

Loose-fill wood fiber insulation: The sustainable alternative to conventional insulation?

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Which SDG does your project relate to?

Buildings account for 40% of the total energy consumption in the world, and therefore there is a need to reduce this energy consumption. As buildings account for such a significant amount of the total energy demand, buildings are a key focus in reducing CO2 emissions and accomplishing the Paris Agreement to keep the global average temperature rise below 1.5 C.



This project relates to Sustainable Development Goal 13, which is about Climate Action. If Denmark wants to reduce its greenhouse gas emissions by 70 % by 2030 taking action to find alternative building materials is needed. By using sustainable and innovative materials, such as the alternative insulation material investigated in this project, we are one step closer to reaching this goal.

Specifically, conventional insulation materials used in buildings have a significant environmental impact. To counter to this, newer and more environmentally friendly materials should be considered, such as wood fiber insulation which has a significantly lower environmental impact. (See figure 1)

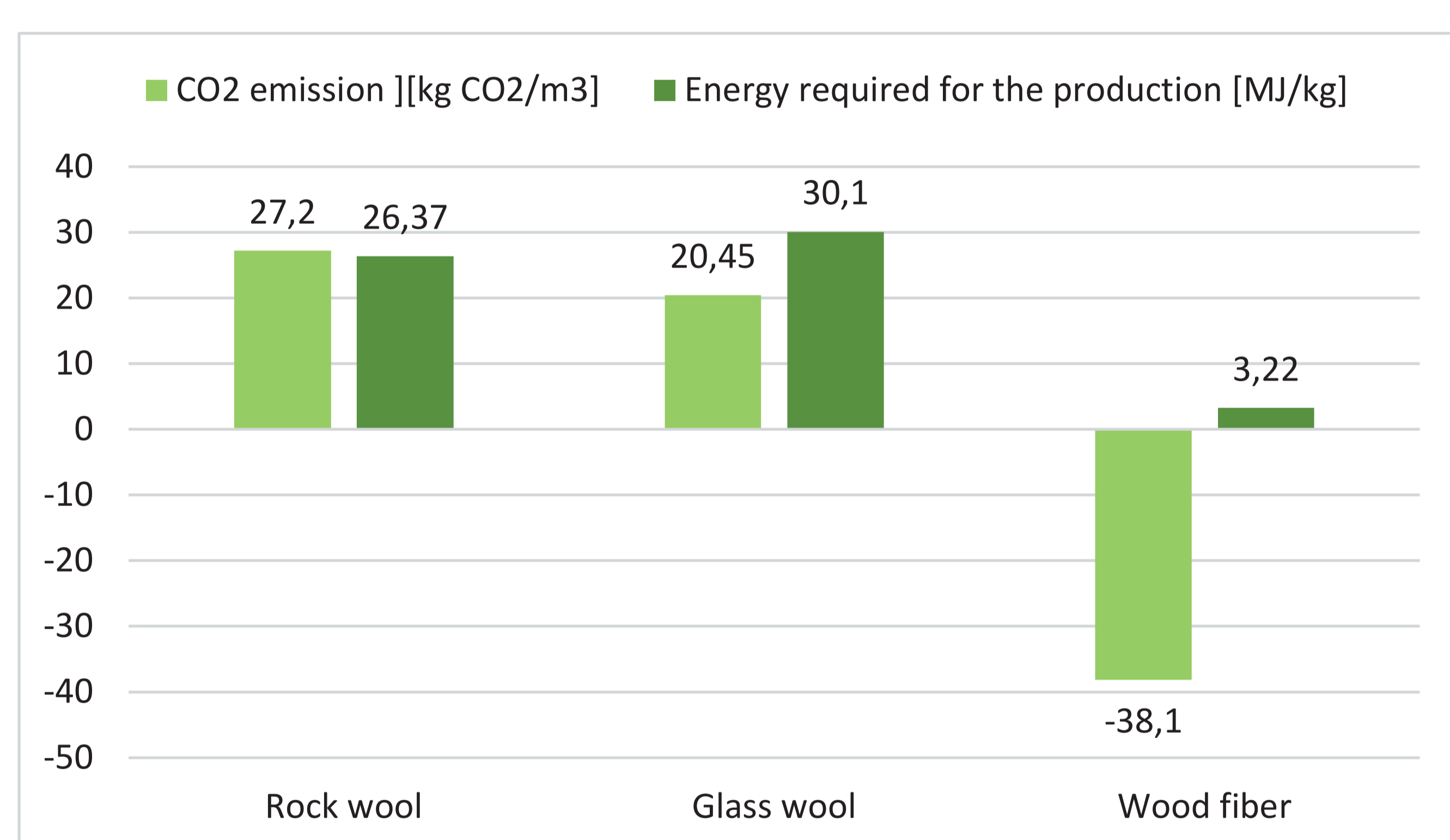
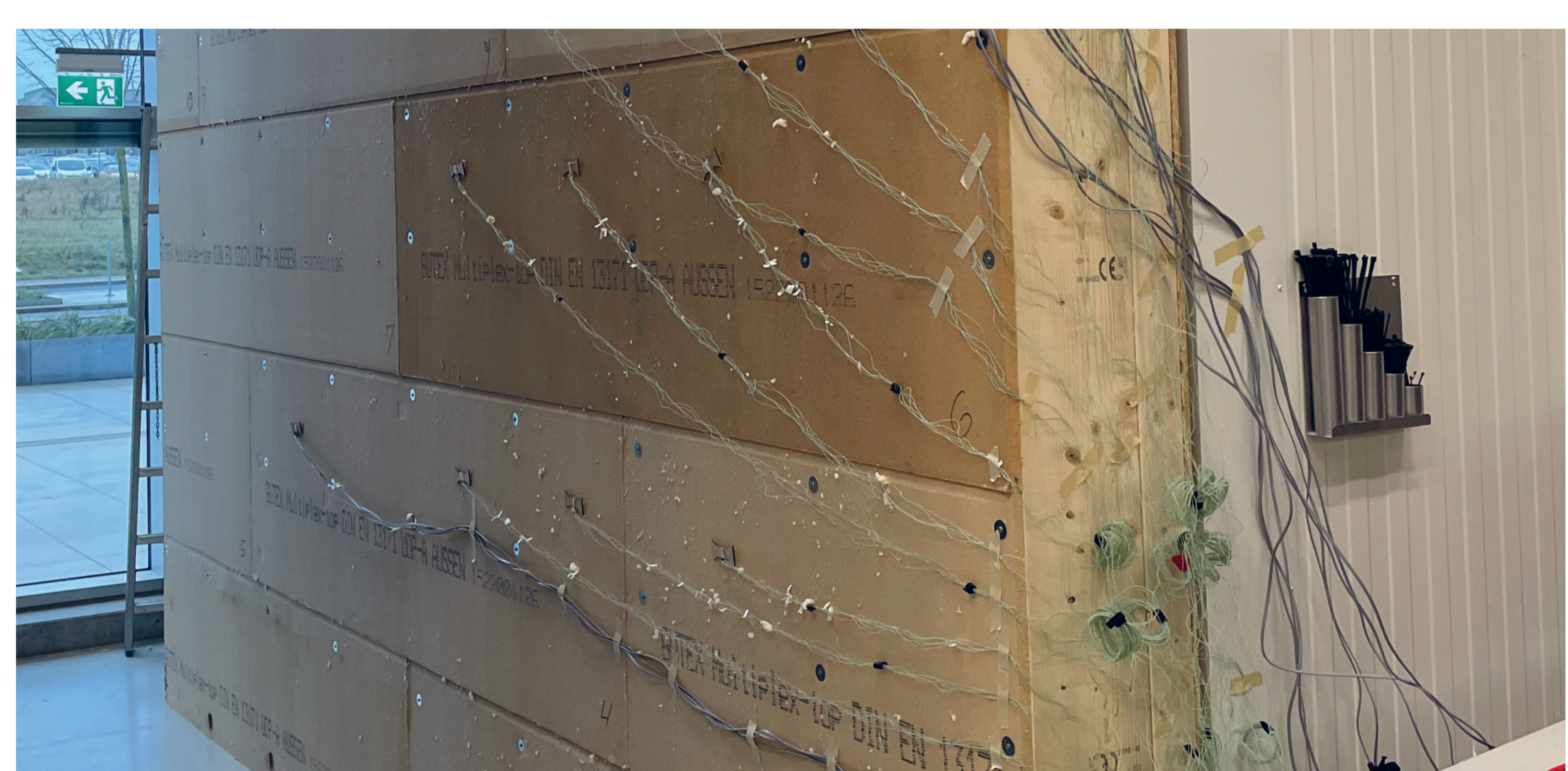


