

Extract from the Annual Report 2023
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From research

The sustainable car body of the future

FutureCarProduction

Climate neutrality by 2050 is the declared goal of the automotive industry in order to comply with the German government's climate-protection law. The ecological change – the "Way to Zero" – is to thereby be achieved in a cost-efficient manner. In order to attain the sustainability targets, vehicle concepts need to be rethought above and beyond the powertrain. For electric vehicles, the body is the largest factor for CO₂ emissions after the battery.

Current body production is a complicated process involving the manufacture and assembly of numerous structural elements. As a rule, more than a hundred individually stamped metal parts have to be welded together to form a car body. The application of aluminum gigacasting technology is increasingly establishing itself as a revolutionary solution for an alternative to these conventional methods. This innovative approach reduces the quantity of required components, which leads to cost savings and streamlined production. Other competing material solutions, such as multi-material body structures, also offer potential environmental benefits.

Navigating these rapid developments and making sustainable decisions with regard to the circular economy is a challenge for the automotive industry. One of the problems is the insufficient research on the environmental risks of novel technologies – such as gigacasting – compared to the potential economic benefits and the associated high investments. Within the project network, the Fraunhofer IST is developing a model-based Life Cycle Engineering assessment tool for lightweight structures in the automotive industry that can robustly assess both the current situation and possible future developments.

Our team is therefore contributing towards the development, analysis and evaluation of technologies for sustainable vehicle construction in terms of potential environmental impact and costs, thereby taking performance criteria into consideration. In this way, we are supporting the decarbonization of the automotive industry.

The project

Future Car Production

Project duration

01/01/2023 - 12/31/2026

Project partners

- Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM
- Fraunhofer Institute for Material and Beam Technology IWS
- Fraunhofer Institute for Machine Tools and Forming Technology IWU
- Fraunhofer Institute for Mechanics of Materials IWM
- Fraunhofer Institute for Integrated Circuits IIS
- Fraunhofer Institute for Structural Durability and System Reliability LBF
- Fraunhofer Institute for Casting, Composite and Processing Technology IGCV



The project promotes holistic solutions for the evaluation and development of integral body concepts for sustainable vehicle construction.

Life Cycle Engineering as a solution approach for sustainable vehicle construction.



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