

Eternali's role as a climate-positive corporation

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This brief explains how Eternali's supply of wood raw material is an important contribution to the circular forest bioeconomy and climate solutions at scale that we need. For 2022 the estimated climate-positive effect is about 130 000 tons of carbon dioxide equivalents, mainly due to reduced dependency of fossil energy.

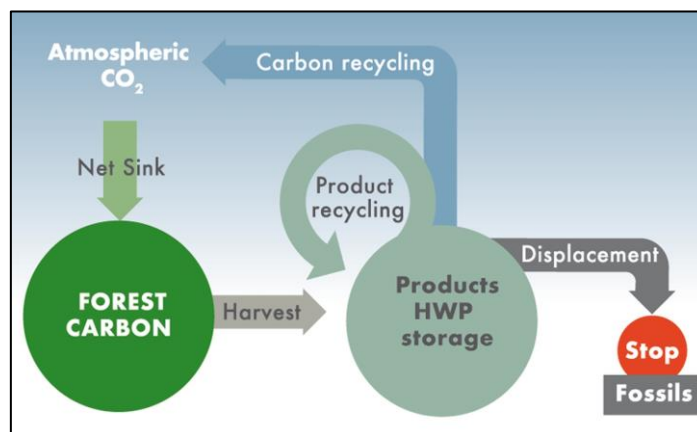
The circular forest bioeconomy¹

There is no time to waste. We need real and reliable climate solutions, and we need them now. Well managed forests and renewable wood-based products are a big part of the solution. Their combined positive effects on the global climate are large, immediate and a co-benefit of financial returns in the forest-based sector.

It is obvious and intuitive. Forests provide us with wood, which we turn into renewable products and bioenergy that reduce fossil emissions. Meanwhile the forest continues to grow, absorbing more carbon dioxide and keeps delivering more wood. This is climate-positive.

But it's also complicated. The forest needs to be managed for the long term, avoiding over-harvesting, ensuring high growth and taking good care of the natural environment. Long and diverse value chains need to be integrated and as fossil-free as possible. Recycling of forest products, often several times, is a fundamental part of the circular economy that reduces demand for new raw material. Bioenergy from residues and waste from forest and forest industry as well as from end-use of products, should be used efficiently.

We want the circular forest bioeconomy to continue to develop for many, many years. This requires investments in long-term sustainable forest management for healthy and stable forests that grow well. It also requires investments in efficient value-chains to maximize the use of all raw material, as well as investments for research and innovation towards new climate-smart wood-based products. We need a sound market economy that manage risk and bring reasonable returns on these investments. Over time a healthy forest-based sector can then lead to even more impressive climate benefits.



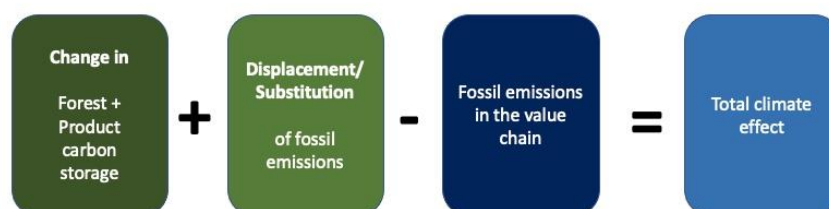
¹) This introduction is based on a recent report by the Swedish Forest Industries, available [here](#)

Eternali's climate effect

Based on the circular forest bioeconomy concept, Eternali's overall impact on the global climate has been estimated for expected wood production volumes in 2022. The model applied has been used by several leading forest industry corporation in recent years to illustrate climate positivity when the combined effects of forest management and value chain are taken into account.

The model has three components.

