

AZL launches Joint Partner Project to scale plastic-based battery casings and battery system enclosures for trucks, buses and off-highway vehicles

Aachen, June 26, 2026. Plastic-based designs open up new potential to reduce manufacturing costs for battery casings and battery systems in trucks, buses and off-highway vehicles. In addition, they can reduce weight, offer excellent fire safety and integrate functions such as connections, mounting and attachment elements, sealing surfaces, coolant connectors or temperature-control functions directly into the component. The new AZL Joint Partner Project **"Scaling Composite Battery Casings: From Automotive Cost and Weight Benefits to Commercial Vehicle Applications"** investigates how these potentials can be made economically viable through modular and standardized enclosure concepts, even at lower production volumes of individual vehicle models.

Plastic-based battery casings are increasingly establishing themselves in the automotive sector as an alternative to steel and aluminium solutions. Current developments show that plastic-based designs can not only contribute to weight reduction, but also enable new approaches to cost reduction, functional integration and improved fire safety. For trucks, buses and off-highway vehicles, however, the starting point differs significantly from the passenger car market. Production volumes per vehicle model are often lower, while requirements vary depending on application, duty cycle, vehicle architecture and manufacturer. At the same time, these segments represent attractive opportunities because battery casings and battery system enclosures can have a substantial impact on manufacturing costs, payload, range, energy consumption and integration effort.

Since 2018, AZL has accompanied and helped shape the development of plastic-based battery casings in the automotive sector through numerous industrial projects. These include large collaborative projects for technology development, Joint Partner Projects as well as development, production and testing activities using AZL's own development, production and testing infrastructure. With the new Joint Partner Project, AZL is transferring this experience to trucks, buses and off-highway vehicles, addressing a relevant growth field for vehicle manufacturers, battery system suppliers and the plastics and composites value chain.

The project focuses on how standardized and modular battery casings and battery system enclosures can be developed for different vehicle types, models and manufacturers. To this end, requirements from different applications will be systematically compared in order to identify commonalities, recurring functional requirements and suitable platform approaches. Based on these analyses, modularization approaches will be derived that can help bundle volumes beyond individual vehicle models and make highly automated plastics and composite processes economically viable.

The project investigates three central modularization strategies. Capacity Scaling realizes different battery capacities through varying numbers of standardized enclosure units. In-Mould Variants enable variants through adapted material configurations or exchangeable mould elements. Cross-Model Combination describes the combination of standardized casing variants for different vehicle models and use profiles. Together, these approaches are intended to show how modular kit systems can contribute to the economic scaling of plastic-based battery casings.

A key advantage of plastic-based designs lies in their potential for functional integration. The term covers a broad range of material and manufacturing concepts, from fibre-reinforced plastics and thermoplastic semi-finished products to combinations of different plastics and plastic semi-finished products as well as hybrid plastic-metal designs. Depending on the concept, functions such as connections, mounting and attachment elements, sealing surfaces, coolant connectors, temperature-control functions and protection against mechanical, thermal and electrical loads can be integrated into the component. This can reduce additional parts, assembly steps, joining elements and interfaces. In combination with modular enclosure concepts, functional integration becomes an important lever for lowering system costs, reducing weight and making industrialization for trucks, buses and off-highway vehicles economically assessable.

The project combines the analysis of market, vehicle and safety requirements with concrete modular reference concepts, CAE-based assessment, manufacturing benchmark, regulatory compliance map and industrialization roadmap. It therefore does not focus on isolated casing components, but on the question of under which conditions plastic-based designs can be used as economically viable platform solutions for battery casings and battery system enclosures in commercial vehicle applications. This will consider effects of commonalities and differences between vehicle requirements.

“The challenge is not to prove the general potential of plastic-based battery casings. The decisive question now is how to enable economic scaling for trucks, buses and off-highway vehicles, even though the volumes per model are significantly lower than in the passenger car sector,” says Philipp Fröhlig, Head of Industrial Services at AZL Aachen GmbH. “Modularization is the key lever. If requirements from different vehicle types, models and manufacturers are systematically analysed and translated into reusable enclosure concepts, highly automated processes and functional integration can unfold their economic advantages much more effectively.”

