EUROPEAN
COMMISSION

Brussels, 23.11.2017
SWD(2017) 401 final

COMMISSION STAFF WORKING DOCUMENT

Energy Union Factsheet Lithuania

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

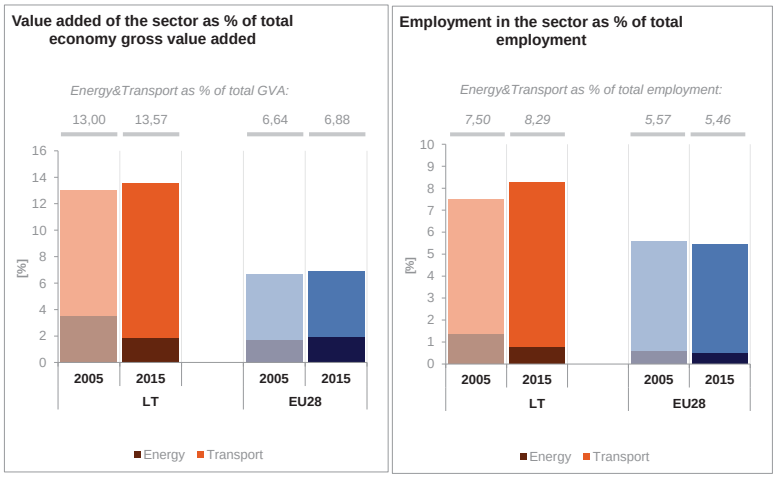
{COM(2017) 688 final} - {SWD(2017) 384 final} - {SWD(2017) 385 final} - {SWD(2017) 386 final} - {SWD(2017) 387 final} - {SWD(2017) 388 final} - {SWD(2017) 389 final} - {SWD(2017) 390 final} - {SWD(2017) 391 final} - {SWD(2017) 392 final} - {SWD(2017) 393 final} - {SWD(2017) 394 final} - {SWD(2017) 395 final} - {SWD(2017) 396 final} - {SWD(2017) 397 final} - {SWD(2017) 398 final} - {SWD(2017) 399 final} - {SWD(2017) 402 final} - {SWD(2017) 404 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}

Lithuania

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 13.6% of the total value added of Lithuania in 2015, twice as much the EU average. Similarly, their share in total employment[3] was 8.3% in 2015, of which 7.5% in the transport sector and 0.8% in the energy sector.



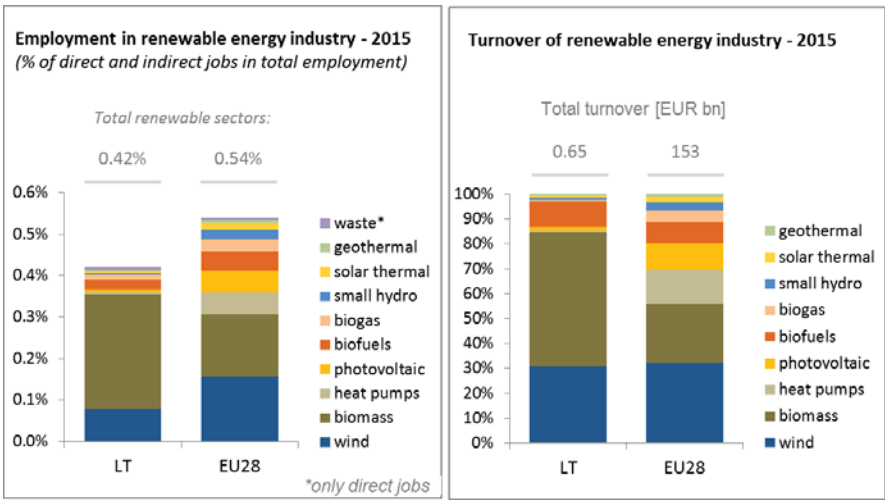
(source: Eurostat)

According to EurObserv'ER, in 2015, the share of direct and indirect renewable energy related employment in total employment of the economy in Lithuania was at about 0.42%. The turnover of the renewable energy industry in the same year was estimated at around EUR 0.65 billion, about more than half being attributed to the biomass (53.8% of total renewable turnover) followed by wind (30.7%) and biofuels industries (10%).

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

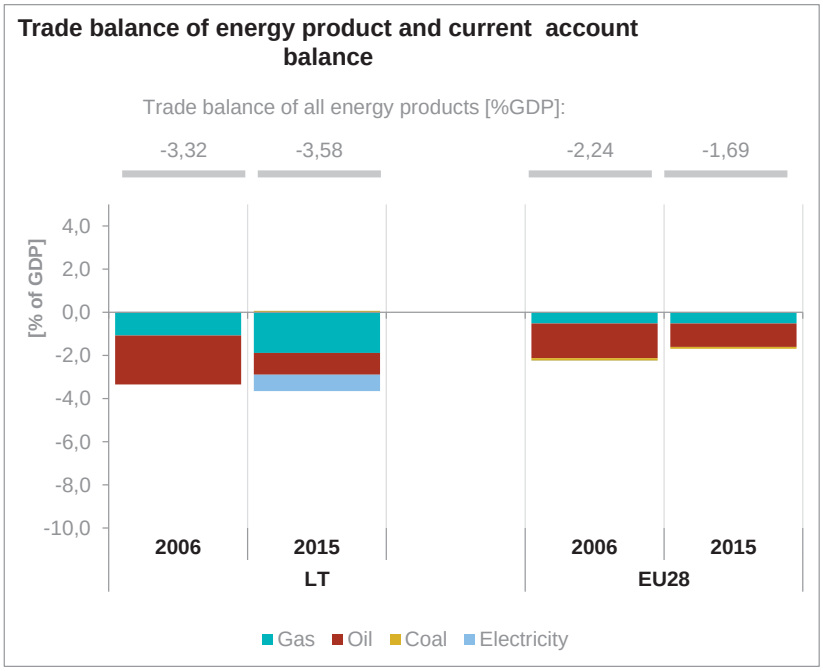
3 National Accounts, Eurostat



(source: EC based on Eurobserv'Er and Eurostat)

The decarbonisation of the energy and transport sectors will require significant investments and economic activity beyond the remit of these sectors themselves. 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.

In terms of the energy trade, Lithuania is a net importer of gas, fossil fuels and electricity. The trade deficit in energy products has remained broadly stable compared to 2006 at about 3.5% of GDP but the composition has changed significantly. Net imports of oil have fallen, whereas net imports of gas and electricity have increased.

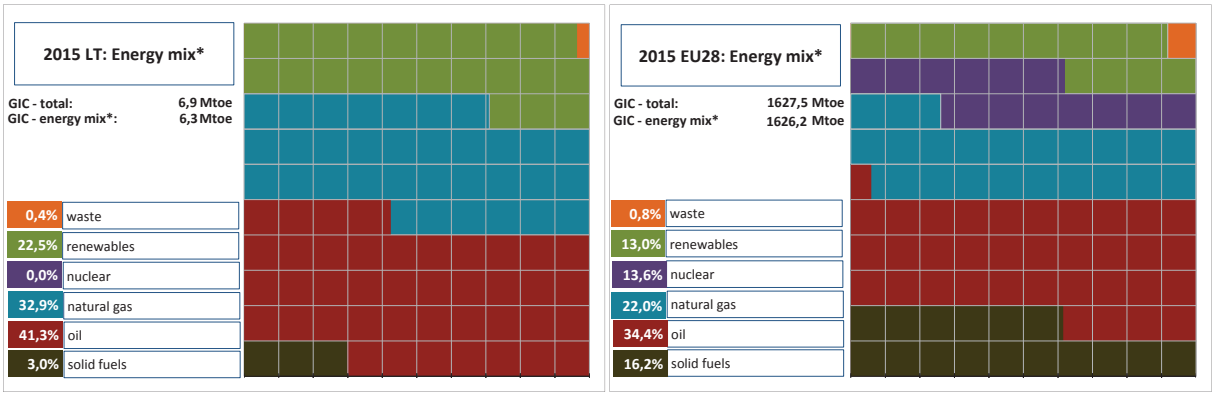


(source: Eurostat)

2. Energy security, solidarity and trust

2.1. Energy Mix

In comparison to the average energy mix of primary products in the EU, Lithuania's energy mix has a much higher share of renewable energy (22.5% vs 13.0%) and a higher share of natural gas (32.9% vs 22.0%). The share of oil (41.3% vs 34.4%) is slightly higher. Conversely, solid fuels have a much lower importance (3% vs 16.2%). Nuclear energy has no role in the energy mix due to the closure of the Ignalina nuclear power plant.



