RioTinto

Scope 1, 2 and 3 Emissions Calculation and Climate Methodology **2024**

Contents

Many of our operations are located on land and waters that have belonged to Indigenous and land-connected Peoples for thousands of years. We respect their ongoing deep connection to, and their vast knowledge of, the land, water and environment. We pay our respects to Elders, both past and present, and acknowledge the important role Indigenous and land-connected Peoples play within communities and our business.

Our 2024 reporting suite

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On the cover: Chute-à-Caron hydroelectric power plant Quebec, Canada.

On this page: Bauxite being loaded onto a ship at the export facility, Weipa operations, Australia.

About this document

Our *Scope 1, 2 and 3 Emissions Calculation and Climate Methodology* is a technical guide to our greenhouse gas (GHG) emissions reporting and climate-related disclosures. It provides additional information to underpin the integrity of the reported data.

Notable changes in 2024 reporting include baseline emissions being adjusted to account for acquisition of additional equity for Boyne Smelters, New Zealand's Aluminium Smelter, Energy Resources of Australia's Ranger mine and divestment of Dampier Salt's Lake MacLeod. Matalco aluminium recycling assets that existed in 2018 have also been added to the baseline. These changes have shifted the 2018 baseline to be 35.7Mt CO_2e

As part of the transition to a new reporting tool within the business, we completed a deep dive into emission factors and sources, and some minor standardisation occurred for Scope 1 reporting. When local regulatory reporting has changed, Rio Tinto has sought to align corporate and local reporting to those requirements.

Scope 2 emissions data sources remain the same, as per the change to dual-market and location-based reporting disclosed in 2023. There have been some additional renewable energy contracts and purchases, increasing the amount of renewable electricity claims in the portfolio, as described later in this document.

Scope 3 emissions calculation methods have improved over the past 3 years, with notable step changes in accuracy for spend-based reporting.

Spend-based emissions calculations transitioned from Quantis to a mixture of EXIOBASE, United States Environmental Protection Agency (US EPA), and UK Government spend-based factors. The starting point was EXIOBASE, and the other factors were selected as mining-specific factors were assessed to be more applicable to Rio Tinto.

The previously used Quantis tool provided emission factors and a US dollar conversion. Neither of these factors changed for a number of years, so the major adjustment to our reporting is the shift due to the realigning of factors into today's financial dollar equivalent. As a result, there is a large decrease in category 1 and 2 Scope 3 emissions. This improvement and the introduction of more specific updates and regional spend-based factors have materially increased our Scope 3 reporting accuracy in these categories.

We have continued to work on the precision of our reporting, incorporating more fuel-based transport, supplier travel and customer data.

Our emissions and climate reporting

In 2024, we have fully integrated climate disclosures into our *Annual Report*. This reflects our focus on continuous improvement, and aligns our reporting with emerging standards, including the International Sustainability Standards Board (ISSB) International Financial Reporting Standard (IFRS) for climate-related disclosures (S2). This Methodology document expands the references, methods used and underpinning source information, for greater transparency and traceability.

Our emissions reporting complies with the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD)'s *Greenhouse Gas (GHG) Protocol: A Corporate Accounting and Reporting Standard (Revised Edition) (2015), GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2013) and the Technical Guidance for Calculating Scope 3 Emissions* (version 1.0). These documents are available at ghgprotocol.org. The GHG Protocol documents are most recognised and widely used global standards and guidance for greenhouse gas reporting.

Scope 1 emissions are direct emissions from our operations, including process emissions and emissions from fuel use. Scope 2 emissions are from using purchased electricity and steam in our operations. Scope 3 value chain emissions are upstream and downstream from our operations, and are generated by our suppliers and customers.

We also report energy data, including renewable energy and electricity source information relating to our operations. The energy approach is consumption-based, with energy consumed by others excluded.

Energy and emissions are detailed in the *2024 Sustainability Fact Book*. This includes disclosure of Scope 1 emissions by GHG type separately, dual market-based and location-based Scope 2 reporting, and biogenic CO_2 emissions from use of renewable fuels. Scope 1 and 2 reporting is split by global decarbonisation program and by product group.

Our GHG metrics and targets

Today, our primary GHG reduction metrics for Group emissions reporting include Scope 1 emissions and Scope 2 market-based methodology. This methodology enables a more accurate representation of commercial decisions such as electricity purchase contracts where the rights to the energy attributes and zero emissions sources are secured.

The emissions targets are set on the base year of 2018 (1 January to 31 December). Our baseline is adjusted annually to remain comparable over time and to reflect our current portfolio. We exclude reductions achieved by divesting assets and adjust emissions associated with acquisitions or changes in equity.

Differences in our current year reported emissions and our current year baseline emissions are predominantly due to mid-year timing differences associated with equity changes in our underlying assets.

The 2024 Scope 1 and 2 data has been assured by KPMG as part of our annual assurance process (the assurance statement can be found in our *2024 Annual Report*).

Scope 1 and 2 reporting

In 2023, we updated our Scope 2 reporting methodology to enhance the integrity and transparency of our reporting of GHG emissions from purchased electricity. This review aligned our Scope 2 reporting with the principles of relevance, completeness, consistency, transparency and accuracy outlined in the GHG Protocol Scope 2 Guidance, an amendment to the *GHG Protocol Corporate Standard (the Scope 2 Guidance)*. The Scope 2 Guidance recommends dual reporting of corporate Scope 2 emissions with both:

- market-based methods accounting for commercial decisions to purchase the rights to renewable units of electricity
- location-based Scope 2 reporting that reflects the location of the operation and the electricity intensity of the grid.

As part of the extensive review of our Scope 2 reporting across assets in 35 countries disclosed in our 2023 reporting, we worked with external consultants to identify the existing renewable energy markets in each country, to establish their boundaries and determine what residual mix factors (RMFs) were available in each country. An RMF is the emissions intensity from the mix of electricity generation sources within a boundary after the contractual rights to zero emissions claims have been deducted. These are typically used for market-based Scope 2 reporting when the user does not hold the rights to energy attribute certificates (EACs) for the relevant power supply. Our review identified some issues with the availability and quality or comparability of market-based RMFs in some areas. While markets are still evolving, so too is the maturity of the factors.

The selection of emission factors for market-based Scope 2 reporting follows the selection hierarchy as set out in the *Scope 2 Guidance*. Here is a brief summary of this hierarchy:

Emission factor	Example
Energy attribute certificates or equivalent	Contracted renewable energy certificates or other energy attribute certificates
Contracts conveying the renewable rights	Contracts with attributes in regions where certificates do not exist or attributes are conveyed directly in the contract
Supplier/utility rates	Emission rate given to retail electricity users for entire energy supply
Residual mix factors	Generation intensity that factors out energy attribute purchases on the grid
Grid-average emission factors	International Energy Agency national factors

Determining the emission factors at our operations

In respect of energy purchases where Rio Tinto and associated joint venture partners have exclusive contractual claims over energy attributes, zero market-based emissions are reported. In these cases, energy attribute certificates (EACs) are being purchased and surrendered equivalent to the quantity of electricity supplied, or energy attributes are part of the contractual agreements, or both.

Where we have not purchased the energy attribute certificate, we use RMFs selected from publicly available and reputable sources like the European Association of Issuing Bodies (AIB) by country, and Green-e factors which are available for internal US grids. Where renewable energy markets are not in place, International Electricity Agency (IEA) country-based Scope 2 factors are used for applicable sites.

