POWERTY

Renewable energies for vulnerable groups

STATE OF ART & SWOT ANALYSIS

Lithuania – January 2020

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STATE OF ART: ENERGY POVERTY AND RENEWABLE ENERGY

1. Brief Picture of the Region

Population of Lithuania

At the beginning of 2018, the resident population of Lithuania totalled 2.8 million persons, which is by 39 thousand less than at the beginning of **2017**. More than a quarter of the country's resident population lived in Vilnius county, one-fifth in Kaunas county. According to the census conducted in 2011, 83.4% of the population identified themselves as Lithuanians, 6.7% as Poles, 6.3% as Russians, 1.2% as Belarusians, and 2.3% as members of other ethnic groups. At the beginning of **2018**, there were 1,165 women per 1,000 men in Lithuania.

	Resident population, beginning of the year 2018			Area, beginning of the year 2018, km^2	Population density, beginning of the year 2018	Average annual population, 2017
	Total	Urban areas	Rural areas			
Total	**2808901**	**1884722**	**924179**	**65286**	**43.0**	**2828403**

The declining population numbers are to a certain extent influenced by international migration. In 2017, 20.4 thousand persons immigrated to Lithuania; there were 7.2 immigrants per 1,000 population.

2019, during the period from January to July, the number of immigrants to Lithuania exceeded the number of emigrants by 6.1 thousand and thus the total population has for a few months been on an upward path. Should similar migration trends persist in the second half of the year, Lithuania's population is expected to increase for the first time since 1992. However, the working age population is likely to further decline, albeit at a significantly slower pace. Such trends will be driven by the fact that older cohorts will leave the workforce in higher numbers than younger cohorts will enter it. More favourable migration trends are determined by several factors. The migration balance of Lithuanian citizens is mainly improved by Brexit and favourable labour market conditions in Lithuania, while the rapid expansion of the transport sector and changes in the Lithuanian immigration policy have led to approximately three times the usual number of immigrants from non-EU countries.

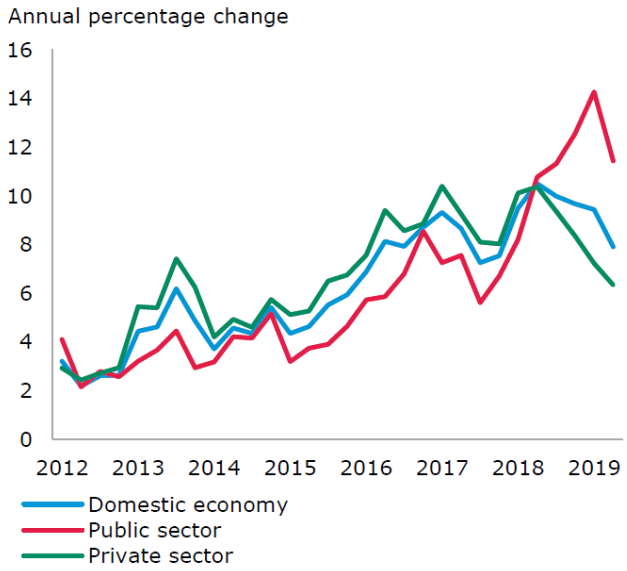
Looking at the internal migration within Lithuania, the constant trend over the past years is that more people moved into urban areas at the expense of rural areas in Lithuania.

Unemployment rate in Lithuania decreased to 7.90 % in October from 8 % in September of 2019. Unemployment rate in Lithuania averaged 8.46 % from 1995 until 2019, reaching an all-time high of 15.30 % in July of 2010 and a record low of 2.70 % in June of 2007.

Income and Expenditures

In **2018**, Lithuania's GDP was increasing rapidly (3.4%), yet slower than in 2017 (4.1%) due to weaker global growth. In 2018, the decline in global demand was to some degree outweighed by higher private consumption, mainly driven by the upturn in wages (9.7 %) resulting from pressures in the labour market and higher salaries in the public sector. This boosted the purchasing power of households, improving their expectations for the future and thus contributing to their stronger inclination towards borrowing.

In the second quarter of **2019**, the average wage stood at €818 (€1,289 before tax), according to Statistics Lithuania. Compared to the same period last year, wages grew nearly 17 % in the public sector and 12 % in the private sector. In the first half of 2019, wage growth stood at 8.7%. Wage growth in the private sector moderated from 8.8% to 6.8% and this may be partly attributed to the fact that labour shortages are no longer increasing; however, this moderation was also underpinned by the fading effect of the floor for social insurance contributions introduced at the beginning of 2018. An opposite trend was observed in the public sector where wage growth significantly accelerated, currently being almost twice as fast as in the private sector. This comes on the back of around 11-15% increases in wages for all main groups of the public sector, namely public administration, education and healthcare workers.



Despite Lithuania's household income inequality being among the highest in the European Union (EU), income inequality in Lithuania is high compared to the EU average. The number of employed household members in Lithuania's households affects income inequality more as compared to the EU. It is related to a larger labour income, and self-employment income in particular, contribution to inequality in Lithuania as opposed to the EU. Moreover, transfers and taxes have a smaller impact on reducing inequality in Lithuania than in the EU.

Building sector in Lithuania

Buildings account for approximately 40% of the energy consumption and 36% of carbon dioxide emission in the European Union (EU). While approximately a third of the EU's building stock is over 50 years old, just 0.4 – 1.2% is renovated each year.

The EU is highly dependent on energy imports, with import dependency reaching 53.5% in 2014 (Eurostat). The dependency rate of natural gas, which is the dominant energy carrier for heating in buildings at the EU level (although this varies significantly across the MS), was 67.4% (JRC, 2015). Imported gas dominantly originates from Russia and Norway, whereas eastern and Baltic

Member States are highly exposed to any disruption of Russian gas supplies. Clearly, renovation of the EU's existing building stock would reduce the need for energy, especially gas, imports, thus improving European energy security. Due to the dominance of fossil fuels for heating purposes (37% of space heating consumption comes from fossil fuels in EU residential sector in 2014, ODYSSEE database), buildings sector is responsible for 38% of the EU's total CO2 emission (JRC, 2015). Given the fact that buildings in Europe are more likely to be refurbished than replaced, energy renovation based on energy sufficiency and energy efficiency measures combined with the use of renewables is essential for reaching climate goals at the EU level.

Energy poverty is a growing problem at the EU level. It denotes the situation where consumers, due to inability to cover energy costs, dominantly heating, compromise on the comfort level in their dwelling. Poor quality of dwellings has significant influence on energy consumption and related bills, leading consumers, to fuel poverty. In 2012, 11% of European population was unable to keep their homes warm in the winter (JRC, 20151). This is especially the case in the MSs with per capita GDP below the EU average. Therefore, reducing energy needs of buildings and consequently the energy bills of the households is essential for alleviating fuel poverty and achieving social and territorial cohesion at the EU level.

