

Novelis Product Carbon Footprint & Recycled Content Methodology – Executive Summary

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Novelis



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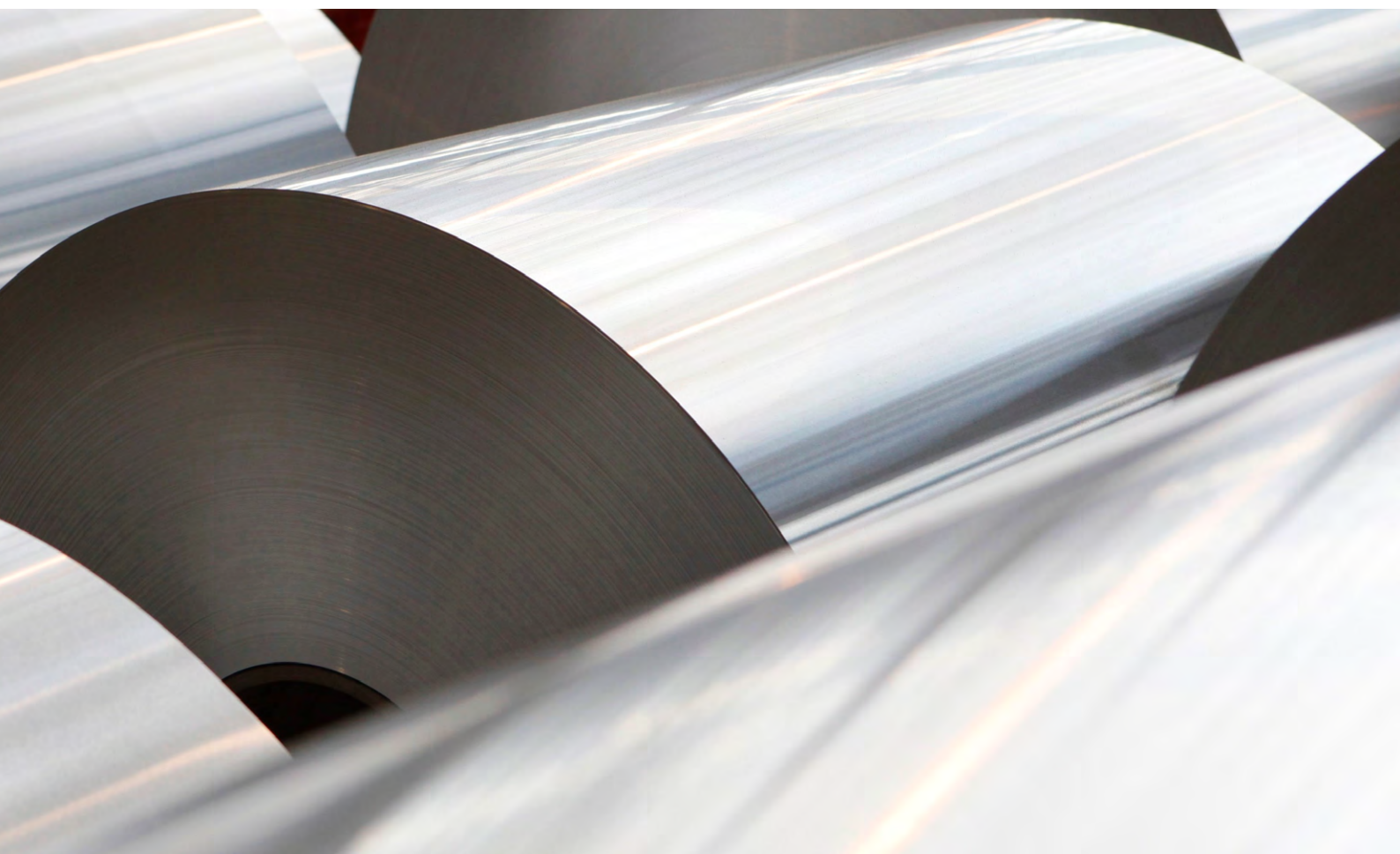




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1.0 Purpose

Novelis is a leading sustainable aluminum solutions provider and a world leader in aluminum rolling and recycling. Driven by our purpose of “Shaping a Sustainable World Together,” we work alongside our customers to provide innovative, low-carbon, and high-recycled-content aluminum solutions to the aerospace, automotive, beverage packaging, and specialty markets. The Novelis Product Carbon Footprint & Recycled Content Methodology (the Methodology) is intended to enable increased value chain collaboration, cultivate the use of lower-carbon, lightweight, infinitely recyclable aluminum, and support aluminum circularity and industry carbon reduction.

