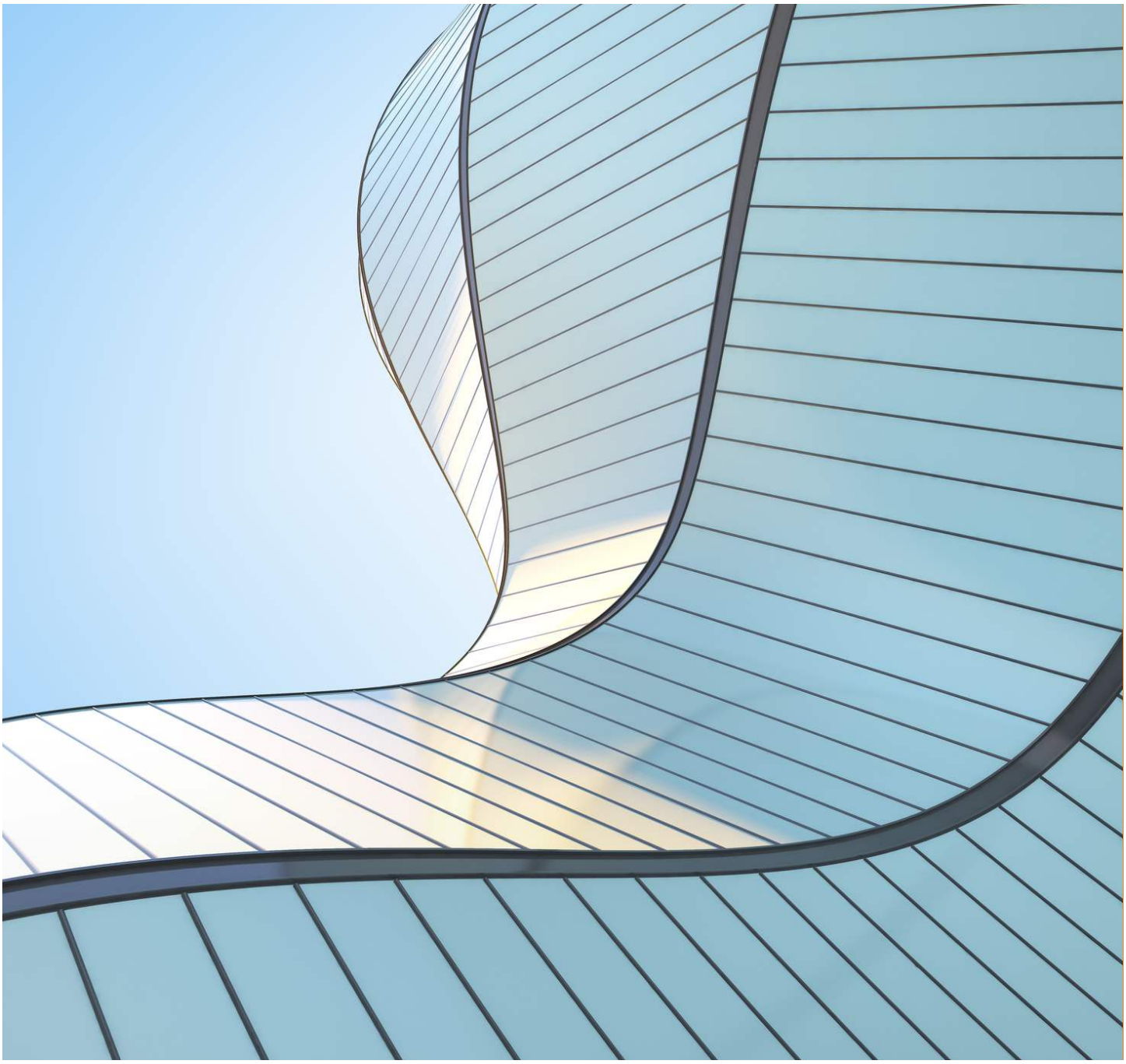
Sustainable Aluminum Finance Framework



RMI

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About RMI

RMI is an independent nonprofit, founded in 1982 as Rocky Mountain Institute, that transforms global energy systems through market-driven solutions to align with a 1.5°C future and secure a clean, prosperous, zero-carbon future for all. We work in the world's most critical geographies and engage businesses, policymakers, communities, and NGOs to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50 percent by 2030. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

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Executive Summary

The Sustainable Aluminum Finance Framework ("the Framework") is an open-source reporting framework that supports banks' ability to assess and disclose the alignment of their aluminum lending portfolios against a 1.5°C pathway. By equipping banks with a methodology, roadmaps, and solutions to access data, the Framework enables lenders to better support their clients' decarbonization efforts and to demonstrate progress against their own climate objectives. The Framework has no sign-on requirements and its implementation is voluntary.

Aluminum is an essential building block of modern life, used in everything from space travel to beverage containers, as well as in many of the new technologies powering the energy transition. Yet aluminum production is also highly emissions intensive, responsible for 2% of global carbon dioxide equivalent (CO_2e) emissions per year.[1] As demand for aluminum grows, supporting the sector's net-zero transition will be critical to meeting climate goals.

Banks implementing the Framework will first measure the greenhouse gas (GHG) emissions intensity of their aluminum sector clients and then aggregate this data to the portfolio level to produce a portfolio alignment score (PAS) — a measure of the climate alignment of their aluminum lending portfolio. Banks disclose their aggregate sectoral PAS and relevant contextual information annually in their individual institutional reporting; client-level data remains confidential.

The Framework covers primary and recycled aluminum production and, optionally, semi-fabrication,[i] capturing 97% of the sector's emissions.[2] The emissions intensity of aluminum can vary considerably as a result of differences between production processes and the source of power used mainly in primary aluminum production. To account for this variability, the Framework differentiates between primary aluminum production, recycled aluminum production, and semi-fabrication and applies the Sectoral Decarbonization Convergence Approach (SDA) to tailor each client's benchmark to its starting emissions intensity. The Framework adopts a combination of the International Aluminium Institute's (IAI) and the Mission Possible Partnership's (MPP) 1.5°C roadmaps to assess alignment for the sector.

To implement the Framework, banks are encouraged to obtain data directly from their clients. If needed, however, banks can also rely on the third-party data provider(s) vetted by the Framework through an open process based on objective, transparent, and nondiscriminatory conditions. The emphasis on data quality control ensures the reliability and comparability of reported information.

The Framework is the result of extensive consultations with banks, industry, experts, and civil society, ensuring its robustness and alignment with existing standards. Ultimately, the Framework aims to enable standardized comparisons between clients and across portfolios and to catalyze more effective collaboration between lenders and their clients on their transition to a low-carbon future. The Framework will be updated over time as needed by RMI's Center for Climate-Aligned Finance in consultation with stakeholders.

RMI and the working group banks that supported the development of this Framework are committed to compliance with the applicable antitrust and competition law.

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i Details for reporting on emissions from semi-fabrication are not included in the main body of this text and can be found in Appendix II.

1. Introduction

Aluminum is an essential building block of modern life, used in everything from space travel to beverage containers, as well as in many of the new technologies powering the energy transition. Yet aluminum production is also highly emissions intensive, responsible for 1.1 billion tons or 2% of global CO_2e emissions per year.[3] On average, producing 1 ton of aluminum generates 11.1 tons of CO_2e, compared with 1.9 tons of CO_2 per ton of steel, for example.[4] As demand for aluminum grows, enabling the sector's net-zero transition will be critical to meeting climate goals.

Recognizing the need for financial institutions to support the decarbonization of the aluminum industry, the Sustainable Aluminum Finance Framework is a voluntary reporting framework that enables banks to assess and disclose the alignment of their aluminum lending portfolios against a 1.5°C pathway and effectively support their clients' decarbonization efforts. The Framework has no sign-on requirements and its implementation is voluntary.

The Framework is a bespoke solution that enables banks to make progress against their individual climate objectives by considering their clients' and their portfolios' emissions intensity compared with the sector's 1.5°C pathway. The Framework relies on three key components to do so:

I. A robust methodology to track and report progress

II. 1.5°C-aligned roadmaps for primary production, recycled production, and semi-fabrication

III. Access to standardized data through comprehensive Client Reporting Guidance and high-quality data provider(s)

RMI's Center for Climate-Aligned Finance led development of the Framework. It is the result of extensive consultations with banks, industry, experts, and civil society, and is aimed at ensuring its robustness and alignment with existing standards where possible.[ii] RMI and the working group banks that supported the development of this Framework are committed to compliance with global antitrust and competition law.

This document is organized in six parts:

- An overview of the reporting requirements for users of the Framework
- A description of the Framework's reporting boundaries, which delineate the activities and processes whose GHG emissions aluminum sector clients and banks will be asked to report on
- A description of the methodology that financial institutions should follow to assess the climate alignment of their clients and lending portfolios when reporting under this Framework
- A description of the roadmaps, which serve as benchmarks to evaluate progress toward achieving net-zero emissions by 2050 and limiting the global temperature rise to 1.5°C with no to low overshoot
- A description of the Framework's financial scope, which defines the universe of clients and financings that should be reported on by users of the Framework
- An overview of how the Framework will be updated over time

ii Existing standards reviewed include various International Aluminium Institute reporting guidance documents, Science Based Targets Initiative (SBTi) Sectoral Decarbonization Approach guidance, Assessing low-Carbon Transition initiative's guidance on aluminum, Transition Pathways Initiative guidance, and the Aluminum Stewardship Initiative Performance Standard.

2. Overview of Reporting Requirements

The Sustainable Aluminum Finance Framework is available for use by any financial institution to calculate the climate alignment of its aluminum lending portfolio and to inform emissions reduction targets for its financed emissions. Banks that report on their climate alignment using the Framework should follow three core requirements:

I. Disclose the following in individual institutional reporting on an annual basis:

- **a.** PAS, calculated as per this guidance
- **b.** Parameters used for calculating the PAS, as delineated in this guidance

II. On a best-efforts basis, pursue annual engagement with clients to source emissions intensity and production information, and — when primary data is not available — source data from a third-party provider(s) vetted through an open application process based on fair, reasonable, and nondiscriminatory (FRAND) conditions, and recommended by the Framework.

III. Attribute the use of the Sustainable Aluminum Finance Framework in public reporting.

To encourage consistent reporting with the Framework, it is recommended that banks obtain external verification or limited assurance for their reporting.

2.1 Annual Public Disclosures

Financial institutions applying the Framework (Reporting FIs) should annually disclose the following information publicly as part of institutional reporting (e.g., sustainability reporting):

I. The PAS, defined as the percent deviation between the weighted average of the emissions intensities and 1.5°C-aligned benchmarks of the clients in scope in a bank's aluminum lending portfolio, calculated as per Section 5.2 of the guidance

II. The parameters within the financial scope used for reporting, determined as per Section 6 of the guidance, including:

- **a.** Whether the score was calculated based on debt outstanding or credit limits
- **b.** Whether the calculation includes any financial products designated as voluntary for reporting
- **c.** Whether clients that fall below the thresholds identified in Section 6.1 were voluntarily included
- **d.** Whether the Reporting FI decided to voluntarily report on financings in which the limit has a tenor shorter than one year

In addition to the above reporting requirements, banks are encouraged to report their aluminum portfolio's emissions intensity in the interest of transparency. Where the PAS is used for target setting, banks are also encouraged to report their emissions intensity target as a best practice.