The Joint Partner Project addresses OEMs of trucks, buses and off-highway vehicles, battery system suppliers as well as companies along the material, process, tooling and machinery value chain. Vehicle manufacturers receive a basis for assessing battery casings and battery system enclosures as strategic levers for manufacturing cost, platform strategy, variant management, weight and operational benefits. Battery system suppliers can investigate how modular enclosure concepts can reduce customer-specific adaptations, bundle development efforts and improve transferability to different vehicle platforms.

For OEMs working with established steel or aluminium solutions today, the Joint Partner Project offers a pragmatic entry point. The objective is not to replace existing solutions based on general assumptions, but to assess whether plastic-based designs can unlock additional potential in manufacturing cost, weight, functional integration and platform scalability. Participation enables vehicle manufacturers to evaluate these opportunities with an investment that is limited compared to dedicated in-house development programmes, while also placing their own requirements into the consortium so that they can be considered in the joint assessment basis.

Material, semi-finished product, processing, tooling and machinery suppliers gain early insight into possible requirement profiles, target costs, volume potentials, manufacturing routes, automation levels and integration functions of future battery enclosure platforms. Participation helps them realistically assess whether and how their materials, technologies, processes and products can open up new markets and applications. This enables the derivation of strategic roadmaps for positioning within future value chains.

Another important benefit is the AZL Joint Partner Project format. Companies share the project costs and gain access to comprehensive results at a comparatively low individual investment. At the same time, the consortium enables exchange across the value chain, from vehicle manufacturers and battery system suppliers to material, process, tooling and machinery partners. AZL is known for Joint Partner Projects that are developed and defined based on concrete needs from industry.

The project is planned for a duration of ten months. The kick-off is scheduled for Q3 2026. Planned results include a validated requirements matrix across the addressed core segments, a kit definition including a commonality map, three to five CAE-validated modular reference concepts, a technology benchmark of cost-efficient manufacturing processes, a regulatory compliance map, a quantified business case including break-even, unit cost and CO₂ assessment, as well as an industrialization roadmap for processes, tooling and supply chains.

Interested companies can gain initial insights into the topic during a free TechTalk. The TechTalk **“Scaling Composite Battery Casings: From Automotive Cost and Weight Benefits to Commercial Vehicle Applications”** will take place on **July 22, 2026 at 11:00 a.m.** in English. In addition to insights into plastic-based battery casings in the automotive sector, the new Joint Partner Project will be presented. Participation is free of charge upon registration at marketing@azl-aachen-gmbh.de.

For further information or to secure participation:

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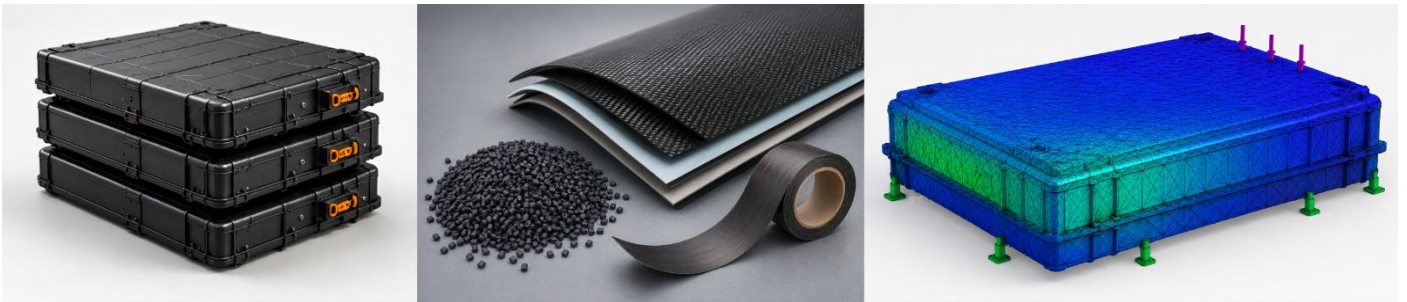
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Picture: Modular Battery Casings for Heavy Vehicles



Picture: Battery Casing Design, Material Selection, Simulation

About AZL Aachen GmbH

AZL stands for excellence in lightweight production. As a one-stop partner for market and technology expertise, AZL supports companies across the entire value chain in developing, benchmarking, and optimizing composite-based products and manufacturing processes.

Located within the RWTH Aachen Campus, AZL combines decades of engineering experience with state-of-the-art infrastructure to enable experimental evaluation of advanced multi-material technologies.

Through its Advisory, Engineering, and Partnership Network, AZL connects international industry players, drives innovation, and supports the industrial implementation of competitive lightweight solutions.

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