Public buildings sector description

The Energy Efficiency Directive (EED) and the Energy Performance of Buildings Directive (EPBD) the public sector's leading role and example-setting obligation is determined. In the EED this obligation focuses on an annual 3% renovation duty or, alternatively, an equivalent energy savings target for central government buildings. This allows for the development of national best practices and serves as a visible example for a wider public.

Additional requirements for public sector buildings are established in the EPBD. These include mandatory energy performance certification and public display of certificates, as well as an earlier date at which all new buildings owned and occupied by public authorities should be nearly zero-energy buildings. Furthermore, the EPBD also requires governments to encourage public authorities to implement the recommendations included in energy performance certificates.

Pursuant to the provisions of Article 5 of EED, authorities have developed the national energy efficiency programme for public buildings, appointed institutions in charge of programme implementation, supervision and management, and allocated funds. Nevertheless, no buildings have been renovated under the previously mentioned programme as of January 2018. Since investments in renovation of public buildings are paid back in 30-40 years and the renovation being financed with a repayable assistance model, authorities were not interested in the renovation of buildings. To reach the implementation of the objectives set out in the Directive, public sector entities are obliged to renovate a concrete amount of building area.

According to the data of the State Enterprise Centre of Registers, as at 1 January 2014, 13 123 public buildings owned by the state and municipalities were registered in the Real Property Register. The approximate floor area of these buildings is 14.8 million m2. About 5 500 buildings (5.9 million m2) are owned by the state. About 7 600 buildings (8.9 million m2) are owned by municipalities.

Approximately 89 per cent of these buildings were built in the period 1900–1990 when the construction of brick and large-block buildings prevailed. These buildings do not meet the current energy efficiency requirements for buildings, nearly 2 300 GWh of heat energy on average is used annually for heating them. Such buildings, in terms of energy performance classes of buildings, are assigned to the classes D, E, F and G, while the annual heat consumption in them, expressed in terms of kilowatt-hours per square metre of useful floor area, is from 160 to 610 kWh/m2. Due to low energy efficiency, high maintenance and operating costs of public buildings, the cost of the public services being currently provided is correspondingly higher.

Municipalities own more than a half of public buildings of which public buildings for culture, education and sport purposes comprise the largest part. Public buildings for administration purpose account for one third of the total number of public buildings owned by the state.

National property, which also includes public buildings, can be owned by the state, which is represented by the Parliament of the Republic of Lithuania and the Government, and municipalities. Ministries, other budgetary institutions, state enterprises, agencies and organizations can dispose and use public buildings owned by the state by the right of trust. Municipal institutions, municipal enterprises, agencies and organizations can dispose and use public buildings owned by municipality by the right of trust. Public establishments, limited liability companies, and public limited liability companies established by the state or municipalities and/or their side institutions can own public buildings. Nevertheless, the final owner is the shareholder of a company or the establisher of a public establishment: the state or municipality.

Most of the buildings are heated using central heating systems. In rural areas buildings are heated using local boiler.

2. Renewable energy sector. Brief Description

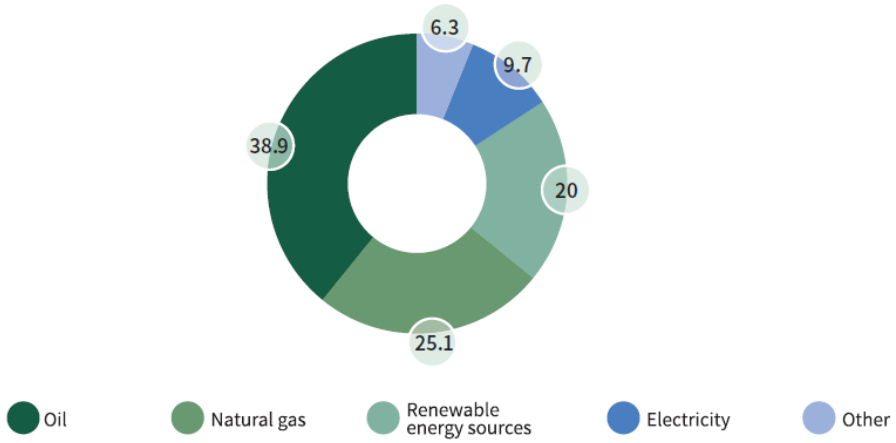
The objective of Lithuania's energy sector is to meet the needs of the state of Lithuania, its citizens, and businesses. The efficient use of energy resources and energy is one of Lithuania's key long-term strategic objectives in the energy sector. Energy saving is a challenge for the state and each of us. It's not easy to change habits, residents need to be clarified that an energy efficiency measures will give us not only savings, but also save our money. This is also important for the state, as our rational and economical use of energy resources contribute to enhancing Lithuania's energy independence and combat global warming.

In recent years, there has been an increasing interest in energy efficiency projects. Investments in energy efficiency bring a number of significant benefits, e.g. lower energy costs, reduction of a country's CO_2 emissions, improvement in a country's trade balance (through reduction of energy imports), etc.

The dominant fuels are natural gas, firewood, and other wood waste fuels. Following the 31 December 2009 closure of the Ignalina Nuclear Power Plant, the country's main source of electrical power has been the natural gas-fired Elektrėnai Power Plant. Lithuania now depends on imports.

ENERGY RESOURCE CONSUMPTION TRENDS

Total consumption of fuel and energy in Lithuania in 2016, %

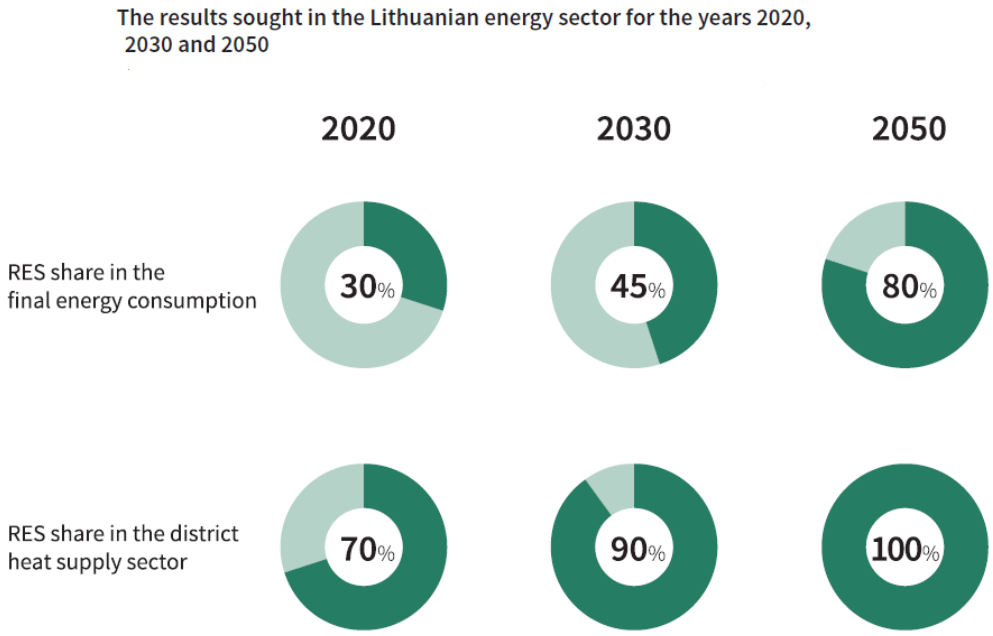


Source: Lithuanian Department of Statistics.

