

▶ THE 2023 ALTAIR ENLIGHTEN AWARD
WINNERS





▶ POLESTAR

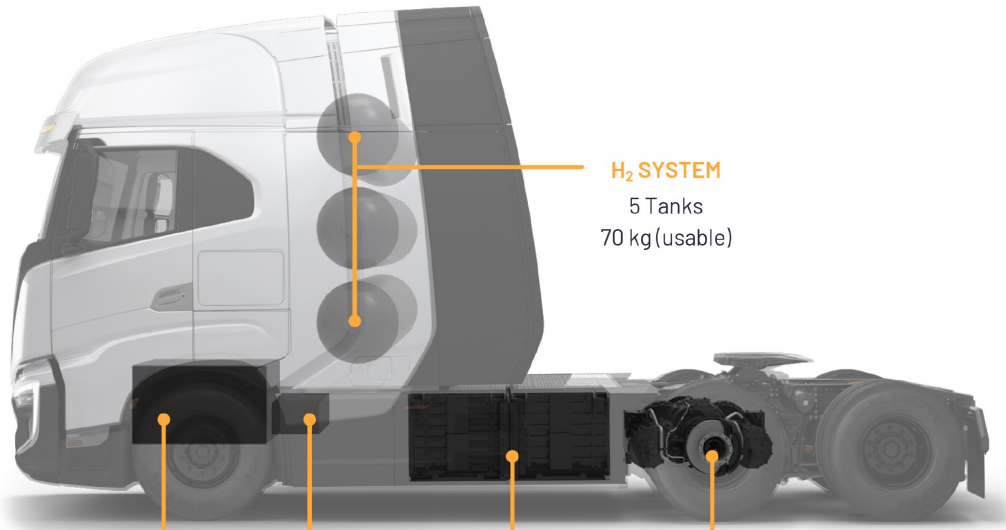
**2023 WINNER
SUSTAINABLE PRODUCT
(PASSENGER VEHICLE)**

Polestar 2 MY24

The 2024 Polestar 2 features next-generation electric motors, quicker charging, greater efficiency, and longer range — now up to 654 kilometers as measured by the Worldwide Harmonized Light Vehicle Test Procedure (WLTP). Despite the significant increases to performance, range, and efficiency, the Polestar 2 also boasts a reduced carbon footprint, with some versions now producing up to three tons less carbon dioxide compared to the launch version released in 2020. In addition, Polestar uses blockchain technology within its supply chain to expand raw material traceability and address social and environmental issues.

 **ALTAIR**





H₂ SYSTEM
5 Tanks
70 kg (usable)

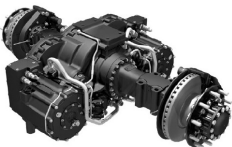


FUEL CELL
200 kW

BRAKE RESISTOR



BATTERY
164 kWh
>400 kW (peak)



eAXLE
400 kW (continuous)
575 kW (peak)

+ + + =

▶ NIKOLA CORPORATION

**2023 WINNER
SUSTAINABLE PRODUCT
(CLASS 8)**

Nikola Tre FCEV

When developing the new Nikola Tre FCEV, Nikola emphasized recycling - 100% of car scrap produced in the production of pre-consumer batteries was recycled and/or reused, and 100% of hazardous waste produced during production was safely recycled. Nikola also implemented a circular reuse program for all battery pallets, and the vehicle manufacturing process consumed no water.

