CLIMATE AND ENERGY POLICY IN SLOVAKIA

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INTRODUCTION

The main aim of *The Paris Agreement*, which entered into force in November 2016, is to strengthen the global response to the threat of climate change by keeping the global temperature below 2 degrees Celsius. The Agreement brings all nations into a common cause and all antions have to redifine its climate and energy policies and strategies in order to meet this goal.

Slovakia is one of the most energy-intensive economies within the EU member states, having various high-carbon manufactoring sectors, therefore protecting the industry is often preffered by the government over low-carbon goals. The mining industry has a very strong political support through coal subsidies and there is a rather low political support of renewable energy. Slovakia has a high share of nuclear energy, but also hydropower in its energy mix, which has a very high share within the renewable energy mix. Renewable energy targtets are therefore accomplished, but a further expansion of other renewable energy sources and technologies would be welcome. A result would be a more decarbonized and decentralized energy market, which could lead to lower electricity bills, since Slovakia has one of the highest prices within the EU member states.

This report analyses the energy and climate policy in Slovakia. In the first section, there is a general overview of the energy market in Slovakia, with special regards to renewable energy profiles. The second part focuses on climate and energy policy of Slovakia, giving an overview of the main strategic documents which influence the climate and energy targets. We analyzed the priorities of these policies and further objectives and plans until the years 2020-2050, which arise from international commitments of Slovakia being a member of the EU and other international organizations.

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1. GENERAL OVERVIEW OF ENERGY MARKET IN SLOVAKIA

The Slovak Republic has a balanced share of individual energy sources on gross domestic consumption in the following ratio[1]: nuclear fuel (heat) 23.8 %, gaseous fuels (natural gas) 23.8 %, crude oil and crude oil products 20.4 %, fossil fuels 20.0 % and renewable energy sources (RES) 12.0 %. Fossil fuel consumption prevail in the energy mix of Slovakia and in 2016 almost 60 % of electricity was produced in nuclear power plants.

Dependency of Slovakia on primary energy resources is high. Supplies of nuclear fuel are secured based on long-term contracts with the Russian Federation. Considering natural conditions and current technological possibilities Slovakia has only few primary energy resources. Almost 90 % of primary energy resources (including nuclear fuel) is imported. Domestic fossil fuel resources include brown coal and lignite. With liquid and gaseous energy resources domestic production represents only about 4 %. With respect to use of fossil fuel for production of electricity the crucial question lies in storing spent nuclear fuel, as well as decomissioning retired nuclear facitlities. The Slovak Republic proceeds in line with EU policy in these matters.

Because energy production and consumption have a significant impact on environment, lowering energy consumption by implementing various conservation measures and increasing energy efficiency, as well as changing primary energy resource composition, influence reducing greenhouse gas emissions and improve air quality in a major way. According to Slávka Štroffeková from the Slovak Environmental Agency, energy development of Slovakia is focused on optimizing energy mix from the aspect of energy safety at achieving the highest possible energy efficiency and thorough protection of environment. Emphasis is placed on utilization of domestic energy resources, low carbon technologies, such as renewable resources and nuclear energy. In the recent years consumption of renewable energy resources has gradually grown, its ratio reached about 12.0 % in 2017 (compared to approximately 6,5% in 2005). Increasing the ratio of RES plays a crucial role in increasing self-sufficiency and thus energy safety. Moreover, using renewable resources represents a great environmental benefit, thus belongs to priorities of Slovak energy policy.