Finally, Reporting FIs are also encouraged to provide a brief narrative alongside their quantitative disclosures with context on their sectoral climate-related efforts. Example topics may include:

- Key takeaways from the PAS
- If applicable, the institution's plans and timeline for achieving a score that is 1.5°C-aligned
- Geographic or geopolitical considerations relevant to the PAS
- Dedicated financings for assets not yet operational (see Section 6.3)

2.2 Data Sourcing

On a best-efforts basis, Reporting FIs should perform client- and portfolio-level climate alignment calculations with data sourced directly from their clients. This will support client engagement around the transition and maximize the Framework's accuracy. A detailed Technical Guidance document and a calculator tool to facilitate reporting by clients are available for Reporting FIs.

When data is not available directly from a client, Reporting FIs may source data from the third-party data provider(s) vetted and recommended by the Framework. More details on this can be found in Appendix III. Reporting FIs are encouraged to make the request for data contractual in any new business. An example covenant clause — which can be utilized in the documentation of new lending facilities — is included in Appendix IV, though Reporting FIs are free to use alternative language if they elect to include this in agreements.

2.3 Attribution

Finally, Reporting FIs should publicly acknowledge the use of the Sustainable Aluminum Finance Framework in their public disclosures. The manner and location of the acknowledgment may be determined at the discretion of the Reporting FIs. The acknowledgment serves to promote standardization, publicize the Framework, and inspire additional financial institutions to undertake similar efforts.

3. Reporting Boundaries

The boundaries described in this section establish the aluminum sector activities that are considered in scope for the Sustainable Aluminum Finance Framework. To ease the implementation of the Framework and support standardized reporting by clients, technical instructions for calculating required data can be found in the accompanying Technical Guidance, alongside an Excel-based calculation tool.[iii] These documents have been "road tested" with industry to ensure clarity, completeness, and accuracy. Moreover, the selected boundaries have gone through extensive consultations with industry and expert stakeholders, ensuring that a diverse variety of companies can report on this data.

3.1 Aluminum Subsector Boundaries

The sector is broken into three distinct subsector boundaries, which are further defined below:

- Primary production
- Recycled production
- Semi-fabrication

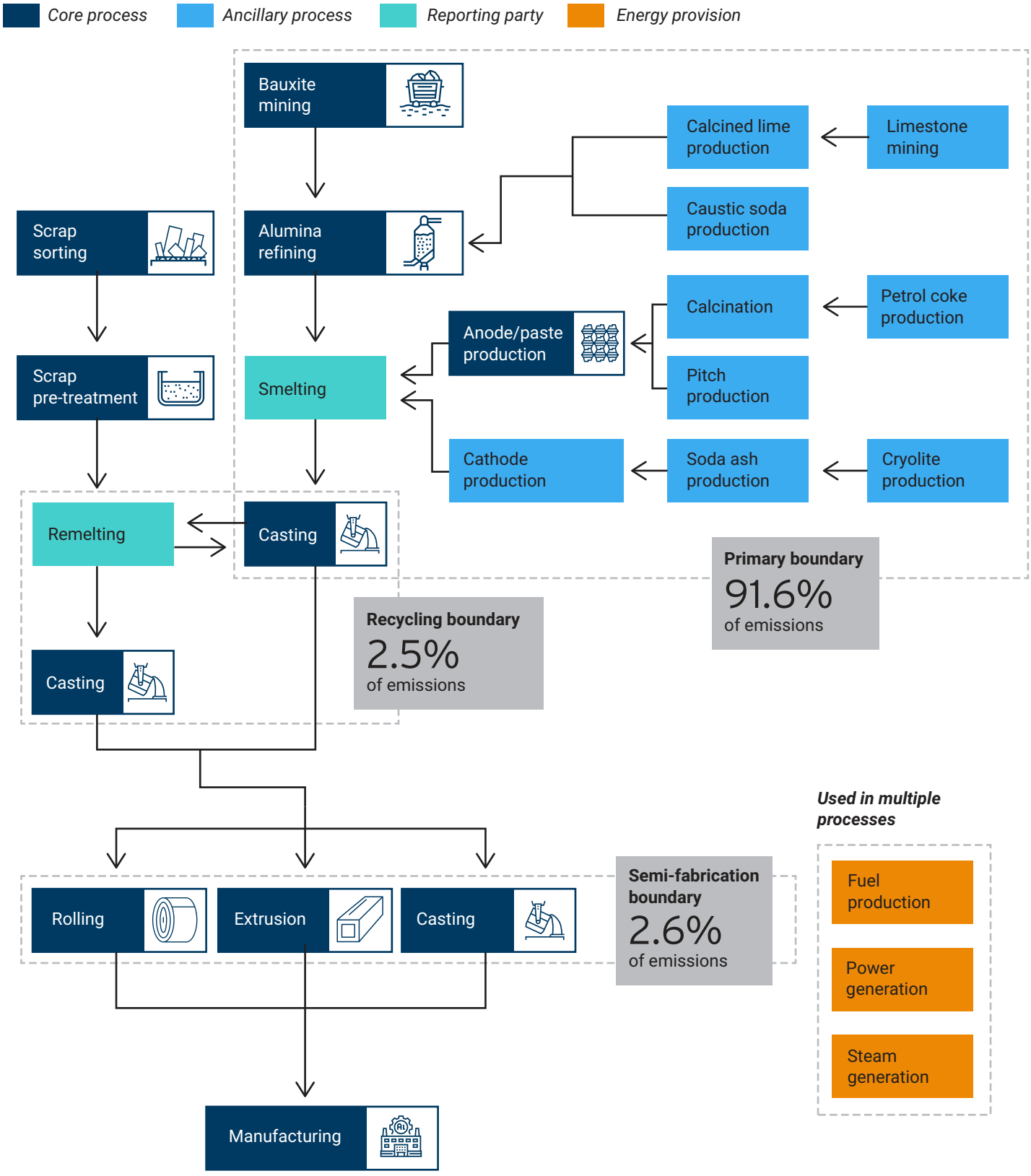
According to the IAI's sectoral emissions accounting, as of 2018, the primary production boundary accounts for 91.6% of emissions, the recycled production boundary accounts for 2.5% of emissions, and the semi-fabrication boundary accounts for 2.6% of emissions. In total, the Framework accounts for 96.7% of the sector's emissions (see Exhibit 1).[5] Reporting FIs should report on the primary and recycled production boundaries and optionally may report on the semi-fabrication boundary. Accordingly, details on the semi-fabrication boundary can be found in Appendix II.

The Framework follows a fixed reporting boundary for primary and recycled production, which requires reporting parties to collect and report emissions data for all activities within the Framework's boundary irrespective of the activities within their financial or operational control. This ensures that companies' emissions performance is compared on the same basis (e.g., on how many emissions were generated along the value chain to produce 1 ton of aluminum) and that financial portfolios can also be evaluated in a straightforward and comparable manner.

Given that the primary and recycled production boundaries represent approximately 98% of emissions from all in-scope activities (and approximately 94% of total sector emissions), following a fixed boundary approach for these activities creates a strong foundation of comparability across companies and portfolios.

iii These documents are meant to be provided to clients to enable reporting; clients only need to report the required final calculations.

Exhibit 1 **Graphic summary of the Framework's boundaries**



Note: The representation of the semi-fabrication boundary, which is optional to report, does not include all possible processes.

RMI Graphic. Source: Emissions estimates derived from the IAI, 2018 data, https://international-aluminium.org/statistics/greenhouse-gas-emissions-aluminium-sector/

3.1.1 Primary production boundary

The activities in scope for primary production include all major processing stages: bauxite mining, alumina refining, anode production, smelting, and casting. All Scope 1 and 2, as well as most upstream Scope 3 emissions are included within the primary production boundary. This includes:

- Emissions associated with the extraction of fuels used for process heat
- Emissions associated with the generation of electricity used in all stages of production, including emissions from the extraction of fuels to generate this electricity
- Emissions associated with the production of ancillary materials, including calcined lime, caustic soda, petrol coke, pitch, cryolite, soda ash, and cathode materials

CO_2, methane (CH_4), nitrous oxide (N_2O), and perfluorocarbons (PFCs) are all included in the primary production boundary. Transport (approximately 3.1% of total sector emissions) is excluded from the boundary because transport emissions are difficult to estimate accurately and largely come from sea transport, which is already covered by the Poseidon Principles, a framework for assessing and disclosing emissions associated with financial institutions' shipping portfolios. Alloying (no emissions estimate available) is excluded from the boundary because alloying emissions vary according to the product.

3.1.1.1 Electricity- and non-electricity-related emissions from primary production

Following the Framework methodology outlined in Section 5, primary production emissions intensity is reported separately for:

- **Electricity-related emissions:** defined as all emissions related to the generation of electricity used in the primary production boundary, including emissions derived from the extraction of fossil fuels used for generation
- **Non-electricity-related emissions:** defined as all remaining emissions sources from the primary production boundary

See Section 2.1.3 of the Technical Guidance for a detailed description of the requirements for separating electricity and non-electricity emissions from primary production. Note also that emissions from recycled material added to the primary smelter casthouse need to be reported and benchmarked following the recycled production boundary and methodology as per Section 3.1.4.

3.1.2 Recycled production boundary

The boundary for recycled production includes remelting and casting. This narrower boundary excludes emissions from scrap sorting and pretreatment but enables a more comparable assessment of recycling activities and captures remelting — the major source (92%) of the subsector's emissions (according to unpublished IAI data).

The boundary assumes no additional embodied emissions in scrap. Recyclers also report on their purchased primary material using the primary production boundary as per Section 2.1.4 of the Technical

Guidance. Following the methodology outlined in Section 5, this material will be benchmarked in the same way as primary production.

Recyclers are also encouraged to report the share of postconsumer scrap — scrap resulting from collection systems after a final product has been used and scrapped — in their remelting inputs. According to the methodology instructions outlined in Section 5.1.4, this fraction of scrap will be assessed as aligned until 2030 in an effort to incentivize its growth. In-scope clients should calculate their fraction of postconsumer scrap as outlined in Section 2.2.2 of the Technical Guidance.

All assets with remelting facilities are in scope of the Framework, regardless of their level of integration and relative intake of different scrap types and ingots. The boundary also includes internal remelting activities. Finally, upstream emissions associated with fuel extraction and electricity generation are included, as they are for the primary production boundary, whereas transport and alloying emissions are excluded.

3.1.3 Accounting for purchased primary material

Primary material is sometimes required in scrap refining furnaces to adjust the composition of the melt to the required specifications. The emissions intensity of this purchased primary material is included in the reporting requirements.

As noted above and in the methodology instructions in Section 5, the emissions footprint of purchased primary material imported into the recycling processes is evaluated against the primary benchmark following the primary production boundary.[iv] However, to ease the possible reporting burden, clients engaged in recycling may report the total primary emissions intensity rather than a disaggregated electricity and non-electricity emissions intensity.

3.1.4 Scrap added to primary material at the smelter casthouse

In some cases, high-quality scrap is added to primary material at the smelter casthouse. Although the output of the casting process is a single mixed product, separate emissions intensities are reported, representing the primary and recycled fraction of the output. The emissions of each material type are determined as per Section 3.2.2 of the Technical Guidance and assessed separately against the respective primary and recycled production benchmarks.

3.2 Reporting Parties

For the primary production boundary, the smelter operator is responsible for reporting all emissions in the boundary to Reporting FIs. Nonintegrated miners, alumina refiners, and other ancillary process operators are not asked to report emissions. However, the reporting smelting operator may ask these suppliers for this information, following the Framework's Technical Guidance. The remelting operator is the reporting party for the recycling boundary.

