumer that is managed by the aggregator. An aggregator attached to a trader performs its function by using control mechanisms to earmark a specific amount of electricity savings for the final consumer defined by the trader. Thus the trader is aware of the electricity reserve it can use in case it is necessary for balancing the market situation or in the event of high electricity prices. The final consumer concludes only one contract — with the trader. An aggregator can merge the reduction/increase of electricity consumption and the reduction/increase of electricity production or combine the electricity acquired during both processes.

Similarly, the condition for reducing energy poverty is included as a criterion in the measures for improving the energy performance of buildings and for improving the energy efficiency of DH, LH and individual heating. If implementation of such measures reduce the level of energy poverty amongst the population, of the population, they should be particularly well received.

Similarly, energy poverty reduction solutions are developed within NRP "Energy"[207], as well as within the international "STEP"[208] project (within Horizon2020). The solutions developed under these projects will be included in the update of the Plan in 2023.

Regional cooperation

By definition, the regional natural gas market provides for a single entry-exit system of natural gas transmission and a balancing zone without internal commercial interconnection points between the Baltic States and Finland. In the field of the electricity market, regional cooperation takes place, and will continue to take place, against the backdrop of synchronisation between the electricity networks of the Baltic States and the network of continental Europe.

Regional cooperation will continue in the Regional Gas Market Coordination Group and the Baltic Council of Ministers' Committee of Senior Energy Officials. Regional cooperation is also implemented within the framework of the Baltic Energy Market Interconnection Plan (BEMIP).

In response to the development trends of the electricity market and changes planned in the EU legislation, TSOs of the Baltic States and Finland organised a working group in 2017 with the aim of developing a conceptual offer for establishing a common framework for the market of the Baltic States to introduce demand response services in the balancing market through aggregation. The main task at the moment is to jointly develop a well-functioning legal framework for introducing the demand response service.

Related action lines

1) Improving energy performance of buildings (action line 1), because increased energy performance of buildings will reduce energy consumption and thus the energy dependency caused by energy imports as a result of energy demand;

2) Improving energy efficiency and promoting the use of RES technologies in heating and cooling, and industry (action line 2), because the reduction in energy consumption resulting from more efficient DH systems will reduce energy dependency;

3) Promoting the use of negative emission technologies in electricity generation (action line 3), because the development of electricity generation in high-capacity wind parks will reduce energy dependency and reduce electricity imports;

4) Promoting economically justified self-generation, self-consumption of energy and renewable energy communities (action line 4), because the promotion of own-purpose - generation and consumption is not possible without smart meters, which in turn also gives aggregators the possibility of entering the market;

[207] https://www.em.gov.lv/lv/nozares_politika/valsts_petijumu_programma__energetika_/konkurss__ilgtspejiga_energetikas_infrastruktura_un_tirgus_/

[208] http://www.zrea.lv/lv/jaunumi_5/ar_starptautiska_projekta_step_palidzibu_lpiaa_noteiks_energijas_nabadzibas_kriterijus_3030/

5) Improving energy efficiency, promoting the use of alternative fuels and RES technologies in transport (action line 5), because the reduction in the consumption of fuel which is currently imported in the main will significantly reduce the State's energy dependency, while the infrastructure modernisation measures taken improve the availability of electricity and gaseous fuels in transport;

6) 'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies (action line 11), because the reduction in the use of heating and motor fuel has a positive impact on energy independence due to the impact of the tax review.

4.11. Waste and wastewater management

Current situation

In 2017, there were 11 municipal waste landfills, one hazardous waste landfill and one landfill where hazardous waste containing asbestos and construction waste are disposed of.[209]

In total, 517,859 t of municipal waste and 4,692 t of hazardous waste were disposed of in Latvia in 2017.[210] **GHG emissions from waste management in 2017 amounted to 5 %** of the total GHG emissions excluding LULUCF. These include CH_4 emissions from solid waste disposal, which account for more than half (71.4 %) of total GHG emissions in the waste management sector, CH_4 and N_2O emissions from bio-treatment of solid waste (8.6 % of total waste management emissions), CH_4 and N_2O emissions from wastewater treatment and discharge (20 %), and a very small proportion (0.05 %) consists of CO_2 and N_2O emissions from waste incineration.

The share of the population using centralised wastewater collection and treatment has increased from 70 % in 2005 to almost 82 % in 2017. In most cases, secondary or tertiary treatment is provided for wastewater collected centrally. The population that does not have access to a centralised sewer system uses different decentralised sewer solutions. More than 200 million m^3 of wastewater is collected and treated every year (231 m^3 in 2017). Over the last 10 years, the total amount of wastewater discharged into surface waters has been observed to fluctuate from one year to the next, but since 2008 there has been a downward trend for the amount of pollution discharged into the environment with wastewater, which has led to a decrease in total nitrogen and phosphorus pollution. Sewage sludge from utility treatment plants is also increasing, but it is used in forestry and agriculture in small quantities. Approximately half of the sludge generated is placed in temporary storage sites.

Similarly, the energy solutions used in sewer components and wastewater treatment plants are often not energy efficient. Also, sewer networks that have become worn through the infiltration of rainwater and have not been refurbished increase the amount of wastewater to be pumped and treated. The load on systems and equipment is expected to increase further due to the impact of climate change. At the same time, wastewater infiltration in the environment may occur during drought periods, having an impact on both environmental pollution and the quality of wastewater treatment.

[209] Latvian GHG inventory report for 1990-2017 https://unfccc.int/documents/194812

[210] Domestic and hazardous waste, their collection and treatment https://data1.csb.gov.lv/pxweb/lv/vide/vide__vide__ikgad/VIG040.px/table/tableViewLayout1/

The potential contribution to energy objectives of energy from the incineration of waste has yet to be assessed. Action line 7 of the Plan sets out measures for the development of waste management focusing on the reduction and recycling of waste, with particular reference to the principles of the circular economy.

Target status quo in 2030:

- *Amount (volume) and hazard of the water disposed of at waste landfills have fallen, and reuse, recycling and recovery of different types of waste has improved, separated waste collection has been achieved;*
- *Before buying a product, members of the pubic assess the need for it and its contribution to the environment.*
- *The availability of centralised sewer services has extended and the share of their users has increased, the infrastructure has been renewed and modernised;*
- *Solutions for management of sewage sludge that are sustainable from an environmental and economic point of view have been evaluated and implemented.*

Benefits to society and the nation's economy:

- *The waste management system has been developed and therefore the living environment has improved;*
- *The waste water management infrastructure has been modernised and extended, thus reducing the risk of environmental pollution and increasing the availability of a qualitative service to the population;*
- *A sewage sludge management system has been established, reducing the risk of environmental pollution and preventing sludge from accumulating in water treatment plants;*
- *A circular economy has been introduced, promoting the use of by-products from one sector as a raw material for another sector;*
- *Companies are given an economic incentive to launch environmentally friendly products on the market and to support recovery and recycling schemes.*

Main challenges

1) Insufficiently developed waste **management infrastructure**

The incentives provided for in Latvian waste management policy (e.g. NRT on landfilling) are insufficient to reduce waste disposal. As too much waste is disposed of in landfills and there is insufficient waste recycling and recovery capacity, better waste management techniques (for example, re-use and recycling) are not being used sufficiently. In order to increase the volume of high-quality recycling, improvements are needed in separate collection and sorting of waste, as well as in increasing waste recycling and recovery capacity.

2) **Unavailability of** separate waste collection and **sorting services**

Separate collection and sorting of municipal waste is gradually being introduced, but this waste management service is not yet available to all producers of waste in all municipalities. Therefore, separate collection of waste is not sufficiently efficient and part of the waste that could be recycled or recovered goes to landfill.

3) **The infrastructure** of water management (water supply and sewer) services **is ageing** and there is a high **need for investment** in its reconstruction and development.

Over the last 20 years, more than EUR 848 million have been invested in the development of water management infrastructure, representing 71 % of all environmental investments. Most of these investments come from EU structural funds and other foreign donors. Thus, the development of the water management sector has been greatly influenced by the availability of EU structural funds for a considerable, though it could decrease in the near future. The service life of not only the pre-1980s infrastructure but also some infrastructure components built in the last 20 years is coming to an end. Leakages, infiltration and accidents often occur in sewer systems. The revenue from water management tariffs is not sufficient to cover investment costs and to ensure the quality and sustainable functioning of water management systems in the long term. The need to ensure access to the service limits the possibility of increasing tariffs.

4) The state **does not have a strategy** for managing sewage **sludge**

More than 20,000 tonnes (dry weight) of sewage sludge is produced in Latvia every year (24,939 tonnes in 2017). The main sludge generators are utility wastewater treatment plants. Only 30-35 % of this quantity are used as fertiliser in agricultural lands, compost production or greening of areas, and since 2013 the use of sewage sludge in agriculture has decreased significantly. Most sewage sludge accumulates in so-called temporary storage sites. At the moment, no policy document sets out the management of sewage sludge. There is increasing scientific evidence that sewage sludge may be an important source of microplastic and other pollution. Therefore, a national strategy is needed to assess the potential environmental impacts of sewage sludge and to identify solutions for its management.

Main action line (action line 7)

Improving the efficiency of waste and wastewater management and reducing GHG emissions

Key actions and activities

1) Ensuring the **reduction in the amount of disposed waste**, promote the preparation of different types of waste for **reuse, recycling and recovery** (measure 7.1)

In order to meet the objective of reducing the amount of waste disposed of at landfills, the plan is to improve the separate collection, preparation for re-use, recycling and recovery of waste, thus improving the possibilities for sorting and recycling waste.

Total volume of waste is linked to the population and the size of the national economy.[211] Data from the CSB show that food and other biodegradable waste predominate in household waste, accounting for 41 % of municipal waste generated. Since the collection and use of biogas for the production of energy from biodegradable waste and sludge has been identified as one of the priorities for waste management, measures are planned to support it.[212]

2) Implementing waste generation prevention measures and measures promoting a transition to circular economy (measure 7.2)

[211] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics/lv
[212] https://unfccc.int/documents/194812

In 2016, 30 % of municipal waste was recycled in Latvia[213], while more than 70 % went to landfill[214]. The circular economy helps to achieve sustainable development objectives by maintaining the value of products, materials and resources for as long as possible.

The aim of the measure is to promote the re-use and sound use of resources, the production of reusable and durable products and the development of eco-design. Such development of waste management contributes to reducing waste generation and educates the population about the environmental impact of a given product.

3) Ensuring the **adequate collection and treatment of all wastewater** by restoring and further **developing the water management infrastructure**, as well as ensuring the establishment of wastewater **sludge management** infrastructure (measure 7.3)

The objectives of the measure are to modernise and restore the wastewater collection and treatment infrastructure in order to reduce environmental pollution caused by wastewater and to increase the availability of the service to the population, and to carry out a study to assess the cost-effectiveness of wastewater sludge management solutions and their contribution to the reduction of environmental risks, and to start implementing the best solution.

Related action lines

1) Improving energy efficiency and promoting the use of RES technologies in heating and cooling, and industry (action line 2), because energy efficiency is assessed in the design process, thus reducing the electricity consumed and the raw materials involved in the manufacturing process.[215]

2) Improving energy efficiency, promoting the use of alternative fuels and RES technologies in transport (action line 5), because policies and measures in waste and wastewater management may have a significant impact on the volumes of biomethane produced in Latvia, which could be used in transport;

2) Energy security, reducing energy dependency, full integration of energy markets, modernisation of infrastructure (action line 6), because the production of biogas from waste and sludge provides for the possibility of cogeneration.

3) Public information, education and awareness raising (action line 12).

4.12. Agriculture, land use and forestry

Current situation

At the beginning of 2019, agricultural land occupied 36 % of the territory of Latvia, 71 % of which was arable land and 27 % meadows and pastures[216]. By contrast, 53 % of Latvian

[213] EUROSTAT

[214] Circular economy: More recycling of household waste, less landfilling http://www.europarl.europa.eu/latvia/lv/jaunumi/2018/aprila_jaunumi_2018/atkritumu_skirosana.html

[215] N. Belmane (2013) Ievads ekodizainā https://www.liaa.gov.lv/files/liaa/attachments/01_namedabelmane_ievads-ekodizains.pdf

[216] https://www.vzd.gov.lv/lv/parskati-un-statistika/statistika/statistika-no-kadastra/ZLV/

territory is under forest[217], some half of which belong to the State, while most of the remainder is privately owned.

Agriculture is the second largest sector of emissions according to the GHG inventory of Latvia with 24.6 % (2782.32 kt of CO_2 eq.) of the total GHG emissions of Latvia in 2017 (excluding LULUCF). In 2017, GHG emissions from agricultural soils accounted for the largest share (60.8 %) of total emissions of the sector, while emissions from the enteric fermentation of cattle were the second largest source of agricultural emissions, representing 31.2 % of total agricultural emissions. Manure management generated 6.8 %, while liming and carbamide use together accounted for 1.2 % of total agricultural emissions in 2017.

Net GHG emissions from LULUCF in 2017 amounted to -1706.85 kt of CO_2 eq. compared to -9828.92 kt of CO_2 eq. in 1990. In 2017, the change in GHG emissions/removals from LULUCF was -82.6 % compared to 1990. The reduction in CO_2 removals in the LULUCF sector is related to increased logging (more than twofold) due to forest age structure and the increase in the share of grown and overgrown forest changes. Transformation of forest lands into settlements as well as transformation of naturally afforested lands into arable land and also plays an important role[218].

