Media communiqué

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Empa scientist awarded Josef Umdasch Research Prize

Combating climate change by using more wood

Everyone is talking about the greenhouse effect, and how to counteract it by removing environmentally damaging carbon dioxide from the atmosphere. A computer model developed by Empa researcher Klaus Richter in cooperation with private consultants and the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) which simulates the effects on the climate of various forestry utilization scenarios has won the Josef Umdasch Research Prize, awarded at the University of Natural Resources and Applied Life Sciences, Vienna, on November 17th.

"Plant trees!" Al Gore urges the audience at the end of the film "An Inconvenient Truth," currently showing in Swiss cinemas. Whether and to what extent increasing the area of forests and the use of wood products will help reduce carbon dioxide (CO_2) concentrations in the earth's atmosphere is a question which has caused heated discussion over the past few years, particularly in the context of individual countries fulfilling their commitments to the Kyoto Protocol. Simulations made by the prize winning Swiss scientists demonstrate that, if immediately implemented, measures to optimize forest husbandry and wood usage in Switzerland really would contribute to a reduction of the concentration of the greenhouse gas CO_2 in the atmosphere – although this would only take effect in fifteen or twenty years. This is how long it would take for forests to adapt to increased wood utilization, and for the increased quantity of wood felled for construction purposes to be actually used in new buildings.

Despite this, a coordinated national climate policy could achieve respectable results in the short and medium term, maintains Klaus Richter, the Head of Empa's Wood Laboratory. On behalf of the Federal Office for the Environment (FOEN) he has, together with the Federal Institute for Forest, Snow and Landscape Research (WSL) and private partners, modeled the ways in which an optimized forestry and wood utilization strategy would affect the Swiss national CO_2 budget over the next 130 years. An increase in the usage of wood products by 810 thousand cubic meters ever year would result in a reduction of about 1.1 per cent of the Swiss annual greenhouse gas emissions of 53 million tonnes of CO_2 equivalent. "In addition to this reduction, the quantity of CO_2 stored in the wood used in building construction would grow by about 32 million tonnes, which represents a respectable 60 per cent of annual greenhouse gas emissions," explains Richter. But he also simultaneously concedes that "increased wood usage by the construction industry alone will neither meet our Kyoto Protocol commitments nor stop climate change."

Home, sweet home – a carbon store

"Exploit maximum growth." According to the computer model this is the most effective strategy for forest husbandry at a global level, and not, astonishingly enough, the increasing of forested areas to create gigantic but problem-prone biomass stores, so-called "Kyoto forests". Afforestation will take place in the model scenario, says Richter, but the new wood growth will be continually felled, allowing the forest to remain in a state of optimum production. By contrast, woodlands which are not exploited rapidly become "overaged" – the trees lose their stability, becoming prone to storm damage or insect attack, thereby reducing their ability to function as carbon stores. If the new growth wood is used, however, in building walls and ceilings or to make furniture, it continues to act as a carbon store – after all, dry wood consist of about fifty per cent carbon. In addition, fossil fuel resources are conserved by the use of waste from wood processing and building renovation or demolition as an alternative to oil. "Use the wood in its natural state as long as possible," recommends Klaus Richter, because increasing the forested area of the globe alone will not be sufficient to remove the CO_2 from the atmosphere.

Answers from computer modeling

The international jury for the Umdasch prize was particularly impressed by the fact that the computer model is capable of representing the complex flow of carbon-based products with a previously unattained accuracy. Using the data from the forest and wood usage scenarios modeled, the research group was able to formulate concrete national recommendations for Switzerland. During this process they combined three model calculations – for forest husbandry, the timber industry and the substitution effect – into a single simulation. In cooperation with his former colleague Frank Werner, who is today the proprietor of the "Environment and Development" consultancy. Richter determined which substitution effects – the use of wood as an alternative to fossil energy sources, and other construction materials such as concrete, steel and plastics – contribute significantly to CO_2 reduction in the atmosphere. In doing so the scientists made use of know-how and results that they had already calculated and entered into "Ecoinvent", the most comprehensive environmental database worldwide. One specific difficulty the researchers faced was due to the fact that they had to take into consideration the flow of goods across national frontiers. The computer model therefore had to be capable of differentiating the effects within the country from those of an international nature. This is absolutely essential for decision-making at the highest political level, in order, for example, to be able to make factually correct statements in the context of the climate convention.

