EUROPEAN
COMMISSION

Brussels, 23.11.2017
SWD(2017) 404 final

COMMISSION STAFF WORKING DOCUMENT

Energy Union Factsheet Latvia

Accompanying the document

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE, THE COMMITTEE OF THE REGIONS AND THE EUROPEAN INVESTMENT BANK

Third Report on the State of the Energy Union

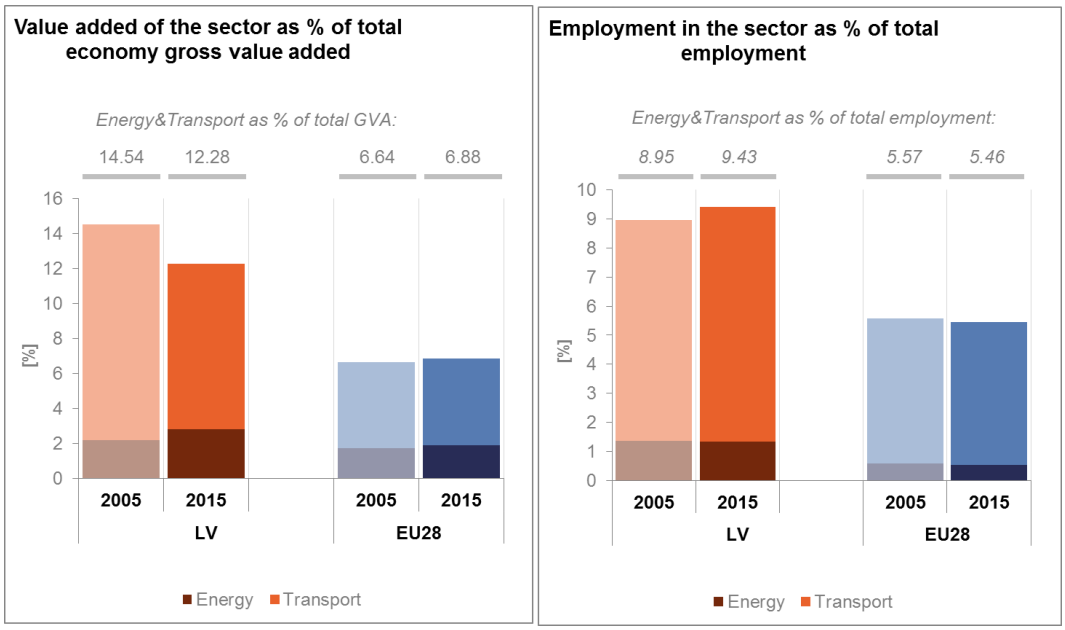
{COM(2017) 688 final} - {SWD(2017) 384 final} - {SWD(2017) 385 final} - {SWD(2017) 386 final} - {SWD(2017) 387 final} - {SWD(2017) 388 final} - {SWD(2017) 389 final} - {SWD(2017) 390 final} - {SWD(2017) 391 final} - {SWD(2017) 392 final} - {SWD(2017) 393 final} - {SWD(2017) 394 final} - {SWD(2017) 395 final} - {SWD(2017) 396 final} - {SWD(2017) 397 final} - {SWD(2017) 398 final} - {SWD(2017) 399 final} - {SWD(2017) 401 final} - {SWD(2017) 402 final} - {SWD(2017) 405 final} - {SWD(2017) 406 final} - {SWD(2017) 407 final} - {SWD(2017) 408 final} - {SWD(2017) 409 final} - {SWD(2017) 411 final} - {SWD(2017) 412 final} - {SWD(2017) 413 final} - {SWD(2017) 414 final}

Latvia

Energy Union factsheet[1]

1. Macro-economic implications of energy activities

Energy and transport are key sectors for the overall functioning of the economy as they provide an important input and service to the other sectors of the economy. Together the activity in these two sectors[2] accounted for 12.3% of the total value added of Latvia in 2015. Similarly, their share in total employment[3] was 9.4% of total employment in 2015, of which 8.1% in the transport sector and 1.3% in the energy sector.



(source: Eurostat)

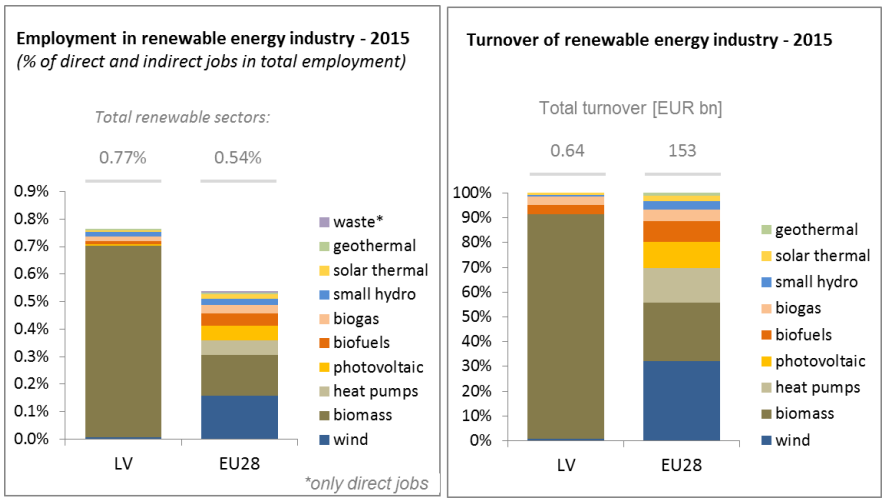
The decarbonisation of the energy and transport sectors will require significant investments and a shift in economic activities beyond these two sectors. The energy transition implies a structural shift in economic activity. Energy-related investment and jobs will in part migrate from traditional fossil fuel based activities towards construction, equipment manufacturing and other services related to the deployment of low carbon and clean energy technologies. At the moment the efforts related to the energy transition in other sectors can only be partially quantified and are therefore not included.

1 The indicators used in this country factsheet largely build on indicators developed for the Commission Staff Working Document "Monitoring progress towards the Energy Union objectives – key indicators" (SWD(2017) 32 final) https://ec.europa.eu/commission/sites/beta-political/files/swd-energy-union-key-indicators_en.pdf

2 Gross value added and employment in NACE sectors D-Electricity, gas, steam and air conditioning supply and H-Transportation and storage

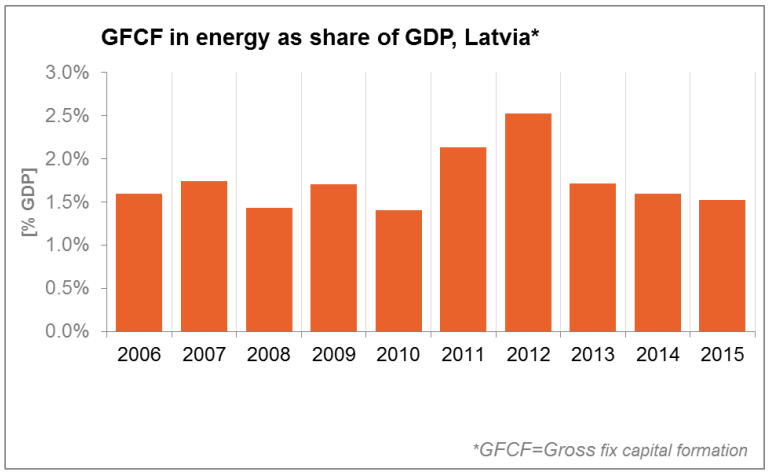
3 National accounts, Eurostat

In the case of renewable energy sector, both the direct as well as the indirect effects on employment are being estimated. According to EurObserv'ER, in 2015, the share of direct and indirect renewable energy related employment (excluding large hydro-power plants owned by the incumbent Latvenergo) in total employment of the economy in Latvia was at about 0.77%, above the EU average of 0.54%. The turnover of the renewable energy industry (excluding large hydro-power plants owned by the incumbent Latvenergo) in the same year was estimated at around EUR 640 million.



(source: EC based on Eurobserv'Er and Eurostat; for hydro-power, only small plants are covered)

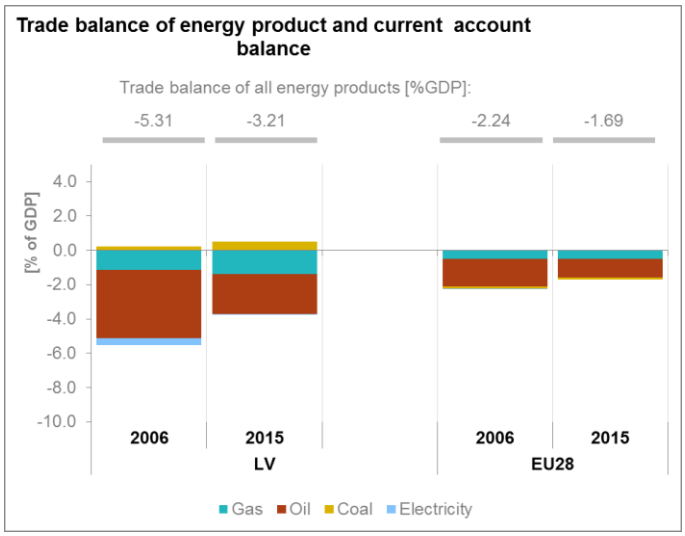
An indication of the level of efforts and challenges encountered by Latvia in the energy sector is given by the Gross fixed capital formation (GFCF)[4]. Investments in the electricity and gas sectors taken as reference sectors amounted to about 1.5% of the country's GDP in 2015.



(source: Eurostat)

[4] Gross fixed capital formation consists of resident producers´ acquisitions, less disposals, of fixed tangible or intangible assets. This covers, in particular, machinery and equipment, vehicles, dwellings and other buildings. It also includes foreign direct investment (FDI). Steam and air conditioning supply are also included in the figures mentioned above as Eurostat reports electricity, gas, steam and air conditioning supply together.

In terms of trade, Latvia is a net importer of fossil fuels. The trade deficit in energy products has fallen from about 5.3% of GDP in 2006 to 3.2% in 2015. This is influenced mainly by the falling prices on fossil fuels and reduced oil import. Conversely, the trade deficit in gas has increased.