The Methodology describes the data and processes used to calculate and report the cradle-to-gate carbon footprint and recycled content of Novelis flat-rolled aluminum products at the product and customer level. It is intended to make the applicable calculation, allocation, attribution, and governance rules transparent, consistently applied, and auditable within each regional system boundary.

The Methodology seeks to increase customer-specific closed-loop recycling (CLR) and enable commercial strategies that support the use of low-carbon primary aluminum and scrap. It provides a transparent system view of the factors affecting product carbon footprints and recycled content. Closed-loop recycling helps preserve the value of aluminum alloys by maintaining material quality and reducing reliance on primary aluminum. The Methodology is intended to support commercial decarbonization by incentivizing CLR agreements, the purchase of low-carbon materials, and customer transitions to products with higher recycled content.

2.0 Approach

The Methodology applies a two-step approach: (1) a Physical Baseline and (2) a Controlled Mass Balance Chain of Custody. The Physical Baseline calculates the cradle-to-gate carbon footprint at the alloy level using life cycle assessment principles and then aggregates results to the customer level based on shipments. The Controlled Mass Balance Chain of Custody begins with the Physical Baseline and uses a credit method to reallocate specified inputs and their associated characteristics within defined regional system boundaries, subject to the Methodology’s allocation rules, technical and physical constraints, balancing-period controls, and credit-account governance.

3.0 Standards Applied

This document summarizes the methodology, reference data, and reference sources used to calculate the carbon footprint and recycled content of Novelis products. The Methodology was reviewed by an independent reviewer, DNV. It follows the requirements of the WRI/WBCSD GHG Protocol Scope 1, Scope 2, Scope 3, and Product Life Cycle Accounting and Reporting Standards as applied through the Novelis Global Environmental Reporting Directive. The Methodology also applies ISO 22095:2020 to its chain-of-custody model and considers ISO 22095-2:2026 where relevant to mass balance documentation, attribution, balancing-period control, and credit-account governance.

1. ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework, International Organization for Standardization, 2006 (ISO 14040, 2006).
2. ISO 14044:2006: Environmental management – Life cycle assessment – Requirements and Guidelines, International Organization for Standardization, 2006 (ISO 14044, 2006).
3. ISO 14067:2018: Greenhouse gases – carbon footprint of products – requirements and guidelines for quantification, 2018 (ISO 14067:2018)
4. ISO 22095:2020: Chain of custody – General terminology and models, 2020 (ISO 22095:2020).
5. ISO 22095-2:2026: Chain of custody – Mass balance – Additional requirements and guidance, 2026 (ISO 22095-2:2026).

4.0 Physical Baseline

The Physical Baseline calculates cradle-to-gate product carbon footprints at the alloy level and aggregates them to the customer level based on mass shipped. Following ISO 14040:2006, ISO 14044:2006, and ISO 14067:2018, it defines the system boundary, allocation methods, data sources, cut-off criteria, intended audience, life cycle inventory, impact assessment method, assumptions, and limitations. Climate change is the only impact category assessed. The Physical Baseline is the first calculation step and the starting point for the Controlled Mass Balance Chain of Custody.

4.1 Intended Audience

Novelis and its customers. The Physical Baseline also serves as the starting point for the Controlled Mass Balance Chain of Custody and for customer-level reporting.

4.2 Product System

Novelis aluminum flat-rolled products of a specific alloy.

4.3 Declared Unit and Reference Flow

1 metric ton of aluminum flat-rolled product (FRP).

