Greenhouse Gas Emission Assessment Update

Winu Project

Rio Tinto Winu

22 April 2026

→ **The Power of Commitment**

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Executive Summary

Rio Tinto Winu Pty Ltd (Rio Tinto) plans to develop a new copper-gold mine and associated infrastructure, referred to as the Winu Project, approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia within both the Nyangumarta people's and the Martu people's Native Title Determination Areas. The Winu Project is in the approvals phase and has been referred to the Western Australian Environmental Protection Authority (EPA).

GHD Pty Ltd (GHD) was engaged by Rio Tinto to prepare a life-of-asset Greenhouse Gas (GHG) Assessment for the project to determine the emissions baseline.

Construction of the Winu Project is expected to take place over 2 years (2028-2029), while the Operational period of the Project is expected to occur over 29 years (2030-2058).

The GHG emissions assessment included direct emissions from the Winu Project activities (Scope 1), indirect emissions from purchased electricity (Scope 2) and other indirect contributions not included in Scope 2 along the Winu supply chain (Scope 3). All GHG emissions estimates have been based on data provided by Rio Tinto and reasonable assumptions developed by GHD and agreed with Rio Tinto. All calculations have been conducted in accordance with industry recognised or Australian regulatory standards.

The EPA has identified through the Environmental Scoping Document (ESD) that it considers for the purpose of this assessment that GHG emissions from:

– Electricity generation produced for the Proposal as Scope 1 (not Scope 2) – although it is GHDs understanding that Rio Tinto intends for a third party to own and operate the Winu Power station. Given EPA feedback no Scope 2 emissions are captured in this assessment report.
– Haulage of concentrate (from mine to port), regardless of third-party contractual arrangements as Scope 1 (not Scope 3).

Noting that this does not align with National and International reporting standards in respect of emissions from purchased electricity and haulage emissions, this EPA's characterisation has been adopted in this GHG assessment and report, and these two emissions sources listed above have been assessed as Scope 1 emissions.

Table 1 summarises the total Scope 1, 2 and 3 GHG emissions for the Construction and Operational (Life of Asset and Annualised) periods for the Winu Project.

Table 1 Total GHG emissions by Scope for Winu construction and operational activities

Activity	Total Construction Emissions	Annual Average Operational Emissions	Peak Annual Operational Emissions (2048)	Total Operational Emissions	Total Emissions over life of proposal (construction + operations)
	tCO2-e				
Scope 1					
Land Clearing	95,642	1,175	926	34,077	129,719
Diesel consumption - (excluding power generation)	66,384	48,843	65,876	1,416,458	1,482,842
Diesel consumption - power generation	0	37,382	39,669	1,084,073	1,084,073
Copper concentrate - transport	0	2,501	2,695	72,516	72,516
Total	162,026	89,901	109,166	2,607,124	2,769,150
Scope 3[1]					
Total Emissions	423,626	162,662	n/a	4,717,206	5,140,832
Source	**Life of Asset Emission Intensity (t CO_2-e per tonne of product)**				
Scope 1 and 2 emission intensity – mined mineral resource	0.0092				
Scope 1 and 2 emission intensity – processed	0.0090				

The operational Scope 1 emissions for the Winu Project are presented in Figure 1, showing results as per the EPA's categorisation of emissions. All emissions sources shown in Figure 1 are regulated under the *National Greenhouse and Energy Reporting (NGER) Scheme*, except for emissions from land clearing.

[1] Category 1 – Purchased Goods and Services, Category 2 – Capital Goods, Category 3 – Fuel and Energy (not included in scope 1 or 2), Category 4 – Upstream Transport and Distribution, Category 7 – Employee Commuting, Category 9 – Downstream Transport and Distribution, Category 10 – Processing of Sold Products