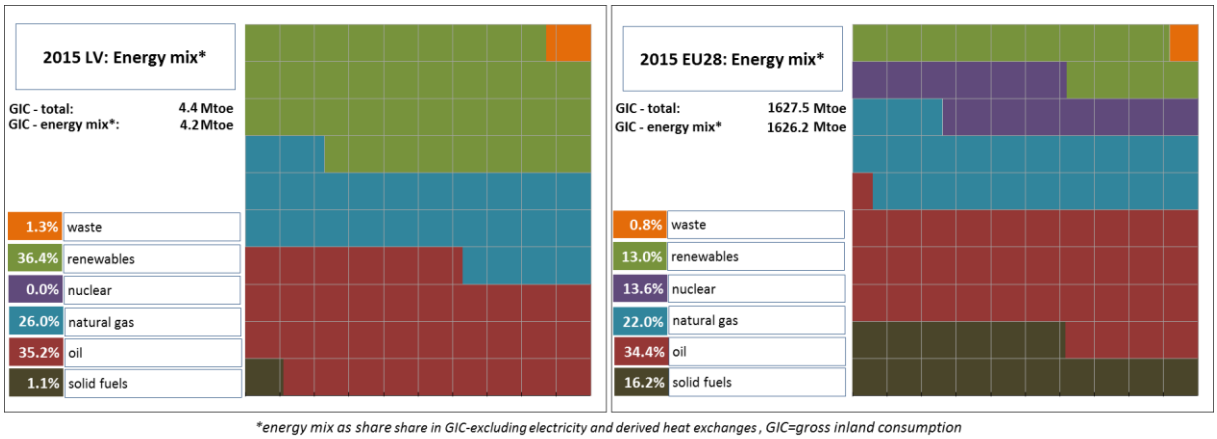


(source: Eurostat)

2. Energy security, solidarity and trust

2.1. Energy Mix

With a 36.4% share of renewable energy in the gross inland energy consumption of primary products in 2015, Latvia has the third highest share of renewables in the energy mix in the EU (after Sweden and Finland). It is considerably higher than the EU average (13%). Petroleum products and natural gas also played an important role in gross energy consumption in 2015 with a share of 35.2% and 26% respectively. In comparison to the average mix in the EU, Latvia's energy mix has also a much lower share of solid fuels (1.1% vs 16.2%).



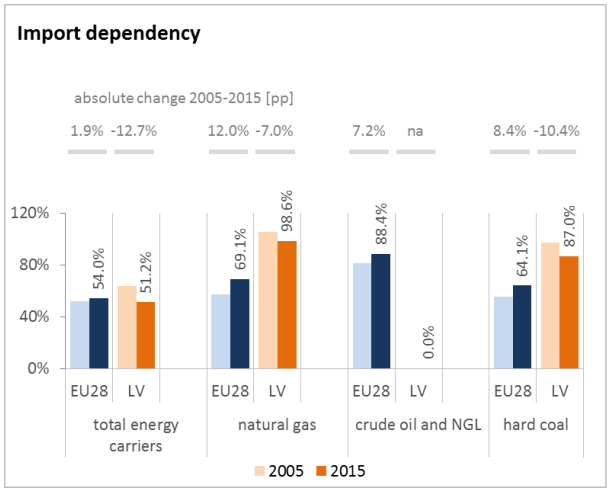
**energy mix as share share in GIC-excluding electricity and derived heat exchanges , GIC=gross inland consumption*

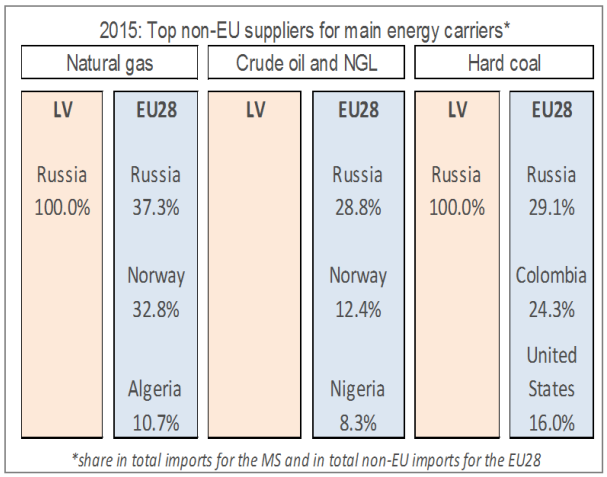
(source: Eurostat)

2.2. Import dependency and security of supply

51% of Latvia's primary energy is coming from imports, slightly less than the EU average. This is due to the high importance of renewables in the energy mix.

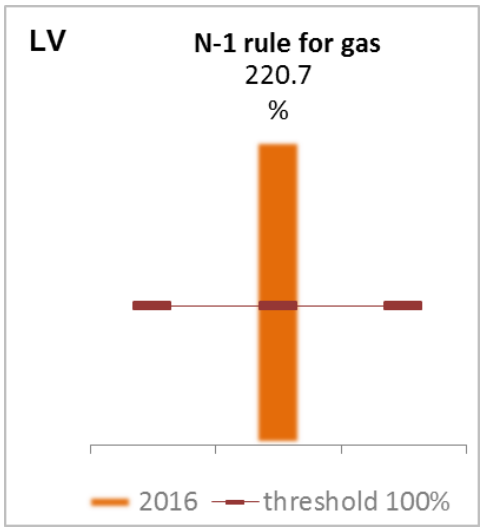
Net import dependency of Latvia decreased between 2005 and 2015, more than in the majority of Member States. It was supported by increase in indigenous renewable energy production, particularly in heating sector, and reduction in energy consumption in 2015, compared to 2005. However, Latvia was exclusively dependent on Russian natural gas supplies until the Klaipeda terminal in Lithuania became operational. As of April 2017 actual deliveries of natural gas from Lithuania to Latvia started both for local consumption and for storing in the Inčukalns natural gas underground storage facility. During the first 5 months the total delivered amount from Lithuania to the Latvian natural gas transmission system reached 1.42 TWh





(source: Eurostat)

The only functioning natural underground gas storage facility (UGS) in the eastern part of the Baltic Sea region (including the three Baltic States and Finland) is located in Inčukalns, Latvia. Due to its capacity largely exceeding domestic demand, Latvia comfortably fulfils requirements of the EU Regulation on Security of Gas Supply related to ability of Member States to satisfy total gas demand during a day of exceptionally high gas demand - up to 294 000 MWh per day. UGS Inčukalns is used to supply gas in winter also to neighbouring countries and contribute to the security of supply and functioning of the regional market in the Baltic region.

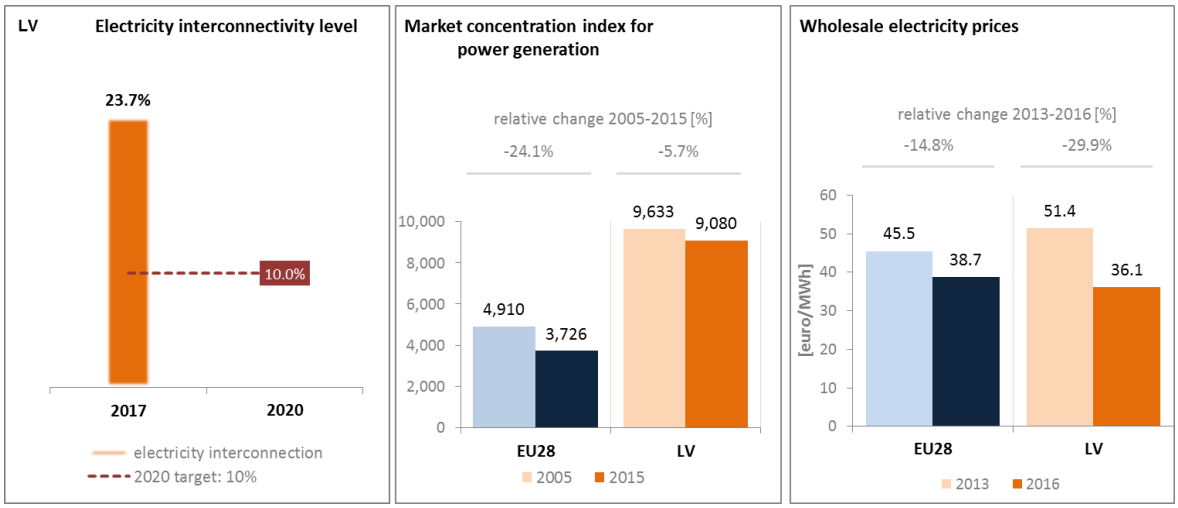


(source: gas coordination group)

3. Internal market

3.1. Interconnections and wholesale market functioning

3.1.1. Electricity



(source: EC based on ENTSO-E scenario outlook and adequacy forecast 2014)

(sources: EC services based on Eurostat for the left graph and based on Platts and European power exchanges for the right graph)

Latvia is part of the Nordic and Baltic wholesale electricity market. The interconnection level[5] for electricity in the Baltic States increased to around 10% after the Estlink2 interconnection with Finland entered into operation in 2014. Once the LitPol Link (connecting Lithuania and Poland) and NordBalt (connecting Lithuania and Sweden) began operating, the interconnection capacity rose to around

[5] The interconnectivity level is calculated as a ratio between import interconnection and net generation capacities of the country (i.e. the 2017 value is the ratio between simultaneous import interconnection capacity [GW] and net generating capacity [GW] in the country at 11 January 2017, 19:00 pm as resulted from ENTSO-E Winter Outlook 2016/2017). For the three Baltic states it is considered the common interconnection level with the rest of the EU.

23.7% for the three Baltic States together. The launch of the Estlink 2 interconnection also contributed to the increased the connectivity of the Baltic States with the Nordic power market.

According to data from the Nordic electricity exchange "Nord Pool Spot", wholesale electricity prices in Latvia since 2013 have experienced a decline of 18.7%, attributable to the improved interconnectivity of the Baltic region with its neighbouring regions.

Latvia is also among the Member States with the highest power generation market concentration with significantly lower degree of competition compared to the EU average.

In 2015, the three Baltic States agreed on a common strategic goal: the synchronisation of their power systems with the European network. It is recognised as a self-standing objective of the reinforced BEMIP cooperation (Baltic Energy Market Interconnection Plan) as it would contribute to achieving a fully functioning and connected internal energy market and to increasing energy security in the electricity and gas sectors of the Baltic States. A dedicated BEMIP Working Group was set up supported by the Commission to work on the identification of the most cost-efficient synchronisation scenario that ensures system stability. The infrastructure element of the synchronisation of the Baltic States' electricity system with the European network has been included in the 3rd list of Projects of Common Interest.

Several projects in the region have received the label of Projects of Common Interest (PCI) in the framework of the trans-European energy networks policy. They are expected to contribute to enhancing security of supply, effectiveness of operation and competitiveness of the electricity markets in the entire Baltic region. The transfer capacity on the Latvian – Estonian border will be improved and the existing bottlenecks will be removed in several steps by 2020, 2024 and 2025 through the construction of the Estonia-Latvia 3rd interconnection and the enhancement of transfer capacity of internal lines within the Baltic States.