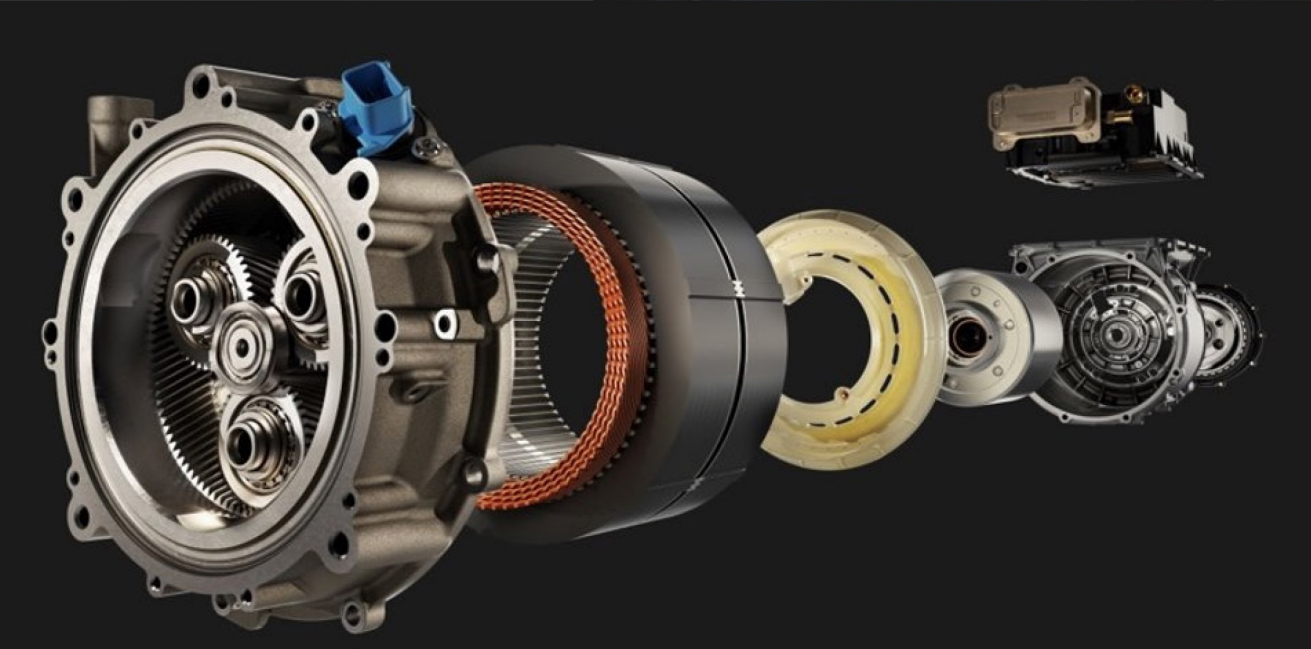


▶ LUCID MOTORS

2023 RUNNER-UP SUSTAINABLE PRODUCT

Lucid Air Sedan

California-based EV manufacturer Lucid Air has launched its flagship Lucid Air sedan, which has broken industry records for range, charging speeds, aerodynamics, and performance. The Lucid Air lineup — with its core technology designed and engineered completely in-house — can add 300 miles of range in just 22 minutes of charge, carries an industry-leading aerodynamic drag coefficient of 0.197, and includes trims with an EPA-estimated range of up to 516 miles and mileage efficiency of 4.6 miles per kilowatt-hour.