The National Energy Independence Strategy of the Republic of Lithuania was approved by the Parliament of the Republic of Lithuania on 21 June 2018. It states that energy costs account for a significant share of industry costs and household budgets. The global trends, including energy decarbonisation, market integration, digitalisation, urbanisation, need for enhanced energy efficiency, and development of technologies for the production and distributed energy generation of renewable energy sources (hereinafter referred to as the RES), necessitate changes in the energy sector.

Therefore, the state will drive the energy sector toward meeting these global trends and the energy interests of its citizens and businesses. Energy prices will form in an effective market, which will be common with the other EU Member States. The country's energy infrastructure will be used effectively, ensuring that the share of the cost of the infrastructure in the final energy price does not exceed the average for the EU Member States, while tariff patterns provide conditions for industrial investments.

As technologies develop, the share of RES energy will be increasing due to more participants in the market. In 2020, 30% of the country's total final electricity consumption will be from RES; in 2030, 45%, and in 2050, 80%. **RES will become the main source of energy in electricity, heating and cooling, and transport sectors**.



The main objective of the Strategy in the field of RES is to continue to increase the share of RES in domestic energy production and total final energy consumption, thus reducing the dependence on fossil fuel imports and increasing local electricity generating capacities. Although RES technologies are constantly improving and the cost of equipment decreases, RES-generated energy produced in newly-installed plants is currently not yet able to compete in the market. Therefore, the production of RES energy is and will continue to be supported until the economically and technically acceptable RES development limit is reached, focusing on the proactive participation of RES energy producers under market conditions, or until the production of RES energy reaches market value.

The National Energy Independence Strategy of Lithuania sets the goal to **double electricity generation from renewable energy sources (RES) and to increase generation from local sources.** For this purpose, at the end of 2018, the Parliament approved the **amendments to the Law on Energy from Renewable Sources**. Amendments establish a **new support model for the promotion of power plants that use RES**. The essence of the support mechanism is transparent, open and technologically neutral auctions (excluding off-shore wind though). Features of new support system – technology neutrality, all RES producers compete for 300 GWh quota, only new installations, competitive support allocation (auctions 12 years support), market premium, winning criteria (lowest offered premium) and ceiling price.

District Heating Sector

At present, the services of heat supply provided by 52 companies (the number is variable) are regulated in Lithuania. And also there are 44 independent heat producers (22 non-regulating). One market participant acted as market operator.

In Lithuania the supply of thermal energy is regulated up to the boundary of ownership with a user. Usually it is up to the input of a heating main into a building. Production of thermal energy, transmission and distribution of thermal energy, as well as the trade of thermal energy are regulated in the sector of thermal energy supply.

At present, in the market structure of the fuel used for the heat energy production the share of natural gas constituted ~39.5%, the market share of biofuel ~58.7%.

Heating and cooling system

The country's district heating system (DHS) is an integral part of the overall energy sector, closely tied by technological and energy ties to the electricity system, fuel supply and other systems. Well-developed district heating systems are in place in all Lithuanian cities and supply about 53% of all buildings nationwide and about 76% of all buildings citywide. The main users of DHS are residents living in multi-apartment buildings.

In **2016**, 17,840 buildings (about 700 thousand apartments) with DHS supply of 27,359 total consisted of multi-apartment houses, where heat sales amounted to about 72.6% of the total amount of heat sold. The remaining users are budgetary institutions (14%) and business organisations (13.9%). As natural gas has been rapidly replaced by biofuels since 2011, the price of DHS has decreased, but the key issue, namely inefficient heat consumption, remains relevant. In 2016, a total of 8.9 TWh of heat energy was produced and supplied to the networks. It is estimated that as the number of district heating customers grows, accompanied by rapid investments in more efficient energy consumption, by 2020 district heating systems will supply 8.9 TWh, by 2030 – 8.5 TWh, and by 2050 – 8.0 TWh of heat energy. The total installed capacity of heat generating facilities in DHS systems is 9582 MW. In 2016, the share of RES-generated heat facilities in the fuel structure was 64.2%, while the share of natural gas decreased to 33.4% (natural gas remains the main fuel for energy 8 The Republic of Lithuania Law on Recognition of the Nuclear Power Plant under Construction in the Ostrovets District in the Republic of Belarus as Unsafe and Posing a Threat to the National Security of the Republic of Lithuania, its Environment and Public Health. 28 production in Vilnius and Klaipėda). In 2016, about 55 MW worth of new biofuel-fired facilities were built in Lithuania, which will further promote the development of the local biofuel market and reduce the final price of heat to consumers accordingly. In 2016, 3.6 TWh of heat energy was generated in CHP plants. It accounted for about 41% of the total heat energy produced in the DHS system.

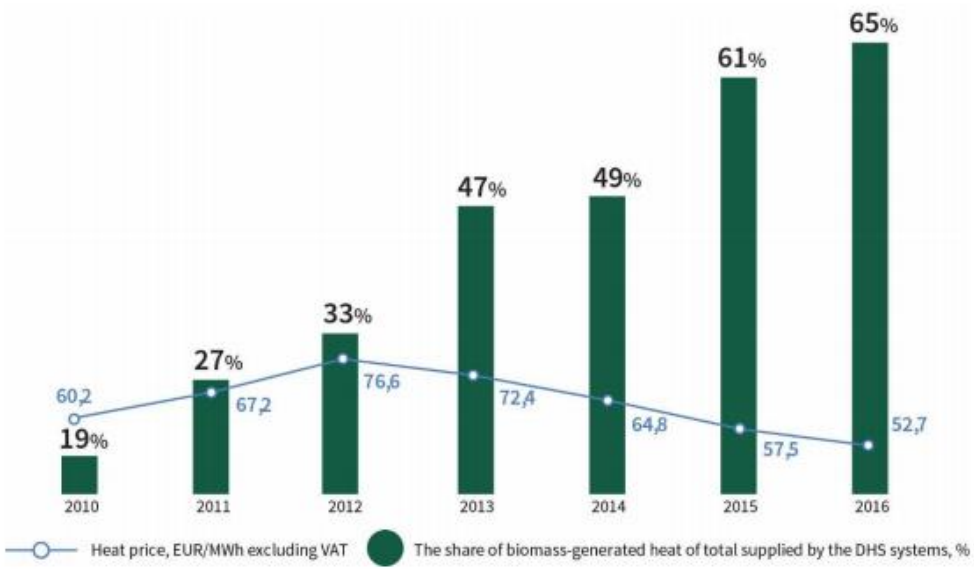
In implementing the **National Programme for Heat Sector Development in 2015–2021**, approved by the Government of the Republic of Lithuania on 18 March 2015 by Resolution No. 284 "On the approval of the National Programme for Heat Sector Development in 2015-2021", high-efficiency biofuel- and municipal waste-fired Vilnius CHP plant with a heat capacity of 229 MW and an electricity capacity of 92 MW, and a waste fired Kaunas CHP plant with a heat

