ECONOMIC COMMISSION FOR EUROPE
Timber Committee

FOOD AND AGRICULTURE ORGANIZATION
European Forestry Commission

Distr.
GENERAL

TIM/SEM.1/2003/R.32 (Summary)
3 February 2003

Original: ENGLISH

Seminar on
STRATEGIES FOR THE SOUND USE OF WOOD
Poiana Brasov, Romania
24-27 March 2003

Comparison of wood products and major substitutes with respect to environmental and energy balances

Session I

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Summary

Wood is a renewable material and energy source with a very long history. Wood utilisation for material purposes and energy uses has increased during the last decades due to growing world population and the "poor man's energy crisis" respectively. Destruction of forests has led to a worldwide discussion about the use of wood and the management of forests.

Sustainable energy supply is one of the major factors for mankind's development. Renewable energy sources gain importance as well as low energy consuming technologies.

Wood is a renewable material with a long-term perspective. Sustainable forest management is a prerequisite for this perspective. Wood production in the forest requires little energy only (~ 1 % of the energy content of wood). Manufacturing of wood based semi-finished and finished products requires little energy as well; in almost all cases much less than the energy content of the wood employed for the manufacture of the products. Wooden houses, furniture etc. need less energy for manufacture than energy, which can be provided from processing residues or from the products after their use. Wood products therefore are zero-fossil-fuel-products!

Wood is a material, for at least, two or three cycles of utilisation: First used as a product (i.e. timber, panels, building components, furniture), secondly used in a material recycling process (i.e.

solid wood based products recovered for panels) and thirdly used for energy generation. No other renewable material can meet these advantages in terms of volume and economy!

Materials competing with wood are numerous: PVC for windows, steel and concrete for large constructions, bricks for walls in houses, plastics for furniture, etc.

Some (technical) advantages of these competing materials are obvious, but the energy balance and the environmental balance (i.e. based on LCA criteria) are dramatically worse compared to wood. Wood products require very little energy for their manufacture compared to other products based on competing materials and for this reason the LCA-profile for wood products is of clear advantage. Wood processing has, in addition to a low energy consumption, clear advantages in environmental indicators like acidification, ozone formation, toxicity potential and, above all, the global warming potential.

The paper provides basic data and examples for wood based and non-wood based products. Links to the literature are given as well.