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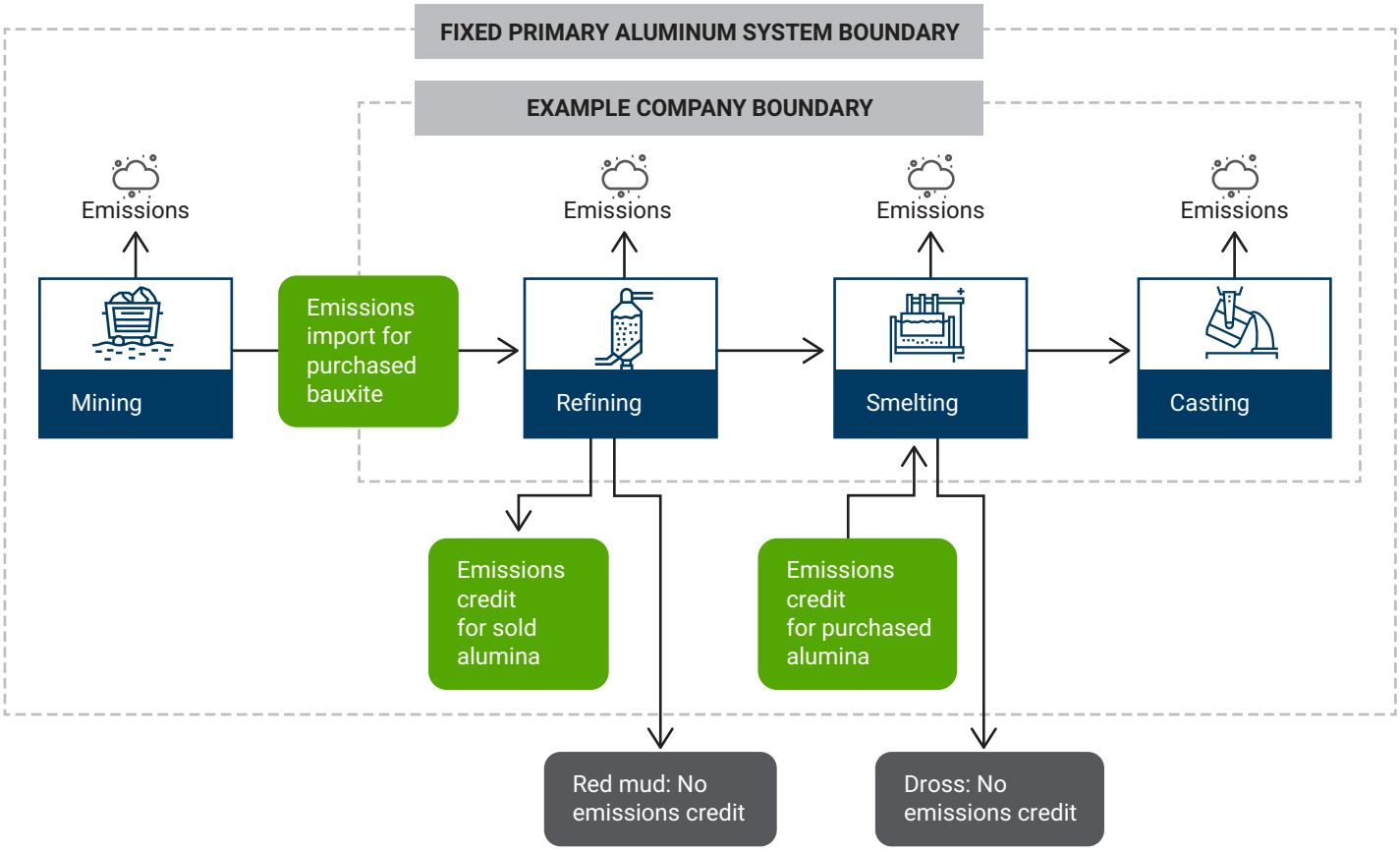
iv Note that this will likely result in double counting for some portfolios because the primary material purchased by recyclers may have already been assessed if the original producer of the primary material is also a client within a bank's portfolio. However, because this is an intensity metric rather than an absolute emissions metric, this double counting does not artificially inflate the portfolio's total emissions. It simply increases the influence of the original primary producer on the portfolio's alignment score.

3.3 Trade in Intermediate Materials

Smelters need to report their emissions intensity based on the inputs consumed in their production of cast aluminum in a given year. The sale of intermediate products (e.g., alumina, aluminum hydroxide) not used in a company's own production of aluminum will be "credited" (i.e., not counted for the purposes of the Framework) from its overall emissions calculations. In turn, any in-scope intermediate products that the company purchases to produce aluminum will be accounted for in its emissions calculations based on the fixed system boundary approach. Exhibit 2 depicts this approach with embodied emissions being accounted for at the company boundary for some intermediate materials.

Emissions "credits" for exported material are allowed only for intermediate and coproducts, not by-products. Exports of electricity from operators with captive power will also be credited because this energy is not used to produce aluminum within the reporting party's boundary. See Section 2.5 in the Technical Guidance for detailed guidance on eligible products. Credits are not considered for recycling. Recycling has a narrow boundary where creditable intermediate products have not been identified.

Exhibit 2 Flow of emissions credits and imports for a mock company



Note: In this example, the company operates an alumina refinery and smelter. Emissions must be added for the purchase of bauxite for use in the refining process. There is also an emissions credit for the sale of surplus alumina. Yet, the company also purchases alumina from a third party. The embodied emissions associated with the purchased alumina must be accounted for in final calculations.

RMI Graphic. Source: RMI Analysis

3.4 Summary of Required Emissions Data

Exhibit 3 summarizes the data required for the primary production and recycled production boundaries. Although primary data from clients is preferred, standard emissions factors are provided in Section 4 of the Technical Guidance for the different activities within the boundaries.

Exhibit 3 Summary of data requirements

Category	Primary production	Recycled production
Direct use of fuels for heat or electricity generation	• Direct fuel use to power equipment or provide heat. • Direct fuel use to generate electricity in "captive" power plants.	• Direct fuel use to power equipment or provide heat. • Direct fuel use to generate electricity in "captive" power plants.
Process emissions	• Direct process emissions from the smelting process resulting from anode production, anode consumption, and anode effects. • Primary data preferred but emissions factors are provided in the Technical Guidance.	• N/A
Greenhouse gases included	• CO_2, PFCs, CH_4, N_2O. • Primary data preferred but emissions factors are provided in the Technical Guidance.	• CO_2, CH_4, and N_2O. • Primary data preferred but emissions factors are provided in the Technical Guidance.
Ancillary materials	• Includes sodium hydroxide, calcined lime, petrol coke, pitch, soda ash, cathodes, and aluminum fluoride. • Primary data preferred but emissions factors are provided in the Technical Guidance.	• N/A
Fuel extraction emissions for electricity and direct use of fuels	• Primary data preferred but emissions factors are provided in the Technical Guidance.	• Primary data preferred but emissions factors are provided in the Technical Guidance.
Purchased electricity	• Location-based approach preferred, but some market-based instruments can also be used.	• Location-based approach preferred, but some market-based instruments can also be used.
Emissions credits for intermediate products	• Exports of bauxite ore, aluminum hydroxide, and alumina can be claimed as emissions credits. Scraps and dross cannot be claimed for emissions credit. • Traded volume and emissions intensity of each are needed to calculate this credit.	• N/A
Emissions credits for energy exports	• Emissions associated with exported energy are credited. • The amount exported and associated emissions are needed.	• Emissions associated with exported energy are credited. • The amount exported and associated emissions are needed.

RMI Graphic. Source: RMI Analysis

4. Roadmaps

Under the Sustainable Aluminum Finance Framework, the climate alignment of clients in the aluminum sector is assessed by comparing the emissions intensity of a client's production against a client-specific SDA benchmark, derived from a 1.5°C-aligned sectoral decarbonization roadmap, as per Section 5 of this report.

The selected roadmaps help banks understand the year-over-year decreases in emissions intensity required for the decarbonization of the aluminum sector by midcentury. They also enable banks to better understand the technology pathways, capital expenditure requirements, and demand prerequisites that will facilitate this result. With deeper knowledge of sectoral decarbonization, banks can better engage with clients to support their transition goals.

Following the boundaries and methodology outlined in Sections 3 and 5, each of the reporting boundaries — primary production and recycled production — have their own boundary-specific roadmap. These roadmaps are derived from two sources:

- **International Aluminum Institute 1.5°C scenario**[6]
  A top-down scenario that covers the entire aluminum value chain, from mining through semi-fabrication, and includes most Scope 3 emissions.

- **Mission Possible Partnership Aluminum Sector Transition Strategy (MPP STS)**[7]
  A bottom-up model that covers the refining, smelting, and anode production processes related to primary aluminum production. It was designed to match the overall intensity of the IAI 1.5°C scenario for these processes but provides significantly more granularity on technology switches and the decarbonization rate of electricity emissions versus other sources.

These two roadmaps are used in tandem to take advantage of the key strengths of each — in particular, the broad value chain and scope coverage of the IAI scenario and the higher granularity and bottom-up technological assumptions of the MPP STS.

The primary production trajectory is formed by the MPP STS for refining and smelting in combination with the mining, ancillary materials, other Scope 3, and primary casting emissions trajectories modeled by the IAI. The recycled production trajectory is derived from the IAI roadmap.

The roadmaps may need to be updated over time to ensure they are up to date with the latest carbon budget for the sector and reflect the latest assumptions of decarbonization technology availability. These updates will be made to the Framework as needed when the new roadmaps are published, as per Section 7.

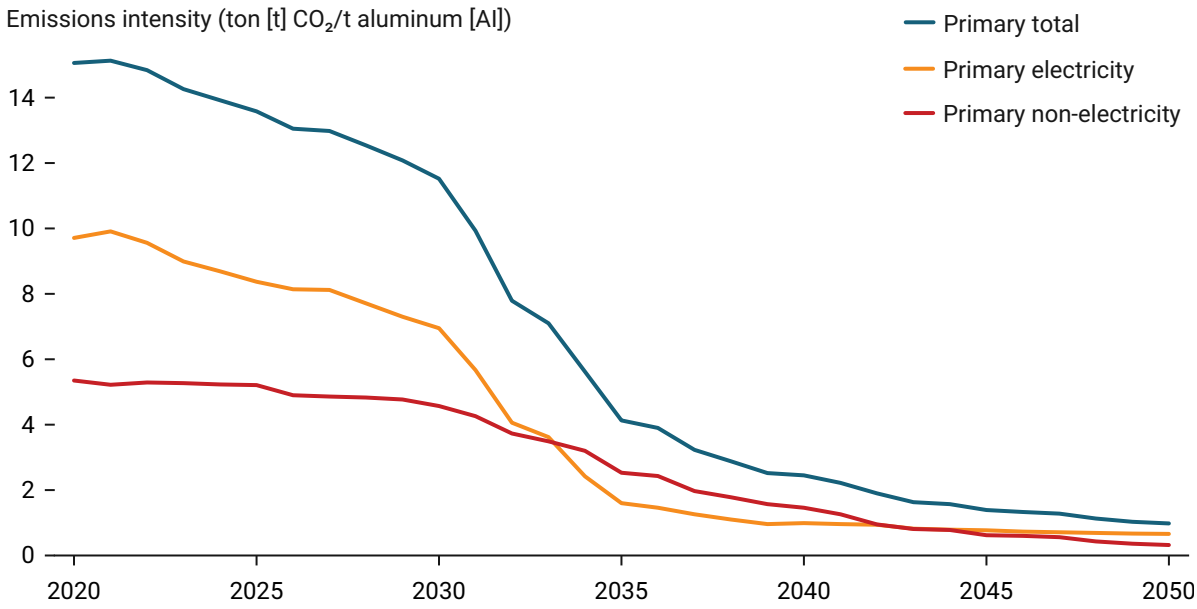
To ease the implementation of the Framework and support standardized reporting, an Excel-based portfolio-alignment calculator tool with prepopulated data on roadmaps is provided to Reporting FIs. Banks implementing the Framework can also download the relevant roadmap data independently from the portfolio-alignment calculator tool. Note that the roadmap for purchased primary material is the same as for primary production.