capacity of 70 MW and an electricity capacity of 24 MW power plant by 2020 Kaunas waste heat generating power plant burning waste are expected to be built. These CHP plants are expected to satisfy around 40% of Vilnius and Kaunas district heat needs. Existing requirements for district heating systems to maintain a reserve capacity corresponding to the capacity of the largest boiler in a particular system but not exceeding 30% of the maximum system capacity, and the installed high surplus capacities of heat generating sources, resulting from significantly lower heat needs and the commissioning of new sources, force to reduce the installed capacities that require running costs, while ensuring the necessary capacity reserve and reliable heat supply to consumers.

In **2015**, private households not connected to district heating systems used up 686 kt of fuel for the production of heat energy. It is almost the same amount of fuel (790.2 kt of fuel) that was used by companies in 2016 for the production of district heat supply, including fuel for purchased energy. Heat production in households mainly uses firewood and wood waste: in 2015 they accounted for 72.4%, natural gas – 14.8%, liquefied petroleum gas and gas oil – 1.67%, solid fuels (coal, peat, briquettes) – 7.48%. About 88% of all fuel is consumed for heating and hot water and 12% for food production. It is estimated that 600 kt of fuel will be consumed in private households for heat production in 2020, 560 kW of fuel in 2030, and 530 kW of fuel in 2050.

The efficiency of heat and hot water production technologies in the decentralised sector is quite low and there is a significant potential for energy savings. This sector also has the potential of converting primary energy resources that can significantly improve the heat supply of the population and promote more efficient use of RES part of which could be used in other sectors. The centralised cooling network in Lithuania is not developed. Residential and commercial premises are cooled independently, using electricity. The preliminary annual cooling demand in Lithuania ranges from 5 to 6 TWh. The need was determined based on the assumption that the cooling demand in Lithuania, given its climatic conditions, is ~60 kWh/m^2 per year. However, in order to develop this sector, one should consider the fact that it would only be useful to do this when connecting to the network buildings that already have a centralised (common mechanical) ventilation system, such as offices, supermarkets and new high energy class multi-apartment buildings, as investments in old multi-apartment buildings to take advantage of centralised cooling supply would be unreasonably high. In this case, the annual cooling demand would be reduced to 2-3 TWh.

The share of RES in a primary fuel structure in DHS systems and heat price is showed in the next scheme:

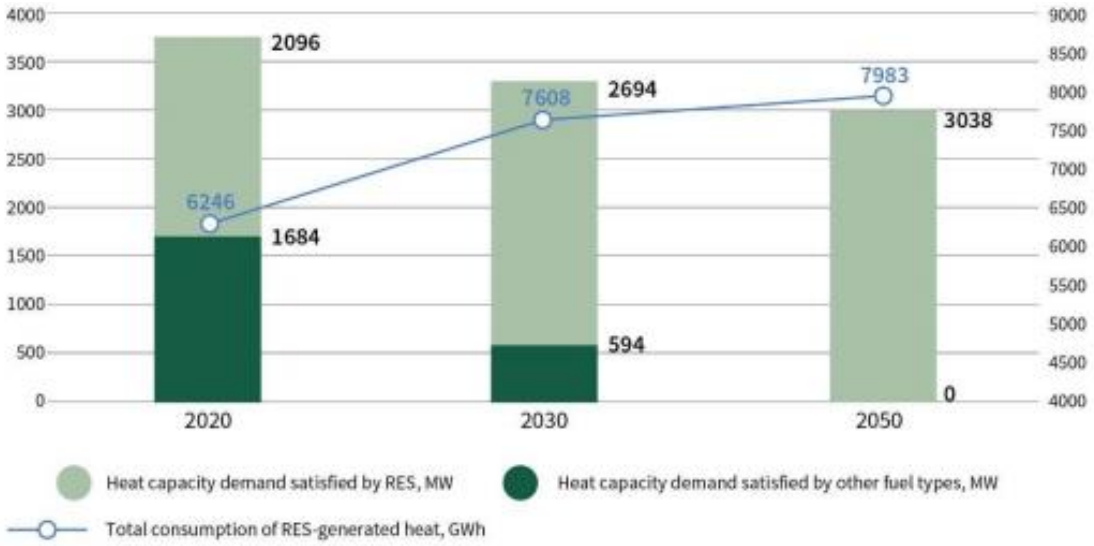


Source: Lithuanian District Heating Association, National Commission for Energy Control and Prices

The main objective of the Strategy in the heating sector is the consistent and balanced renewal/optimisation of the DHS system, which ensures efficient heat consumption, reliable, economically attractive/competitive supply and production, enabling the deployment of modern and environmentally-friendly technologies using local and renewable energy sources, ensuring system flexibility and a favourable investment environment. The heat sector in Lithuania will be further developed in accordance with the following principles:

- **Transparency** – ensure that heat supply activities are managed in an efficient, transparent and non-discriminatory way with respect to entities operating in the heat market and its consumers, including the acquisition of energy resources in the most transparent and competitive manner, ensuring the lowest costs to the final consumer;
- **Competitiveness** – the rational use of investments necessary for the reliable supply of consumers with non-polluting heat at an acceptable price, ensuring the ability of DHS to compete with alternative heat supply methods;
- **Efficiency** – the establishment of regulatory principles, which promotes the implementation of technical and management solutions in the systems of DHS enterprises, ensuring reliable and the most cost-effective heat supply to the end user; Advancement – the adjustment of the system to the deployment of different environmentally-friendly and price-competitive innovative technologies in the areas of heat production, supply and consumption. In developing the heat sector in Lithuania, the following will be pursued:

- District heat supply from renewable and local energy sources is 70% by 2020;
- District heat supply from renewable and local energy sources is 90% by 2030;
- District heat supply from renewable and local energy sources is 100% by 2050 and at least 90% of buildings in cities receive heating from the DHS.

