

Circular Economy (CE) in Forestry: Business Models for Optimising Biomass Utilisation in Baltic Sea Region

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ABSTRACT

The Baltic Sea Region (BSR) harbours vast volumes of underutilised forestry biomass residues, including bark, needles, cones, and other organic materials. Despite their abundance, the utilisation of these forestry side streams varies significantly across countries in the region, reflecting differing stages of development and technological adoption. In many instances, these residues are primarily used for lower-value applications such as bioenergy production. However, this biomass represents an untapped potential for the extraction of high-value compounds, which can be applied across a multitude of industries. The challenge lies in shifting from traditional, low-value utilisation to innovative practices that unlock the full potential of these resources, thereby contributing to a more sustainable and circular economy (CE). Project “Innovation in forestry biomass residue processing: towards circular forestry with added value products (acronym: CEforestry)” aims to address this challenge by developing and implementing new CE concepts, transforming forestry side streams into valuable products and fostering collaboration across sectors in the BSR.

The primary objective of the CEforestry project is to develop and implement new practices and CE concepts within forestry to better utilise biomass side streams in the BSR. This will be achieved by fostering collaboration across various sectors, including researchers, small and medium-sized enterprises (SMEs), large companies, and other relevant stakeholders. Through pilot facilities, the project will demonstrate the practical application of these innovative solutions. Moreover, one of the project’s aims is to develop a CE business models tailored to the recovery and utilisation of forestry biomass residues. These models will serve as a long-term strategic plan, detailing how enterprises can finance their activities, set goals, and efficiently use resources.

This paper presents four specific business models (BMs) that have been developed:

- BM 1: Antibacterial extracts for B2B (wastewater treatment and paper industry)

This model focuses on the extraction and utilisation of antibacterial compounds from forestry residues for use in wastewater treatment processes and the paper industry.

- BM 2: Antibacterial extracts for the food industry (food preservatives)

Targeting the food industry, this model explores using antibacterial extracts as natural food preservatives. This approach aims to extend the shelf life of food products while maintaining safety and quality, addressing a growing demand for natural additives.

- BM 3: Meat analogue for B2B (fermentation/purification variant)

This model proposes the development of meat analogues through fermentation and purification processes. It offers a sustainable and plant-based alternative to traditional meat products, catering to the increasing demand for vegetarian and vegan options.

- BM 4: Antibacterial extracts for B2B cosmetic production

Focusing on the cosmetic industry, this model leverages antibacterial extracts as ingredients in cosmetic products. This approach provides a natural and effective alternative to synthetic antibacterial agents, aligning with consumer preferences for natural and sustainable cosmetic products.

The expected outcomes include the successful demonstration and validation of these BMs, leading to practical recommendations for the broader adoption of CE practices in forestry. These recommendations will aim to align with the European Union (EU) Green Deal, the EU CE strategy and BSR bioeconomy strategy goals. By optimising the use of forestry biomass residues, the project will contribute to a more sustainable and circular forest economy, benefiting enterprises and promoting the development of high-value, sustainable products.

In conclusion, CEforestry represents a significant step towards a CE in forestry, transforming underutilised biomass residues into valuable resources. Through innovative collaboration and practical application, the project aims to enhance sustainability, economic viability, and environmental stewardship in the BSR.

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