One of the benefits of dual reporting is the ability to compare purchasing decisions against grid emissions, so the location and market factors should be set on the same boundary. In Australia, we have chosen to use more accurate and relevant state-based residual mix factors, rather than use the country-based RMF, in order to align to the same area as the available location-based factors in the National Greenhouse and Energy Reporting Scheme. The equivalent state-based RMF calculation methodology has been established by a third-party consultant and independently assured by KPMG, our auditor. The calculations use reputable data sources, including AEMO (Australian Energy Market Operator) data, that are adjusted for inter-state transfers and have deducted the quantity of RECs (large-scale generation certificates in Australia) reported on the Government's REC Registry. This approach to calculating Scope 2 factors has been used for our Queensland, New South Wales and Tasmanian assets that are connected to the National Electricity Market. These are Bell Bay Smelter, Boyne Smelters, Gladstone Power Station, Tomago Smelter, Queensland Alumina and Yarwun Alumina refineries.

In Canada, there are no recent annually reported RMFs available for use. Our Canadian operations that import electricity from the grid are based in 3 provinces. For Quebec, we have used an RMF published by Hydro Quebec as the dominant grid operator.

Energy reporting

Within the *2024 Sustainability Fact Book*, we report some of our energy tables on a managed 100% basis to be consistent with the Global Reporting Initiative (GRI). Other tables are on an equity basis (the same as our primary Scope 1 and 2 reporting).

Definitions within standards and guidelines vary as to what should be counted as renewable energy, especially electricity. The following is to assist with transparency and understanding the differences within the tables and the breakdowns of data we provide.

Rio Tinto's reporting of electricity is intended to maintain broad alignment with the market basis for emissions reporting.

Renewable electricity generated and consumed includes the generation (with consumption) of renewable electricity at Rio Tinto. Where electricity is sold to third parties for use, it is excluded from energy reporting. The IFRS S2 guidance requires certificates to be generated and surrendered for electricity to be considered renewable.

Rio Tinto continues to generate large amounts of hydroelectricity through the Énergie Électrique power stations mainly located in the Saguenay–Lac-Saint-Jean region in Quebec, Canada, the Kemano power station in British Columbia and Sept-Îles in Quebec. The main users of this electricity are our aluminium and alumina operations in Canada and Iron Ore Company of Canada.

In the Pilbara region of Australia, the Gudai-Darri solar power plant has been built and is generating renewable energy. More solar and battery energy storage projects have been announced and are underway in the region. Solar energy production at Diavik diamond mine has come online to complement the existing wind generation. Kennecott has commissioned the first of its solar generating projects and commenced construction on a second.

Purchased electricity is split into several categories.

Where we have the contracted rights to the renewable energy with power purchase agreements, this is reported as ***contracted renewable electricity purchased and consumed.*** This electricity is differentiated in reporting between where RECs or guarantees of origin (GOs) are surrendered and those where unique rights are contracted without certificates. These MWh align with zero Scope 2 emissions reporting on a market basis.

The GHG Protocol Scope 2 Guidance recognises market-based reporting as renewable with zero emissions when contracts convey the energy attributes. The IFRS S2 guidance is limited in interpretation of renewable electricity and only recognises certificate-based schemes and arrangements.

Where one Rio Tinto entity generates the renewable electricity and supplies to another, this is included in ***renewable energy generated***.

In 2024, RECs with unbundled power purchase agreements (PPAs) were surrendered for Richards Bay Minerals, the ISAL aluminium smelter and Oyu Tolgoi copper operations.

Renewable electricity PPAs are delivering abatement for Escondida, QIT Madagascar Minerals and Weipa. The Kennecott copper operation continues to surrender RECs as part of the agreement with Rocky Mountain Power.

Grid electricity purchased is defined as being related to any purchase of electricity from a grid where a contract is not in place regarding the renewable attributes. Grid electricity is a mixture of renewable and non-renewable electricity sources.

In instances where grids are 90% or more renewable energy, these have been shown in reporting as ***grids that are predominantly all renewables***, such as Quebec. Electricity consumed from these grids is counted as use of renewable energy. Where regulated renewable energy markets exist requiring the purchase of RECs to make low emission claims, this has been treated as electricity purchased from other grids.

Renewable energy from biomass-based fuels includes energy from renewable solids, liquids and gaseous fuels. In 2024, renewable energy use from substituting diesel with biomass-based fuels expanded to include Kennecott. In 2023, our U.S. Borax operation in California became the first open pit mine to transition to renewable diesel. Trials are underway at various assets using biochar and biogranules as well as other biofuels, with options to expand these in 2025 and beyond.

Non-renewable energy (generated electricity) relates to fossil fuels used to generate electricity that is used by our operations.

Other non-renewable energy is the remainder of carbon-based fossil fuels used for mobile, heat and stationary use at our operations.

Emissions under limiting regulations

Many of our assets have carbon costs associated with their emissions. They report to governments including in Canada, Australia, the US, Europe, New Zealand and South Africa.

The following emissions-limiting regulations predominately cover process emissions and stationary fuels. They are estimated to cover 83% of our gross global Scope 1 emissions, particularly from our aluminium smelters, alumina refineries and iron ore mines.

Scheme	Country, Province/State	% of Scope 1 emissions covered
Australian Safeguard Mechanism (National Greenhouse and Energy Reporting Act)	Australia	50%
New Zealand Emissions Trading Scheme (Climate Change Response Act)	New Zealand	3%
Quebec Cap-and-Trade System (Quebec Environmental Quality Act)	Canada, Quebec	19%
California Cap-and-Trade Program (California Global Warming Solutions Act)	US, California	2%
European Union Emissions Trading Scheme (EU ETS)	Europe	1%
Alberta Technology Innovation and Emissions Reduction (TIER) Regulation (Emissions Management and Climate Resilience Act)	Canada, Alberta	0.3%
B.C. Output-Based Pricing System (British Columbia Carbon Tax Act)	Canada, British Columbia	4%
Newfoundland and Labrador carbon pricing (Newfoundland and Labrador Management of Greenhouse Gas Act)	Canada, Newfoundland and Labrador	3%
South Africa carbon tax (South Africa Carbon Tax Act)	South Africa	1%
Total		**83%**

Carbon credits and targets

Carbon credits retired as offsets represent reductions in emissions that would have occurred, or the effective permanent sequestration of GHG emissions, outside of the Rio Tinto reporting boundary. They result from actions undertaken by Rio Tinto or third parties on Rio Tinto's behalf, usually through purchase of the carbon credits.

- The reduction is represented by a controlled certificate or other token for each 1t CO_2e.
- The certificate is retired or otherwise permanently removed from circulation.
- The certificate must be generated by a national government or organisation recognised internationally as a transfer of emissions between nations.
- The certificate must be generated by a national government or organisation that issues units recognised internationally as a transfer of emissions between nations.
- When a carbon credit is retired, it will be nominated as applying to a specific reporting period and only be counted within one reporting period.

Net emissions: The Rio Tinto climate change targets are currently and historically based on total emissions, which are reported as:

Net emissions = Scope 1 + Scope 2 – carbon credits

Carbon credits retired as offsets towards our climate targets must pass our due diligence assessment, including meeting our high-integrity criteria. In 2024, Australian Carbon Credit Units (ACCUs) retired as part of the Safeguard Mechanism obligations have been included as offsets counted towards Rio Tinto's net emissions number. This includes ACCUs only when they have met internal integrity and quality requirements, and excludes Safeguard Mechanism Credits (SMCs).

