Group D-3 | Building-Level Life Cycle GWP Analysis: Comparing Hempcrete and Wood-Framed Walls

COA SHOWCASE

Yasaman Norouzi

The construction industry is one of the largest contributors to global carbon emissions, responsible for up to 39% of global emissions, with a significant portion arising from the use of construction materials. In response, initiatives such as carbon-neutral building concepts, green building rating systems, and the adoption of bio-based materials have gained prominence as methods to reduce the carbon footprint of the construction sector. Hempcrete, a bio-based material with notably low environmental impacts, particularly in terms of CO_2 emissions, is increasingly recognized as a candidate for sustainable building applications. Hempcrete functions as both a self-bearing envelope material and a thermal insulator, offering enhanced thermal properties. This study presents a comparative Life Cycle Assessment (LCA) focused on the Global Warming Potential (GWP) of hempcrete versus wood-framed walls in a residential building context. By analyzing the life cycle impacts associated with material production, transportation, construction, and building operation, the results demonstrate that hempcrete may offer a significant reduction in GWP compared to wood-framed walls, while maintaining comparable thermal performance. These results highlight the potential of hempcrete as an environmentally sustainable material, capable of reducing the carbon footprint of residential buildings and contributing to more sustainable construction practices.