1.1. Energy Profile of Slovakia from the Aspect of Renewable Energy Resources

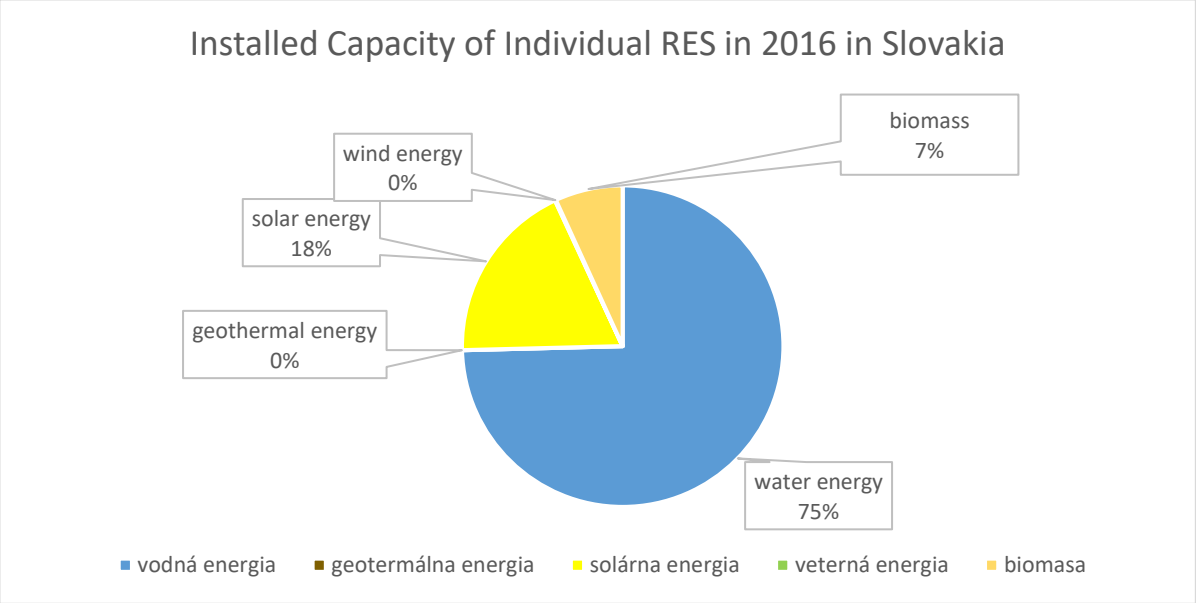
We focused this chapter on analysing energy profile of Slovakia with respect to renewable energy resources. We will describe the current condition of using energy from renewable resources

[1] Data from 2015

not only from the perspective of their total share in energy mix,[2] but also with respect to their use in electricity, heat production and transport.

Slovakia aims to achieve a 14 % ratio of RES on energy production in 2020[3]. In 2010 EU member countries introduced their *National Action Plans for Energy from RES*[4], where they declared how they plan to achieve these objectives. Within these plans each member state set itself an estimated ratio growth trajectory[5]. Slovakia reached a 12 % share of energy from RES in 2016, thus surpassing the estimated trajectory, since the state set the level of renewable energy share in 2017-2018 at the level of 11,4 %.

