



# HIGH-PERFORMANCE ELECTRIC VEHICLE IN ULTRALIGHT DESIGN

### Ideas on utilisation

The automotive industry, as one of the most important industrial sectors in Germany and Europe, has a special challenge in dealing responsibly with technology. In particular, the balancing act between ecology and economics is becoming increasingly complex, especially with regard to the changing living conditions of customers towards a metro-urban living environment and the increasing ecological awareness of the population.

For more than fiftheen years, the Institute for Lightweight Engineering and Polymer Technology has been researching efficient solutions for electromobility. The first is the electric sports car study E1. The E-Multicar and the InEco research demonstrator highlight the application possibilities in the commercial vehicle segment and urban mobility. In the InEco project, not only questions about the design and the materials used, but also innovative ideas for vehicle packaging, occupational safety and drive technology were incorporated from the very beginning. For example, innovative material combinations such as CFRP-steel hybrid composites and the implementation of novel integral designs are important for cost-effective lightweight system design.



Abb. 1: E1 - Elektrosportwagen



Abb. 2: E-Mulitcar



Abb. 3: InEco-Forschungsdemonstrator

Figure potential for solutions for electromobility in ultralight design. (©ILK)

## Potential adopters of technology

The interdisciplinary research in the fields of materials science, holistic lightweight structures, allelectric drive systems and serial production technologies makes it possible to sharpen the core competences of the local partners and the involved Saxon SMEs. The research and development activities in the field of electromobility will sustainably strengthen the global competitiveness of the partners within the autoland Saxony. In particular, the know-how structure to fiber-reinforced lightweight construction materials secures the market opportunities in the automotive sector for future ultra-light electric vehicles.

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### Advantages of technology

In addition to its ecological relevance over existing vehicle concepts with conventional drive technologies, state-of-the-art battery technology is another important innovation. The battery, including its optimized air conditioning, was integrated crash-proof and neutral in the center tunnel of the vehicle floor. Added to this is the reduction in the individual masses of many vehicle components. The research results of these individual considerations can also be used for other vehicle concepts. For example, the mass savings on front and tailgate up to 75 percent compared to conventional steel components without limiting their functionality. Together with DEKRA, the experts tested various aspects of the front door. Attempts to burn and splinter behavior and head impact tests were all certified positive.

# Market and context of technology

The know-how for electric drive technology associated with electromobility is very diversified within the automotive supply industry and in many SMBs.

For the implementation of novel component concepts and connection technologies in ultralight construction vehicles, new design principles, which have already been tested in the aerospace industry in particular, can be used.