

Bio-energy in the Baltic States: Current policy and future development

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Abstract

The rapid economic growth in the Baltic States requires significant alterations in their energy sectors. This paper describes current status and specific features of the energy systems in the Baltic States, and in particular discusses the role of the renewable energy sources in the primary energy supply and energy transformation sector of these countries. The structure of the energy sectors inherited from the Former Soviet Union and constructed through several decades was inappropriate in terms of size of these countries and their access to primary energy. Based on common principles changes in the primary energy supply during the period 1990–2003 in each country are analysed. This paper presents analysis of the main driving forces for future usage of bio-energy, such as sound general energy policy in the Baltic States, favourable legislative framework, implementation of the EU Directives and corresponding National Programs. The paper focuses on comparison of existing potential for energy production from feasible renewable energy sources, trends of bio-energy production and the role of renewable energy sources for the future energy needs in the Baltic States. Due to existence of some limiting factors additional energy policy measures encouraging future development of bio-energy production in the region are necessary.

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1. Introduction

Lithuania, Latvia and Estonia, being in transition from a centrally planned to a free market economy, were experiencing fundamental transformations. The Baltic States have inherited from their Soviet past the energy sectors with a comparatively good technical structure. However, excess of capacities in the power systems of this region as well as inappropriate management of the national economies and the energy sectors were serious deficiencies on a way of integration into the European Union (EU). Therefore, recession of the economies during transition period was followed by dramatic structural changes, alteration of energy policy, gradual creation of market conditions, etc.

High dependence on import of primary energy resources from Russia, especially in Lithuania and Latvia, was and remains one of the major concerns in energy policy. In

1990, share of imported energy resources (natural gas, petroleum products, coal, nuclear fuel, etc.) was almost 98% in Lithuania, 90% in Latvia and 38% in Estonia. Therefore efforts of governments, directed to stimulation of increased use of indigenous energy resources, were common for all three countries.

In 1990s Estonia, Latvia and Lithuania have signed the United Nations Framework Convention on Climate Change and several other international conventions leading to certain environmental obligations of these countries. Since May 2004 all three Baltic States are members of the enlarged EU. Thus, their energy sectors should comply with the requirements of the EU environmental directives. In addition the Baltic States have agreed in the Accession Treaty on further increase of green energy in their energy balances and in particular all three countries have concrete obligations related with implementation of the Directive 2001/77/EC of the European Parliament and of the Council on the promotion of electricity produced from renewable energy sources in the internal electricity market, presented in the Amendment of this directive (Directive

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2001/77/EC, 2003). All these obligations requires from new member states of the EU to start with implementation of policies supporting increasing usage of renewable energy sources.

The aim of this paper is to set out some findings from analysis of the energy sector development in the Baltic States, to focus on comparative analysis of energy policy documents and alteration of energy balances in each country, to assess existing potential of energy production from renewable energy sources, to discuss trends of bio-energy production and the role of renewable energy sources in the region. The paper also presents factors stimulating and limiting faster utilization of bio-energy and other renewable energy sources in the Baltic States.

2. General overview of the energy sectors and role of renewable energy in the Baltic States

For half a century the Baltic States were tightly integrated into the Former Soviet Union and have had to live under centrally planned economy of a huge country. Energy sectors of the region were constructed through decades with orientation towards large energy consumption, as well as towards considerable exports of electricity and petroleum products. Therefore, after restoration of independence in the Baltic States their energy sectors, inherited from their Soviet past, have some features common for all countries.

2.1. Common features

Estonia, Latvia and Lithuania have well-developed power systems, which were constructed as integrated parts of the former Soviet grid, the North-Western United System. The Baltic countries are highly interconnected—power plants in each country can supply the electricity generated to internal consumers through the electricity network, which could be also used for transmission of transit flows to other Baltic States, Belarus and Russia. However, interconnections outside the region are limited and oriented only towards Russia and Belarus. Up to now the Baltic States have no direct connection to the power systems of Central and Western Europe. All three countries have district heating systems in many larger cities. Currently, due to significant reduction of heat demand the district heating systems in the Baltic States have excess capacities and require modernization.

The Baltic States have comparatively well developed systems of natural gas supply. Since mid-1970s gas has been imported to Estonia, Latvia and Lithuania by pipelines, which connected their gas systems with the “Northern Lights” pipeline transporting natural gas from the Siberian gas fields to Western Europe. Thus, natural gas imports come from a single source and are handled by the Russian natural gas monopoly “Gazprom” and its subsidiaries. Taking into consideration the large resources of the Russian gas fields, the routes and trends in their

export to the West, the existing technical supply facilities and the more stringent environmental requirements, natural gas is one of the most attractive forms of the fossil fuel. However, dependence on gas supply is one of the major concerns for the Baltic States, because possibilities for diversification of natural gas supply are very limited. The most promising option would be construction of new transit pipelines from Russian gas fields to Western Europe crossing a territory of the Baltic countries (Commission of the European Communities, 2001). Therefore authorities of the Baltic States and Poland are concerned very much about construction of the gas pipeline under the Baltic Sea that will take the Russian natural gas straight to Germany, bypassing all other countries.

Seeking to increase energy supply security construction of interconnections between the Baltic States, Scandinavian countries and Poland is one of the strategic priorities in the region. Finally a necessity to modernize power plants, district heating systems, electricity grids, pipelines and other physical installations in the energy systems is also common concern for Estonia, Latvia and Lithuania.

2.2. Specific features

Energy sectors in each country have specific features and certain differences. Electricity production in Lithuania during the transition period was based mostly on Ignalina Nuclear Power Plant (Ignalina NPP). Its share in the country’s electricity production since 1992 was fluctuating about 80%. In Estonia almost all electricity is generated by the power plants using oil shale, and in Latvia about 62% of electricity is generated by the hydro power plants. Currently, available capacity of power plants in Estonia and Lithuania is about two times higher than actual maximal demand of internal consumers. Only Latvia is lacking of capacities and about 25–40% of its internal electricity demand is covered by electricity import from Estonia, Latvia and Russia.

Specific feature of the Latvian energy sector is existence of the underground gas storage, which is significant for all three countries from the point of gas supply security. Similarly Mazeikiiai Refinery was constructed in Lithuania with intention to meet regional needs of petroleum products in the Baltic countries and Kaliningrad region of the Russian Federation.

2.3. Dependence on energy import

Dependence on import of primary energy resources is one of the most important concerns of governments in the Baltic States, especially because major part of primary energy is imported from one country. In 1990, share of imported energy resources (natural gas, petroleum products, coal, nuclear fuel, etc.) was almost 98% in Lithuania, 90% in Latvia and 38% in Estonia. Fortunately, Ignalina NPP, as the main electricity generation source in the region, has mitigated high dependence of

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