

# THE VALUE OF LOW CARBON ALUMINUM IN BUILDING AND CONSTRUCTION



Buildings account for ~40% of greenhouse gas emissions, with one-third coming from embodied carbon. Reducing embodied carbon is critical for lowering the environmental impact of buildings. Aluminum is a very versatile material. With its high strength-to-weight ratio, design flexibility, durability and end-of-life recyclability, aluminum is an attractive material of choice for commercial framing systems. More than 90% of commercial framing systems use aluminum-based framing systems\*. Architects can also choose from a range of surface finishes to apply on these aluminum systems, allowing for greater design aesthetics and more creative freedom. These factors combined make aluminum an attractive material for architects and designers to utilize in their buildings.

This whitepaper explores the benefits of selecting aluminum products for building projects, the environmental benefits that come with aluminum, why not all aluminum is equal in sustainability and environmental impact and the factors that contribute to aluminum's quality.

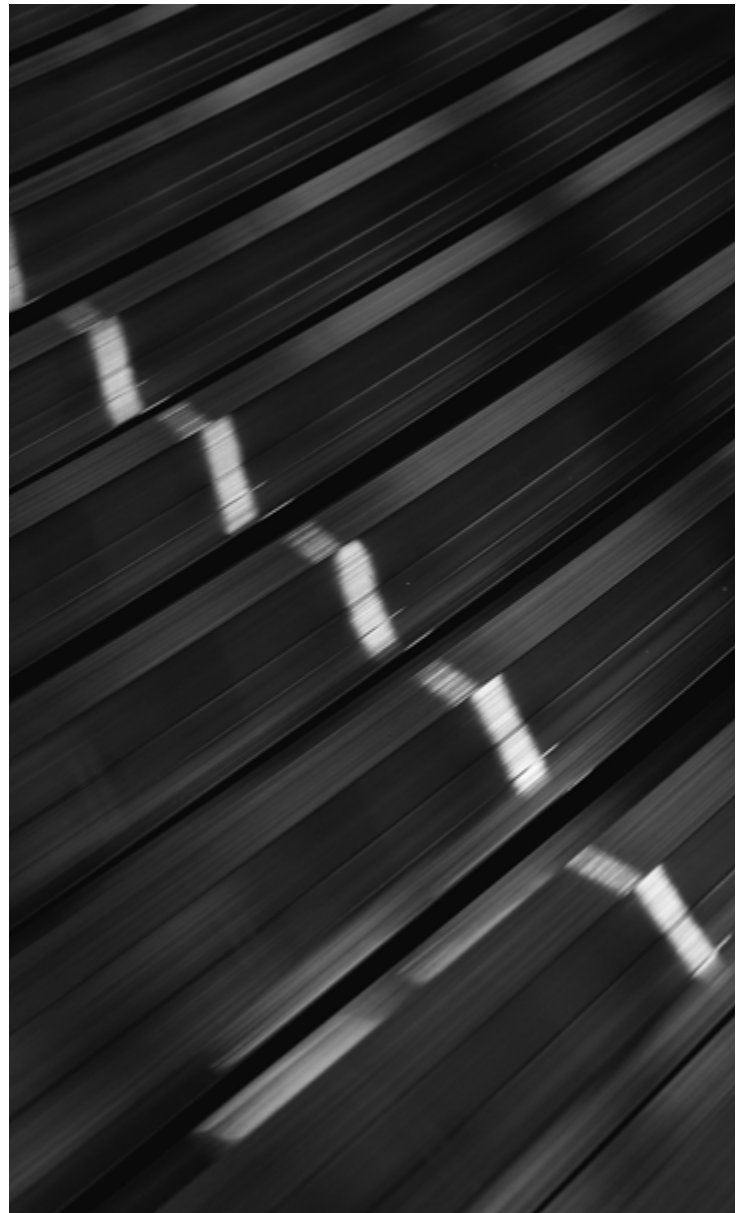
### THE PRODUCTION OF PRIMARY ALUMINUM

The production of primary aluminum is energy intensive and uses large amounts of electricity. The source of electricity used in production significantly impacts the carbon footprint of aluminum. For example, with an aluminum smelter that uses electricity from a coal-fired power plant, this would result in very high carbon emissions associated with this aluminum in the range of ~24 t CO<sub>2</sub>e/t Al.