Figure 1



What is the concrete problem you have worked with?

This project investigates the energy performance of the sustainable and unconventional insulation material loose-fill wood fiber insulation. This is done by investigating the performance of the insulation material in a full-scale wall element and investigating whether air movement inside the insulation material occurs and the effect hereof. If air movement occurs inside the insulation material to a significant extent, this creates an additional heat loss, which will decrease the energy performance of the insulation material.

On basis of this, the project examines the building physics of sustainable insulation materials to document and analyze if sustainable insulation materials can compete with the commonly used insulation materials used today.

What is your conclusion and/or solution that can be applied in the 'real' world?

Previously, scientists have focused on examining air movement inside conventional insulation materials, such as glass wool and rockwool, along with the effect the air movement has on the thermal performance of the insulation material. While the air movement is shown to decrease the thermal performance of these insulation materials by up to 30 %, it has not been investigated for the highly dense, and sustainable insulation material that is loose-fill wood fiber insulation. This air movement is therefore investigated in the loose-fill wood fiber insulation, to determine if this material is as affected as glass wool or rock wool are.

It was found, that while air movement also occurs in the loose-fill wood fiber insulation, it takes significant temperature differences, which do not occur commonly in Denmark. To accurately conclude whether the performance is similar or better than glass wool or rock wool, these materials should be tested in a similar experimental setup as the loose-fill wood fiber insulation was tested in.