To finalise our use of carbon credits reporting strategy, we consulted various standards and voluntary guidance documents. The GHG Protocol Mitigation Goal Standard (the Mitigation Goal Standard) aligns most closely with Rio Tinto's reporting situation regarding our greenhouse gas reduction goal. Using ACCUs to account for our net emissions posed challenges related to retirement timing and reporting timing. We considered 2 main options: first, an accruals approach to match baseline emissions exceedances with the number of ACCUs, and second, a surrender-based approach to count ACCUs retired within the reporting year.

Given the mismatch between reporting periods in different national or regional carbon pricing systems and our own reporting period, we calculate the total number of carbon credits that are needed for compliance purposes during our reporting period. This includes credits that have been, or will be, retired for compliance in that 12 month period to 31 December.

This aligns with the accruals approach used in our financial accounting for these credits.

The estimation of emissions liability for the non-finalised part of the year (July-December) is robust, as the baselines are calculated using fixed intensities and known formulas. The actual Scope 1 emissions are included as part of this year's reported values, which are audited at the Group level.

The Mitigation Goal Standard acknowledges that "accounting for anticipated use of transferable emissions units" is acceptable, provided certain risks are managed. The accruals method aligns with our financial incurred cost accounting for ACCU obligations, and more accurately represents the obligations when the emissions occur. Confidence in the retirement of units is strengthened by Rio Tinto owning a portfolio of units at the time of reporting, the regulated requirement to retire these units, and our knowledge of actual emissions and draft baselines at year-end reporting. Although unlikely, if the quantity of units retired changes materially, restatements and disclosures will be made.

For voluntary retirement of carbon credits that are not required for compliance purposes, the retirement will occur during the reporting calendar year or ahead of the published reporting claim, or both.

Methodology summary: Scope 1, 2 and 3

Scope 1 emission factor sources

Scope 1 emissions sources are primarily aligned with local reporting regulations and requirements. Where these do not exist or where there are inclusions in our inventory such as land clearance which are not within the reporting boundary of those guidance documents, the Intergovernmental Panel on Climate Change (IPCC) factors are used.

Source information	Country of reporting
Guidelines for National Greenhouse Inventories, Intergovernmental Panel on Climate Change (IPCC) 2006, 2019 updates	All
National Greenhouse and Energy Reporting (Measurement) Determination 2008 (as amended), Australian Government (2024)	Australia
National Inventory Report 1990–2022: Greenhouse Gas Sources and Sinks in Canada (Part 2), Government of Canada (2024)	Canada, Federal
Harmonization of Reporting in Canadian Jurisdictions, 2012 amendment, Government of Canada (2024)	Canada, Federal
Alberta Greenhouse Gas Quantification Methodologies, Government of Alberta (2023)	Canada, Alberta
British Columbia Best Practices Methodology for Quantifying Greenhouse Gas Emissions, Government of British Columbia (2023)	Canada, British Columbia
Guidance Document for Reporting GHG emissions for Large Industry, Government of Newfoundland and Labrador (2017)	Canada, Newfoundland and Labrador
Guide: Greenhouse Gas Emissions Reporting, Government of Ontario (2016)	Canada, Ontario
Environment Quality Act – Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere, Government of Quebec (2024)	Canada, Quebec
Icelandic National Inventory Report: Greenhouse Gas Sources and Sinks in Iceland, Government of Iceland (2023)	Iceland
Measuring emissions: A guide for Organisations, Government of New Zealand (2024)	New Zealand
Greenhouse Gas Emissions Reporting System (SAGERS): Methodological guidelines for quantification of Greenhouse Gas Emissions, Government of South Africa (2022)	South Africa
GHG Emissions Factors Hub, United States Environmental Protection Agency (2023)	US

Scope 2 emission factor reference sources

Scope 2 emission factor reference sources include market-based and location-based factors. The most recently available are referenced below. Where purchases of energy attributes have been made, the emission factors have not been used but are included here for transparency as to what has been used in the 2018 base year.

Source information	Country of reporting
National Greenhouse and Energy Reporting (Measurement) Determination 2008 (as amended), Australian Government (2024)	Australia
Calculated and independently verified market-based Scope 2 factors for Australian states	Australia
Fator médio - Inventários corporativos, Government of Brazil (2023)	Brazil
Residual electricity mix and greenhouse gas (GHG) emission rate, Hydro Quebec (2023)	Canada
Chile Informe del Inventario Nacional de Chile, 2022	Chile
European Residual Mix, Association of Issuing Bodies (AIB) (2023)	Europe
Iceland National Energy Authority (2023) Orkustofnun	Iceland
Eskom electricity factor	South Africa
Green-e Residual Mix Emission Rates, United States Centre for Resource Solutions (2023)	US
Emissions & Generation Resource Integrated Database (eGRID), United States Environmental Protection Agency (EPA) (2023)	US
Electricity Emissions Factors, International Energy Agency (IEA) (2023)	Various

Scope 3 emission factor sources

Source information	Scope 3 category	Type
2019 Life Cycle Inventory (LCI) Data and Environmental Metrics: Appendix A, International Aluminium Institute (IAI) (2022)	Categories 1 and 10	Quantity-based emission factors
Life Cycle Inventory for Rio Tinto Aluminium assets	Categories 1 and 2	Activity-based emission factors for high-emitting goods
Ecoinvent v3.10 factors	Category 1	Quantity-based emission factors
United States Environmental Protection Agency - Supply Chain Factors	Categories 1 and 2	Spend-based emission factors
EXIOBASE3 spend-based factors, 2019	Categories 1 and 2	Spend-based emission factors
National Greenhouse Accounts Factors (Australian NGA), Australian Government (2024)	Categories 1 and 3	Quantity-based emission factors
Greenhouse Gas Reporting: Conversion Factors 2024, UK Government (2024)	Categories 1-4, 6, 7 and 9	Spend-based emission factors Liquid and gas fuel factors Transport and freighting goods factor
Life Cycle Greenhouse Gas Emissions, National Renewable Energy Laboratory (NREL) (2021)	Category 3	Electricity factors
Electricity Emissions Factors, International Energy Agency (IEA) (2023)	Category 3 Category 10, iron ore	Electricity factors
Fourth IMO GHG Study 2020 – Final Report, International Maritime Organization (IMO) (2020)	Categories 4 and 9	Transport emission factors
Australian and Canadian governments Census data, 2021 and 2016 respectively	Category 7	Travel distances and user ratios of transport methods
Comparison of Energy Consumption and CO Emissions for Three Steel Production Routes – Integrated Steel Plant Equipped with Blast Furnace, Oxygen Blast Furnace or Corex – *Jiayuan Song, Zeyi Jiang, Cheng Bao and Anjun Xu* Thermochemical Data of Pure Substances, Third Edition – Prof. Dr. Ing. Ihsan Barin	Category 10, iron ore processing	Processing factors
CRU Group data	Category 10, bauxite and alumina processing	Processing factors
Titanium Dioxide Industry Average Carbon Footprint, TDMA	Category 10, TiO_2 feedstocks	Processing factors
Assessing the future environmental impacts of copper production in China: Implications of the energy transition, Di Dong, L van Oers, A Tucker, Evan der Voet, 2020, Table 5	Category 10, copper processing	Processing factors
SimaPro V9 Life cycle database: Sodium Hydroxide, 50% in H_2O, production mix, at plant/RER U/AusSD U (Method: IPCC 2013 HWP 100a V1.03)	Category 10, salt processing	Processing factors