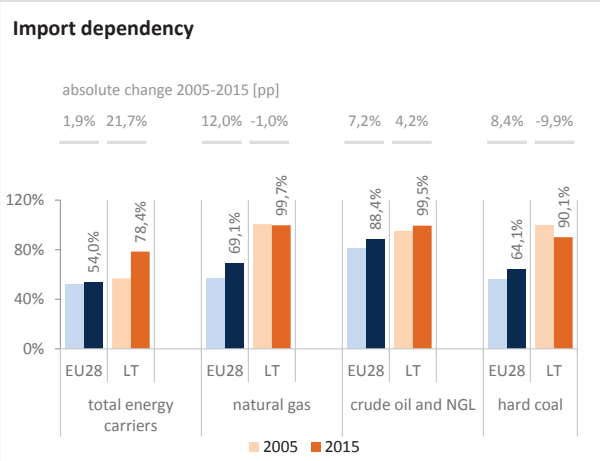
**energy mix as share share in GIC-excluding electricity and derived heat exchanges , GIC=gross inland consumption*

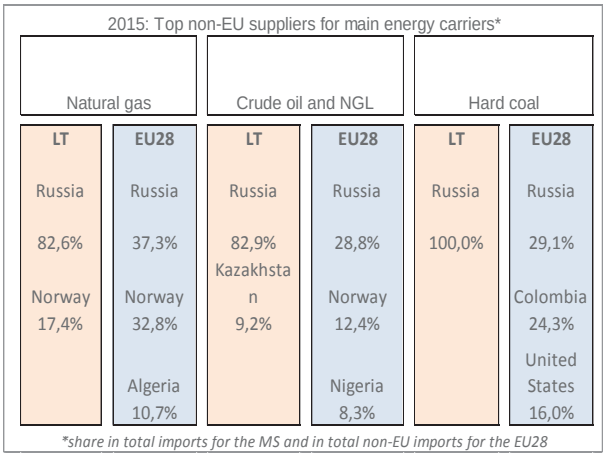
(source: Eurostat)

2.2. Import dependency and security of supply

78.4 % of Lithuania's energy consumption comes from imports, significantly higher than the EU average. This is mainly due to the dependence of natural gas, crude oil and NGL from Russia (82.6 % and 82.9 % of imports from non-EU countries, respectively). For natural gas, however, the LNG Terminal in Klaipeda, which was put in operation in December 2014, has allowed for significant diversification of gas import.

The overall import dependency of Lithuania increased about 21.6 p.p. between 2005 and 2015, whilst at the EU level, import dependency increased by 1.9 p.p. over the same period.

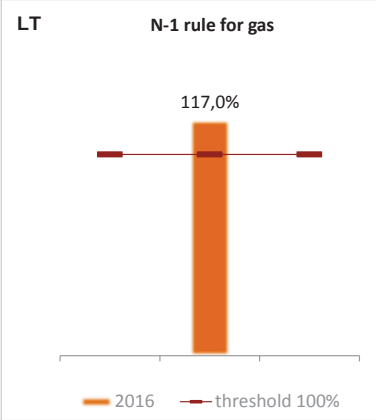




**share in total imports for the MS and in total non-EU imports for the EU28*

(source: Eurostat)

The security of gas supply regulation requires that, if the single largest gas infrastructure fails in one Member State, the capacity of the remaining infrastructure is able to satisfy total gas demand during a day of exceptionally high gas demand. Lithuania complies with this rule.

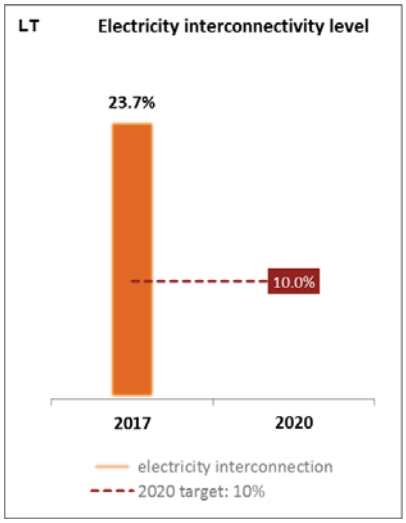


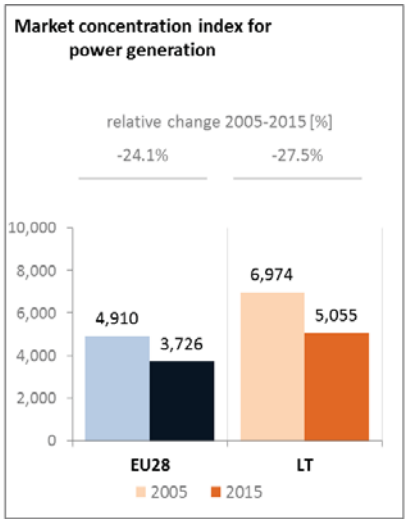
(source: gas coordination group)

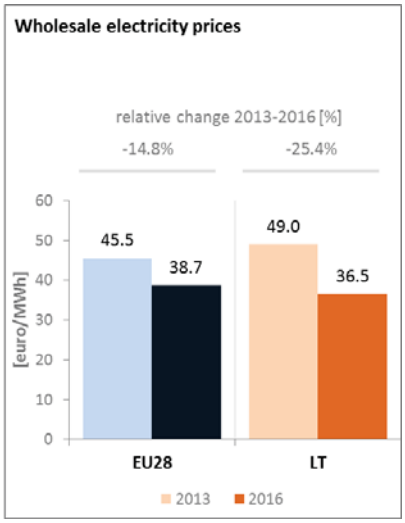
3. Internal market

3.1. Interconnections and wholesale market functioning

3.1.1. Electricity







(source: EC services based on ENTSOE European power exchanges) *source: EC services based on Eurostat* *source: EC services based on Platts and*

Lithuania is part of the Nordic and Baltic wholesale electricity market. The interconnection capacity 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 level[4] rose to the

[4] 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.

current 23.7% for the three Baltic States together. The launch of the NordBalt interconnection remarkably increased the connectivity of the Baltic States with the Nordic power market.

Better interconnections have increased competition and at the same time benefitted not only Lithuanian but also Latvian and Estonian electricity consumers.

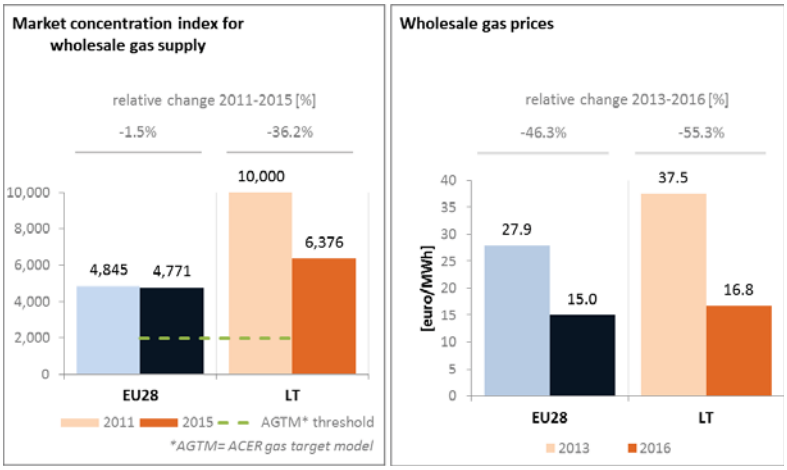
In 2015, the three Baltic States agreed on a common strategic goal: the synchronisation of their power systems with the European network. It is recognised as a self-standing objective of the reinforced BEMIP cooperation (Baltic Energy Market Interconnection Plan) as it would contribute to achieving a 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.

3.1.2. Gas

On the upstream gas market, until the opening of the Klaipėda LNG terminal and the signing of an LNG supply contract with Statoil, Gazprom was the only gas supplier to Lithuania and the whole Eastern-Baltic region. The Klaipėda LNG terminal significantly enhanced security of natural gas supply for all consumers in the Baltic States by providing an alternative gas supply source on the basis of full Third Party Access, thus ending Lithuania's single dependency on Russian gas. Klaipėda LNG terminal regasification capacities of 3.8 bcm/y (10.3 mcm/d) are sufficient to cover around 90% of all current demand of the Baltic States. The related gas pipeline (Klaipeda-Kursenai) was commissioned in November 2015. Furthermore, an agreement on a gas interconnector with Poland (GIPL) was reached in September 2015, and works are advancing.

The diversification of import sources via the new LNG terminal has had a positive impact on prices.

The gas market is 100% liberalised and customers are free to choose among gas suppliers, while the concentration on the wholesale market remains very high.

