

## **The contribution of timber utilization for a sustainable development**

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Aspects of sustainable development (SD) have become highly important in political discussions and public awareness. SD includes numerous aspects, from biodiversity, resource management, economic growth, environmental issues to human health. Accordingly the forestry sector and the Forestry Wood Chain (FWC) is confronted with many SD related issues, like biodiversity, overexploitation of forests, forest health, tree species mix, natural disasters, timber cuttings, harvesting damages etc. Quite often wood exploitation is criticized for interfering with SD criteria although forest management follows SD criteria on large areas, which could be supported by certification schemes.

The use of wood as a material and an energy source contributes to SD in many aspects like:

- The possibility to use any piece of wood regardless of species, shape, age, etc. through appropriate utilization-channels as raw material or energy.
- The same applies to forestry and wood residues and recycled wood after products are out of use.
- The use of wood - fresh or recycled fibre as energy source - and so the substitution of fossil fuels.
- The use for wood based products which can be recycled or turned into energy.
- The low energy demand for wood processing and product manufacture and so reducing drastically the use of fossil fuels for competing products.
- The aspect of carbon sink in wood products.
- The easy maintenance of wood products, the easy remodelling of wooden buildings including easy DIY activities.

The presentation will deal with some prominent examples as follows:

1. Environmental concerns in the Forestry Wood Chain during the 60's to 70's concentrated mainly on technical aspects like water and air pollution, timber preservatives and formaldehyde. Later, aspects of the destruction of large forest areas through clear-cut for agriculture, infrastructure and heavy timber utilization got importance even in the political discussion. The FWC implemented a large number of appropriate measures to improve environmental issues by technical measures (product and process design), sustainable forest management and the introduction of certification schemes.
2. The FWC introduced methods to measure environmental impacts, for example Life Cycle Assessment. This method consists of lifecycle analysis and an impact assessment. Impact categories are global warming, acidification, eutrophication, ozone formation, land use, terrestrial, aquatic and human toxicity. The life cycle

analysis deals with all material and energy flows during the full life cycle of a product or a part of it.

LCA for wood based products show clear advantages compared to non-wood based products in terms of low energy demand for processing, high share of renewable energy, lower emissions to air, water and soil. The LCA method is an appropriate tool for product and process design.

3. Wood products are low energy products. Forest Management including timber harvesting requires only about 3 % of the energy of the wood grown in the forest. So, forests are highly productive “energy factories”. To manufacture products from logs only little energy is needed:

Sawn timber, dried and planned	2100 MJ/m <sup>3</sup>	(15%)
Glued laminated timber	3300 MJ/m <sup>3</sup>	(20%)
Particle board	3800 MJ/m <sup>3</sup>	(30%)
Oriented structural board	3700 MJ/m <sup>3</sup>	(25%)
Medium density fibreboard	4800 MJ/m <sup>3</sup>	(40%)

The figures in parenthesis are the percentage of consumed energy in relation to the energy content of the employed wood.

For building elements and wooden houses the same low energy demand is of environmental and financial advantage compared to other building systems. It is possible to generate the energy required for the manufacture of building elements and wooden houses exclusively from the processing residues (sawdust, chips etc.). Theoretically no fossil fuel is required.

4. Another important aspect is the carbon storage effect in wood.

For Europe the carbon emissions from traffic, industry and households is estimated to 900 million tons carbon, of which 130 Mill t are accumulated into forests. The carbon sink effect is prolonged if the wood is used for long-life products such as building elements and long lasting buildings. For Germany as an example the carbon stock in the forests above ground is about 1100 Mill t c, in all wood products in use about 330 Mill t c. More use of wood products has a positive effect on preventing climate change!

5. The substitution effect (wood products replace non-wood products) reduces the energy consumption considerably. The use of processing residues and recovered (waste) wood to generate energy reduces c-emissions from fossil fuels. Thirdly, there is the carbon sink effect with wood products. All three aspects offer a tremendous contribution to reach the targets of the Kyoto Protocol. For Europe the subsequent use of the sustainable available forest resources could reduce the c-emission by 10-15 %. Sustainable supply of the people with wood based products for building and living, while simultaneously reaching the Kyoto targets, is the miracle of the future.