Calculation methodology: Reported Scope 3 emissions categories

Category	Calculation boundary	Calculation methodology and notes
1. Purchased goods and services, and **2. Capital goods**	Includes emissions associated with relevant purchased goods and services. Excludes emissions associated with other Scope 3 categories (fuel, energy and transport). Includes emissions associated with the upstream goods purchased or acquired by the business for capital projects.	Spend data method using operating business costs for managed sites on equity basis using EXIOBASE, US EPA, UK Government spend-based factors. Scope 3 emissions are calculated for major consumables and raw materials using quantity-based reporting. Where unavailable, non-managed site costs are estimated using costs from similar production facilities.
3. Fuel and energy-related activities	Includes emissions from the production and transportation of purchased fuels, including natural gas, diesel, coal and energy sources not included in Category 1. This includes transmission losses from purchased electricity.	Fuel and energy consumption data from Rio Tinto business systems. Factors are sourced from the Australian NGA, UK Government, IEA, NREL.
4. Upstream transportation and distribution	Total Scope 3 GHG emissions from upstream transportation and distribution of Rio Tinto products. Includes all inbound transport, all inter-company transport paid for by Rio Tinto and all outbound product transport paid for by Rio Tinto (eg under cost, insurance and freight (CIF, CFR) or similar terms). Includes emissions from bulk marine shipping, containerised shipping, road and rail transport of sold products and inbound transport emissions of major consumables. Excludes emissions from Rio Tinto owned vessels (this is included in Scope 1 emissions).	For our managed fleet (period-chartered and spot), actual emissions are derived from consumed fuel reported from each individual voyage. Estimated emissions from non-managed voyages (eg FOB and similar terms) are calculated using the EEOI guidelines, including vessel type-size, cargo volumes and distances. Generic EEOIs are sourced from the 4th International Maritime Organization (IMO) GHG Study. For containership, road, rail and air, UK Government conversion factors have been utilised. Transport emissions estimated by spend data and EXIOBASE emission factors are also included in this section.
5. Waste generated in operations	Estimated emissions for third-party landfill, waste processing and wastewater. Rio Tinto processes do not generate biodegradable waste. Site-based landfill and water treatment are included in Scope 1 reporting if applicable.	Estimates of domestic waste and wastewater sent to third-party facilities multiplied by the UK Government Scope 3 factors. Rio Tinto's 2024 Sustainability Fact Book for quantities of third-party landfill and water processing.
6. & 7. Business travel and employee commuting	Includes domestic and international flights, road and rail travel as well as travel services including hotels and taxis. Employee commuting to remote sites is included in Scope 3 business travel including company-arranged charter flights. Company buses and cars are reported as Scope 1 emissions. Remainder of employee commuting to and from work has been estimated.	Air travel for fly in/fly out has been included in business travel. Emissions reports are from the corporate Rio Tinto travel provider and estimates made for the few sites that do not use the provider. Flight emissions are provided by the Rio Tinto travel provider and major airlines we charter with. Business travel and employee commuting emissions using spend data and EXIOBASE emission factors are also included in this section. Remainder of employee commuting is calculated using average commute travel modes and employee numbers.

Category	Calculation boundary	Calculation methodology and notes
9. Downstream transportation and distribution	Total Scope 3 GHG emissions from downstream transportation and distribution of sold products. Includes emissions from the transport and distribution of our products where freight has not been arranged by Rio Tinto (eg under free on board (FOB) or similar terms). Includes emissions from bulk marine shipping, containerised shipping, and road and rail transport of sold products.	As per Category 4.
10. Processing of sold products	Includes emissions related to the processing of iron ore, bauxite, alumina, TiO_2 feedstocks, copper concentrate and salt. "Other" includes an estimate for processing emissions related to Rio Tinto's other products including molybdenum and minor minerals.	Emissions calculated as described in this report. High purity products like gold, silver and diamonds, which are low volume and have minimal amounts of further processing, are considered not material.

Excluded Scope 3 categories

The following categories are excluded for the reasons provided:

- **Category 8:** Upstream leased assets. Rio Tinto does not lease significant upstream assets.
- **Category 11:** Use of sold products. This category is for emissions from fuels and feedstocks or from sold products that directly consume energy, such as engines. This category is not applicable since Rio Tinto does not produce any fossil fuels or manufacture products applicable to this category.
- **Category 12:** End-of-life treatment of sold products. Rio Tinto's products include metals and minerals with minimal emissions at end of life. This category is not applicable since Rio Tinto does not produce any fossil fuels or manufacture products applicable to this category. Final products related to Rio Tinto's material value chains (steel, aluminium and copper) produce materials with established recycling industries.
- **Category 13:** Downstream leased assets. This category is not applicable since Rio Tinto does not lease significant downstream assets.
- **Category 14:** Franchises. This category is not applicable since Rio Tinto does not lease significant downstream assets.
- **Category 15:** Investments. This category is not applicable for any material emissions reporting since Rio Tinto reports Scope 1, 2 and 3 on an economic interest (equity) basis. Emissions from investments, both managed and non-managed, are included in reporting of Scope 1 and 2 and across Categories 1–10 in Scope 3. Investments such as the Rio Tinto Pension Fund UK are managed by third parties.

Scope 3 reporting methodology

Category 10: Processing of sold products – iron ore

Processing of iron ore into steel is the largest contributor to our Scope 3 emissions. Currently, the 2 primary steelmaking routes are the blast furnace/basic oxygen furnace (BF/BOF) integrated system and the electric arc furnace (EAF). BF/BOF accounts for ~70% of global steel production and EAF for ~30%.

Around 99% of our iron ore is processed in the BF/BOF steelmaking route, which uses iron ore, metallurgical coal and other additives to produce steel. The remainder is processed with natural gas to produce direct reduced iron (DRI) for conversion to steel in an EAF. We supply only the iron-based inputs to steelmaking processes, which contain no carbon, but due to the consumption of metallurgical coal, natural gas and electricity from local grids (which typically rely on fossil fuel power generation), making steel is carbon intensive.

