Alcoa Corporation

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Introduction

In March 2024, Alcoa Corporation ("Alcoa" or the "Company") issued a Green Bond (the "2024 Green Bond") and raised USD 750 million[1] to finance or refinance existing and future projects that are expected to support the clean energy transition. In March 2025, Alcoa engaged Sustainalytics to review the projects financed with proceeds from the 2024 Green Bond (the "Nominated Expenditures") and provide an assessment as to whether they meet the use of proceeds criteria and whether Alcoa complied with the reporting commitments in the Alcoa Green Finance Framework (the "Framework").[2] Sustainalytics provided a Second-Party Opinion on the Framework in February 2024.[3]

Evaluation Criteria

Sustainalytics evaluated the Nominated Expenditures and Alcoa's reporting based on whether they:

1. Meet the use of proceeds and eligibility criteria defined in the Framework; and
2. Reported on at least one key performance indicator (KPI) for each use of proceeds category defined in the Framework.

Table 1: Use of Proceeds Categories, Eligibility Criteria

Use of Proceeds Category	Eligibility Criteria
Circular Economy Adapted Products, Production Technologies and Processes and/or Certified Eco-efficient Products	Recycled content products: Expenditures related to the sourcing of pre- and post-consumer scrap and certification costs for recycled content products. Examples include: • EcoDura aluminum • Aluminum produced with at least 50% recycled content[4]. Secondary aluminum recycling process Expenditures related to the acquisition, research & development, design & redesign and development of secondary aluminum recycling manufacturing processes, technologies, and/or infrastructure. Examples include: • ASTRAEA™ recycling process • Post-consumer scrap recycling process to convert low-quality aluminum scrap into high-purity aluminum (purity level of up to P0101[5]) • Induction furnaces to recycle scrap aluminum
Renewable Energy	Expenditures related to the acquisition, development, operation and maintenance of renewable power generation plants, both on- and off-site, from: • Wind and Solar photovoltaic ("PV") sources

[1] Alcoa communicated to Sustainalytics that USD 737.4 million was allocated to the Nominated Projects after deducting underwriting discounts and offering expenses.
[2] Alcoa Corporation, "Alcoa Green Finance Framework", (2024), at: https://www.alcoa.com/sustainability/pdf/Alcoa-Green-Finance-Framework.pdf
[3] Sustainalytics, "Second-Party Opinion, Alcoa Green Finance Framework", (2024), at: https://mstar-sustops-cdn-mainwebsite-s3.s3.amazonaws.com/docs/default-source/spos/alcoa-green-finance-framework-second-party-opinion.pdf?sfvrsn=95f934b6_1
[4] Pre-consumer scrap. Recycled content is defined using mass balance / credit allocation system at facility and production line level.
[5] Surpassing the purity of P1020 aluminum that is produced at any commercial smelter.

	Expenditures related to the procurement of power through long-term power purchase agreements ("PPAs") or virtual PPAs for wind, solar PV and hydro projects. Alcoa intends that such contract(s) shall have a tenor of at least 5 years.
Pollution Prevention and Control	Lower-carbon (Sustana™) products All expenditures related to sites dedicated to manufacturing the following lower-carbon products: • EcoSource™ alumina Alumina from a refinery portfolio with an average emissions intensity no more than 0.6 metric tonnes of carbon dioxide equivalents (CO_2e) per tonne of alumina produced—an emissions intensity less than half the industry average—including both direct and indirect (Scope 1 and Scope 2) emissions from bauxite mining and alumina refining. • EcoLum™ aluminum Lower-carbon primary aluminum with a maximum 4.0 metric tonnes of carbon dioxide equivalents (CO_2e) per tonne of metal produced, including both direct and indirect (Scope 1 and Scope 2) emissions across bauxite, alumina, smelting, and casting. Lower- carbon primary aluminum •For other products, all expenditures related to manufacturing sites that meet the following criteria: manufacture primary aluminum in facilities with (i) a current GHG emission intensity[6] not exceeding 4.35 tCO_2e per tonne of aluminum manufactured, and (ii) expected GHG emissions intensities following the Transition Pathway Initiative's ("TPI") 2 Degrees scenario. Carbon-free aluminum (smelting) process Expenditures related to the research and development, design & redesign and development of carbon-free aluminum manufacturing processes, technologies and/or infrastructure. Examples include: • ELYSIS™ smelting process • Carbon-free smelting technology using next-generation electrode design; the R&D technology would replace traditional carbon anodes with inert, proprietary materials. Expenditures for technologies related to Alcoa's Refinery of the Future program. Examples include: • Electric calcination would use renewable energy sources to power the process used to heat alumina hydrate crystals to remove water molecules. Expenditures related to the reduction of environmental pollutants (such as carbon dioxide capture, sulfur dioxide, nitrogen oxide, fluoride mercury, Volatile Organic Compounds) using emission-reduction and monitoring technologies
Water and Wastewater Management	Expenditures related to water efficiency, recycling, reuse and conservation projects in Alcoa's operations, operations, particularly at locations with high water consumption, competing users or water supply risks. Examples include: • Retrofitting once-through water system to closed loop • Technologies that minimize evaporative losses • Residue filtration • Treatment and reuse

