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TOWARDS CARBON LIMIT VALUES FOR BUILDINGS IN LATVIA: A LIFE-CYCLE PERSPECTIVE

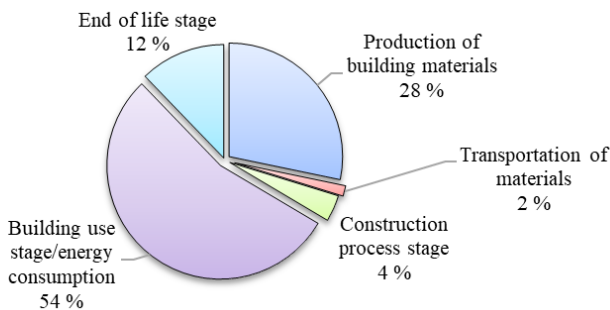
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Abstract – The energy sector accounts for more than three quarters of the European Union's (EU) greenhouse gas emissions. Heating and cooling of buildings consume 40 % of the total EU energy demand, while 75 % of EU buildings are still not energy efficient; therefore, the decarbonization of this sector is essential for achieving climate targets by 2050. European Parliament and Council (2024) Directive (EU) 2024/1275 on the energy performance of buildings the focus of building decarbonization has expanded beyond operational energy performance towards a whole-life carbon approach. In this light, the study analyses the characteristics of the Latvian and EU building sectors and evaluates the regulatory framework for decarbonization targets and their implementation scenarios. A comparative analysis of CO₂ limit values in the Nordic countries and Latvia is carried out based on building life cycle stages. The results show that in several EU Member States, CO₂ limit values have already been established for specific stages of a building's life cycle, whereas such regulation has not yet been introduced in Latvia. Considering the specifics of the Latvian construction sector, the analysis confirms the need to implement a unified methodology and to gradually introduce CO₂ limit values. In light of the EU Green Deal and the established decarbonization targets, the results highlight the urgent need to reduce building emissions by optimizing both operational energy use and related emissions, as well as emissions generated during the product and construction stages (A1–A5). The study seeks to assess the extent to which Latvia's nearly zero-energy building (NZEB) requirements align with the CO₂ threshold frameworks applied or planned in the Nordic region, and to propose potential solutions for improving performance indicators. The main objectives of the study are: i) To compare the NZEB requirements for new buildings in Latvia with the established and forthcoming CO₂ threshold requirements and zero-emission building definitions in the Nordic countries; ii) To propose CO₂ threshold levels for new buildings in Latvia and to develop a zero-emission building definition adapted to Latvian conditions.

Keywords – Building decarbonization; CO₂ limit values; Life Cycle Analysis (LCA); sustainable buildings



Share of carbon emissions by life-cycle stage for a residential building complex in Riga