4.1 Primary Production Roadmap

The primary production roadmap is derived from a combination of the MPP STS and the IAI 1.5°C scenario. The MPP STS is used for the refining, smelting, and anode production processes and the IAI scenario is used for the remaining processes in the boundary (see Exhibit 7, page 19, for details). This is further divided into a roadmap for the electricity-related emissions and a roadmap for all other emissions sources from primary production. The resulting roadmaps are shown in Exhibit 4. Note that this is the roadmap used for both purchased primary material and primary production.

Exhibit 4

Emissions intensity roadmaps for the electricity and non-electricity components of primary aluminum, and for primary aluminum in total according to the combined IAI/MPP roadmap



RMI Graphic. Source: RMI Analysis based on IAI and MPP roadmap data.

4.2 Recycled Production Roadmap

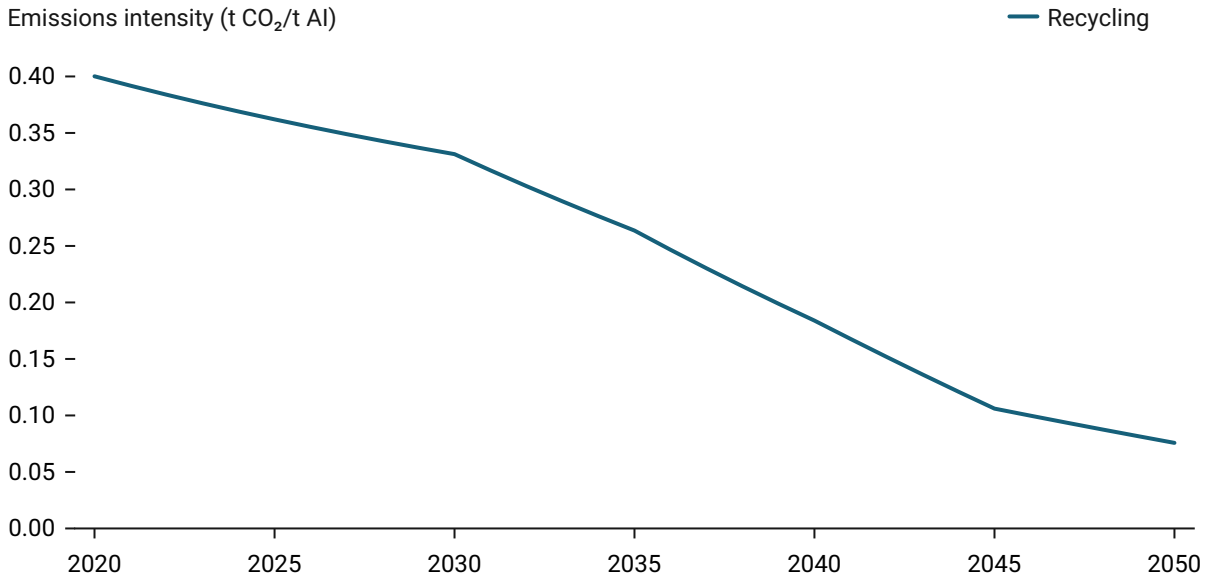
The MPP STS does not assess recycled production. As such, the recycling roadmap is derived entirely from the IAI 1.5°C scenario. To match the precise recycled production boundary defined by the Framework in Section 3.1.2 and detailed in Section 2.2 of the Technical Guidance, the following modifications were made to the standard IAI 1.5°C recycling scenario:

- Add internal remelting emissions (also derived from the IAI 1.5°C scenario)
- Exclude emissions associated with scrap sorting and pretreatment

The resulting roadmap for recycled production is shown in Exhibit 5.

Exhibit 5

Emissions intensity roadmap for recycled production



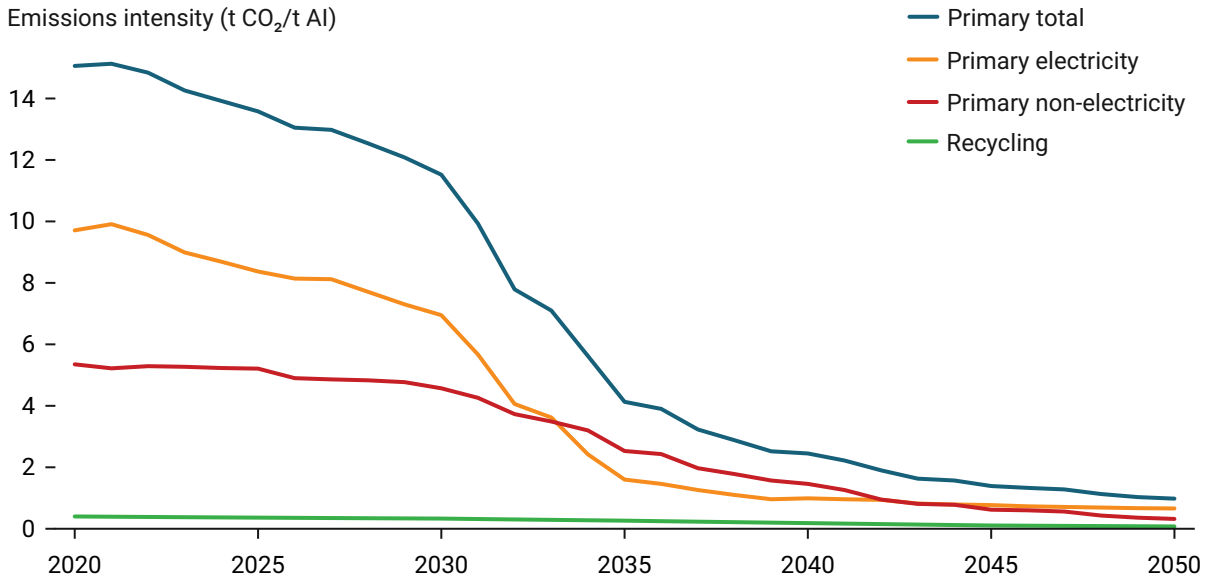
RMI Graphic. Source: RMI analysis based on unpublished IAI data.

4.3 Roadmaps Summary

Exhibit 6 shows all the reporting boundary roadmaps, indicating the relative reductions required for each subsector.

Exhibit 6

Emissions intensity roadmaps for all reporting boundaries



RMI Graphic. Source: RMI Analysis based on IAI and MPP roadmap data.

Exhibit 7 provides a complete breakdown of how the MPP STS and the IAI 1.5°C scenario complement each other under the Framework. The exhibit shows which roadmap is used for each emissions source and its corresponding boundary, as well as the share of sectoral emissions each source represents.

Exhibit 7 Emissions sources in the aluminum sector broken into the same structure as the IAI emissions inventory

Percentages indicate the fraction of emissions that each source contributed to the sector's total emissions in 2018. The roadmap and boundary used for each emissions source is indicated by color coding. As a reminder, inclusion of the semi-fabrication boundary is optional. More information about semi-fabrication can be found in Appendix II.

In primary boundary and uses MPP roadmap
In primary boundary and uses IAI roadmap
In recycling boundary and uses IAI roadmap
In the optional semi-fabrication boundary and uses IAI roadmap

Emissions source	Mining	Refining	Anode	Smelting	Casting	Recycling	Semis	Internal	Total
Electricity	0.1%	1.5%	–	61.2%	–	0.3%	0.9%	0.2%	**64.2%**
PFCs	–	–	–	3.2%	–	–	–	–	**3.2%**
Process	–	–	0.6%	8.5%	–	–	–	–	**9.1%**
Ancillary	–	1.4%	1.8%	0.6%	–	–	–	–	**3.7%**
Thermal energy	0.2%	11.4%	0.6%	–	0.6%	1.4%	1.7%	0.8%	**16.7%**
Transport	–	1.4%	–	1.7%	–	–	–	–	**3.1%**
Total	**0.3%**	**15.7%**	**2.9%**	**75.2%**	**0.6%**	**1.7%**	**2.6%**	**1.0%**	**100.0%**

RMI Graphic. Source: RMI analysis based on IAI and MPP roadmap data

5. Methodology

The objective of the Sustainable Aluminum Finance Framework's methodology is to produce a metric for measuring the yearly climate alignment — or alignment score — of a Reporting FI's aluminum lending portfolio against a 1.5°C-aligned benchmark, as well as to measure the portfolio's associated emissions intensity. A bank's PAS is calculated as the percent deviation between the weighted average of the emissions intensities and the 1.5°C-aligned benchmarks of each client in scope in its aluminum lending portfolio, as per Section 5.2.

To the extent possible, the Framework's methodology enables banks to make robust, like-for-like comparisons between clients and, in turn, portfolios. Banks adopting the Framework:

I. Assess the emissions performance of in-scope clients in their portfolios as per Sections 5.1.2 to 5.1.4

II. Aggregate client-level data as per Section 5.2 to produce a PAS and the associated portfolio emissions intensity, if desired

As per the boundaries outlined in Section 3 and the methodology described in detail in the sections below, Reporting FIs need the following data points to assess the alignment of their clients and portfolios:

I. Clients' baseline emissions intensity for:

- Electricity-related emissions from primary production[v]
- Non-electricity-related emissions from primary production
- Recycled production

II. Clients' yearly emissions intensity for:

- Electricity-related emissions from primary production[v]
- Non-electricity-related emissions from primary production
- Recycled production

III. Clients' yearly production of:

- Primary aluminum
- Recycled aluminum (required) and the percentage of recycled production derived from postconsumer scrap (recommended)

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v Note that to ease reporting, recyclers and semi-fabricators (if choosing to report on this boundary) can report simply on the emissions baseline and yearly emissions of their primary material purchases following the primary production boundary, without separating electricity and non-electricity emissions.

IV. Clients' yearly emissions intensity benchmarks derived from roadmap data for:

- Electricity-related emissions from primary production
- Non-electricity-related emissions from primary production
- Recycled production

V. Financial exposure to in-scope clients, determined as per Section 6

To ease the implementation of the Framework and support standardized reporting, an Excel-based portfolio-alignment calculator tool is provided to Reporting FIs. Banks implementing the Framework can also download the relevant roadmap data independently from the portfolio-alignment calculator tool. Note that the roadmap for purchased primary material is the same as for primary production.

If requesting the above data from clients, information shall be shared in line with the Framework's guidance, and no commercially sensitive data will be disclosed between individual Reporting FIs within the context of this Framework. Each Reporting FI makes individual and independent decisions regarding clients, and the Framework will not lead to any collective decision or action. Reporting FIs retain the freedom to participate or withdraw from the Framework at their discretion.

5.1 Assessing Client Emissions Performance

Given the fundamental differences in their processes, emissions intensities, and decarbonization trajectories, the Framework's methodology differentiates between primary production and recycled production by assessing a client's emissions for activities in each subsector separately and comparing these against their respective 1.5°C-aligned benchmarks.

The methodology further assesses primary production in two parts:

I. Client's emissions performance is first gauged against performance on electricity and non-electricity emissions intensity separately.

II. These two emissions sources are then aggregated to produce the overall alignment for a client's primary production.

Assessing electricity and non-electricity emissions separately for primary production ensures that a client's emissions performance is measured against the categories where they need to and can make progress toward decarbonization. For example, producers that rely largely on clean hydro power for smelting cannot drastically reduce their electricity emissions for primary production. However, they can (and indeed must if they wish to be aligned with a 1.5°C trajectory) reduce their non-electricity emissions related to other processes or inputs, such as alumina refining or — as technologies mature — the use of carbon anodes for smelting.