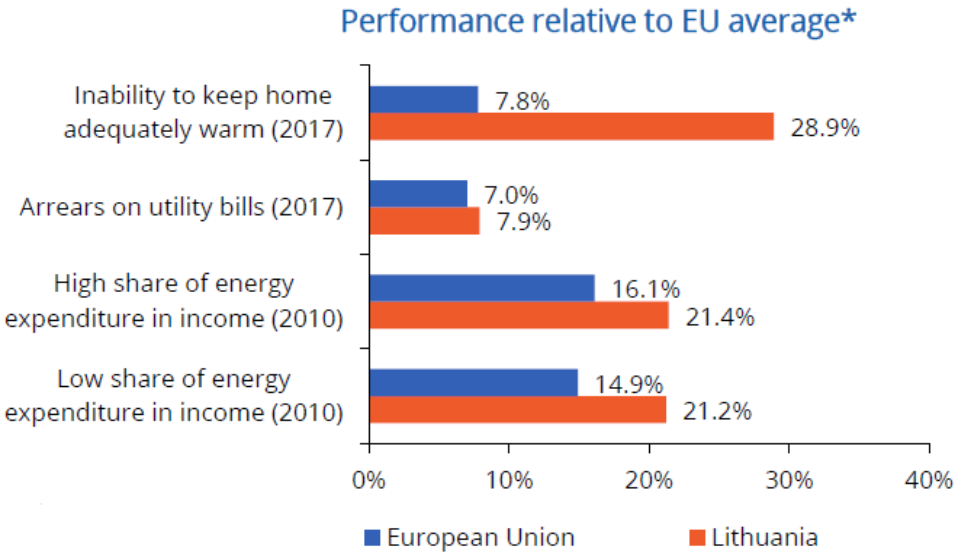


Source: Lithuanian Energy Institute

The end-tariff for users is regulated in 60 municipalities. The average heat price in Lithuania is ~5 ct/kWh – during 5 years it decreased by 35%

3. State of Play of energy poverty in your region

According to the EU Energy Poverty Observatory (EPOV) Lithuania performs worse than the EU average on the household-reported indicators: **28.9% of households were unable to keep the home adequately warm in 2017 and 7.9% were in arrears on utility bills.** Lithuania is also worse than the EU average for the expenditure-based indicators: 21.4% of households spend more than twice the median on energy and 21.2% spend less than half the median. In Lithuania, the percentage of households unable to keep the home adequately warm is significantly higher than households in arrears on utility bills. This might be because households underspend on energy, which is also illustrated by the high number of households that have a low share of energy expenditure in income.



Lithuania maybe one of the most affected countries by energy poverty among the EU Member States. According to the EU Survey on Income and Living Conditions, 31.1 % of inhabitants of Lithuania could not afford to keep their house adequately warm (second highest indicator among the EU countries after Bulgaria) and 17% reported to live in housing affected by dampness, draughts and leaks in 2015.

According to Eurostat, on average 46% of household consumption expenditures in Lithuania are devoted to necessities – food, housing and transport. This figure stands at 52% in Latvia and 44% in Estonia. Swedbank Finance Institute conducted expenditure analysis of a hypothetical middle class family with two children living in the capital cities of the Baltic States. In Vilnius, household income would be around 1,300 €/month, while their expenditure on utilities alone would stand at around 152 €/month during the heating season for a typical 70 m^2 flat. According to Eurostat, 82.3% of Lithuanians owned their accommodation, 10.1% lived in rented accommodation and 7.6% had mortgages. Utilities, food and transport (assuming public transport) would constitute 40% of household's monthly income during the heating season.

In the past few years Lithuania, Latvia and Estonia managed to accomplish a few national scale energy projects that have helped to reduce the effect of the so-called energy island of the Baltics – electricity power links to Finland (2014), Sweden (2015) and Poland (2015), a brand new gas terminal in Lithuania (2014). As a result of that electricity prices have decreased by 20% and natural gas prices have decreased by 30%. Nevertheless, Lithuania remains to be a net importer of energy. The country imports up to 80% of electricity and most of local electricity plants are morally and

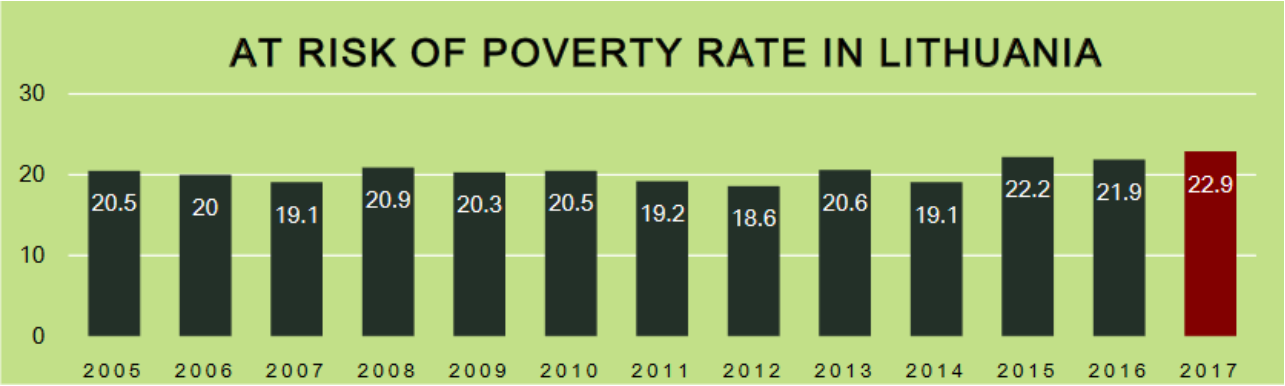
technologically out-of-date. Lithuania currently considers to build a few waste-to-energy plants that could decrease heat energy prices by a further 20%.

District heating is well developed in Lithuania and enjoys a monopoly status. A typical flat owner connected to the district heating network does not exercise control neither over the heating levels, nor the heating bills. He emphasized that according to the EU principles, Lithuania will eventually have to comply with consumer's right to choose in the heat energy market. Although access to energy infrastructure has improved greatly in the last few years (connection to gas, electricity networks), but energy service prices remain to be a problem.

In 2017 Lithuanian Parliament has passed a law that cancels preferential tariff of the value added tax on district heating and hot water services. This preferential tariff was launched to alleviate the heating bills temporarily in 2000, but has remained in force for over 15 years (a case of temporary becoming nearly permanent). Until now all governments found enough reasons to keep it intact due to the extent of the population affected (57% use district heating services). From June 1st 2017 value added tax for these energy services jumped from 9% to a regular 21% applied to all other goods and services in Lithuania. It is likely that the public reaction to this change will reach its peak upon the receipt of the first heating bills in autumn.

To mitigate the price effect the **Parliament suggested to extend the existing subsidies to socially vulnerable households** – the compensation for heating services will be available to households who pay at least 10% of their income for these services. This is in line with the internationally acknowledged threshold of energy poverty. Previously compensations for heating services have been calculated according to a different formula with a 20% threshold. It is expected that the number of those seeking compensations for heating services will increase significantly in autumn of 2017. Under the preferential 9% tariff, **around 100,000 applicants received compensations for heating services under the threshold of 20% of income for energy services**. Under the new policy of 21% tariff and 10% threshold of income for energy services, it is expected that the number of applicants will increase to 250,000. This may be the extent of energy poverty in Lithuania, but the figure has to be multiplied even further to account for size of household.

