

WHITE PAPER

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GLOBAL CONSULTING, STRATEGY AND M&A SERVICES

# The Future of Green Aluminum:

Opportunities & Uncertainty  
in a Changing Market



# Introduction

**The demand for aluminum is rising**, particularly in the automotive sector, where battery electric vehicles (BEVs) rely heavily on lightweight materials. With strict CO<sub>2</sub> regulations and corporate sustainability targets, automakers are increasingly turning to green aluminum, produced through renewable energy sources or recycling processes.

However, uncertainty looms over the future of green aluminum demand. While aluminum adoption is expected to grow, a slowdown in BEV demand and regulatory shifts—such as a potential ICE ban reversal—could impact the market. If BEV production slows, so will the demand for low-carbon aluminum solutions.

This white paper explores the drivers of green aluminum growth, the challenges it faces, and what OEMs and suppliers need to consider in this evolving landscape.

# The Growing Role of Aluminum in Automotive Manufacturing

The demand for aluminum in the automotive sector is growing strongly, particularly as electrification continues to reshape vehicle design and production. BEVs require significantly more aluminum than internal combustion engine (ICE) vehicles due to the need for lightweight materials that enhance energy efficiency and driving range. The strongest aluminum demand growth comes from Body-in-White (BIW) and electrification components like battery pack housing and the e-drive, where weight reduction is crucial to improving vehicle performance.

Aluminum extrusions are also seeing increased adoption, particularly for battery housings, crossmembers, and structural reinforcements. These applications contribute to the overall efficiency of BEVs and align with industry-wide efforts to reduce carbon emissions through material innovations. As regulatory pressures intensify, OEMs are prioritizing the use of low-carbon aluminum, reinforcing the importance of sustainable sourcing and production practices.

OEMs are driving this shift through their corporate sustainability targets. Globally, 480 automotive companies have pledged to reduce their carbon footprint, with an estimated \$1.2 trillion investment in sustainability initiatives by 2030. A key element of this strategy is Scope 3 emissions reduction, which focuses on lowering indirect emissions across the supply chain. This makes green aluminum a critical component of automakers' long-term sustainability goals. As a result, suppliers capable of providing verifiable low-carbon aluminum solutions will gain a competitive advantage in securing long-term partnerships with OEMs.

# Green Aluminum Production: Renewable Energy & Recycling

The shift toward green aluminum is being achieved through two primary pathways: the use of renewable energy in aluminum smelting and the increased recycling of aluminum scrap. Both methods significantly reduce the carbon footprint of aluminum production and align with regulatory requirements for decarbonization.

One of the most effective ways to produce low-carbon aluminum is by utilizing renewable energy sources in the smelting process. Hydropower is the most widely used renewable energy source for aluminum production, particularly in regions where hydroelectric plants are abundant. In some markets, wind and solar energy are also being integrated into aluminum production to further reduce emissions.

Recycling is another key pillar of green aluminum production. The two main types of aluminum recycling include production scrap recycling, which involves repurposing aluminum waste generated during manufacturing, and post-consumer scrap recycling, where aluminum from end-of-life products is recovered and reintegrated into the supply chain.

Regulatory support for green aluminum is strong, particularly in the European Union. The EU Green Deal (2020) and Circular Economy Action Plan have introduced incentives for sustainable aluminum production and recycling, aiming to reduce reliance on high-carbon imports. Recycling rates have improved significantly, with some markets achieving a 76% aluminum recovery rate from beverage cans alone. Additionally, the Carbon Border Adjustment Mechanism (CBAM) is expected to further discourage CO<sub>2</sub>-intensive aluminum imports and encourage domestic production of low-carbon aluminum.





# Future Uncertainty: Green Aluminum Demand

Despite the clear benefits and regulatory backing, the long-term demand for green aluminum remains uncertain. Several key factors could influence its growth trajectory, including market conditions, policy shifts, and cost dynamics.

One of the most pressing concerns is the slowdown in BEV adoption. Initial forecasts predicted a rapid shift toward full electrification, but consumer hesitancy, high vehicle costs, and charging infrastructure limitations have slowed the transition. Some automakers are adjusting their production strategies by increasing hybrid vehicle output, which alters the expected aluminum demand growth. If the ICE ban is reversed or delayed, BEV demand could decline further, reducing the urgency for green aluminum solutions.

The economic viability of green aluminum production is another significant challenge. Transitioning to low-carbon aluminum production requires substantial investment in new technologies, making green aluminum more expensive than conventional alternatives. The volatility of electricity prices further complicates the situation. Between 2021 and 2023, electricity costs surged by approximately 100% due to geopolitical factors, increasing the operational costs of renewable-powered smelting.

Additionally, the availability of high-quality aluminum scrap remains a bottleneck for expanding recycled aluminum production. In 2023, 1.3 million tons of aluminum scrap were exported, highlighting the difficulty of securing domestic recycled material for sustainable production. This challenge is exacerbated by the EU's heavy reliance on aluminum imports, with 50% of all aluminum consumed in the region being sourced from external markets. Supply chain disruptions and trade policies could further impact the stability of green aluminum availability.

# Conclusion: Strategic Considerations for OEMs and Suppliers

Despite strong growth in aluminum usage and increasing regulatory support for green materials, market uncertainties present both risks and opportunities for industry players. OEMs and suppliers must take proactive steps to navigate these complexities and ensure long-term sustainability in aluminum sourcing.

To stay competitive in the evolving market for green aluminum, OEMs and suppliers should:

- ✓ **Strengthen post-consumer scrap supply by securing diverse sources beyond automotive recycling.**
- ✓ **Adapt strategies to account for potential regulatory shifts, such as ICE ban reversals.**
- ✓ **Monitor BEV market developments and remain flexible in adjusting material sourcing strategies based on shifting production trends.**

# Partner with Ducker Carlisle

At Ducker Carlisle, we provide in-depth strategic market insights into electrification, BEV demand, aluminum and green aluminum trends, and OEM strategies. Our expertise helps businesses navigate industry complexities and optimize their supply chain, sustainability approach, and market positioning. Contact us to learn how we can support your strategic decision-making.

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