Graph 1: Installed Capacity of Individual RES in 2016 in Slovakia



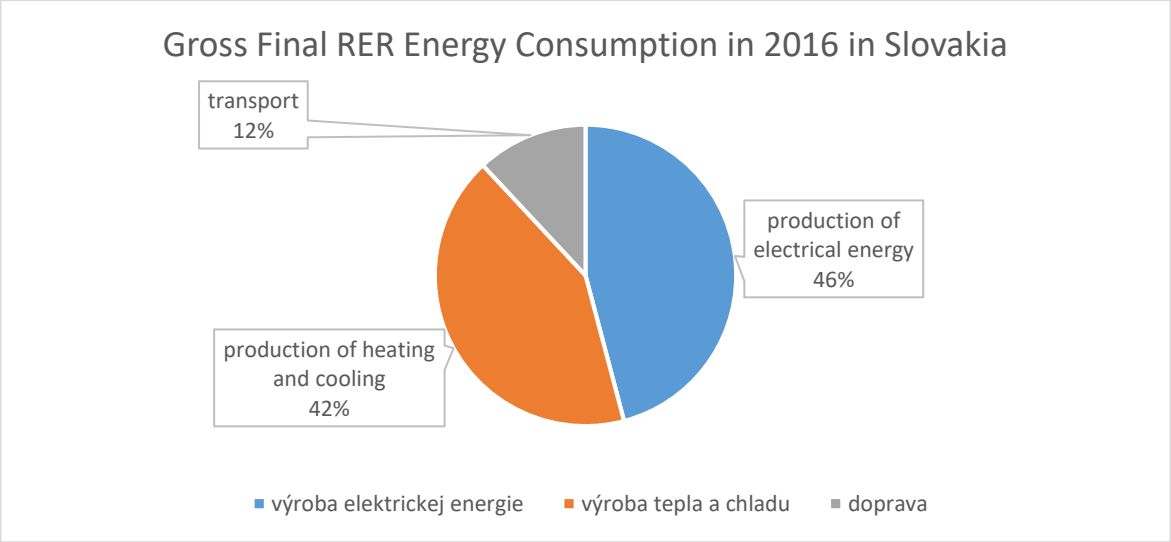
Source: Prepared based on Eurostat data

In this energy profile analysis of Slovakia with respect to RES we focused on energy mix of renewable energies as well[6]. As graph no. 1 shows, use of water energy dominates in the country. The second prevailing resource in Slovakia is solar energy, which in 2016 represents approximately 18 % of total RES share on energy production. Wind energy takes up only less than 0.1 % share. Equally geothermal energy has a low representation.

[2] Share of individual energy resources (renewable and non-renewable) on state gross domestic consumption.
[3] European Commission. Eurostat: Renewable energy shares. 2016. <http://ec.europa.eu/eurostat/web/energy/data/shares>
[4] National action plans of all EU member countries are available on web <https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans>
[5] Estimate of RES ratio on energy production for 2015/2016, 2017/2018 and 2019/2020.
[6] Share of individual renewable resources.

Graph 2 portrays RES share on energy by individual sectors[7]. Production of electricity from RES and production of heating and cooling from RES had identical share. Use of RES in transport takes up about 10 %.

Graph 2: Gross Final RER Energy Consumption in 2016 in Slovakia



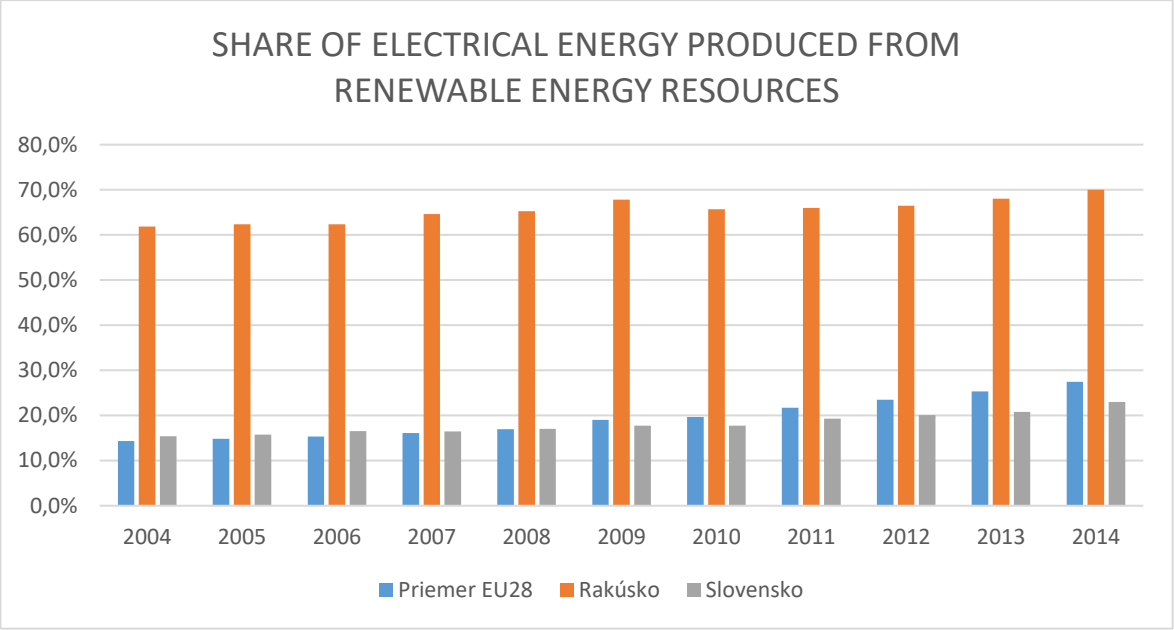
Source: Prepared based on Eurostat data

As a matter of interest we also provide the difference between Slovakia and Austria (neighbour countries with common natural conditions) in electrical energy production from RES. As can be seen on Graph no. 3, Austria significantly exceeds not only the share of Slovakia, but also average of all EU member countries[8]. In 2014 share of RES produced electricity in Slovakia was on the level of 23 %, average of EU countries represented 27.5 %. Austria achieved the level of 70 % share in 2014.

