

Management Aspects of the “Green Economy” in the Production of Construction Materials in Latvia Within the Requirements of the European Union in the Context of Reducing CO₂ Emissions

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Abstract. Requirements of CO₂ emission reduction of international institutions is becoming higher in a construction sector and Latvian and EU authorities are underlining the importance of use of “greener” building materials, for example to increase the use of wooden structures. Researchers in many developed EU and non-EU countries are paying a lot of attention to a low-carbon target in a construction sector, in Latvia at the moment this subject just starting to be widely discussed. The aim of the present paper is to discuss a topicality of the question on reduction CO₂ emissions in construction material production in EU and non-EU countries, and an actuality of this question application in Latvia considering construction development tendencies. Research methods applied in research: scientific publication analysis on several aspects of CO₂ emission reduction in different countries and analysis of statistical data on construction development tendencies in Latvia. Statistical data are indicating that construction in Republic of Latvia has stable tendency to keep approximately the same level since 2018 with significantly bigger share for non-residential buildings. In 2021 Q2 a “green” building material – wooden production sub-sector – occupies a significant part from total Latvian export - 19,8 %, and provisionally continues to grow. Considering such situation and perspectives, it is recommended to Latvian authorities to begin a development of the policies planning documents at government level, defining objectives, roadmaps, regulations, and other documents in order to achieve goals in signed memorandum (April 2021) between Latvian Ministry of Economics and diverse local actors..

Keywords: Green economy, construction materials, CO₂ emission reduction.

1. Introduction

Requirements of CO₂ emission reduction of international institutions is becoming higher in a construction sector and Latvian and EU authorities are underlining the importance of use of “greener” building materials, for example to increase the use of wooden structures. Researchers in many developed EU and non-EU countries are paying a lot of attention to a low-carbon target in a construction sector on reduction CO₂ emissions in construction material production in EU and non-EU countries, and specifically this question in Latvia’s realities.

Multiple EU prescriptive documents (e.g., No. 2018/842) present specific targets of CO₂ emissions reduction to be achieved by member-countries (including Latvia) before 2030. The way to achieve such reduction of the CO₂ is also by using “greener” building materials in a construction (e.g., increase the use of wooden material), that probably will change Latvian construction material manufacturing sub-sector and directly touch wooden production, that for the 2021 Q2 occupies 19,8 % from total Latvian export (Official Statistics Portal of Republic of Latvia). And not only an export area, as recently (April 2021) an important memorandum was signed between Latvian Ministry of Economics and diverse local actors of the wooden manufacturing and construction industry in order to promote use of sustainable construction materials and construction products in Latvia. It is worth to mention that memorandum underlines that “Construction industry in Latvia plays an important role in economic growth” and “the use of wood in construction is essential for the construction industry to achieve the European Commission's goal of creating a sustainable and climate-neutral economy by 2050” (Ministry of Economics of Republic of Latvia, 2021). So, at the moment wooden manufacturing is very optimistic and that mood continues to improve (Strautiņš, 2021), the industry has not yet seen such interest in itself both in export and internal market.

Key questions that are asked in the paper are:

- What could be a global context of the CO₂ emissions reduction in construction materials production in EU and non-EU countries?
- What is an actuality of this subject and question application in Latvia taking into account tendencies for construction in Latvia?

Problematic aspects of such topic may be related to a skepticism of the entrepreneurs participating in the questionnaires and by their low activity in collaboration with the research authors and in filling questionnaires. The entrepreneurs may not fully agree with the topic that reduced CO₂ emissions in the production of their materials can help to do export more competitive. Or they may not be fully informed of such possibility by governmental organizations and sector associations. Besides, the entrepreneurs may not also see the direct connection between proposed managerial solution and gained profit.

A possible delimitation of the subject is related with a strict focalizing only on Latvia’s situation in “greener” construction materials’ production, while to have

fuller picture of the problematic it is recommended to make a contrastive comparison with one of the EU countries with a bigger percentage of CO₂ emissions reduction to be achieved than the Latvian before the 2030.