Target status quo in 2030:

- *Land management, arable and livestock farming and forest management are performed sustainably way with due account taken on climate, environmental protection, economic and social aspects;*
- *Forest area in Latvia is not shrinking and is managed in a sustainable manner;*
- *Agriculture and forestry contribute significantly to bioenergy without endangering food security and the CO_2 removals and in compliance with the cascade principle[219];*
- *High productivity in agriculture and forestry through efficient use of bio resources (including land resources);*
- *Wood use volumes in construction have increased.*

Benefits to society and the nation's economy:

- *Increased rural population and increased wellbeing;*
- *Increased crop yields without reduction in soil fertility;*
- *Reduced energy demand from external suppliers;*
- *Increasing competition of forestry and agriculture.*

Main challenges

1) high **share of** hard-to-reduce **GHG emissions** in agricultural activities

In view of the volume of livestock kept in Latvia, account should be taken of GHG emissions from enteric fermentation and manure management. Dairy farming is one of the most important agricultural sectors in Latvia. The number of dairy cows has fallen in recent years,

[217] National Forest Monitoring 2019

[218] GHG inventory of Latvia 2019 https://www.meteo.lv/fs/CKFinderJava/userfiles/files/Vide/Klimats/Majas_lapai_LVGMC_2019_seginvkopsavilkums.pdf

[219] Principle of the circular economy. Under the cascade principle, wood is used in the following order of priorities: wood-based products, extending their service life, re-use, recycling, bio-energy and disposal

but productivity has increased. The number of meat cattle and poultry has increased in recent years. Livestock farming and livestock management are closely linked to the physiological digestive processes of each animal. The amount of GHG emissions generated by them is very difficult and costly to reduce, for example, the amount of GHG emissions from digestive processes generated by enteric fermentation. Improvements must therefore be made directly in the field of animal nutrition. Compared to other European countries, Latvia is characterised by a large proportion of dairy farms with small livestock herds, in which organic dairy or meat livestock farming has development potential. Extensive livestock farming has a positive impact, as it avoids a high concentration of on a single unit of land. At the same time, most dairy cows are kept in large holdings. Therefore, GHG emissions mitigation measures must be adapted to optimise the effectiveness of implementing measures.

The main sources of GHG emissions in the cultivation of agricultural soils are the management of organic soils and the use of nitrogen fertilisers. In Latvia, arable land accounts for 67 % of agricultural land on average. The amount of fertiliser used has increased by 57 % compared to 2005, but data from the last three years have shown a slight decrease in the use of fertiliser (3 %)[220].

The production of agricultural products should be based on socially responsible and sustainable development principles. Harvest is sustainable and does not reduce soil fertility, biomass is used successively several times, thus ensuring resource efficiency, and production should be diversified to make better use of available natural resources.

Technological techniques should develop to contribute to the reduction of total GHG emissions and CO_2 removals. However, the development of such techniques requires financial contributions and research.

According to the information report "Latvian Bioeconomy Strategy 2030"[221] and the long-term forecasts for the development of the agricultural sector for 2050, it is necessary to increase the efficiency of use of land and resources by gaining more added value from 1 ha of agricultural land and reducing GHG emissions per unit of products. This is possible by developing innovation and by introducing the principles of the circular economy, while maintaining areas of perennial grasslands and biologically valuable grasslands.

2) **Sustainable increase in forest CO_2 removals**

Forests can influence climate change in two ways, firstly by removing CO_2 and collecting carbon in wood and soil, and secondly by replacing CO_2-intensive timber materials. Carbon in wood continues to be stored in wooden structures, buildings, furniture, various household objects until the end of their life cycle, when burning can produce energy. Consequently, in progress towards Latvia's climate neutrality goal in 2050, the productivity of forest stands for increasing CO_2 removals and the wider use of wood as material should be promoted.

Over the last decade, a steady increase in the proportion of grown and overgrown forest stands in Latvia is reducing the intensity of CO_2 removals into the forest, especially their potential in the future. Measures should therefore be taken to improve the productivity of forests and to balance the ageing structure of forests. The incidence of extreme natural phenomena is also increasing leading to increased risks to the development of forest stands. These can be mitigated by forest management – by selecting forest planting material

[220] CSB database http://data1.csb.gov.lv/pxweb/lv/lauks/lauks__agro/MGG010.px/table/tableViewLayout1/
[221] http://polsis.mk.gov.lv/documents/6100

adapted to climate extremes, by maintaining coppice in a timely manner and by taking other measures to improve the adaptation of forest stands. Significantly, private forests are managed to a limited extent only. Support measures are needed to improve the productivity and adaptation of private forests to climate change.

3) **Fulfilment of the LULUCF target for 2030 (fulfilment of the net removal rule**) and creation of additional removals

A major challenge is to ensure in LULUCF accounting categories and in the entire LULUCF sector that the no-debit conditions are met, as this is influenced by both agricultural development and unbalanced forest age structure (a high share of grown and overgrown forest stands), and the management of wetlands/peat bogs (the development of peat bogs).

This is a key prerequisite for not compensating emissions accounted for within LULUCF using non-ETS emissions units, and for Latvia to be able to use the additional units created by the LULUCF sector to compensate non-ETS emissions of up to 3.1 million tonnes of CO_2 equivalent (the amount that Latvia is allowed to carry over during the entire period).

Forest lands, like agricultural lands, have a major problem with a degraded or unrestored amelioration system, which historically was set up to greatly improve land quality and exploitation capabilities. However, at the moment this system is significantly outdated or has been destroyed altogether, so work is needed on measures to restore amelioration systems.

Main action line (action lines 8 and 9)

Efficient use of resources and reduction of GHG emissions in agriculture

Sustainable use of resources and reduction of GHG emissions and increasing CO_2 sequestration in the sectors of land use, land-use change and forestry

Key actions and activities

1) Efficient use of fertilisers and improvement of the manure management system (measures H.2, 8.2, 8.3, 8.1)

Efficient use of fertilisers is essential both from an economic point of view (crop production) and from an environmental point of view. Lack of nutrients can reduce plant growth and production, while excessive nutrients can lead to economic losses and environmental pollution. The main reduction in GHG emissions relates to the reduction of nitrogen emissions. For example, precise use of fertiliser and fertilisation planning reduces direct and indirect N_2O emissions, provided N consumption is reduced. Optimal and balanced soil quality indicators ensure good development of the plant, the uptake of elements and the yields with less mineral nitrogen fertiliser.

The objective of the manure fermentation biogas reactor is to reduce GHG emissions to a minimum in large cattle, pig and poultry holdings by ensuring efficient manure management and the production of valuable manure for agricultural crops. The benefits of biogas use are most often seen in the context of energy, so the benefits of emissions are credited to the results of the energy sector. The reduction in manure emissions is key.

2) Improving soil fertility (measures 8.7, 8.13, 8.8)

Measures to improve soil fertility relate mainly to reducing nutrient leaching. An improved soil structure provides better uptake of fertiliser and leads to a lower N drain, thus reducing N_2O emissions. Maintenance of amelioration systems has a complex impact on soil and its fertility. Overly wet and overly dry soils are both unsuitable for crop cultivation. At optimal

availability of water, there is much more oxygen available to plant roots and the biodiversity of organisms living in soil is not affected.[222]

3) Improvement of animal nutrition (measures 8.5, 8.6)

A variety of well-known methods are used worldwide for measuring the digestibility of feeding stuffs and for measuring and analysing the volume of gases released by animals. The results of such studies make it possible to find ways of reducing methane emissions. Balanced and animal-friendly feed has an impact on the rate of release of N from manure, which has a positive impact on the reduction of N_2O emissions. In turn, improving the quality of feed will increase the digestibility of feed and reduce CH_4 emissions.

4) Improving CO_2 removals in forest stands (measures 9.2, 9.3, 9.4, 9.5 and 9.6)

Forests are a significant sink of CO_2. The increase in forest coverage and stock has a stable and positive impact on carbon build-up.

Afforestation is one of the most effective ways of increasing CO_2 removals, because three new carbon pool sites are created in the afforested area – litter, living and non-living biomass and a significant increase in carbon pool. It is also possible to achieve a reduction in emissions by supplementing the overgrown areas in areas that are naturally overgrown by trees, where the stocking level is low. In order to maintain the mitigation effect on climate change, it is necessary to maintain afforested areas. Maintenance of coppices contributes to improving the resilience of forest stands to climate change and increasing forest productivity, which increases carbon sequestration.

The replacement of unproductive forest stands with low carbon removals by planting highly valuable forest planting material and by ensuring adequate maintenance of coppices a way of increasing productivity and carbon sequestration by 20 %.

As the incidence of natural extremes caused by climate change (drought, flooding, windthrow, snow and ice storms, etc.) increases, so the areas of forest stands destroyed by natural disasters increase. Operational restoration and maintenance of destroyed forest stands stabilise carbon sequestration in the forest.

Timely maintenance of coppice will increase the productivity and resilience of forest stands to climate extremes, thus contributing to CO_2 removals.

5) Improving the quality of soils (measure 9.7)

Soil humidity is one of the factors affecting soil quality. Most reclamation ditches over the age of 25 have lost their functionality in full or in part. CO_2 and N_2O emissions reduce, but CH_4 emissions increase considerably in areas with increased amounts of water. The establishment of amelioration systems increases forest productivity, and hence the removal of GHG emissions. Soil quality can also be characterised by the presence of minerals available to plants. The use of wood ash to improve forest soil leads to a rapid increase in the concentration of nutrient elements in soil. Due to higher increases in living mass, CO_2 removals increase tool[223].

Regional cooperation

[222] LLU "Measures reducing GHG emissions" https://www.llu.lv/lv/seg-emisijas-samazinosi-pasakumi

[223] LLU "Greenhouse gas emission reduction opportunities with climate-friendly agriculture and forestry in Latvia " EVIDEnT projects. 2018.

Give that areas to be used for agricultural and forestry activities may straddle borders, it is necessary to ensure regional cooperation on measures to be taken in such territories, such as amelioration measures, soil quality improvement measures. Similarly, regional cooperation on the reduction of agricultural GHG emissions is carried out within the framework of Directive 91/676/EEC[224] (for nitrogen emissions) or the Air Pollution Reduction Action Plan (for ammonia emissions).

Related action lines

1) Promoting the use of negative emission technologies in electricity generation (action line 3), introducing additional measures to promote biogas production, infrastructure development, purification to biomethane and use, as well as developing conceptual solutions for the construction of wind power plants in forest and agricultural lands;

2) Energy security, reducing energy dependency, full integration of energy markets and modernisation of infrastructure (action line 6), because measures (construction of wind farms on forest and agricultural lands) to improve electricity infrastructure contribute to the attractiveness of the use of EVs.

3) 'Greening' of the tax system and improvement of the attractiveness of energy efficiency and RES technologies (action line 11), with regard to revising of tax policy guidelines to define a reduced excise duty rate (compared to the petrol and diesel rate) for other alternative fuels, evaluating their production costs

4) Public information, education and awareness raising (action line 12).

4.13. Use of fluorinated GHG (F-gases)

Current situation

Although they are less familiar than CO_2, F-gases strongly contribute to global warming and many of them remain in the atmosphere for a very long time – up to 50,000 years. The main reason for the increase in emissions of F-gases is the replacement of ozone-depleting substances (ODS), which started in the 1990s, because F-gases were considered to be more environmentally friendly than ODS.

Fluorinated GHG (hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF_6)) occur in the industrial process and product use sector. The sub-sector of products used to replace ODS (includes the use of F-gases in cooling plants and air conditioners, building foam, stationary fire protection equipment and aerosols) accounts for **32.0 % of total emissions from the industrial process and product use sector** and **2.1 % of Latvia's total GHG emissions** in 2017. Emissions of F-gases increased by 317.2 % in 2017 compared to 2005. The use of these gases in equipment depends mainly on the quantities imported into the country. On the other hand, imports are affected by the country's economic situation, which has led to a sharp increase in emissions of F-gases, particularly in recent years. The main reason for the increase in emissions is the replacement of ODS with F-gases in **cooling and air conditioning**

[224] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources

plants, which is the main sub-sector of emissions of F-gases, generating 93.7 % of all emissions of F-gases in Latvia in 2017.[225] Therefore, it can be concluded that this sub-sector is the main sector where significant measures need to be taken.

Target status quo in 2030:

- *the public understands the impact of F-gases on climate change;*
- *the number of unscrupulous economic operators has decreased owing to improved technical equipment at the disposal of control authorities;*
- *the control authorities exercise full control and are able to explain the consequences to economic operators;*
- *economic operators are aware of the reduction in the use of F-gases under international commitments and are actively seeking and applying equally efficient alternatives with less global warming potential;*
- *persons working with F-gases are motivated to formally qualify, because they know that they are subject to closer scrutiny;*
- *a Baltic cooperation network has been established with regular sharing of good practices and challenges in the field of control of imports and handling of F-gases.*

Benefits to society and the nation's economy:

- *Economic operators are motivated to act legally because of comprehensive control, protecting the interests of honest economic operators and imposing effective sanctions on unfair operators for illegal trade and the pursuit of activities without adequate qualifications;*
- *Understanding of the impact of F-gases on climate by economic operators has improved and a corresponding incentive to switch to climate-friendly alternatives has been provided;*
- *As illegal imports fall, the country's economic situation improves (taxes on gas trading and refuelling are paid);*
- *General public and institutions understand the domestic market in F-gases.*

Main challenges

1) Control authorities have insufficient **knowledge and equipment** to carry out checks.

In Latvia, F-gases are controlled by the Customs Board of the State Revenue Service (SRS) (border checks on imports in bulk and pre-filled equipment) and the State Environmental Service (SES) (issues permits and controls handling of F-gases). Improving equipment, such as purchasing analysers for F-gases, and enhancing the knowledge of the control authorities about developments in legislation on F-gases strengthens their capacity, makes it possible to better control F-gases and reduces illegal imports and emissions accordingly.

2) **Insufficient information** on the internal market of F-gases and the role of natural persons in imports of F-gases.