[7] European Commission evaluates the RES share in three categories: electrical energy production, production of heating and cooling and use of RES in transport.

[8] Average of RES ratio in all EU member countries should be 20 % in 2020.

Graph 3: share of RES produced electrical energy



Source: Prepared based on Eurostat data

2. CLIMATE AND ENERGY POLICY

In the following chapter we are going to present the position of Slovakia to global climate and energy agreements. Considering the fact that Slovakia is a EU member country, its policies respect especially European environmental and energy strategic documents and objectives. Slovakia was one of the first countries that ratified the Paris Global Agreement in 2016 and because of holding the Presidency of the Council of the EU at that time, Slovakia focused on completing the ratification procedure at European level too.

There is an internal divide within the Slovak government and parliament concerning low-carbon development. While Prime Minister Fico has repeatedly spoken out in favour of safeguarding coal, the Ministry of Environment is more progressive and has even broached the topic of a coal phase-out in the past. It therefore constitutes one of the most progressive Ministries of Environment in the Central and Eastern European (CEE) region. Moreover, Slovakia is currently developing a 2050 low-carbon strategy with support from the World Bank. In general, however, climate change is not a high-priority topic in Slovak politics nor among the public or media.[9]

2.1 Slovak strategic targets for climate change and energy

In 2010 the European Union introduced its so far most complex strategic document, which defines objectives and priorities in the area of sustainable development. This strategy was prepared as a "10-year strategic plan, serving for creating conditions suitable for intelligent, sustainable and inclusive growth".[10] EU set 5 ambitious objectives for itself in the areas of employment, education, social inclusion and climate change therein, which ought to be met by 2020. Strategy implementation should take place at the level of each member state, therefore the member states independently transformed the determined priority Strategy areas into their own national objectives.[11]

The European Commission places great emphasis on effective implementation of the individual objectives defined by the strategic document Europe 2020 and monitors the member countries in regular intervals in their commitment fulfillment. Each member country was entrusted with a task to create its own strategic plan respecting its internal conditions and indicators, which will take the Strategy objectives into consideration.

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[9] Sandra Esser, Sabrina Schulz, Julian Schwartzkopff: Climate & Energy Snapshot: Slovakia. 2018. https://www.e3g.org/library/climate-energy-snapshot-slovakia

[10] European Commission, 2010. *Europe 2020 in a nutshell.* <http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/index_en.htm>

[11] European Commission, 2010. *Europe 2020*. <http://ec.europa.eu/europe2020/index_en.htm>

Table 1: Targets of Europe 2020 strategy

Employment
- 75% of people aged 20–64 to be in work
Research and development (R&D)
- 3% of the EU's GDP to be invested in R&D
Climate change and energy
- greenhouse gas emissions 20% lower than 1990 levels
- 20% of energy coming from renewables
- 20% increase in energy efficiency
Education
- rates of early school leavers below 10%
- at least 40% of people aged 30–34 having completed higher education
Poverty and social exclusion
- at least 20 million fewer people in – or at risk of – poverty/social exclusion

Source: www.ec.europa.eu/europe2020

2.1.1. National Reform Programme of the Slovak Republic - *Europe 2020 Strategy objectives for the Slovak Republic*

When in 2010 the European Commission introduced the Strategy Europe 2020, EU member countries were asked at the same time to elaborate their national strategies, so called "*National Reform Programmes*", which are to name exact indicators specific countries use to meet their strategic objectives. The National Reform Programme of the Slovak Republic 2013[12] defines structural measures for achieving sustainable economic growth, creation of new job positions and improving life quality. Objectives overview for the Slovak Republic as well as general EU objectives following from Europe 2020 Strategy are provided in the table below:

[12] *National Reform Programme of the Slovak Republic*. April 2013. <http://ec.europa.eu/europe2020/pdf/nd/nrp2013_slovakia_en.pdf>

Table 2: Slovak objectives within Europe 2020 Strategy

EUROPE 2020	OBJECTIVE SR	OBJECTIVE EU
Rate of Employment (in %)	**72**	**75**
Research and Development (% GDP)	**1.2**	**3**
Lowering Emissions (in %)	**13**	**-20**
Share of Energy Production from Renewable Resources (in %)	**14**	**20**
Energy Efficiency	**16.2**	**20**
Share of Prematurely Ended School Attendance (in %)	**6**	**10**
3rd degree Education (in %)	**40**	**40**

Source: Overview of Europe 2020 Targets.