The data shows that poverty and social exclusion rates in Lithuania are among the highest the EU. Current data show that in 2017, compared with 2016, the risk of poverty rate has increased by 1 percentage point and reached 22.9 %. It is worrying that in 2017 the risk of poverty has risen to an unprecedented height. The level of risk of poverty last year was the highest since joining the EU.



Compared with 2016 at-risk-of-poverty rate has increased significantly among old-age pensioners. As the average wage increased, pensions grew slower. As a result, the risk of poverty among old-age pensioners increased by 6 percentage points. It should be noted that the average amount of old-age pension during the income research period (2016; 255€) did not reach the poverty threshold (307€). The poverty of one adult, raising children and large families also increased significantly. The latter's poverty risk increased by 12 percentage points. The growth of the risk of poverty is also notable for single person. In recent years, this has increased by 5 percentage points.

Lithuania has made remarkable progress during the independence period in approaching Western standards and living standards. It is one of the fastest growing economies in Europe, but the income inequality in the country is currently one of the largest in the European Union. In 2012 the income of 20% the richest and 20% of the poorest people in Lithuania varied 5 times. In 2016 this difference increased to 7 times.

According to European Commission this is a result of limited progressivity of the tax system, high employment gaps between low-skilled and high-skilled workers and an inadequate benefit system.

Typically, certain social groups are more sensitive to socio-economic challenges and risks and have less resources to cope with successfully. Statistics show that **the most vulnerable persons are children, disabled people, old-age pensioners, single people and the unemployed.**

9% Lithuanian residents face difficulties paying their heating bills. In 2016, 17-18% reported to live in housing affected by dampness, draughts and leaks. These are among the worst indicators across the EU. This shows that there is a huge spread of energy poverty in Lithuania.

4. Link to the RIS3

The Government of the Republic of Lithuania has identified **six priority areas** for research and development and innovation development direction. One of these areas "energy and sustainable environment". The selection of this area has been determined by the need to respond to such future challenges and trends as insufficient diversification of energy sources, high energy prices, uneconomical and inefficient use of energy, and lack of ecosystems 'sustainability.

5. Policy Instruments. Regional and National Plans and Policies on renewable energies and energy poverty

Modernizing the residential sector in Lithuania is a key government priority for several reasons:

- Existing multi-apartment buildings do not comply with technical norms: a large share of the 35,000 of multi-apartment buildings were built according to construction norms that were valid until 1993.
- Housing stock is, by value, the largest national asset.
- Household incomes are too low to allow for significant household investment in building modernization.
- Residential energy consumption is very high at 160-187 kWh/m^2 per year.
- Low-income owners require state budget subsidies to cover heating costs.

The **Lithuanian Housing Strategy** was approved on January 21, 2004, by the Lithuanian government. On the 22nd March 2017 the Government of the Republic of Lithuania invalidated this strategy. Its main goals were to:

- Expand housing options for all social groups,
- Strengthen the capacity of the housing sector in the housing market,
- Ensure effective use of existing housing, maintenance, upgrading, and modernization, including the rational use of energy resources.

On the 26th June 2012 the Parliament of the Republic of Lithuania approved **Lithuania's National Energy Independence Strategy** identifies increased efficiency of heat consumption in households and public buildings as a national priority. It aims to gradually improve the country's heat production and transportation infrastructure by, for example, replacing inefficient boilers and installing combined heat and power facilities.

After invalidating Housing Strategy, on the 21st June 2018, the Parliament approved the revised National Energy Independence Strategy (hereinafter – the Strategy). The Strategy provides for four main directions of Lithuanian energy policy: energy security, the development of green energy, efficient energy consumption, and competitiveness and innovation**.** The revised Strategy includes the country's key energy targets for 2030 and defines the guidelines for energy development until the middle of the century. The Strategy reflects the vision of the Lithuanian energy sector to provide reliable, renewable and environmentally friendly energy to the residents of the country for the most favourable price.

In the revised Strategy, it is projected that by 2030, 45% of electricity consumption and as much as 90% of heat energy will be produced from renewable energy sources. Furthermore, all electricity and heat consumed in Lithuania will be produced from renewable and other clean sources by 2050. Renewable energy sources will account for 80% of Lithuania's total energy consumption.

The state will promote the integrated renovation of multi-apartment and public buildings (prioritizing renovation in quarters).

By 2020, the renovated multi-apartment and public buildings will save around 2.6–3 TWh of energy and by 2030, 5–6 TWh.

Considering the specifics and needs of the Lithuanian energy sector, the strategic goals, the existing and desired competences, the following priority directions for research and development in energy have been identified:

1. The planning of the future development of the energy sector, energy economics;
2. The modernisation of existing energy production technologies based on new challenges and requirements;
3. The development of new energy production and storage technologies with low GHG and air pollutant emissions and resilience to climate change and their integration into the network;
4. Technologies using local energy generation and renewable energy sources;
5. The analysis of the operation of the electricity system and improvement of its control;
6. Technologies relating to distributed generation, smart networks, production and use of new promising energy types;
7. Ensuring reliability and high-quality of electricity supply, vulnerability of electricity systems and optimisation of operating modes;

8. The functioning of electricity markets, power mechanisms and the proactive involvement of consumers in the operation of the electricity system and markets;
9. Energy and cyber security, reliability of energy equipment and systems, resilience to cyber-attacks.

6. Legislation, Regulation

The main laws regulating the modernization of multi-apartment buildings in Lithuania are the following:

1. The **Civil Code of the Republic of Lithuania**. The Civil Code states that the maintenance and administration of multi-apartments buildings are compulsory.
2. The **Lithuanian Housing Strategy** approved by the Government of the Republic of Lithuania (Resolution No. 60) on January 21, 2004 (on the 22nd March 2017 LR Government invalidated this strategy).
3. The **Law for State Support to Obtain or Rent House and Modernize Multi-Apartment Buildings** defines conditions to provide state support.
4. The **Multi-Apartment Buildings Modernization Program** defines objectives, tasks, implementation measures, financing sources and implementation mechanisms.
5. The Regulations on **State Support for Modernization of Multi-Apartment Buildings and on Supervision of Implementation of Renovation Projects** define procedures for providing state support and functions to renovation process participants.
6. The **Rules on Credit Taken to Modernize Multi-Apartments**, and on **Interest Compensation Rules, for Persons with the Right to House Heating Subsidies** define credit and interest coverage procedure.
7. The Rules for **Projects Preparation for Multi-Apartment Buildings Renovation** define investment plan preparation and approval procedures as well as requirements for construction design.
8. The Procurement Rules for **Construction Works and Technical Supervision Services for Multi-Apartment Building Renovation** regulate construction work and procurement of technical supervision services, when procurement is executed by the body that does not belong to the purchasing organization (such as HOA, administrators, apartment owners under JAAs, etc., for which the Law on public procurement is not applicable).
9. The **Homeowners Association Law** defines establishment and management of HOA for collaboration in the residential sector.