[225] GHG inventory submitted in 2019 (1990-2017): https://unfccc.int/documents/194812/ Summary: https://www.meteo.lv/fs/CKFinderJava/userfiles/files/Vide/Klimats/Majas_lapai_LVGMC_2019_seginvkopsavilkums.pdf

Permits are issued to undertakings engaged in imports of F-gases, as well as to natural persons carrying out maintenance of equipment or handling of F-gases. The importing companies must also be registered in the register of F-gases managed by the EC, provided that >100 t CO_2 eq. are imported. These companies are controlled mainly by verifying whether licences and permits have been received and are valid and whether all necessary reports and data have been submitted under EU and national legislation. Licensed undertakings and certified natural persons who do not need a licence and who are not therefore controlled operate on the internal market. Therefore, an assessment of the current situation and the methods applied is necessary to limit the involvement of natural persons in the internal market and to establish easy-to-use standards for the control of companies and other locations where F-gases are handled.

At present, there is no clear overall situation in the country regarding the volume of F-gases imported by natural persons. As regards the control of natural persons, the regulatory framework should be improved in the field of both imports and operational controls.

3) **Society and businesses lack knowledge** about the impact of F-gases on climate and the consequences of their leaks.

In companies working with equipment using F-gases, such as refrigeration or freezing equipment (food companies, shops), training of employees is important to raise awareness about the impact F-gases have on the climate and to prevent leaks and related emissions.

If companies which use refrigerants on a daily basis lack understanding of F-gases and their climate impact, it can be assumed that the general public has not been informed of potentially harmful effects of greenhouse gas emissions, including long-term effects of F-gases. Building public awareness of the impact of reusable F-gas tanks on the climate is of great importance.

Main action line (action line 10)

Promoting the reduction in the use of fluorinated greenhouse gases (F-gases)

Key actions and activities

1) **Market surveillance** (measure 10.1)

The aim of this measure is to promote control on the domestic market and on the border. Internal market surveillance is carried out at car repair workshops and other places where F-gases are commonly most. Import and export control, by contrast, is designed to ascertain whether the company has the necessary permits or authorisations, and whether the volumes imported and exported in the previous year were reported correctly.

2) **Improved control** of handling of F-gases and development of a system (measure 10.2)

Successful checks reflecting the actual situation with F-gases (trade and consumption) in the country require an appropriate knowledge and equipment base. Under this measure, the plan is to carry out training activities at control authorities and improve the availability and quality of equipment (SRS Customs Board, Consumer Rights Protection Centre, SES).

3) **Identifying** the necessary historical **information** on volumes of imports and internal market volumes of F-gases and developing appropriate measures based on the results of the investigation (measure 10.3)

Since the situation regarding the internal market in F-gases is not fully clear, it is not possible to assess their impact on climate. No accurate information is collected on the impact of

natural persons on the total volume of imports and trade. It is therefore necessary to carry out an analysis to establish the role played by natural persons in the internal market. On the basis of the assessment and analysis, measures can be planned and implemented to limit the use and imports of F-gases.

4) **Informing the public and businesses** (measure 12.11)

The aim of the measure is to raise public awareness of the impact of F-gases on climate. In addition, awareness and education of businesses is carried out to prevent leakages from equipment, and it is encouraged to choose more climate-friendly refrigerants with less global warming potential, such as CO_2 or hydrocarbons like propane, propene or isobutane.

Related action lines

1) Improving energy performance of buildings (action line 1), because improving energy performance for buildings will reduce the need for air conditioners;

2) Improving energy efficiency and promoting the use of RES technologies in heating and cooling, and industry (action line 2), because plants should be as energy efficient as possible in order to reduce the energy consumption needed for cooling, thus leading to fewer emissions in the energy sector;

3) Informing, education and awareness raising of the public (action line 12).

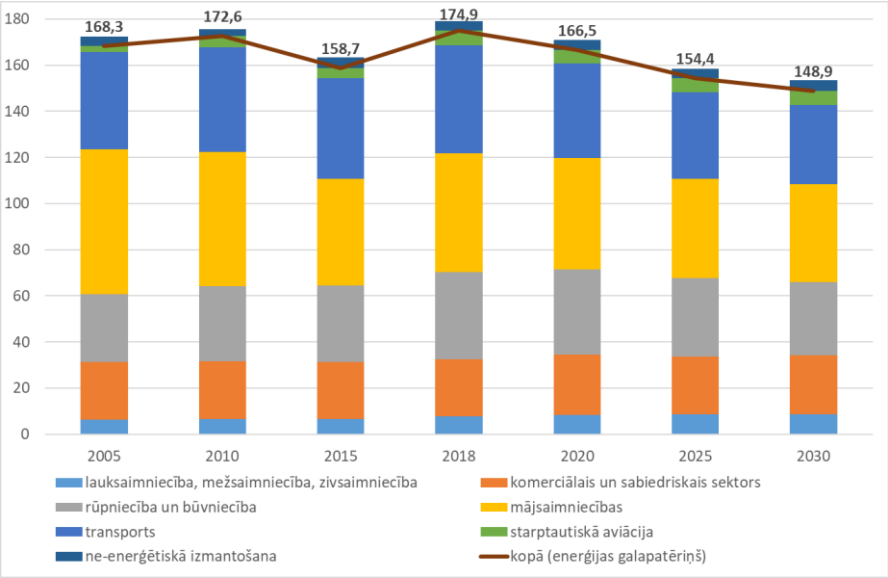
5. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES

5.1. Projections of the development of the energy system, GHG emissions, CO_2 removals, and air pollutant emissions under the planned policies and measures

5.1.1. Energy system development projections

The implementation of the planned policies and measures (hereinafter referred to as the target scenario) meets the mandatory energy efficiency improvement target – cumulative energy savings for 2030 and the share of RES in total final energy consumption reaching 50 %. However, a substantial increase in the share of RES in final energy consumption has an impact on primary energy consumption and on final energy consumption and affects the possibility of reducing this consumption, since the modelling based on developed additional policies and measures proposes as the most cost-effective measures ensuring a significant increase in the consumption of solid biomass in industry and low capacity energy (mainly in the commercial and public sectors), where, while respecting the principles of eco-design, the efficiency of combustion plants is lower than that of large capacity combustion plants.

Projected final energy consumption, excluding energy consumption for non-energy needs, is forecast to be around 14.9 % lower in 2030 than in 2018. The calculated final energy consumption projections predict that the largest reduction in energy consumption in 2030 against 2018 is in the transport sector, households and industry. According to the projections, the main energy consumption sectors in 2030 will be transport and households with 27.1 % and 28.6 % of the total final energy consumption respectively. Industry will consume 21.2 % the commercial and public sector will consume 17.2 %, while the rest will be consumed on meeting agricultural and forestry needs.



Key reads:

Agriculture, forestry, fisheries

Industry and construction

Tranport

Non-energy use

Commercial and public sector

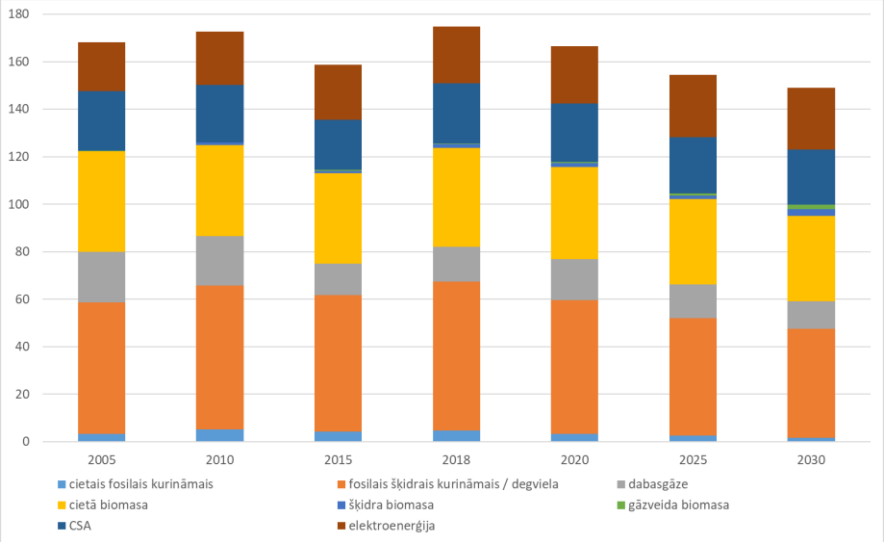
Households

International aviation

Total (final energy consumption)

Figure 42. Final energy consumption projections in the target scenario broken down by sectors until 2030[226] (PJ)

In the target scenario for 2030, the share of electricity increases by around 3.7 percentage points in total final energy consumption compared to 2018, while taking into account increased car efficiency, wider use of EVs, wider use of RES in transport, a reduced share of oil consumption by around 5 % points. The share of consumption of all types of biomass increases by about 2.2 % points compared to 2018. The planned energy efficiency measures save 9 PJ in 2030.



Key reads, left to right, top to bottom:

Solid fossil fuel

Solid biomass

MSW

Liquid fossil fuel

Liquid biomass

Electrical energy

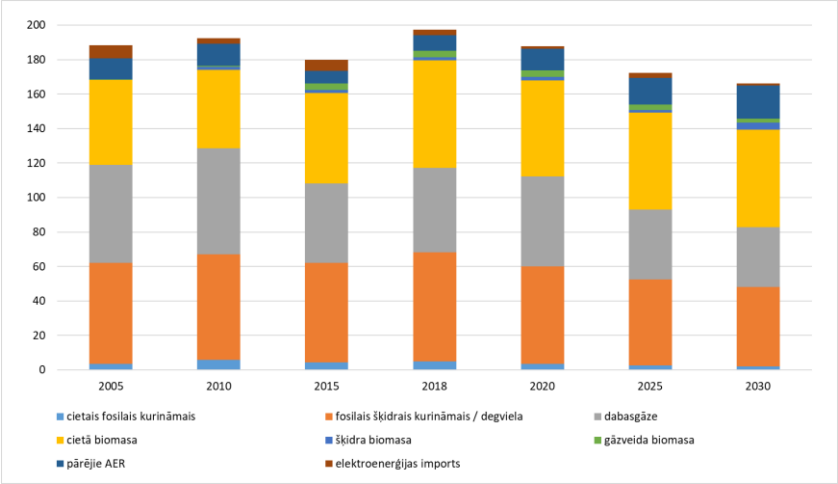
Natural gas

Gaseous biomass

[226] MoE

Figure 43. Final energy consumption projections in the target scenario broken down by energy types until 2030[227] (PJ)

Taking into account the measures included in Annex 4 to the Plan on improving energy efficiency at final consumers, as well as measures in the energy transformation sector and energy transport, the total primary energy consumption, excluding consumption for non-energy needs, according to the results of the modelling of the target scenario, is 166.2 PJ in 2030. It is 15.8 % lower than in 2018 and provides an average annual decline of around 1.2 % of energy consumption by 2030. All fossil fuels in total primary energy consumption show a downward trend until 2030 compared to 2018. By contrast, the trend of all types of RES is upward. The share of wind and solar energy in total consumption of primary sources is growing at the fastest rate.



Key as in previous figure.

Figure 44. Primary energy consumption projections in the target scenario broken down by energy types until 2030[228] (PJ)

The results of the modelled target scenario show that planned energy efficiency measures in respect of final energy consumers and in energy transformation and transportation sectors save 12.3 PJ in 2030. This means that primary energy consumption would be 12.3 PJ higher without these measures.

The intensity of primary energy consumption and final energy consumption in the target scenario improves compared to the baseline scenario (it also improves in the baseline scenario), taking into account the planned energy efficiency measures and assumptions about the modernisation of the energy system. In the target scenario, which uses more RES and implements additional energy efficiency measures to reduce GHG emissions, energy intensity improves further still. The calculated final energy consumption intensity is 49 % lower in 2030 than in 2017. The average decrease over the period is 3.8 % per year.

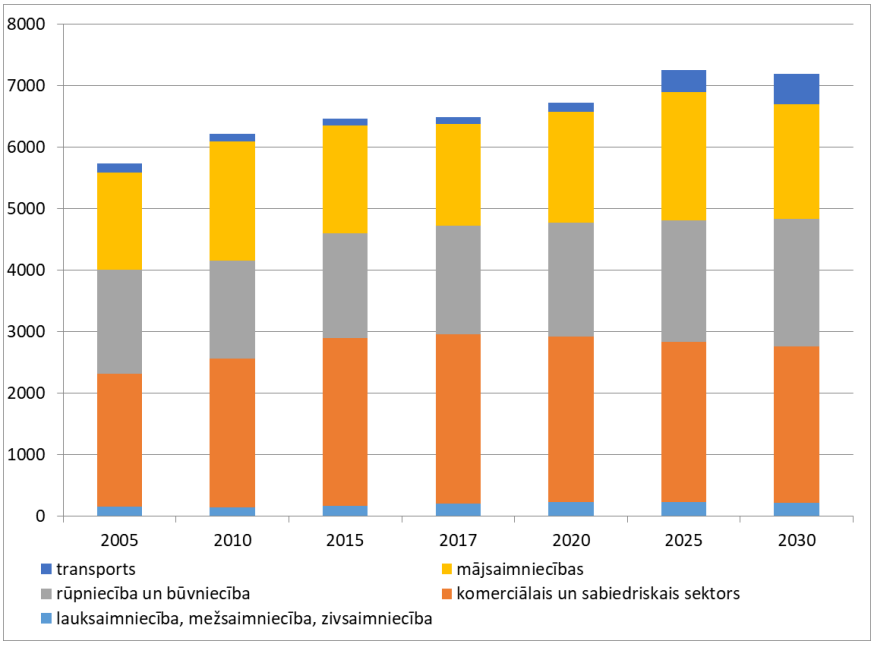
Table 23. Final energy consumption and primary energy intensity in baseline and target scenarios (MJ/EUR (2010))

		2017	2020	2025	2030
Baseline scenario	Final energy consumption intensity	7.38	5.91	4.61	3.92
	Primary energy intensity	8.23	6.70	5.11	4.33

[227] MoE
[228] MoE

Target scenario	Final energy consumption intensity	7.38	5.86	4.54	3.75
	Primary energy intensity	8.23	6.61	5.10	4.18

The target scenario provides for the deployment of additional electricity capacities using RES, which increases the average electricity production price. Since a flexible demand approach is used in the modelling of scenarios, the increase in electricity prices in the target scenario, in addition to the deployment of RES capacities, has the effect of reducing electricity consumption in individual sectors compared to the baseline scenario, including the scenario where energy efficiency measures are implemented in respect of the final consumer. Electricity consumption in the target scenario is projected to be around 11.7 % higher in 2030 than in 2017.



