

## Greenhouse gas emission reduction perspectives in the Baltic States in frames of EU energy and climate policy

Inge Roos<sup>a,\*</sup>, Sulev Soosaar<sup>a</sup>, Anna Volkova<sup>a</sup>, Dalia Streimikene<sup>b</sup>

<sup>a</sup> Department of Thermal Engineering, Tallinn University of Technology, Kopli 116, 11712 Tallinn, Estonia

<sup>b</sup> Mykolas Romeris University, Ateities 11, LT-10101 Vilnius, Lithuania

### ARTICLE INFO

#### Article history:

Received 19 September 2011

Accepted 5 January 2012

Available online 18 February 2012

#### Keywords:

Renewable energy

GHG emissions

Biofuels

Energy efficiency

Energy sector

### ABSTRACT

The goal of this paper is to estimate the perspectives of the Baltic States: Estonia, Latvia and Lithuania on meeting the new European Union climate commitments, i.e., to reduce greenhouse gas emissions by 20% to the year 2020 in comparison with 1990. This ambitious target could be reached based on other EU climate and energy package commitments: increase of the share of renewables and improvement of energy efficiency as tools for fulfilling the GHG emissions reduction target.

The paper gives an overview on the current situation and future plans of the Baltic States in the field of energy efficiency, consumption of renewables and reduction of GHG emissions.

© 2012 Elsevier Ltd. All rights reserved.

### Contents

1. Introduction.....	2134
2. Background.....	2134
2.1. Overview of Estonian energy sector.....	2134
2.2. Overview of Latvian energy sector.....	2135
2.3. Overview of Lithuanian energy sector.....	2135
2.4. Energy and climate related targets and obligations for the Baltic States.....	2136
3. Energy efficiency.....	2136
3.1. Estonia.....	2136
3.2. Latvia.....	2137
3.3. Lithuania.....	2137
3.4. Summary of the Baltic states.....	2137
4. Renewable energy consumption.....	2138
4.1. Estonia.....	2138
4.2. Latvia.....	2139
4.3. Lithuania.....	2140
4.4. Summary of the Baltic states.....	2141
5. Greenhouse gas emissions in The Baltic States.....	2141
5.1. Estonia.....	2142
5.2. Latvia.....	2142
5.3. Lithuania.....	2142
6. Greenhouse gas emissions reduction perspectives in the Baltic States.....	2143
7. Conclusions.....	2145
Acknowledgment.....	2145
References.....	2145

\* Corresponding author. Tel.: +372 661 3653; fax: +372 620 3901.

E-mail address: [inge@staff.ttu.ee](mailto:inge@staff.ttu.ee) (I. Roos).

## 1. Introduction

In December 2008 the European Parliament adopted a set of legislative documents (the so called EU climate and energy package) for transforming Europe gradually into a low-carbon economy and increasing energy security. An agreement has been reached on legally binding targets, by 2020:

- to cut GHG emissions by 20% compared to 1990
- to establish a 20% share for renewable energy in final energy consumption and the share of biofuels up to 10% in transport fuels, and
- to achieve a 20% reduction in energy consumption by 2020 (to improve energy efficiency).

Regarding the reduction of GHG emissions, the package contains an offer to go further and commit to a 30% cut in the event of a satisfactory international agreement being reached [1].

Directive 2009/28/EC sets legally binding targets for each EU member state, in order to reach the EU aggregated target of a 20% share of renewable energy by 2020. It creates cooperation mechanisms for achieving the targets in a cost effective way. Several administrative barriers and other burdens will be removed, confirming the 10% target for renewables in transport, and biofuels sustainability criteria are fixed to ensure that only those biofuels are supported that have no negative environmental impact. The directive also has implications for small-scale emitters in sectors such as transport, buildings, agriculture and waste. By 2020, emissions from these areas are to be reduced by an average of 10% compared to 2005, divided between Member States according to differences in GDP per capita. National targets were set for member States, together with a linear legally binding trajectory for the period 2013–2020 with annual monitoring and compliance checks [2].

Directive 2009/31/EC establishes a legal framework for the environmentally safe geological storage of carbon dioxide (CO<sub>2</sub>) to contribute to the fight against climate change [3].

Directive 2009/30/EC provides a set of binding targets for the emissions from the fleet of new cars which is an important tool for meeting emission targets in the non-ETS sectors. The directive sets targets to ensure that emissions from the new car fleet are reduced to an average of 120 g CO<sub>2</sub>/km. The long-term target is set to 95 g CO<sub>2</sub>/km to be reached by 2020 [4].