1. Net carbon sink in forest and Harvested Wood Products (HWP) – normally a positive climate effect
2. Wood-based products displacing fossil emissions that would be caused by alternative products – a positive climate effect.
3. Fossil emissions in the value chain – a negative climate effect



Forest carbon storage

Eternali sources wood raw material from Eucalyptus plantation forests in the State of Maranhão in North-Eastern Brazil. The forests are located in the tropical moist zone, outside of the more known Amazon tropical rainforests and the Cerrado savanna. They have been established in landscapes that earlier were heavily impacted by agriculture and cattle ranching.

The initial sourcing area stretches over 6,000 ha (60 km²), split across seven privately owned estates. The plantation forests have been established over a ten-year period. With an average growth rate of 30 m³ of stemwood per ha and year, the area currently holds 1.3 million m³ and have thereby delivered a net sink of more than 1.5 million tons of CO₂e since their establishment and including stumps, roots and branches of the trees.

Eternali will establish additional sourcing areas in Maranhão State to meet its target of 625,000 m³/year for the period 2022-2025 (4 years). It is therefore relevant to relate the climate effect of these harvests to the development of Eucalyptus plantations in Maranhão State as a whole. Based on Government statistics, the area of forest plantation has increased from about 185,000 ha in 2013 to 250,000 ha in 2018, almost exclusively using Eucalyptus.

Plantations in Maranhão are generally established on degraded or agricultural land and can therefore be considered as afforestation (new forests). From a climate perspective, an increasing demand for renewable wood has stimulated shifts in land use into forest plantations that over time likely leads to a higher level of carbon storage than before. While this macro trend arguably is beneficial to climate efforts, it needs more investigation and verification.

For this initial analysis, it can be concluded that Eternali's sourcing of wood fits into a broader establishment and management of short-rotation forest plantations and that this sourcing is unlikely to have any negative effect on carbon storage in the Maranhão forest plantation estate.

In addition to the sourcing of Eucalyptus wood, Eternali has procured 3,500 ha of natural forest, primarily as part of its commitment to protect biodiversity along with its forest operations. There will be no commercial wood harvesting from these forests, which means that they also will serve as a net sink of atmospheric carbon. For this initial analysis, it is conservatively assumed that the net sink will be 1 tCO₂e/ha.

The climate effect with respect to forest carbon storage therefore is therefore limited to Eternali's conservation forest estate, and amounts to an estimated net sink of 3,500 tCO₂e/year.

Product carbon storage

Eternali supplies wood primarily to pulp mills in Portugal. The resulting marketed products consists mainly of printing paper, tissue, textiles and bioenergy. While fibre-based products contribute to the Harvested Wood Products (HWP) pool in official climate accounting, the inflow and outflow of fibre-based products appear to be in balance for Portugal. For this reason it is assumed that the delivery of wood by Eternali does not lead to an increased storage of carbon in HWP.

Displacement of fossil emissions

Based on an analysis of marketed products from key Eternali customers – The Navigator Company and Altri – an average displacement factor (DF) was calculated. The DF expresses the quantity of fossil emissions that is avoided when using renewable wood-based products.

Given the mix of marketed pulp, printing paper, tissue, textiles and bioenergy, and taking into account a relatively limited recovery of products for end-use as bioenergy – the average DF was estimated at 0,29 t CO₂e/m³ of wood supplied. This means that for each m³ of wood supplied, the equivalent of 290 kg of fossil CO₂ emissions are avoided. Most of this effect is realized as the biomass is converted to energy, either from wood residues, from byproducts of the pulp mill processing, or at end-use of the paper products.

For the expected delivery quantity of 625,000 m³ in 2022, the displacement effect would therefore be 181,000 tons of CO₂e

Value chain emissions

Value chain emissions have been calculated from forest management until the delivery of wood in Portugal. The three main emission components are (a) forest management and harvesting, (b) road transport in Brazil, (c) shipping from Brazil to Portugal.

The table below summarizes the emission estimates. For the transport estimates, it was assumed that a m³ of raw wood weighs one metric ton as it contains considerable amounts of water.