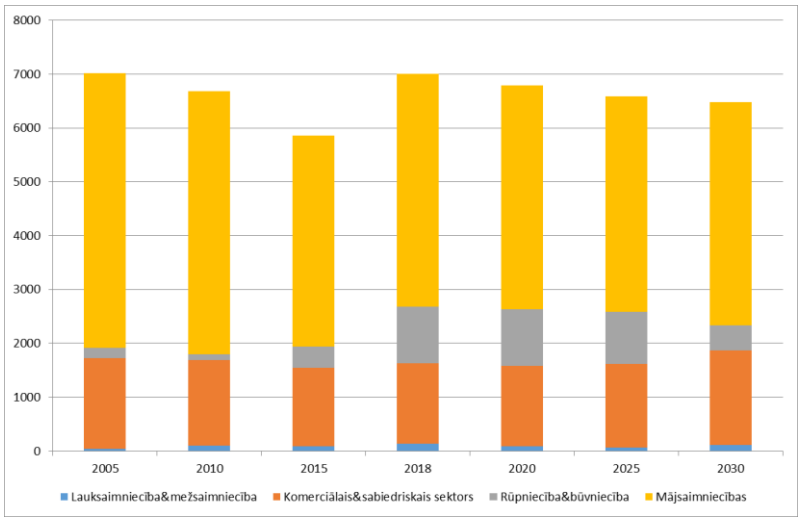
Cf. Key to fig. 42 above

Figure 45. Electricity consumption projections in the target scenario broken down by sectors (GWh)[229]

The results of the target scenario projections show the greatest percentage increase in electricity consumption to be in transport and industry by 2030 compared to 2017. The expected increase in the number of EVs in this scenario provides for this increase in consumption in the transport sector against the baseline scenario of around 40 %.

Total CSA consumption in the target scenario is approximately 4.7 % lower in 2030 than in 2017. The target scenario provides for the continued replacement of natural gas with solid biomass in DH boiler houses and therefore RES in thermal energy also increases by 2030 and reaches around 58 %. Compared to the baseline scenario, the amount of thermal energy produced from RES increases only slightly in the target scenario.

[229] MoE



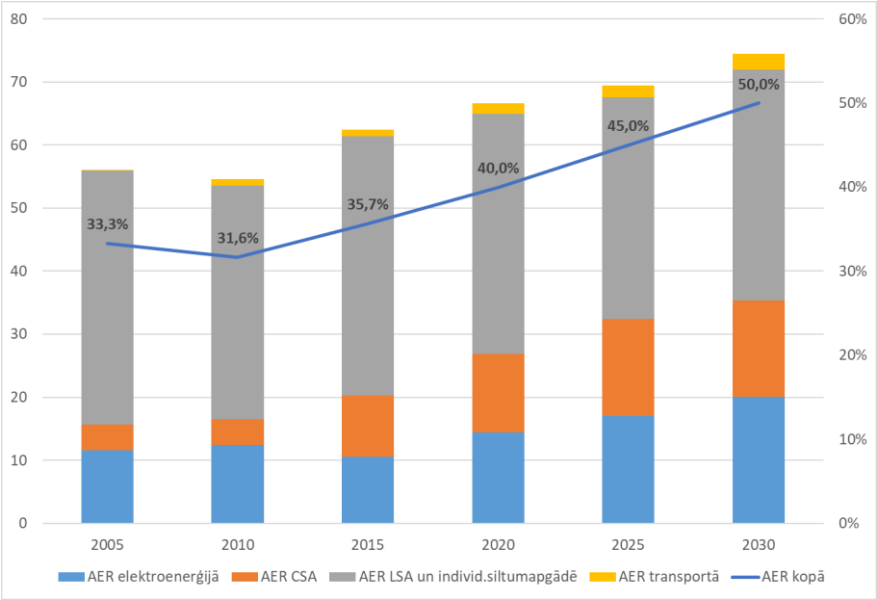
Key reads, left to right:

Agriculture and forestr, Commercial and public sector, Industry and construction, Households

Figure 46. DH thermal energy consumption projections in the target scenario broken down by sector (GWh)[230]

5.1.2. RES use development projections

Assessing the economically available potential of RES and the planned measures to support the use of certain types of RES (wind energy, solar energy, biomass, biogas), the share of RES in total final energy consumption in the target scenario rises to 50 % by 2030.



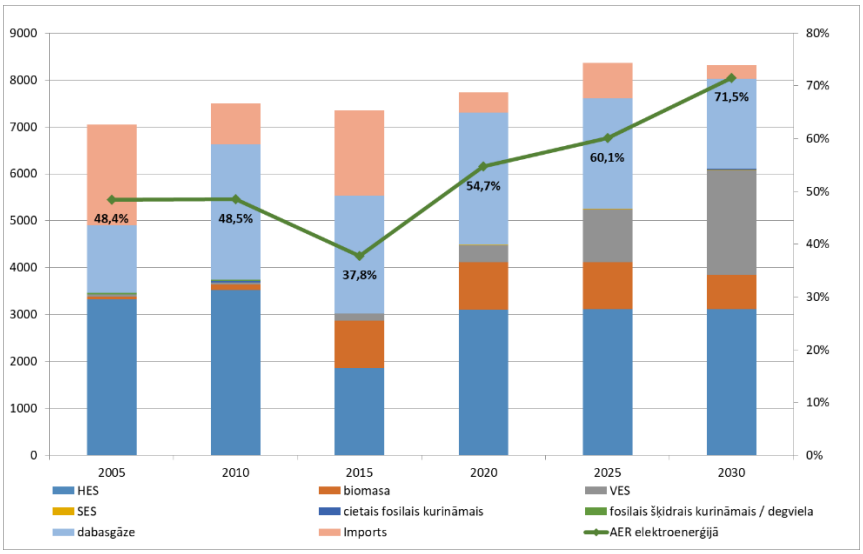
Key reads, left to right

RES in electrical energy, RES in MSW, RES in local and individual heating, RES in transport, RES total

[230] MoE

Figure 47. Share of RE in the final energy consumption projected in the target scenario (right axis – %) and projections of the share of RES until 2030 (left axis – PJ)[231]

In order to reach the share of RES in total energy final consumption of 50 % in 2030, it is necessary to increase the consumption of all types of RES (electricity consumption (RES in electricity), DH (RES in DH), fuel consumption (RES in LH and individual heating) and transport fuels (RES in transport).



Key reads, top to bottom, left to right:

HPP

SPP

Natural gas

Biomass

Solid fossil fuel

Imports

WPP

Liquid fossil fuel

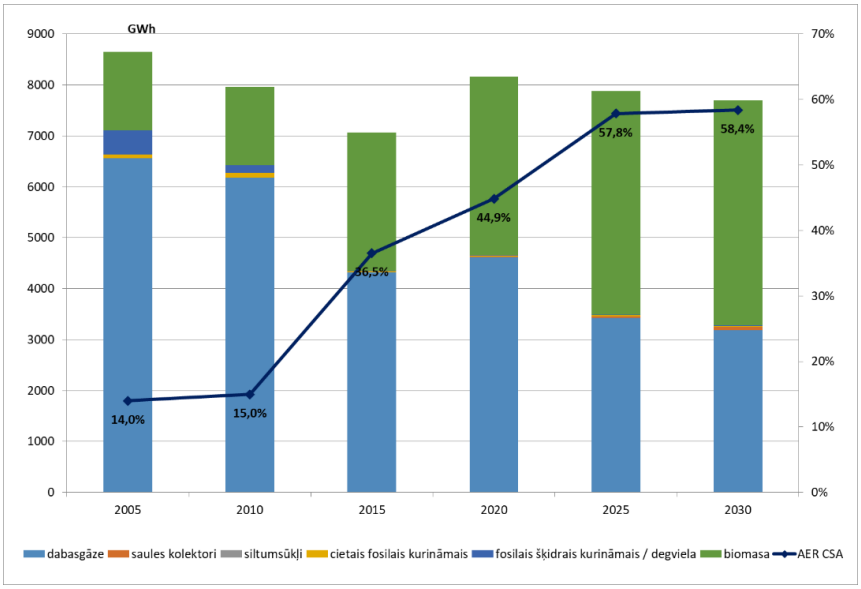
RES in electrical energy

Figure 48. Electricity supply structure and RES in electricity projected in the planned policies and measures[232] (left axis – GWh, right axis – %)

In the target scenario, the amount of electricity generated from the RES increases significantly. The increase is mainly due to wind stations, but there is also a small increase in electricity produced from solar power plants. In 2030, the share of electricity generated from the RES is at least 67 %. It is secured by hydropower plants, all types of biomass cogeneration plants and wind power plants. A very small quantity is also produced by solar power plants. If the amount of electricity produced by biomass power plants decreases by

[231] MoE
[232] MoE

2030 compared to 2017, the amount of electricity produced in wind power plants increases due to installation of the total capacity of approximately 1100 MW.

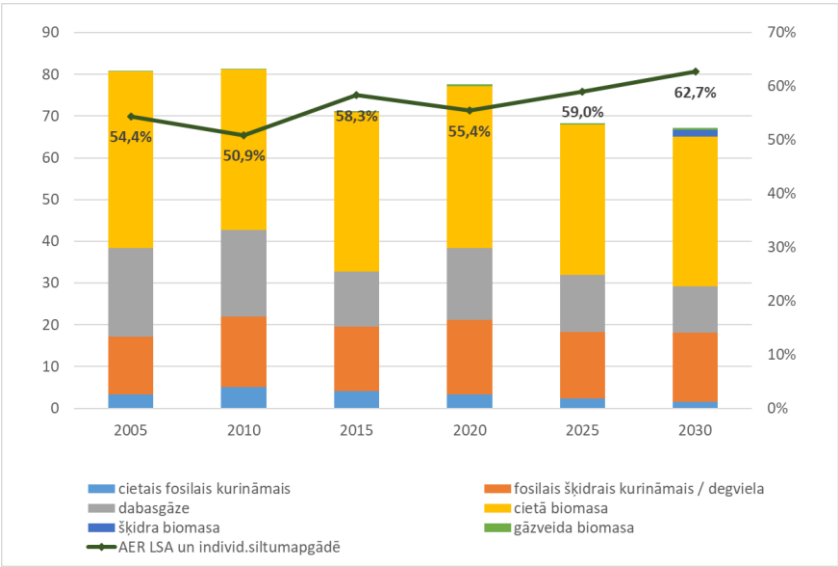


Key reads, left to right:

Natural gas, solar collectors, heat pumps, solid fossil fueld, liquid fossil fuel, biomas, RES MSW

Figure 49. DH structure and share of RES in DH projected in the planned policies and measures[233] (left axis – GWh, right axis – %)

In 2030, the share of DH generated from the RES reaches 58 %. In order achieve the increase in AER, natural gas is replaced by biomass in boiler houses and the use of solar collectors increases.



Key reads, left to right, top to bottom:

Solid fossil fuel

Natural gas

Liquid biomass

[233] MoE

RES in local and individual heating networks

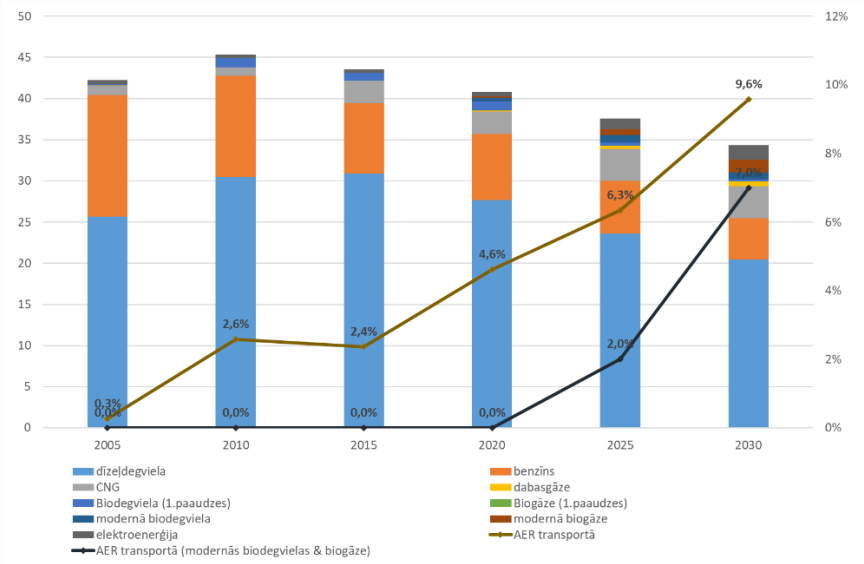
Liquid fossil fuel

Solid biomass

Gaseous biomass

Figure 50. Structure of fuel consumed in LH and indiv.heating, share of RES in LH and indiv.heating projected in the planned policies and measures[234] (left axis – GWh, right axis – %)

The target scenario provides for a significant increase in the use of RES in the transport sector, including electricity consumption, and thus the share of the contribution of the transport sector to the overall target almost triples. In the target scenario, diesel and petrol consumption reduces, while increasing consumption of biogas (advanced), biofuels (first generation and advanced) and electricity increases. The target scenario provides for a decline in first-generation biofuel consumption after 2025, but an increase in consumption of advanced biofuels.