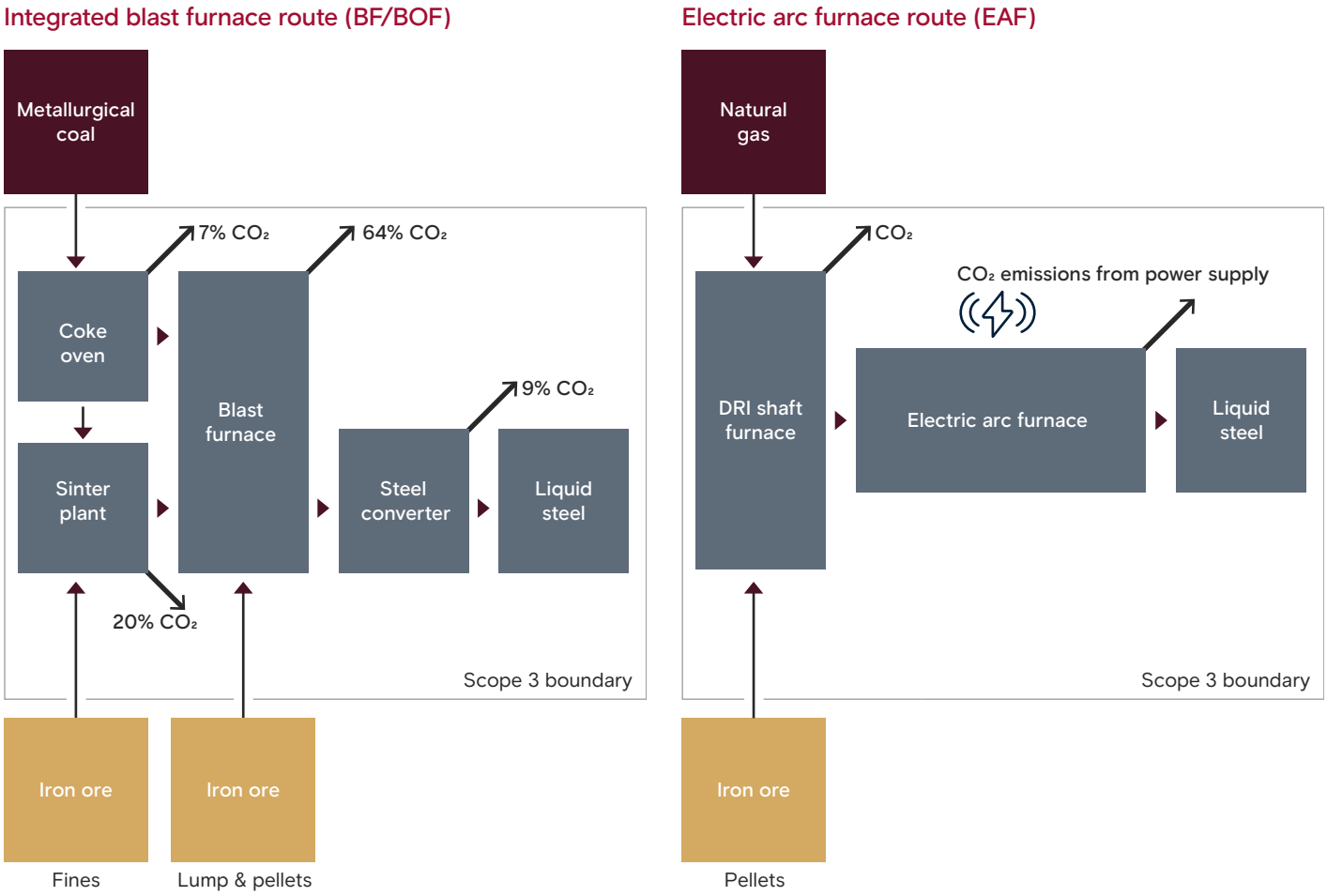
The BF/BOF steelmaking route is complex and varies at each of our customers' facilities. These complexities contribute to different operating and carbon efficiencies and ultimately varying emissions intensities at the facilities that process our iron ore products. We have taken a conservative approach to capturing these differences while ensuring our modelling accounts for the different emissions profiles associated with our suite of iron ore products.

Calculation boundary

The calculation of emissions for processing of iron ore uses a sophisticated steelmaking energy and mass balance model to estimate emissions from the BF/BOF and DRI/EAF processes. Each of our 12 iron ore products is analysed, linked to the steelmaking technology they supply, to estimate emissions from processing each ore product into liquid steel. The calculation model is updated annually with quantity of ore sold, respective product grades, mineral chemistry and moisture content.

The model captures the activities incorporated at a typical steelmaking facility, recognising that this varies by customer and region. The emissions boundary used to prepare this estimate is represented in figure 1 below. For BF/BOF steelmaking this includes emissions from the 4 principal sources: production of coke, iron ore sintering, blast furnace operations and final steel conversion. For DRI/EAF-processed steel, we have included direct emissions and emissions associated with electricity used. For both steelmaking routes, we have employed conservative model assumptions on technology deployment, closed-loop energy efficiency and regional grid factors across the regions in which our customers operate.

Figure 1. Calculation boundary. Note percentages provided for each unit process are approximate and subject to change.



Calculation methodology

We use typical industry parameters when modelling to consider the energy needed in each step of the steelmaking process relative to the grade of iron ore, flux materials and corresponding volume of coke required. Our approach to calculating emissions from steelmaking attributes emissions to 4 elements of the integrated process: the production of coke, ore sintering, blast furnace operations and final steel conversion.

Within our calculation boundary, the coke plant is the beginning of the process and uses heat energy to convert metallurgical coal to coke used in the steelmaking process. Emissions in this process represent about 7% of our calculated downstream emissions, despite the absence of our products in this part of the steelmaking process.

The sinter plant is used to prepare fines ores for the blast furnace through a heat-based agglomeration process. Lump ore and pelletised products are screened and largely bypass the sinter plant process, reducing the associated emissions. Emissions attributable to sintering represent about 20% of our calculated downstream emissions.

The blast furnace uses coke to heat and reduce iron ore (typically Fe_2O_3) to liquid iron. This reduction process is completed with carbon-based products in all global blast furnaces and as such results in the emission of CO_2. Around two-thirds of our iron ore downstream emissions are generated in this process.

The steel converter removes the final impurities from the liquid iron generated in the blast furnace, using oxygen and lime flux inputs. Emissions in this process represent about 9% of our calculated downstream emissions.

Integrated steelworks employ a complex variety of processes and energy uses. In our model, the conversion of energy into emissions is based on parameters and typical operating values from relevant published technical papers and International Energy Agency global averages as set out in the references below. These calculations are consistent with the approach taken in the *GHG Protocol Tool: Calculating Greenhouse Gas from Iron and Steel Production* published by the World Resources Institute and World Business Council for Sustainable Development.

Data sources

Iron ore product grades are determined using laboratory analysis for the ore shipments. Shipment volumes are from site operational data for fines, lump and pellets as used for compiling the Rio Tinto published annual results for managed and non-managed operations.

We have developed the energy and mass balance model internally, using key assumptions representative of typical steelworks operating parameters and typical coke and metallurgical coal specifications. We monitor research and industry publications to validate or continuously improve our key assumptions, which we update and document as required.

Item	Range (by product)	Example (Pilbara Blend™ fines)	Rio Tinto portfolio	Description
Iron ore production (million tonnes, equity share)				
2024 iron ore shipments[1]		97.9	292.7	We produce a range of iron ore products from our Pilbara and Iron Ore Company of Canada operations. Data sourced from Rio Tinto shipments data for the year ended 31 December 2024.
Processing iron ore to steel (million tonnes)				
2024 attributed steel production		60.5	181.6	By analysing the different characteristics of our products including iron grade, minor elements and moisture, we have estimated the steel production attributable to our iron ore.
Processing of iron ore to steel – emission factor (tonnes CO_2e per tonne steel)				
Emissions associated with the production of coke	0.12 – 0.17	0.16	0.16	Emissions are estimated using representative grades of metallurgical coal and typical coke oven efficiencies.
Emissions associated with ore sintering	0.04 – 0.64	0.54	0.44	The sinter plant is primarily used to agglomerate fines ore. Lump and pellets are screened, with much of this product bypassing the sinter plant.
Emissions associated with the blast furnace	1.31 – 1.54	1.36	1.39	The energy required in the reduction of iron ore is the largest emissions contributor. Variations in these emissions are modelled relative to the iron content and gangue components of the ore.
Emissions associated with final processing in steel converter (BOF)	0.21	0.21	0.21	Emissions in the steel plant are reasonably consistent across our products.
Emissions per tonne of attributable steel (tonnes CO_2e per tonne liquid steel)		2.27	2.18*	Emission factors sourced from our energy and mass balance modelling of iron ore processing. * Includes contribution from direct reduction pellets used in DRI+EAF process.
2024 iron ore value chain emissions (million tonnes CO_2e, equity share)				
Total Scope 3 GHG emissions from processing of iron ore (Mt CO_2e equity share)		137.2	395.9	Total estimated emissions from processing of our iron ore to produce steel. Calculated on a product basis by applying the specific product emission factors to the 2024 sales volumes of each product.

