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Sustainable energy development – Lithuania's way to energy supply security and energetics independence



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ABSTRACT

In this article, the possibility to increase the use of renewable energy for the production of heat, electricity, the use of biofuels for transport and energy policy is analyzed. In Lithuania the energy demand is constantly increasing, the increase in traditional fuels for energy generation continues to increase the impact on environment. The share of production renewable energy for all EU Member States until 2020 is indicated in Directive 2009/28/EC. The target for Lithuania is 23% in gross final energy consumption. In Lithuania the annual gross inland consumption of energy during years 2001 to 2010 varied from 8.22 to 9.22 Mtoe. The share of renewable energy sources increased approximately from 8.3% to 18.1%. In 2011 the gross inland consumption of imported fossil fuel comprises 81.7% and local fuel – 18.3%. The Lithuanian government has prepared and legislated acts and programs, both for the promotion of renewable energy use and increase the use of this ones in the country. The most important obstacles for faster growth of renewable energy use are high investment costs, long pay-back periods for projects, a lack of the financial resources necessary to implement governmental policies and a comparatively fast increase in prices for alternative fuels. Recently in Lithuania, renewable energy comprises about 18% of gross inland consumption of energy and about 0.3% local fuel or other fossil fuels are mainly imported from Russia. The increase of use renewable energy will improve the security of energy supply in Lithuania and also enable to reduce above 8% a greenhouse gas emission.

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1. Introduction

There are obvious reasons for increasing the share of renewable energy sources (RES) in the European Union (EU). The objectives of the EU Member States are to change their policy in order to significantly increase the use of renewable energy in such sectors: heating and cooling, electricity production and transport. EU Member States are called upon to ensure rapid, fair and simple authorization procedures for RES, improve pre-planning mechanisms in which regions and municipalities must assign suitable locations for the deployment of RES and integrate these into their regional and local action plans [1]. These measures will improve energy security, mitigate greenhouse gas emissions and reduce regional and local pollutants from the energy sector [2,3]. For these reasons, the EU set a target for Lithuania to source 23% of its gross final energy consumption from RES by 2020. Each EU Member State has a national target for energy production from RES to contribute towards the overall target. EU Member States are free to choose their preferred support mechanism to achieve their target [3]. In EU the use of RES is seen as a key element in energy policy, reducing the dependence on fuel from non-member countries, reducing emissions from greenhouse gas, and energy costs from oil prices. The date of Eurostat shows that from 1997 to 2007 installed capacity for electricity generation from RES increased by 54% in EU-27. Therefore wind capacity increased twelvefold in this period. Wood capacity and the capacity of other RES as well as geothermal, photovoltaics, municipal solid waste and biogas – exhibited an almost threefold and a fivefold increase respectively [4,5]. The capacity of hydro maintained the largest share of the total over the last ten years. However, its share fell from 91% in 1997 to 62% in 2007 in favor of wind capacity, which grew from a 3% share in 1997 to a 25% share in 2007 [4–7]. Wood and wood waste continues to make the largest contribution to the share of energy from renewable sources in gross inland energy consumption. In EU the use of renewable energy is seen as a key element in energy policy, reducing the dependence on fuel from non-member countries, reducing emissions from carbon sources, and energy costs from oil prices.

The European Commission adopted a communication proposing an energy policy for Europe, with the goal to combat climate change and boost the EU's energy security and competitiveness [8]. This set out the need for the EU to draw up a new energy path towards a more secure, sustainable and low-carbon economy, for the benefit of all users. Based on the European Commission's proposal, in March 2007 the Council endorsed the targets: to raise the share of renewable energy to 20% by 2020; to increase the level of biofuels in transport fuel to 10% by 2020; to improve energy efficiency by 20% by 2020; to reduce greenhouse gas emissions by at least 20% (compared with 1990 levels) by 2020 [3]. The promotion tasks of use of RES for energy production became a key element in energy policy of EU-27 Member States. There is large difference among individual EU Member States regarding the use of renewable energy [2,5]. For example, in EU-27 Member States as well as Sweden, Finland, Austria are leaders in this field comparing with others countries (France, Italy, Greece etc.).

In Lithuania, it is extremely important to use RES as widely as possible. The target is to increase the share of RES to at least 23% of

country's final gross energy consumption by 2020. It will ensure the further development of heating and cooling, and electricity production from RES, implementation and development of production and use technologies in the transport sector and other actions [3,8]. It will help to reduce of amounts of pollutants (including greenhouse gas) emitted into the environment, to save of fossil energy sources, to reduce of the dependence on fossil energy sources and their imports and increase national energy security. To ensure that the mandatory national overall targets are achieved, EU Member States should work towards an indicative trajectory tracing a path towards the achievement of their final mandatory targets. In addition, as is indicated in Directive 2009/28/EC the EU Member States should set out measures to achieve those targets. EU Member States have different renewable energy potentials and operate different schemes of support for energy from renewable sources at the national level. The majority of Member States apply support schemes that grant benefits solely to energy from RES that is produced on their territory.

In this study we set out the renewable energy options available in Lithuania, their current status, the main positive results obtained to date and future potential. For the proper functioning of national support schemes it is vital that Lithuania can control the effect and costs of their national support schemes according to yours potential. The increase of use renewable energy improves the security of energy supply in Lithuania and also enables to reduce a greenhouse gas emission.

2. Energy sector in Lithuania

The energy sector of the Baltic States faces specific threats, yet it has valuable opportunities for efficient and reliable operation. With a more efficient use of the available opportunities and existing capacities, the energy sector of the Baltic States can achieve a more rapid economic development in the region, strengthen its competitiveness, reduce the possible threats and avoid unforeseen interruptions in energy supply. According to this Lithuania confronts a change in the power utilization structure with an emphasis on local and renewable power [9]. A major issue concerning the future development of the Lithuanian energy sector was the decommissioning of the Ignalina nuclear power plant (NPP) at the end of 2009, which was required for Lithuania's negotiations for joining the EU. The Lithuanian National Energy Strategy, in addition to EU directives and other documents, calls for the reduction of fossil fuel imports and for the reduction of atmospheric impacts caused by energy production. The focus is on promoting the use of RES and other indigenous energy sources and on increasing energy efficiency in all sectors of the country. Lithuania must also decrease the amount of imported fuel and become less dependent on fuel suppliers. Until 2010, the main Lithuanian power resources comprised imported fossil fuels and nuclear energy [10]. The primary energy utilization structure did not change considerably before the decommissioning of the Ignalina NPP (Fig. 1). Primary annual energy consumption between 2001 and 2009 varied from 8.22 to 9.22 Mtoe (toe is ton of oil equivalent, 1 toe=11.628 MWh). In 2009, imported natural gas comprised 25.7% of the primary energy balance of Lithuania,

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