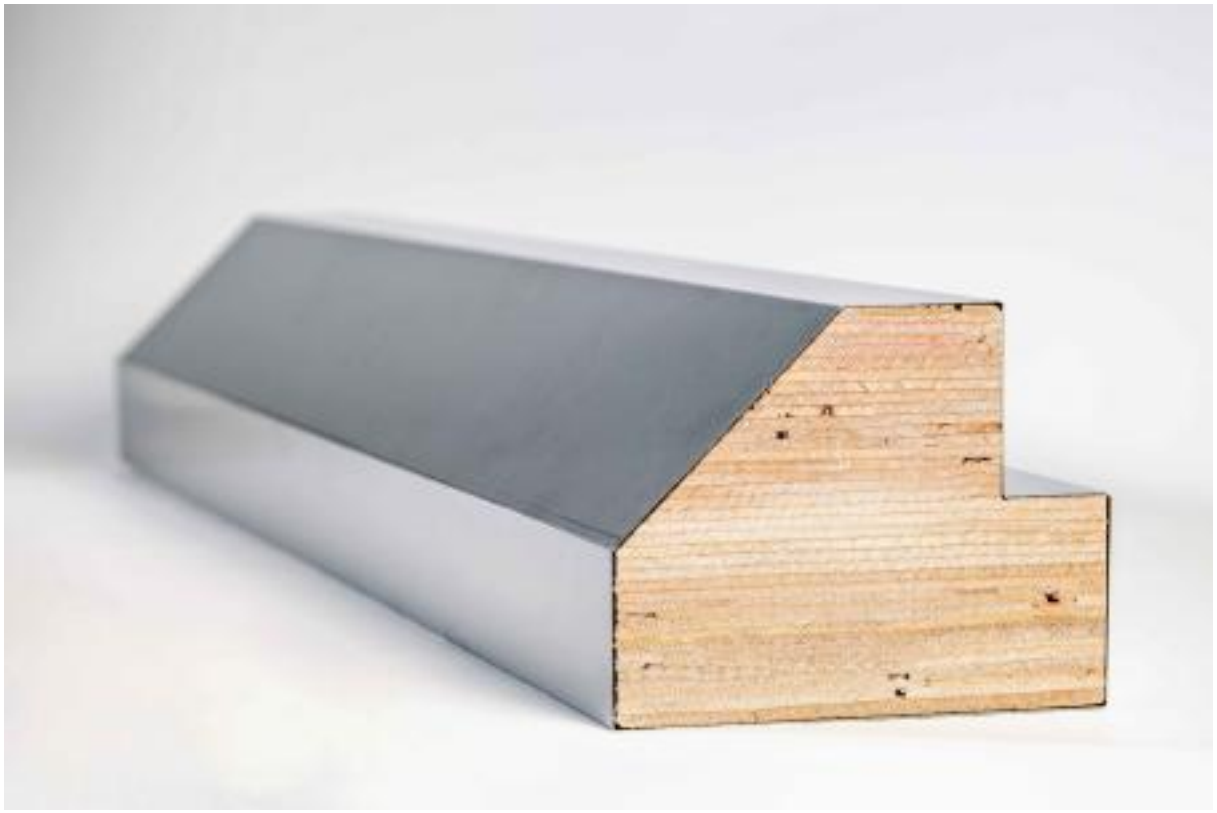
Reducing the carbon footprint at the material level: Albasia wood for electric cars and lifts

About this project



SuMatHrA

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Markets:

Material: Wood

This project is funded by the Technology Transfer Programme Leichtbau (TTP LB) of the Federal Ministry of Economics and Climate Action.

Technology Transfer Program Leichtbau

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Context

Lightweight construction is crucial to making vehicles more sustainable: The components weigh less and material is saved. This improves resource efficiency and reduces greenhouse gas emissions - not only during production, but also when the lightweight components are later used. Companies are increasingly using hybrid materials that combine different functions and are therefore particularly efficient. However, these materials are usually difficult to recycle and often have a negative carbon footprint. One way to resolve this conflict is to use sustainable lightweight materials - such as wood - as part of hybrid materials.

Purpose

The project team wants to replace conventional lightweight construction materials, such as aluminium or steel, with wood hybrids based on Albasia wood in order to reduce the carbon footprint of structures at the material level. Due to its low density in combination with excellent mechanical properties, Indonesian lightweight wood is very suitable for lightweight construction. Albasia is sustainably cultivated in Indonesia in order to reforest areas left fallow by slash-and-burn agriculture and to enable local smallholders to generate additional income from the utilisation of these areas and the sale of the wood. Its use in vehicle structures is particularly sustainable when the material is used together with domestic hardwoods and conifers as a wood-wood hybrid. As these woods are cheap and readily available, this also increases the competitiveness of the domestic industry and value creation in Germany.

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Procedure

The project team wants to demonstrate the wood hybrid materials in three applications: In crash-loaded vehicle structures of electric vehicles, for the box body of a small commercial vehicle and in lift construction as a panel product. The researchers also see great potential here for the integration of additional functions, as wood has very good acoustic and thermal insulation properties. This means that other CO2-intensive materials that are currently used to integrate insulation or noise protection can be saved. In addition, the wooden components are lighter, so the CO2 balance is also better in use.

Current research activities are aimed at further optimising the hybrid material system. For example, different variants for the wooden core are being investigated for the crash-loaded vehicle structure in order to save further weight and fulfil the requirements resulting from the integration of the component into the body. The production of moulded wood parts from Albasia veneer is currently being investigated for use in commercial vehicle bodies and lift construction. The aim here is to produce three-dimensionally moulded components from veneer material. As part of a life cycle analysis, the material is being analysed, taking into account all relevant process steps from planting the seedling to transporting the material and manufacturing the components.

Funding duration:

Funding sign:	03LB2033	**Funding amount:**	EUR 1 million

Further websites foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB2033A - SuMatHrA in the federal funding catalogue

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Project coordination

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English (EN){{ Projektpartner }}

Lightweighting classification

	Realisation
Offer	
Products Parts and components	✓
Services & consulting	

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Lightweighting classification

	Realisation
Field of technology	
Design & layout	
Functional integration	
Measuring and testing technology Materials analysis	✓
Modelling and simulation Crash behaviour, Loads & stress	✓
Plant construction & automation	
Recycling technologies Recycling	✓
Manufacturing process	
Additive manufacturing	
Coating (surface engineering) Others	✓
Fibre composite technology	
Forming	
Joining Adhesive bonding, Others	✓
Material property alteration	
Primary forming	
Processing and separating	
Textile technology	

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Lightweighting classification

	Realisation
Material	
Biogenic materials Wood	✓
Cellular materials (foam materials)	
Composites	
Fibres	
Functional materials	
Metals	
Plastics	
Structural ceramics	
(Technical) textiles	