2. Literature Review

Researchers in many developed countries are paying more and more attention to “green economy” and corporate social responsibility in construction (Olanipekun, et al, 2020) as the requirements by international institutions and society in many developed countries are requiring more and more high standards towards “green economy” including CO₂ reduction. Research results indicate that some branches on the national economy are requiring several important steps in CO₂ reduction (Susanty, et al, 2021), including transportation in Balkan countries (Karaduman, et al, 2020). Japan has already respectable experience in use of construction materials with reduced CO₂ in housing and big attention in global warming reduction (Ishida, 2008) where are used well developed technologies and construction materials. Researchers are analyzing taxing influence on CO₂ reducing (Stapleton, et al, 2006) and have suggested policy changes for Irish government. Researchers have investigated different results in CO₂ emissions by building ownership (Reed & Wilkinson, 2005) to introduce innovative approaches. Researchers (Ilhan & Yobas, 2019) have evaluated the relationship between construction for social, economic and environmental aspects. Researchers (Jackman & Moore, 2021) have investigated the differences in payment for work between “green” and “not green” industries with research results on impact of wage differences. Research on the impact of green growth on financial stability (Jadoon, et al, 2021) revealed that overall green growth enhanced FS in the country for both the short and long run.

With Europe's economic systems growing rapidly (Vonyo, 2008) the issue of sustainable development and the resource economy has become particularly actual, especially with the adoption of the Rio Declaration on Sustainable Economic Development by more than 100 countries and updating the commitment to continue its implementation at the 2012 Rio + 20 Summit in the “Green” economy frame.

This commitment introduces a new wording - “green economy”, which marks it as “one of the important tools available for achieving sustainable development and that it could provide options for policymaking” (RIO+20, 2012). Such direction for policymaking is also important for Latvia as the principles of sustainable development have promoted the development of new innovative technologies and infrastructure, thus becoming one of factors in economic growth.

Researchers from Japan (Da-Young, *et al*, 2014) have proposed various research based suggestions on reuse of building material waste in Japanese cement industry for CO₂ emissions reduction.

Researchers from Taiwan (Yu-Hao, *et al*, 2021) have discussed several important aspects for construction by use of so called «green building envelopes» and air

conditioning systems proposed by the Taiwan government and researchers have developed and discussed two different models among them the second model considers minimal CO₂ emission when the envelope materials are manufactured and used from the building envelope (Yu-Hao, *et al*, 2021).

Researchers from China (Wang, *et al*, 2020) by discussing their research results on CO₂ emissions reduction suggest real recommendations for optimal use of construction materials and concrete technologies for construction. Researchers from China (Liu, *et al*, 2020) in detail have analyzed several construction materials uses including detailed instruction preparation for bricks.

Researchers from Croatia and Sweden (Meha, *et al*, 2021) have suggested practical recommendations on CO₂ emission reduction based on analysis of different scenarios.

New technologies in construction of apartments and new construction material use for CO₂ emission reduction analysis was performed by researchers from South Korea (Won-Kee, *et al*, 2010) are proposing new construction materials ensuring CO₂ emission reduction.

Researchers (Wang, *et al*, 2017) have stated research question «Is the CO₂ emissions reduction from scale change, structural change or technology change? Evidence from non-metallic sector of 11 major economies in 1995–2009 »where the research result was based on the results is suggested the model, this paper presents some implications for the non-metallic sector CO₂ emissions reduction and low-carbon development. Researchers (Hasanbeigi, *et al*, 2012) have stressed that with increase of use of construction materials it is increasing also CO₂ emissions but the regulations and requirements for CO₂ emission reduction motivates scientists around the globe look for more efficient construction materials. Several aspects for organization of the business are on great importance (Raudeliūnienė, *et al.*, 2021; Rupeika-Apoga, *et al*, 2019 ; Tang & Cheung, 2010; Raudeliuniene & Szarucki, 2019; Tang, *et al.*, 2016; Davidaviciene, *et al*, 2019) where the resarchers have proved importance of different influentive factors.

According to the Regulation 2018/842 of the European Parliament and of the Council, EU countries should reduce the emission of the CO₂ until year 2030 (European Parliament, 2018). The percentage of reduction per country and in relation to their level in year 2005 is indicated in Annex I of the Regulation. By that, Latvia should reduce its emission of the CO₂ on – 6 %; Estonia on – 13% and other more developed countries around – 35-40% (for example, France – 37%, Sweden – 40%). Important to underline, that in developed EU countries National Energy and Climate Plans 2021–2030 the ways indicated to reduce emission are 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 (Sweden’s Integrated National Energy and Climate Plan, 2020; Integrated National Energy and Climate Plan for France, 2020) (e.g., focus on building in wood instead of concrete, etc.). Latvia’s National Energy and Climate

Plan 2021–2030 also points out that the target status quo in 2030 is the “wood use volumes in construction have increased” and expects the relatively rapid growth in one of largest manufacturing sector — wood processing (Latvia’s National Energy and Climate Plan, 2020). That might be related with export of wooden construction products (e.g., wooden frame houses, laminated timber etc.) to other EU countries according to mentioned above increasing demand.