	Fossil emissions per m ³ harvested	Total emissions for 625 000 m ³	Comment
	tCO ₂ /m ³	tCO ₂ e	
Forest management and harvesting	0,007	4 400	
Road transport Brazil	0,032	20 200	Average road distance = 272 km
Shipping Brazil-Portugal	0,048	30 000	Distance = ca 5700 km
Total	0,087	54 600	

Total climate-positive effect

Adding up the climate effect of shows that Eternali is climate positive at a level equal to about 130 000 tons of carbon dioxide for the expected volume of its operations in 2022 (625,000 m³). The table below summarizes the contributing components:

Component	Climate effect 2022 tCO ₂ e ¹	Comment
Forest carbon storage	-3 500	Net sink in unharvested forest
Product carbon storage	0	No net contribution to HWP pool
Displacement of fossil emissions	-181 000	Average DF = 0,29 tCO ₂ e/m ³
Fossil emissions in value chain	54 600	55% related to sea freight
Total climate effect	-130 000	Rounded total

¹⁾ Negative numbers denote a net reduction of atmospheric carbon dioxide

Points to consider

- The above calculations are to some extent based on experiences from other, but similar situations as specific data were not available, e.g. for value chain emissions. The concerned activities are, however well investigated in other locations;
- The forest carbon changes merits a closer investigation as it is likely that active forestry with long-term demand for produced wood is likely to increase the overall carbon stock over time. This is the experience from many European countries;
- The main positive climate effect is from the products as they displace fossil alternatives. This is on one hand not controversial and also with the conservative assumptions in this analysis, the effect is substantial. But on the other hand, it is an effect that is invisible in official climate reporting and as a consequence absent from forest-related climate policies. Highlighting the displacement effect is key for appreciating the contributions of forests to climate solutions;
- The analysis confirms the positive climate contributions by forest-based corporations. The key is to see the full picture and circularity of the bioeconomy, and to acknowledge that all actors along the value chain contribute.

Literature consulted

- Agencia Portuguesa do Ambiente, 2021. National Inventory Report 2021 [WWW Document]. URL <https://unfccc.int/documents/271508> (accessed 12.21.21).
- Altri, 2021. 2020 Sustainability Report [WWW Document]. URL <https://altri.pt/en/investors/reports-and-presentations>
- CEPI, 2020. Climate effects of the forest-based sector in the European Union.
- Drax, 2020. 2019 Annual report and accounts.
- Governo do Maranhao, 2020. Producao da extracao da vegetal e da silvicultura -O que mudou no Maranhão nos últimos 20 anos?
- Holmgren, P., Kolar, K., 2019. Reporting the overall climate impact of a forestry corporation - the case of SCA [WWW Document]. URL <https://mb.cision.com/Main/600/2752801/999695.pdf>
- Leskinen, P., Cardellini, G., González-García, S., Hurmekoski, E., Sathre, R., Seppälä, J., Smyth, C., Stern, T., Verkerk, P.J., 2018. Substitution effects of wood-based products in climate change mitigation [WWW Document]. URL https://www.efi.int/sites/default/files/files/publication-bank/2018/efi_fstp_7_2018.pdf
- The Navigator Company, 2021a. Annual Report 2020 [WWW Document]. URL http://en.thenavigatorcompany.com/var/ezdemo_site/storage/original/application/1cd6cc1a17674278a56e896103a77600.pdf (accessed 12.21.21).
- The Navigator Company, 2021b. Sustainability Report 2020 [WWW Document]. URL http://en.thenavigatorcompany.com/var/ezdemo_site/storage/original/application/c4f6677d09fa2f7ffbf3e27c4c57c96a.pdf (accessed 12.21.21).

(Agencia Portuguesa do Ambiente, 2021; Altri, 2021; CEPI, 2020; Drax, 2020; Governo do Maranhao, 2020; Holmgren and Kolar, 2019; Leskinen et al., 2018; The Navigator Company, 2021a, 2021b)