With respect to the fact that Europe 2020 Strategy defines also specific objectives in the area of energy efficiency, lowering emissions or increasing energy production from renewable resources, environmental strategy is one of the foundation themes of the National Reform Programme of the Slovak Republic.

2.2 Slovak Climate Policy

Slovak Climate Policy is defined in the document "*Envirostrategy – Greener Slovakia*" prepared by the Ministry of Environment in September 2018.[13] Considering the fact that the document is very actual, in our analysis we present the vision of „healthy environment and sustainable economy" according to the department of environment in the following chapter.

[13] Envirostretágia – Zelenšie Slovensko. Ministerstvo životného prostredia. September 2018. file:///C:/Users/admin/AppData/Local/Microsoft/Windows/INetCache/IE/ME7C47JQ/x_2017_envirostrategia_20180904.pdf

Slovakia currently faces many environmental challenges with air quality, low rate of waste recycling, but also protection of ecosystems. Air pollution alone in the country causes more than 5, 000 premature deaths annually. Environmental problems have a growing impact on economy, employment and life comfort of its citizens. The strategy of environmental policy of the Slovak Republic until 2030 (Enviro-strategy 2030) defines the vision until 2030 considering possible, probable and desirable future development, identifies basic system issues, sets objectives for 2030, proposes framework measures for improving the current situation and contains also the basic result indicators, which will enable verification of achieved results.

The basic vision of Enviro-strategy 2030 is to achieve better quality of environment and sustainable circular economy using the least non-renewable natural resources and toxic substances, which should lead to improvment of population health. Environment protection and sustainable consumption should be a natural component part of population and policy makers awareness.

Some of objectives defined by the Enviro-strategy include[14]:

- within air protection Slovakia will achieve the set objectives and lower greenhouse gas emissions in emission trading sectors by 43 % and outside these sectors by 20 % compared to the year 2005;
- in addition to continuation in the emission trading scheme green fiscal reform is to be considered, where the burden of taxation goes to environmental taxes in line with the principal "polluter pays";
- environmentally damaging subsidies and regulations are to be elimininated. Adaptation measures are to reflect their specifics in regions and react in sufficient scope to climate change;
- energy intensity of Slovakia's industry is to approach EU average and until 2020 all types of renewable resources used in energy production will have had elaborated and accepted criteria of sustainable utilization;
- electricity and heat production from coal will be gradually lessened;
- environmental education will be performed by the state in cooperation with professional institutions, entrepreneurial sector, employers, self-governing bodies and non-governmental organizations.

[14] Enviro-strategy– Greener Slovakia. Ministry of Environment. September 2018. file:///C:/Users/admin/AppData/Local/Microsoft/Windows/INetCache/IE/ME7C47JQ/x_2017_envirostrategia_20180904.pdf

For all objectives, measures, control, monitoring and data the state has to secure sufficient financial resources, whether from public sources, or also participation of private sector. It shall be guided by the priority areas and measures, which are set by the Enviro-strategy 2030.

2.3 Slovak Energy Policy

Slovak energy sector objectives and priorities are defined in the strategic document *Energy Policy of the Slovak Republic*, which is prepared at the Ministry of Economy SR, on a long-term basis, (minimum for 20 years), while it gets updated in 5-year cycles. The last Energy Strategy update was published in October 2014 (we are expecting and update next year). The document introduces the main objective as follows: ”to support sustainable growth and competitiveness of national economy by securing sustainable Slovak energy sector on a long-term basis, while achieving energy supply reliability and stability, effective energy use at optimal costs and providing environmental protection.”[15]

2.3.1 Strategic Goal and Priorities of the Energy Policy

Slovak Energy Policy is significantly influenced by the objectives of the EU, which follow from the strategy *Europe 2020* and relate to lowering greenhouse gas emissions by 20%, increasing energy efficiency by 20% and using renewable energy sources at the level of 20% before 2020.