On the other hand, with a primary aluminum smelter that is getting electricity from a hydroelectric smelter or clean energy sourced power plant, its carbon emission would be much lower, around 4 to 5 t CO<sub>2</sub>e/t Al.

### THE RECYCLABILITY OF ALUMINUM

According to the International Aluminum Institute, 75% of all aluminum ever produced is still in use, which showcases its true circular nature. There is a robust infrastructure and economical value that ensures aluminum gets recycled at the end of its life, like when a building is decommissioned. Aluminum is infinitely recyclable and compared to primary aluminum production, recycled aluminum uses 95% less energy. The carbon footprint for recycled aluminum varies from 0.3 to 0.6 t CO<sub>2</sub>e/t Al. When evaluating the overall spectrum of the potential carbon footprint of aluminum, it varies all the way from 0.3 of aluminum to 25 t CO<sub>2</sub>e/t Al, depending on the source.



### ALUMINUM PRODUCTION: EMISSIONS SPECTRUM

The emissions intensity of aluminum can range from -0.3 to 25 t CO<sub>2</sub>e/t Al due to differences between each production process, the production technology used, and the sources of power and heat.

- Recycling average: 0.6
- Global primary average: 16

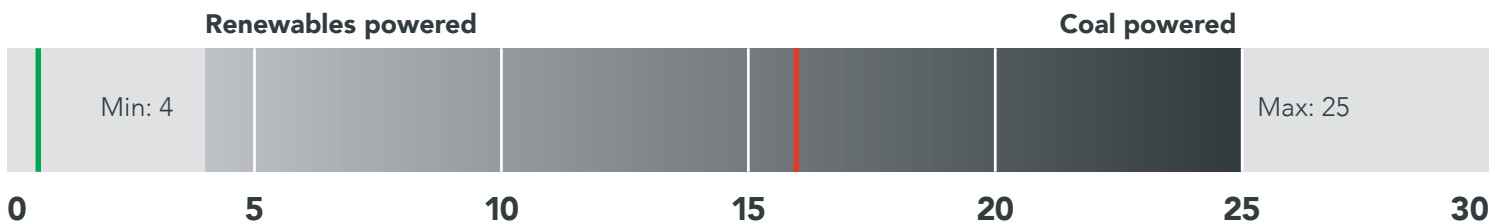


Chart: RMI Data: International Aluminum

\* Ducker research (FGIA)



## RECYCLED CONTENT ≠ CARBON FOOTPRINT

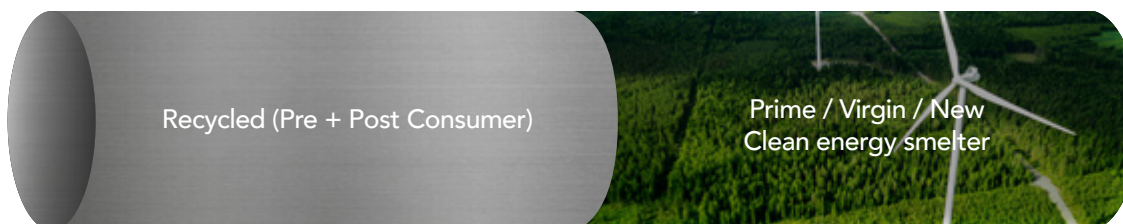
The carbon footprint of aluminum is not only about its recycled content—which impacts the overall carbon footprint of that aluminum—but also where the origin of the remaining portion of the primary aluminum in the billet. The carbon footprint depends on both the percentage of recycled content as well as the source of primary aluminum.