Key reads, top to bottom, left to right:

Diesel

CNG

Biofuel (1st generation)

Advanced biofuel

Electrical energy

RES in transport (advanced bio and biogas)

Petrol

Natural gas

Biogas (1st generation)

Advanced biogas

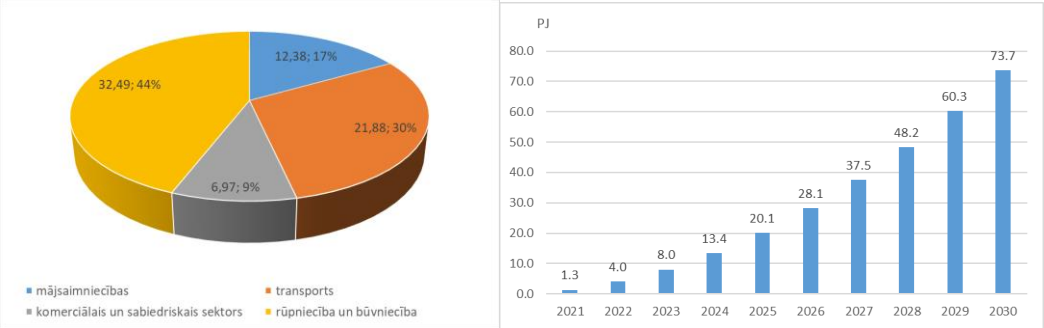
RES in transport

[234] IPE

Figure 51. Structure of fuels consumed in the transport sector and share of RES in transport projected in the planned policies and measures[235] (left axis – PJ, right axis- %)

5.1.3. Projections for achievement of energy efficiency targets

The mandatory energy efficiency target for Latvia is defined in Article 7 of Directive 2012/27/EU, according to which Latvia's mandatory target for the period 2021-2030 is the calculated target for Latvia's cumulative energy end-use savings for that period, which is 73.72 PJ (1.76 Mtoe). This cumulative energy end-use savings target means that new and additional energy savings of 1.34 PJ should be achieved every year. In order to meet this target, it is necessary to implement additional energy efficiency policies and measures set out in Annex 4 to the Plan. The largest contribution is expected from fuel and electricity savings in industry. The measures include the already defined involvement of large enterprises both in the system of voluntary agreements and in the performance of their energy audit duties. In addition, greater involvement of enterprises in the implementation of energy efficiency measures through the EEOS is envisaged. The second major contribution is expected to be achieved in the transport sector. The measures include switching from internal combustion engines to EV (plug-in hybrid vehicles and EVs) in road transport, electrification of railways and information and training measures on energy efficiency improvements. Measures are planned for households and commercial and public sector to improve the energy performance of buildings (residential buildings, public buildings, including State buildings, and commercial sector buildings), improvement of energy efficiency for appliances and lighting using electricity, as well as information measures.



Pie chart key reads, left to right, top to bottom:

Households

Commercial and public sector

Transport

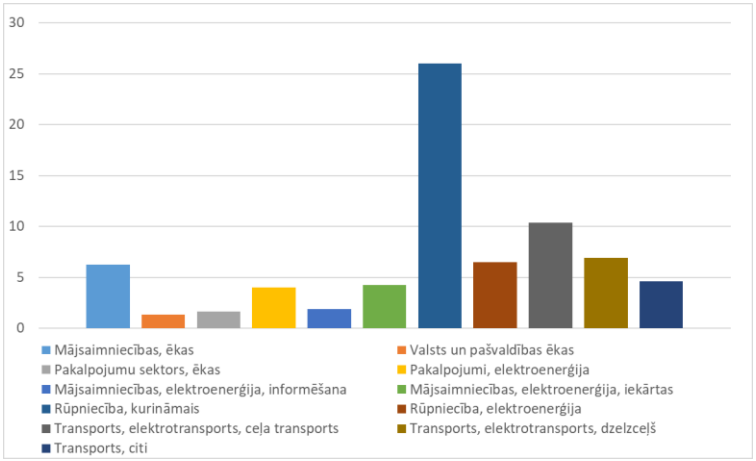
Industry and constuction

Figure 52. Cumulative energy savings for 2030 and by years in the period until 2030[236] (PJ) in the planned energy efficiency improvement measures

The measures listed in Annex 4 to the Plan have been grouped into packages and their overall contribution to energy savings calculated as cumulative savings for 2030 has been assessed. The calculation of this value took into account the possible dynamics of the implementation of the measures and the lifecycle of the measures to be implemented. The

[235] IPE
[236] MoE

cumulative savings for 2030 estimated by individual groups of measures are shown in the following figure.



Key reads, left to right, top to bottom:

Households, housing

Service sector, housing

Households, electrical energy, information

Industry, fuel

Transport, electical transport, road transport

Transport, other

State and municipal buildings

Services, electrical energy

Households, electrical energy, equipment

Industry, electrical energy

Transport, electrical transport, rail transport

Figure 53. Calculated amount of energy saved cumulatively for 2030 by groups of measures (PJ)

Detailed information with notification of the measures to achieve the energy efficiency target – EEOS and alternative measures – developed in the reporting format established by the EC, has been published on the website of the Ministry of Economics[237].

5.1.4. Energy security and internal energy market

Latvia is expected to implement target scenarios by hitting energy security and dependency reduction targets mainly thanks to:

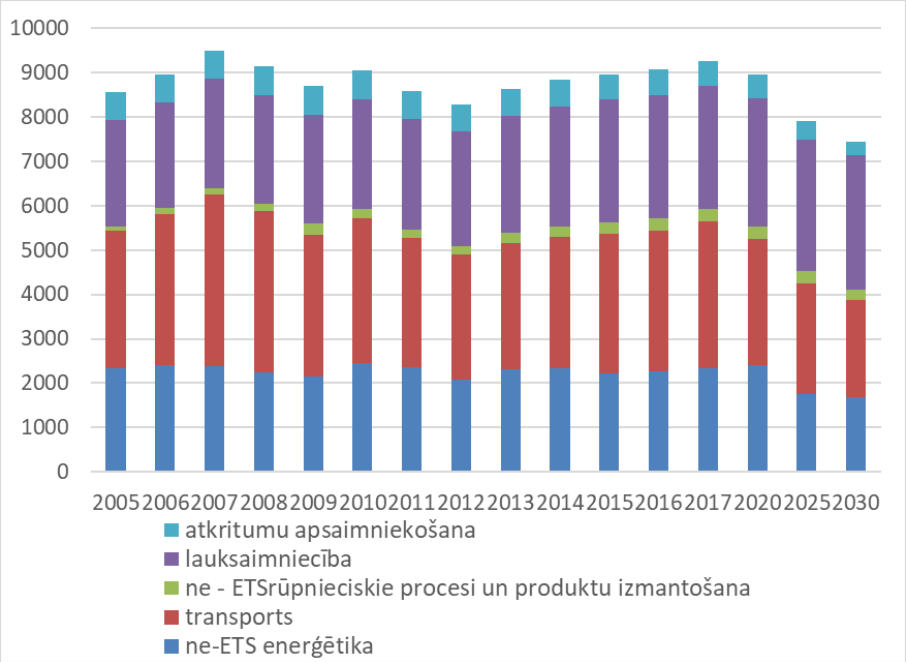
- measures for the deployment of various RES technologies, wind energy and solar energy, promotion of the use of RES and RES diversification measures being implemented;
- energy efficiency measures implemented reducing the need for both domestic and imported energy;

[237] https://em.gov.lv/lv/nozares_politika/nacionalais_energetikas_un_klimata_plans/

- electricity synchronisation measures, the implementation of which has already been started;
- start of functioning of the regional natural gas (Finland-Latvia-Estonia) on 1 January 2020;
- measures taken to open up the electricity and natural gas market, ensuring free competition on the market and enabling users to choose the most suitable energy supplier.

5.1.5. Projections for GHG emissions and CO_2 removals

It is estimated in the target scenario that the amount of GHG emissions from non-ETS activities will decrease to 13 % in 2030 compared to non-ETS emissions in 2005. The target scenario projects non-ETS of 79 % of the total amount in 2030. In 2030, most of the non-ETS emissions come from the agricultural sector, which accounts for 40 % of total non-ETS emissions, then from the transport sector, which accounts for 29 % of non-ETS emissions, while non-ETS energy generates 23 % of emissions. The rest of the non-ETS emissions come from waste management (4 %) and the non-ETS industrial process and product use sector (3 %).



Key reads:

Waste management

Agriculture

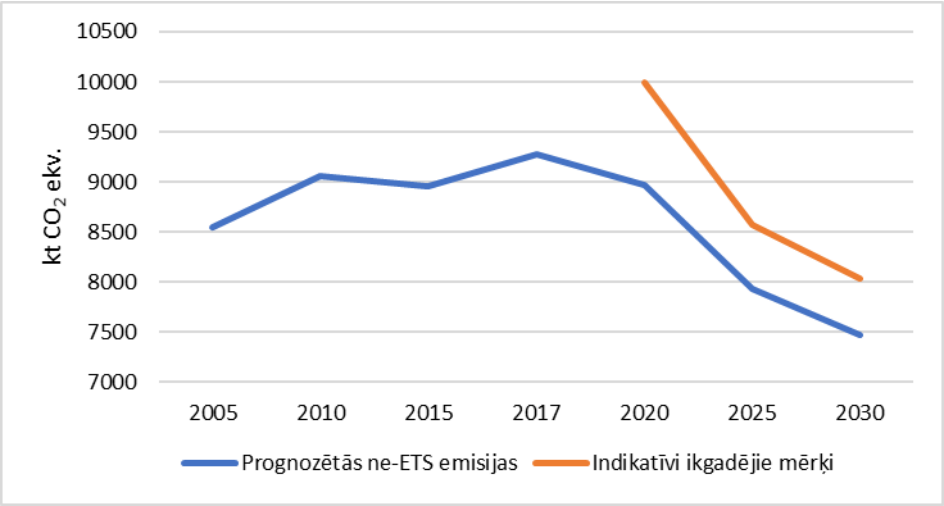
Non-ETS industrial processes and product use

Transport

Non-ETS energy

Figure 54. Historical and target scenario projections for Latvia's non-ETS GHG for 2030 (kt CO_2 eq)

According to the target scenario projections, in 2030 Latvia's GHG emissions from the non-ETS sector will be 7 462 kt CO_2 eq. As the indicative target for 2030 is 8 038 kt CO_2 eq., this means that the indicative target in the target scenario could be achieved.



Key reads

Forecast non-ETS emissions, Indicative annual targets

Figure 55. Actual non-ETS GHG emissions (up to 2017) and target scenario projection for GHG emissions

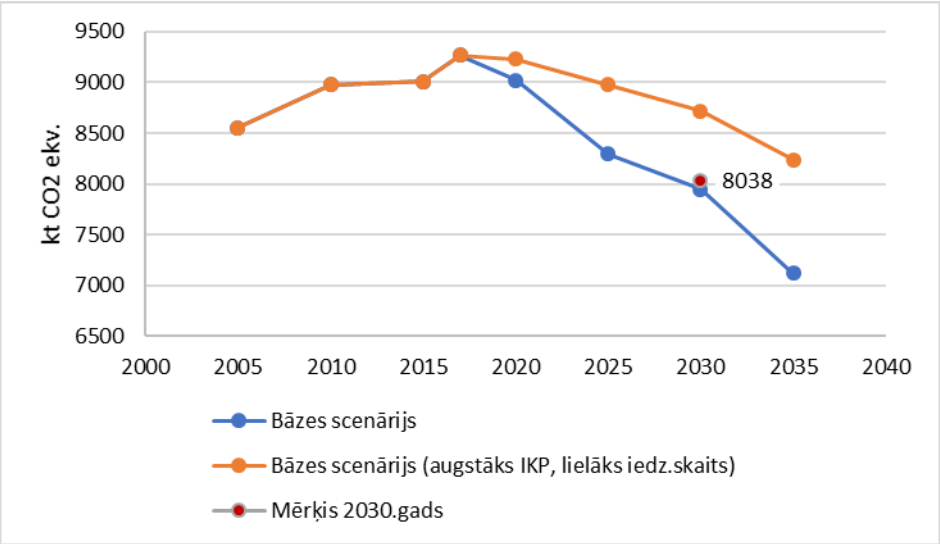
For the calculation of projections of GHG emissions of energy, in addition to the policies included in the baseline scenario, the target scenario provides for a wider use of RES, reaching 50 % of total final energy consumption in 2030. In the target scenario, additional measures are also designed to improve energy efficiency in all sectors of energy consumption (households, commercial and public sectors, industry). In the target scenario, non-ETS emissions decrease by approximately 1 758 kt $_2$ eq. or 31.2 % by 2030[238]. Projections for GHG emissions of the non-ETS sector for the target scenario are approximately 9 % lower than for the baseline scenario. The implementation of energy efficiency measures and the transition from the use of fossil fuels to biomass reduce GHG emissions in industry by around 148 kt CO_2 eq. by 2030. On the other hand, the implementation of energy efficiency measures in households and the commercial and public sector and the wider use of RES in the commercial and public sector reduce emissions by approximately 310 kt CO_2 eq. by 2030. Wider use of biogas (advanced biofuels) and biofuels (1st generation and advanced biofuels) is planned for the transport sector, in addition to the railway electrification project implemented in the baseline scenario. GHG emissions in the transport sector decrease by approximately 1 140 kt CO_2 eq. by 2030.