Main pillars of Slovak Energy Policy include[16]:

- Energy Safety
- Energy Efficiency
- Competitiveness
- Sustainable Energy Sector

Each of the pillars has partial priorities defined, which ought to facilitate efficient fulfillment.

The main priorities of Energy Policy of Slovakia include[17]:

- Optimal energy mix
- Increasing safety of energy supplies
- Energy sector infrastructure development

[15] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft.* <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>
[16] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft.* <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>
[17] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft*. <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>

- Diversification of energy resources and transportation routes
- Maximum use of distribution networks a transit systems crossing the territory of the Slovak Republic
- Energy efficiency and lowering energy intensity
- Functioning energy market with competitive environment
- Quality of energy supplies at affordable prices
- Protection of vulnerable consumers
- Solving energy poverty
- Appropriate pro-export balance in electro-energy sector
- Using nuclear energy as fossil free electricity resource
- Increasing safety and reliability of nuclear power plants
- Support of highly efficient combined production of electricity and heat

The basic strategic and legislative materials, which have been prepared since 2006, (when the original *Energy Policy of Slovakia* was ratified) dealing especially with renewable energy resources include:

- Strategy of higher use of renewable energy resources (2007)
- Act on support of renewable energy resources (2009)
- National action plan for renewable energy resources (2010)

2.3.2 Priorities of Slovakia in the area of renewable energy resources

The main objectives of Slovakia in the area of renewable energies, following from the European Union priorities, are defined as follows[18]:

- Increase share of renewable energy resources to 14% before 2020 (while in 2005 RES share was 6.7%);
- Gradually increase share of renewable resource installations to 80 production units before 2020 to 120 production units before 2030;
- Increase share of renewable resources in transport to 10%

[18] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft.* [Online]. [Quoted 15.2.2016]. Available on the web: <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>

Pursuant to *Energy Policy of the Slovak Republic*[19] increasing the share of renewable resources is one of the priorities, because "using RES especially with predictable production, in addition to environmental benefit enhances self-sufficiency and thus also energy safety"[20]. In 2010, the Slovak Republic ratified the *"National Renewable Energy Action Plan"*[21], which should support meeting national objectives in the area of energy efficiency. The document places strong emphasis on using RES in the heat area. Also according to Slovak *Energy Policy*, the main priority is using RES for the production of heat, while support of electricity production should be gradually limited. From the aspect of the RES energy mix, hydro power plants play an important role. Wind farms or photovoltaic power plants are not a priority area for Slovakia and thus economic support mechanisms, such as feed in tarrifs, should be gradually eliminated[22]. The aim of the *Slovak Energy Policy* in the context of economic support to RES is to gradually optimize feed in tarrifs in such manner not to need this state support by 2020. Geothermal energy expansion is not expected before 2020. In heat production using RES biomass should be used and should dominate in achieving the 14% objective because of its high technical potential.

The main measures, which should serve rational use of renewable resources according to the *Slovak Energy Policy* include[23]:

- Implementation of the *National Renewable Energy Action Plan;*
- Focus on financing RES projects especially on heat production from RES and support small resources for households;
- Analyze influence of support mechanisms for renewable resources on the final price of electricity and support especially local resources;
- Simplify administrative processes and speed up acquiring respective permits for installation of renewable resource facilities;
- Amend the Act no. 309/2009 Coll. on RES support.

[19] Energy Policy of the Slovak Republic is a strategic document, which defines the main objectives and priorities of the enegy sector until 2035 with the outlook until 2050.
[20] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft.* <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>
[21]National Action plan is a strategic document, which defines the main objectives and priorities of Slovakia in the area of renewable resources use.
[22] "feed in tarrifs" are one of economic support mechanisms for implementing RES, which support establishment of new technologies in the market
[23] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft*. <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>

Nuclear power plants represent a dominant part of energy resources in Slovakia, heat and big hydro power plants follow. Share of energy production from RES reached about 12% in 2016.