10. **Building Code and Certificates**: Lithuania developed its first performance-based building code in 2005 following the adoption of the EU Energy Performance of Buildings Directive (EPBD) 2002/91/EC in 2002, which requires member states to use energy sources economically and promote energy efficiency.

11. The **Technical Regulation of Construction STR 2.01.09:2005** was adopted under the authority of the Ministry of Environment and the Ministry of Energy. A performance-based code covering single and multi-family residential buildings, it requires an energy frame calculation to establish the maximum allowable energy consumption of new buildings. The code addresses low maximum u-values, thermal bridging linear value requirements, heat recovery considerations, mandatory commissioning and testing of boilers and HVAC systems, and compulsory training of energy inspectors. The code enforces conformity to the regulations during construction via third-party inspection.

12. The **Building Energy Performance Certificate** requires that all new and existing buildings be certified starting from 2007. It evaluates the performance of each building based on its energy consumption. After the evaluation, the building is grouped according to one of nine classes, from A++ (very efficient) to G (inefficient). According to the regulations, the energy class of new buildings should be at least C, and renovated buildings should not be less than D. The certificates are valid for 10 years. The certificates are available to the public on the online database.

13. According to the Regulations on the **Inspection of Boiler, Heating, and Air-Conditioning Systems and Methodologies**, boilers should be inspected every 2–3 years.

    Heating installations with boilers with a capacity over 20 kW and older than 15 years should be inspected separately.

    Air conditioning systems with a capacity higher than 12 kW should be inspected every 3 years.

    The government covers the cost of the inspections, and residents can request inspections free of charge. One year after the implementation of the scheme, limited interest in inspection and lack of information on the consumer side were the biggest challenges for the legislation.

7. Financial Support and Instruments

The Lithuania's national Energy Efficiency policy (**Lithuania's EE policies**) and residential Energy Efficiency program can be roughly divided into three time periods:

First Period: 1996 – 2004. In the first period the government implemented an Energy Efficiency/Housing Pilot Project, then continued post-project renovation of multi-apartment buildings. Before 1996, government institutions did not have much experience in running complex modernization programs related with housing or public buildings renovation.

Second Period: 2005 – 2007. After joining the EU in 2004, Lithuania's EE policies were shaped by EU legislation. The Lithuanian Housing Strategy adopted in 2004 specifically addressed the residential sector and focused on increasing energy savings in households through retrofits of multi-flat buildings. A Multi-Apartment Buildings Renovation Program was adopted that provides loans or subsidies for efficiency upgrades in apartments.

Third Period: 2008 – 2013. This period covers implementation that started with introduction of the EU-funded Joint European Support for Sustainable Investment in City Areas (JESSICA) financial instrument. On 11th June 2009 the Ministry of Finance, the Ministry of Environment and Europe Investment Bank (EIB) established JESICCA holding fund, which ensured financing for renovation (modernisation) of multi-apartment buildings. Fund financed soft loans which were provided with more state support. The amount of fund was 227 MEUR. JESSICA aims in Lithuania were:

- to encourage residents to modernise multi-apartment buildings so energy efficiency would be increased;
- to modernise dormitories of old construction which were built according to the technical construction standards applicable before 1993 to ensure rational use of energy resources and improve the conditions of students who live in dormitories.

Fourth Period: 2014 – 2020. After successful JESSICA financial instrument implementation, on 7th May 2015 the Ministry of Finance, the Ministry of Environment and Europe Investment Bank (EIB) established JESSICA II for 2014-2020 period. The amount of fund was 150 M€.

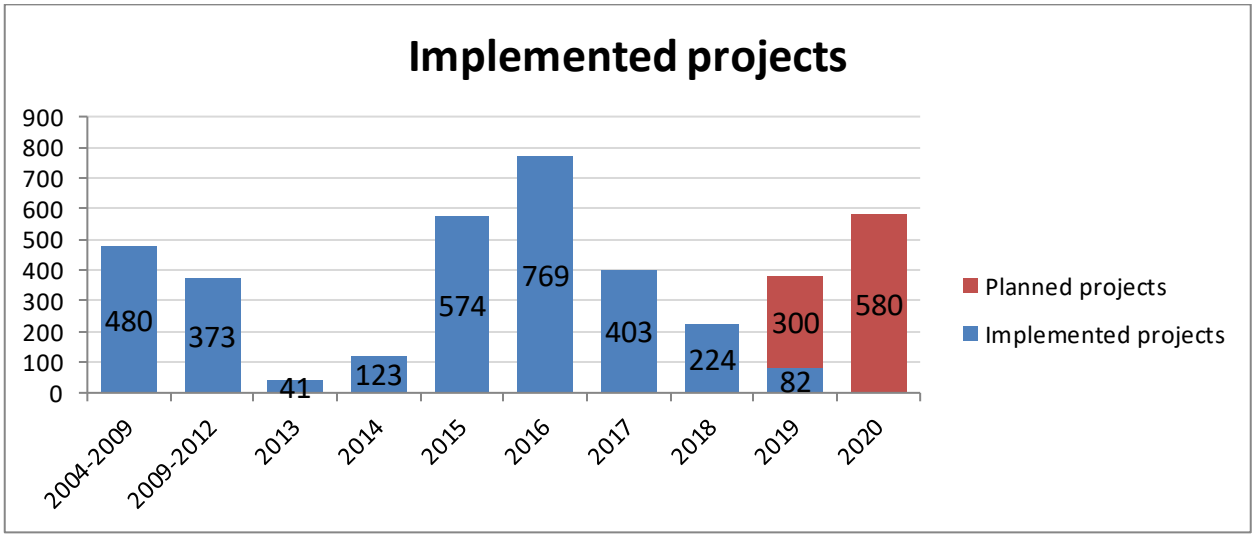
Based on the success in implementing JESSICA HF and JESICCA II and having measured all **advantages of financial instruments**, the decision was made to expand the application of financial instruments in the period from 2014 to 2020 and using the allocations of the 2014-2020 EU structural funds the Fund for Modernisation of Multi-apartment buildings (hereinafter referred to as the (DNMF) was established which is designated to meet the dramatically increased demand and ensure the **continued funding of projects on modernisation of multi-apartment buildings**. DNMF agreement were signed on 27th of March 2015 by the Ministry of Finance, the Ministry of Environment and Public Investment Development Agency (VIPA) and it manages 74 M€.

Also, in autumn of 2016 Risk sharing fund with amount of 100 M€ 2014-2020 EU funds was established by the Ministry of Finance and EIB. This funding was guaranteed by the loans provided by private investors. 500 M€ more is foreseen to attract from private investments. It is planned to modernise about 1,500 multi-apartment buildings financed from this fund.