3. Research Results and Discussion

In Latvia construction always has been an important part of national economy. Recent tendencies in new construction in Latvia are included in Fig. 1.

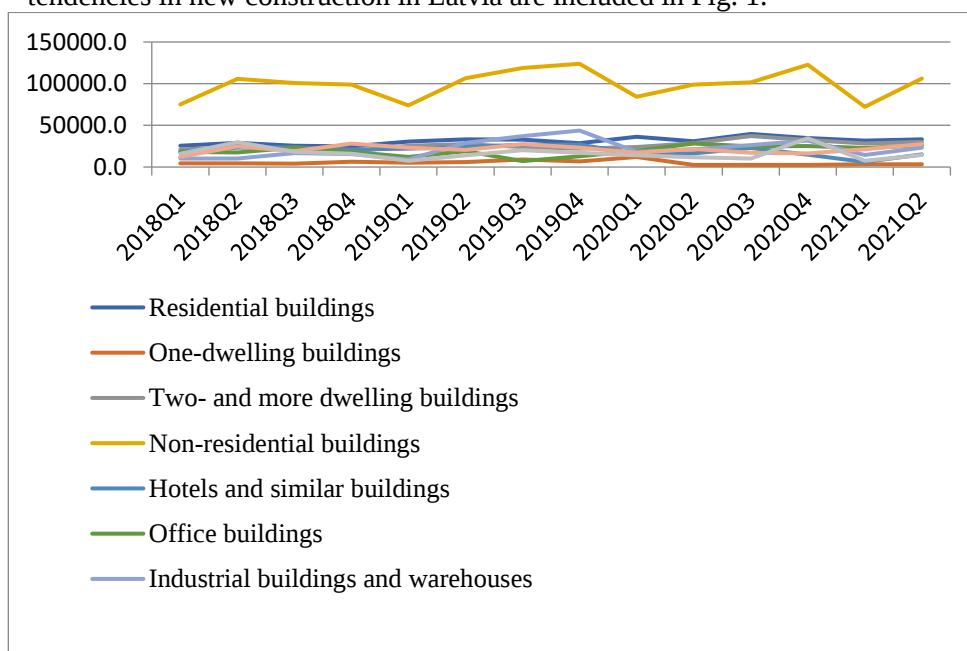


Fig. 1: Construction of buildings output at current prices by building type, thsd euro 2018-2021 in Latvia (Source: author’s construction based on Official Statistics Portal of Republic of Latvia B, UP030c)

Statistical data are indicating that construction in Republic of Latvia has stable tendency to keep approximately the same level since 2018 with significantly bigger share for non-residential buildings. Important is not only data in monetary volume, but also in real numbers – for that it is used “Calculation of the volume index of production in construction (henceforth – the IPC) is based on the chain-linked index method. Within the framework of it, the average volume of construction work done (at constant prices) in previous year is used as a calculation basis, and the value added of construction enterprises produced two years ago by NACE chapters is used as weights. IPC is calculated by recalculating construction production value indicator at

constant prices with the help of corresponding construction cost indices” (Official Statistics portal of Republic of Latvia, 2021).

Tendency of volume indices in volume of construction production of economic activity are included in Fig. 2.