2.3.3 Education and Building Awareness

Slovak Energy Policy strategy also discusses the question of education and public awareness, because according to the document this area was underdeveloped so far. Level of education of energy sector professionals is a pre-requisite for meeting the national objectives. Greater emphasis should be placed on popularization of the term "*energy efficiency and sustainability*" and foundations of energy conservation should be part of education in kindergartens, elementary and secondary schools, where these topics are currently missing. The area of education and building awareness is managed by the *Slovak Innovation and Energy Agency (SIEA)*[24]. The strategy also states, that „education in the area of energy production is further supported by activities of various professional associations, non-profit organizations and funds"[25].

Energy strategy of Slovakia recommends to "prepare the *National Strategy for Information and Building Awareness in the area of Energy Efficiency*, focused on public from the early age to professionals and producers"[26], which would aim at developing education of lay and professional public, but also state administration employees.

Promotion of renewable energies should focus especially on:

- Increasing public awareness on energy efficient solutions through information campaigns and advertising
- Support of educational programs for children and youth, through creating clubs and interest groups, where students acquire new information on energy and its use

[24] www.siea.sk
[25] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft.* <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>
[26] Ministry of Economy, 2014. *Energy Policy of the Slovak Republic Draft.* <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23993>

2.4. Energy subsidies in Slovakia

The Regulatory Office for Network Industries is responsible for electricity and natural gas price regulation. There are several energy subsidies in Slovakia.

- **Brown coal subsidy** in the Nováky thermal power plant - the annual subsidy for electricity production from coal is currently in 2018 around 100 million eur.

- **Green energy subsidies for households** - Slovak Innovation and Energy Agency (SIEA) has launched a pilot project called 'Green to the Households', giving Slovakia's households the opportunity to apply for grants to buy and install sources of renewable energy. Since its launch, the project has provided over EUR 30 million in total, resulting in over 18 000 installations of new renewable energy sources. These include more than 5 000 solar collectors, 3 500 heat pumps, 1 500 biomass boilers and 3 000+ photovoltaic systems. The project's total budget is EUR 45 million and the SIEA is aiming to open two more rounds of grant applications intended for the installation of new heat pumps, biomass boilers and solar collectors outside the Bratislava region in the months to come.

- **Renewable energy feed in tarrifs** - In Slovakia, green electricity is supported by a scheme of feed-in tariffs, which however, has resulted in higher electrical prices for end consumers. Now, in 2019 the government is going to modernise the support scheme and emphasise market principles more. The revision will change the support for producers of electricity from RES. While existing producers will keep the so-far granted feed-in tariffs, new producers with an installed capacity of more than 500 kW will sell produced electricity to the state via auctions.

- **Green mobility subsidies** - By mid-November 2016, the Economy Ministry introduced a state funding programme to support purchases of electric cars in Slovakia. The programme responds mainly to the effort of European authorities to expand alternative fuels in all EU countries. Those interested in buying an electric car can ask for a state subsidy of €5,000 if they are looking to purchase a vehicle with pure electric drive, or for €3,000 if they are buying a plug-in hybrid car. The overall budget of the programme amounts to €5.2 million and the subsidy applies to all electric vehicles weighing less than 3.5 tonnes that their owners register in Slovakia.

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3. CONCLUSION

The Slovak Republic was one of the first four countries, which in 2016 ratified the *Paris Climate Agreement*. In 2018 Representatives of the Ministry of Environment introduced the environmental strategy – *Enviro-strategy 2030,* which reflects direction and objectives of Slovakia in the area of climate policy. Moreover, the Ministry of Environment currently begins works on preparation of *Low Carbon Development Strategy of Slovakia until 2030 with outlook until 2050* for selected sectors of economic activity. Low Carbon strategy should include efficient and cost effective measures in the sectors of industry, energy production, energy efficiency, transport, agriculture and forestry and waste management. Direction and objectives of the Energy Policy of Slovakia follow from the common EU objectives, which are defined especially in the strategy *Europe 2020,* but are also influenced by the document „*Clean energy for all Europeans*“, which the European Commission introduced in 2016.

National strategic documents, prepared by the Slovak Ministry of Economy and Ministry of Environment, present optimistic goals and solutions in the area of climate change and energy.

Should Slovakia follow these trends and the optimistic scenarios, and the national strategies do not remain on paper, then the country has a great potential to become a role model for other developed countries towards meeting the objectives of the Paris Climate Agreement.