1. Iron ore shipments are net of unsold product in portside trading facility.

Processing of bauxite and alumina

The processing of bauxite and alumina into aluminium is the second largest contributor to our Scope 3 emissions. For reporting, we calculate our Scope 3 emissions looking at the supply chain of each of our bauxite and alumina operations, and accounting for Scope 1 and 2 emissions of our purchases and sales, upstream and downstream. When our sites purchase third party bauxite and alumina, this is reported under Scope 3, Category 1 (Purchased goods). Emissions from our sales of bauxite and alumina are reported under Scope 3, Category 10, (Processing of sold products). As illustrated below, the upstream emissions from bauxite mining associated to our alumina purchases, and downstream emissions from aluminium smelting associated with our bauxite sales are also included.

Calculation boundary and methodology

Emissions are calculated using a mixture of site-specific actual data, site specific CRU data, and CRU data based on region of origin, and include all internal and external purchases of bauxite and alumina. This methodology allows direct customer and supplier improvements to be measured over time and also provides the pathway for greater accuracy of Scope 3 reporting using site-specific emission factors, conversion ratios and regional emission factors instead of global factors and conversions.

The calculation methodology for calculating Scope 3 emissions from processing of bauxite and alumina used in 2024 is similar to the methodology used in 2023 and 2022. The boundary of processing is inclusive of the customer's final primary aluminium smelter facility. Typically, this is to the first cast product onsite. Processing of any hot metal sales by the customer to third-party are not accounted for. Further processing (for example, extrusion or thermal treatment) is out of our boundaries if it is not within the Scope 1 and 2 emissions of the customer's facility. The granularity of facility-specific information is not available to make such adjustments, and these emissions are not likely to be material to the Scope 3 inventory.

The method accounts for the Scope 1 and 2 emissions of our suppliers or customers and currently excludes their Scope 3 emissions. Using Scope 1 and 2 data from immediate downstream partners is consistent with the *International Aluminium Institute Scope 3 Calculation Tool & Guidance, 2022* for processing of sold products.

These processes are currently outside the boundaries of our reporting approach:

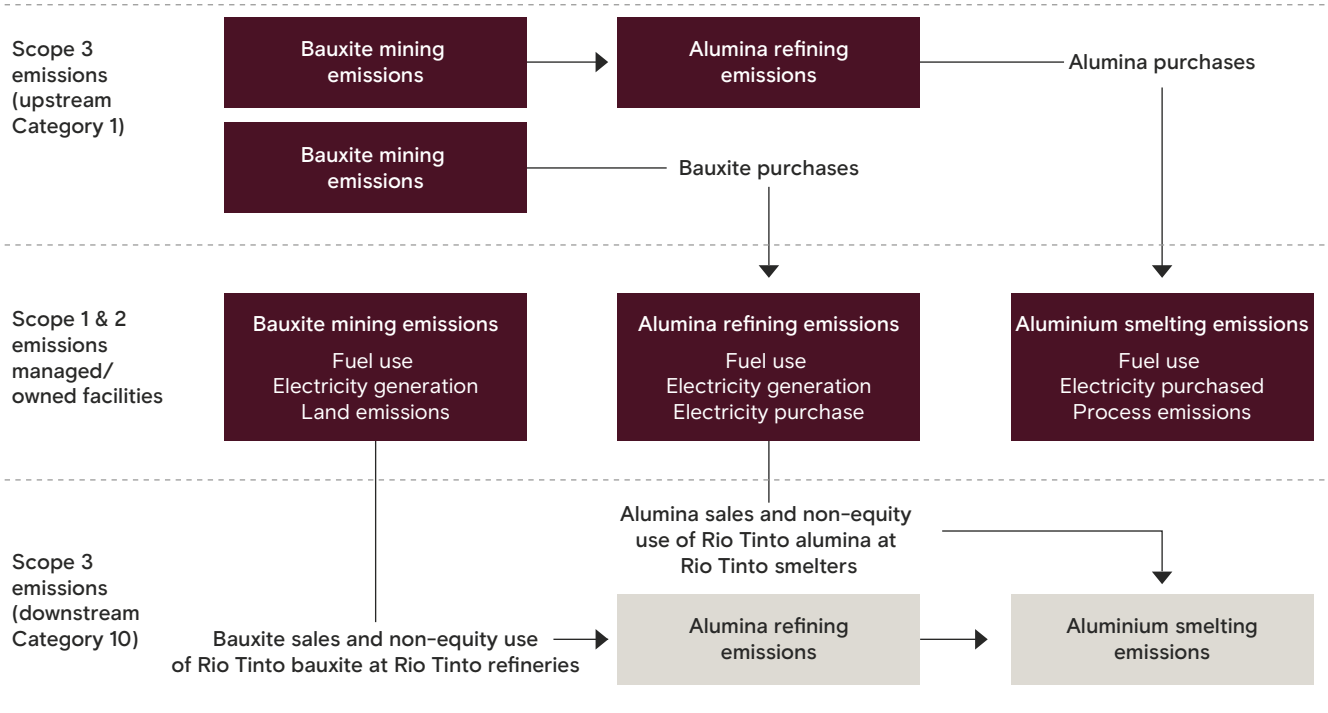
- Alumina hydrate is considered a final product, with minimal associated downstream emissions from processing and is excluded from further processing calculations.
- Customer offsite processing of co-products (dross, carbon mix, spent-pot lining) is out of our boundaries.

Compared to 2023, we made updates to actual emissions data relating to our joint venture assets for which we do not report Scope 1 and 2 emissions, and updates to CRU data from 2022 to 2023 factors. Other key parameters such as the bauxite-to-alumina and alumina-to-aluminium quantity ratios are unchanged.

Bauxite and alumina volumes are sourced from sales quantities based on bill of lading records for shipments of bauxite and alumina shipped to and from managed and non-managed operations. These are consistent with published production data in the Rio Tinto *Annual Report*.

In 2024, the emissions from processing of bauxite and alumina have increased. Rio Tinto produced more bauxite across the assets, especially Gove and Weipa. These additional tonnes increased the sales of bauxite to third parties and hence the Scope 3 emissions from refining that bauxite and then smelting that alumina into aluminium.

Figure 2. Bauxite and alumina processing emissions classification of scope and category.



Below are the quantities, with examples of the conversion factors and intensities used for the reporting, in an equivalent disclosure to previous Scope 3 reporting. For comparison, in 2023, the bauxite sales to third parties totalled 39Mt with 1.6Mt of bauxite purchased. Alumina sales totalled 4Mt with 1.2Mt purchased.

Customers are matched to the CRU asset name and customer-specific emission factors were used when available. The table below shows an average of the CRU emission factor used; it also corresponds to the factor used when customer facility is unknown. This table is provided to demonstrate how the calculations work.