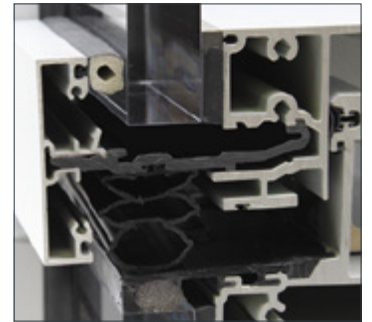
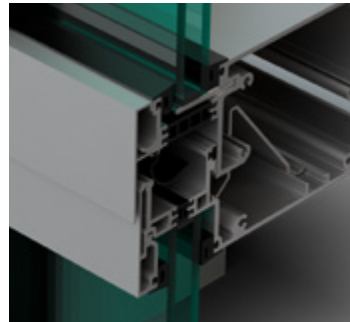
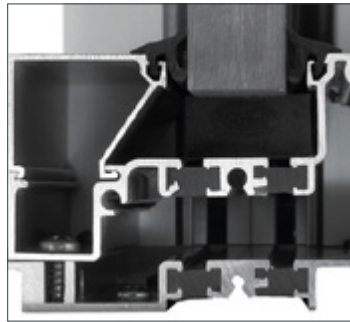
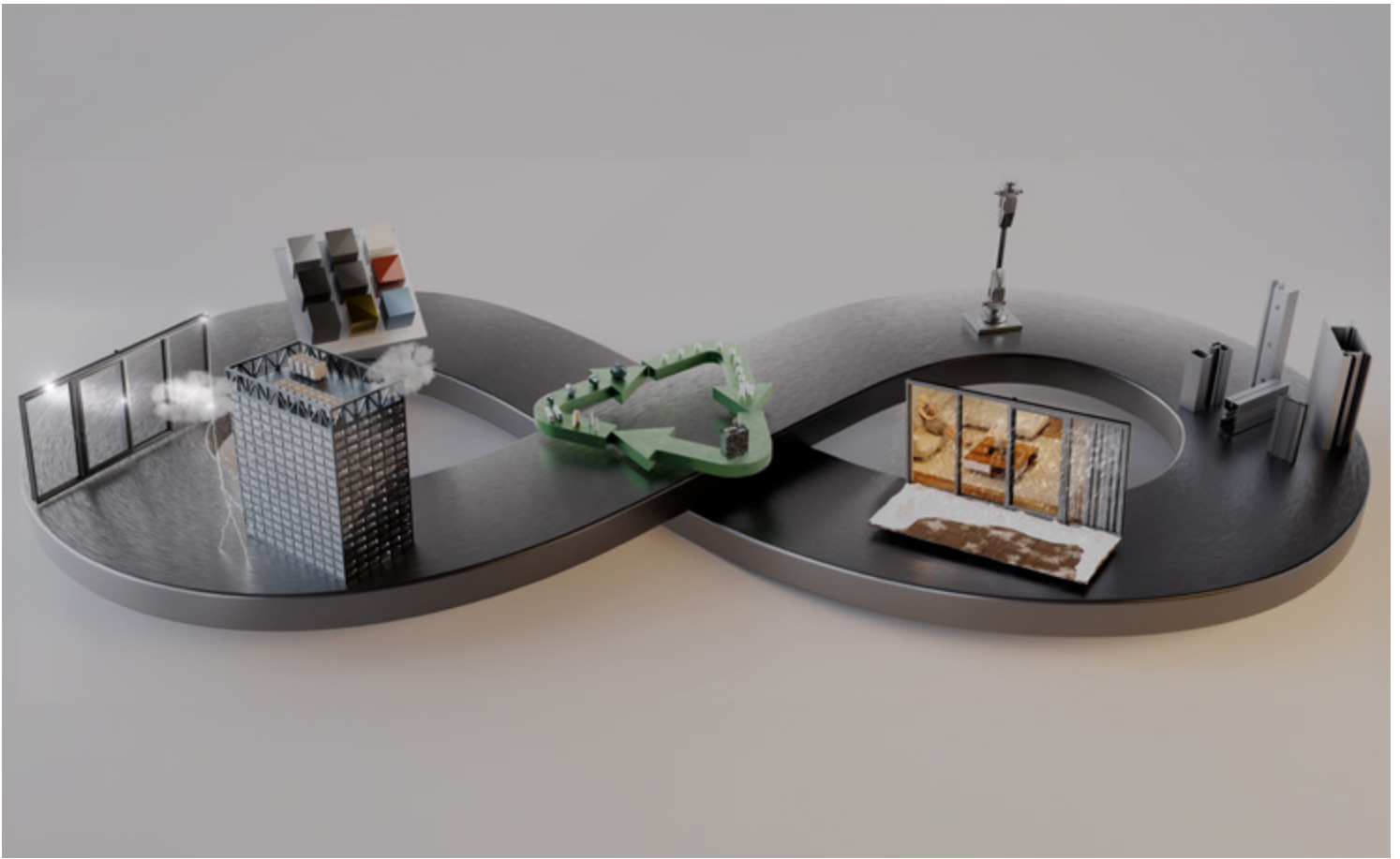
For example, an aluminum billet with 70% recycled content and its remaining 30% primary aluminum coming from a coal-powered smelter, would have a much higher carbon footprint compared to if the primary aluminum came from a hydroelectric smelter as the recycled content plus the source of prime is what defines the carbon footprint of the aluminum.

