

<https://doi.org/10.7250/CONNECT.2023.097>

ON CARBON STORAGE AND SUBSTITUTION FACTORS OF HARVESTED WOOD PRODUCTS IN THE CONTEXT OF CLIMATE CHANGE IMPACTS OF THE NORWEGIAN FOREST SECTOR

A. Maarit I. KALLIO^{1*}, Silke HOUTMEYERS², Ana AZA³

¹⁻³ Norwegian University of Life Sciences, Faculty of Environmental Sciences and Natural Resources Management, PO BOX 5003, N-1432 Ås Norway

* **Corresponding author.** E-mail address: Maarit.Kallio@nmbu.no

Abstract – Harvested wood products (HWP) contribute to climate change mitigation via two main mechanisms: carbon storage and substitution. The authors examined the data on carbon storage and substitution factors of HWPs that are relevant in evaluating the climate change mitigation potential in the context of the Norwegian forest sector. While there seem to be many uncertainties in these parameters, the data suggest that several uses of wood for industrial products come with clear carbon substitution benefits and, in some cases, provide long-term carbon storage. Such wood products could play an important role in climate-friendly bioeconomic transformation. In particular, the authors considered wood-based construction materials, textile fibres, and insulation materials as examples of such products with potential in future bioeconomy. The decay of the carbon stored in HWP pools over time is often modelled using the product half-lives that correspond to the number of years it takes for the carbon in a pool to be reduced to half of its initial value. Using the default half-life values of greenhouse gases reported to the United Nations Framework Convention on Climate Change, the average half-life of carbon in HWPs produced by the forest industry in Norway of today is approximately 21 years. Shifting some of the use of pulpwood and sawn wood chips from producing paper and pellets to produce insulation materials or panels for construction would increase the time carbon is stored in the HWP pool. Accounting for the large uncertainty in the carbon substitution parameters of HWPs found in this study, a cautious estimate of the substitution benefits of HWPs produced in Norway can be considered to amount to at least 5 Mt CO₂. Redirecting some pulpwood use from paper production to the production of textile fibres and the above-mentioned construction materials would increase the substitution benefits.

Keywords – Carbon displacement factor; forest industry; forest products; mean lifetime; wood-based insulation materials; wood-based textiles