Item	Calculation steps	Rio Tinto portfolio	Description
2024 sales (million tonnes, equity share)			
Bauxite sales	A	41.8	Sales of bauxite to third parties
Alumina sales	B	2.5	Sales of alumina to third parties
Conversion factors			
Bauxite : alumina	C	2.69	International Aluminium Institute, Life Cycle Inventory (2019 data published 2022)
Alumina : aluminium	D	1.92	International Aluminium Institute, Life Cycle Inventory (2019 data published 2022)
Processing-related emission factors (tonnes CO_2e per tonne of input material) (average data)			
Bauxite-to-alumina intensity (t CO_2e/t alumina)	E	1.22	CRU Group dataset (2023), global weighted average (excluding Rio Tinto assets)
Alumina-to-aluminium intensity (t CO_2e/t aluminium)	F	11.00	CRU Group dataset (2023), global weighted average (excluding Rio Tinto assets)
2024 aluminium value chain emissions (million tonnes CO_2e)			
Emissions from processing of bauxite sales	A ÷ C x E + A ÷ C ÷ D x F	119.1	Emissions associated with processing of bauxite to alumina and then further to aluminium
Emissions from processing of alumina sales	B ÷ D x F	14.9	Emissions associated with processing of alumina to aluminium
Total Scope 3 GHG emissions from processing of bauxite and alumina (Mt CO_2e equity share)		134.0	Total estimated emissions from processing of bauxite and alumina This is reported in Category 10
2024 purchases (million tonnes, equity share)			
Bauxite purchases		0.55Mt	Purchases of bauxite from third parties
Alumina purchases		1.40Mt	Purchases of alumina from third parties
Total Scope 3 GHG emissions from purchased bauxite and alumina (Mt CO_2e equity share)		0.95Mt CO_2e	Total estimated emissions from purchased bauxite and alumina This is reported in Category 1

Processing of other sold products

There have been no changes to the factors and methods used to calculate Scope 3 Category 10 emissions from the remaining sold products. This includes salt, gypsum, molybdenum and other minerals products.

Processing of titanium dioxide feedstocks

We are involved in the titanium dioxide (TiO_2) supply chain through our interests in QIT Madagascar Minerals (QMM) in Fort Dauphin in Madagascar, Richards Bay Minerals (RBM) in South Africa, and Rio Tinto Iron and Titanium Quebec Operations – Lac Tio in Canada, as well as smelters at RBM and Sorel-Tracy in Canada. These operations generate products for the TiO_2 pigment industry.

Our TiO_2 business provides the main feedstock for the TiO_2 pigment industry, which is used in a wide range of industrial and consumer products including paints, plastics, cosmetics, paper, rubber, ceramics and textiles.

We treat emissions from mining, mineral processing, smelting and refining TiO_2 feedstock as Scope 1 and 2 emissions. Our Scope 3 emissions estimate incorporates the emissions associated with the conversion of mineral sands and feedstock to TiO_2 pigment.

The conversion process from feedstock to 100% pure TiO_2 refined pigment generates the majority of the value chain emissions and is the downstream boundary of our estimate.

We use the Titanium Dioxide Manufacturers Association's (TDMA) calculation methodology, which has calculated the average mine-to-gate carbon footprint related to processing TiO_2 feedstock into TiO_2 pigment. This considers both typical processing routes: sulphate and chloride. Our total annual production volumes are assessed against the TDMA average emission factor to estimate our Scope 3 emissions. We acknowledge that our Scope 1 and 2 emissions double up somewhat within this Scope 3 calculation. The source factor used in the 2021 inventory was 4.9t CO_2e/t pigment and this has remained the same in subsequent years.

Processing of copper concentrate

We are involved in producing copper concentrate and refined copper through our interests in Kennecott in the US, Oyu Tolgoi in Mongolia and Escondida in Chile.

The emissions captured within our Scope 3 estimate include processing of our net sales of copper concentrate into refined copper. The emissions associated with mining, concentrating and, where applicable, refining copper at our operations are included in our Scope 1 and 2 emissions reporting.

Our calculation boundary concludes with the production of copper cathode (refined copper). At this stage, copper can be converted into various products, including wire, tube or sheet. Due to the various processing routes, and their comparatively low emissions, we have not included the downstream processing of our refined copper into different end-use products in this estimate.

The emissions from mining and concentrating copper ore are highly variable due to differences in open cut and underground mines, as well as the emission factors of the electricity consumed in the mining and concentrating processes. Life Cycle Assessments for copper that capture mine-to-gate emissions from copper extraction to final product are subject to these variations and, as such, include large variations in the emission factors proposed in the use of Scope 3 assessment of copper products.

Our calculation uses a regional factor that is representative of the processing of our copper concentrate by our customers. The factor in the paper referenced below is 5.88t CO_2e/t Cu for all processing stages from mining to refining.

Using the emissions breakdown in the paper, the emissions associated with processing of copper concentrate into refined copper have been determined to be 1.64t CO_2e/t Cu. We have used this emission factor for the copper refining process and applied this to our net copper concentrate sales. This approach has been reviewed and is still considered accurate and appropriate in 2024.

Processing of salt

Our Dampier Salt operations are located in Western Australia and comprise 2 salt operations at Dampier and Port Hedland. Up until December 2024, it also included the Lake MacLeod site. As Rio Tinto had equity ownership of Lake MacLeod for 11 months of 2024, the Scope 3 emissions associated with that production are included in 2024 reporting.

The majority of our salt production ends up in chlor-alkali processes and the manufacturing of caustic soda and chlorine. The emissions captured within our Scope 3 estimate include processing of our salt into refined products on an equity basis. The emission factor applied to the amount of production estimated to have been used in chlor-alkali processes is 2.03t CO_2e/t NaOH, sourced from SimaPro V9 Life cycle database.

To apply this factor to sodium chloride, the molar mass ratios were used to give an equivalent t CO_2e/t NaCl and adjusted for % of moisture. The amount of caustic that our customers would likely produce from our salt is then multiplied by the emission factor. Using salt in processes such as in the paper and pulp industry is lower in emissions intensity than those used in chlor-alkali processes. We have estimated GHG emissions from salt in these other processing applications.

Category 1, 2 and 3: Purchased goods, services, capital goods and fuels

The GHG Protocol advises several methods for calculating emissions for Categories 1, 2 and 3 that are associated with different levels of specificity. Rio Tinto strives to increase the types of purchased goods that are calculated using quantities to calculate emissions (for example supplier-specific, hybrid or average-data methods), with the remainder calculated using a spend-based method.

All the major raw material inputs into each production process that have high processing emissions have been identified and are reported using one of the quantity-based reporting methods. These include coke, pitch, anodes and alloying elements from aluminium smelting, caustic soda and lime, explosives and grinding media.

Rio Tinto has historically used the Quantis Scope 3 Evaluator Tool from the GHG Protocol for spend-based emissions calculations. This tool was decommissioned and removed from the GHG Protocol website as the recommended calculation tool in late 2023.

In 2024, Rio Tinto transitioned to using newer and more accurate spend-based emission factors. These were mapped against the company purchasing classifications. We have used EXIOBASE for the majority of spend. For mining-specific categories, we have used UK Government and US EPA databases used instead of EXIOBASE as they have been deemed more representative for our business.