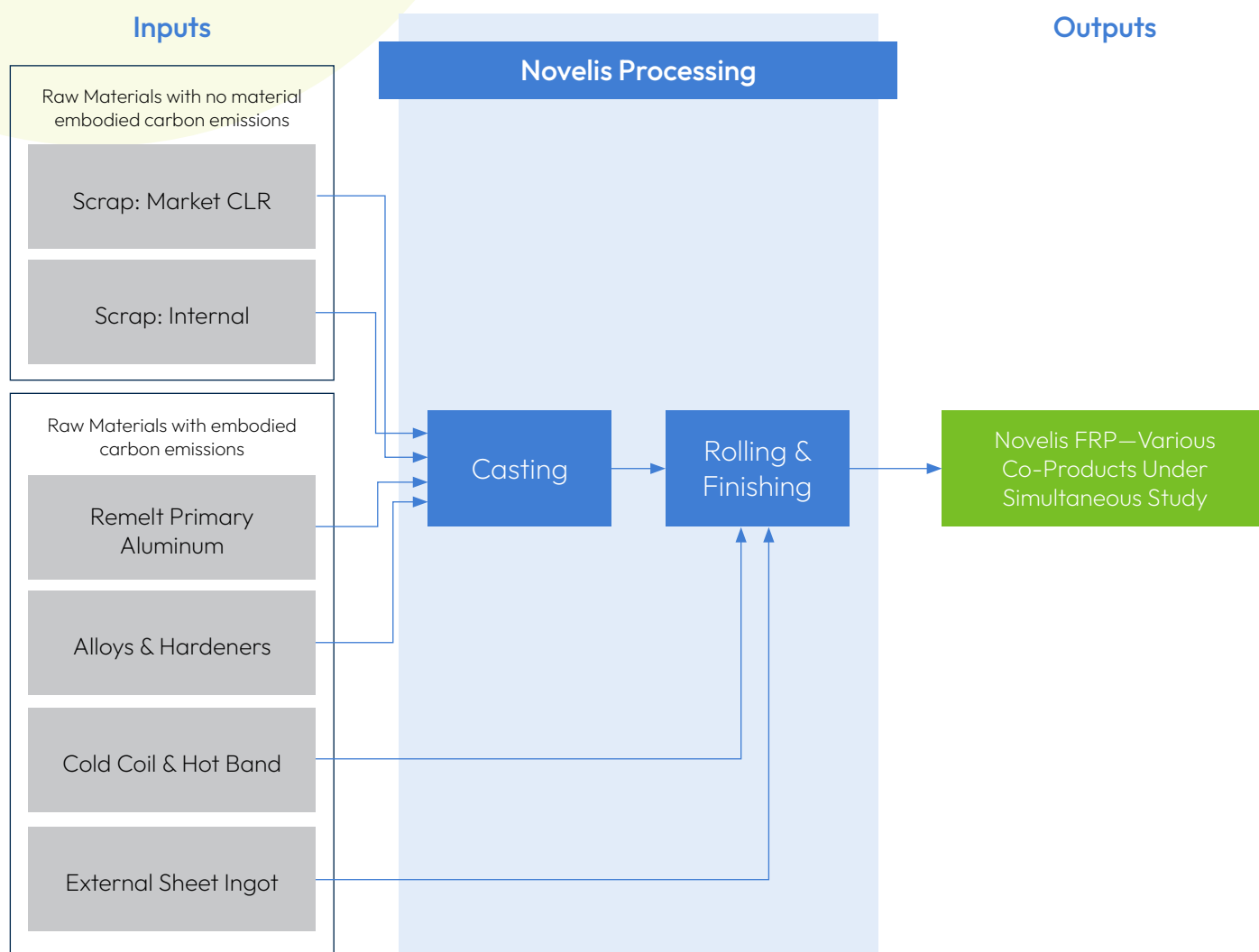
4.4 System Boundary

The Methodology accounts for cradle-to-gate greenhouse gas emissions, expressed as carbon dioxide equivalents (CO₂e), associated with producing Novelis FRP. The full product system includes upstream raw-material production and Novelis processing, including casting, rolling, and finishing. The calculation includes Scope 1, Scope 2, and relevant upstream Scope 3 emissions within the defined system boundary.

Table 1: Activities Considered in Carbon Calculation

Included	Excluded
Raw material (metals), mining, and processing	Capital goods and maintenance
Combustion of fuels in operations	Research and development
Electricity used in operations	Fuel sourcing and refining
Intercompany and outbound transport paid for by Novelis	Employee commuting and business travel Transport from tier 1 suppliers to Novelis sites

Figure 1: System Boundary Emission Sources



4.5 Time Coverage

The Methodology may report results for the Novelis fiscal year or for another contiguous 12-month period, such as a calendar year, where commercially required. Calculations are performed ex post using the same underlying data inputs and processes. Balancing periods must be structured so that inputs and credit movements are recorded, reviewed, and locked once within the applicable regional ledger, preventing overlap or double allocation across reporting windows.