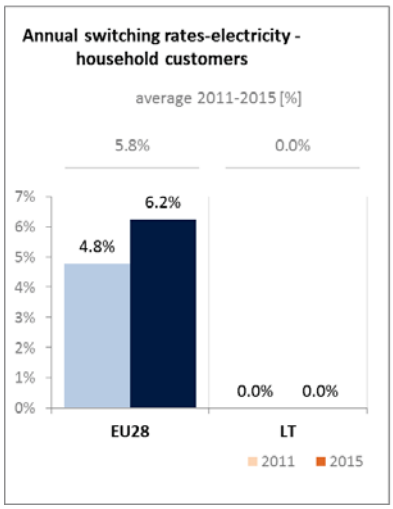


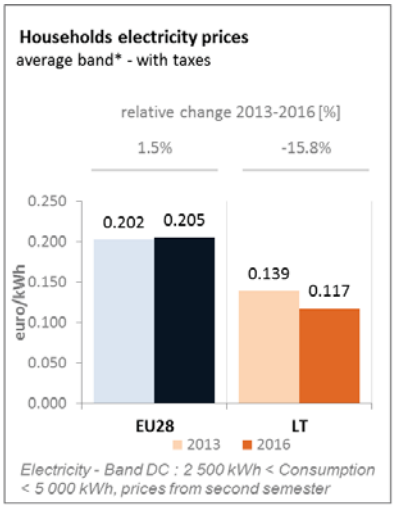
(source: ACER for the left graph and EC services based on on Platts, gas hubs, Eurostat for the right graph)

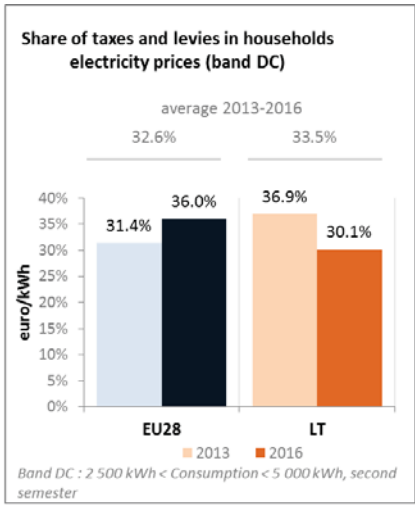
3.2. Retail electricity and gas markets

3.2.1. Electricity

In 2016, households' electricity prices in Lithuania were below the EU average. Between 2013 and 2016 average band retail electricity prices for households decreased, but to a lesser extent than the wholesale prices.





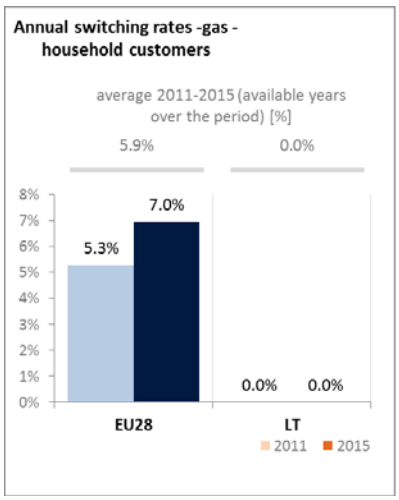


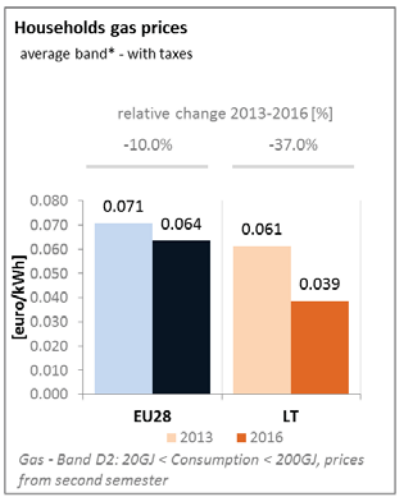
(source: ACER) *(source: Eurostat)* *(source: Eurostat)*

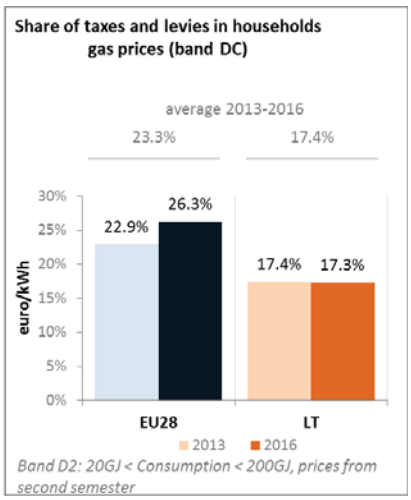
3.2.2. Gas

In 2016, household gas prices were slightly below the EU average. In the same year, the switching rate of gas household customers was inexistent (0 %), the same as for electricity.

Natural gas smart metering is planned to be installed in Lithuania, starting with a pilot project for large customers.



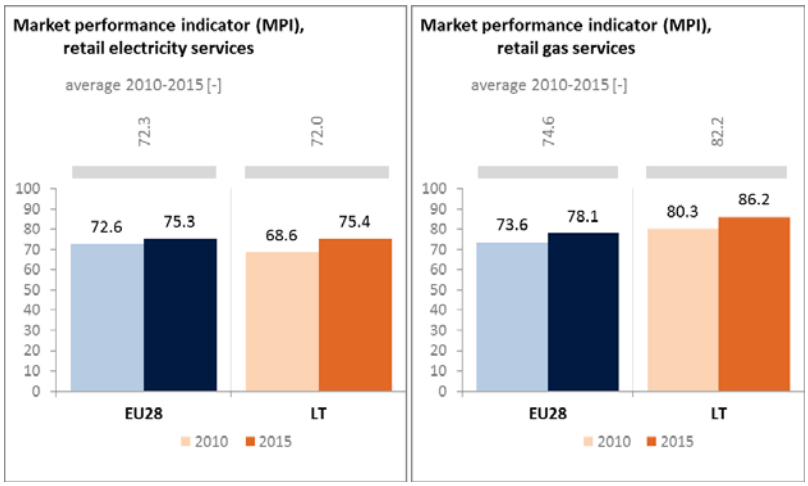




(source: ACER) *(source: Eurostat)* *(source: Eurostat)*

3.2.3. Market performance indicators

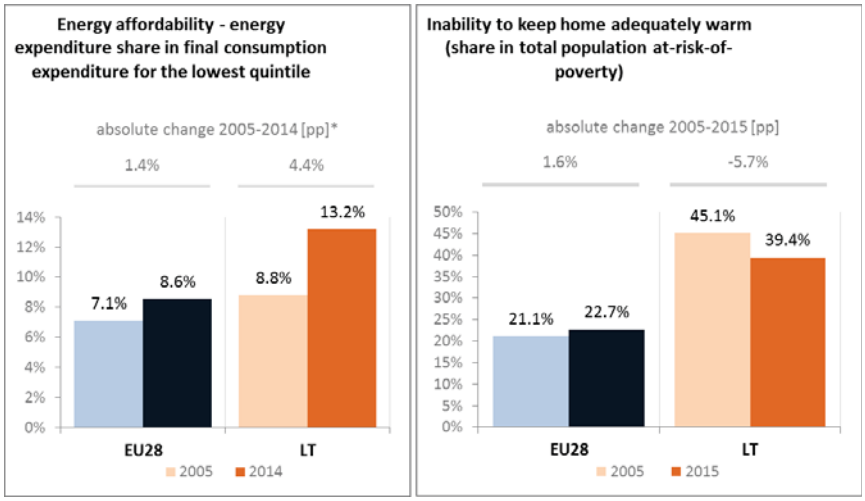
According to the periodical survey by DG JUST, Lithuanian consumers are slightly more satisfied than the EU average about the services received on energy retail markets.



(source: DG JUST survey)

3.3. Energy affordability

In Lithuania, climate conditions imply significant heating needs in EU comparison and the share of energy in total household expenditures of the lowest quintile of population is higher than the EU average. It is estimated that around 39.4% of households report that they are enable to keep their homes adequately warm. This figure is higher than the EU average.

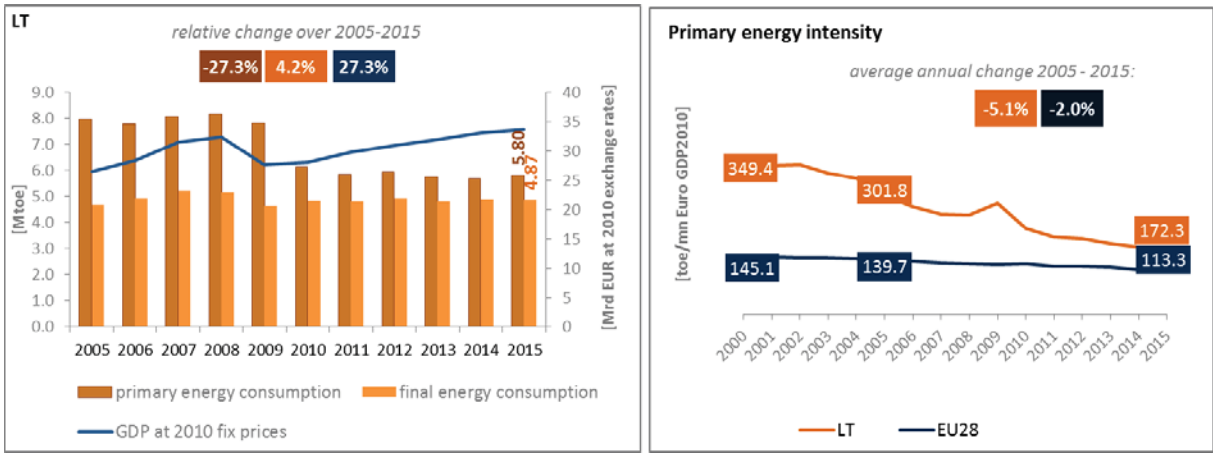


(source: ad-hoc data collection of DG ENER based on HBS with the support of Eurostat and national statistics)

