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Study investigates impacts of the material and energetic utilization of wood:

Build or burn? Competition for wood on the rise



Wood supplies become increasingly scarce when oil prices rise. (Photo: R. Rosin / TUM)
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Wood is becoming an increasingly popular raw material – and not just in the construction sector. More and more private households and municipal authorities are also using wood for heating. All of which is driving competition for this desirable raw material. A team of researchers has been investigating the ecological, economic and social impacts that this “run on wood” could have in Bavaria.

2010 marked a turning point for the timber industry. For the first time since World War Two, more wood was being used in Germany to produce energy such as heat and electricity than to create commodities such as construction materials, composite wood products or paper. This rise in demand for wood fuel was driven on the one hand by increased oil prices and, on the other, by government subsidies aimed at promoting the use of wood as a sustainable fuel.

A team of researchers* coordinated by Technische Universität München (TUM) has used three oil price scenarios** to investigate how wood supply and demand in Bavaria could develop by 2035 and what the

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consequences of these trends might be. The aim of the study is to provide detailed data about efficient, sustainable wood consumption, which could then be used to support decisions made by politicians and businesses alike.

According to [Prof. Klaus Richter](#), Chair of Wood Science at TUM, one of the key findings from the project was that using wood in cascades resulted in a number of ecological benefits: "Using wood as a building material first and then later as a fuel has advantages for the environment. Lumber is an important, long-term carbon sink and so we should be looking to use wood primarily as a building material."

Wood becomes scarce as oil prices rise

In the two scenarios where prices rise**, wood harvests are lower than in the baseline scenario. This is because forest owners – much like shareholders – initially wait for better prices before bringing their wood to market. When oil prices rise, forest owners sell a greater proportion of their wood for fuel and less of it as industrial wood for producing engineered wood or paper. In addition, overall demand for wood fuel rises as oil prices increase.

These scenarios clearly show that wood, in general, would become scarce. In order to meet demand, pellet imports would have to rise. In a scenario where oil prices remain at current levels, 46 percent of wood in Bavaria is used as fuel. In the event of prices doubling, this proportion would rise to 54 percent.

At the same time, capacities and production levels for the material utilization of wood in Bavaria would fall – even if the manufacturing industries were to introduce technical innovations or reduce capacity utilization. More wood products would have to be imported to make up for this shortfall in materials. Alternatively, industries would have to use more non-wood products.

Heating or construction – a question of sustainability

During the study, the researchers regarded wood consumption as a system. "It's not simply a question of whether using wood as a fuel is more sustainable than using lumber to build a house," explains project leader [Prof. Gabriele Weber-Blaschke](#). "Both aspects are part of the same equation. For example, if we used all available wood as fuel, we would have to use less sustainable materials – such as steel or brick – for building houses."

If demand for wood fuel continues to rise relative to the baseline year of 2010, imports and substitute products will also have to be factored in to the overall equation along with the resulting ecological, economic and social consequences.

Building with wood for a better carbon balance

In their sustainability calculations, the researchers show that using non-wood alternatives such as steel or concrete in the construction sector increases greenhouse emissions. In terms of fuel, however, wood replaces fossil fuels and so total greenhouse gas emissions remain more or less the same. However,

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burning more wood does increase levels of particulate matter. The researchers were unable to determine how decreased utilization of wood as a commodity affects particle emission levels.

In the scenarios, less wood is utilized when oil and wood prices rise. This means that more carbon is stored in forests. However, there are also two other factors that have a larger impact on the carbon balance of the entire system. Firstly, the amount of carbon stored in wood products and, secondly, the utilization of wood instead of more energy-intensive materials such as concrete or steel and the utilization of wood instead of other fossil fuels.

In the case of the [Bavarian Forestry and Wood Cluster Initiative](#), the researchers calculated that the long-term storage of carbon translated into economic gains of up to EUR 150 million per year based on current prices in CO2 emissions trading.

More jobs in the wood fuel sector

According to the scenarios, jobs would be created in the wood fuel sector, for example in the felling and processing of wood fuel and in logistics. In contrast, the number of people employed in the sawmill, wood-based panel, paper and printing industries could fall. Overall, more jobs would be lost than would be created by the expansion of the wood fuel sector.

When examining the utilization of wood, the conversion of forests also has to be taken into consideration. Foresters in Bavaria, for example, are increasing the proportion of deciduous trees, in order to increase biodiversity and robustness of forest ecosystems. Since 2002, the proportion of broadleaf, in particular beech trees, has increased by seven percent. According to Richter, however, "Spruce has certain properties that make it the preferred wood for the construction industry. And so we need to find new applications for wood from broadleaf trees."

*[The research project](#) was undertaken by the Chair of Wood Science (coordination) and the Institute of Forest Management at Technische Universität München, the Wood Energy division at the Weihenstephan-Triesdorf University of Applied Sciences and the Bavarian state institute for forestry (Bayerische Landesanstalt für Wald und Forstwirtschaft).

**The study looked at three pricing scenarios spanning the years 2010 to 2035. Baseline scenario A0: Price of oil remains unchanged; scenario A50: Price of oil increases by a factor of 1.5; scenario A100: Price of oil doubles.

[Pictures for download](#)

More Information:

- [Short report of the study](#)
- [Final report of the study](#)



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- **Institute for Forest Management**, Technische Universität München
- **Wood energy** at the Weihenstephan-Triesdorf University of Applied Sciences
- **Bayerische Landesanstalt für Wald und Forstwirtschaft**

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