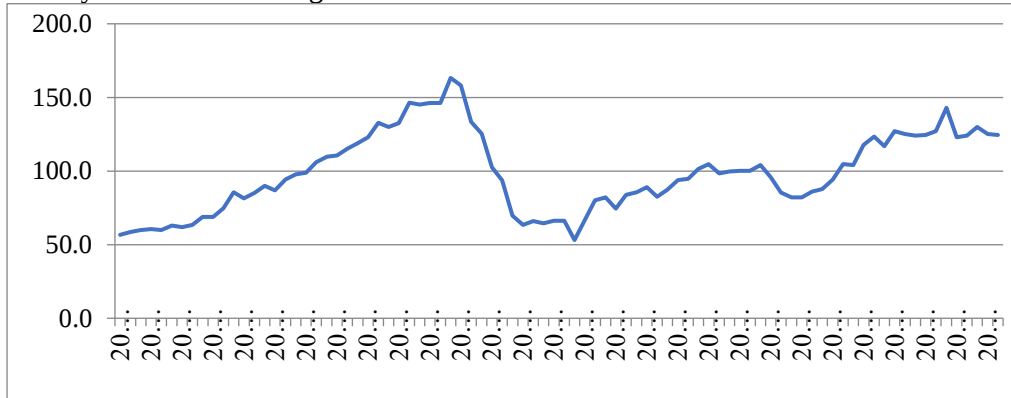


Fig. 2: Volume indices in volume of construction production by economic activity (2015=100, seasonally adjusted data) in 2000-2021 (Source: author’s construction based on Official Statistics Portal of Republic of Latvia B, UP010c)

Data indicate that it was significant reduction in the construction production after crisis in 2008 and 2009 with stable growth after this crisis. Detailed analysis of tendency of construction production since 2010 is reflected in Fig. 3.

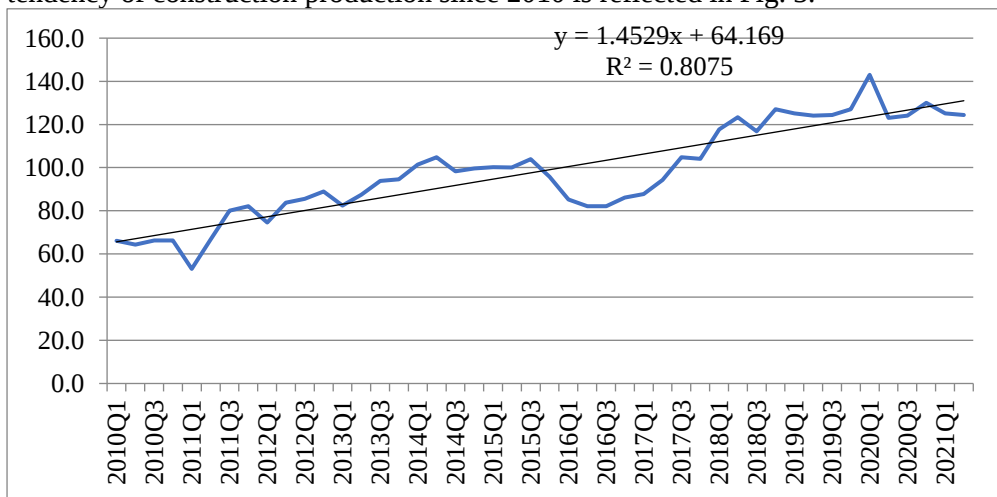


Fig. 3: Volume indices in volume of construction production by economic activity (2015=100, seasonally adjusted data) in 2010-2021 and linear trend (Source: author’s construction and calculations based on Official Statistics Portal of Republic of Latvia B, UP010c)

Statistical data and data analysis indicate that since 2010 construction volume is increasing in average by 1.45 percent points by every quarter since 2010. The share of “green” construction materials have to be considered reasonably to keep the tendency for construction development in Latvia.

Taking into account the research results and possible perspectives, it is recommended to Latvian authorities to begin a development of the policies planning documents at government level, defining objectives, roadmaps, regulations and other state institutions coverage procedures in order to achieve goals in signed memorandum (April 2021) between Latvian Ministry of Economics and diverse local actors of the wooden manufacturing and construction industry in order to promote use of sustainable construction materials and construction products in Latvia.

4. Conclusions

The topicality of consideration of the question on reduction CO₂ emissions in construction material production is quite actual in EU and non-EU countries. In developed countries a lot of studies are already guided on that subject, though in Latvia this question just starting to be widely discussed.

Construction in Republic of Latvia has stable tendency to keep approximately the same level since 2018 with significantly bigger share for non-residential buildings. Though the wooden production export sub-sector provisionally continues to grow.

Taking into account the mentioned memorandum between Latvian Ministry of Economics and diverse local actors of the construction industry (in order to promote use of sustainable construction products in Latvia), it is important to begin a development of the policies planning documents at government level, defining objectives, roadmaps, regulations and other state institutions coverage procedures in order to achieve memorandum goals by the Ministry of Economy, State Construction Control Bureau (Būvniecības Valsts Kontroles Birojs) and State Real Estate (VNĪ).

For the Ministry of Economy - a special committee should be responsible for such policies planning documents' elaboration, including experts competitive in EU and non-EU countries similar experience.

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