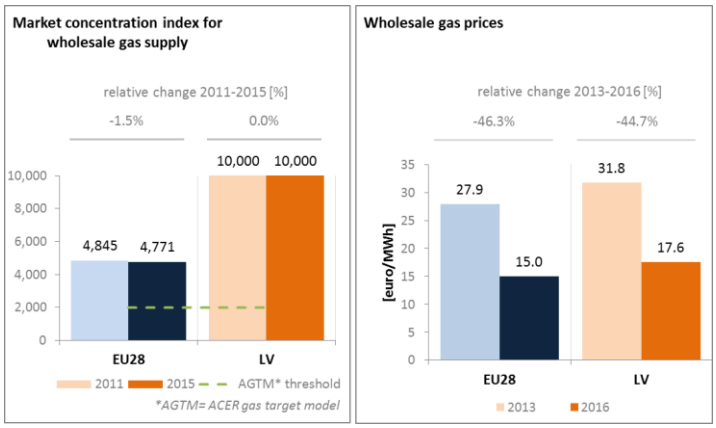
3.1.2. Gas

In 2015, wholesale gas prices in Latvia were higher than the EU average prices, inter alia due to import dependence from only one country and exclusive rights of gas supply given to one gas supplier.

So far, Latvia has been fully and exclusively dependent on Russian gas imports. Nevertheless, other sources of supply are starting to become available. The Klaipeda LNG terminal in Lithuania, which opened in 2015, now provides an alternative source of gas for Latvian consumers.

On 3 April 2017, the Latvian gas market has been opened to competition ensuring that instead of a single supplier, consumers in Latvia can now choose between several possible suppliers who can freely access the system in line with EU rules.

The vertically integrated gas company JSC Latvijas Gaze is set to be fully unbundled by end of 2017.



(source: ACER for the left graph and EC services based on Platts, gas hubs, Eurostat for the right graph)

Enhancing the cross-border gas infrastructure between Latvia and Lithuania and reinforcement of the internal gas transmission lines in Latvia are of high importance for improving the operation of the whole Baltic gas transmission system operation and for a development of a regional gas market in the Baltic Sea region. Also the project on Modernisation and expansion of the Underground Gas Storage in Inčukalns has been included in the list of the PCI projects.

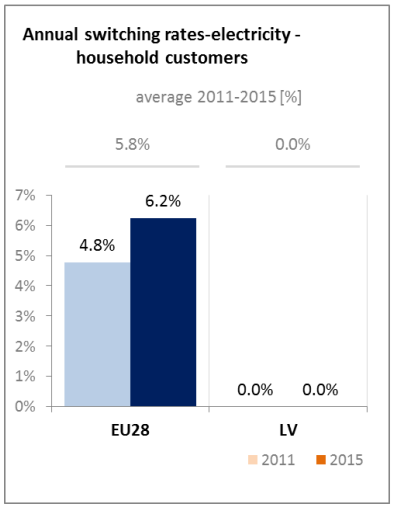
3.2. Retail electricity and gas markets

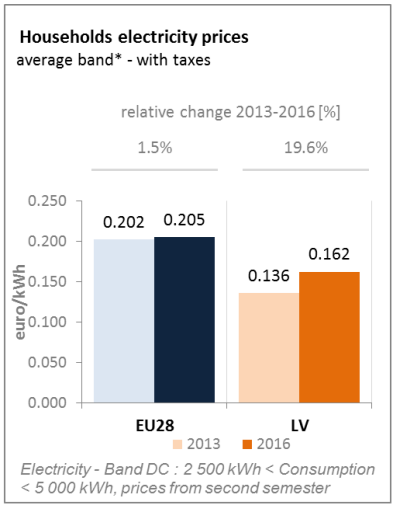
3.2.1. Electricity

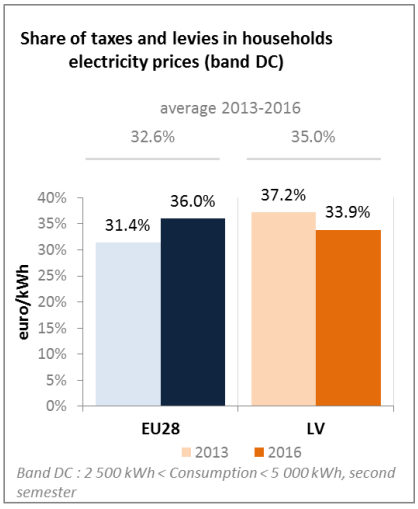
Latvia's electricity market was liberalised in 2015 and there are currently 15 electricity suppliers. While facilitating investment and choice, the deregulation and the discontinuation of subsidies led to a sharp increase in household electricity prices by around 28 % in 2015, followed by a decrease in 2016 and in 2017. For industries, electricity prices remained stable.

In the summer 2016, an electricity tariff reform introduced a fixed connection-capacity payment component, favouring consumers with a constant use of their connection capacity.

Smart electricity meters were introduced in Latvia in 2014. Around one third of electricity customers were equipped with electricity smart meters by March 2017. Their share is expected to increase significantly to 80 % by 2020 and 100 % by 2023.



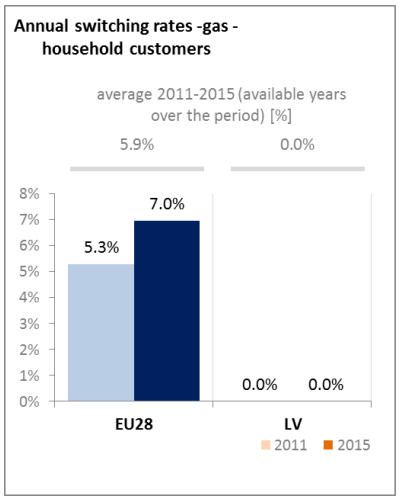


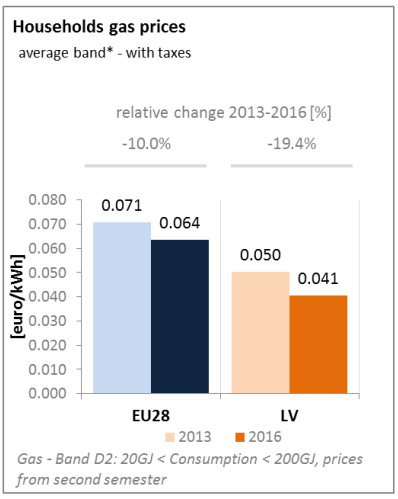


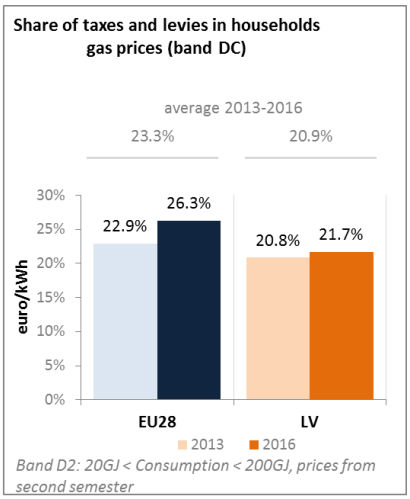
(source: ACER) *(source: Eurostat)* *(source: Eurostat)*

3.2.2. Gas

Following the gas market liberalisation on 3 April 2017, also household consumers can now choose between several possible suppliers. Regulated tariffs are to remain available for vulnerable consumers to guarantee that they can still access affordable energy.



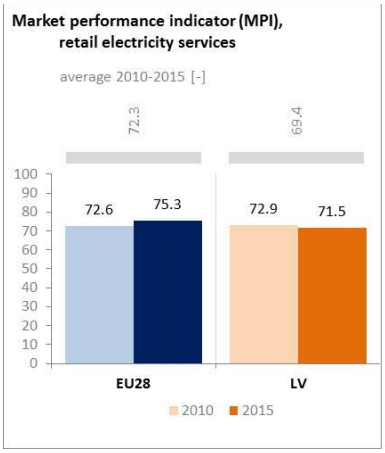


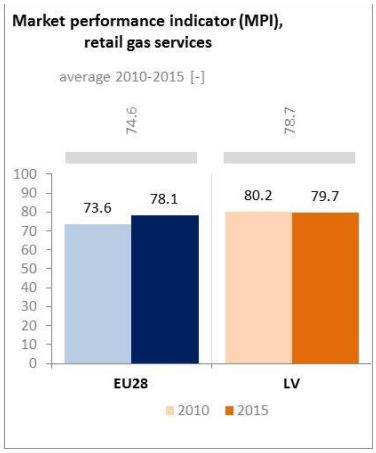


(source: ACER) *(source: Eurostat)* *(source: Eurostat)*

3.2.3. Market performance indicators

According to the periodical survey of DG JUST, Latvian consumers are as satisfied with the services received on energy retail markets at the same level as the EU average.



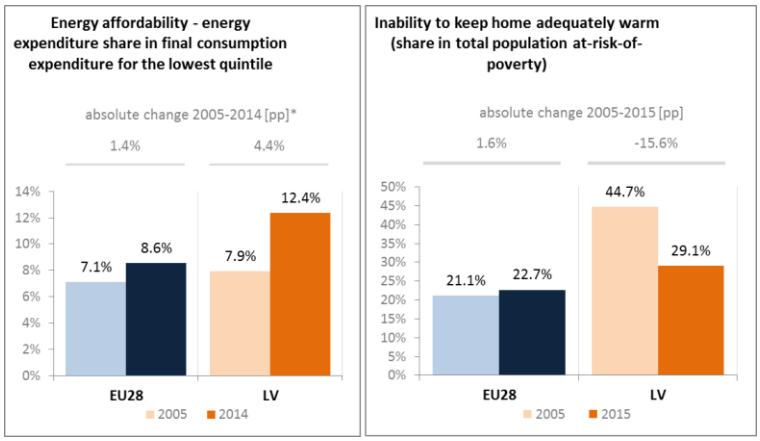


(source: DG JUST survey)

3.3. Energy affordability

In Latvia, the share of energy in total expenditures for all households as well as for the poorest households is among the highest in the EU (12.4% vs EU average of 8.6%).

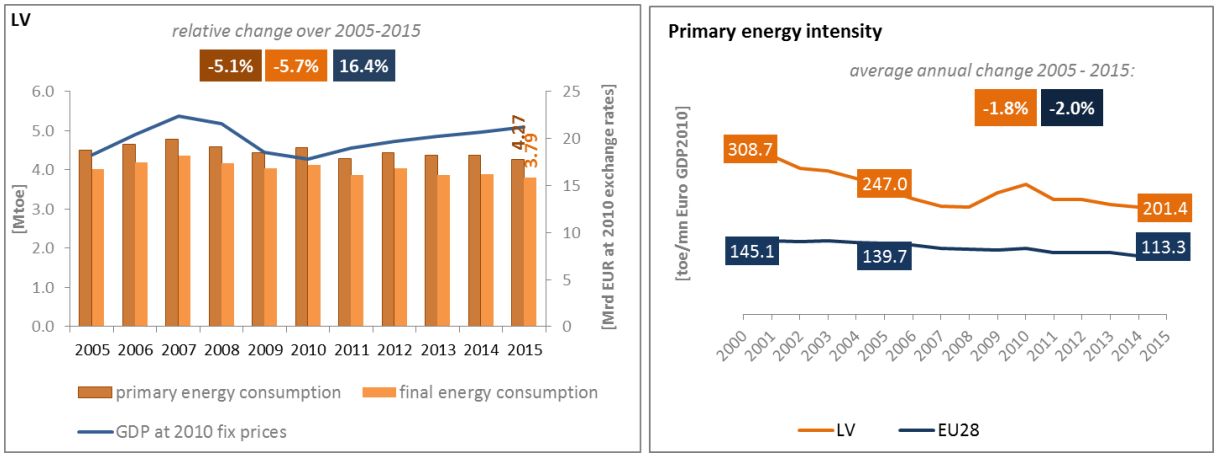
In 2015, around 29% of citizens of the most socially deprived households were not able to keep their homes adequately warm. It is 6% more compared to the EU average (23%) but almost 16% less than in 2005. Thus, Latvia is among the Member States with the largest improvement over the last decade in this area. Nevertheless, more needs to be done in coming years to improve the energy affordability.