4.6 Geographical Coverage

The Methodology operates through four standalone regional system boundaries: Novelis Asia, Novelis Europe, Novelis North America, and Novelis South America. Each region maintains its own balances and credit accounts. Inter-regional transfers carry the applicable Physical Baseline attributes but do not transfer credit-account balances between regions.

4.7 Allocation

Since Novelis produces FRP with multiple alloy specs from the same manufacturing site or chain of sites, the inputs and outputs of the system are partitioned between its different alloys in a way that reflects the underlying physical relationships between them. This allocation is performed by using alloy bill of material (BoM) data to quantify the carbon-intensive input consumption of each respective product by mass.

The allocation process uses the alloy BoM from the casting stage of aluminum FRP production. Site-level data is allocated based on alloy mass, which determines how the carbon footprint from material inputs is distributed across individual products.

4.8 End-of-Life Allocation

The Methodology considers cradle-to-gate emissions and excludes the use and end-of-life stages. The Physical Baseline follows the cut-off, or recycled-content, approach. Under this approach, burdens from processing and recycling waste material are attributed to the subsequent scrap-consuming product system and are outside the preceding product system boundary. Scrap inputs are therefore treated as having no upstream virgin-material carbon emissions when entering Novelis operations.

4.9 Impact Assessment

The Physical Baseline follows ISO 14067:2018 and assesses climate change only. Results are expressed as carbon dioxide equivalents (CO₂e) using the applicable Global Warming Potential characterization method. The Methodology does not assess other environmental impact categories and is not, by itself, a basis for comparative assertions of overall environmental superiority or equivalence.

5.0 Controlled Mass Balance Chain of Custody

The Controlled Mass Balance Chain of Custody begins after the Physical Baseline. It applies the principles of ISO 22095:2020 and considers ISO 22095-2:2026 where relevant to reallocate specified inputs and their associated characteristics within a defined regional system boundary. The model uses credit accounts for CLR Scrap, Market Scrap, and Low-Carbon Prime. It is constrained by demonstrated technical limits, applicable physical-volume controls, defined allocation hierarchies, balancing-period requirements, and inventory reconciliation. The aggregate regional system remains in balance before and after reallocation.

5.1 Technical Constraints

Technical constraints ensure that each product is not allocated more scrap than our system has historically demonstrated for that alloy at the site level. This is represented by the Maximum Demonstrated Scrap / Minimum Demonstrated Prime limits. To set these limits, all historical monthly average primary aluminum consumption is calculated for each alloy at each site within a respective region. The lowest demonstrated primary aluminum consumption monthly average for each alloy becomes the limit for CLR and Market Scrap reallocation and is expressed as a percentage of inputs. This internal control ensures that the outcomes of this methodology reflect the technical constraints measured in our operational environment while maintaining the incentivization of good scrap handling practices and alloy innovation.

5.2 Physical Constraints

Physical constraints apply when establishing active, forward-looking commitments for highly circular alloys in significant volumes. Actual production volumes are grouped into recycled-content buckets, and commitments must not exceed the corresponding demonstrated volumes after application of the Methodology's internal buffer. The regional governance process manages these controls.

5.3 Intended Audience

The intended audience for the results of this methodology includes Novelis' beverage packaging, automotive, aerospace, and specialties customers. Novelis will share results derived from this methodology with customers as part of contractual agreements via a two-page customer disclosure.

5.4 System and Coverage

The product system and boundaries, time, and geographical coverage are the same as the Physical Baseline.

5.5 Credit Method

To reassign inputs and their respective attributes, a credit account system is applied. Volumes by mass of specific inputs are removed from the physical baseline and placed into credit accounts to be reassigned to products and customers based on a predefined ruleset.

1. **Credit Account Inputs:** CLR Scrap, Market Scrap, and Low-Carbon Prime. The total mass of each of these inputs will be removed from the Physical Baseline and placed into credit accounts.
2. **Credit Account Boundaries:** Each Novelis region maintains CLR Scrap and Market Scrap credit accounts by alloy. Low-Carbon Prime credit accounts are maintained by Market Segment Group within each region. Credits may not be transferred between regions.
3. **Credit Account Quantities:** CLR Scrap credits are based on documented customer returns; Market Scrap credits are based on documented Market Scrap inputs by alloy; and Low-Carbon Prime credits are based on documented qualifying primary aluminum mass and its associated carbon intensity. The applicable conversion factor is 1:1 because inputs and outputs are measured by mass and physical losses are addressed in the Physical Baseline.