Given the fact that the interest in renovation of multi-apartment buildings has remained considerable, on 10 May 2017, VIPA signed an agreement of 50 M€ with the European Bank for Reconstruction and Development (EBRD) to further ensure the continuity of the process.

In 2018-2019 VIPA also signed two more agreements with the Ministry of Finance for 118 M€ from State treasury to continue fulfilling demand and to ensure the continued funding of projects on modernisation of multi-apartment buildings.

Total number of applications of multi-apartments buildings renovation (modernisation) (2004-2019), submitted to the Housing and Energy Saving Agency (HESA) **was 5,884**; totally 5,817 of them were approved by HESA during 2004-2019; totally 4,201 was approved by the owners of multi-apartment buildings during 2004-2019.



8. Preliminary Good Practices

VIPA project team together with stakeholders has discusses following preliminary good practices:

- Carrot and stick game – the lessons learned (energy efficiency investments in multi-apartment buildings) from other projects, especially related to the vulnerable groups showed that usually individuals are not motivated by only incentive schemes and there is a need for "punishing" measures (e.g. increasing taxes/expenses, waving compensations, etc.). It should be noted that both incentive and "punishing" measures must be introduced at the same time and should be complimentary.

- Lithuanian experience in making investments approachable when amended to legislation was made in order to sort out "bureaucratic nightmare" and currently to make RES investments is much easier, especially to natural persons (e.g. decreasing documents needed from 30 to 3 and days needed from 105 to 21).

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- Prosumers platform – special tool designed to foster prosumers project pipeline development. This is on-line tool enabling to bring together supply and demand side and reduces risks for both parties.

- In 2019 Lithuanian Parliament approved amendments to the Laws on Renewable Energy and on Electricity prepared by the Ministry of Energy which opened opportunities for any electric energy user to become electricity producing consumers and consume electricity generated from remotely situated renewable energy resources.

- In the process of implementation of the Energy Efficiency Directive the Energy Service Companies (electricity transmission and distribution companies) entered into an agreement with the Ministry of Energy regarding the required amount of annual energy savings.

- The Energy Service Companies together with VIPA establish special fund which would be financing EE projects (including prosumers).

The final "Guide of Good Practice" is available in the LIBRARY of the POWERTY website.

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SWOT ANALYSIS

TOPIC 1. INNOVATIVE RENEWABLE ENERGY TECHNOLOGIES AIMED AT VULNERABLE GROUPS, INCLUDING COLLECTIVE AND URBAN ENERGY SYSTEMS.

WEAKNESSES

- Still relatively high investment needed in RES (long payback period).
- Small local market (limited use of economies of scale) in Lithuania.
- Lack of knowledge about RES technologies among individuals.
- Use of some RES technologies possibilities are limited (e.g. wind power plants can't be installed in numerous places due to national security measures).

THREATS

- Increasing solar power plat production will reduce energy prices especially during summer sunny day's thus increasing payback of investments.

STRENGTHS

- Increasing RES efficiency and decreasing investment costs.
- Long life of RES installations (lower cost of living after investments are fully paid).

OPPORTUNITIES

- Emerging market segment with high development potential for renewable energy industry.
- Increasing renewable energy technologies production area extends job opportunities for unemployed people, who are part of vulnerable groups.

TOPIC 2. NEW FINANCING FORMULAS FOR RENEWABLE ENERGIES SUITABLE FOR VULNERABLE GROUPS.

WEAKNESSES

- Still relatively high investment needed in RES (long payback period).
- No special incentives in Lithuania for most vulnerable groups to use RES.
- The need of additional state support to ensure bankability of the RES projects (especially relatively small installations).
- Resistance to financial instruments (especially among long payback investments).
- Small local market (limited use of economies of scale).
- Conservative financing entities (banks) don't trust RES financing opportunities.
- Low level of financial education among vulnerable groups resulting in low awareness about RES benefits.

THREATS

- Uncertainty due to demographic problems in remote areas and smaller cities (lower investments due to uncertainty of possible relocation).
- Possibility to enter to new phase of economic crisis.
- Increasing solar power plat production will reduce energy prices during sunny day's thus increasing payback of investments.
- Imbalanced income sources (raising credit risk for financing parties) among vulnerable group's representatives.

STRENGTHS

- Experience from already implemented financial instruments (experience accumulated by public institutions, financial intermediaries) in Lithuania.
- Potential saving due to investments – electricity costs replaced with investment payments.
- Increasing RES efficiency and decreasing investment costs with higher popularity of RES.
- Long lifetime of RES installations (lower cost of living after investments are fully paid).

OPPORTUNITIES

- Financial mechanisms targeting climate change investments (including RES) developed at EU level EFSI/InvestEU/ESI, thus resulting in low cost and long period funding.
- The possibility to combine grants and financial instruments for RES projects in developing financial instruments to foster use of RES.
- Propose attractive electricity pricing (e.g. big scale power plants with attractive long term financing).

TOPIC 3 IMPROVEMENTS IN THE REGULATORY FRAMEWORK FOR RENEWABLE ENERGIES AND VULNERABLE GROUPS

WEAKNESSES

- No special incentives for vulnerable groups to use RES.
- The need of additional state support to make RES sector more simple.

THREATS

- Changes in the regulatory framework is long lasting process and the lack in common understanding concerning topic is a challenge for different players involved.
- New regulation is not enough incentive for vulnerable groups for using renewable energies.

STRENGTHS

- Experience from already implemented financial instruments (experience accumulated by public institutions, financial intermediaries).
- Increasing society consciousness related to regulations, including renewable energies.

OPPORTUNITIES

- New regulations targeting climate change investments (including RES) developed at EU and Lithuanian level, thus resulting in more incentives to use RES.
- The possibility to combine grants and financial instruments for RES projects in developing financial instruments to foster use of RES.

TOPIC 4 EMPOWERMENT OF VULNERABLE GROUPS AND SOCIAL INNOVATION TO STIMULATE CITIZEN PARTICIPATION OF THESE SOCIAL GROUPS

WEAKNESSES

- No special incentives for vulnerable groups to use RES.
- The need of additional state support to ensure bankability of the RES projects (especially relatively small installations).
- Low level of financial education among vulnerable groups resulting in low awareness about RES benefits.
- Vulnerable groups of people prioritise day-to-day challenges (work, food, clothes, etc.) rather than seek knowledge in new initiatives (including RES).

THREATS

- Uncertainty due to demographic problems in remote areas and smaller cities (lower investments due to uncertainty of possible relocation).
- Imbalanced income sources (raising credit risk for financing parties) among vulnerable group's representatives.

STRENGTHS

- Potential saving due to investments – electricity costs replaced with investment payments.
- Potential higher real estate value with RES technologies.

OPPORTUNITIES

- Financial mechanisms targeting climate change investments (including RES) developed at EU level EFSI/InvestEU/ESI, thus resulting in low cost and long period funding.
- The possibility to combine grants and financial instruments for RES projects in developing financial instruments to foster use of RES.