In the target scenario, the results of projections for agricultural emissions indicate that emissions in the agricultural sector could rise by 8.2 % by 2030 (227 kt CO_2 eq.) compared to 2017 and by 26.2 % (625 kt CO_2 eq.) compared to 2005. The target scenario shows a reduction in emissions against the baseline scenario as emissions from agricultural soils reduce by 5.5 %. Agricultural land has the biggest impact in 2030 – 57.3 % of total agricultural emissions. The second largest sector is enteric fermentation accounting for 33.7 % in 2030.

In the waste management sector, non-ETS GHG emissions gradually fall from 565 kt CO_2 eq. (in 2017) to 316 kt CO_2 eq. in 2030. Disposal of solid waste is the largest source of GHG emission in the waste management sector in 2030 at 42.6 %. The second largest sector in the waste management sector in 2030 is the wastewater treatment sector with 38.4 %.

[238] here and below compared to 2017

According to the target scenario, in the waste management sector, GHG emissions in 2020 are the same as in the baseline scenario, but they are by 3.1 % in 2030 in the baseline scenario. The target scenario takes account of the fact that just 10 % of the waste generated will be disposed of in landfills in 2035. Therefore, a reduction in emissions is observed in the target scenario.



Key reads:

Base scenario

Base scenario (higher GDP, higher population)

2030 target

Figure 56. Changes in non-ETS GHG emissions under the influence of macroeconomic indicators (Baseline scenario)

The calculation of GHG emission projections is linked to the uncertainties established by the assumptions made. The most important parameters influencing GHG emission projections include assumptions about macroeconomic development trends, changes in population and fuel price development trends. In order to assess the impact of some of the listed parameters on GHG emission projections, a sensitivity analysis has been carried out using an alternative scenario. Macroeconomic indicators (GDP, population, added value) of the 'optimistic scenario' produced by the Ministry of Economics were used in the alternative scenario. In 2030, the calculated non-ETS GHG emissions are 9.7 % higher than in the baseline scenario and are therefore 8.5 % higher than the target for GHG emissions of the non-ETS sector for 2030. This points to the need for additional GHG reduction measures to provide more certainty regarding the achievement of the target in 2030, which were included in the target scenario.

Detailed information on GHG emission projections in the baseline scenario and target scenario prepared in the reporting format developed by the EC can be found on the website of the Ministry of Economics[239].

5.1.6. Interaction with emissions of air pollutants

Poor air quality adversely affects quality of life and can lead to health problems such as asthma and cardiovascular diseases, reducing life expectancy. This in turn results in absence

[239] https://em.gov.lv/lv/nozares_politika/nacionalais_energetikas_un_klimata_plans/

from work due to illness and increases the cost of health services, particularly for children and the elderly. The European Environment Agency[240] has estimated that in 2015 $PM_{2,5}$ particulate pollution caused 1 600 premature deaths and $PM_{2,5}$ pollution has the greatest impact on this indicator compared to other types of pollution (nitrogen dioxide pollution and ozone pollution).

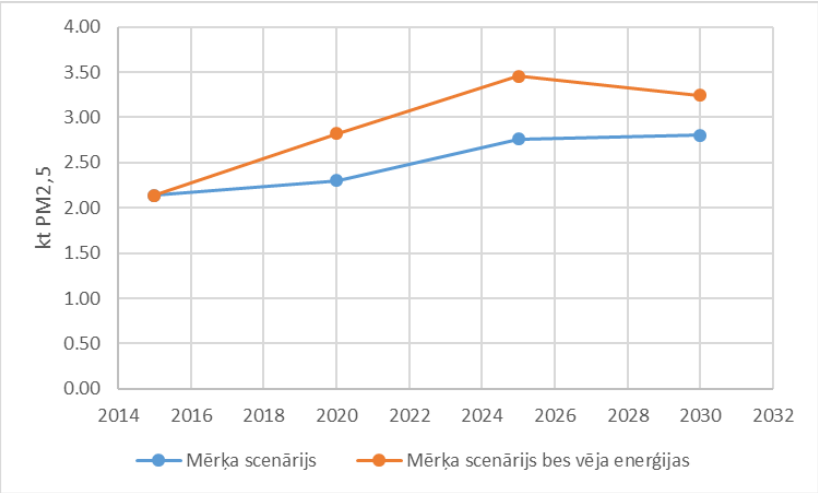
Existing policies and measures under the plan, together with additional policies and measures directly interact with policies and measures to reduce emissions of air pollutants in Latvia in respect of particulate matter (dust) emissions, since both the plan and the assessment carried out under APRAP2030 have come to the conclusion that emissions of nitrogen oxides, carbon oxide, non-methane volatile substances or sulphur dioxide are not significantly affected by the policies and measures planned to help mitigate climate change.

The plan and APRAP2030 were developed in a harmonised manner in Latvia without including in either policy planning document any policies and measures that might have a significant negative impact on the mitigation of climate change, the fulfilment of energy or air pollution reduction targets, particular care going into the development and planning of measures that affect emissions of particulate matter (dust) in Latvia . The main sources of emissions of particulate matter (dust) in Latvia are low capacity energy – solid biomass stationary combustion plants in households and in the commercial and public sector, as well as transport. In the plan's target scenario, emissions of particulate matter ($PM_{2,5}$) in the energy sector decrease by around 7.5 % in 2030 compared to 2016, mainly due to the energy efficiency measures implemented. The use of wind energy in electricity generation in the target scenario allows for a 3 % reduction in emissions in 2030 against a scenario in which wind energy is not used. As a result of the planned additional policies and measures, only the energy sector can provide a nearly 34 % reduction in particulate matter ($PM_{2,5}$) emissions compared to 2005.[241]

In order to assess the impact of the policies implemented in the target scenario on air quality, $PM_{2,5}$ emissions were assessed in the target scenario compared with the results of the alternative scenarios generated when these policies are not implemented. In the target scenario, in order to increase the share of RES in total final energy consumption by 2030 to 50 %, the amount of electricity generated from wind energy is significantly increased by installing wind generators with a capacity of 1100 MW. If the same target (50% of RES in 2030) is achieved by another strategy (alternative scenario), it increases $PM_{2,5}$ emissions in the energy transformation sector in 2030 by 13.5 % compared to the target scenario.

[240] Report of the European Environment Agency No 12/2018 "Air Quality in Europe-2018 Report", ISSN 1977-8449, https://www.eea.europa.eu/publications/air-quality-in-europe-2018

[241] IPE

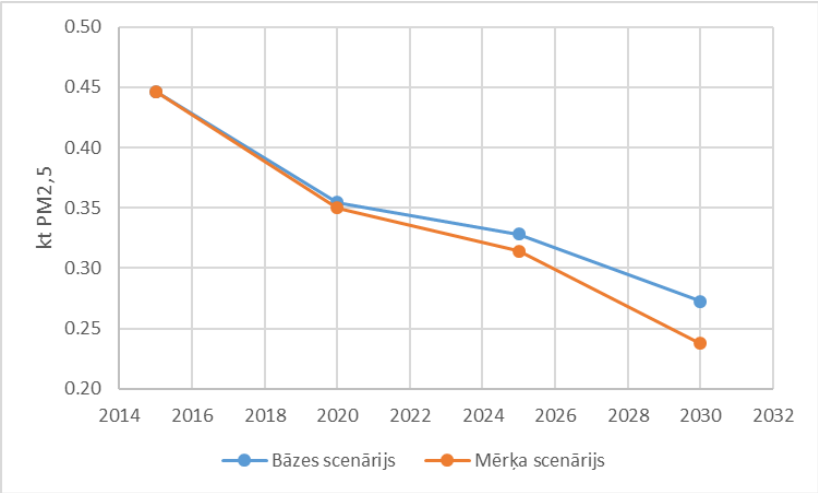


Key reads:

Target scenario, Target scenaria excluding wind energy

Figure 57. $PM_{2,5}$ emissions in the processing sector in target and alternative scenarios

The target scenario aims at facilitating the faster introduction of EVs (PHEV and BEV). This will also have a positive impact on changes in $PM_{2,5}$ emissions in the road transport sector, and the implementation of such policies might reduce PM emissions in the sector by around 13 % by 2030.



Key reads:

Base scenarioTarget scenario

Figure 58. $PM_{2,5}$ emissions in the road transport sector in target and baseline scenarios

5.2. Impact of planned policies and measures

5.2.1. Macroeconomic impact of planned policies and measures and investments

On the basis of the modelling results, the additional costs necessary to implement the target scenario compared to the baseline scenario have been calculated, taking into account the necessary investments for the deployment of new technologies (RES capacities for electricity and heat generation, electrification of the transport sector, etc.), for the implementation of energy efficiency measures, comparing these additional costs with a reduction in fuel costs. These costs can be covered by both public and municipal budget funding and EU finances or other funding and private capital. A comparison of the indicator of the 'change in total costs

versus baseline' of the target scenario with the 'additional costs compared to GDP' would allow an assessment of the impact of one or other energy and environmental policies on the overall costs of the system, on the one hand, allowing an assessment of how these costs are related to the estimated GDP, on the other hand.

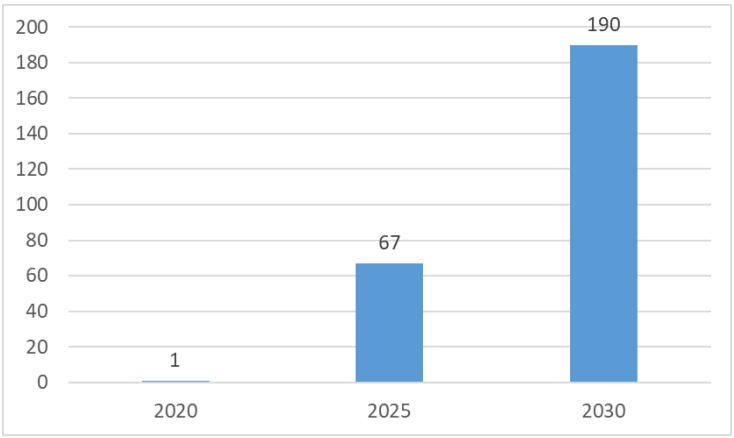


Figure 59. Additional costs until 2025 and 2030, respectively, in the target scenario against the baseline scenario (million EUR at constant 2010 prices)[242]

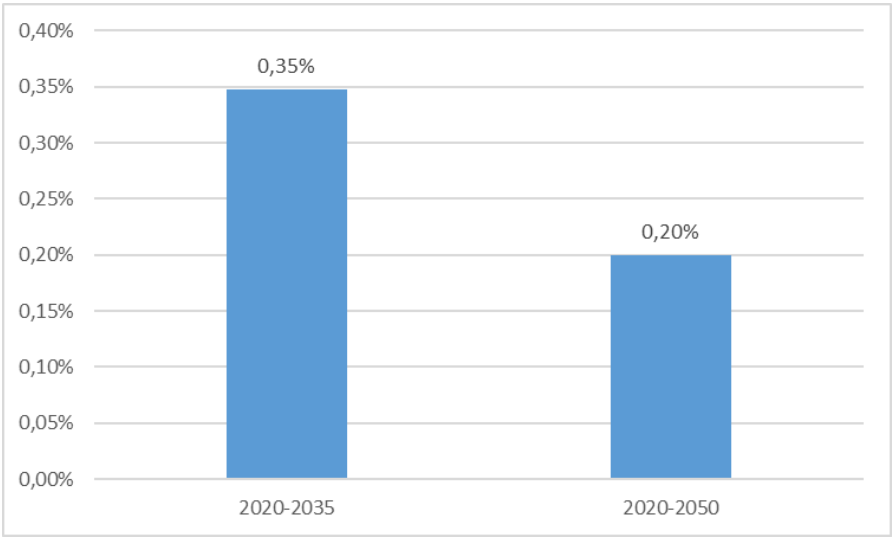
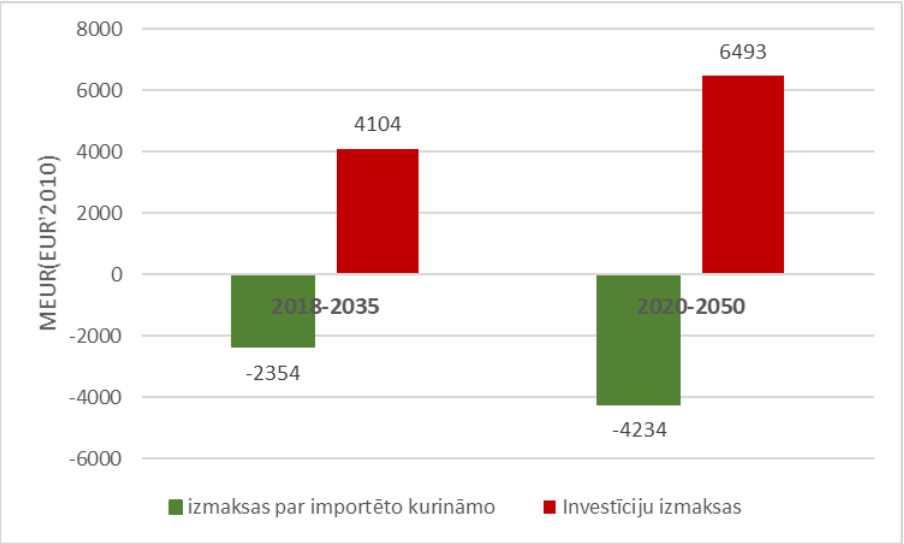


Figure 60. Additional costs in the target scenario against the baseline scenario per year to GDP[243]

Energy efficiency and wider use of RES reduce costs for imported energy sources, thus improving the country's external trade (import and export) balance. On the one hand, energy efficiency and wider use of RES reduce costs of imported energy sources, but on the other hand, additional investment in technology is needed. The investment needed to achieve the energy efficiency targets for 2030 calculated in the model is estimated at around EUR 4 billion at constant 2010 prices.