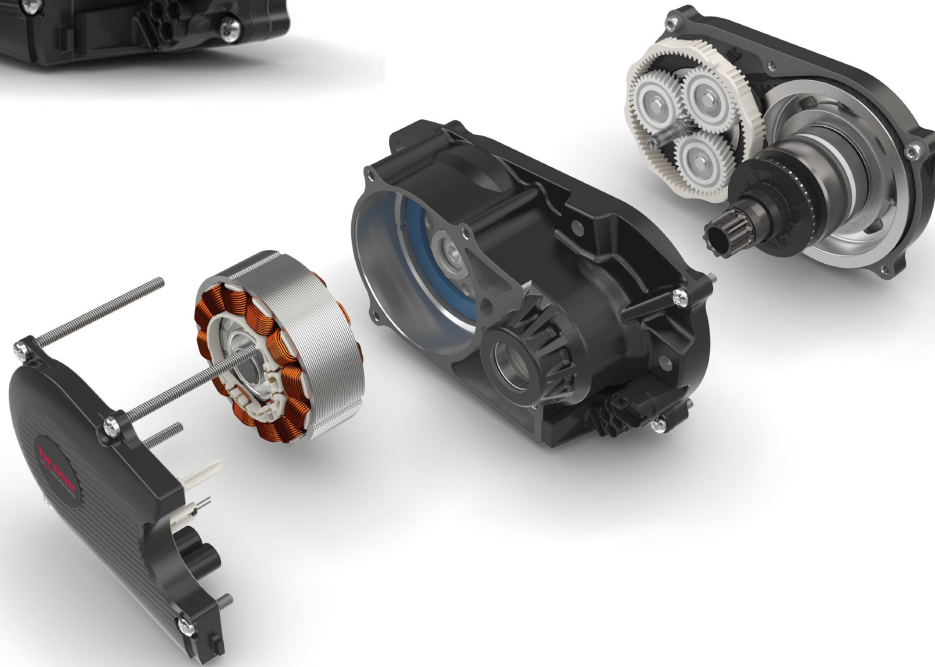


▶ ARCELORMITTAL

**2023 WINNER
SUSTAINABLE PROCESS**

Use of Biomass for Carbon-Neutral Steelmaking

The ArcelorMittal Port-Cartier pellet plant became the first in the world to substitute pyrolytic oil for heavy fuel oil on a continuous basis. By using this biofuel, produced locally by BioÉnergie AE Côte-Nord Canada, ArcelorMittal not only reduces its emissions but builds a true regional energy ecosystem by uniting the two great resources of the Côte-Nord region, iron and forest.

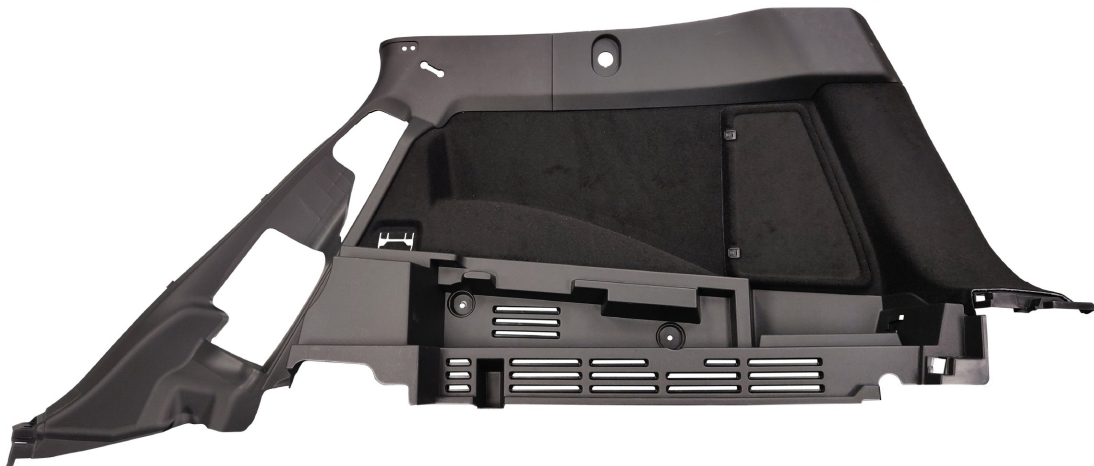


▶ **BROSE ANTRIEBSTECHNIK GMBH,
CO. KOMMANDITGESELLSCHAFT,
BERLIN**

**2023 RUNNER-UP
SUSTAINABLE PROCESS**

Reman-Drive - Remanufactured E-Bike Drive

Brose introduced a remanufactured, lower-cost drive that saves 21 kilograms (46.2 pounds) of carbon emissions per unit, while maintaining quality standards. The process recovers and restores previously sold, worn-out, or non-functional products to “like new” conditions and saves material, costs, and carbon emissions.