(source: ad-hoc data collection of DG ENER based on HBS with the support of Eurostat and national statistics)

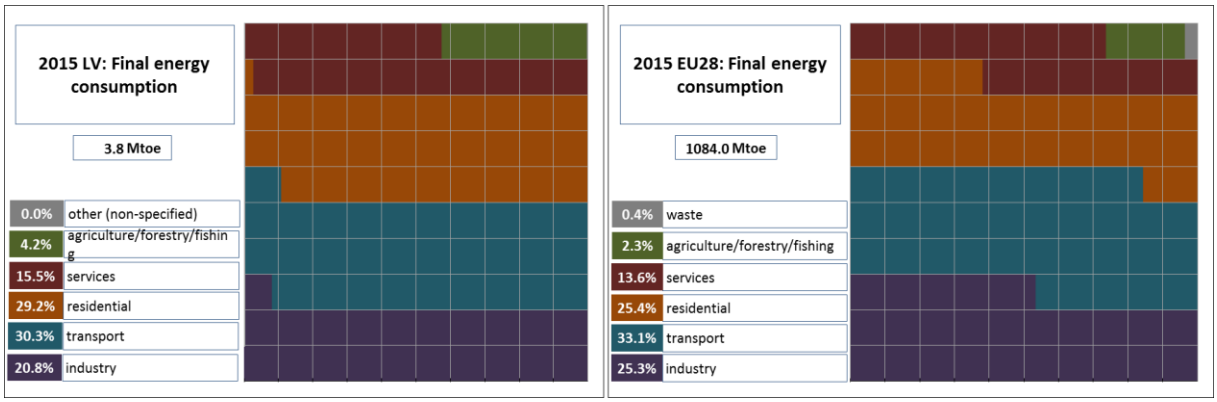
4. Energy efficiency and moderation of demand

Latvia reduced its primary energy consumption by 2% from 4.36 Mtoe in 2014 to 4.27 Mtoe in 2015. Final energy consumption also decreased by 2.8% from 3.9 Mtoe in 2014 to 3.79 Mtoe in 2015 showing a positive trend. Latvia energy consumption is already below the levels of primary and final indicative national 2020 targets. However, in the coming years up to 2020, Latvia is expected to keep up the national energy efficiency actions and programmes, in particular the ones under Article 7 of the Energy Efficiency Directive.



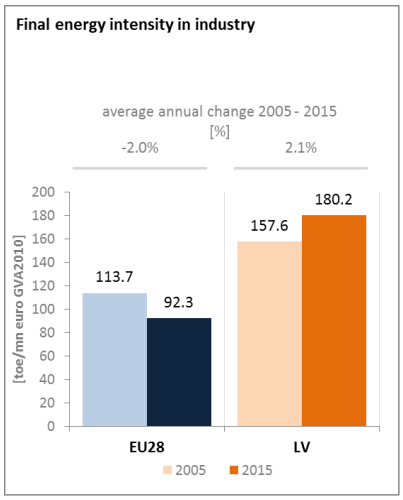
(source: Eurostat)

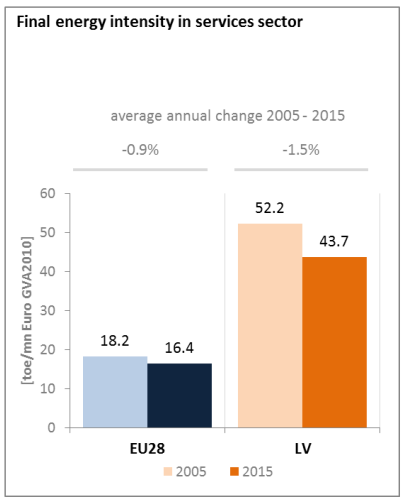
Although primary energy intensity decreased over the 2005-2015 period at a faster pace than that of the EU average, it is still the 7th highest in the EU. While energy intensity has decreased for services and residential sectors, energy intensity of Latvia's industry increased in the time period from 2005 to 2015. A set of measures were introduced in Latvia to increase energy efficiency in the manufacturing industries, including support from the European Structural and Investment Funds. In 2015, transport sector was the biggest energy consuming sector in Latvia representing a 30% share in the total final energy consumption, which is below the EU average (33%). The share in energy consumption of the residential and services sectors in Latvia were above the EU average.

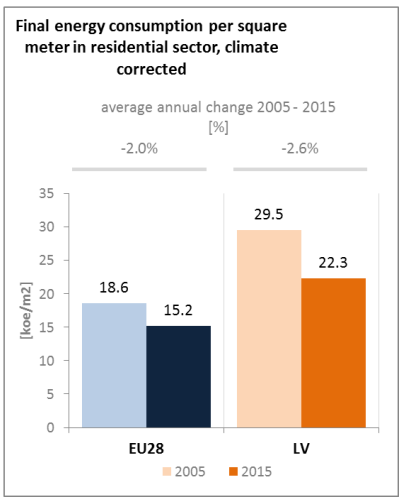


(source: Eurostat)

Energy efficiency financing instruments for multi-apartment buildings are becoming more available to their inhabitants in Latvia. Achieving further energy savings in the residential sector is an important investment priority under the European Structural and Investment Funds for the financing period 2014-2020, as only some 3 % of apartment buildings have been renovated in the period 2009-2013. The framework for energy performance contracting is being developed (with an emphasis on residential and public buildings as well as public lighting), which is expected to create the functioning energy services market in Latvia.

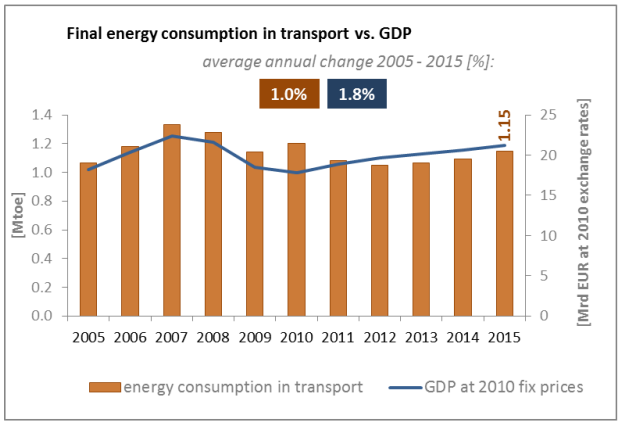


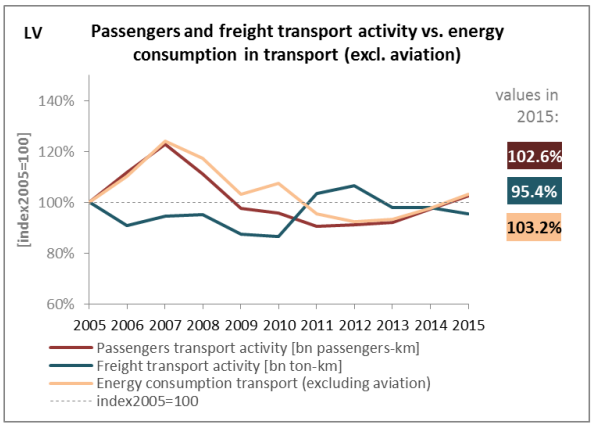




(source: Eurostat) *(source: Eurostat)* *(source: Odyssee database)*

Between 2005 and 2015, the final energy consumption in transport in Latvia increased by 1.0%, slower than the 1.8% average annual increase of the GDP. The evolution of transport energy consumption is highly correlated to the trends in passenger activity rather than with freight transport.

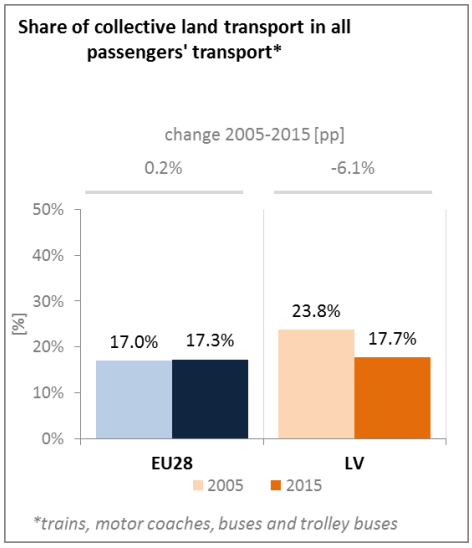




passengers transport activity=Private cars + bus + rail + tram & metro
freight transport activity=road+rail+inland waterways+pipeline

(source: Eurostat) *(source: Eurostat and DG MOVE pocketbook)*

The share of collective passengers land transport into total passengers' transport decreased by 6% between 2005 and 2015, indicating a higher use of private transport means.



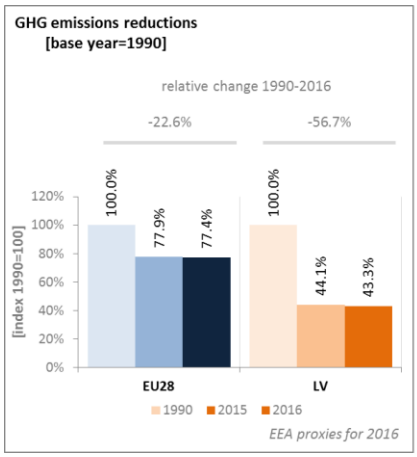
(source: Eurostat)

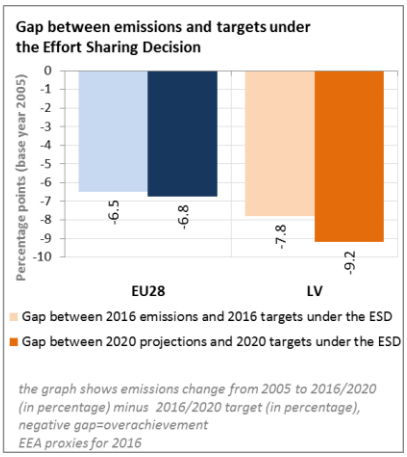
The Latvian transport development guidelines determines the increase in energy efficiency as an important indirect goal which aimed to be achieved through the majority of actions considered for a period of 2014-2020. In particular, railway electrification and Rail Baltic project aim at reducing the current emissions level and increasing energy efficiency. In the same vein, the planned road quality improvement measures will contribute to better energy efficiency and will help to decrease the amount of fuel consumed by road transport.

