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Bamboo Life Cycle Assessment LCA

Life Cycle Assessment (LCA) is the generally accepted method for systematically assessing the environmental impact of a product or material over its entire life cycle, i.e. from the extraction of the resource to the final phase of destruction and recycling (from cradle to grave). The LCA methodology is internationally standardized in the ISO 14040 series and measures environmental impacts in several categories, including exhaustion, air quality (dust, smog), toxicity, global warming potential (GWP). The environmental impact of products can be expressed by an equation, for example as environmental costs. In view of the increasing attention to global warming, the GWP of products is often separated from the GWP by a carbon footprint. In this assessment, all greenhouse gas emissions in the life cycle of a product are measured in kg CO2 equivalent.

The two leading research institutions in the field of LCA, Carbon Footprint and Bamboo are the Delft University of Technology www.tudelft.nl and the International Network for Bamboo and Rattan www.inbar.int These two institutions have conducted a number of scientific publications including an official Life Cycle Assessment (including Climate Assessment) according to ISO 14040 and 14044 standards.

The official Life Cycle Assessment shows that bamboo is an important CO2 fixer.

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This means that bamboo absorbs a relatively large amount of CO2 from the atmosphere during its growth and life up to harvest, while at the same time emitting an equal amount of oxygen (O2) through photosynthesis. Since the area of Moso bamboo plantations is constantly growing, an increasing amount of CO2 is permanently trapped in the plantation plants. After harvesting, this CO2 remains permanently sealed in the bamboo material and is only released again when the material is recycled and incinerated at the end of its life cycle. This is preferably done in power plants where it is used as a substitute for carbon-intensive fossil fuels. This allows additional CO2 emission credits to be generated according to the LCA methodology.

On the other hand, CO2 is released by the machinery and transport equipment needed to produce the bamboo products and deliver them to the end users. It is very important for us to keep these greenhouse gas emissions as low as possible during these processes, for example through efficient production and the use of bamboo sawdust as an energy source. The CO2 balance of a product can be determined over its entire life cycle. The emissions during production, transport and use are determined by comparing the CO2 fixation and the substitution of fossil fuels in the end-of-life phase with the CO2 balance of a product. If the emission credits from CO2 fixation and fossil fuel substitution are greater than the CO2 emissions, the product is CO2 neutral.

The Life Cycle Assessment report assesses Moso bamboo products as CO2 neutral or better over their entire life cycle.

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The increasing speed with which renewable materials are used in terms of annual returns in cubic meters per hectare is not yet included in this Life Cycle Assessment. This is an additional environmental benefit of renewable raw materials in general and most fast-growing materials such as Moso bamboo in particular.

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