As per Section 5.1.1, the SDA is adopted to assess client's emissions performance across the primary production and recycled production boundaries to account for the large variability in starting emissions intensities of aluminum producers (particularly primary producers).

While recognizing the important role that all recycling plays in the aluminum sector's transition, the Framework also acknowledges that different scrap types have different growth curves and may require different incentives. To achieve 1.5°C alignment, postconsumer scrap needs to grow significantly to supply growing demand for aluminum products.[8] Clients engaged in postconsumer scrap recycling are encouraged to report the share of postconsumer scrap in their remelting inputs. This fraction of postconsumer scrap will be assessed as aligned until 2030 in an effort to incentivize the growth of postconsumer scrap recycling, as per the instructions in Section 5.1.4.

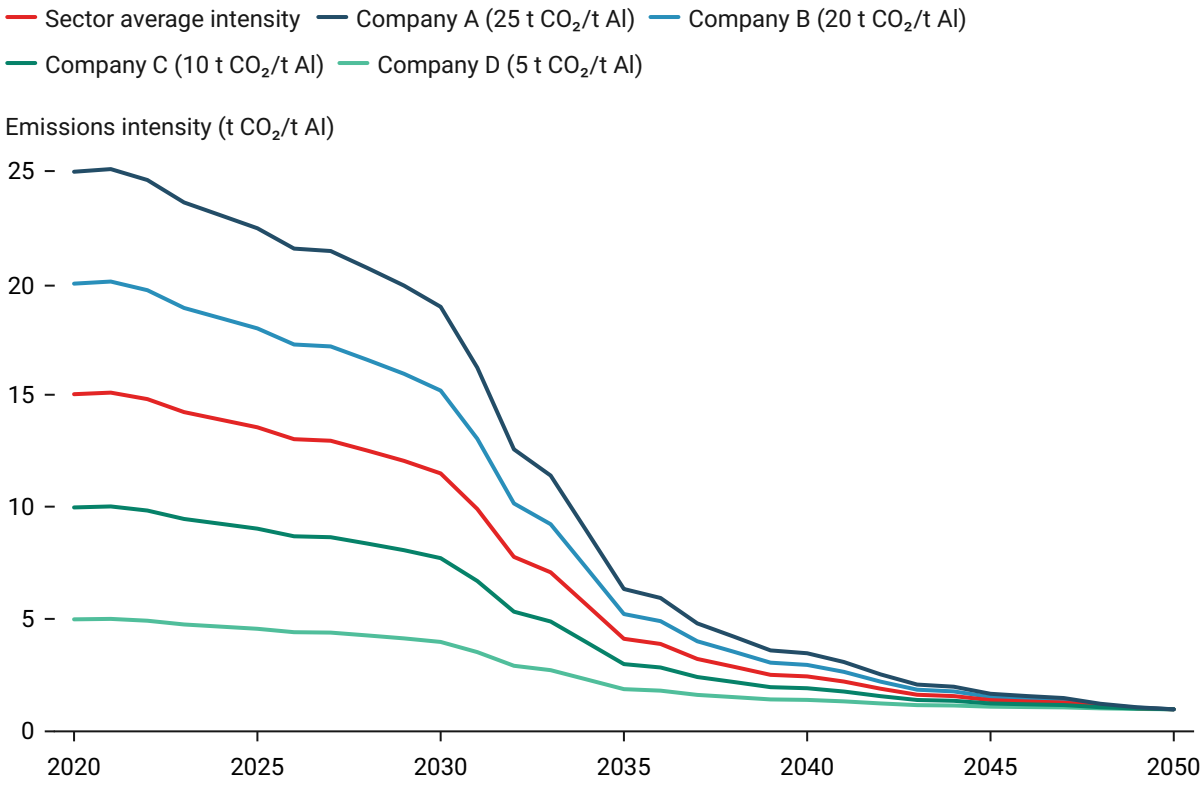
5.1.1 The Sectoral Decarbonization Convergence Approach

The SDA, originally developed by the SBTi, translates a sectoral decarbonization roadmap into a specific trajectory for a company or asset based on its starting point in a given base year. All trajectories converge on the climate-aligned target for the sector (e.g., net-zero emissions intensity by 2050). See example in Exhibit 8.

Exhibit 8

Example SDA convergence trajectories based on the primary production emission intensity (t CO_2/t Al) roadmap

Four company trajectories are shown based on different intensity starting points in 2020. The sectoral trajectory is shown in red, all other trajectories follow the same shape but are normalized to their company starting point.



Source: RMI Analysis based on IAI and MPP roadmap data.

5.1.2 Calculating SDA baseline emissions intensity

Implementation of the SDA requires establishing a reporting party's baseline emissions intensity, which — along with roadmap data — determines future benchmarks for that client. The Framework requires establishing separate baseline emissions intensities for electricity-related emissions from primary production, non-electricity-related emissions from primary production, and recycled production. A given client will require baselines for particular boundaries depending on which activities they are engaged in.

As per Section 3.1.3 of the Technical Guidance, a client's baseline emissions intensity for a given boundary shall be calculated as the average annual emissions intensity of the company for the two-year period from 2021 to 2022. This baseline is applied to clients of all banks adopting the Framework. In some cases, a client's baseline will require revision as per Section 5.1.2.1 below and Section 3.1.3 of the Technical Guidance.

5.1.2.1 Revising the baseline emissions intensity over time

Over time, a client's baseline across different boundaries may need to be updated to remain relevant. For example, some clients — particularly those with high baseline emissions intensities — may make early investments that result in a significant reduction in their emissions intensity compared with their original SDA benchmark. These positive actions will be recognized through the Framework's methodology. However, over time, new decarbonization projects may still be needed to maintain pace with a 1.5°C-aligned trajectory, as well as for emissions performance to remain comparable with other clients that operate at a similar emissions intensity.

For this reason, baseline emissions intensities need to be reviewed every five years from the first reporting year to ensure their relevance. If a client has not shown continued improvements in emissions intensity over the five-year period but has maintained alignment due to emissions intensity improvements that are over 10 years old, the client's base years should be changed to the three years immediately preceding the reporting period. For example, in 2034, a client that meets these criteria would need to change its base years from 2021–22 to 2031–33. The intent of this baseline revision methodology is to ensure that companies continue making improvements in emissions intensity to maintain alignment with a 1.5°C trajectory, and do not use the SDA with a high baseline that is no longer relevant to the business.

5.1.2.2 Accounting for mergers, acquisitions, and divestments

Some activities will trigger re-baselining for a client before the five-year review period. In particular, mergers, acquisitions, and divestments will require re-baselining of a client's emissions intensity without a change in the base years.

In cases of acquisitions or sales of assets, a client's original baseline emissions intensity will be based on a set of assets that are no longer the same assets owned and/or operated by the client, so the baseline intensity should be revised. Similarly, in the case of mergers, it would not be clear which company baseline should be used because either baseline would not reflect the assets in the newly formed company; therefore, the baseline intensity should be revised.

To update the baseline emissions intensity, the emissions intensity of the new company boundary should be calculated as if its current assets were already under its control in the base years. This means that if

an acquired asset was in operation in the base years, its emissions data in the base years should be used in the calculation of the new baseline emissions intensity. If the asset was not in operation in the base years, it may be excluded from the recalculation. Likewise, a sold asset should be removed from the company's baseline emissions intensity calculation.

This method may introduce data availability challenges, particularly for Scope 3 emissions of acquired assets. Note again that this Framework operates on a best-efforts basis and provides the option to use default emissions factors or data from third-party providers when needed.

5.1.2.3 Setting the baseline emissions intensity for greenfield projects or new joint ventures

In the case of project financing of greenfield assets or financing a new joint venture, there will be no base-years emissions intensity data with which to calculate the client's baseline emissions intensity. In these cases, the sector's average intensity for the relevant reporting boundary in the base years is used as the baseline emissions intensity. For example, a new joint venture smelter would use the primary roadmap emissions intensity in the base years (2021–22) as the baseline emissions intensity.

5.1.3 Calculating SDA benchmarks

Following guidance from SBTi, benchmarks across all reporting boundaries are calculated in three steps:

I.

$$d = CI_b - SI_{2050}$$

d: Initial performance in base years relative to 2050 sector target
CI_b: Company emissions intensity in base years
SI_{2050}: Sector emissions intensity target in year 2050

II.

$$p_y = \frac{SI_y - SI_{2050}}{SI_b - SI_{2050}} = \frac{\text{Intensity reduction from target year to 2050}}{\text{Intensity reduction from base year to 2050}}$$

p_y: Decarbonization index of the sector in target year
SI_y: Sector emissions intensity target in year y
SI_b: Sector emissions intensity in base years
SI_{2050}: Sector emissions intensity in 2050

III.

$$CI_y = d \times p_y + SI_{2050}$$

CI_y: Company emissions intensity target in year y (benchmark intensity)

CI_y is the SDA-derived benchmark intensity calculated for the reporting year. *SI* is the sector emissions intensity based on the roadmaps described in Section 4. For each reporting boundary, the associated roadmap should be used to calculate the benchmark.

5.1.3.1 Setting benchmarks for greenfield projects or new joint ventures

In the case of project financing of greenfield assets or financing a new joint venture, the baseline emissions intensity is the sector's average intensity for the relevant reporting boundary, as per Section 3. The resulting

benchmarks are therefore equal to the respective boundaries' roadmap emissions intensity over time. The roadmap emissions intensity data can be downloaded from the portfolio-alignment calculator tool that is provided to Reporting FIs.

5.1.4 Recalculating the intensity of postconsumer scrap recycling until 2030

The Framework considers postconsumer scrap recycling activities aligned until 2030. Clients engaged in recycled production are encouraged to report the share of postconsumer scrap inputs in their production, as defined in Section 3.2.4 of the Technical Guidance.

If a recycler is determined to be misaligned (i.e., their reported emissions intensity exceeds their benchmark) and it has reported its postconsumer scrap share, its overall emissions intensity must be recalculated with the intensity of the postconsumer scrap share equal to the benchmark, ensuring that the postconsumer share of production is considered aligned. If the recycler is already aligned, no changes are made.

In practice, this calculation is done in the following steps:

I. Recyclers report postconsumer scrap fraction in conjunction with their emissions intensity:

An example recycler is shown in Exhibit 9. It reports an emissions intensity and postconsumer scrap fraction; the benchmark is derived from the recycler's baseline emissions intensity.

Exhibit 9

Example recycler emissions data

Client	Intensity, *I* ($t\ CO_2/t\ Al$)	Benchmark, *B* ($t\ CO_2/t\ Al$)	Postconsumer scrap fraction, *F*
Client 4	0.48	0.44	30%

RMI Graphic. Source: RMI Analysis

II. Identify which recyclers are misaligned:

If the emissions intensity from recycled production is less than the benchmark (i.e., aligned), no further action is taken. If the emissions intensity is higher than the benchmark (i.e., misaligned) as it is in the example in Exhibit 9, proceed to the next step.

III. Recalculate the recycler's emissions intensity if misaligned:

For misaligned recyclers, the emissions intensity of recycled production is recalculated assuming that the intensity of postconsumer scrap remelting is equal to the benchmark:

$$\text{Revised intensity} = I \cdot (1 - F) + B \cdot F = (0.48)\ (1 - 0.3) + (0.44)\ (0.3) = 0.468$$

Note that this revised intensity should also be used when aggregating all client data to derive the PAS.