There is a material reduction to the 2024 calculated emissions resulting from changes to the emission factor database source, for several reasons:

- The Quantis factors were last updated in 2016, including no updates to the US dollar conversion factor provided by the tool to account for inflation. Updating the spend-based factors to today's dollars would have calculated a lower emissions total for spend-based emissions if it had been implemented.
- Most emission factor databases are built on Environmentally Extended Input-Output (EEIO) tables. These tables combine national or regional input-output tables representing the monetary flows between industries, with environmental data, and enable the calculation of emissions associated with production and consumption across various sectors. EXIOBASE incorporates more recent estimates and offers finer granularity at a regional level compared to Quantis, which can explain some of the discrepancies between them.

With the revision to spend-based factors, we reviewed new and emerging Scope 3 guidance to reassess what should be included and excluded in our assessment. To bring the Rio Tinto exclusions list into alignment with the ICMM *Scope 3 Emissions Accounting and Reporting Guidance, 2023*, spend that is categorised as "taxes" has now been fully (instead of partially) excluded from the emissions inventory in 2024.

We recalculated 2022 and 2023 spend data and, where material, provide restated historical data in the Scope 3 emissions tables.

Emission factors for certain goods with high Scope 3 emissions (coke, pitch, caustic soda) have been refreshed in 2024, in particular, delineation between purchase quantities of green and calcined coke (used in aluminum anodes), which has reduced the calculated emissions.

Since the changes to the spend-based method have been so material, the restatement of historical values as an indication has been provided.

Scope 3 Category 1 and 2 reporting	2024	2023
Quantis spend-based as reported in 2023		13.2Mt
Quantis spend-based with 2023 inflation adjustment		10.7Mt
Spend-based with new emission factors and inflation adjusted	**10.8Mt**	10.2Mt

Category 3 (fuels and energy-related activities) are reported using the average-data method, using quantity information gathered and reported under Scope 1 and 2 emissions reporting. Where possible we seek to use emission factors that are representative of the full upstream lifecycle emissions for reporting in this category.

Categories 4 and 9: Upstream and downstream transport and distribution

Transportation and distribution of sold products is reported across 2 separate Scope 3 categories depending on the party who pays for, and arranges, the transport. Category 4 and Category 9 together report the Scope 3 GHG emissions from the transportation and distribution of sold products, including iron ore, bauxite, alumina, aluminium, salt, TiO_2 feedstocks, borates, copper concentrates and copper cathodes, and other minor products. These categories exclude emissions from Rio Tinto owned vessels which are reported under Scope 1 emissions, and also excludes transport emissions associated with fuels as this is reported in Category 3 using cradle-to-gate factors inclusive of transport.

Category 4 represents all inbound, inter-company and outbound transport and distribution paid for by Rio Tinto that covers cost, insurance and freight (CIF, CFR) or similar terms.

Category 9 includes emissions from the transport of our products where freight has not been arranged by for Rio Tinto (for example under free on board (FOB) or similar terms).

A large part of our Categories 4 and 9 emissions come from the bulk marine shipping of iron ore, bauxite and alumina products, contributing approximately 4.9Mt CO_2e of Category 4 emissions and 1.7Mt CO_2e of Category 9 emissions. The remaining balance of emissions are from shipping of other products, third-party containerised shipping, and road and rail cargo movements.

In 2024, we have further enhanced our digital capabilities, resulting in a more efficient, streamlined, and partially automated process for data consolidation and calculations. We continue to derive our transport emissions using a hybrid approach, leveraging actual fuel data for most Category 4 emissions from managed voyages. Category 9 emissions from customer-arranged transportation remain reliant on emissions calculated using the distance-based method, given the limited visibility of voyage data.

Transport and distribution upstream and managed (Category 4) approach

For the majority of managed voyages (period-chartered and spot), emissions data is collected upon the completion of each voyage (via bunker data and direct submission from our partners).

For estimates and non-managed voyages, emissions are calculated using the distance-based method. EEOI (Energy Efficiency Operating Index) emission factors are sourced from the 4th International Maritime Organization's (IMO) GHG Study, specific to vessel type and size.

For containership, road, rail and air transport, we use UK Government Scope 3 emission factors. In 2024, we used more distance data reported on each shipment through our logistic partners, and have reduced the city-to-city distance estimations compared to 2023.

Category 4 also includes spend-based emissions from handling, storage and warehousing activities on ports and distribution centres, in line with the new methodology being used for purchased goods and services.

The inbound transport emissions of major consumables are being reported under Category 4. These emissions are derived in a similar manner to our product transport emissions, using a hybrid approach based on available information.

Transport and distribution downstream (Category 9) approach

All of our Category 9 emissions are calculated using a distance-based method:

Emissions = shipped quantity x laden distance travelled x emission factor matching the vessel class or mode of travel

Distances for marine and logistics Category 9 voyages are mostly derived from shipping-specific commercial data, supplemented with port-to-port or city-to-city distances from DataLoy or Google Maps respectively. Emission factors are sourced from the cited registries above.

Summary of results

Scope 1, 2 and 3 (value chain) emissions 2024

Rio Tinto Scope 1, 2 and 3 emissions 606.4Mt CO_2e (2024, equity basis)

This representation of our emissions shows the Scope 3 upstream emissions, Scope 1 and 2 emissions and the Scope 3 downstream emissions from our overall operations, on an equity basis.

Upstream emissions

29.8Mt CO_2e

Scope 3	Mt CO_2e
Cat 1 Purchased goods (spend data)	6.8
Cat 1 Bauxite and alumina purchases	0.9
Cat 1 Higher emission purchases (eg caustic, lime, explosives coke, pitch, anodes, alloys)	7.1
Cat 2 Capital goods	3.0
Cat 3 Fuels	4.4
Cat 4 Transport (includes Rio Tinto chartered vessels)	6.8
Cat 5, 6, 7 Waste, business travel and commuting	0.8

Scope 1 and 2 (market-based) emissions

29.8Mt CO_2e

Scope 1 and 2	Mt CO_2e
Scope 1	23.0
Scope 2*	6.8

* Market-based method.

Downstream emissions

544.8Mt CO_2e

Scope 3	Mt CO_2e
Cat 9 Transport (includes customer chartered vessels)	2.1
Cat 10 Processing	
– Iron ore	395.9
– Bauxite and alumina	134.0
– TiO_2 feedstocks	4.5
– Copper	0.7
– Salt	6.6
– Other	1.0

Emissions (indicative) breakdown by product group

Product group	Upstream Scope 3 (Cat 1-3, 5-7 & 4) Cat 4 spend Mt CO_2e	Marine seaborne transport (Scope 3, Cat 4 & 9) Mt CO_2e	Logistics transport (Scope 3, Cat 4 & 9) Mt CO_2e	Scope 1 and 2 emissions Mt CO_2e	Processing of sold products (Scope 3) Mt CO_2e	Total Scope 1, 2 and 3 Mt CO_2e
Total	23.87	7.06	0.86	29.8	542.7	604.4
Iron ore (includes Pilbara iron ore and Dampier Salt)	5.12	4.78	0.0	3.1	382.6	395.6
Aluminium	11.49	1.72	0.34	22.8	134.0	170.4
Copper	3.15	0.01	0.10	1.0	0.7	5.0
Minerals (includes Iron Ore Company of Canada)	1.55	0.45	0.42	2.3	25.4	30.1
Other (includes shipping and corporate functions)	2.56	0.10	0.0	0.6	0.0	3.3

Data includes some rounding and approximations when apportioning between product groups.

Marine seaborne transport includes bulk marine shipping plus all seaborne vessels. Logistics transport includes all land-based transport.

Scope 1 and 2 emissions are on equity basis without carbon credits.

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