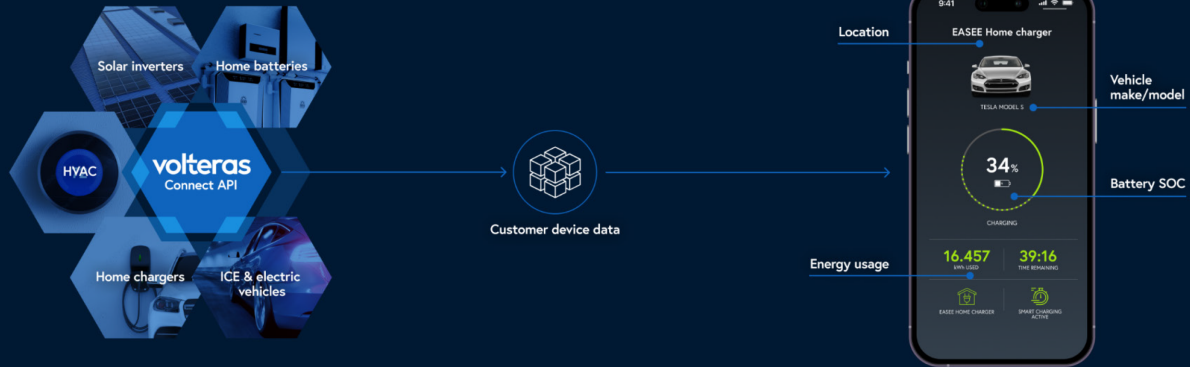


▶ KASAI KOGYO CO. LTD.

2023 HONORABLE MENTION SUSTAINABLE PROCESS

Kasai Hi-Papia, Kasai Original Sustainable Material

Kasai Hi-Papia (KHP) is composed of 100% recycled polypropylene (PP), polyethylene terephthalate (PET), and pure talc. In addition, material scrap from the KHP manufacturing process is reused. KHP has helped spread the recycling plastic market and reduce the amount of material needed by fabric manufacturers. KHP's adaptable production system enables higher flexibility to support different recyclable plastic contents in various regions.



VOLTERAS

2023 WINNER
RESPONSIBLE AI

A Novel Way to Connect the Electric Vehicle Ecosystem

Volteras's API gives businesses access to electric vehicle (EV) ecosystem data with a two-week integration that would take organizations years to integrate otherwise. Its products allow organizations to reduce energy waste and emissions, better manage EV fleets, optimize charging across home chargers using its smart charging algorithms, and more.



▶ TOYOTA, BASF CORP, AND US FARATHANE

**2023 WINNER
ENABLING TECHNOLOGY**

World's First Adoption of Resin Frame for IsoDynamic Seat

Toyota converted more than 17 multi-piece steel parts into just one molded part, thus using far less raw material and decreasing waste. The process also generated an estimated 20% cost reduction and a 30% weight reduction. In addition, this is the world's first adoption of lateral, vertical, and horizontal dynamic motions with adjustable dampers for the driver and passenger seats in off-road vehicles.



▶ NIO

2023 RUNNER-UP ENABLING TECHNOLOGY

HPDC Material and Processing Methods for Efficient Structural Design

With the goal of minimizing environmental impact, NIO used a new alloy material that doesn't require heat treatment, and used a more accurate, more efficient laser cleaning process. These changes reduced part mass by 31%, reduced part count by 98% (turning 54 stamped parts to one), and slashed manufacturing time by 60%.

