SNUG

Innovative circular economy & AI methodology for sustainable high-energy performance buildings

Sustainable Wood Panels: A Collaborative Approach to a Greener Future

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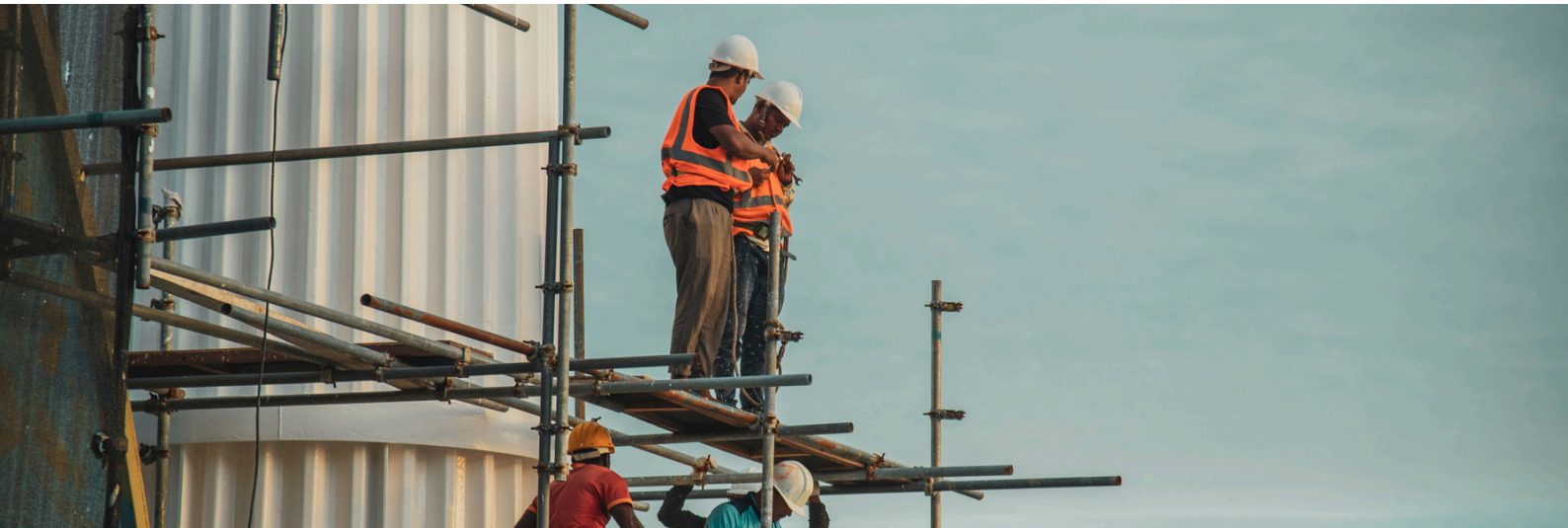
The wood-based panel industry is a vital sector, providing essential materials for construction, furniture manufacturing, and various other applications. However, with the increasing emphasis on sustainable practices, the industry faces the challenge of minimising its environmental impact. A key area of focus is the development of more sustainable adhesives, which are essential in the lifecycle of wood-based panels. Traditional formaldehyde-based adhesives have raised significant concerns due to their potential health and environmental risks. In response, the industry is actively exploring bio-based alternatives. These adhesives not only reduce reliance on fossil fuels but also minimise emissions of volatile organic compounds (VOCs), contributing to healthier indoor environments in buildings. Bio-based adhesives are particularly notable for their significantly lower carbon footprint compared to conventional options. Corporate carbon footprint assessments reveal that at least 40% of total emissions from Scope 1, Scope 2, and Scope 3 are linked to the production and use of adhesives. Therefore, adopting bio-based adhesives is considered a critical step in strategies aimed at reducing carbon emissions. This approach is vital for achieving sustainability goals and minimising environmental impacts, making it a cornerstone of eco-friendly innovation in the industry.



Among the various bio-based adhesive options, tannin-based adhesives have gained considerable attention. Tannins, natural polyphenols found in tree bark and other plant tissues, possess excellent adhesive properties and can be used to produce high-quality wood panels. Research and development efforts are focused on optimising the performance and cost-effectiveness of tannin-based adhesives to make them competitive with conventional options, thereby promoting their wider adoption in wood-based panels.

In addition to bio-based adhesives, the wood-based panel industry is exploring the potential of natural waste materials like hemp shives. One of the key benefits of using hemp shives is their lower bulk density compared to wood. This property allows for the production of lighter-weight panels, which can be advantageous in various building applications, such as wall and roof systems. This approach not only reduces waste but also creates new value streams from existing resources, contributing to a more circular economy in the building sector.

Furthermore, the use of hemp shives aligns with the principles of industrial symbiosis, as they are a byproduct of the textile sector. However, incorporating hemp shives into existing wood panel production lines requires adjustments due to the differences in density and other properties compared to traditional wood chips.

The SNUG project exemplifies the growing collaboration between industry and research institutions to drive innovation in the wood-based panel sector for building construction. By combining the expertise of different stakeholders, the project aims to create sustainable and high-performance panel products that meet the demands of the market while minimising environmental impact and enhancing the energy efficiency of buildings.

The SNUG project is a testament to the power of collaboration. CHIMAR is developing the cutting-edge tannin-based adhesive, AIDIMME is handling production protocols and material characterisation, and KEAS is fabricating the bio-panels. It is a true team effort, with each partner playing a crucial role in bringing this sustainable vision to life.

KEAS, a global wood-based panel manufacturer, which aims to develop innovative wood-based panels with enhanced insulation properties for building applications. KEAS is actively engaged in optimising their processes to ensure the production of high-quality panels that meet the required performance standards for insulation panels.

In buildings, insulation materials such as polyurethane foams, extruded polystyrene (XPS), expanded polystyrene (EPS), and phenolic foams, which are fossil-based, are widely used due to their high insulation performance. However, these materials pose significant environmental challenges due to the high carbon emissions associated with their production processes and their limited recyclability. To address these issues, the SNUG project focuses on developing sustainable and circular economy-compliant bio-based wood panels. These panels are produced using natural resources, such as bio-based adhesives, and the valorization of waste materials like hemp shives, resulting in a significantly lower carbon footprint compared to fossil-based alternatives. Additionally, these innovative panels aim to enhance energy efficiency and indoor air quality, thereby contributing to sustainable construction practices and advancing environmental goals.

References:

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KASTAMONU

Melis is a Senior Strategy & Competition Analytics Specialist at Kastamonu Entegre. With a Master of Science in Chemical Engineering from Istanbul Technical University, she possesses a strong foundation in research and development, coupled with expertise in project management.

Melis currently leads two major international projects, SNUG and E2COMATION, with significant funding, focusing on Sustainability and Industry 4.0. She actively represents Kastamonu within international networks, fostering collaborations with startups and industry experts.

Melis' previous roles as a Product Development Engineer and Project Researcher demonstrate a strong understanding of R&D processes, including project management, and technical documentation. She is passionate about innovation and driving business growth through strategic partnerships and technological advancements.

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Project funded by

Co-funded by the European Union

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

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Federal Department of Economic Affairs, Education and Research EAER State Secretariat for Education, Research and Innovation SERI

This work has received funding from the Swiss State Secretariat for Education, Research and Innovation (SERI).

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UK Research and Innovation, Horizon Europe Guarantee.