5.6 Environmental Additionality

Environmental additionality is required for premium-based allocation of credits. The applicable commercial arrangement must support the allocation, and premium funds must be used in accordance with the Methodology's additionality requirements.

1. CLR Scrap supports circularity by returning documented customer scrap to Novelis for reuse and reducing the risk of downcycling.
2. Low-Carbon Prime premium funds intended to pass through Low-Carbon Prime benefit are to be used to procure additional Low-Carbon Prime.
3. Market Scrap premiums are intended to support projects that increase the uptake of usable aluminum scrap or provide another measurable environmental benefit.

5.7 Closed-Loop-Recycling (CLR) Scrap:

CLR Scrap credits are assigned based on the following rule hierarchy:

1. Customers with CLR agreements receive credits proportional to the CLR Scrap supplied to Novelis on a 1:1 mass basis, displacing primary aluminum.
2. CLR Scrap allocation is limited by the applicable demonstrated minimum-primary-aluminum or maximum-scrap constraint. For designated high-circularity alloys, a 25% cap may apply as described in the full Methodology.
3. Any remaining CLR Scrap credit is distributed pro rata by shipment share to remaining customers in the applicable Market Segment Group.

5.8 Market Scrap

Market Scrap credits are assigned based on the following rule hierarchy:

1. Customers with premium-based high-recycled-content agreements receive the quantity of Market Scrap credits needed to meet the applicable contractual arrangement, subject to the Methodology's additionality requirements and constraints.
2. Customers who engage in high-recycled-content agreements that are based on a specific routing to ensure traceability shall receive credits reflective of the routing arrangement.
3. Any remaining Market Scrap credit is distributed pro rata by shipment share to remaining customers in the applicable Market Segment Group. A 5% buffer volume by mass of Market Scrap, calculated before reallocation, is maintained in the credit account, subject to the inventory-balancing provisions of the full Methodology.

5.9 Low-Carbon Prime

Low-Carbon Prime (LCP) credits are assigned based on this rule hierarchy:

1. Customers with existing Low-Carbon Prime agreements receive credits in accordance with those agreements, including applicable pass-through funding arrangements.
2. Customers paying an applicable premium receive a specified quantity of Low-Carbon Prime credits consistent with the contractual arrangement and the Methodology's premium-fund requirements.
3. Remaining Low-Carbon Prime credits are allocated in proportion to customers' Physical Baseline share.

LCP shall be defined as meeting at least one of the following conditions:

1. Primary aluminum from a smelter with a carbon intensity below 7 tCO₂e per metric ton of aluminum.
 2. Primary aluminum from a smelter that sources more than 50% of its electricity from renewable energy sources.
-

6.0 Recycled Content (RC)

The Methodology calculates recycled content for each applicable alloy and customer twice: first after the Physical Baseline and again after allocation of CLR Scrap and Market Scrap credits through the Controlled Mass Balance Chain of Custody. The calculation follows the Novelis recycled content methodology and includes the applicable treatment of primary material, coated scrap, and runaround melt loss. Aggregate regional recycled content remains equivalent before and after reallocation.

7.0 Assurance

The Methodology and resulting chain-of-custody process are subject to third-party review and assurance as described in the full Methodology. Assurance includes review of relevant input data, credit-account formation and allocation, calculation controls, documentation, and reported results.

8.0 Governance

The Methodology establishes governance for data collection, calculations, credit-account management, customer commitments and disclosures, documentation, competence, assurance, and non-conformity management. The Novelis Executive Committee provides top-management oversight; the Global Sustainability Center of Excellence owns the methodology and common control expectations; regional governance bodies oversee regional commitments and implementation; and Commercial, Procurement, Operations, Finance, Legal, and third-party assurance providers have defined responsibilities.

Performance and conformance are reviewed through ongoing controls, periodic regional reviews, internal audit, and third-party assurance. Material imbalances or non-conformities must be investigated, corrected, documented, and escalated through the applicable governance process before affected external reporting proceeds.

