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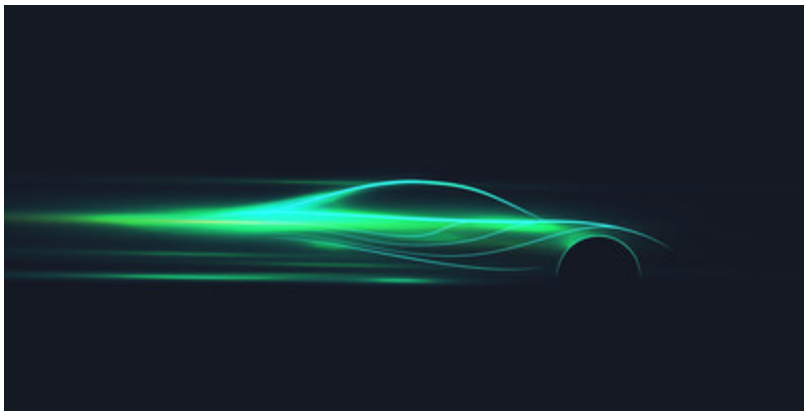
Novelis

Lightweighting for a Sustainable Future: Unlocking the Aluminum Advantage for Automakers

ATLANTA, Dec. 13, 2024 /PRNewswire/ -- The following is a blog post by Daniel Kern, Vice President, Global Automotive Development, Novelis



As the automotive industry navigates the crossroads of electrification, sustainability, and consumer preferences for vehicles that are more efficient, safer, and environmentally friendly, one thing is clear: the future of mobility requires a new approach to vehicle design. At Novelis, we believe that aluminum is the key to unlocking a lighter, greener, simpler, and safer future for automakers and their customers.

The Case for Aluminum

Aluminum is uniquely positioned to address some of the most pressing challenges in automotive manufacturing today:

Lighter

- Vehicles made with aluminum are significantly lighter than those made with steel, reducing energy consumption.
- Aluminum-intensive body-in-white structures, for example, weigh up to 45% less than steel-intensive vehicles, enabling automakers to improve performance and increase payload capacity.
- For electric vehicles (EVs), reduced weight also translates into extended battery range —a critical factor for consumer adoption. Moreover, lighter vehicles require fewer batteries and smaller engines, suspension systems, and brakes, translating to additional weight and cost savings for automakers.

Greener

- As the world's leading provider of low-carbon, recycled aluminum, Novelis enables automakers to design vehicles with lower lifecycle emissions, aligning with carbon reduction goals.
- For internal combustion engine vehicles, lighter vehicles produce fewer emissions and require less fuel during operation.
- For EVs, fewer batteries or smaller battery packs reduce the vehicle's carbon footprint in three critical ways: a smaller battery pack means less energy is being consumed while driving over its life; less energy consumption means less CO_2 produced from electricity generation; and lessen the need for resource-intensive mining of critical minerals. Additionally, aluminum's infinite recyclability creates opportunities for a more circular economy, through the recovery of aluminum in body and battery enclosure systems at the end of the life of the vehicle. Reusing recovered aluminum scrap significantly reduces the need for primary aluminum production, leading to substantial environmental benefits. Specifically, recycling aluminum consumes only about 5% of the energy required for primary production, resulting in up to a 95% reduction in energy usage. This process also achieves a similar percentage reduction in greenhouse gas emissions.

Simpler

- Aluminum's versatility supports modular design and manufacturing efficiencies, helping automakers streamline production across vehicle segments.
- Fewer total parts mean reduced robots, tools, and joints, resulting in l improved assembly efficiency and lower factory emissions.
- Using aluminum also reduces the complexity of material grades compared to steel while achieving similar functionality. These efficiencies reduce downstream supply chain requirements, simplify manufacturing complexity, and create value for automakers.

Safer

- High-strength aluminum alloys deliver exceptional crash performance, protecting occupants while still allowing for vehicle weight reduction.
- Aluminum demonstrates better energy absorption, allowing vehicle architectures to be engineered for improved occupant protection. This contributes to high marks in 5-star crash safety testing. Additionally, aluminum's lightweight properties enhance vehicle dynamics, improving handling, braking, and acceleration—essential features for safer driving experiences.

Building a Sustainable Automotive Future

The demand for lighter, greener, simpler, and safer vehicles will continue to grow as consumers and regulators prioritize sustainable mobility. For automakers, the transition to aluminum should not be seen as a challenge but as an opportunity. Aluminum is not just a material choice—it is a strategic enabler for achieving the automotive industry's long-term goals.

At Novelis, we are ready to be your partner on this journey. With our unmatched expertise, innovative solutions, and commitment to sustainability, we empower automakers to create vehicles that meet today's demands and anticipate tomorrow's challenges. Together, we can

drive the automotive industry toward a more sustainable, efficient, and prosperous future.

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