

## From trees to paper—how Swiss wood impacts the environment

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Wood has a largely favourable environmental effect. A study of the National Research Programme "Resource Wood" recommends using wood more widely as a source of energy and as a building material.

The study has systematically examined the overall environmental impact of <u>wood</u> in Switzerland, analysing the entire value chain: from cutting trees to recycling wood or burning it, including the manufacture of semifinished products such as paper, boards and pellets for heating purposes. The study indicates that the sustainable use of wood can contribute to meeting our needs in terms of energy and raw materials with a smaller footprint than other resources.

## **Reducing emissions**

The study estimates that the use of wood in Switzerland leads to a reduction in CO2 emissions of between 2.0 and 3.1 million tonnes per year - in comparison, Switzerland emitted a total of 52.6 million tonnes in 2013. Replacing gas or oil with wood accounts for two thirds of the estimated reduction. The last third is linked to construction and furniture production where wood replaces materials with a high carbon footprint such as cement, steel, aluminium and plastics.

Conducted in the context of the National Research Programme "Resource Wood" (NRP 66), the study based its analysis on the one hand on comprehensive statistics of material flows (origin, use and disposal of



wood) that were compiled by the federal offices in particular. On the other hand, it referred to several data bases evaluating the life cycle of products. "We considered different environmental impacts, in particular in relation to climate change, <u>energy consumption</u>, <u>air pollution</u> and loss of biodiversity," explains Florian Suter, first author of the study and doctoral student at the Chair of Ecological Systems Design at ETH Zurich.

"As long as wood consumption does not increase, there is no main advantage from an environmental point of view in recycling used wood in preference to burning it," Suter adds. "This may appear paradoxical, but if, for example, you make chipboards from waste wood you gain very little advantage in the current situation. It will simply lead to less timber being cut although stocks are plentiful, at least for the time being."

## **Problematic particulate matter**

Paper has the greatest environmental impact, mainly due to the energy consumption during production. It is followed by domestic heating and industrial heating, the production of boards and finally forestry. "The different environmental impacts obviously depend on the exact use," Suter adds. "But generally speaking, the energy requirements of manufacturing wood products are relatively low as compared to other materials." One of the disadvantages of wood is the <u>particulate matter</u> emitted when wood is burned: it contributes to air pollution and has adverse health effects.

The study also looks at international trade: "Wood imports can have a considerable impact," Suter explains. "They often include semi-finished goods which are not always obtained from sustainably managed forests."

The researchers have prepared three recommendations: (1) use wood



where it brings the greatest comparative benefits (construction materials and energy); (2) mitigate the negatives such as the emission of particulate matter and (3) consider the entire value chain to maximise the positive effects. More wood should be extracted from forests, according to Stefanie Hellweg, professor at the Institute of Environmental Engineering of ETH Zurich: "The stockpiles of wood are growing in Switzerland and across Europe. The climate benefits of wood have therefore not been sufficiently exploited. It is easy to forget that wood is one of the very rare renewable materials that is available."

## Is wood climate neutral?

In the very long term, the climate footprint of forests is neutral, Suter explains: all the CO2 absorbed during the growth of a tree is returned into the atmosphere when it naturally decomposes or is burnt. The use of wood as a construction material means that this CO2 is stored for decades, which is a mitigating factor in these times of global warming. "It would be preferable if wood were burnt only after being used and not directly after being cut," he continues. At the same time, the CO2 emitted by wood at the end of its life is not immediately reabsorbed by forests and therefore contributes to climate warming. "The short-term impact of wood is highly contested among scientists," Suter adds.

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