

Towards climate neutrality: economic impacts, opportunities and risks

Friday, March 18, 2022 - Friday, March 18, 2022

Zoom



**80th International Scientific
Conference of the
University of Latvia 2022**



Book of Abstracts

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Computable General Equilibrium Model as a Tool to Assess the Impact of Climate Policy in Latvia

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Abstract. Ambitious climate policy targets by developed countries towards carbon neutrality created a necessity to model the impact of climate policy on macroeconomic and socioeconomic indicators. Academic literature suggests that Computable General Equilibrium (CGE) model representing the entire economy, linked with a TIMES model reflecting the energy sector in detail, proved to be an effective tool for such modelling. This research contributes to the starting point for creating such a modelling system in the University of Latvia (CGE model) and the Institute of Physical Energetics (TIMES model), focusing on the CGE model. First, it reviews the literature on the use of the CGE model and its effective link with the TIMES model to assess the economic impact of climate policy. Second, it reviews the features of the current Latvian CGE model owned by the University of Latvia, compared to its ORANI-G model prototype. Third, as a list of recommendations, it proposes a roadmap for the future development of the Latvian CGE model to be effectively linked with the TIMES model to assess the impact of climate policy on macroeconomic and socioeconomic indicators.

Keywords: Computable General Equilibrium model, climate policy modelling, soft-link.

JEL codes: C68, Q54, Q58.

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Structural limits of Czech energy policy

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Since the first State Energy Policy of Czech Republic in 2004, the country has based its energy policy efforts around two concepts: independence and autarchy. This philosophical background leads to long-term support of conventional fossil fuels industry: coal, nuclear and natural gas power plants with very rigid acceptance of modern energy policy approaches. Long-term interference of Czech national strategies with EU climate neutrality reached its frontier with the European green deal and the EU taxonomy for sustainable activities, leaving the national energy policy in ashes. The presentation focuses on identification of structural in-depth reasons for Czech energy policy rigidity. The outcomes could serve as lessons learned for energy policy creation. The presentation is based upon long-term research at the Center for Energy Studies of Masaryk University in Brno, Czech Republic, focused on the Czech Energy Policy, its formation and execution. A monograph is about to be published on the topic within a year.

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The potential impact of energy policies on energy costs

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Moving forward to the ambitious goals of climate neutrality governments are looking for the most cost-efficient solutions. Due to this, it is highly important to identify the potential costs positions to be reflected in the zero emissions models. The research focuses on the different world sustainable energy policy scenarios and corresponding policy instruments in relation with the factors affecting energy costs. The research concludes that factors affecting energy costs could be combined into to the three basic groups: energy demand factors, energy supply factors and energy system and network costs. It highlights that future persistence assessments against cyber threats should be treated with caution, as a false sense of security is a major vulnerability. Similarly, system scale changes can lead to an essential change in the threat perception. At the same time, digitization of energy systems has a great potential to effectively speed up efforts to achieve carbon neutrality to promote the achievements of data, analytics, and systems, and this can significantly increase the overall energy infrastructure efficiency and energy use with reduced costs. Development of climate neutral plans at the municipal level has also a particularly great potential, considering local features and opportunities for higher rate or renewable energy sources in the local energy portfolio. However, moving towards sustainability purposes, it is highly important to ensure an optimal energy trilemma balance without compromising energy security and ensuring relatively lower energy costs, facilitating a competitiveness of economy.

Key words: sustainability, energy costs, energy modelling, zero emissions

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The Energy Trilemma Index as a tool to support national security of energy system towards climate neutrality

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The World Energy Council's (WEC's) Energy Trilemma Index tool ranks 127 countries on their energy system performance through 3 dimensions: energy security, energy equity, environmental sustainability. The goal of the Index is to provide insights into a country's relative energy system effectiveness in each dimension and together. Highlighting challenges and opportunities for improvements, for example, regarding the transition to renewables, where new challenges might arise. Without disclosing original methodology of Energy Trilemma Index, this research reviews status quo of Latvian national energy security dimension. The aim of this study is to investigate Latvian energy security dimension to assist decision makers describing the key points that can move the energy sector onto safer ground. The dimension of energy security considers various sub-indicators that covers the effectiveness of management of domestic and external energy sources, along with the reliability and resilience of energy infrastructure. Up to ten-year period retrospective analysis of statistical records of those indicators as well as Latvian and foreign scientific and professional research studies was revised by authors and discussed with another 12 experts from a programme "The Future Energy Leaders Latvia" organized by the Latvian WEC committee. In conclusions, authors highlight most important opportunities and potential risks of no actions for Latvian energy security dimension. Authors also acknowledge need for new sub-indicators to represent an evolving energy system in transition.