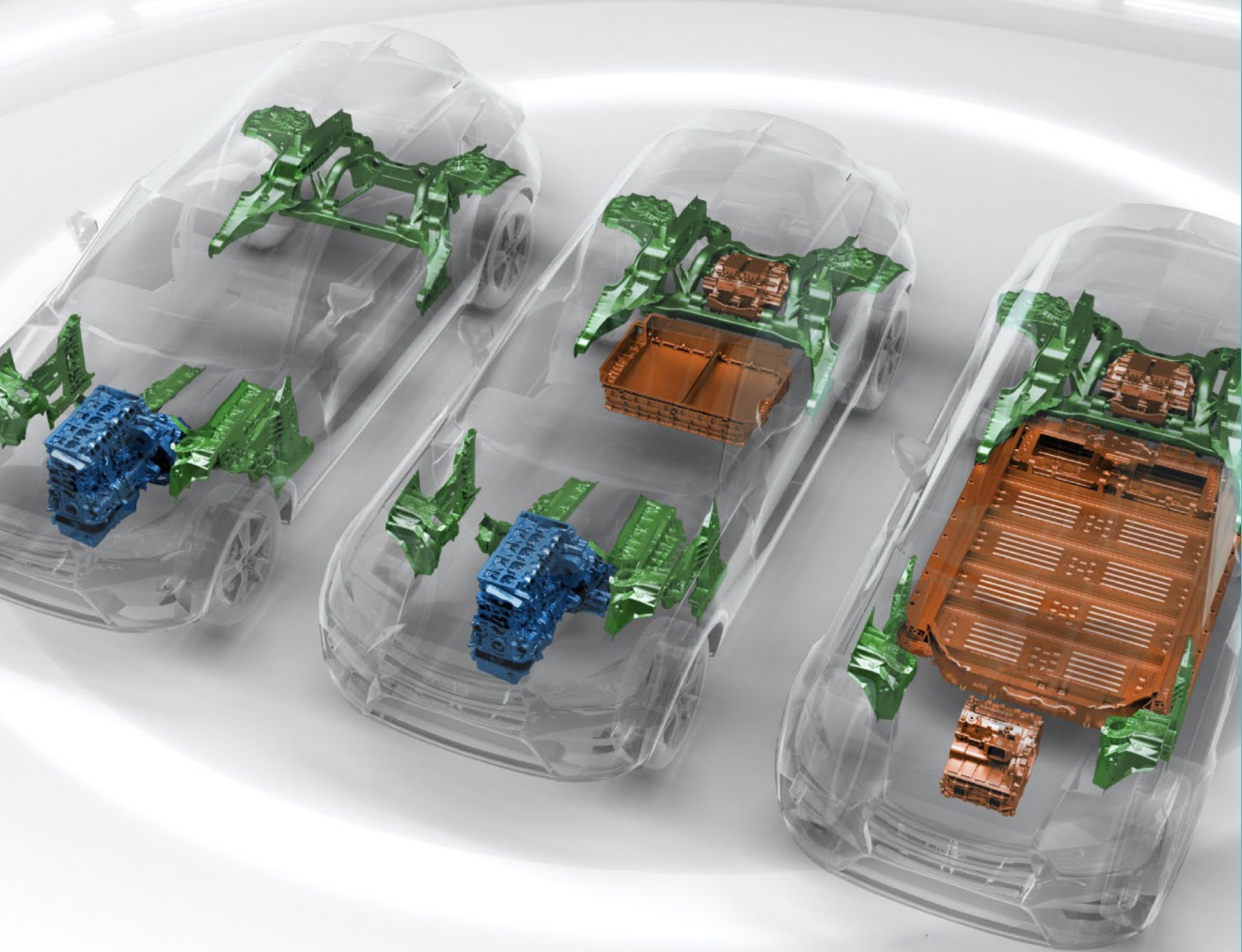


▶ **TOYOTA, ADIENT,
AND MULTIMATIC**

**2023 WINNER
MODULE LIGHTWEIGHTING**

**IsoDynamic Seat,
Accra® SuperStructure**

Multimatic's Accra® technology is a high-volume, hot-form manufacturing process that uses form blow hardening (including rapid water quenching) to manufacture ultra-high strength (boron) steel. Thanks to these production adjustments, the process reduced mass by 17%, reduced packaging space by 40%, and increased torsional load strength in key areas by 30%.



▶ NEMAK

2023 RUNNER-UP MODULE LIGHTWEIGHTING

BMW HPDC E-Bracket

Nemak developed a new alloy material for high-pressure die casting (HPDC) and reduced the BMW E-bracket's overall weight by 30%, resulting in a final weight of 16.74 kilograms (36.9 pounds).

▶ MARELLI

2023 WINNER
FUTURE OF LIGHTWEIGHTING

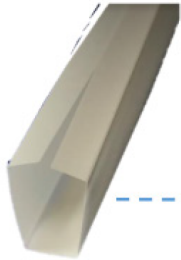


Lightweight Urethane for Interior Products

Marelli developed a new lightweight polyurethane foam that can be applied to all foam-in-place (FIP) applications, particularly the main dashboard panel. It reduces part mass by 40% with new tooling, 8% from current tooling, and reduces volatile organic compounds (VOCs) by 80% compared to the current polyurethane foam in use – all while retaining a high-quality feel and appearance.