[6] With regards to Scope 1 and 2 GHG emissions.

Table 2: Key Performance Indicators

Use of Proceeds	Key Performance Indicators
Circular Economy Adapted Products, Production Technologies and Processes and/or Certified Eco-efficient Products	• Tonnes of recycled content • Tonnes of pre-consumer scrap
Renewable Energy	• GHG emissions avoided/reduced (tonnes of CO_2e) • MWh of renewable electricity capacity consumed/generated
Pollution Prevention and Control	• Tonnes of lower-carbon products • Emission intensity versus world average • Carbon dioxide, sulfur dioxide, nitrogen oxide, fluoride, mercury, and Volatile Organic Compounds emissions avoided/reduced (tonnes or kilograms) • GHG emissions avoided (tonnes of CO_2e) through the use of Alcoa products
Water and Wastewater Management	• Volume of (fresh) water avoided/reduced/recycled (cubic meters) • Total water use intensity (m^3/metric tonnes alumina)

Issuer's Responsibility

Alcoa is responsible for providing accurate information and documentation relating to the details of the projects, including descriptions, amounts allocated and impact.

Independence and Quality Control

Sustainalytics, a leading provider of ESG research and ratings, conducted the verification of the use of proceeds from Alcoa's 2024 Green Bond. The work undertaken as part of this engagement included collection of documentation from Alcoa and review of said documentation to assess conformance with the Framework.

Sustainalytics relied on the information and the facts presented by Alcoa. Sustainalytics is not responsible nor shall it be held liable for any inaccuracies in the opinions, findings or conclusions herein due to incorrect or incomplete data provided by Alcoa.

Sustainalytics made all efforts to ensure the highest quality and rigor during its assessment process and enlisted its Sustainability Bonds Review Committee to provide oversight of the review.

Conclusion

Based on the limited assurance procedures conducted,[7] nothing has come to Sustainalytics' attention that causes us to believe that, in all material respects, the Nominated Expenditures do not conform with the use of proceeds criteria and reporting commitments in the Framework. Alcoa has disclosed to Sustainalytics that the proceeds from the 2024 Green Bond were fully allocated as of 31 December 2024.

[7] Sustainalytics' limited assurance process includes reviewing documentation relating to details of projects, as provided by the issuing entity, which is responsible for providing accurate information. These may include descriptions of projects, estimated and realized costs, and reported impact. Sustainalytics has not conducted on-site visits to projects.

Detailed Findings

Table 3: Detailed Findings

Framework Requirements	Procedure Performed	Factual Findings	Error or Exceptions Identified
Use of Proceeds Criteria	Verification of projects to determine alignment with the use of proceeds criteria outlined in the Framework.	The Nominated Expenditures comply with the use of proceeds criteria.	None
Reporting Criteria	Verification of projects or assets to determine if impact was reported in line with the KPIs outlined in the Framework.	Alcoa reported on at least one KPI per use of proceeds category.	None