5.2 Calculating the Portfolio Alignment Score

The PAS is defined as the percent deviation between the weighted average of the aggregated emissions intensities and 1.5°C-aligned benchmarks of the clients in scope in a bank's aluminum lending portfolio:

$$\text{PAS} = \frac{\text{Aggregated intensity} - \text{Aggregated benchmark}}{\text{Aggregated benchmark}}$$

In practice, calculating the PAS requires aggregating the intensities and benchmarks across all clients and the respective reporting boundaries in which they are engaged. The sections below outline the process for aggregating all client-level data to the portfolio level to produce the PAS.

Note that calculating client-level alignment scores is not strictly necessary to derive the PAS. Nevertheless, calculating a client's alignment score is recommended for banks to better understand which areas a given client may wish to focus on and to identify opportunities for engagement.

5.2.1 Determining the weight of each client and reporting boundary in a portfolio

The portfolio weighting of each client and reporting boundary is determined in three steps:

I. Determine the weight of the client based on exposure (refer to Section 6 for details on how to determine exposure to a client).

II. Determine the weight of each subsector boundary reported by the client based on production volume.

III. Combine the two weights to find the final weighting.

Note that when providing financings for specific projects or assets, the project or asset may be treated as a distinct client (refer to Section 6.3 for more details).

Exhibit 10 shows an example calculation for a mock portfolio. The weighting outlined in the example is used in the following sections to show how to aggregate client-level data to the portfolio level.

Exhibit 10 Calculation example for determining the weight of each client and its reporting boundaries

Client	Exposure *($M)*	Exposure weighting (w_E)	Subsector	Volume *(kt)*	Volume weighting (w_V)	Final weighting ($w_F = w_E \cdot w_V$)
Client 1	200	80%	Primary	2,000	80.0%	64.0%
			Recycling	500	20.0%	16.0%
Client 2	50	20%	Recycling	300	90.9%	18.2%
			Purchased primary for recycling	30	9.1%	1.8%

RMI Graphic. Source: RMI Analysis

5.2.2 Aggregating client-level data to the portfolio level

Once the final weighting of each client and its subsectors is determined, three steps are required to determine the PAS:

I. Aggregate each client's electricity and non-electricity emissions intensities and benchmarks:

Sum the electricity and non-electricity intensities and benchmarks to produce a single cumulative intensity and benchmark for a client's primary production or purchased primary production (see Exhibit 11).

Exhibit 11

Aggregation of electricity and non-electricity emissions intensities and benchmarks for an example primary producer (t CO_2/t Al)

	Electricity emissions	Non-electricity emissions	Total
SDA benchmark	10.2	4.2	14.4
Reported intensity	10.4	4.2	14.6

RMI Graphic. Source: RMI analysis

II. Aggregate benchmarks and intensities across all boundaries to the portfolio level:

Note that if the intensity for recycled production is greater than the benchmark, and the recycler reported the share of postconsumer scrap in its production, the recycling emissions intensity is revised as per Section 5.1.4 before this step.

All the intensities and benchmarks are aggregated to the portfolio level using the final weight w_F:

$$\text{Aggregated intensity} = \sum_{i=1}^{n} w_{F,i} I_i$$

$$\text{Aggregated benchmark} = \sum_{i=1}^{n} w_{F,i} B_i$$

Exhibit 12 on the next page shows this calculation for the example portfolio.

Exhibit 12 **Aggregation of benchmarks and deltas in an example portfolio**

Client	Subsector	Final weighting (w_F)	Intensity, I (t CO_2/t Al)	Benchmark, B (t CO_2/t Al)	Weighted intensity, $w_F \cdot I$	Weighted benchmark, $w_F \cdot B$
Client 1	Primary	64.0%	16.3	16.0	10.432	10.24
	Recycling	16.0%	0.31	0.32	0.0496	0.0512
Client 2	Recycling	18.2%	0.34	0.33	0.0618	0.06
	Purchased primary for recycling	1.8%	19.4	18.5	0.3527	0.3364
Portfolio totals		**100%**	**—**	**—**	**10.8961**	**10.6876**

RMI Graphic. Source: RMI analysis

III. Calculate the portfolio alignment score:

The PAS can be calculated directly from the portfolio delta and portfolio benchmark:

$$\text{PAS} = \frac{\text{Aggregated intensity} - \text{Aggregated benchmark}}{\text{Aggregated benchmark}}$$

Using the example portfolio data, the PAS is:

$$\text{PAS} = \frac{10.8961 - 10.6876}{10.6876} = 2\%$$

A positive PAS in this case shows that the portfolio is misaligned with its 1.5°C benchmark. A negative PAS, on the other hand, would show that the portfolio is aligned.

5.3 Calculating Portfolio Emissions Intensity

In the interest of transparency, banks following the Framework are encouraged to report their aluminum portfolio's emissions intensity alongside the required PAS and related disclosures outlined in Section 2.1. Banks have multiple options when reporting their portfolio's emissions intensity. It is recommended that banks disclose which method was followed to calculate the reported intensity.

Banks could report:

- The aggregated emissions intensity from Section 5.2 for simplicity.
- The overall portfolio's emissions intensity for primary and recycled aluminum production (referred to as "production intensity"), plus semi-fabrication. See Appendix II.5 for more information on this method. Note that if semi-fabrication is not included, this will be the same as the aggregated emissions intensity from Section 5.2.

- The portfolio's emissions intensity disaggregated by primary production, recycled production, and semi-fabrication.

Where banks prefer to report primary production, recycled production, and semi-fabrication emissions intensities separately, new weightings for each company and process need to be calculated. The new weightings enable calculation of the intensity in each boundary (primary, recycling, and semi-fabrication) in the portfolio individually. To determine these weights for primary production (see Exhibit 13 for an example):

1. Set all non-primary boundary weights to 0%.

2. Sum the remaining primary weights (65.8% in Exhibit 12).

3. Recalculate a new weight by dividing the original weight by the sum of the primary weights:

$$\text{Client 1 primary weight} = \frac{64.0\%}{65.8\%} = 97.2\%$$

The same process is followed for recycling with all non-recycled production weights set to 0. Exhibit 13 shows the results of this process for the example portfolio.

Exhibit 13 Recalculation of primary production and recycled production weightings

Client	Subsector	Primary weight		Recycling weight	
		Non-primary weights set to 0	Revised weight (w_{Pr})	Non-recycling weights set to 0	Revised weight (w_{Re})
Client 1	Primary	64.0%	97.2%	0.0%	0.0%
	Recycling	0.0%	0.0%	16.0%	46.8%
Client 2	Recycling	0.0%	0.0%	18.2%	53.2%
	Purchased primary for recycling	1.8%	2.8%	0.0%	0.0%
Portfolio totals		**65.8%**	**100%**	**34.2%**	**100%**

RMI Graphic. Source: RMI analysis

The primary production and recycled production intensities are then aggregated using the revised weights calculated in Exhibit 13.

$$\text{Primary product intensity} = \sum_{i=1}^{n} w_{Pr,i} I_i$$

$$\text{Recycled production intensity} = \sum_{i=1}^{n} w_{Re,i} I_i$$

5.4 Calculating a Portfolio's Emissions Intensity Target from a PAS Target of Zero

A PAS of zero means a bank's portfolio is aligned, indicating that the required reductions in the emissions intensity of clients are in line with the SDA. Therefore, setting a target of a PAS of zero will inherently be an ambitious 1.5°C-aligned target. In the interest of transparency, Reporting FIs are also encouraged to express their target as an emissions intensity.

To express a PAS target of zero as an emissions intensity, the method described in Section 5.3 can be used.[vi] However, instead of aggregating the emissions intensities in the reporting year to determine the portfolio intensity, the SDA-based benchmarks in the target year should be aggregated to determine the emissions intensity associated with a PAS of zero in the target year. These benchmarks can be calculated using the method described in Section 5.1.3. A bank may assume the weightings do not change between the current reporting period and the target year in order to perform the calculation. A bank may also make informed estimates of exposure and production volume to calculate predicted weights for the target year. It should be noted that this intensity target may be achieved, but the PAS could still be misaligned in the target year due to changes in the portfolio such as exposure and client mix.

vi Note that when including semi-fabrication in the calculations, the PAS cannot be easily converted into a portfolio emissions intensity. See Appendix II.5 for guidance on this calculation.

6. Financial Scope

Under the Sustainable Aluminum Finance Framework, banks obtain data on their clients' emissions intensity and then perform calculations to measure the climate alignment of their lending portfolios. This section provides guidance for Reporting FIs to support these calculations by first defining the universe of clients and financings that are in scope of the Framework. This guidance is intended to be consistent with the existing reporting requirements of the Net-Zero Banking Alliance (NZBA). Although currently applicable only to lending activities, the guidance is expected to expand over time to capital markets activities to align with the methodological developments of NZBA.

6.1 Identifying In-scope Clients

Per the reporting boundaries outlined in Section 3, the aluminum sector is broken into three subsectors: primary and recycled production and semi-fabrication. Details on the optional semi-fabrication boundary can be found in Appendix II. The following section outlines guidance for identifying in-scope clients for primary and recycled production, which are defined as follows:

- Any client that produces a minimum of 250 kilotons of cast primary aluminum through the processes outlined in the primary production boundary described in Section 3.1.1 and detailed in Section 2.1 of the Technical Guidance

- Any client that produces a minimum of 250 kilotons of cast recycled aluminum through the processes outlined in the recycled production boundary described in Section 3.1.2 and detailed in Section 2.2 of the Technical Guidance

Each of the above thresholds should be calculated at the group level, defined as being inclusive of the entity and all subsidiaries on an aggregate basis but not any parent entity. An entity is considered to have a subsidiary if it holds a direct or indirect ownership stake of more than 50% of the voting equity of another entity or otherwise controls another entity.

Although the minimum thresholds above are a lower limit for reporting purposes, lenders using the Framework may also report on clients with smaller production values on a voluntary basis. If a lender decides to do so, it is asked to disclose this decision within the parameters used for reporting.

To avoid doubt, in-scope clients will be asked to report on the emissions intensity of their production at the group level, as per Section 3.1.2 of the Technical Guidance.

6.2 Identifying In-scope Financings

Once all in-scope clients have been determined, Reporting FIs identify in-scope financings to determine their exposure to the in-scope clients that need to be included in reporting.

An in-scope financing is a financing that:

I. Is provided to an in-scope client, or

II. Is provided to any captive financial or captive trading company that is a subsidiary of an in-scope client

In each case, the recipient of the financing will be asked to report on the group-level emissions of the in-scope client that is associated with the financing.

A captive trading company is defined as a subsidiary of an in-scope client that operates as a separate entity to trade aluminum products in domestic or international markets, serving as a distribution arm of its parent company in the aluminum sector.

A captive financial company is defined as a subsidiary of an in-scope client that provides financial services to support the parent company's operations, including financing, leasing, insurance, risk management, and other financial products and services.

Financial products that should be reported as in-scope financings are defined as credit products, including bilateral loans, syndicated loans, and club deals, per Exhibit 14. For syndicated financial products, climate alignment calculations should be based on the portion of the financing provided by the bank adopting the Framework.

Exhibit 14 Financial products in scope of the Framework

Financial product	In scope?
Asset finance	Yes
Bank guarantee	Voluntary
Bridge loan	Yes
Buyer credit	Yes
Export finance	Yes
Factoring programs (both recourse and nonrecourse)	Voluntary
General corporate purposes loan	Yes
Letters of credit	Voluntary
Revolving credit facility	Yes
Revolving loan	Yes
Swingline	Yes
Term loan facility	Yes
Working capital facility	Yes

RMI Graphic. Source: RMI analysis

Reporting on bank guarantees, letters of credit, and factoring programs can be performed voluntarily. Banks must report on voluntary products consistently throughout all portfolio calculations, and disclose included products.