4. Energy efficiency and moderation of demand

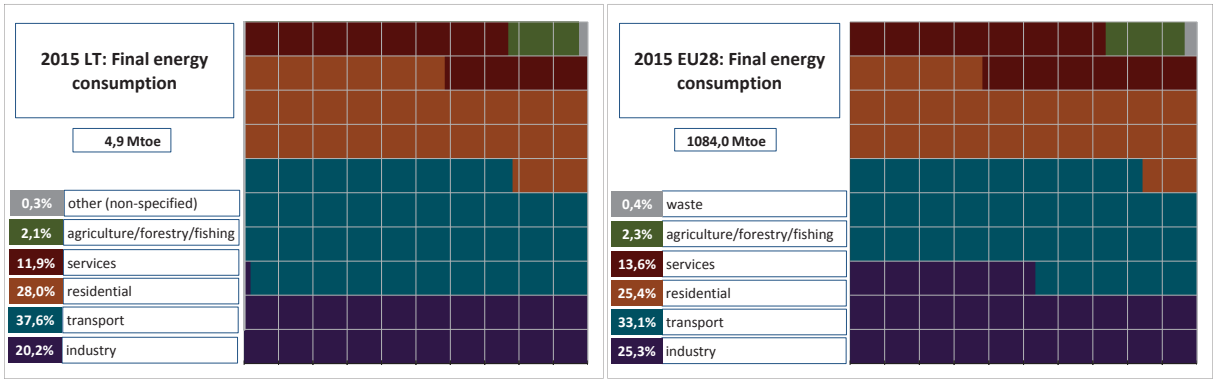
Primary energy consumption has been steadily decreasing in Lithuania and the current level (5.8 Mtoe in 2015) is already below the 2020 target for primary energy consumption (6.5 Mtoe). On the other hand, Lithuania's final energy consumption has been relatively stable and following a year-on-year increase of 2% in 2015 stood at 4.9 Mtoe. This is mainly due to an increase of the final energy consumption in the transport sector by some 28% during this period, offsetting savings in other sectors. Therefore, in order to reach its 2020 target for final energy consumption (4.3 Mtoe), Lithuania must further increase its efforts in promoting energy efficiency.

Although primary energy intensity decreased over the 2005-2015 period, it remains above EU average.



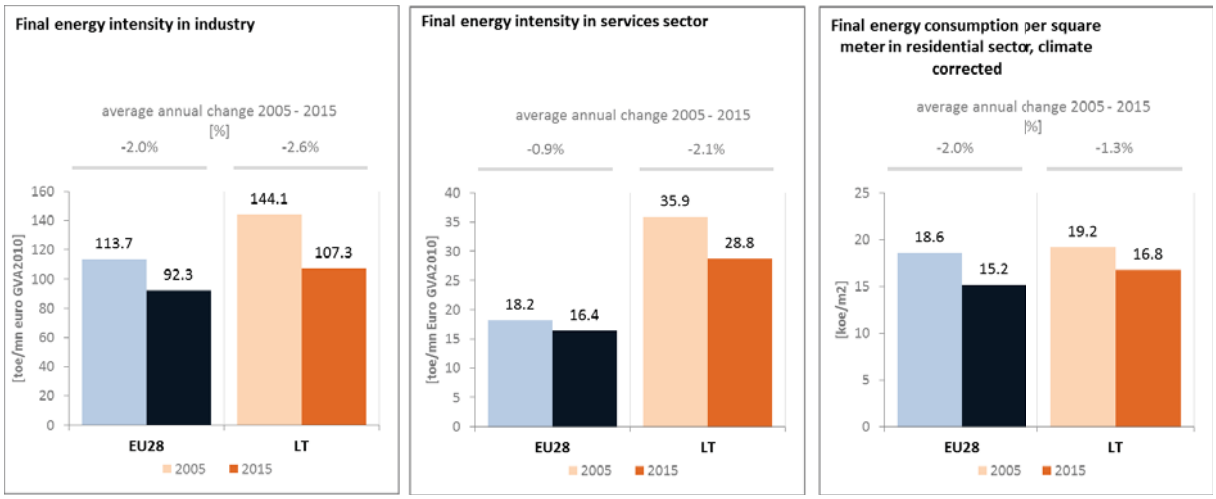
(source: Eurostat)

In 2015, the residential sector was the biggest energy consuming sector representing a 28% share in the total final energy consumption, which is above than the EU average (i.e. 25.4%). The energy consumption of Lithuania's transport sector was in 2015 at 37.6% in total final energy consumption, above the EU average of 33.1%. Finally, the energy consumption of the services sectors is below the EU average, with a share in total final energy consumption of 11.9%.



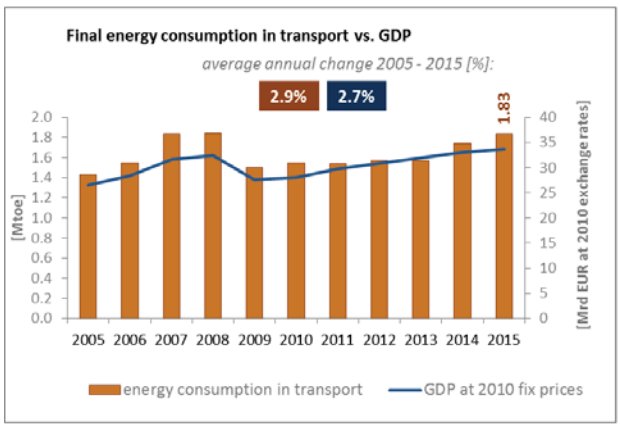
(source: Eurostat)

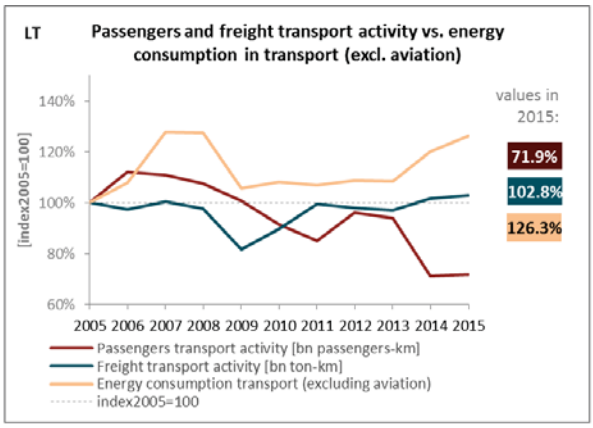
In terms of energy efficiency, some progress can be observed in the final energy intensity in industry and in the services sector as well as in the final consumption per m^2 for the residential sector.



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

Between 2005 and 2015, the final energy consumption in transport recorded an average annual increase of 2.9%, slightly higher than the 2.7% average annual increase of the GDP.

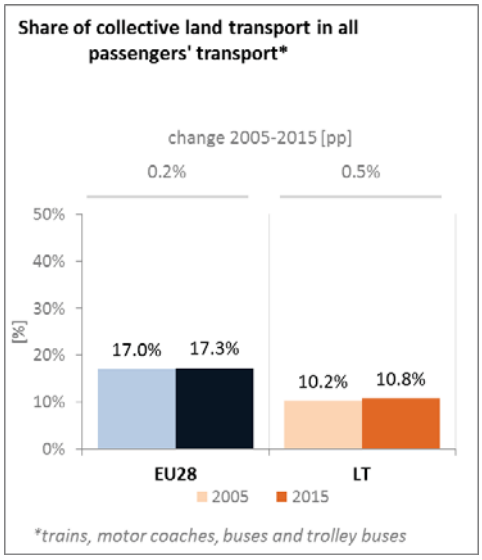




passengers transport activity=Private cars + bus + rail + tram & metro
freight transport activity=road+rail+inland waterways+pipeline

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

The share of collective passengers land transport into total passengers' transport increased between 2005 and 2015 indicating a higher use of public transport means.



(source: Eurostat)

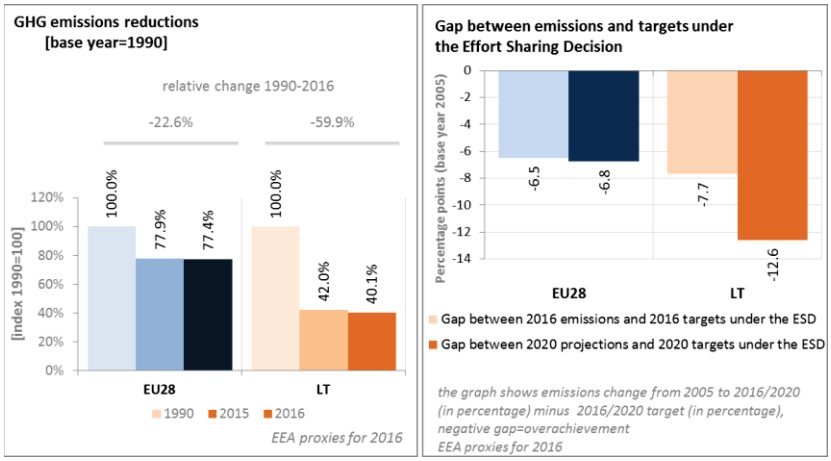
One of the key directions of the transport policy of Lithuania is to strengthen the interaction of different transport modes. In the field of carriage of goods, much attention is being paid to the intermodal transportation processes and technologies. The Lithuanian National Transport Development Programme (2014-2022) emphasizes need for a sustainable development of Lithuanian transport sector, effective management of state resources and structural funds of the EU, and enhancement of transport sector competitiveness. Main focuses are on increasing mobility of goods and passengers, improving the corridors of the core network of the EU Trans-European Transport Networks as well as their connections with national and local transport networks, and increasing the efficiency of multimodal transport.

