

# Wood Products & Greenhouse Gas Impacts

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British Columbia Forest Facts

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## WOOD DECREASES GREENHOUSE GASES MORE THAN OTHER BUILDING MATERIALS

For anyone concerned about climate change and how to mitigate the impacts of buildings, there's good news about wood.

A review of top international scientific studies concludes that using wood products from sustainably managed forests rather than non-wood building products, such as cement, plastics or metals, means fewer emissions of greenhouse gases (GHG). Reducing these gases is a key factor in stabilizing and eventually reducing climate change.

To assess the net life cycle GHG footprint of wood construction, a review of 66 international scientific studies was conducted by FPInnovations. The review and summary report, which was carried out by scientists specializing in GHG emissions, wood products and sustainable building systems, focuses on peer-reviewed scientific articles, the majority of which present original data and analysis on the GHG impact of wood products.

While the studies vary in their focus, transparency and completeness, the findings are conclusive regarding the benefits of using wood instead of non-wood products in buildings to mitigate climate change. Overall, the production of wood products results in

fewer GHG emissions than the production of comparable non-wood products. As well, over the complete life cycle of the product, including use and disposal, the great majority of the studies indicate that wood products have lower GHG emissions. In the few cases where wood products cause greater GHG emissions than their non-wood counterparts, inappropriate post-use disposal of wood products was the cause.

In addition, several studies observe that the GHG impacts of the use phase of a building life cycle are generally greater than those of the construction and disposal phases. This suggests that minimizing the GHG impacts of products and buildings requires consideration of the entire life cycle, including production, use and disposal.

The FPInnovations report concludes that, while there are several issues with current methodologies that compare wood and non-wood products, over the long term forests can best contribute to climate change mitigation by being sustainably managed to produce wood that is used efficiently in place of non-wood building materials as well as fuels.

## THE ROLE OF WOOD IN CARBON BALANCES

The studies show several ways whereby using wood products instead of non-wood products in buildings affects GHG balances. These include the following:

**Less fossil fuel consumption in manufacturing:** The studies universally conclude that manufacturing wood products requires less total energy — especially energy from fossil fuels — than the manufacturing of most alternative materials. “Cradle to gate” analyses of material production show that wood products need less production energy than a functionally equivalent amount of metals, concrete or bricks. Also, much of the energy used in wood processing is thermal energy for drying, for which wood processing residues are commonly used.

**Avoided cement process emissions:** Using wood products in place of cement-based products avoids the carbon emissions inherent in the industrial processes of cement manufacturing. During the course of its life, cement reabsorbs some of the carbon dioxide emitted during the chemical reactions (calcination) that occur in cement manufacturing. But the net result is that substituting wood for cement products still creates a GHG benefit.

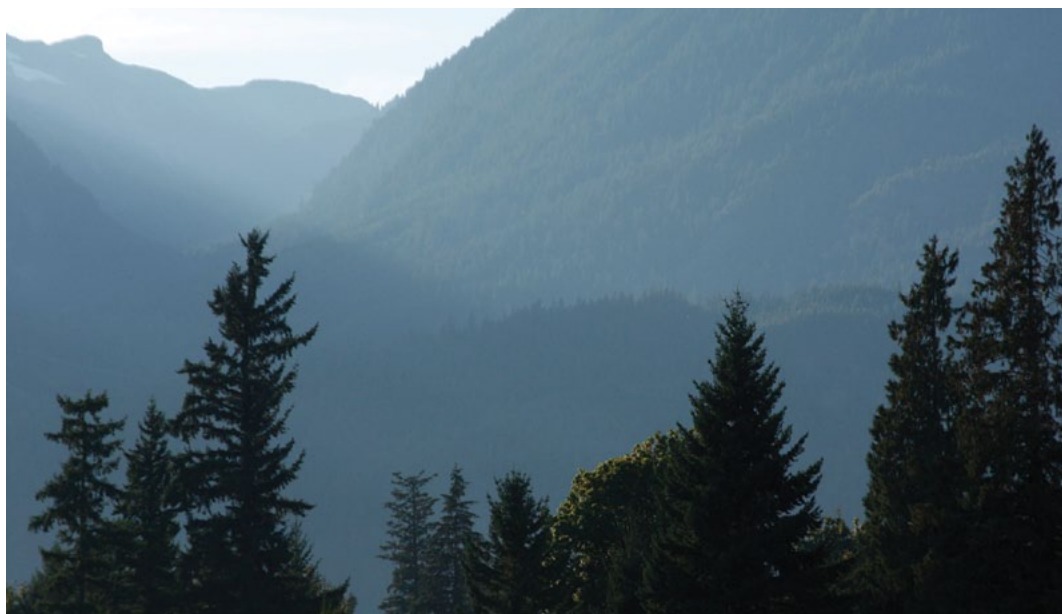
**Carbon storage in products:** Wood material is composed of about 50 per cent carbon by dry weight since trees, as they grow, take in and store carbon from the atmospheric carbon dioxide absorbed during photosynthesis. So wood products physically store carbon that was previously in the atmosphere as a GHG.

**Carbon storage in the forest:** The life cycle of wood products begins with the growth of trees, so considering carbon flows in forest ecosystems is essential to accurately understanding the climate impacts of using wood products. Without exception, all of the studies reviewed assumed that the forests producing the wood are managed sustainably.

**Avoided fossil fuel emissions due to biomass substitution:** Wood products at the end of their service life and the substantial biomass residues from harvesting and wood processing can be used as biofuel to replace fossil fuels and avoid fossil carbon emissions. While the GHG benefits due to the use of residues from the wood product value chain is not straightforward, many studies indicate that the recovery and combustion of the

biomass by-products associated with wood products is the single most significant contributor to the life cycle GHG benefits of wood product use.

**Carbon dynamics in landfills:** Placing post-use wood products in landfills carries great uncertainties, and it is still to be determined if this will result in climate benefits or climate impact.



About 50% of wood products exported from Canada come from the Province of British Columbia's sustainably-managed forests. This publication is part of the 'Forest Facts' series, published by Forestry Innovation Investment. Visit [www.naturallywood.com](http://www.naturallywood.com) for details.

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