The prize winning team now hopes, thanks to the award, to make as many politicians and civil engineering professionals as possible aware of the possibilities opened up through optimized forest husbandry and timber utilization. "The CO_2 problem will not be solved by the consistent utilization of more timber products alone," admits Richter, "but despite this, wood is an important piece in a large jig-saw puzzle."

Author: Manuel Martin

The Josef Umdasch Research Prize

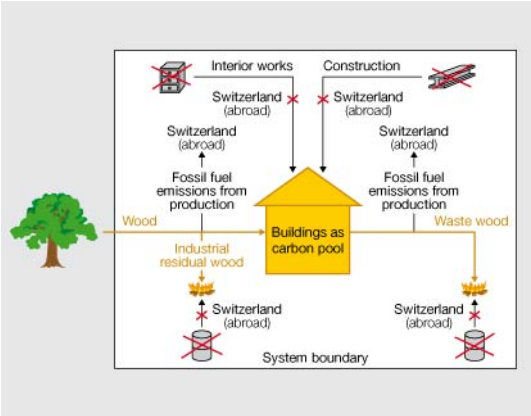
On November 17th, the Josef Umdasch international research prize was presented for the eighth time at the University of Natural Resources and Applied Life Sciences, Vienna. Every two years the chairpersons of the Board of Directors of Umdasch AG, Hilde and Alfred Umdasch, award a prize of 30,000 Euros in memory of the founder of the Umdasch Group for outstanding research in the field of forestry and wood science, with a particular emphasis on environmental aspects. The prize was presented this year by Prof. Gerd Wegener of the Technical University of Munich in the course of the «Dies Academicus 2006».

Technical information:

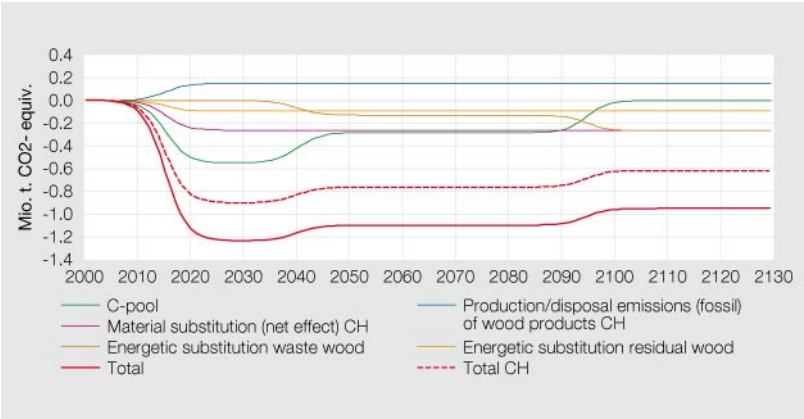
Dr. Klaus Richter, Head, Wood Laboratory, +41 44 823 43 89, klaus.richter@empa.ch

Editorial and images:

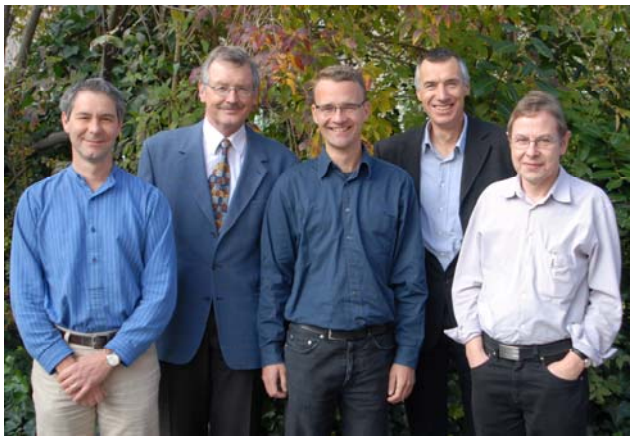
Sabine Voser Möbus, Communications, sabine.voser@empa.ch



The research team combined one three models – forest husbandry, the timber industry and the substitution effect – to create a single one.



By raising the usage of timber products by 0.81 million cubic meters, the annual emissions of greenhouse gases could be reduced by 1.1 per cent in Switzerland.



The prize winning research team (from left to right): Ruedi Taverna, Peter Hofer (both of GEO Partner AG), Dr. Frank Werner (Environment and Development), Dr. Klaus Richter (Empa), Edgar Kaufmann (WSL).