## HOW DOES KAWNEER DEFINE LOW CARBON ALUMINUM?

There are currently no industry standards that define low-carbon aluminum. For primary aluminum production, aluminum produced with a clean energy source or hydroelectric energy source are considered low-carbon aluminum, which would be around 4 to 5 t CO<sub>2</sub>e/t Al.

At Kawneer, we want our aluminum to contain recycled content and contain primary aluminum. Kawneer's current aluminum billet standard stipulates minimum 50% recycled content, while the remaining 50% is coming in from hydroelectric or clean energy sourced smelter, giving us a combined overall carbon footprint of less than 3 t CO<sub>2</sub>e/t Al.





### **ADDING LOW-CARBON ALUMINUM BILLET REQUIREMENT IN SPECIFICATION**

Architects and building designers are looking to reduce the embodied carbon in their projects. Low-carbon aluminum billet is now Kawneer's standard billet offering for all its products and is meant to drive an impact at reducing the overall emissions associated with Kawneer's product portfolio. Specifying the billet used down to the smelter source of primary aluminum, along with their recycled content, will help ensure a lower product carbon footprint for the project.

Besides embodied carbon, Kawneer has a suite of ultra-thermal facade systems that lower the operational carbon footprint of a building. Advancements in thermal break technologies have allowed aluminum to remain the material of choice for architectural framing systems, helping reduce the operational carbon emissions.

# Planet



# People



## **BALANCE: OUR COMMITMENT TO HOLISTIC SUSTAINABILITY**

Kawneer leads the industry in sustainable design and innovation. We provide a tremendous amount of transparency, not just about what goes into our products but also on how they are manufactured. In 2016 we released our first Environmental Product Declaration (EPD) and have since continued to work diligently in defining sustainability for the industry. With advanced technology processes and highly recyclable aluminum products, we are focused on continuing to reduce our environmental footprint.

Kawneer is committed to accelerating this approach through our 'BALANCE' philosophy to actively care for our planet and our people across our entire value-chain for a more sustainable and resilient world. This does not represent a new path but an ongoing journey. We are dedicated to constantly improving for future generations.

# Product



To learn more about Kawneer's commitment to holistic sustainability, visit our BALANCE webpage: [kawneer.us/sustainability](http://kawneer.us/sustainability).