

Detailed description of the calculation method for Holmen's climate benefit





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Storage in forest and soil

Carbon dioxide uptake comprises the extra growth that has taken place during the year, subtracting the harvesting that has taken place during the year.

Storage in forests

The calculation is based on the company inventory Holmen conducted in 2019, where Holmen's entire forest stands were measured using high-quality methods based on sampling.

With this as a basis, we have then been able to calculate how much CO₂ is in the cubic meters of living trees that make up the growth we had during the year.

Storage in soil

When calculating carbon dioxide uptake on Holmen's territories, we apply Sweden's official climate reporting to calculate the uptake of carbon dioxide of the forest land on Holmen's acreages. SLU calculates this figure on behalf of the Swedish Environmental Protection Agency, which then reports it to the UN via the National Inventory Report Sweden.

SLU uses the IPCC's (UN) methodology. The number and selection of sample areas SLU examines varies statistically and naturally between the years then, which affects the result, as carbon dioxide uptake varies between different sample areas.

Holmen adjusts the reporting of carbon dioxide uptake in the soil according to the current NIR report in order to maintain transparency and credibility. The change in Sweden's official statistics is well known and also affects LULUCF.

Storage in wood and fibre products

Holmen reports the global stock change of bound carbon dioxide in harvested wood products as a result of Holmen putting both wood and fiber products on the market. This is a lower figure than the total amount of carbon dioxide that is bound in Holmen's products as old harvested wood products also decomposes and are incinerated during the year. This is the IPCC's (UN) methodology, and it is described in the image below.



The picture shows the principle behind the calculation of the global stock change of bound carbon dioxide in forest-based products; Harvested Wood Products (HWP) ^[2].

The storage in wood and fiber products is calculated in accordance with Sweden's official climate reporting to the UN, which is made by the Swedish Environmental Protection Agency using the IPCC's methodology National Inventory Report Sweden^[2]. According to this methodology, it is the increased storage of carbon dioxide from Holmen's production of wood products, paperboard and paper during the year that is reported. This means that the methodology takes into account that a certain amount of old wood and fiber products rots or are incinerated during the year and thus stops sequestering carbon dioxide.

Fibre products are estimated to have a half-life of 2 years and wood products 30 years.^[4]

It is this storage factor that Sweden reported to the UN.

Substitution

The largest climate benefit is created when our customers choose to replace fossil products with our renewable products because that enables fossil raw materials such as oil, coal and gas to stay underground, instead of being extracted. We call this the substitution effect.

Both Holmen's wood products, fiber products and production of renewable energy replace fossil-intensive materials and fossil energy.

It is only once we can avoid pumping out fossil carbon atoms that we can have a chance of attaining the 1.5°C target of the Paris Agreement. This is why reducing fossil usage as a result of using products from the forest (substitution) is such a major and important part of Holmen's climate benefit. At the same time, methods and underlying data for the substitution effect are not yet fully developed. The experience of recent years and knowledge development in this

field means, however, that Peter Holmgren at FutureVistas AB has been able to produce a robust, and at the same time conservative, estimate based on a number of research reports. The work has been conducted in partnership with the Swedish forest industry and the method is described in Holmgren, P. and Kolar, K. (2019): Reporting the overall climate impact of a forestry corporation – the case of SCA^[5].

Substitution – wood products

The calculation of the substitution effect from wood products consists in the fact that wood products substitute (replace) fossil-intensive building materials such as steel and concrete. The climate benefit created in this way is calculated as being in the order of magnitude: for every biogenic carbon atom bound in a wood product, 1.5 fossil carbon atoms can avoid being extracted from the surface of the earth, and keeping them in the ground removes the risk of their release into the atmosphere

Substitution – fibre products

Using the same methodology, it is calculated that a biogenic carbon atom used for bioenergy contributes to 0.7 fossil carbon atoms staying in the ground. The figure 0.7 takes into account firstly that a certain amount of fossil energy is used to handle the biofuel, and secondly that different power plants have different levels of efficiency in different countries in Europe and North America. Holmen sells branches and treetops, bark, and wood chips to external customers as biofuel.