Lithuania is facing challenges in meeting the European target for transport under the Europe 2020 strategy. The Lithuanian rail network remains among the least electrified rail networks in the EU. No progress has been observed over the period of 2010-2015 and only 6.9% of rail tracks are electrified. However, with the help of different financial and funding instruments significant progress is expected over the coming years.

5. Decarbonisation of the economy

5.1. GHG emissions

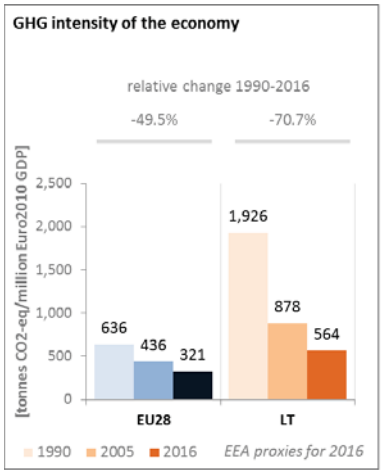
In 2016, GHG emissions in Lithuania were about 60% below their 1990 levels, and therefore, significantly below the EU average of 23% emissions reduction. Lithuania is expected to meet its GHG target under the Effort Sharing Decision by a margin of 13 percentage points.

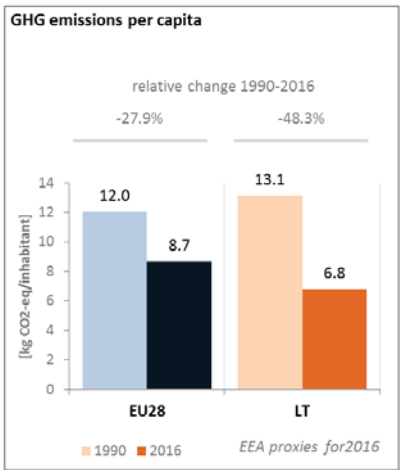


(source: EC and EEA)

However, according to 2016 EEA estimates, the GHG intensity of Lithuania's economy was above the EU average. Nevertheless, the GHG emissions per capita were well below the EU average.

In 2015, the largest sectors in terms of GHG emissions were the transport sector (25.4 % of the total GHG emissions) followed by agriculture (23.9 %), industry (22.8 %). In relative terms, the GHG emissions from residential and commercial sectors were well below the EU average (i.e. 5.2% vs 12.2%).



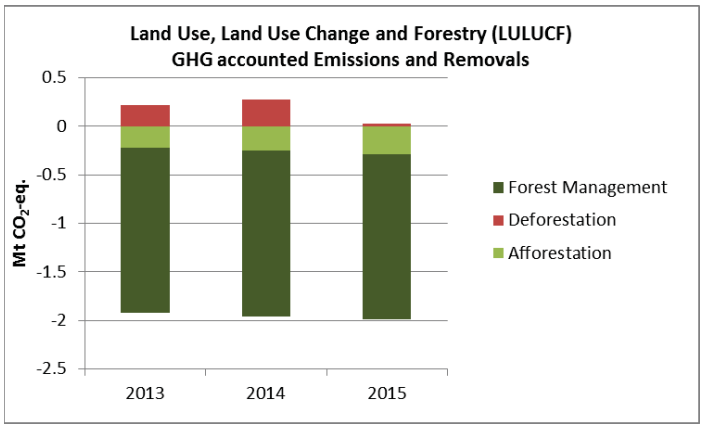


Largest Sectors of GHG Emissions in 2015	LT	EU28
Energy/power industry	17.2%	30.9%
Transport	25.4%	21.0%
Industry	22.8%	19.9%
Agriculture (incl. forestry & fishery)	23.9%	12.0%
Residential & Commercial	5.2%	12.8%
Waste	5.2%	3.2%
Other	0.2%	0.2%

(source: EC and EEA)

Preliminary accounts under the Kyoto Protocol for Lithuania show overall removals of 1.8 Mt CO_2eq. 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_2eq. It should be noted that in this preliminary simulated accounting exercise, removals from Forest Management were capped to 1.7 Mt CO_2eq per year, due to significantly exceeding the limit of the difference between the reported sink and the accounting forest management reference level.

The highest contributor to removals is Forest Management. Although smaller, removals by Afforestation have similar importance than emissions by Deforestation, expect for the year 2015 where accounted emissions were nearly zero. Overall, there is an increasing trend in removals, mainly due to declining emissions by Deforestation. Afforestation shows also increasing removals over the course of the three-year period.

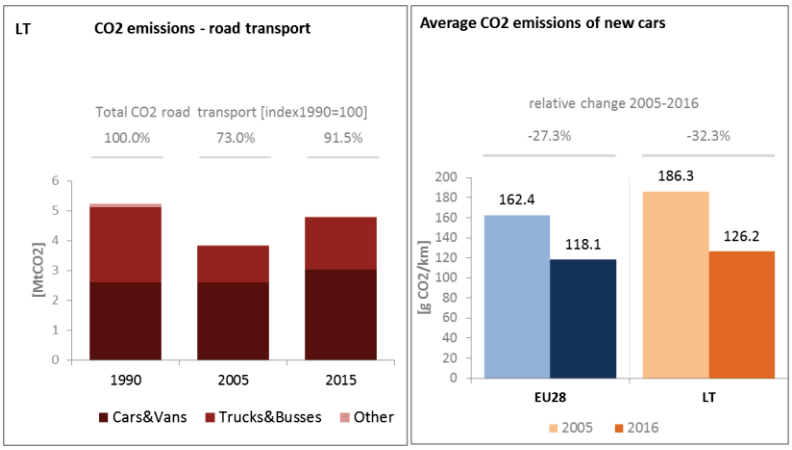


Note: Forest Management credits are capped and presented as yearly averages when the total Forest Management credits of the considered period exceed the simulated cap over the same period.

(source: EC and EEA)

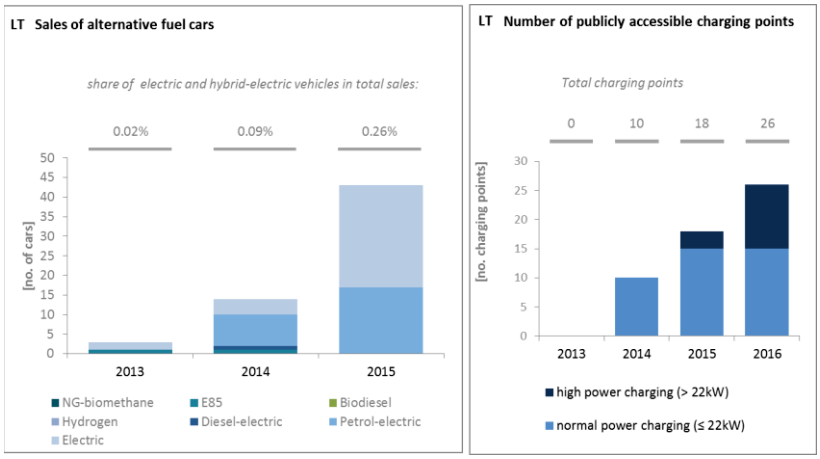
CO_2 emissions in transport and alternative fuelled vehicles

The average CO_2 emissions of new cars in Lithuania were in 2016 above the EU average but decreased substantially between 2005 and 2016.



(source: European Environment Agency)

The share of alternative fuel cars is increasing, but is still low. By 2016 only 26 publicly available charging points have been installed.



(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. Lithuania has submitted its National Policy Framework as requested under article 3 of the Directive 2014/94/EU.

A detailed assessment of the Lithuanian 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.

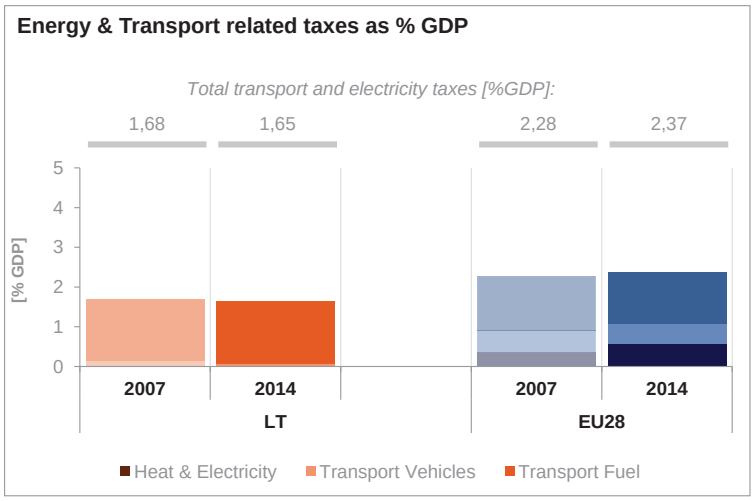
5.2. Adaptation to climate change

Lithuania adopted a 'Strategy for National Climate management Policy 2013-2050' in 2012. An Interinstitutional Action Plan on the implementation of the goals and objectives of this Strategy was adopted for the period of 2013-2020. The following priority sectors have been identified: energy, transport, industry, agriculture, landscape, spatial planning, ecosystems and biodiversity, fisheries

and aquaculture sector, forestry, tourism, groundwater resources, and waste management. Every two years, the Government of the Republic of Lithuania prepares a report on the implementation of the Strategy. The outcomes of the monitoring, reporting and evaluation scheme will feed into further development of the Action Plan and the update of the Strategy.