[242] IPE
[243] IPE



Key reads:

Cost of importing fuel Investment costs

Figure 61. Reduced expenditure on imported energy sources (green bar) and increase in expenditure on investment in technology (red bar) for the target scenario[244]

The benefits of reducing the costs of heating / motor fuel imports, taking into account future prices currently projected in the model are largely offset by additional investment (the difference is not high). The positive impacts of additional jobs and the multiplier effects of additional investment have yet to be taken into account when calculating the overall GDP impact. If this condition is assumed, the overall benefits are expected to offset the additional costs incurred for the implementation of the scenario. Therefore, the overall impact on GDP is expected to be positive.

5.2.2. Impact assessment of planned policies and measures on jobs

Measures designed to replace fossil fuel imports with RES and measures to improve energy efficiency contribute not only to the improvement of diversification and safety of energy supply and to reducing costs on imported energy sources, but also provide social and economic benefits. They are related to the development, production and installation of technologies using RES and their operation, maintenance and fuel preparation. Moreover, the use of RES and the implementation of energy efficiency measures is closely linked to business promotion, innovation and the use of modern technologies. Increasing energy efficiency by renovating buildings in the household and services sector will generate energy savings and stimulate economic growth by prompting the development of the construction sector. The planned implementation of energy efficiency measures for building renovation will stimulate local and regional development by creating jobs.

On the basis of the modelling results on the amount of energy savings by achieving the 2030 target and the necessary investments, the number of new jobs from the implementation of energy efficiency measures in buildings as well as in the service sector and industry was

[244] IPE

assessed[245]. Depending on the scale of the implementation of energy efficiency measures, they might provide up to 2 100 direct new jobs on average (2020-2030), leading to the creation of an additional 3 150 indirect jobs.

The target scenario provides for installation of additional RES capacities until 2030, including for electricity generation and heat generation. There are significant differences between different RES technologies, so employment in bio-energy projects differs significantly from wind and solar projects. For the latter, jobs in Latvia are mainly created in installation, as well as operation of equipment, while for bioenergy projects – in production of biomass and its supply. The deployment of additional RES capacities by 2030 may generate up to 2 500 new direct jobs and up to 5 500 direct and indirect jobs.

Overall, the implementation of energy efficiency and RES policies may create up to 4 600 new jobs during the period covered by the plan and around 6 100 indirect jobs during the period of the plan.

5.2.3. Ensuring equitable and fair transition

In general, the planned policies and measures included in the plan do not have a significant impact on the aspects of equitable and fair transition during the period covered by the plan, since no measures are foreseen for the implementation of significant changes in any economic sector. A number of measures proposed in the plan contribute to employment in activities such as energy efficiency improvement measures, the production of advanced biofuels, the installation and operation of zero-emission technologies, the reconstruction and maintenance of land improvement systems, etc.

Agriculture and other land use are emission-intensive activities and a large part of GHG emissions come from activities where it is very difficult to implement measures to reduce GHG emissions. Similarly, the agricultural, land-use and forestry sector in Latvia employs about 7 % of all employees, w the vast majority being in the regions. However, this employment is higher when we take into account related sectors, such as the food industry, the timber industry, which will be affected by changes in the agricultural and LULUCF sectors. It is therefore necessary to plan and take measures to encourage changes in population employment without a significant impact on the social situation and well-being of the population when planning changes in any sector or promoting measures to switch from GHG-intensive agricultural, land-use and forestry techniques and technologies to less intensive techniques and technologies. These measures include both the training and reorientation of individuals' careers and help with finding a job in another sector, including help with changing residence, if necessary.

Although the Latvian energy sector (excluding transport) is not significantly emission-intensive with prevailing use of natural gas and various types of biomass fuels, the long-term shift towards decarbonisation of the energy sector and a significant improvement in energy efficiency in the periods until 2050 might also make it necessary to reorient employees in the energy sector to other areas and sectors. Also, some of the largest industrial companies in Latvia are currently emission-intensive, where part of the emissions comes from production processes rather than fuel use activities, and if these companies decide to change their production methods, volumes or change the operating sector in order to safeguard Latvia's contribution to the EU's progress towards the 2050 climate neutrality

[245] The number of jobs was calculated using the information available from international literature on the number of jobs on invested investments (jobs/MEUR) or the amount of energy savings (jobs/GWh). The assessment is given as the average of the two methods applied.

target, then employees in these companies would also need assistance and measures would need to be implemented with regard to these employees to ensure that their social situation is not adversely affected by assistance with the changing employment environment .

ensure equitable and fair transition, use should also be made of EU structural funds that are linked to the transition to a climate neutral economy, since these funds would to be financed that support upskilling, the development of employee skills or mitigation of the impact of higher energy prices on the financial capacity of households.

5.3. Impact of policies and measures of the plan on other EU Member States and regional cooperation

The policies, objectives and measures scheduled to be implemented in Latvia will not have a major negative impact on the other two Baltic States. On the contrary, for example, the development of offshore wind parks in Latvia will have a positive impact on the energy supply within the region. Based on existing wind park monitoring programmes, in the North Sea for example, it is possible to take appropriate planning and mitigation measures to build offshore wind parks without causing significant damage to the environment. It should be borne in mind that coastlines are technically suited to the development of wind energy, but these habitats are also attractive to many benthic communities[246].

Policy support has helped the EU reach nearly 20 GW of offshore wind capacity by the end of 2018. Offshore wind energy is earmarked for strong growth in the EU and the current policy aims to increase offshore wind capacities fourfold over the next ten years. The power factor for new offshore wind projects is 40 %-50 %, where larger turbines and other technology improvements help maximise the available wind resources. Offshore WPPs match the capacity factors of efficient gas-fired and coal-fired power plants in some regions, and exceeds those of onshore WPP, being around double those of solar PV[247].

In 2017, the level of interconnection between the Baltic States was >60 %, which will increase with the synchronisation of the Baltic and European power grids. In Estonia, the plan is to increase electricity connectivity capacity between Estonia and Latvia, this being the third Latvia-Estonia interconnection project (330 kV high-voltage line between substations Kilingi-Numme in Estonia and Riga CHPP-2 in Latvia). This measure is also included in the Latvian plan, as the project is already under construction and by 2025 will increase Latvia-Estonia maximum cross-cutting capacity by 700MW in the direction of Estonia and by 500MW in the direction of Latvia. After 2025, interconnection capacity between Estonia and Latvia will double.

The Baltic States have coordinated the measures proposed in their plans and have assessed the potential impact of the measures on neighbouring countries, and most of the measures do not adversely affect other countries. Direct transboundary impacts are expected from measures related to electricity and gas infrastructure development projects. These impacts will generally be positive in terms of energy prices and energy market integration. In addition, Latvia and Estonia are currently Europe's leading producers of wooden pellets[248], and are looking to make up for the lack of RES in other European countries. This is being bolstered by sectoral cooperation on wood supply (including chips, pellets) for the wood

[246] https://www.wwf.no/assets/attachments/84-wwf_a4_report___havvindrapport.pdf
[247] https://www.iea.org/offshorewind2019/
[248] https://www.graanulinvest.com/eng/frontpage

industry and the energy sector, such as Baltpool[249], which was proposed by the Lithuanian operator. In addition, future technologies (energy storage, CCU, hydrogen, etc.) will be sought in cooperation with the Nordic countries and the Baltic States.

[249] https://www.baltpool.eu/lv/

6. INTEGRATED MONITORING AND REPORTING SYSTEM

According to Regulation 2018/1999, a biennial integrated national energy and climate progress report covering all five dimensions of the Energy Union shall be submitted to the EC. It shall cover the following elements:

- information on the progress accomplished towards reaching the targets, objectives and contributions set out in the plan, and towards implementing the policies and measures necessary to meet them;
- overview of the actual investments compared to the initial investment assumptions;
- information on the progress accomplished towards establishing a multilevel climate and energy dialogue;
- integrated reporting on renewable energy and latest information about policies and measures in this dimension;
- integrated reporting on energy efficiency and latest information about policies and measures in this dimension;
- integrated reporting on energy security and latest information about policies and measures in this dimension;
- integrated reporting on the internal energy market and latest information about policies and measures in this dimension;
- integrated reporting on energy poverty and latest information about policies and measures in this dimension;
- integrated reporting on research, innovation and competitiveness and latest information about policies and measures in this dimension;
- information on adaptation to climate change;
- impact of the policies and measures of the Plan on air quality and emissions of air pollutants.

In addition to the integrated national energy and climate progress report, the following shall be prepared and submitted to the EC biennially:

- integrated report on greenhouse gas policies and measures and on projections;
- integrated report on national adaptation actions, financial and technology support provided to developing countries and auctioning revenues.

Every two years, therefore, Latvia must submit at least three interconnected reports as an assessment of the progress of the plan, with one of them covering all the dimensions of the plan and the other two covering the decarbonisation dimension; the same statistical data and assumptions have to be used and the same policies and measures have to be analysed in all three reports.

In addition to assessing the progress made in the implementation of the plan, it is necessary to draw up an environmental monitoring report twice during the programming period (in 2024 and 2028) using State environmental data and other data available, and submit it (also in electronic form) to the State Environmental Monitoring Bureau.

Latvia will have to implement major changes in the regulatory framework and in the institutional capacity in order to be able to comply with the monitoring and reporting obligations provided for in Regulation 2018/1999. If the data on compliance of the achievement of the energy efficiency target in the integrated national energy and climate progress report on energy efficiency show progress to be insufficient, Latvia will assess the reasons for the lack of progress and take appropriate measures to improve the situation as appropriate.

In order to ensure appropriate implementation of the integrated reporting obligation provided for in Regulation 2018/1999, it is necessary to establish an efficient monitoring and reporting system in Latvia that lays down the authorities responsible for ensuring compliance with the monitoring and reporting obligations as well as the procedure for data and information exchange to avoid repeated collection and assessment of data and information that is already available.

The Law on Pollution[250] and Cabinet Regulation No. 737[251] currently include provisions for assessing the progress achieved in meeting GHG emission and CO_2 removal targets and biannual reports on the progress — report on the progress, measures and projections — as well as provide for the national system for the greenhouse gas inventory and the national system for preparing greenhouse gas projections.

In order to ensure appropriate implementation of the integrated monitoring and reporting system, it is necessary to designate a single direct state administration authority — a competent authority subordinate to a ministry that will perform the monitoring and collect and analyse the data and information required for the integrated reporting. Since monitoring and reporting data have to be completely coordinated across all dimensions of the plan, the respective authority should also provide monitoring and reporting functions with regard to GHG emissions and CO_2 removals. If, by contrast, competent authority is not able to monitor certain data or if such monitoring is already being carried out, the authority will receive, process, and include these data in the integrated report.

If there is no such authority with specific competence and expert knowledge at the time of developing and approving the plan, the obligations and remit of an existing authority will have to be expanded once the plan is approved.

Establishment and implementation of the integrated monitoring and reporting system will require additional financial resources, and financial from the EU structural funds can be brought in for this purpose. To prevent significant impact on the State budget and avoid new authorities being set up, it is possible to designate an existing authority subordinate to a ministry as the competent authority for performing the functions of the integrated monitoring and reporting system.

[250] https://likumi.lv/ta/id/6075-par-piesarnojumu

[251] Cabinet Regulation No. 737 of 12 December 2017 on the establishment and maintenance of the national system for drawing up the inventory of greenhouse gas emissions and projections" (https://likumi.lv/ta/id/295801-siltumnicefekta-gazu-inventarizacijas-un-prognozu-sagatavosanas-nacionalas-sistemas-izveidosanas-un-uzturesanas-noteikumi)

7. FINANCIAL IMPACT OF THE PLAN

In order to implement measures and tasks provided for in the plan, the plan is to use both national, municipal budget funding and national co-financing of EU structural funds for projects and to raise EU funds or other sources of funding and private capital, depending on the nature of the measure. Measures involving drafting of legislation and policy planning documents and conducting the research or evaluation associated with this are implemented by the authorities within the framework of grants received from the State budget.

The amount of funding required for the implementation of the objectives set out in the Plan and the actions included therein at the time of submission of the Plan to the EC, as at 31 December 2019, cannot be calculated with any particular accuracy , given that this is a long-term (up to 2030) development planning document and that the policies of many sectors concerned have not been planned for the period after 2020. The EC has published proposals for the EU multiannual financial budget for the period from 2021 to 2027, which aims to redirect 25 % of the total available funds to climate change activities, however, the EU's multiannual financial budget has not yet been approved or accurately planned. Similarly, EU structural fund funding legislation and operational programmes for EU structural funds will be developed in Latvia until 1 January 2021. Annex 2 to the Plan contains detailed information about the consistency of the common result indicators of the ERDF and the CF with the indicators of the Plan.

The activities planned for the implementation of the action lines covered by the Plan shall be implemented within the limits of the budgets allocated by the responsible authorities. The issue of allocating additional State budget funds is discussed by the Cabinet when preparing the medium-term budgetary framework or the national budget for year n+1.

The overall expected (preferred) amount of funding and its potential sources for the implementation of the measures proposed to implement the Plan policy are set out in Annex 4 to the Plan, where the total amount of funding for each measure is the total amount and, depending on the type of measure, may include both part of funding from the EU structural funds and national co-financing and, for example, private and additional public funding. The amount of the total investment[252] needed for the 10-year period of the measures identified in Annex 4 to the Plan includes both the continuation of the measures already in place and any additional necessary investments.