5. Decarbonisation of economy

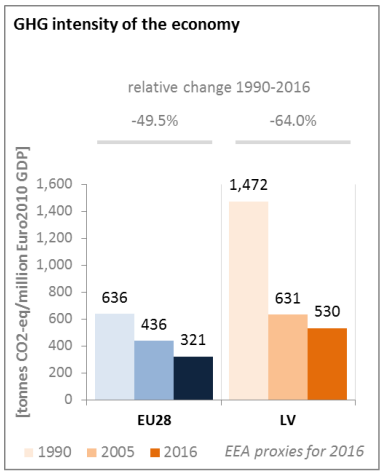
5.1. GHG emissions

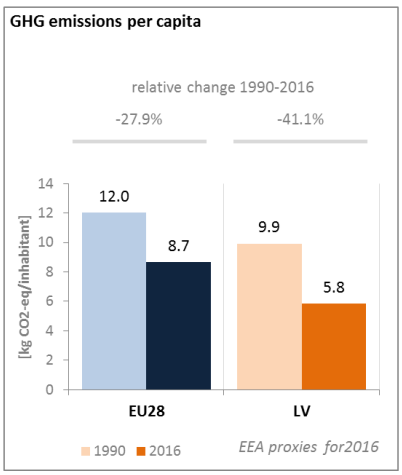
Latvia is on track to meet its 2020 target of greenhouse gas (GHG) emissions reduction outside the ETS by a 9 p.p. margin. Emissions outside the ETS are expected to increase by 8 % between 2005 and 2020 whereas the target is not to increase more than 17 %. In 2015, such emissions account for 80 % of Latvia's total GHG emissions. More than half of this total is due to the transport and agriculture sectors.





(source: EC and EEA)



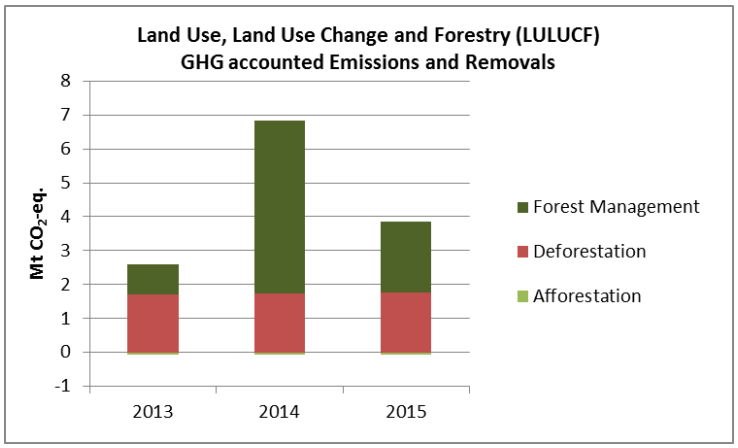


Largest Sectors of GHG Emissions in 2015	LV	EU28
Energy/power industry	16.6%	30.9%
Transport	27.7%	21.0%
Industry	12.7%	19.9%
Agriculture (incl. forestry & fishery)	28.0%	12.0%
Residential & Commercial	8.8%	12.8%
Waste	6.1%	3.2%
Other	0.2%	0.2%

(source: EC and EEA)

Preliminary accounts under the Kyoto Protocol for Latvia show overall emissions of +4.4 Mt CO_2-eq. as an annual average in the period 2013-2015. For comparison, the annual average of the EU-28 accounted for removals of -119.0 Mt CO_2-eq. Latvia is one of four EU Member States which show overall emissions in this preliminary accounting exercise. This is primarily due to Forest Management accounts showing emissions; Latvia is one of only three EU Member States with this accounting issue.

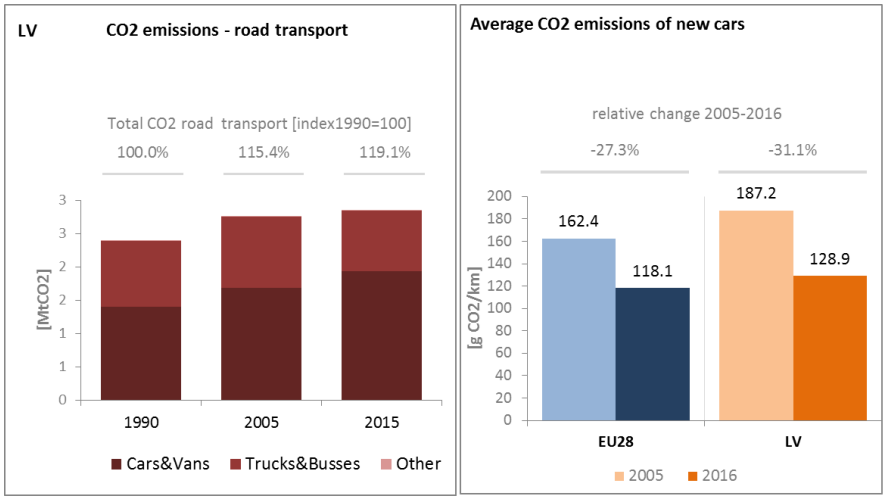
Emissions by Deforestation are by far higher than very limited removals by Afforestation. While the initial share of emissions by Forest Management was comparatively small, it strongly overshadowed emissions by Deforestation in 2014, and then reduced to the same share in 2015. Overall, there is a changing pattern of emissions which is driven by varying emissions by Forest Management. All other reported activities remained constant over the course of the three-year period.



Note: Forest Management credits are capped and presented as yearly averages when the total Forest Management credits of the considered period exceed the simulated cap over the same period.
(source: EC and EEA)

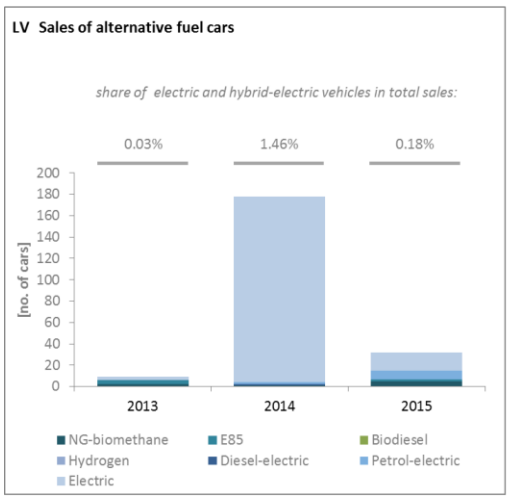
CO_2 emissions in transport and alternative fuelled vehicles

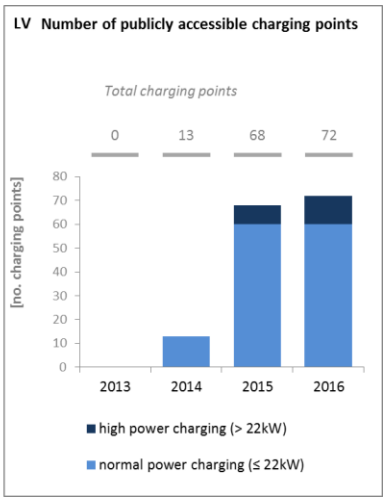
Although the average CO_2 emissions from new cars in Latvia decreased slightly faster than EU average between 2005 and 2016, they are among the highest in the EU. In 2016 new cars in Latvia had CO_2 emissions per kilometre of 128.9g CO_2/km, against an EU average of 118.1 g CO_2/km.



(source: European Environment Agency)

Between 2015 and 2016, the number of charging points in Latvia has been almost stable reaching the amount of 72 points in 2016 as reported by the EAFO observatory. The implementation process for local charging network only started in 2016 and in two years it is expected to reach a number of 150 points.





(European Environment Agency) *(European Alternative Fuels Observatory)*

National Policy Frameworks under Directive 2014/94/EU on alternative fuels infrastructure have to establish targets, objective and measures for the development of the market of alternative fuels in the transport sector and the deployment of the relevant infrastructure. Latvia has submitted its National Policy Framework as requested under article 3 of the Directive 2014/94/EU.

A detailed assessment of the Latvian National Policy Framework in terms of its compliance with the requirements of Directive 2014/94/EU on alternative fuels infrastructure, its contribution to achievement of long-term energy and climate objectives of the Union and coherence of its targets and objectives in terms of cross-border continuity has been published as part of the Communication on Alternative Fuels Action Plans (COM(2017)652) and the related staff working document SWD(2017)365.

On April 25, 2017, Latvia approved the Alternative Fuel Development Plan for 2017-2020 which aims to result in the development of a future policy of alternative fuels in certain transport sectors to reduce greenhouse gas emissions.

5.2. Adaptation to climate change

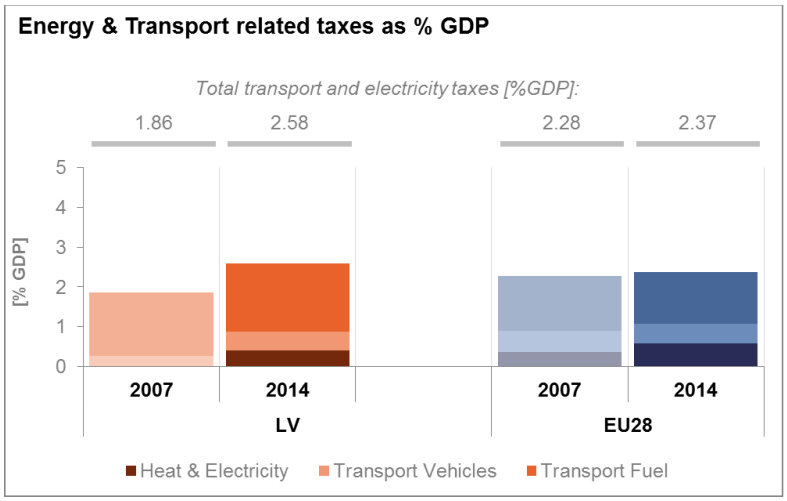
Latvia is expected to finalise its National Adaptation Strategy (NAS) to climate change, including an Action Plan up to 2030, by the end of 2017. Climate change risk an vulnerability assessments, cost-benefit and cost-effectiveness assessments for adaptation measures were developed in 2017 for the most vulnerable sectors, which include biodiversity and ecosystem services, forestry and agriculture, tourism and landscape planning, health and welfare, building and infrastructure planning, civil protection and emergency planning. The draft NAS includes an adaptation monitoring, reporting and evaluation system with 32 adaptation indicators and 38 climate change parameters.