5.3. Taxes on energy and transport[5]

The overall tax burden on energy and transport in Lithuania amounts to 1.7% of GDP, which is considerably below the EU average and has remained at this level since 2007. This is explained by low revenue from taxation of heat and electricity as well as of transport vehicles. The tax burden on transport fuels is in contrast above the EU average. There is no CO_2 component in the taxation frameworks for energy products or vehicles in Lithuania.



(source: Eurostat)

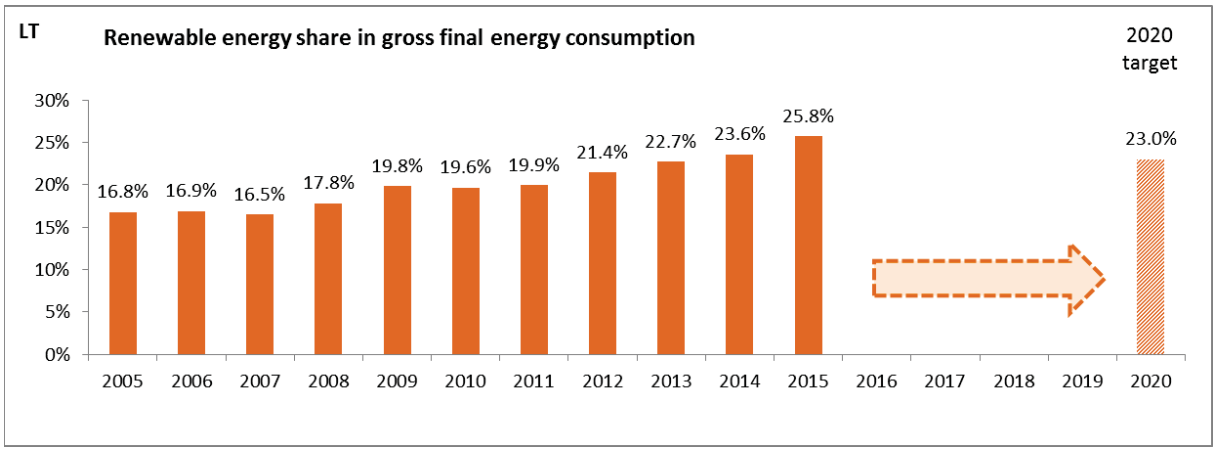
5.4. Renewable energy

Lithuania's renewable energy share, expressed in percentage of gross final energy consumption, was 25.8% in 2015, above its 2020 target of 23%.

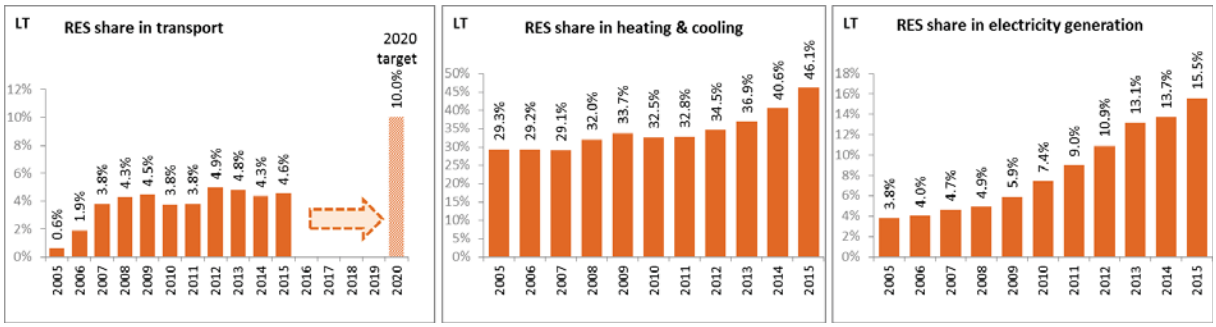
This good performance was driven mostly by the heating sector, where the share of renewables reached 46%, as opposed to a 39% renewables share anticipated for 2020 by Lithuania's National Renewable Energy Action Plan (NREAP). This reflects a strong growth during the last five years in the deployment of biomass via new investment in district heating and cogeneration, also helping raise the renewables shares in electricity production. Investment in geothermal, solar thermal and heat pumps remained however below the intended development. The large share of renewable heating using local biomass and new efficient, mostly CHP production facilities helped Lithuania to reduce heating costs to households and businesses in many localities, while at the same time reducing the dependence on imported natural gas from Russia, which it has been replacing.

Lithuania is however below the 2020 target of 10% for renewable energy share in transport, with 4.6% in 2015. Renewable energy in electricity generation is about 16%.

[5] There is no data on fossil fuel subsidies for Lithuania.

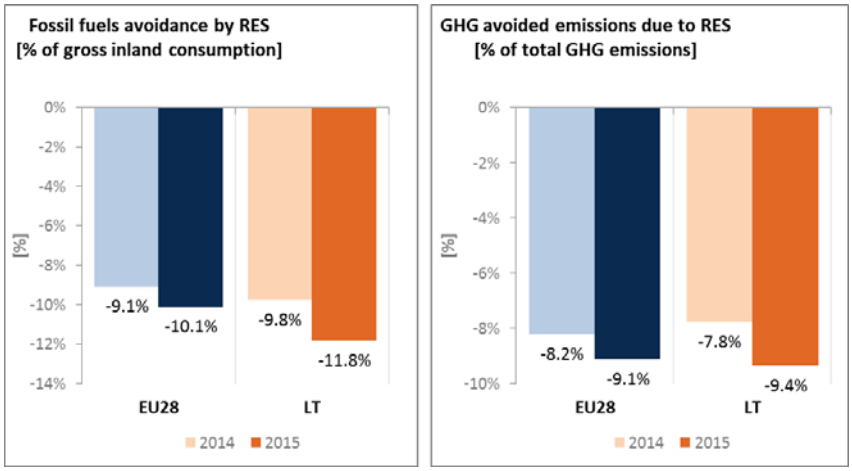


(source: Eurostat-SHARES)



(source: Eurostat-SHARES)

Due to a consistent deployment of renewables since 2005, it is estimated that Lithuania avoided in 2015 about 11.8% of the fossil fuel in gross inland consumption and about 9.4% of GHG emissions at national level[6].



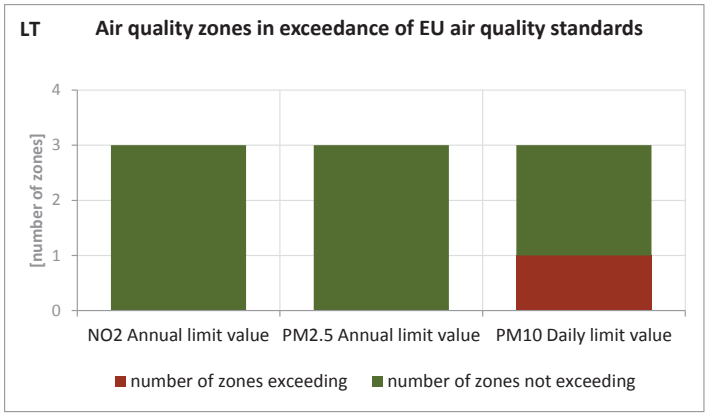
(source: EEA)

5.5. Contribution of the Energy Union to better air quality

Air quality in Lithuania continues to give cause for concern. For the year 2013, the European Environment Agency estimated that about 3,170 premature deaths were attributable to fine particulate matter ($PM_{2.5}$) concentrations[7].

[6] Avoided GHG emissions mentioned here have a theoretical character as these contributions do not necessarily represent 'net GHG savings per se' nor are they based on life-cycle assessment or full carbon accounting.

