The use of green roofs to improve wood buildings for a future bioeconomy

Authors: Birgit Brunklaus (1), Jutta Schade (1), Jani Mukkavaara (2)

(1) RISE Research Institut of Sweden, Division of Built Environment
(2) Luleå University of Technology, Division of Industrialized and Sustainable Construction

Key words: green roofs, bioeconomy, construction modelling, life cycle assessment

Introduction

Bioeconomy helps to move to a renewable, fossil-free future. The environmental impact is significantly reduced when replacing products made from fossil resources with bio-based alternatives. In the building sector examples for biogenic sources are traditionally wooden building structures, while green roofs are becoming more popular.

Goal and research question

The goal of the present project is to assess the amount of biogenic carbon stored in green roofs and wooden buildings overall. The question is if green roofs are improving the biogenic carbon usage of buildings and find out how that can be improved.

Material and methods

The methods used are based on construction modelling, life cycle assessment and standardised environmental product declaration (EPD).

Results

The results of a semi-detached passive house in Northern Sweden are presented as biogenic and fossil carbon (304 m2 living area, 204 m2 roof area). These are compared with standard roofs in Sweden

Green roof: 1,9 ton CO2 eq (50% bio)
Coated steel roof: 2,8 ton CO2 eq (fossil)
Asphalt roll roof: 0,6 ton CO2 eq (fossil)
Concrete tiles roof: 1,9-2,8tCO2eq (fossil)
Clay tiles roof 3 ton CO2 eq (fossil)

The results show that wooden building structures make 60% and green roofs 5% of the total CO2. These results indicate that this neither enough for a complete biogenic building nor enough to move to a renewable, fossil-free future. The remaining fossil carbon comes from windows, insulation and concrete/gips.

Conclusions

In conclusion, the biogenic benefits of green roofs do have a potential (50% biogenic), while seen over the whole building the benefits are negligible (5% of CO2 is roof).

Acknowledgement: This research is financed by the Swedish Energy Agency.

RI. SE Research Institutes of Sweden

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Swedish Energy Agency

LCM 2021