That amount shall be allocated for the action lines set out in the Plan (for those measures for which funding is indicated) in the following manner:

H. Horizontal measures – EUR 418.22 million

1. Improving energy performance of buildings – EUR 1,730.04 million;
2. Improving energy efficiency and promoting the use of RES technologies in heating and cooling and industry – EUR 1,663.43 million;
3. Promoting the use of zero-emission technologies in electricity generation – EUR 1,057.05 million;
4. Promoting economically justified own use generation and consumption of energy – EUR 2.03 million;

[252] taking into account the investments from the baseline scenario and additional investments for the implementation of additional measures, where the total investment consists of both the funding from the EU structural funds and the national or municipal budget, as well as funding from auctioning emission allowances and private funding

5. Improving energy efficiency, promoting the use of alternative fuels and RES technologies in transport – EUR 988.77 million;
6. Energy security, reducing energy dependency, full integration of energy markets and modernisation of infrastructure – EUR 830.06 million;
7. Improving the efficiency of waste and wastewater management and reducing GHG emissions – EUR 595 million;
8. Efficient use of resources and reduction of GHG emissions in agriculture – EUR 718,15 million;
9. Sustainable use of resources and reduction of GHG emissions and increasing CO_2 sequestration in the sectors of land use, land-use change and forestry – EUR 187.84 million;
10. Promoting the reduction in the use of fluorinated greenhouse gases (F-gases) – EUR 43 million;
11. 'Greening' of the tax system and improvement of friendliness to energy efficiency and RES technologies – EUR 25 million;
12. Public information, education and awareness raising – EUR 1.57 million.

The distribution of funding by sectors or by responsible ministries is not recommended, since the objectives and activities set out in the plan cannot be divided by sectors, where, for example, energy efficiency improvement measures affect most of Latvia's economic sectors, but the achievement of the target is determined as the competence and responsibility of the Ministry of Economics. Several measures have several responsible authorities.

The breakdown of the measures included in Annex 4 to the plan by budget department is possible only for those measures for which the potential impact on the public budget has been assessed. It is also currently difficult to define a specific breakdown by budget department, since several measures have several responsible authorities.

Annex 5 to the plan contains information on the necessary additional financing for the measures included in Annex 4 to the plan with an identified amount of State budget financing.

When assessing and developing the support measures referred to in the draft plan, they will be assessed in accordance with the relevant commercial support control framework.

7.1. Potential sources of funding

State budget

State budgetary funding should be used as part of support for the performance energy efficiency improvement measures, for the deployment of RES technologies, or for support or co-support or other GHG emission reduction measures. Similarly, the government budget could be affected by the applicable tax reliefs or exemptions for the use of zero-emission or low-emission heating/motor fuels or technologies.

At present, it is difficult to identify a possible indicative part of the State budget, including co-financing for the implementation of the measures set out in Annex 4 to the plan, since the conditions for allocating the EU structural funds for the period after 2021 have not yet been approved. For the measures listed in Annex 4 to the plan, the necessary funding was determined in accordance with the conditions for the period up to 2021.

The State budget finding instruments for R&D are the programme of fundamental and applied research, the National research programmes and the Latvian Innovation and Technology Development Fund, if the fund is created[253].

Income from the auctioning of emission allowances in phase 3 of the ETS (2013–2020) might be in the region of EUR 197 million over the entire period (indicative guideline). And in the period after 2021, the funding that was available under the EAAI in 2013-2020 but was not spent by 2021 will be used within EAAI. This accrued funding currently amounts to approximately EUR 120 million[254]. Latvia would auction around 16.07 million emission allowances between 2021 and 2030, and could get up to EUR 472 million in its State budget from auctioning emission allowances[255]. It should be noted that the actual figures may differ from the projections as there are still many unknown factors, including the initial total amount for 2021, so it is not possible to calculate a precise amount to be auctioned each year. Moreover, the income largely depends on the price of emission allowances, which can also differ from projections due to large fluctuations. The calculation of revenue forecasts is indicative and has been modelled based on actual trends in emission allowance prices and price forecasts of leading carbon market experts during the first half of 2019[256]. Since 2013, emission allowance prices, which reached the lowest point in the third ETS period – EUR 2.65 per allowance, have increased significantly and exceeded EUR 29 per allowance in July 2019. However, in the short term[257], the price of emission allowances is also very volatile and makes forecasting difficult. The price of emission allowances is mainly based on market supply and demand but also depends on various developments in the energy sector in Europe, including changes of energy prices in energy markets, weather conditions, developments and decisions in international negotiations (including at the EU level) about climate change, as well as announcements by certain countries. EAAI will also include all amounts of financial resources that will be recovered from the projects which have not been implemented within CCFI. Therefore, if the EAAI accrual remains at the existing level, more than 600 million EUR might be available for the EAAI period up until 2030.

EAAI is a sub-programme of the national budget, the funding of which is eligible for mitigation of and adaptation to climate change, including reduction or limitation of GHG emissions in the energy, industry, transport, agriculture and waste management sectors. This funding will also be available for regional and municipal investment projects.

Municipal budget

Pursuant to the Law on local government budgets, municipalities shall draw up their own budgets taking into account the applicable legislation, and the public administration does not have the right to intervene in the development and implementation of municipal budgets. The municipal budget is made up of a number of tax revenues, some of which are also linked to energy and climate activities, such as NRT and RET. Municipalities also have the right to grant tax reliefs. In Latvia, many municipalities plan funding in their budgets for the implementation of energy efficiency measures, including introduction of energy management systems, both in their properties and as support for the performance of energy

[253] the matter of the State budget funding needed for this fund can be viewed during the preparation of the State budget
[254] http://polsis.mk.gov.lv/documents/6456
[255] Information report on the operational strategy of the Emission Allowances Auctioning Instrument
[256] Berenberg, Clearblue, Commerzbank, Energy Aspects, Engie Global Markets, ICIS, MOL, Refinitiv, Vertis (published on 10.04.2019; http://carbon-pulse.com/72837)
[257] The average price of an emission allowance in April-June 2019 was around EUR 25, but in February and March EUR 21-22, while the average price of 2018 on the primary market was EUR 15.5

efficiency improvement measures for the general public. Similarly, several municipalities apply RET reliefs for energy efficiency measures taken in properties, such as apartments in heat-insulated multi-apartment residential buildings.

MFF2027

By the end of 2019, availability of EU structural funds in the period covered by the plan can only be decided on based on the draft MFF2027. However, the amount of funding in each fund may change as a result of negotiations. Latvia's amount in the funding sources mentioned below is also unknown.

A number of funding sources have been created under the MFF:

- *InvestEU* will anchor all centrally managed financial instruments inside the EU in a single, streamlined structure. This new approach will avoid overlaps, simplify access to funding and reduce red tape. In addition, the InvestEU Fund will provide advisory services and accompanying measures to support the creation and development of projects. The Fund also provides funding in a variety of forms, including grants, loans and guarantees, subsidies, prizes and public contracts.
- *Horizon Europe* is the EU's flagship programme to promote research and innovation in the period from 2021 to 2027 with the aim of providing financial support for promising projects aimed at excellence submitted by international consortiums in the EU's thematic priority areas. The programme focuses on science and innovation with the aim of strengthening the EU's scientific and technological base, promoting EU competitiveness and innovation, implementing the EU's strategic priorities and addressing global challenges.
- The *Connecting Europe Facility* supports investment in cross-border infrastructures in the transport, energy and digital sectors. The Facility is designed to foster investment in the trans-European networks. The Facility supports investment and cooperation for developing infrastructure in the transport, energy and digital sectors and connects the EU and its regions.
- *ERDF* and *CF* funding will be available in the following areas: a smarter Europe by promoting innovative and smart economic transformation, a greener, low carbon Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate adaptation and risk prevention, a more connected Europe by enhancing mobility and regional ICT connectivity, a more social Europe by implementing the European pillar of social rights, a Europe closer to citizens by fostering the sustainable and integrated development of urban, rural and coastal areas. ERDF supports investment in infrastructure, investment in access to services, productive investment in SMEs, equipment, software and intangible assets, information, communication, research, networking, cooperation, exchange of experience and activities relating to clusters, and technical assistance. The CF supports environmental investments, including investments relating to sustainable development and energy and benefits to the environment, investments in TEN-T (Trans-European Transport Network) and technical assistance.
- In *LIFE – Programme for the environment and climate action*, the main focus is on developing and implementing innovative ways of reacting to problems in the area of climate, thus favouring changes in policy development, implementation and enforcement. Funding under the programme will be available for transitioning to the

circular economy, which is characterised by efficient use of resources and energy, low carbon emissions, and climate resilience, nature conservation, halting biodiversity loss, and restoring biodiversity.

- The *European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development* cover all the three dimensions of sustainable agriculture: to foster a smart and resilient agricultural sector, to bolster environmental care and climate action, to contribute to the environmental and climate objectives of the EU and to strengthen the socio-economic fabric of rural areas.
- The *European Maritime and Fisheries Fund* is a special EU programme for supporting the EU fisheries industry and coastal communities that depend on it, funding from which will be available for the following: safeguarding healthy seas and oceans and delivering sustainable fisheries and aquaculture by reducing the impact of fisheries on the maritime environment while enhancing the competitiveness and the attractiveness of the fisheries sector, promoting the blue economy, particularly by fostering sustainable and prosperous coastal communities towards investment, skills, knowledge, and market development, strengthening international ocean governance and the safety and security of maritime space in areas which are not already covered by international fisheries agreements.

ETS financial mechanisms

Innovation Fund[258]

The Innovation Fund is established within the framework of the EU ETS financial instruments and at least 450 million emission allowances will be channelled into it in 2021-2030, with a view to obtaining more than EUR 11.2 billion from auctioning. The Innovation Fund support programme supports projects aimed at capture and geological storage of CO_2 in an environmentally safe manner, demonstration projects for innovative RE technologies, carbon capture and utilisation projects, innovative RE and energy storage technology projects, innovative projects in the energy-intensive industrial production sector, which will start functioning in 2020. It is not possible to predict exactly how much funding will be available to Latvia, as Member States will apply for the finance from the Innovation Fund themselves after assessing and approving the projects submitted by the applicants in their respective countries.

Modernisation Fund

This fund's resources will be available to finance energy efficiency improvement and energy sector modernisation projects (including small-scale projects) – investments in electricity generation and use from renewable sources, energy efficiency improvement, excluding solid fossil fuel technologies, energy storage and the modernisation of energy networks, including pipelines used for DH, and electricity networks, and interconnections; increasing interconnections between Member States. Energy efficient transport, buildings, agriculture and waste will also be eligible for investment. The maximum amount available to Latvia for implementing the projects corresponds to 1.44 % of the total funding available under the Fund or approximately 4.464 million emission allowances, which may total EUR 115 million at an average price of EUR 25.7 per emission allowance in September 2019. This funding will also be available for regional and municipal investment projects.

[258] https://ec.europa.eu/clima/policies/innovation-fund_en

8. REVIEWING AND UPDATING THE PLAN

According to Article 14 of Regulation 2018/1999, Latvia shall prepare and submit to the EC a draft update of the plan or a reasoned justification as to why it is not necessary to update the plan by 30 June 2023. The final version of the plan shall be submitted to the EC by 30 June 2024 if Latvia does not provide a reasoned justification as to why it is not necessary to update the plan or if the EC concludes that the arguments are not justified.

According to Regulation 2018/1999, the targets, objectives and contributions included in the plan can be changed in the updated version so that they are equal or more ambitious than those set in the current plan. Latest EC recommendations and recommendations to Latvia in the context of the European Semester, as well as obligations arising from the Paris Agreement have to be taken into consideration in the updated version of the plan. The updated version of the plan should strive to reduce any negative impact on the environment identified in the integrated report, which is described in Chapter 6 of the plan.

Latvia may also make changes and adjustments to the national policies set out in the plan at any time on condition that such changes and adjustments are included in the integrated report referred to in Chapter 6 of this plan.

It is clear that a plan update, possibly before the first deadline for submitting the updated version laid down by Article 14 of Regulation 2018/1999, will be required for the following reasons:

- NDPL2027 has not yet been approved;
- The EU structural fund regulation has not yet been approved;
- Only after the approval of NDPL2027 and EU structural fund regulation will a framework be developed for the distribution of funds from EU structural funds, the EU Structural Funds Framework Law and the operational programmes for EU structural funds (CM regulations);
- Work on preparing the information and data for the new National Reform Programme of Latvia for the period after 2021 will start shortly;
- In the two years after approving the plan in Latvia and the EC, work on developing new or updating the existing sectoral programming documents for the period after 2021 will start, including Environmental Policy Guidelines, the Strategic Plan for the Common Agricultural Policy, the Long-term Renovation Strategy, Guidelines for the Development of Forestry and Related Sectors, Transport Development Guidelines, National Industrial Policy Guidelines, and Guidelines for the Development of Science, Technology and Innovation (including Smart Specialisation Strategy).

It can therefore be concluded that a review of the measures for implementing the action lines included in the plan, and in particular the amount of funding and the source of funding, will be required in the period after 2021.

In view of the above, and in view of the fact that the draft updated plan is to be submitted to the EC by 31 June 2023, as well as the fact that the initial progress report on the implementation and impact of the measures included in the plan (see Chapter 6 of the Plan) is to be submitted to the EC by 15 March 2023, the review of the Plan should be carried out in 2022, where an assessment should include:

- An evaluation of how the plan is contributing to the creation of a strong EnU;

- An assessment of what economic sectors, including in terms of population employment, are affected and are likely to be affected by the measures included in the plan below;
- An assessment of measures to promote the convenience of public transport and to ensure compliance with the requirements;
- An assessment of the impact of the measures on the competitiveness of Latvian companies in the Baltic region;
- An assessment of the causal links between the target indicators and the funding intended to achieve them;
- An assessment of the results of the 'greening' of taxes, assessing the impact of tax discounts on the achievement of the objectives of the Plan;
- An assessment of the necessary energy efficiency improvements, the introduction of technical solutions to limit the overall energy consumption of a building.

The review of the plan should also include the development of performance indicators and a more detailed assessment of the impact of measures on energy consumption and GHG emissions.

Minister for Economics R. Nemiro

State Secretary Ē.Eglītis