Holmen considers it reasonable that the climate benefit created through Holmen's production of fibre-based products (paper and paperboard) is equivalent to the climate benefit of 100% of the paper and the paperboard being sent for biofuel at the end of its lifecycle. (The IPCC calculates that fibre products have a half-life of 2 years). The reason why we consider this a reasonable assumption is that we are not including in the calculation the climate benefit of our fibre products being recycled, or substituting plastic, metal and glass packaging which are fossil and/or more energy-dependent. Therefore, Holmen has applied the same substitution factor to fibre products as for bioenergy, 0.7.

Substitution – Renewable energy

Holmen also considers it reasonable to assume that 100% of the old wood products that stopped binding carbon dioxide during the year were used for bioenergy, which substituted fossil fuel. Therefore, Holmen has also included a substitution factor of 0.7 for this proportion of wood products.

Given that the hydro power that Holmen produces is controllable, we consider it reasonable to calculate that it replaces coal power through electricity imports and electricity exports from Sweden to Europe. The emission factor for coal power is 820 g fossil CO₂/kWh from a lifecycle perspective ^[6].

The wind power that Holmen produces is not controllable and is therefore assumed to replace a mixture of coal and natural gas power through electricity imports and electricity exports from Sweden to Europe. The emission factor of coal and gas power is estimated at 600 g fossil

CO₂/kWh from a lifecycle perspective. This is compared with hydro power which has an emission factor of 9 g fossil CO₂/kWh and wind power's 15 g fossil CO₂/kWh from a lifecycle perspective.

Emissions

Holmen's own operations generate greenhouse gas emissions that are already in line with the Paris Agreement's levels for the year of 2045. We have achieved this by implementing measures for increased energy efficiency and investments in renewable energy at our facilities. Since 2005, the emissions from fossil fuels in our production has decreased by 90 percent.

Today, most of our fossil emissions derive from purchased input products and from transport to, and from Holmen's industries. Therefore, we are now focusing on reducing emissions in these areas.

As part of the development of our sustainability work, we have therefore improved our method for compiling and reporting greenhouse gas emissions in our value chain in accordance with the Greenhouse Gas Protocol's methodology for scope 2 and 3. The new report is based on a larger and more in-depth set of data and as a consequence, the greenhouse gas emissions reported from Holmen's value chain in 2020, are not fully comparable with the greenhouse gas emissions reported for 2021

References

[1] <https://unfccc.int/documents> National Inventory Report Sweden

[2] Grassi, G., Fiorese, G., Pilli, R., Jonsson, K., Blujdea, V., Korosuo, A. and Vizzarri, M., Brief on the role of the forest-based bioeconomy in mitigating climate change through carbon storage and material substitution, Sanchez Lopez, J., Jasinevičius, G. and Avraamides, M. editor(s), European Commission, 2021, JRC124374.

<https://publications.jrc.ec.europa.eu/repository/handle/JRC124374>. Brief on the role of the forest-based bioeconomy in mitigating climate change through carbon storage and material substitution

[3] 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 4: Agriculture, Forestry and Other Land Use; Chapter 12: Harvested Wood Products, chapter 12.2.2. https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_12_Ch12_HWP.pdf

[4] Holmgren P och Kolar K; 2019; Reporting the overall climate impact of a forestry corporation - the case of SCA <https://mb.cision.com/Main/600/2752801/999695.pdf>

Detaljerad beskrivning av beräkningsmetod för Holmens klimatnytta



[5] Page 71 and 1335 in the report: "Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, New York: Cambridge University Press":
https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf

[6] Svensk vindkraft kan minska klimatutsläppen med 50 procent
<https://svenskvindenergi.org/wp-content/uploads/2019/04/Nätverket-Vindkraftens-klimatnytta-2019-04-16.pdf> page 7