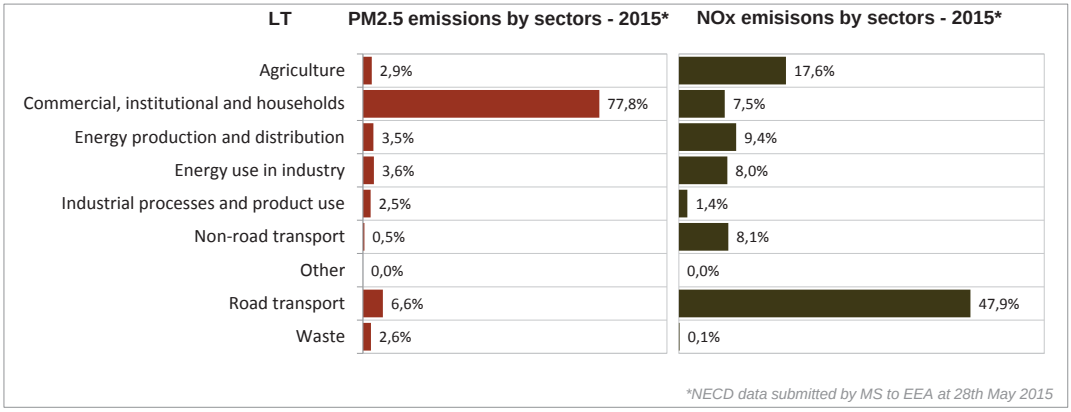
For PM, Lithuania reported exceedances of the binding EU air quality standard[8]. For the year 2015, Lithuania reported exceedances of the limit value for PM_{10} in 1 out of the 3 air quality zones in Lithuania as shown in the figure below.



(source: EEA)

The health-related external costs from air pollution in Lithuania have been estimated to be more than EUR 1 billion/year (income adjusted, 2010), which includes the intrinsic value of living a healthy life 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[9].

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[10].



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

[7] 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.
[8] 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
[9] See also the EU Environmental Implementation Review Country Report for Lithuania, SWD(2017)48 final of 3.2.2017
[10] 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/lt/eu/nec_revised

6. Research, innovation and competitiveness

6.1. Research and innovation policy

The main energy research areas funded by the Lithuanian government include the development of planning methods for the energy sector; the safety and reliability of power plants and their impact on the environment; efficient use of energy; and renewable energy sources. Priorities for future research include thermal physics; fluid mechanics and metrology; simulation of complex systems; development of new control methods; the effects of ageing on construction materials used in the energy sector; development of new multifunction materials; and combustion and plasma processes to save fuel, reduce environmental pollution and improve incinerator performance.

Lithuania is not a very active contributor to the ongoing work of the Strategic Energy Technology (SET) Plan. It only participates in one (out of fourteen) temporary working groups for the implementation of the integrated SET Plan, the one dedicated to nuclear safety.

Regarding the Horizon 2020 programme, Lithuania has so far received 0.1% of the EU contribution devoted to the 'secure, clean and efficient energy' part of the programme. As of September 2017, 27 participations from Lithuanian organisations have been awarded EUR 2.5 million in Horizon 2020 energy projects. This includes a grant of almost EUR 0.5 million to UAB MET for its participation in project SUSPIRE (energy recovery from residual heat) and another of also almost EUR 0.5 million to Geotherma UAB for its participation in project DESTRESS (geothermal reservoirs).

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

In 2014, public (national) investments in the Energy Union R&I priorities reached EUR 2.3 million having decreased by 12% compared to 2013. The largest share of these investments (51%) was attracted by the Sustainable Transport priority of the Energy Union, followed by the Efficient Systems and Renewables priorities (19% and 18%, respectively). In the period 2011-2014, the maximum annual public investment was EUR 4 million, reported in 2012. In 2014, the most recent year for which data from most Member States are available, public investment per GDP in Lithuania was lower than the EU average.

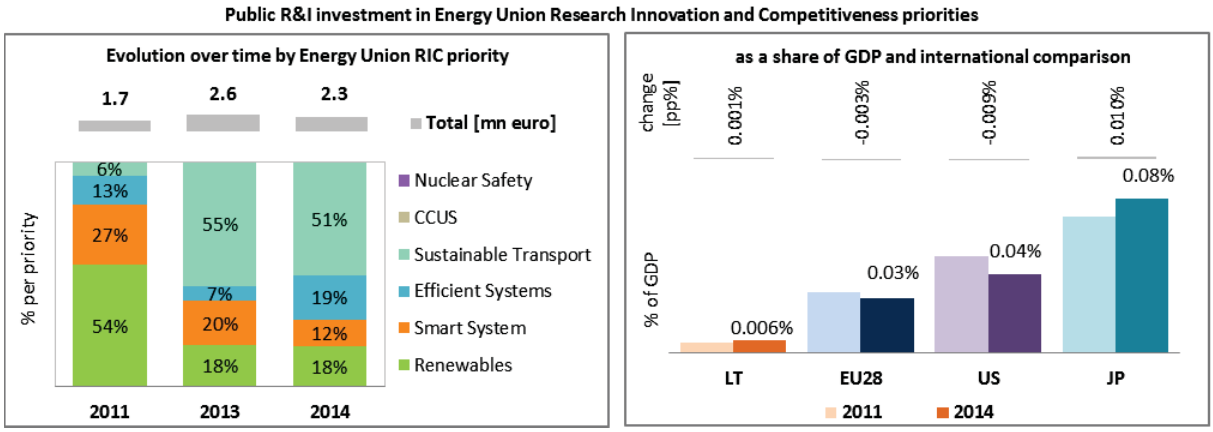
Private investment in the Energy Union R&I priorities in 2013 was estimated at EUR 10 million (0.06% of the private R&I investment in Energy Union R&I priorities in the EU). The focus was on the Smart Systems priority, which attracted all the investment.

In 2013, the most recent year for which complete patent[11] statistics are available, 5 companies and research organisations based in Lithuania filed 6 patents in low-carbon energy technologies (0.1% of the EU total). The focus was on the Smart System (83%) and Efficient Systems (17%) priorities.

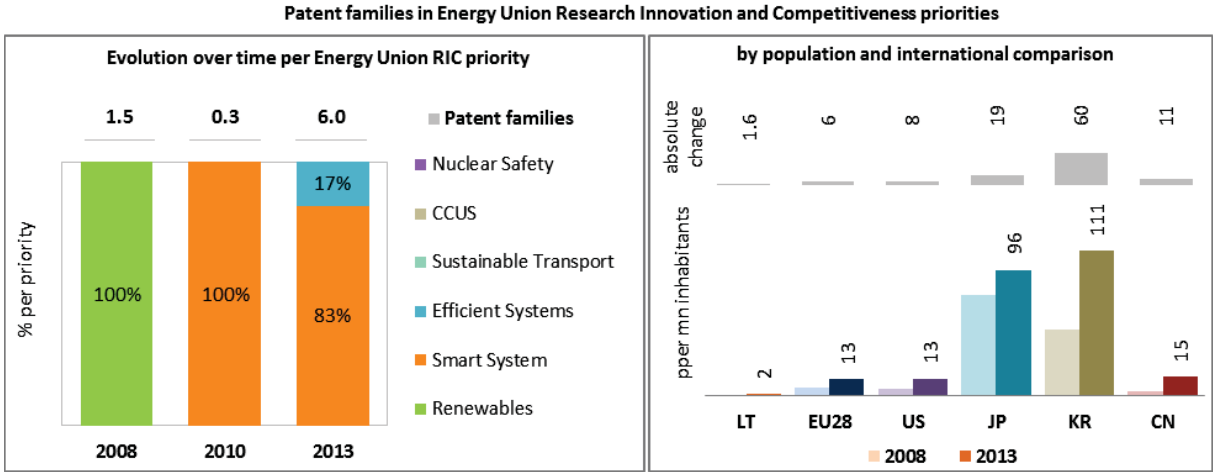
In 2013, both private investments and patents in Energy Union R&I priorities were lower than the EU average when normalised by GDP and by population respectively. In the period 2008-2013, both private R&I investments and the number of patents in Energy Union R&I priorities increased on

[11] 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.

average by 40% and 32% per year, showing higher rates of increase than the EU indicators (6% and 15% respectively).



Note: Data only available for the years 2011-2014 as collected by JRC SETIS.

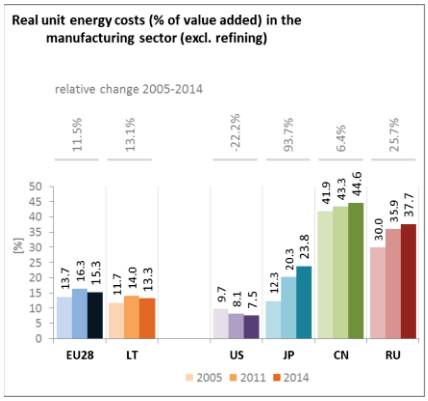


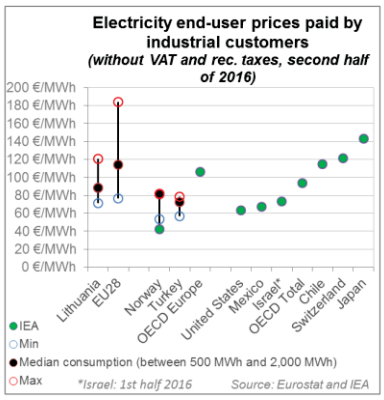
(Data sources: Public investment as collected by JRC SETIS for codes relevant to Energy Union RIC priorities. Patent data based on the European Patent Office PATSTAT database[12]. Private investment as estimated by JRC SETIS. Detailed methodology available from the JRC[13].)