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Life cycle assessment of renewable energy sources towards climate neutrality

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The National Energy and Climate Plan 2030 (PNEC 2030) is the most recent instrument defining the Portuguese decarbonisation strategy. In a 2030 horizon, it sets ambitious targets for reducing greenhouse gases, incorporating renewable energies, improving energy efficiency, and increasing energy security.

This study compares renewable energy sources (RES) and natural gas' environmental impacts in electricity generation. To such an end, a Life Cycle Assessment (LCA) was performed to understand how the construction, operation, and decommissioning stages will affect several environmental indicators. The assessment focused on hydroelectric power, onshore wind, solar photovoltaic, and concentrated solar. The study evaluated potential global warming, fossil and mineral resources use, land occupation, and water consumption. The impacts on the 2020 energy mix were compared with PNEC2030's projections.

The results show that, with the increase in RES, global warming impacts and the use of fossil resources will decrease considerably. In contrast, land use and mineral resources usage are expected to increase. While the natural gas impacts are primarily associated with the operation stage, renewable sources impacts are predominant in the construction, with little expression in the operation and dismantling stage. Despite the renewable nature of the new production plants' resources, their impact on the environment is not negligible, revealing the importance of the LCA.

The relevance of the LCA lies in enabling the understanding of the potential consequences of the decarbonisation strategy outlined for 2030, allowing to speed up the decision-making process regarding pollution prevention and optimisation of the use of resources for a broader horizon.

Keywords: Life Cycle Assessment (LCA), Renewable Energy Sources (RES), PNEC 2030

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CSR and its Role in Communicating Climate Change Challenges

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Corporate world has long assessed the importance of the corporate social responsibility (CSR). Climate and environmental impact are one of the most important parts of CSR reporting and communication. Firms, communities, and individuals must shift their perspectives on CSR from voluntary actions to almost obligatory initiatives. In light of expected climate challenges, this study advocates concentrating CSR reporting and increasing our inquiry into the role of communication in environmental efforts. Communication is more than a means of cultivating a positive business image in order to obtain or maintain legitimacy. It is the method by which CSR-related sustainability, environmental and climate change projects are developed. The study has reviewed CSR dimensions and initiatives, CSR reporting and role of communication in environmental challenges. This research has

used secondary qualitative method, reviewing previously published scholarly literature and studies on the selected topic. The findings cannot be considered exhaustive and conclusive, but have provided a better insight and perspective on the mentioned frameworks and their interpretations. CSR and sustainability communication have traditionally been viewed through the lenses of public relations, marketing, public affairs, and crisis management. Communication was frequently viewed as a means of enhancing a business reputation and credibility, and has been used to address climate change and environmental concerns to a lesser extent. Researchers and practitioners must consider the role of CSR communication in a broader context. Given the difficulties connected with climate change, good communication is critical for mobilization and deciding on goals through consensus.

Keywords: *Corporate social responsibility, climate change, sustainability, corporate communication*

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Latvia's green energy development - at what expense?

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Abstract

In 2019 The European Union member countries made a pact that they will become climate-neutral by the year 2050. The study aims to analyze the assessment of the World Energy Council's Trilemma Sustainability Index. The study contains the following research methods: analysis of publications, strategic documents of companies. The authors have concluded that the sustainability of the Latvian energy sector is based on historical

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Distributional Implications of GHG mitigation policies: Methods and Insights

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The decarbonization of the energy system will not impact uniformly the different activities of the economy. Countries and sectors producing materials, equipment and services related to reducing GHG emissions (such as RES technologies, batteries, energy saving equipment, RES fuels) will benefit from the energy system transformation whereas activities related to the generation of GHG emissions (such as fossil fuel mining/extraction, refineries, fossil based power generation, repair of conventional vehicles) are expected to decline. Changes in the structure of the energy and economic systems will be accompanied by changes in electricity prices and changes in financing requirements: the purchase and operation of energy and electrical equipment/appliances will change from low CAPEX/high OPEX to high CAPEX/low OPEX. The changes in prices and production levels will affect households' disposable income. Households whose income is linked to fossil-based activities and low income households (that will face high upfront costs in purchasing energy saving equipment) will both be negatively affected. General equilibrium models often feature one representative household over the national economy. This aggregation although useful when large scale modelling

is required (covering many countries and for many years) may mask critical insights regarding distributional implications among household types. This study uses a large scale CGE model soft-linked with a bottom up representation of multiple households in order to assess the distributional implications across households of ambitious GHG mitigation policies.