5.3. Taxes on energy and transport[6]

The overall tax burden on energy and transport in Latvia amounts to 2.6% of GDP, slightly above the EU average. The significant increase registered from 2007 of 0.7 p.p. is due both to a higher tax burden on heat and electricity (0.4 p.p.) and transport vehicles (0.2 p.p.). The tax burden on transport fuel has in contrast remained broadly stable.

[6] There is no data on fossil fuel subsidies for Latvia.

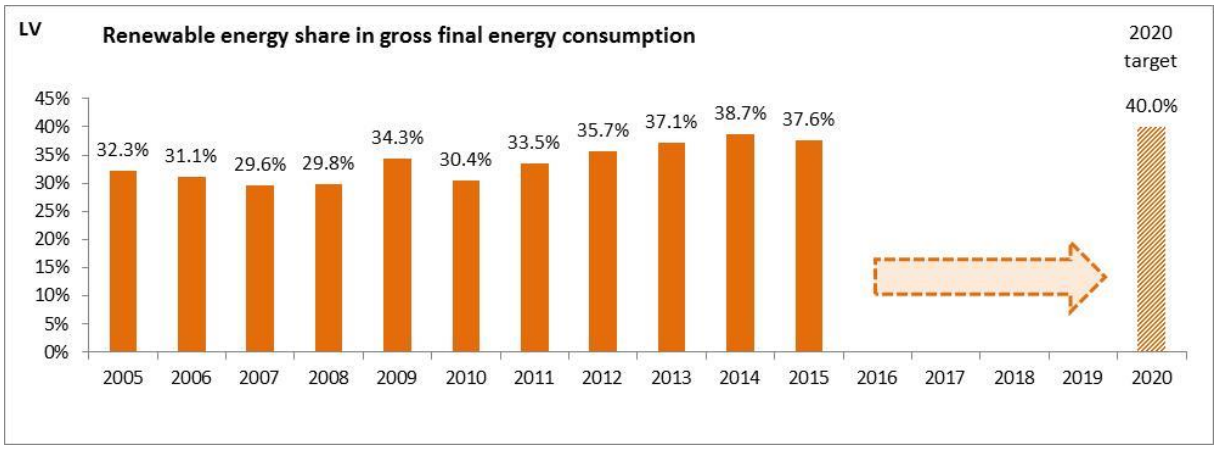
Between 2009 until 2016, Latvia had a registration tax that took into account the CO_2-emissions. As of 2017, provisions on CO_2-emissions are incorporated in annual circulation tax, i.e. the Motor Vehicle Operation tax (concerns the vehicles with first registration as of 2009). This tax is paid annually according to the vehicle's emissions of CO_2 g /km. For vehicles registered before 2009, the previous tax regime still applies due to lack of data and reflects the mass of the vehicle, engine capacity (cm3) and engine power. The circulation tax is not applied on electric vehicles.



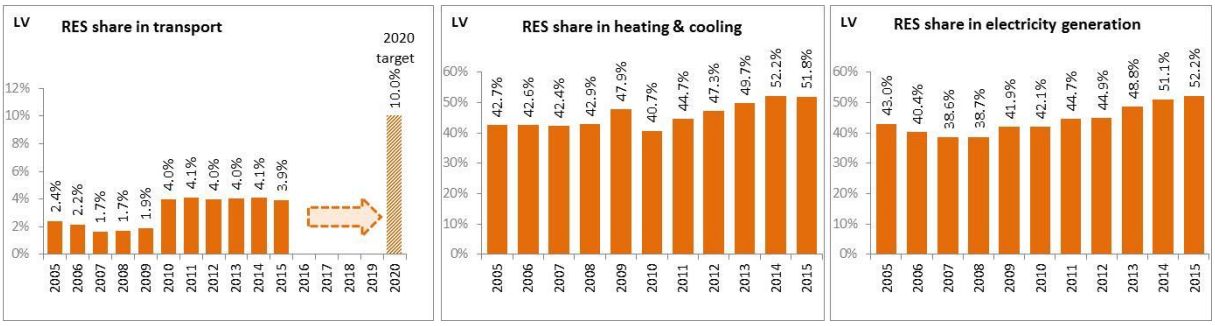
(source: Eurostat)

5.4. Renewable energy

Latvia has historically high share of renewables (large hydro and biomass) in its energy mix. The overall share of renewable energy in Latvia's final energy consumption reached 37.6% in 2015 which is 2.4 p.p. away from its 2020 target of 40%. The largest share of renewable energy was reached in the electricity sector (52.3%), followed by the heating and cooling sector (51.8%).



(source: Eurostat-SHARES)



(source: Eurostat-SHARES)

In 2015, the share of support for renewable energy and fossil fuel based co-generation in national electricity prices in Latvia was the fifth highest in the EU for households and the fourth highest for industry. Support for renewables and co-generation is based on a complex feed-in tariff system which also includes elements of a quota system and tenders. It is closed for new installations since 2011. In 2017, a new provision was introduced requiring an examination of supported installations in view of avoiding over-compensation.

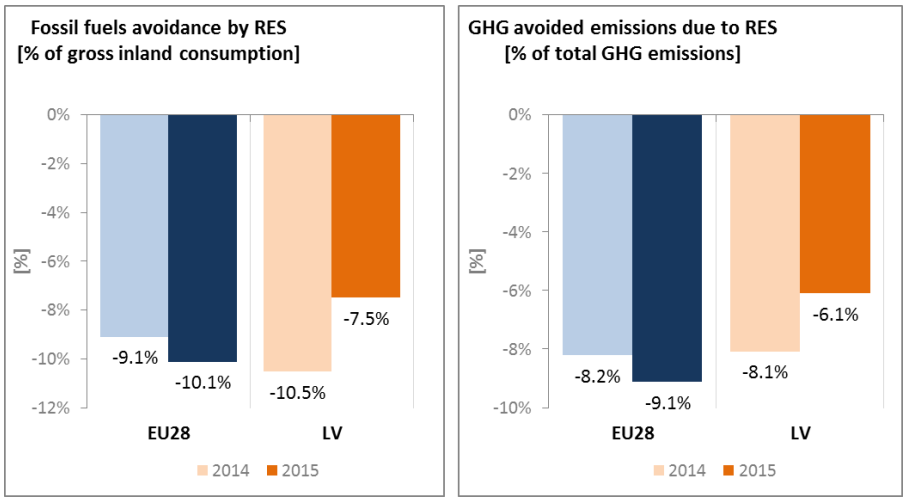
On 1 January 2014, net-metering for electricity produced by self-consumers and injected into the grid through a small-scale connection (≤3*16A) was introduced. Self-consumers connected to the electricity grid are required to pay a grid use charge.

In the heating and cooling sector, significant investment support is provided by using the EU structural Funds – in April 2017 a large investment programme for investments in energy efficiency and the use of renewable energy in the heating sector was launched (the first stage financing projects to be finalised by end of 2020). Support from the EU Cohesion Fund is foreseen to reach EUR 35 Mio.

Main support scheme for the increased use of renewable energy in transport sector is a blending obligation of biofuels into liquid transport fuels. Due to the high share of renewable energy in Latvia's electricity sector, support for increased use of renewable energy in transport sector is also supported by measures to improve the infrastructure for recharging of electric vehicles.

Due to a consistent deployment of renewables since 2005, it is estimated that in 2015 Latvia avoided about 7.5% of the fossil fuel in gross inland consumption and about 6.1% of GHG emissions at national level[7].

[7] Avoided GHG emissions mentioned here have a theoretical character as the contributions do not necessarily represent net GHG savings not are they based on life-cycle assessment or full carbon accounting.

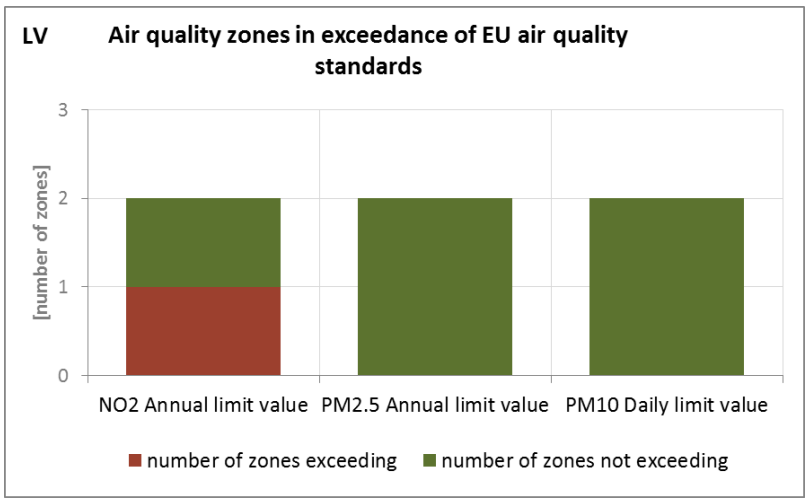


(source: EEA)

5.5. Contribution of the Energy Union to better air quality

Air quality in Latvia is reported to be generally good, with exceptions. Nevertheless, for the year 2013, the European Environment Agency estimated that about 2,080 premature deaths were attributable to fine particulate matter ($PM_{2.5}$) concentrations and over 110 to nitrogen dioxide (NO_2) concentrations[8].

For NO_2, Latvia reported exceedance of the binding EU air quality standard[9]. For the year 2015, Latvia reported exceedance of the limit value for NO_2 in 1 out of the 2 air quality zones in Latvia as shown in the figure below[10].



(Source: EEA)

The health-related external costs from air pollution in Latvia have been estimated to be more than EUR 748 million/year (income adjusted, 2010), which includes the intrinsic value of living a healthy life

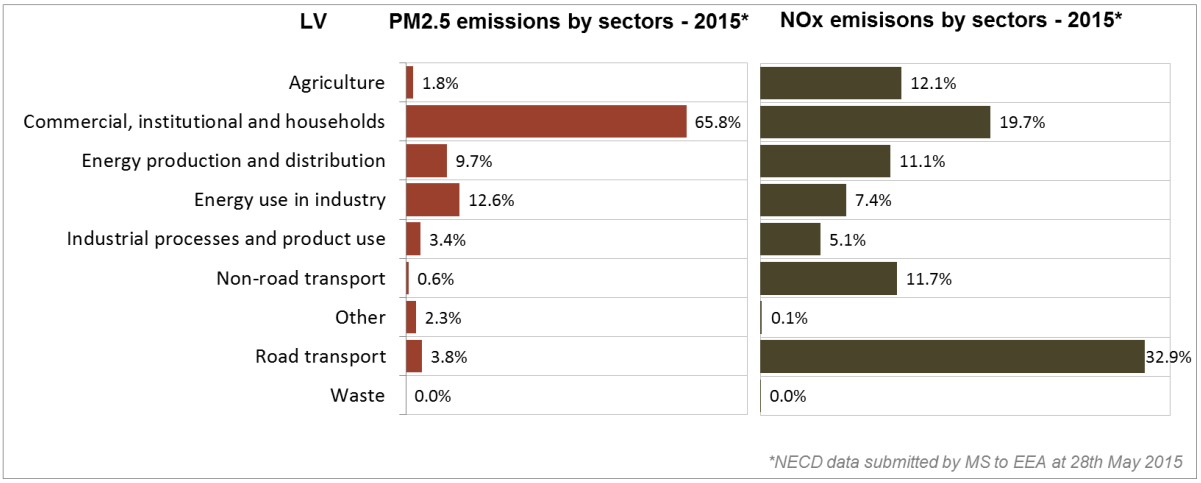
[8] European Environment Agency, 2016, Air Quality in Europe – 2016 Report, table 10.2. The report also includes details as regards the underpinning methodology for calculating premature deaths.