Appendix

Appendix 1: Allocation Reporting

Table 4: Allocation reporting for the 2024 Green Bond

Use of Proceeds Category	Project Name	Project Description	Total Allocated Amount (USD million)
Circular Economy Adapted Products, Production Technologies and Processes and/or Certified Eco-efficient Products	Mosjøen smelter induction furnace	The Mosjøen induction furnace enables Alcoa, in partnership with MMG Aluminium AG, to repurpose pre-consumer scrap aluminum using electric induction melting. Typically, remelting scrap involves using furnaces powered by natural gas burners. However, Mosjøen's induction furnace runs on electricity sourced from wind and hydropower and uses alternating current that runs through a resisting coil, creating heat.	6.1
	ASTRAEA™	The ASTRAEA™ process is a proprietary technology under development to purify post-consumer aluminum scrap, regardless of alloy combination, and beneficiate it up to high purity levels that exceed what is produced at most primary aluminum smelters operating today, permitting use in high tolerance applications.	
Renewable Energy	Long-term power purchase agreements ("PPAs") for wind and hydro projects	The selected Power Purchase Agreements (PPAs) support wind projects in Australia and Europe, as well as hydropower in Brazil.	229.3
Pollution Prevention and Control	Ecolum	EcoLum® is a primary aluminum product with an emissions intensity that is one-third of the industry average. EcoLum® sales in Europe have grown by eight to nine times in 2024, compared to the 2021 baseline, reaching up to 361,000 metric tonnes. By operating smelters using renewable energy and sourcing bauxite and low-carbon alumina.	490.6
	ELYSIS® smelting process	ELYSIS® smelting technology, currently in research and development, eliminates all direct GHG emissions from the smelting process. In contrast, traditional smelting emits 2.3 tCO_2e per metric tonne of aluminum (global average based on IAI 2023, excluding anode production). This breakthrough technology has the potential to help decarbonize the aluminum industry, which in 2023 generated 1.116 billion	

		tonnes of CO_2 (2% of global emissions).	
	Refinery of the Future	Refinery of the Future technologies, which are currently under development, aim to reduce the emissions generated from the thermal energy used in the refining process as well as reduce water usage. New technologies may be deployed across our global refinery operations to: • Reduce energy demand within operations or reuse waste energy to lower energy demand and intake. • Reduce and/or transform waste into new products that reduce environmental impacts, bringing benefits to adjacent industries and local communities, improve alumina production yields and product quality that meets rising customer demands.	
Water and Wastewater Management	Pinjarra refinery residue filtration Stage 2	The Pinjarra refinery residue filtration project is expected to enable the recovery of approximately 1 gigalitre of alkaline water for reuse in the process per year and reduces drying area requirements due to advanced filtration technologies.	16.5
Total Amount Allocated (USD million)			**742.5[8]**
Total Amount Unallocated (USD million)			**0.0**
Total Net Proceeds issues (USD million)			**737.4[9]**

[8] The total funded amount allocated to the Nominated Expenditures exceeds the net proceeds from the issuance of the Notes.
[9] The number represents the amount raised from the 2024 Green Bond after deducting the issuance expenses.

Appendix 2: Reported Impact

Table 5: Reported Impact for the 2024 Green Bond

Use of Proceeds Category	Project Name	Reported Impact	
		Impact Indicators	**Reported Impact**
Circular Economy Adapted Products, Production Technologies and Processes and/or Certified Eco-efficient Products	Mosjøen smelter induction furnace	Metric tonnes of pre-consumer scrap	Approximately 5,000 metric tonnes
	ASTRAEA™	Carbon footprint versus global average	A potential carbon footprint of ~1 tCO_2e/metric tonne of aluminum for the process compared to 14.8 tCO_2e/metric tonnes of aluminum for the global average of primary aluminum.
Renewable Energy	Wind and hydro projects	MWh of renewable electricity capacity consumed/generated	These PPA will generate approximately 5 million MWh of renewable electricity annually through the life of the contracts.
Pollution Prevention and Control	Ecolum	Metric tonnes of lower-carbon products	Up to 361,000 metric tonnes of EcoLum® sold in 2024.
		Emission intensity versus world average	EcoLum®'s emissions intensity is one-third of the industry average.

	ELYSIS® smelting process	Emission intensity versus world average	Eliminates all direct GHG emissions, whereas traditional smelting emits 2.3 tCO_2e/metric tonne of aluminum.
	Refinery of the Future	• Reduce energy demand within operations or reuse waste energy to lower energy demand and intake. • Reduce and/or transform waste into new products that reduce environmental impacts, bringing benefits to adjacent industries and local communities, improve alumina production yields and product quality that meets rising customer demands.	NA
Water and Wastewater Management	Pinjarra refinery residue filtration Stage 2	Volume of (fresh) water avoided/reduced/recycled (cubic meters)	One gigalitre (1,000,000 cubic meters) of alkaline water recovered annually for reuse.

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