

2025

HOLMEN

Holmen's climate benefit reporting





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1. Summary

This document provides background information on Holmen's annual climate reporting. The positive climate benefit of managed forests and wood-based products has been reported in Holmen's annual reports since 2019. From the 2024 annual report onwards, the methodology has been updated and refined and has been calibrated to national reporting principles.

2. Background

The forest delivers the most benefit when it is put to use. With this at the heart of Holmen's business, our goal is to increase our contribution to the climate transition throughout our value chain, mainly by increasing the positive impact that our business has, but also by reducing our negative footprint.

As societies around the world seek to reduce their dependence on fossil fuels, forest products have a natural role to play and will be in ever greater demand going forward. Active forest management increases the amount of renewable raw material. Owning land gives Holmen fantastic opportunities to create value over time.

Holmen has reported its climate impact, expressed as climate benefit, in every annual report since 2019. In 2024, the calculation of climate benefit was updated in line with the methodological guidance produced by the Swedish Forest Industries Federation and Skogforsk, Forestry Research Institute of Sweden ^[1].

The updates to the methodology include new displacement factors produced for paperboard, packaging paper and bio-based electricity. New product categories, such as net sales of wood raw material, soil and sediment fibre, have been added to the calculation, and the recovery rate for fibre products has been updated from 100% to 70%. Furthermore, an ISO standard ^[2] is under development and is expected to be published in 2025. Ongoing work on the ISO standard may lead to changes in terminology and/or the methodology described in this document.

The purpose of this document is to describe the calculation used in Holmen's climate benefit reporting.

3. Calculation

3.1. Storage

3.1.1 Storage in forests, dead wood, litter and soil organic matter

Storage in forests and dead wood, litter and soil organic matter refers to the change in carbon during the reporting period. This includes changes in living biomass (trees), dead wood, litter

and soil carbon. "Forest" includes all land classified as forest under the applicable national/international definition.

For Holmen, the change in storage in forest, dead wood, litter and soil organic matter is calculated as follows:

- **Storage in forests:** Living biomass on productive forest land is based on the company inventory carried out by Holmen in 2019, in which Holmen's entire forest holding was measured using approved methods based on sampling. This is then used to carry out a harvesting calculation. The amount of CO₂ contained in the cubic metres of living biomass that represent that year's growth is calculated based on this harvesting calculation. This method means that differences may arise between Holmen's reported storage in living biomass and the reporting in national statistics.
- **Storage in dead wood, litter and soil organic matter:** Carbon uptake is based on Sweden's official climate reporting regarding carbon uptake in forest land calculated by the Swedish University of Agricultural Sciences (SLU) for the Swedish Environmental Protection Agency, which then reports this to the UN via the National Inventory Report (NIR) Sweden^[3]. SLU uses the methodology of the UN's climate panel, the IPCC, where the number and selection of sampling sites investigated by SLU varies statistically and naturally between years. This also affects the result as the carbon uptake varies across different sampling sites. Holmen adjusts its reporting of carbon uptake in soil in line with the current NIR report to maintain transparency and credibility. Changes in Sweden's official statistics are well publicised and also affect Land Use, Land-Use Change, and Forestry (LULUCF).

Holmen also buys wood from other landowners. The forest carbon balance in these forests is not included in Holmen's climate reporting, although data exists showing a positive carbon trend. As far as Holmen's climate reporting is concerned, the change in carbon storage in these forests is assumed to be 0.

3.1.2 Storage in wood and fibre products

Storage in wood and fibre products refers to the change in carbon storage in wood-based products that are in use. In national climate reporting, this is termed the pool of harvested wood products (HWP). The change in carbon storage in wood-based products is assessed in tonnes of carbon dioxide equivalents (t CO₂e) and is calculated using an HWP coefficient for the amount of carbon stored in wood and fibre products during their life cycle, taking into account half life and material recovery rates. The half life is assumed to be 35 years for wood products and 2 years for fibre products. This method is in line with the IPCC's guidelines for estimating storage in wood and fibre products.

3.2. Avoided emissions

Avoided emissions are the greenhouse gas emissions that would be caused by alternative products. Avoided emissions are a climate impact that is realised outside the forest sector – in

all other sectors. Conventional corporate climate reporting guidelines, such as the GHG Protocol, do not offer methods that cover such cross-sectoral impacts. The assessment is therefore based on data obtained from life cycle assessments and similar studies.

Avoided emissions are expressed in tonnes of carbon dioxide equivalents (t CO₂e) and are calculated for every identified product category and then added together. For each product category, prevented emissions are calculated as the volume of products delivered to the market, multiplied by a displacement factor for that product category. The displacement factor expresses the relative amount of emissions displaced or avoided and is defined as the amount of fossil carbon avoided per amount of biogenic carbon in wood-based products delivered to the market, taking into account the same functionality of the alternative products.