△ ALTAIR

Ajedium™ PEEK Slot liners



KetaSpire® PEEK Magnet Wire

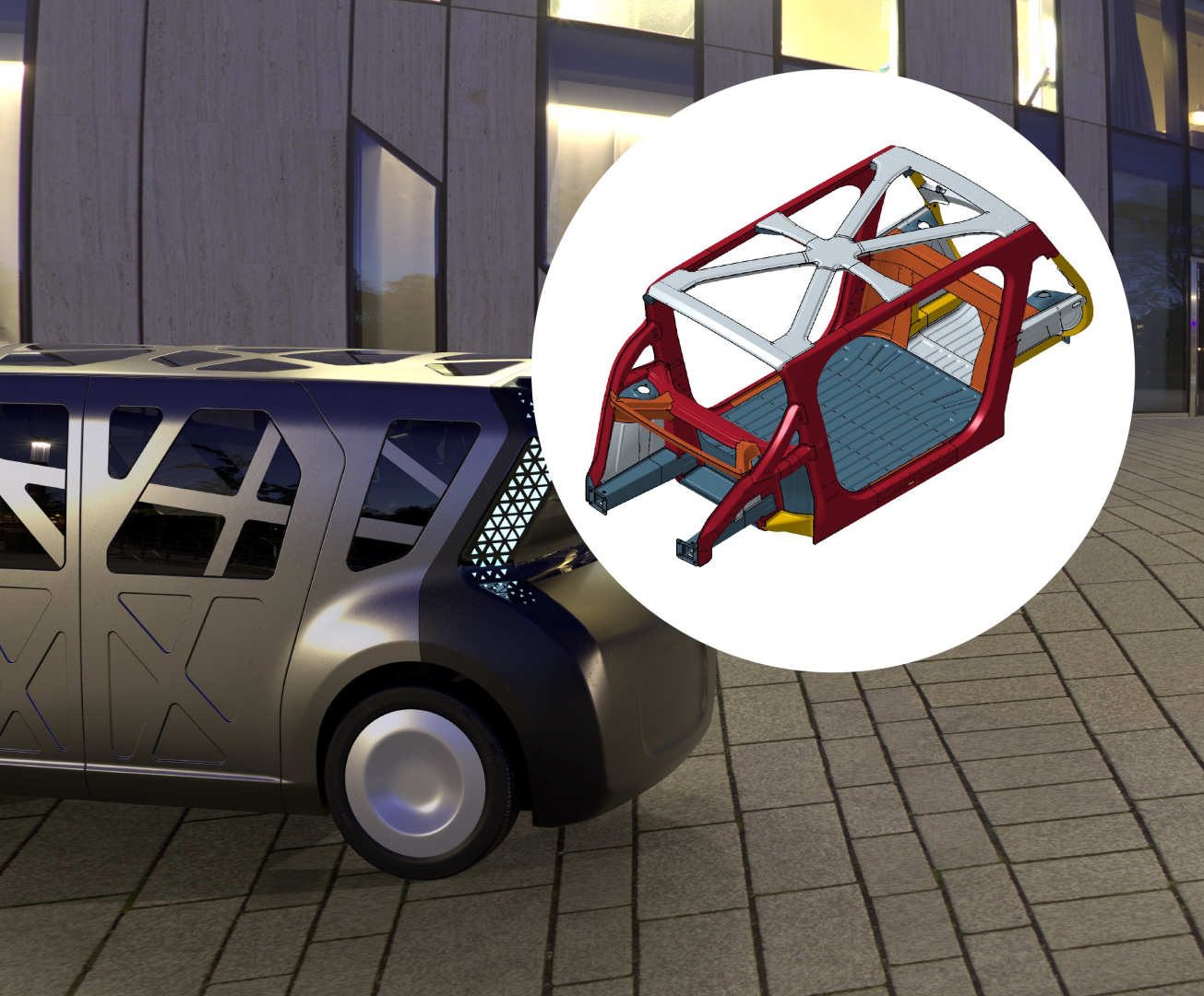


▶ SOLVAY SPECIALTY POLYMERS

2023 RUNNER-UP
FUTURE OF LIGHTWEIGHTING

Ajedium™ PEEK Slot Liners

Ajedium™ PEEK slot liners can reduce battery pack weight by 12 kilograms (36.4 pounds) and the e-motor size by 4 kilograms (8.8 pounds). Additionally, there's no requirement for high-power dedusting equipment or climate-controlled storage to prevent moisture uptake - which reduces energy consumption - since PEEK slot liners can be inserted via existing equipment. The reduction in aluminum casting motors uses less energy and material than before.

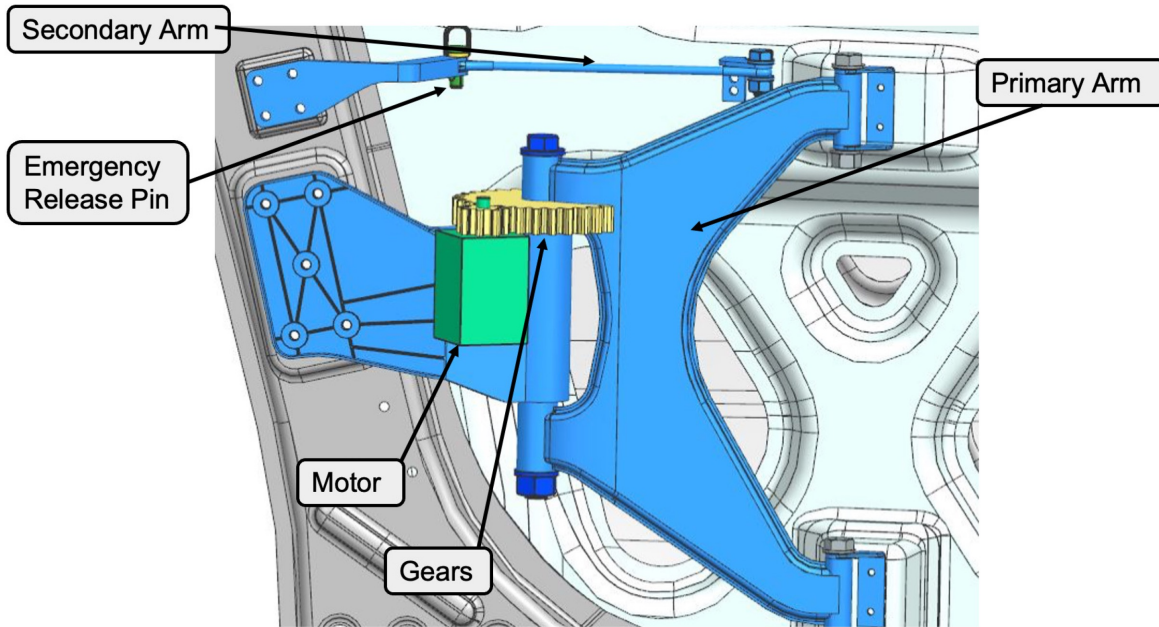


▶ **WORLDASTEEL AND RICARDO PLC**

**2023 HONORABLE MENTION
FUTURE OF LIGHTWEIGHTING**

Steel Body Structures for Fully Autonomous Vehicles

As the world's first autonomous vehicle constructed to fulfill the most stringent crash requirements, WorldAutoSteel and engineering partner Ricardo developed this concept vehicle that features a 282-kilogram (621.7-pound) body structure, and a 25% mass reduction over an expected reference vehicle. It also has the potential to reduce total lifecycle carbon emissions by 86%, which will help meet global net-zero goals.



▶ MICHIGAN TECHNOLOGICAL
UNIVERSITY FOR AUTO/
STEEL PARTNERSHIP

2023 HONORABLE MENTION
FUTURE OF LIGHTWEIGHTING

**Steel E-Motive
Side Closure Mechanism**

By developing this mechanism using advanced high-strength steel (AHSS) instead of aluminum, there is the potential to reduce carbon emissions by 3x while also reducing manufacturing costs.