



Benchmark Methodology for Reduction of Greenhouse Gas Emissions

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Background

Latvia is placed among those European Union Member States with high technical potential to improve energy efficiency and to reduce greenhouse gas (GHG) emissions. In order to achieve that it is necessary to make different surveys on economical tools to promote implementation of GHG emission reduction and RES measures in energy installations.

Benchmarks are quantitative emission factors for produced unit (e.g. $\times \text{gCO}_2/\text{MWh}$). These are quantitative parameter base lines that are estimated by political decisions.

The goal of this study is to estimate regional emission benchmarks for Latvian energy installations that could be used by Latvian government when different alternatives will be evaluated to reach the objectives stated in the RES directive for 2020.

Methodology

For the study data on fuel consumption of around 3600 energy installations have been collected from the state database "Gaiss 2" (above 200 kW). CO_2 emissions and energy for each installation has been calculated according to the methodology approved by the Latvian government.

For the estimation of the benchmarks the following parameters should be taken into account:

- activity data (tCO_2 / \dots):
 - ✓ input energy (tons or m^3 fuel; MWh fuel);
 - ✓ installed capacity (MW);
- output energy (MWh):
 - ✓ MWh electricity;
 - ✓ MWh heat;
 - ✓ MWh electricity and heat (cogeneration cycle);
- fuel-dependent or fuel-independent benchmarks.

In this study benchmarks based on input energy is used as detailed information regarding energy efficiency and output energy of each installation cannot be obtained.

Acknowledgment

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Results

Distribution and consumption of the main fuels by 5 large regions (Kurzeme, Zemgale, Vidzeme, Latgale and Pieriga region) is shown in Figure 1.

As shown in the Fig.1 in the energy installations included in this study mainly is used natural gas (75%) and wood resources (22%). In Pieiga region the share of natural gas reaches approximately 91%, however greatest fuel diversification is in Kurzeme region, where besides natural gas and wood resources as well as diesel oil, coal, heavy fuel oil and other fuels are used. In the meantime wood resources mainly are used in Vidzeme (approx. 81%), which likely is explained with the high share of forested area in the region (around 52% of total area of the region) like in Kurzeme region. Percentage of total CO_2 emissions from the selected energy installations by regions in 2006 is showed in Figure 2. While benchmarks for all 26 regions in Latvia are given in the figure 3.

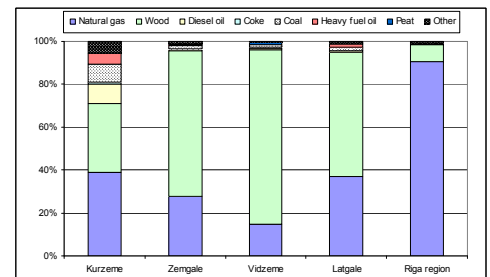


Fig.1. Share of fuels in 5 regions

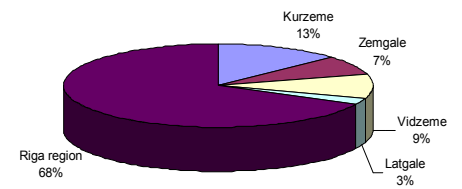


Fig.2. Percentage of CO_2 emissions by regions in 2006

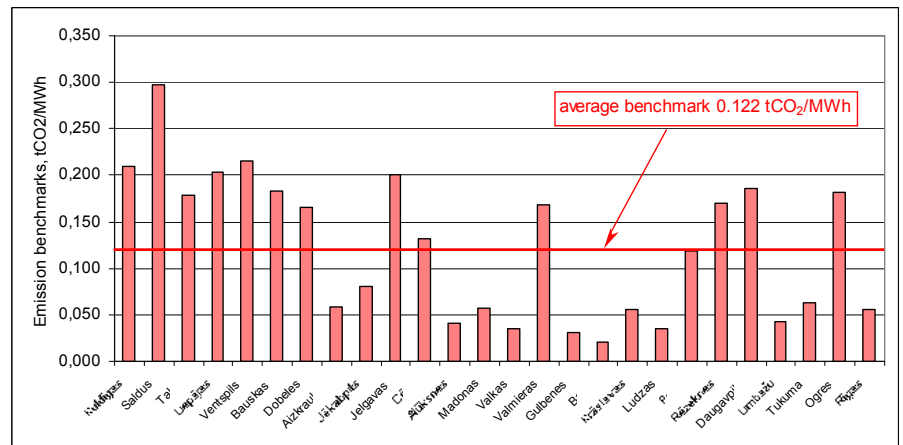


Fig.3. Emission benchmarks of 26 regions in Latvia

Though Riga region is the most economically active and emits around 2 million tCO_2 per year, emission benchmark for the region is rather low – $0.056 \text{ tCO}_2/\text{MWh}$. The average emission benchmark of Latvia is $0.12 \text{ tCO}_2/\text{MWh}$.

Conclusions and application

- This research gives the first analysis on the level of use of RES at regional level
- Developed benchmarks can be further introduced in the support mechanisms for RES and in state energy policy;
- It is a good starting point for the revision of CO_2 tax ($0.5 \text{ Euro}/\text{tCO}_2$) that is now applied to energy installations (installations under EU ETD excluded);
- Calculated benchmarks can be used for developing the next National Allocation Plan in the framework of EU ETD.