[9] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, OJ L 152, 11.6.2008, p.1-44

[10] Compliance data as reported by the Member States as part of their official annual air quality report for the calender year 2015 (available on the European Environment Agency's (EEA) Eionet/Central Data Repository), http://cdr.eionet.europa.eu/lv/eu/aqd

without premature death as well as the direct costs to the economy such as healthcare costs and lost working days due to sickness caused by air pollution[11].

The Energy Union can substantially contribute to addressing these air quality problems through measures reducing emissions of both GHG and air pollutants such as PM and nitrogen oxides (NO_x) from major contributing sectors such as (road) transport, energy production, industry and residential heating (e.g. stoves and boilers) as shown in the figure below[12].



(Source: EEA. This table reflects only sources of primary $PM_{2,5}$ emissions.)

6. Research, innovation and competitiveness

6.1. Research and innovation policy

Priorities in energy research in Latvia include regional energy sector analysis and optimisation, management of energy savings, energy-related environmental policy, renewable energy resources, energy efficiency, electrical networks and electricity supply systems clean fossil energy technologies, electrical devices and machines, advanced materials and solid-state physics.

Public funding for energy-related research is managed under the National Research Programme LATENERGI, which had a reduction in budget in the financial period 2014-2017 compared to 2010-2013: from EUR 4.1 million to EUR 2.25 million.

Latvia participates to varying degrees in five (out of fourteen) temporary working groups for the implementation of the integrated Strategic Energy Technology (SET) Plan, and is generally an active contributor to the ongoing work of the SET Plan.

Participation in the EU financed projects plays important role in the viability of the Latvian organisations involved in energy research. Regarding the Horizon 2020 programme, Latvia has received so far 0.3% of the EU contribution devoted to the 'secure, clean and efficient energy' part of the programme. As of September 2017, 42 participations from Latvian organisations energy projects have been awarded EUR 6 million in Horizon 2020. This includes a grant of over EUR 0.6 million to Riga's Technical University for its participation in project RealValue (smart electric thermal storage)

[11] See also the EU Environmental Implementation Review Country Report for Latvia, SWD(2017)50 final of 3.2.2017

[12] National emission data as reported by the Member States to the EEA (available on the EEA's Eionet/Central Data Repository), http://cdr.eionet.europa.eu/lv/eu/nec_revised

and six grants totalling EUR 1.3 million to Latvian beneficiaries participating in the project SUNShINE (energy efficient buildings).

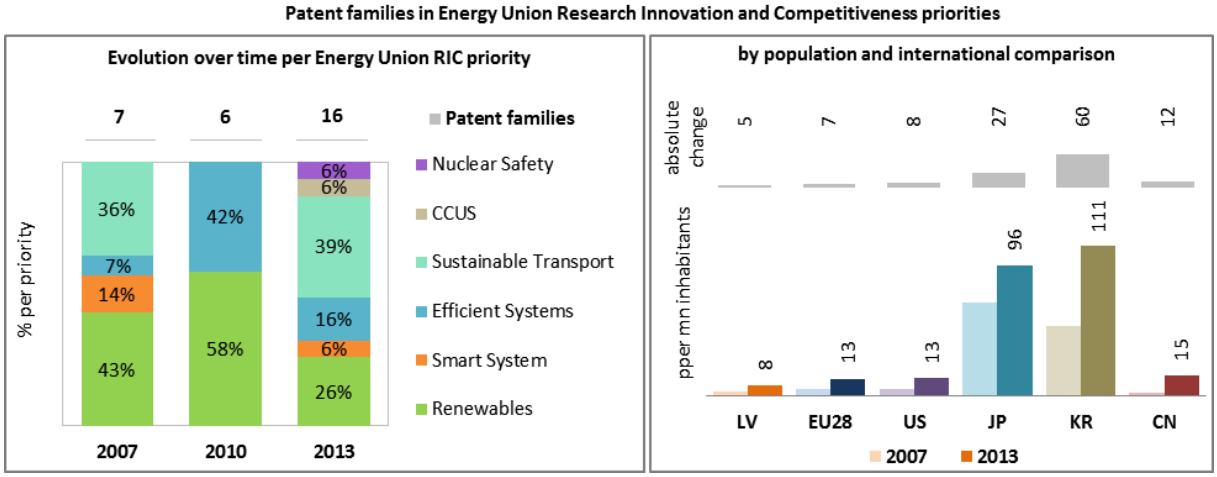
6.2. Investments and patents in the Energy Union R&I priorities

The European Commission does not have any data regarding the total public (national) investments in the Energy Union R&I priorities.

Private investment in the Energy Union R&I priorities in 2013 was estimated at EUR 1.4 million (0.01% of the private R&I investment in Energy Union R&I priorities in the EU). The focus was on the Renewables R&I priority of the Energy Union, which received 69% of the investments. The remaining 31% was dedicated to the Efficient Systems priority.

In 2013, the most recent year for which complete patent[13] statistics are available, 6 companies and research organisations based in Latvia filed 16 patents in low-carbon energy technologies (0.25% of the EU total). The focus was on Sustainable transport (39%), followed by Renewables (26%) and the Efficient Systems priority (16%).

In 2013, both private R&I investments and patents in Energy Union R&I priorities were lower than the EU average when normalised by GDP and by population respectively. In the period 2007-2013, private R&I investments decreased by 34% per year on average, contrary to the EU indicator that increased by 6% on average. For the same period, the number of patents in the Energy Union R&I priorities increased by 14% per year on average, a rate of increase just under the EU average (15%).



(Data sources: Patent data based on the European Patent Office PATSTAT database[14]. Private investment as estimated by JRC SETIS. Detailed methodology available from the JRC[15].)

6.3. Competitiveness

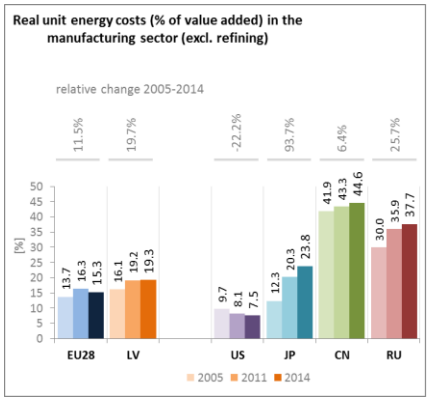
In 2014, the real unit energy costs (RUEC)[16] in Latvia (19.3) were above those at the EU average (15.3). These costs were more than two times higher than those in the US but below those in Japan,

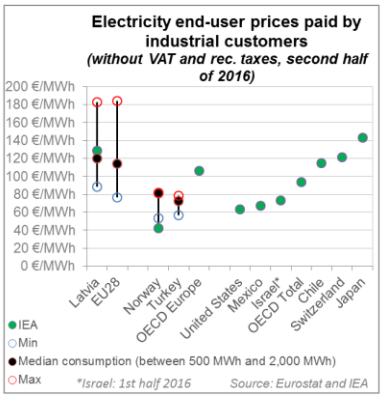
[13] In the context of this document, the term 'patent' refers to patent families, rather than applications, as a measure of innovative activity. Patent families include all documents relevant to a distinct invention (e.g. applications to multiple authorities), thus preventing multiple counting. A fraction of the family is allocated to each applicant and relevant technology.

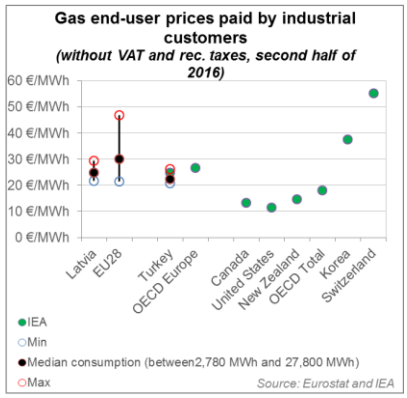
[14] https://www.epo.org/searching-for-patents/business/patstat.html#tab1

[15] https://setis.ec.europa.eu/related-jrc-activities/jrc-setis-reports/monitoring-ri-low-carbon-energy-technologies

China and Russia. This can be partly explained by the presence of energy intensive industries in Latvia (e.g. cement and steel industries). The electricity prices paid by industrial customers in Latvia are at a similar level as the EU and OECD averages. Gas prices for industrial consumers are below the EU average but higher than the OECD averages.







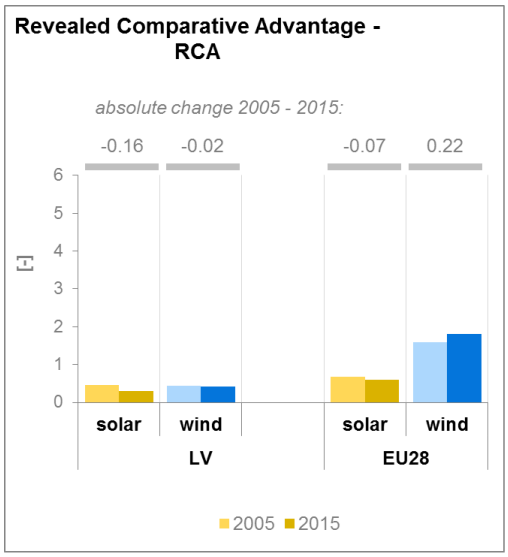
(source: ECFIN) *(source: Eurostat and IEA)*

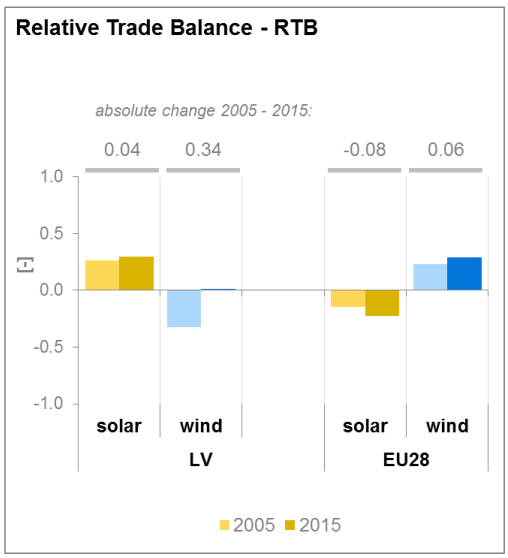
Regarding the competitiveness in wind and solar energy, Latvia is performing around the EU average for solar energy and well below for wind energy as indicated by a revealed comparative advantage below 1[17]. Nonetheless, the Latvian economy is specialised in power electronics for solar photovoltaic panels and the manufacturing of wind turbine towers. The relative trade balance[18] shows that Latvia is a net exporter of solar energy components, in particular power electronics and has balanced position in terms of wind technologies and components, due to a relative trade surplus in towers for wind turbines. The revealed comparative advantage in both sectors has not changed significantly since 2005.