Decision 406/2009/EC lays down the minimum contribution of EU member States to meeting the GHG emission reduction commitment of the Community for the period from 2013 to 2020 for GHG emissions covered by this decision, and rules on making these contributions and for the evaluation thereof [5].

## 2. Background

### 2.1. Overview of Estonian energy sector

In Estonia the domestic fuels play an important role in energy supply. The share of these fuels in the primary energy balance has remained at the level of 65–75% during the last decade. Estonia is the only country in the world to use oil shale as its major primary source of energy. Estonian oil shale as a fuel is characterised by high ash (45–47%) and sulphur (1.5–1.7%) content, low net calorific value (8.3–8.7 MJ/kg) and high content of volatile matter in the combustible part (up to 90%) [6]. Wood is another important primary energy resource: more than half of the territory of Estonia is covered by forest. The third important indigenous fuel is peat. Estonia's dependency on imported energy sources was 21.2% in 2009 [7] Estonia has no oil-refining capacity, and therefore all petroleum

products are imported to Estonia, mainly from Lithuania, Finland and Russia. Nevertheless, Estonia has a long term experience of processing oil shale into shale oil – a liquid fuel, which is the only locally produced liquid fuel. Estonia has no indigenous natural gas, so it is fully dependent on imports of natural gas from Russia. In total primary energy consumption, the share of fossil fuels is very high, approximately 90%.

The Estonian electricity sector is well developed and mainly organised around Eesti Energia AS which is a state – owned company engaged in power generation and sales throughout the country. There are also some privately owned companies in the market dealing with generation as well as with the distribution of electricity (small-scale combined heat and power generation, mini hydro and wind turbines). In total, the power plants of Eesti Energia AS generate approximately 91% of the electricity in Estonia [8]. Estonia has always been a net exporter of electricity, mainly to Latvia, but also to Finland, Russia and Lithuania. The only time when import exceeded the export by 82 GWh was in 2009.

The structure of primary energy supply in Estonia is shown in Fig. 1.

In 2009, the primary energy supply totalled about 199.8 PJ in Estonia. The major part (81%) of it was utilised in conversion processes. Approximately half (51%) of the converted primary energy was used for electricity generation, and the rest for heat production (24%) and manufacturing secondary fuels, mainly shale oil and peat briquettes (25%). 8% of primary energy was utilised in the energy sector, including the use for non-energy purposes and transmission and transportation losses. About 11% went directly to final consumption [8].

In Fig. 2 final energy consumption by sectors is presented. The biggest energy consumer is households sector – 45%,

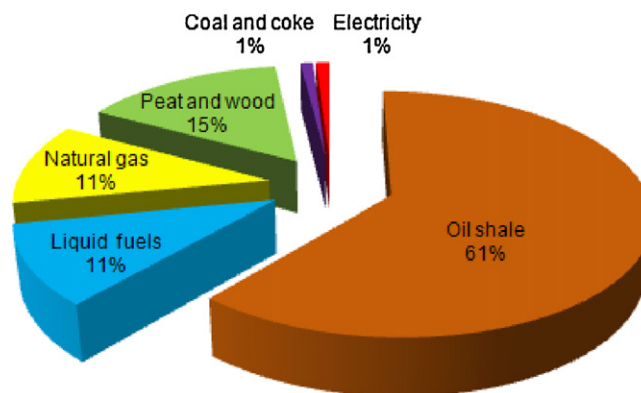


Fig. 1. Primary energy supply in Estonia, % [8].

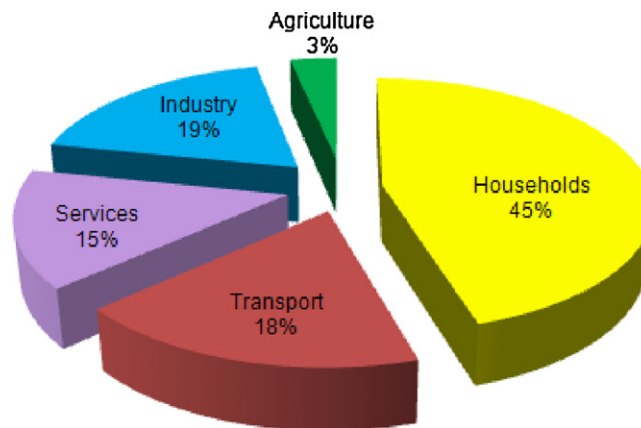


Fig. 2. Final energy consumption in Estonia, % [8].

Download English Version:

<https://daneshyari.com/en/article/1750469>

Download Persian Version:

<https://daneshyari.com/article/1750469>

[Daneshyari.com](https://daneshyari.com)