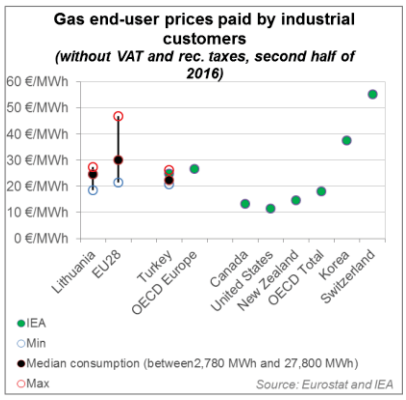
6.3. Competitiveness

In 2014, the real unit energy costs (RUEC)[14] in Lithuania (13.3) were below those at the EU average (15.3).

[12] https://www.epo.org/searching-for-patents/business/patstat.html#tab1
[13] https://setis.ec.europa.eu/related-jrc-activities/jrc-setis-reports/monitoring-ri-low-carbon-energy-technologies
[14] This indicator measures the amount of money spent on energy sources needed to obtain one unit of value added.

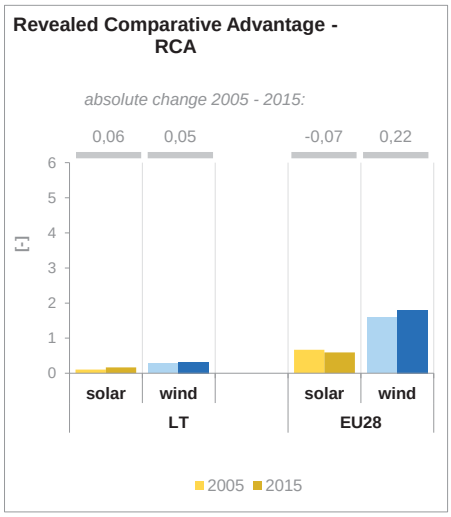


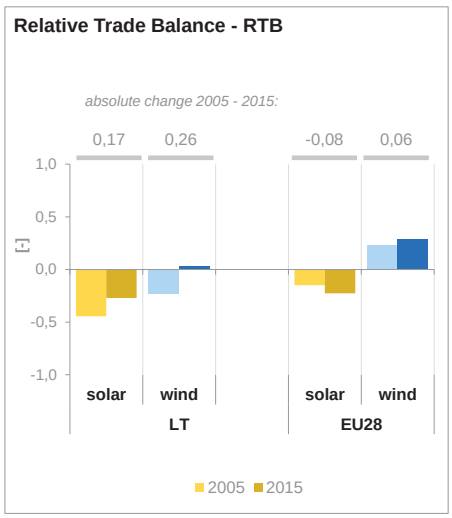




(source: ECFIN) *(source: Eurostat and IEA)*

Regarding the competitiveness in wind and solar energy, Lithuania has slightly improved over time but is performing well below the EU average in both sectors in terms of revealed comparative advantage[15]. The relative trade balance[16], however, shows that Lithuania is a net importer of solar energy components and has a small surplus in terms of wind technologies and components.





(source: UN comtrade)

7. Regional and local cooperation

Lithuania is part of the Baltic Energy Market Interconnection Plan (BEMIP). BEMIP's main objectives are to develop an internal and 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

[15] 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.

[16] 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.

structural funds, including the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Many infrastructure projects 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[17]. 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 Lithuania takes part can be used as a basis for regional cooperation on energy. Lithuania 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.

By 2016, in the context of the Covenant of Mayors, the sustainable energy action plans delivered by 14 Lithuanian municipalities had been assessed. Overall, these municipalities cover more than 1.4 million inhabitants. All together, these municipalities committed to reduce by 2020 the GHG emissions by 47.5% (as compared to 1990 baseline).

	No. of SEAPs submitted	Population covered by SEAPs [million]	Average GHG emissions [t CO2-eq/capita*year]		Relative GHG savings by 2020
Lithuania	14	1.39	Baseline emissions 4.14	by 2020 2.17	GHG -47.5%
European Union	5332	160.06	Baseline emissions 5.50	by 2020 4.00	-27.2%

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

In Lithuania, by September 2016, no cities have yet 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.

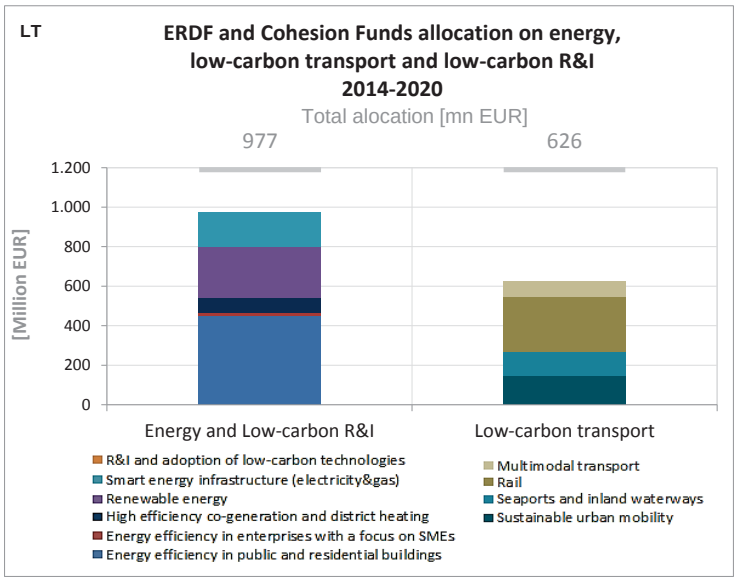
8. Cohesion policy and EU clean energy investments

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 Lithuania which are complemented by national public and private co-financing, aiming at optimal

[17] Regulation (EU) No 994/2010

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 977 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 Lithuania. Cohesion policy is also investing significantly in R&I and in SME competitiveness in Lithuania, based on the national strategy for smart specialisation. For Lithuania, the strategy includes a focus on energy and a sustainable environment priorities, namely (1) smart systems for energy efficiency, diagnostic, monitoring, metering and management of generators, grids and customers, (2) energy and fuel production using biomass/waste and waste treatment, storage and disposal, (3) technology for the development and use of smart low-energy buildings – digital construction and (4) solar energy equipment and technologies for its use for the production of electricity, heat and cooling. At this stage, the allocations foreseen for investments in R&I and adoption of low-carbon technologies in Lithuania are not specified, but should become available in line with the evolving content of the smart specialisation strategy. A further estimated EUR 626 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 30,000 households with improved energy consumption classification, a decrease of around 60,000,000 kWh per year of primary energy consumption of public buildings, around 470 MW of additional capacity of renewable energy production and 10 000 additional users connected to smart grids, as well as to around 70 km of reconstructed or upgraded railway lines and 20 km of new or improved inland waterways. Overall, the EU cohesion policy investments in Lithuania over 2014-2020 are expected to contribute to an estimated annual decrease of GHG emissions of around 680,000 tonnes of CO2eq.

For example, the Renovation of the multi-apartment buildings programme is one of the country's priority projects aimed at increasing energy efficiency of the most heat-intensive multi-apartment buildings. In 2014-2020, around EUR 314 million from the European Regional Development Fund (ERDF) will be invested through several financial instruments (loans and guarantees) into the modernisation of old inefficient multi-apartment buildings and building blocks. The expected results

of these investments include 30,000 families living in renovated homes with significantly reduced energy consumption (by around 60% in average) and smaller energy bills. Until now, about 1000 loan agreements have been signed with the final recipients, 750 multi-apartment buildings (over 19,000 households) have already been renovated, around 400 buildings are under renovation and another 700 buildings are in the pipeline. Possibilities of upscaling the available funding by attracting funding from the European Fund for Strategic Investments (EFSI) are being actively explored.

As another example, the South Baltic region is repositioning itself as a liquefied natural gas hub. The MarTech LNG project provided the crucial spark needed to unleash a range of investments in the LNG shipbuilding and bunkering sectors. As a result, today the region boasts a cross-border cluster of smart ports, shipbuilding yards, ship owners, technology firms and bunkering providers. During the course of the project, MarTech LNG trained 200 experts in using the latest technology. It also ensured the project's involvement in the leading LNG tradeshow, with project organisers successfully securing the involvement of the private sector. The contribution from the European Regional Development Fund (ERDF) amounted to EUR 1,088,532.

Through its support to sustainable transport systems, the Connecting Europe Facility (CEF) also contributes to the goals of the Energy Union. Following Lithuanian participation in the CEF – Transport 2014-2015 Calls, the Lithuanian action portfolio comprises 12 signed grant agreements, allocating EUR 368.8 million of actual CEF Transport Funding to Lithuanian beneficiaries (state-of-play February 2017)[18]. The transport mode which receives the highest share of funding is rail (84 % of actual funding). Lithuania has a considerable rail portfolio under the CEF programme. Apart from the involvement in a multinational study for the Rail Freight Corridor "North Sea – Baltic", the focus is definitely on the Rail Baltic line, the most significant and strategic Global Project of the North Sea-Baltic Corridor.

Lithuania has also enhanced its interest and activity in maritime transport actions compared to the TEN-T Programme. It seeks actively to integrate maritime transport better in the logistics chain by upgrading the Klaipeda-Karlshamn line and by promoting the use of LNG fuels.[19]

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