6.3 Dedicated Financings

When providing financings for specific projects or assets, banks may prefer to report on the basis of asset-level data instead of corporate-level data. This is permitted under the methodology if the financing provided is considered a dedicated financing. Dedicated financings are defined as any financing that is provided for a dedicated funding source for the construction, development, maintenance, or retrofitting of a specific smelter or remelter facility that falls within the reporting boundaries outlined in Section 3.

For the purpose of reporting on dedicated financings, asset-level data is defined as the emissions of the financed asset, as well as all emissions within the applicable reporting boundary (see Section 3) that are generated by assets that directly supply the financed asset. If the smelter or remelter facility financed by a dedicated financing is not operational for the entire calendar year of the reporting year, then the financing shall be excluded from alignment calculations. The asset is only included for reporting purposes once operational. Operational is defined as producing primary or recycled aluminum for the purposes of generating revenue.

6.4 Additional Guidance

6.4.1 Credit limits or outstandings

To calculate the climate alignment of their lending portfolios, banks adopting the Framework may determine the reported exposure to each client using the credit limit of the in-scope financing (i.e., committed amounts) or the outstandings under the in-scope financing as of December 31 annually. Whichever method the lender selects, the method must be applied consistently throughout all portfolio calculations and it must be disclosed.

6.4.2 Tenor

An in-scope financing need only be reported if the original tenor of the limit under which it is issued is at least one year. Exposure with a shorter tenor may be reported on a voluntary basis. If the lender elects to report on exposure with a shorter tenor, this must be reported consistently throughout all portfolio calculations and be disclosed.

6.4.3 Weighing exposure by aluminum-related revenue

Reported exposure will be weighted by the percentage of aluminum-related revenues of the total revenues of the in-scope client. This approach can simplify reporting for financial institutions with exposures to a large, diversified group since total exposure can be weighted by the percentage of aluminum-related revenues of the group, rather than by identifying each borrower under the financing.

For example, if a lender has $100 million of reported exposure to a client where the client generates 30% of its revenue from the production of aluminum (either primary, recycled, or shaped products), the lender would use an exposure of $30 million for that client when calculating alignment at the portfolio level.

7. Maintaining the Framework

The Sustainable Aluminum Finance Framework is intended to be updated as the sector evolves. For example, new scenarios may become available, new technologies may emerge, and the regulatory environment may change, which would prompt updates to this Framework to ensure relevance and consistency with other initiatives. RMI will be responsible for all updates, engaging the Advisory Group comprised of banks and other stakeholders as outlined below. Reporting FIs should make best efforts to implement the changes when they are made.

7.1 Advisory Group

Financial institutions that use the Framework will have the opportunity to inform methodological updates through participation in the Advisory Group. Advisory Group members commit to meeting annually to discuss the status of the Framework and advise RMI as to whether updates are required to ensure the Framework remains relevant and effective. In addition, input from Advisory Group members will be requested on an ad hoc basis.

Participation in the Advisory Group will be open to the banks that participated in the original Aluminum Climate-Aligned Finance Working Group (2022–23), as well as to additional financial institutions that use the Framework. All Reporting FIs will be invited to join the Advisory Group. However, the number of members is capped at 10 and will be filled on a first-come, first-served basis. The joining process is based on FRAND conditions.

Prior to the Advisory Group annual meeting, RMI's Center for Climate-Aligned Finance will determine whether to recommend updates to the Framework. To inform this recommendation, RMI will survey the sector to identify whether material changes have occurred across other methodologies, scenarios, data availability, as well as sectoral and climate finance initiatives.

7.2 Consultation Process

If an update is determined to be necessary, RMI will conduct the work to update the Framework in consultation with external stakeholders. Consultation will entail engaging industry members, civil society, and other financial institutions to source feedback on the use of the Framework and the proposed updates. Advisory Group members commit to supporting RMI on a best-efforts basis in the consultation process by sharing consultation materials with various stakeholders and following up if needed.

7.3 Decision-making

Advisory Group members commit to supporting RMI in the consultation process; however, RMI will be the developer and the ultimate decision-making authority on the methodology updates.

Appendix I: Deriving the Portfolio Alignment Score

This section contains a numerical example of the derivation of an alignment score for a portfolio consisting of two fictional clients (see Exhibit A1).

Exhibit A1

Sample calculations of portfolio alignment score, client alignment scores

Parameter			Terms and equations	Producer A	Producer B
Client-level data	Primary aluminum production	Electricity emissions intensity (t CO_2/t Al)	E	1.02	12.60
		Non-electricity emissions intensity (t CO_2/t Al)	N	4.90	4.30
		Production (kt Al)	P_p	4,066	3,702
	Recycled aluminum production	Emissions intensity (t CO_2/t Al)	R	0.29	0.36
		Production (kt Al)	P_R	1,379	1,004
Client-level calculations	Exposure ($M)		X	150	100
	Company benchmarks (t CO_2/t Al)	Primary electricity	B_E	1.04	12.67
		Primary non-electricity	B_N	4.68	4.69
		Recycling	B_R	0.30	0.36
	Aggregated primary company intensity		$A_p = (E + N)$	5.92	16.90
	Aggregated primary company benchmarks		$B_p = (B_E + B_N)$	5.72	17.36
	Client alignment score	Primary	$S_p = \frac{(A_p - B_p)}{B_p}$	3.5%	−2.6%
		Recycling	$S_R = \frac{(R - B_R)}{B_R}$	−3.3%	0.0%
Portfolio-level calculations	Exposure and production weight	Primary	$w_p = \frac{P_p}{(P_p + P_p)} * \frac{X}{X_{total}}$	38%	31%
		Recycling	$w_R = \frac{P_R}{(P_p + P_R)} * \frac{X}{X_{total}}$	13%	9%
	Aggregated emissions intensity		$I_p = \sum_{i=1}^{N} w_{pi} A_{pi} + \sum_{i=1}^{N} w_{Ri} R_i$	7.56	
	Aggregated benchmark		$B_p = \sum_{i=1}^{N} w_{pi} B_{pi} + \sum_{i=1}^{N} w_{Ri} B_{Ri}$	7.63	
	Portfolio alignment score		$S_p = \frac{(I_p - B_p)}{B_p}$	−0.9%	

Note: This example does not include capping the alignment score of postconsumer scrap (see Section 5.1.4) because recycling activities are already aligned. For simplicity, purchased primary is not included in this example.

RMI Graphic. Source: RMI Analysis

Appendix II: Semi-fabrication

Due to the complexity associated with aggregating the emissions of semi-fabrication with the emissions from primary production and recycling, and due to the lack of data available for this boundary from third-party data providers, semi-fabrication has been designated as optional for inclusion in reporting under the Framework. This appendix provides guidance for how to report on semi-fabrication if a lender opts to do so.

Appendix II.1 Boundary

The fixed reporting boundary approach (see Section 3.1) is not applicable to the semi-fabrication boundary because semi-fabricators transform primary and recycled aluminum to produce different products through different processes. For this reason, the Framework follows a company-based variable reporting boundary for semi-fabrication, where reporting parties report only on the activities that are both in scope and within their financial or operational control.

Following the Aluminum Association's definition,[9] semi-fabrication includes forming processes to transform aluminum ingots into a semifinished shape. Typical semi-fabrication processes include rolling, extrusion, forging, and casting. Semi-fabricated products may be treated further (surface treatment, thermal treatment, etc.) and/or coated. These treatment and coating processes are considered in scope for reporting if they are performed by the semi-fabricator. Note also that embodied emissions in purchased materials for coatings are excluded.

Additionally, semi-fabricators are asked to report on their purchased primary material using the primary production emissions boundary, as per Section 2.1.4 of the Technical Guidance; this material will be benchmarked following the methodology for primary production. However, to ease the possible reporting burden, clients engaged in semi-fabrication may report the total primary emissions intensity rather than a disaggregated electricity and non-electricity emissions intensity. Note that semi-fabricators do not report on their purchased recycled material. However, integrated producers with both remelting and semi-fabrication on-site do report on these two activities separately, following the recycling and semi-fabrication boundaries, respectively.

A single client may report against both the recycled production and semi-fabrication boundaries. In these cases, their purchased primary material should likewise be reported separately based on the primary material used in the recycled production boundary and the primary material used in the semi-fabrication boundary. The type of primary material input into each of these boundaries can come from different sources and have different emissions profiles.

Finally, as with the primary and recycled production boundaries, upstream emissions associated with fuel extraction and electricity generation are included, while transport emissions are excluded. See Exhibit A2 for a summary of data requirements for the semi-fabrication boundary.

As with the recycling boundary, credits are not considered for the semi-fabrication boundary because it is a narrow boundary where creditable intermediate products have not been identified.

Exhibit A2

Summary of data requirements for the semi-fabrication boundary

Category	Data Requirements
Direct use of fuels for heat or electricity generation	• Direct fuel use to power equipment or provide heat • Direct fuel use to generate electricity in "captive" power plants
Process emissions	• N/A
Greenhouse gases included	• CO_2, CH_4, and N_2O • Primary data preferred but emissions factors are provided in the Technical Guidance
Ancillary materials	• N/A
Fuel extraction emissions for electricity and direct use of fuels	• Primary data preferred but emissions factors are provided in the Technical Guidance
Purchased electricity	• Location-based approach preferred, but some market-based instruments can also be used
Emissions credits for intermediate products	• N/A
Emissions credits for energy exports	• Emissions associated with exported energy are credited • The amount exported and associated emissions are needed

RMI Graphic. Source: RMI Analysis

Appendix II.2 Reporting

When reporting on semi-fabrication, Reporting FIs will need the following data in addition to the data listed in Section 5:

I. Clients' baseline emissions intensity for semi-fabrication

II. Clients' yearly emissions intensity for semi-fabrication

III. Clients' yearly production of semi-fabricated products

IV. Clients' yearly emissions intensity benchmarks derived from semi-fabrication roadmap data

V. Financial exposure to in-scope semi-fabricator clients, determined as per Appendix II.5 below

Appendix II.3 Application of the SDA

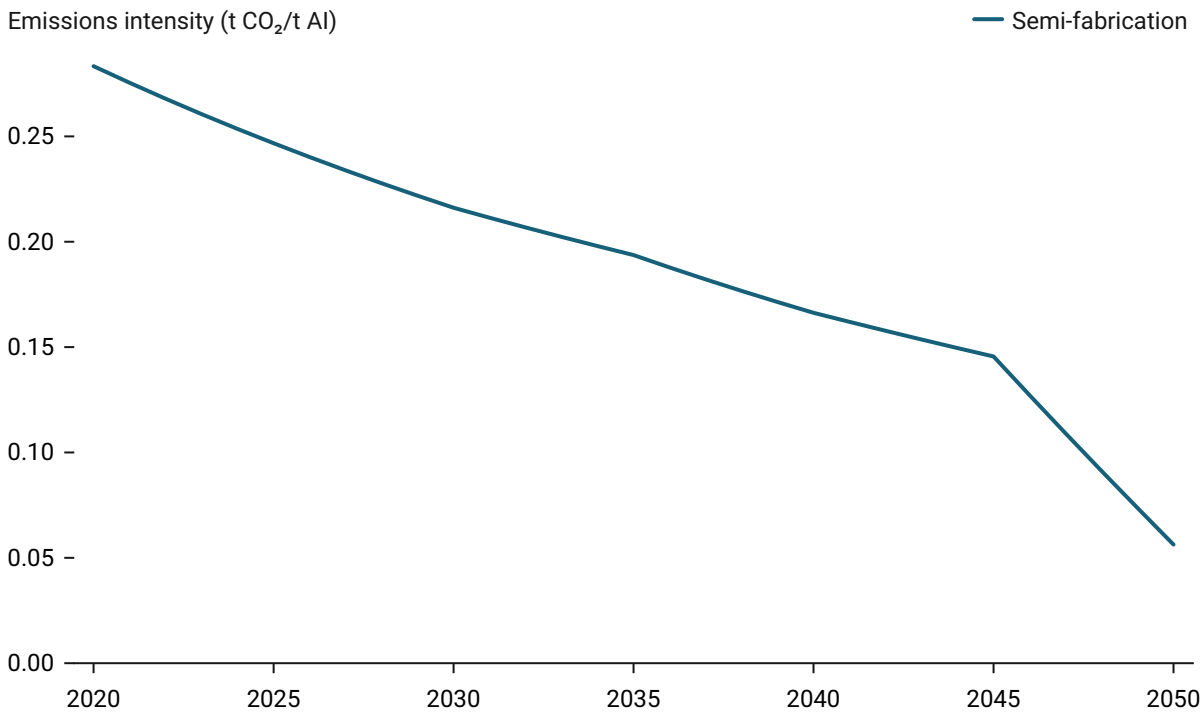
Implementation of the SDA requires establishing a reporting party's baseline emissions intensity, which — along with roadmap data — determines future benchmarks for that respective client. The Framework requires establishing separate baseline emissions intensity for electricity-related emissions from primary production, non-electricity-related emissions from primary production, recycled production, and semi-fabrication. A given client will require baselines for particular boundaries depending on which activities they are engaged in. More details on establishing a client's baseline emissions intensity can be found in Section 3.1.3 of the Technical Guidance.

