METHODICAL GUIDELINES FOR PREPARATION OF LITHUANIAN GHG EMISSIONS PROJECTIONS

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Overview

Although greenhouse gas (GHG) emissions in Lithuania are relatively low, the country's contribution is essential for the implementation of international climate change agreements: the United Nations Framework Convention on Climate Change and its Doha amendment to the Kyoto Protocol, the Paris Agreement and the climate change mitigation objectives consolidated in the European Union legal acts seeking to ensure that the average global temperature rise well below 2°C from times of the industrial revolution and the objective of halting global warming at 1.5°C limit. Striving to improve the quality of GHG emissions projections in Lithuania by linking the forecasts of GHG emissions to the perspective development of the Lithuanian economic sectors the methodical guidelines for GHG emissions projections has been prepared.

This paper presents the main principles of the recommended methodology for preparation of Lithuanian GHG emissions projections.

Method

First of all, the general requirements of preparation of the GHG emissions projections are based on the analysis of international legislation that sets different requirements: UNFCCC decisions, Regulations of the European Commission and requirements for the Integrated National Energy and Climate Plans in the Proposal for a Regulation of the European Parliament and the Council on the Governance of the Energy Union (30 November 2016). Analysis of the climate change mitigation measures and their impact asessment requirements was caried out according to the different clasification criteria.

Secondly, the analysis of national GHG emission trends for 1990-2014 period according to the different source categories was performed seeking to investigate the most important factors influencing the amount of emissions.

Thirdly, recommendations regarding application of appropriate methods for national GHG emisisons projections for each source category were formulated based on results of the best practise analysis of various forecasting methods and taking into consideration the existing experience in GHG emission modelling.

Results

The largest source of GHG emissions in Lithuania is the energy sector (fuel combustion) that accounted about 54% of the total national GHG emissions in 2014 (Fig. 1). Historically the energy industries accounted for the largest share of GHG emissions from the energy sector. In 1990, energy industries accounted for 40.9% of total GHG emissions from the energy sector, transport – 17.6%. In 2014, share of transport increased till 46.3% and energy industries accounted for 28.5%. The closure of Ignalina nuclear power plant stipulated significant increase of electricity import from neigbouring countries, increased use of renewable energy sources and natural gas. These changes in the energy sector stipulated decrease of GHG emissions, particularly in public electricity and heat production sector.

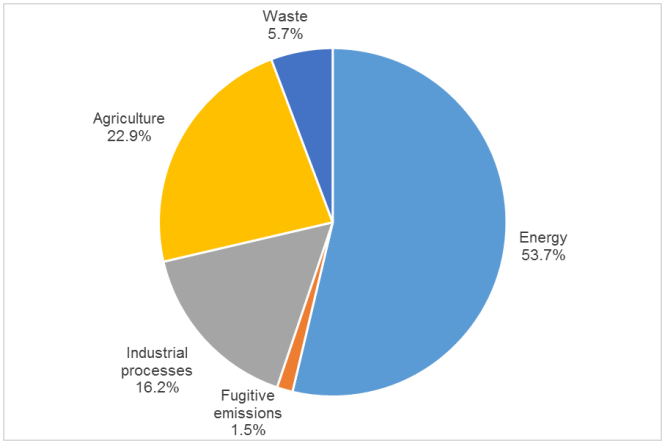

Fig. 1. GHG emissions structure in Lithuania (2014)

Performed analysis of international legislations related to GHG emission projections allowed to distinguish four levels of national GHG emission projections, as presented in Figure 2.

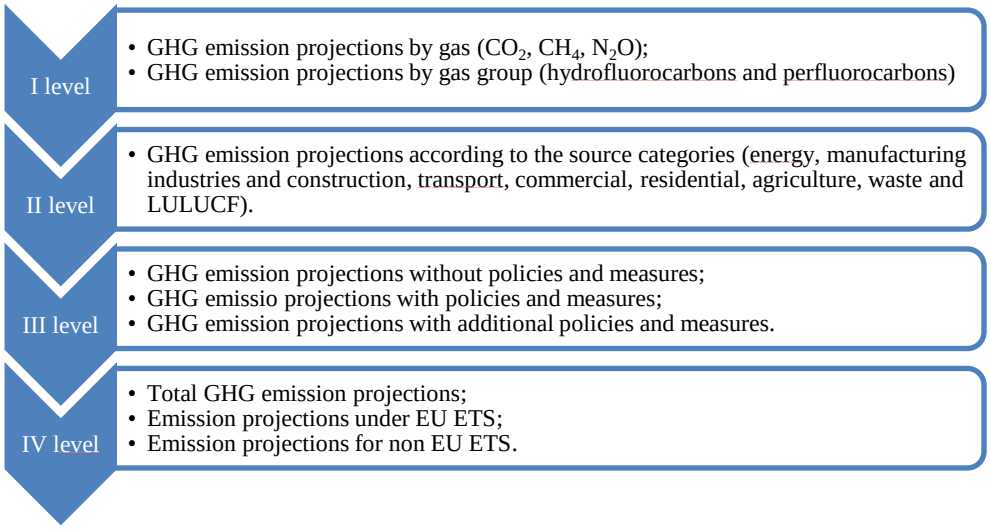

Fig. 2. GHG emissions projection levels according to the general requirements of forecasting

Methodical guidelines for GHG emissions projections were prepared taking into consideration mentioned four levels. The perspective assessment of GHG emissions is inherent from the analysis of prospective development of economic sectors. The perspective development of different economic sectors and their impacts on GHG emissions, however, implementation of targets set for reduction of GHG emissions has a feedback impact on the development of economic activities. Seeking to increase the soundness of forecasts of GHG emissions, their preparation has to be closely related to the analysis of the prospective development of energy, industry, transport and other sectors.

A forecasting of GHG emissions requires an integrated approach and modern tools used for modelling of developments in all branches of economy and assessing emissions. Methodological guidelines for preparation of GHG emissions projections are based on the integrated approach to prospective development of economic branches, and at the same time assess the possibilities of current status. The recommended methods and tools for the preparation of GHG emissions in different economic sectors differ in their detail and ease of use, however, over time, coupled with more information, they can be improved, new methods learned and the balance between the optimal development of economic sectors and environmental impacts reached.

Seeking to forecast GHG emissions in the energy sector, it is recommended to apply methodology which is based on the optimization of the perspective development of the energy sector considering to the environmental aspects. In general long-term planning of the energy sector development has two stages: firstly, forecasting of energy demand; secondly, optimization and analysis of the sector development scenarios. It is recommended to apply econometric model for forecasting of energy demand and the optimization modelling tool MESSAGE to apply for investigation of possible options of the energy sector development and projections of GHG emissions based on various scenarios of the energy sector development. Methods based on the IPCC Guidelines for national GHG inventories taking into account projection factors, emissions factors and other calculation parameters are recommended to apply for other source categories.

Conclusions

Analysis of economic sectors development, application of various policies and measures and GHG emission projections are extremely linked to each other. Development of one branch of the economy and its impact on the environment is an integral part of the development of other sectors of the economy and environmental impact.

This issue is taken into consideration in the proposal on the Governance of the Energy Union. Under this proposal EU Member States will have to prepare an integrated national energy and climate plan for 2021-2030 by 2019. GHG emissions projections requires an integrated-complex approach and application of the modern tools for analysis of all economic sectors development and emission assessment.

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