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Energy Equity and its Evaluation Methodologies

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Keywords: Energy trilemma, Energy Equity, WEC methodology, energy performance in Latvia, new indicators / tools.

Energy Equity is important to guarantee the economical wealth of the population and business in countries. The overall global preview is developed according to the World Energy Council (WEC) energy trilemma methodology which assesses the performance of many countries around the world in terms of their ability to provide universal access to energy, its quality and affordability for both households and commercial enterprises.

According to the WEC methodology and the basic Energy Equity parameters, electricity is 100% technically available for several decades in Latvia. Around 94-96% of the Latvian population have the opportunity to cook using clean energy and technologies. Also the affordability of electricity prices for the population in Latvia is evaluated with the highest rating. Thus, fuel and electricity prices downgrades Latvia's rating of Energy Equity.

The global parameters are used in WEC methodology, they are common for all countries under the scope and are indicative to show the performance of each country in the context of other countries. Analysing the performance of one country with the aim to find solutions to improve the global rating appropriate parameters are needed to take into account the uniqueness of the country.

There is a need to assess the Equity of Energy at the national level. The development of the new model is based on the analysis of various information sources and databases, taking into account the experience of other Energy Equity methodologies. The aim is to develop indicators that will be able to analyse the situation in Latvia. For example, new indicators will take into account the heating aspect, which is important in Northern Europe and is not included in the WEC methodology. It is expected that developing a new model will determine the possibilities to improve the Equity of Energy in Latvia.

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Tourism Transformation into Responsible Form towards the Sustainable Development

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Tourism is a cross-cutting economic activity with a wide-ranging impact on the environment, climate and economy, in particular on the regions' economic growth, employment and social and sustainable development. For quite a long time, the development of tourism was based on economic goals – income generation, export of services, job creation. However, with the emergence of tourism monoculture and the negative consequences of tourism development in highly visited regions, increasing

attention has been paid to integrating sustainable and responsible tourism concepts into tourism development programs, disseminating information to the public and putting them into practice. The aim of the research is to evaluate tourism transformation into responsible form towards the sustainable development. The research methods of scientific literature analysis and synthesis, data analysis, situation modelling, logical conclusions are used. The results of the research revealed that tourism, due to the circumstances (exacerbation of the negative effects of tourism and the sector has experienced a stagnation in recent years) may be the opportunity to transform the pre-existing form of operation of the sector into more responsible and sustainable tourism. To achieve the results of tourism transformation into responsible form towards the sustainable development, the involvement and unity of the actors of the tourism system and complex initiatives and actions are needed. Tourism has an obligation to use its unique power to lead the response to the climate emergency and ensure responsible growth.

Keywords: tourism, responsible tourism, sustainable development, climate change.

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TOWARDS CLIMATE NEUTRALITY: DIMINISHING OF THE CO₂ EMISSIONS IN CONSTRUCTION MATERIALS' PRODUCTION IN LATVIA

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Keywords: “green economy”; construction materials; CO₂ emission reduction.

According to the Regulation 2018/842 of the European Parliament and of the Council, EU countries should reduce the emission of the CO₂ and not only by offering alternative energy sources, renovating (insulating) existing buildings, using electric transport, sorting waste etc., but also by using “greener” building materials in construction (e.g., use of recycled steel, change of the concrete in building construction to the wood, etc.).

These requirements probably will change Latvian building materials manufacturing sub-sector and, by statistical sub-sector's numbers, directly or indirectly it may touch:

- More than 100 000 employees (data of Central Statistical Bureau, Republic of Latvia) biggest part of whom receives approximately 1000 - 1500 EUR brutto salary (CSB data on 2021 Q2);
- Summary metal product and wooden product approximately export amount 600 mio EUR (CSB data on 2021 Q2).

Research's tasks:

- 1) Analyze the time-series of salaries in the construction field (with possible specification in construction material production) and evaluate the influence of Covid-19 pandemic;
- 2) Analyze the development of construction materials production in Latvia taking into account the requirements related for use of “greener” construction materials in construction. Analyze the Latvia's export of construction materials.

Expected results

Research results could be useful and used as one part for future development of a specific mechanism (impact) to be offered to construction material production companies in Latvia, which would help to assess the factors influencing the production sub-sector (in terms of CO₂ emissions reduction). Consequently, that should allow the companies to become more competitive doing export.

Finally, the topicality of the research is related also to the fact that there are no empirical studies and scientifically substantiated evidence of the existing performance of the already implemented investment program in Latvia in the field of construction materials production.