Appendix II.4 Roadmap

The MPP STS does not assess semi-fabrication production. As such, the semi-fabrication roadmap is derived entirely from the IAI 1.5°C scenario. No modifications were needed to match the boundary of semi-fabrication for the Framework. The roadmap for semi-fabrication is shown in Exhibit A3.

Exhibit A3

Emissions intensity roadmap for semi-fabrication



Source: RMI analysis of unpublished IAI data

Appendix II.5 Calculating Portfolio Emissions Intensity with Semi-fabrication

Semi-fabrication is a process downstream of primary and recycled aluminum production. Thus, it makes sense to add the emissions intensity of semi-fabrication to the emissions intensity of primary and recycled

aluminum production, rather than to average these intensities together when calculating portfolio intensity. To do so, a bank must:

I. Recalculate weighting of production and semi-fabrication subsectors:

The final weighting applied when calculating the PAS is used to calculate the new weighting for aggregating just the production intensities. To do this, the weighting of semi-fabrication boundaries is set to zero and the remaining weightings are recalculated using the new sum of the final weighting percentages. For example, in Exhibit A4, Client 1's primary production is re-weighted as follows:

$$\text{Client 1 primary weight} = \frac{11.4\%}{54.1\%} = 21.1\%$$

Exhibit A4 Recalculation of production and semi-fabrication weightings

Client	Subsector	Original weight	Production weight		Semi-fabrication weight	
			Semi-fabrication weights set to 0	Revised weight (w_p)	Production weights set to 0	Revised weight (w_s)
Client 1	Primary	11.4%	11.4%	21.1%	0.0%	0.0%
	Recycling	2.9%	2.9%	5.3%	0.0%	0.0%
Client 2	Recycling	6.1%	6.1%	11.2%	0.0%	0.0%
	Purchased primary for recycling	0.6%	0.6%	1.1%	0.0%	0.0%
	Semi-fabrication	30.3%	0.0%	0.0%	30.3%	66.0%
	Purchased primary for semi-fabrication	20.2%	20.2%	37.3%	0.0%	0.0%
Client 3	Semi-fabrication	15.6%	0.0%	0.0%	15.6%	34.0%
	Purchased primary for semi-fabrication	13.0%	13.0%	24.0%	0.0%	0.0%
Portfolio totals		**100%**	**54.1%**	**100%**	**45.9%**	**100%**

RMI Graphic. Source: RMI Analysis

II. Calculate the weighted average production and semi-fabrication intensity:

The revised production and semi-fabrication weightings are then used to aggregate the intensities to determine portfolio-level production and semi-fabrication intensities. Note that the reported intensity for recycling should be used before it is adjusted based on the postconsumer scrap share. The results below indicate the results for the example portfolio.

$$\text{Production intensity} = \sum_{i=1}^{n} w_{P,i}\, I_i$$

$$\text{Semi–fabrication intensity} = \sum_{i=1}^{n} w_{S,i}\, I_i$$

III. Sum the production and semi-fabrication intensities to determine the overall portfolio intensity:

Portfolio intensity = Production intensity + Semi–fabrication intensity

Appendix II.6 Financial Scope

In-scope clients in the semi-fabrication boundary are defined as any client that:

- Produces a minimum of 250 kilotons of shaped aluminum products through the processes outlined in the semi-fabrication boundary described in Appendix II.1 and detailed in Section 2.3 of the Technical Guidance, and
- Generates 50% or more of total revenue through the sale of shaped aluminum products

Additional guidance on how financial exposure should be measured can be found in Section 6.

Appendix III: Third-Party Data

Suitable third-party data providers for Reporting FIs were identified through a request for information (RFI). The RFI process adhered to FRAND principles. The objective was to obtain comprehensive information concerning the availability, precision, and applicability of potential commercial data offerings that — to the extent possible — align with the specifications of the Sustainable Aluminum Finance Framework's methodology.

Each response to the RFI was assessed based on specific criteria to ensure alignment with the Framework's objectives. These criteria included:

- Ability to provide data as described in the methodology of Section 5, with responses that cover the full range of data requests evaluated more favorably
- Coverage of data across reporting boundaries and geographic regions, with higher coverage evaluated more favorably
- Timeliness of data availability within the reporting year, with earlier availability of data evaluated more favorably
- Quality of data, with higher demonstrated data quality evaluated more favorably
- Ability of the respondent to identify relevant ownership and control information of the activities within the reporting boundaries
- Usability of the platform and data of the respondent, including navigability of any user-facing interface, and accessibility of output data

Upon thorough evaluation, CRU emerged as best aligned with the Framework's requirements. For instances when Reporting FIs cannot directly obtain client data, they are encouraged to collaborate directly with CRU. Reporting FIs can obtain more information about CRU's offering by contacting Glenn Cooney at **glenn.cooney@crugroup.com**.

Appendix IV: Covenant Clause

For guidance: Below are standard definitions and covenant wording that may be inserted (subject to appropriate drafting adjustments to account for each specific set of definitions) in the relevant aluminum financing documents.

Even though the inclusion of the Covenant Clause creates an obligation upon the Borrower to provide the relevant information, it is not intended to be more onerous than any of the Borrower's other obligations in relation to the provision of periodic information to Lenders under its facility agreements. Additionally, the Covenant Clause should benefit from any relevant grace periods as customarily negotiated in those facility agreements.

Definitions

"**Sustainable Aluminum Finance Framework**" means the framework for assessing and disclosing the emissions associated with aluminum production.

"**Technical Guidance**" means the "Technical Guidance for Aluminum Producers to Calculate Emissions Intensity" included in the Appendix of the Sustainable Aluminum Finance Framework and published on the Sustainable Aluminum Finance Framework website.

Covenant Clause:

The [Borrower] shall, upon the request of [any Lender] and at the cost of the [Borrower], on or before [July 31][vii] in each calendar year, supply or procure the supply to [the Facility Agent] [such Lender] of the following information[viii]:

a) Yearly production of:

- **a.** Primary aluminum
- **b.** Recycled aluminum and the percentage of recycled production derived from postconsumer scrap
- **c.** Semi-fabricated products

b) Baseline emissions intensity[ix] for:

- **a.** Electricity-related emissions from primary production
- **b.** Non-electricity-related emissions from primary production

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vii Date is to be determined by each Lender.

viii See "Section 2: Overview of emissions reporting requirements" of the "Technical Guidance for Aluminum Producers to Calculate Emissions Intensity."

ix Based on a multiyear average from 2021–2022.

c. Recycled production

d. Semi-fabrication

c) Yearly emissions intensity for:

a. Electricity-related emissions from primary production

b. Non-electricity-related emissions from primary production

c. Recycling production

d. Semi-fabrication

as defined in the Technical Guidance for Aluminum Producers to Calculate Emissions Intensity, in each case relating to the [Borrower/Asset] for the preceding calendar year.

[**OPTION A:** provided always that [no Lender] shall publicly disclose such information with the identity of the [Borrower/Asset] without the prior written consent of the [Borrower].]/ [**OPTION B:** For the avoidance of doubt, such information shall be ["Confidential Information"]["Information"] for the purposes of [Clause [•] (Confidential Information)] [Section [•] (Treatment of Certain Information; Confidentiality)]]x but the [Borrower] acknowledges that, in accordance with the Sustainable Aluminum Finance Framework, such information will be included as part of the aggregated information published regarding the [relevant] [Lender's] portfolio climate alignment.

x The information supplied should be "Confidential Information" for the purposes of Loan Market Association–style facility agreements and can be identified as "Information" for the purposes of Loan Syndications and Trading Association–based agreements and therefore subject to the restrictions on disclosure. However, alternative wording should be considered where confidentiality is not addressed in the relevant agreement.

Endnotes

1 Mission Possible Partnership, *Making Net-Zero Aluminium Possible: An Industry-backed, 1.5°C-aligned Transition Strategy*, April 2023, **https://missionpossiblepartnership.org/wp-content/uploads/2023/04/Making-1.5-Aligned-Aluminium-possible.pdf.**

2 International Aluminium Institute, "Statistics," accessed June 2023, **https://international-aluminium.org/statistics/greenhouse-gas-emissions-aluminium-sector/.**

3 Mission Possible Partnership, *Making Net-Zero Aluminium Possible: An Industry-backed, 1.5°C-aligned Transition Strategy*, April 2023, **https://missionpossiblepartnership.org/wp-content/uploads/2023/04/Making-1.5-Aligned-Aluminium-possible.pdf.**

4 World Steel Association, "Our Performance: Sustainability Indicators," accessed June 2023, **https://worldsteel.org/steel-topics/sustainability/sustainability-indicators/.**

5 International Aluminium Institute, "1.5 Degrees Scenario: A Model to Drive Emissions Reduction," October 2021, **https://international-aluminium.org/resource/1-5-degrees-scenario-a-model-to-drive-emissions-reduction/**.

6 International Aluminium Institute, "1.5 Degrees Scenario: A Model to Drive Emissions Reduction," October 2021, **https://international-aluminium.org/resource/1-5-degrees-scenario-a-model-to-drive-emissions-reduction/**.

7 Mission Possible Partnership, *Making Net-Zero Aluminium Possible: An Industry-backed, 1.5°C-aligned Transition Strategy*, April 2023, **https://missionpossiblepartnership.org/wp-content/uploads/2023/04/Making-1.5-Aligned-Aluminium-possible.pdf.**

8 International Aluminium Institute, "1.5 Degrees Scenario: A Model to Drive Emissions Reduction," October 2021, **https://international-aluminium.org/resource/1-5-degrees-scenario-a-model-to-drive-emissions-reduction/**.

9 Jinlong Wang, *The Environmental Footprint of Semi-Fabricated Aluminum Products in North America: A Life Cycle Assessment Report*, The Aluminum Association, January 2022, **https://www.aluminum.org/sites/default/files/2022-01/2022_Semi-Fab_LCA_Report.pdf.**

Estefania Marchan, Tom White, and Sam Kooijmans, *Sustainable Aluminum Finance Framework*, RMI, 2023, **https://rmi.org/insight/sustainable-aluminum-finance-framework/**.

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