[16] This indicator measures the amount of money spent on energy sources needed to obtain one unit of value added.

[17] The RCA index for product "i" is defined as follows: $RCA_i = \frac{\frac{X_{j,i}}{\sum_i X_{j,i}}}{\frac{X_{w,i}}{\sum_i X_{w,i}}}$ where X is the value of exports, and j is the country and w is the reference group, the World economy. 2005 refers in the text to the indicator average over the 2000-2009 period, while 2015 represents the average over the 2010-2016 period. The same applies for the RTB indicator - see below.

[18] The RTB indicator for product "i" is defined as follows: $RTB_i = \frac{X_i - M_i}{X_i + M_i}$ where X_i is the value of product's "i" exports and M_i imports.





7. Regional and local cooperation

Latvia is part of the Baltic Energy Market Interconnection Plan (BEMIP). BEMIP's main objectives have been to develop a regional energy market between the EU Member States in the Baltic Sea region and integrating it fully into the EU's energy markets thus increasing security of supplies. BEMIP projects have been part of the European Economic Recovery Plan (EERP) and the Trans-European Energy Networks Programme. BEMIP projects have also been funded through the EU's structural funds, including the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Many infrastructure projects of the BEMIP Priority Corridors for gas and electricity are supported through CEF co-funding amounting to 534.3 million euro. In the framework of the societal challenge for secure, clean and efficient energy of the Horizon 2020 programme, 16.9 million euro is allocated to participants from the Baltics to stimulate research and innovation in this field.

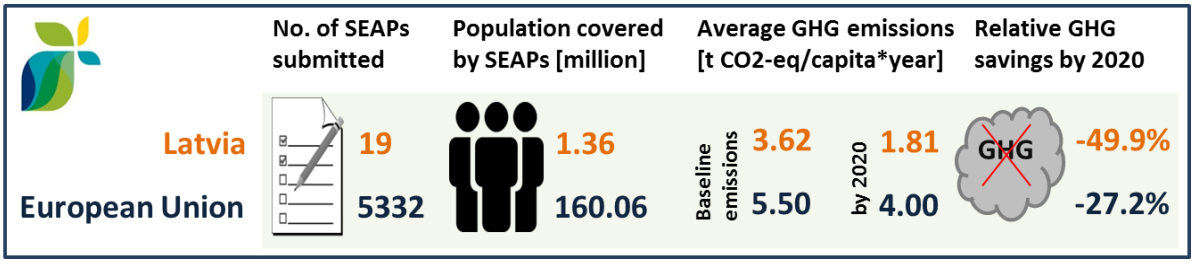
The Baltic region was the first region that adopted in 2012 a joint Risk Assessment of the risks affecting the security of gas supply in the region under the Regulation on Security of Gas Supply which is currently being updated[19]. The three Baltic countries and Finland are working together on the preparation of a joint Preventive Action Plans and an Emergency Plan for the region.

The EU macro-regional strategy for the Baltic Sea Region in which Latvia takes part can be used as a basis for regional cooperation on energy. Latvia is a co-coordinator of the policy area 'Energy'. European Territorial Cooperation – 'Interreg' – –under EU cohesion policy also provides further opportunities for cross-border, transnational and interregional cooperation, including in the Energy Union areas.

Cities and urban areas have a key role in the energy and climate challenge. The Urban Agenda for the EU, established by the Pact of Amsterdam in May 2016, better involves cities in the design and implementation of policies, including those related to the Energy Union. It is implemented through Partnerships, in which the Commission, Member States, cities and stakeholders work together on a number of important areas, including on Energy Transition, Urban Mobility, Air Quality, Climate Adaptation and Housing. Latvia is participating in the partnerships on Energy Transition, with Vidzeme Region as member, and Housing, with the country as well as the city of Riga as members.

[19] Regulation (EU) No 994/2010

By 2016 on Covenant of Mayors, the sustainable energy action plans delivered by 19 Latvian municipalities had been assessed. Overall, these 19 municipalities cover about 1.4 million inhabitants representing around 68 % of the total population in Latvia. All together, these municipalities committed to reduce by 2020 the GHG emissions by 49.7% (as compared to 1990 baseline).



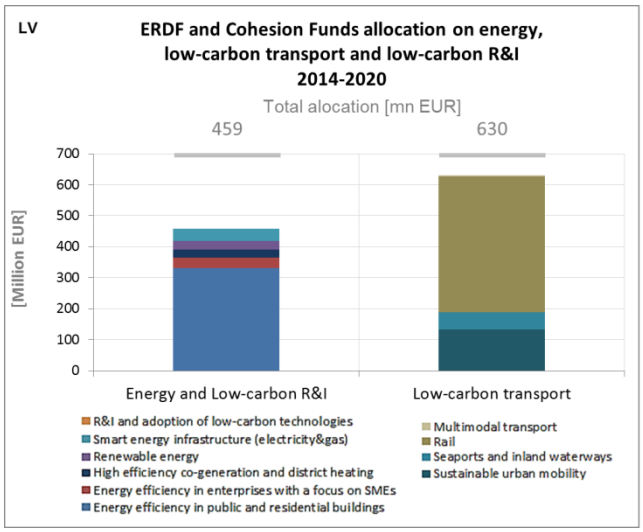
(source: JRC 2016. Notes: SEAP=sustainable energy action plan, GHG=greenhouse gas emissions)

In Latvia, by September 2016, 1 city (covering 0.01 million inhabitants) has committed to conduct vulnerability and risk assessment and develop and implement adaptation plans in the framework of the Covenant of Mayors for Climate and Energy.

8. Cohesion policy and EU clean energy investments

EU cohesion policy makes a key contribution to delivering the Energy Union objectives on the ground, including important investment possibilities to implement energy policy objectives in Latvia which are complemented by national public and private co-financing, aiming at optimal leverage. It also ensures integrated territorial solutions to energy and climate challenges, supports capacity building and provides technical assistance.

Over 2014-2020, cohesion policy is investing some EUR 459 million in energy efficiency improvements in public and residential buildings and in enterprises, as well as in in high-efficiency cogeneration and district heating, renewable energy and smart energy infrastructure (in relation to local gas and electricity connections for enterprises in industrial zones and connections of degraded territories to main networks of engineering communications of the city) in Latvia. Cohesion policy is also investing significantly in R&I and in SME competitiveness in Latvia, based on the national strategy for smart specialisation. For Latvia, the strategy includes a focus on smart energetics. At this stage, the allocations foreseen for investments in R&I and adoption of low-carbon technologies in Latvia are not specified, but should become available in line with the evolving content of the smart specialisation strategy. A further estimated EUR 630 million is invested in supporting the move towards an energy-efficient, decarbonised transport sector.



(source: DG REGIO)

These investments are expected to contribute to around 14,000 households with improved energy consumption classification, a decrease of around 50,100,000 kWh per year of primary energy consumption of public buildings and around 40 MW of additional capacity of renewable energy production, as well as to around 300 km of reconstructed or upgraded railway lines and 8 km of new or improved tram lines. Overall, the EU cohesion policy investments in Latvia over 2014-2020 are expected to contribute to an estimated annual decrease of GHG emissions of around 63,000 tonnes of CO_2eq.

For example, the Energy Efficiency Programme for Multi-Apartment Residential Buildings 2007-2013 was a traditional grant scheme, with partial reimbursement of investment costs). Total investments represented EUR 133 million, of which public funding from the European Regional Development Fund (ERDF) EUR 101 million (grants). The average reduction of heat consumption of supported apartment buildings has been 46% as comparing to a planned 15%, due to fact that project implementers have chosen multi-insulation works, thus achieving greater savings. For example, the project "Energy efficiency improvement measures for Multi-Apartment Residential Building in Venta Street 2, Liepaja" (total cost EUR 0.285 million, including EUR 0.143 million ERDF) resulted in total heat energy saving after the renovation of 74 kWh /m2 (53%). The total heat energy consumption of the building after renovation is 66 kWh/m^2 . The project duration was 2 years.

Another example is the project "Improvement of Heat for Multi-Apartment Residential Building in Bauskas Street 51, Riga (total cost EUR 0.156 million, including EUR 0.064 million ERDF), which resulted in total heat energy savings after the renovation of 66 kWh/m^2 (53%). The total heat energy consumption of the building after renovation is 60.3 kWh/m^2 and this is reflected into a strong reduction of heating costs for apartment owners. The project duration was also 2 years.

The Energy Efficiency Programme for Multi-Apartment Residential Buildings 2014-2020 includes both grants and financial instruments. Public funding, of which 85% from the European Regional Development Fund (ERDF), represents EUR 166 million and includes grants of EUR 121 million. Total investments will be around EUR 300 million, supporting an estimated 1,030 projects, with the goal of increasing energy efficiency in multi-apartment buildings leading to an energy consumption (for heating) of less than 90 kWh/m2 per year after renovation.

As another example, the project on environmentally friendly mobility in Latvia involves the establishment of charging infrastructure for electric vehicles, aiming to create a country-wide Latvian network of 150 electric vehicles charging points in line with the EU's alternative fuel infrastructure requirements (an estimated 747 electric vehicles registered for use across Latvia by 2023). Total investment of EUR 7.8 million, of which the European Regional Development Fund (ERDF) EUR 6.6 million.

Through its support to sustainable transport systems, the Connecting Europe Facility (CEF) also contributes to the goals of the Energy Union. Following Latvian participation in the CEF – Transport 2014-2015 Calls, the Latvian action portfolio comprises 8 signed grant agreements, allocating EUR 254.7 million of actual CEF Transport Funding to Latvian beneficiaries (state-of-play February 2017)[20]. The transport mode which receives the highest share of funding is rail (95.8% of actual funding). Latvia is participating in two multinational, cross-border rail actions, which are both dealing with the Rail Baltica line, the most significant and strategic Global Project of the North Sea-Baltic Corridor. The Latvian activities of these two CEF actions cover preparatory and technical studies combined with land acquisition and with the first set of works. A smaller share of the Latvian portfolio constitutes two multi-beneficiary air actions concerning the deployment of the SESAR Pilot Common Project, two multi-beneficiary maritime actions concerning hydrographic surveys for the Baltic Motorways of the Sea, as well as one mono-beneficiary air action contributing to the modernisation of the air traffic management (ATM) system in Latvia.[21]

[20] Note that European Economic Interest Groups and International Organisations are excluded from the analysis.
[21] Source: INEA