3.2.1 Avoided emissions from wood and fibre products

Holmen's wood products are assumed to replace fossil-based materials such as concrete and steel, while paperboard and packaging paper are assumed to replace other packaging, e.g. plastic packaging. Previous reports assumed that all fibre products go straight to energy recovery. Using the new methodology, the fibre products are divided into additional categories, where a displacement factor has been identified for the categories paperboard and packaging paper.

3.2.2 Avoided emissions from renewable energy

Bioenergy

Bioenergy from branches and treetops and residual products from Holmen's operations replace other, fossil, fuels. Reporting of Holmen's climate benefit only includes the amount of bioenergy sold externally.

Wind and hydro power

The climate benefit calculation model in line with Skogforsk report 1187–2024 does not include a calculation of renewable electricity production from wind and hydro power replacing fossil energy. Therefore, a separate calculation has been made, in which wind and hydro power are assumed to replace coal and gas power via electricity exports to Europe. When increased Swedish electricity exports displace carbon and gas power in our neighbouring countries, emissions are reduced by approximately 600 000 tonnes per TWh^[4].

3.3. Holmen's own emissions

Holmen's emissions in the value chain include Scopes 1, 2 and 3 and are based on the GHG Protocol, measured in tonnes of carbon dioxide equivalents (t CO₂e). The emissions include carbon dioxide, methane and nitrous oxide, whose global warming potential is converted into carbon dioxide equivalents. The calculation does not include biogenic emissions.

4. Assumptions

When calculating Holmen's climate benefit, it is necessary to make certain assumptions in order to be able to model and analyse the impact of our operations. These assumptions are based on available data and established calculation methods.

- Dead wood, litter and soil organic matter on Holmen's land is considered to have the same dynamics and behaviour as the average for Sweden's forests.
- Every cubic metre of growing stock solid over bark is assumed to bind 1.375 tonnes of carbon dioxide.
- The carbon change in HWP (harvested wood products) is calculated following the IPCC's methodology, based on material recovery rate and half life. The half life is assumed to be 35 years for wood products and 2 years for fibre products.
- Holmen's wood products, paperboard and packaging paper are assumed to replace alternatives with a higher carbon footprint, instead of leading to increased total consumption where these alternatives are still used. It is assumed that other products go straight to energy recovery at the end of their life cycle.
- It is assumed that 70% of the wood and fibre products is collected in and helps to reduce fossil emissions through energy recovery.
- It is assumed that 30% of the wood and fibre-based products is collected in and sent for material recovery.
- The displacement factor for wood products is based on data from Skogforsk's database^[5], where we have calculated the median value of the average values for all categories in wood products.
- The displacement factor for paperboard and packaging paper is taken from Skogforsk's database, where we have calculated the median value of the average values for all categories in packaging material.
- The displacement factor for wind power is based on data from Nätverket Vindkraftens klimatnytta (the Wind Power Climate Benefit Network).
- The displacement factor for hydro power is based on data from AIB (the Association of Issuing Bodies).
- The displacement factor for bio-based electricity is based on data in the Renewable Energy Directive.
- Our Scope 3 emissions cover the categories purchased goods and services, capital goods, fuel and energy-related activities, upstream transport, travel and downstream transport. The travel category is based on a travel survey conducted in 2019 and has not been updated since.

5. References

[1] Skogforsk. *Manual for reporting corporate impact of wood-based products on the global climate* [Internet]. Arbetsrapport 1187-2024. Skogforsk; 2024 [cited 11.03.2025]. Available at:

https://www.skogforsk.se/cd_20240524113158/contentassets/44f965767de0485a9bd828525ae6b86a/1187-2024-manual-for-reporting-corporate-impact-of-wood-based-products-on-the-global-climate.pdf

[2] International Organization for Standardization. *ISO 21930:2017 – Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services* [Internet]. Geneva: ISO; 2017 [cited 11.03.2025]. Available at: <https://www.iso.org/standard/84358.html>

[3] Swedish Environmental Protection Agency. Sweden's National Inventory Report 2023 [Internet]. Stockholm: Swedish Environmental Protection Agency; 2023 [cited 11.03.2025]. Available at: [Sweden. 2023 National Inventory Report \(NIR\). | UNFCCC](#)

[4] Nätverket Vindkraftens klimatnytta (the Wind Power Climate Benefit Network). Svensk vindkraft kan minska klimatutsläppen med 50 procent (Swedish wind power can reduce climate emissions by 50 per cent) [Internet]. Nätverket Vindkraftens klimatnytta; 2019 [cited 11.03.2025]. Available at: https://7f94ab9b-b2cc-453c-8243-dd17bd82407f.filesusr.com/ugd/361822_5f9e8af63a9f465ab68335ceee814aaf.pdf

[5] Skogforsk. Displacement factor references [Internet]. Version 04.06.2024. Uppsala: Skogforsk; 2024 [cited 12.03.2025]. Available at: [displacement-factor-references-v2024-06-04.xlsx](#)