9.0 Customer Communication

Methodology results are communicated using standardized customer disclosures coordinated by the Global Sustainability Center of Excellence and relevant regional functions. Communications include applicable standards references, a description of the Methodology and approach, and the customer- and product-specific chain-of-custody result. Externally published versions and customer-facing disclosures must include the applicable legal disclaimer.

Glossary of Relevant Terms

Term	Definition or Description
Allocation	Partitioning input or output flows among products or product systems in a way that reflects the applicable physical relationships. Adapted from ISO 14040:2006, section 3.17.
Alloy	A specific chemical composition of aluminum that affects properties such as strength, conductivity, ductility, corrosion resistance, and appearance.
Balancing Period	The period during which a credit account must not be overdrawn and its inputs, deductions, transfers, buffers, and closing balance must reconcile.
Bill of Material (BoM)	A record of the material inputs used to produce sheet ingots. For the Methodology, BoM data support allocation of metal inputs and associated carbon emissions to alloys.
Chain of Custody	The process by which inputs, outputs, and associated information are transferred, monitored, and controlled through a supply chain.
Closed-Loop Recycle Scrap (CLR Scrap)	Pre-consumer scrap returned by a Novelis customer under a closed-loop recycling agreement.
Controlled Mass Balance Chain of Custody	The Methodology's credit-based chain-of-custody model for reallocating specified inputs and associated characteristics within defined regional boundaries, subject to technical and physical constraints and governance controls.
Credit Account	A record of an available quantity of an input with a specified characteristic, together with credits added, deducted, transferred, buffered, and carried as a closing balance.
Credit Method	A mass balance implementation method that tracks inputs with specified characteristics as credits and assigns those credits to outputs under defined rules.
Cut-off Approach	A recycled-content approach under which burdens from processing and recycling waste material are attributed to the subsequent scrap-consuming product system.
Declared Unit	The quantity of product used as the reference unit for quantifying a partial product carbon footprint. The Methodology uses 1 metric ton of FRP.
Environmental Additionality	A requirement that a premium-based allocation support an environmental benefit beyond what would otherwise occur under regular conditions.
Flat-Rolled Product (FRP)	An aluminum product made by rolling aluminum to reduce its thickness and increase its length.
Life Cycle Assessment (LCA)	Compilation and evaluation of the inputs, outputs, and potential environmental impacts of a product system throughout its life cycle. Adapted from ISO 14040:2006, section 3.2.
Low-Carbon Prime (LCP)	Primary aluminum meeting the specified characteristics in Section 5.9 of this Executive Summary.
Market Scrap	Scrap purchased from a third party that is not Novelis internal scrap or customer CLR Scrap.

Term	Definition or Description
Market Segment Group	One of the principal market groupings used by Novelis for governance and certain Low-Carbon Prime credit accounts: Aerospace, Automotive, Beverage Packaging, and Specialties.
Novelis Region	One of the four standalone regional system boundaries used by the Methodology: Novelis Asia, Novelis Europe, Novelis North America, and Novelis South America.
Physical Baseline	The first calculation step, which calculates cradle-to-gate product carbon footprints at the alloy level before controlled mass balance reallocation and aggregates results to customers based on shipments.
Physical Constraint	A control that limits forward-looking high-recycled-content commitments to demonstrated production volumes, after application of the Methodology's internal buffer.
Primary Aluminum / Prime	Unalloyed aluminum produced from alumina, typically by electrolysis, with an aluminum content of at least 99.7%.
Product Carbon Footprint (PCF)	The greenhouse gas emissions associated with a product system, expressed as carbon dioxide equivalents. This Methodology reports a cradle-to-gate footprint.
Reference Flow	The measure of inputs to or outputs from processes needed to deliver the function expressed by the declared unit. Adapted from ISO 14067:2018, section 6.3.3.
Scrap	Aluminum-containing material recovered from production stages or products after use for remelting into aluminum products.
Sheet Ingot (SI)	A slab of aluminum that enters the rolling process and is rolled into FRP.
Specified Characteristic	A product or production characteristic that a chain-of-custody system is designed to maintain. Adapted from ISO 22095:2020, section 3.2.5.
Technical Constraint	A control limiting scrap allocation to the demonstrated minimum-primary-aluminum or maximum-scrap level for an alloy using historical casting-level data.

References

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