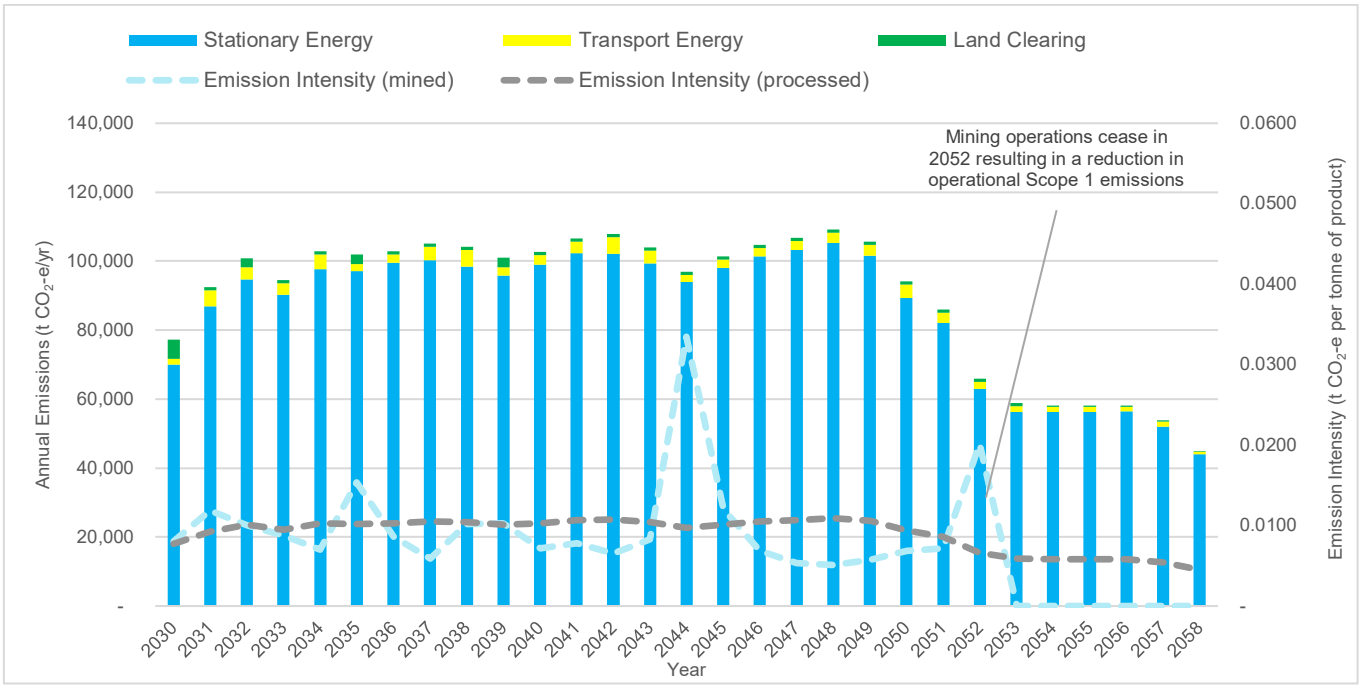

Figure 1 ***Operational Scope 1 emissions baseline for Winu***

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1. Introduction

1.1 Overview

Rio Tinto Winu Pty Ltd plans to develop a new copper-gold mine and associated infrastructure, referred to as the Winu Project, approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia within both the Nyangumarta people's and the Martu people's Native Title Determination Areas. The Winu Project is in the approvals phase and has been referred to the Western Australian Environmental Protection Authority (EPA).

GHD was engaged to prepare a life-of-asset Greenhouse Gas (GHG) Assessment for the project to determine the emissions baseline.

1.2 Purpose of this report

The purpose of this report is to detail the greenhouse gas assessment of the construction and operational GHG emissions for the Winu Project and provide an evaluation of the estimated emissions for each emissions scope. Additionally, the report documents the relevant assumptions, methodologies, and reporting boundaries on which the assessment was conducted.

1.3 Scope

The scope of the work includes estimating the Scope 1, Scope 2, and select material Scope 3 GHG emissions forecast for the Winu Project during the construction period (2028-2029) and operational period (2030-2058).

The GHG emissions related to both direct (Scope 1) and indirect (Scope 2 and 3) emissions have been defined in accordance with the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (GHG Protocol Standard) as described in Table 2. The *National Greenhouse and Energy Reporting Act 2007* also defines Scope 1 and Scope 2 emissions, and the NGER definitions align with the definitions in the GHG Protocol Standard.

Table 2 Description of Scope 1, 2 and 3 emissions

Emission Scope	Description
Scope 1	Direct emissions from owned or controlled sources resulting from the combustion/consumption of fuels (e.g., combustion of diesel in owned vehicles)
Scope 2	Indirect emissions from the generation of purchased energy (e.g., purchased electricity)
Scope 3	All indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions (e.g., purchase of goods and services)

Notwithstanding the above, the EPA has identified through the Environmental Scoping Document (ESD) that it considers for the purpose of this assessment that GHG emissions from:

– Electricity generation produced for the Proposal as Scope 1 (not Scope 2) - given this, no Scope 2 emissions will be reported in this assessment.
– Haulage of concentrate (from mine to port), regardless of third-party contractual arrangements as Scope 1 (not Scope 3).
– Noting that this does not align with National and International reporting standards in respect of emissions from purchased electricity and haulage emissions, the EPA's characterisation has been adopted in this GHG assessment and report, and these two emissions sources listed above have been assessed as Scope 1 emissions.

1.4 Limitations

This report is subject to, and must be read in conjunction with, the limitations set out in this section and the assumptions and qualifications contained throughout the report.

This report: has been prepared by GHD for Rio Tinto Winu and may only be used and relied on by Rio Tinto Winu for the purpose agreed between GHD and Rio Tinto Winu as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Rio Tinto Winu arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD and described in this report (refer section(s) 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect and liability for any decisions taken by Rio Tinto as a consequence of GHD recommendations.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

1.5 Assumptions

Several high-level assumptions have been made in order to best represent the GHG emissions inventory related to Winu operations. These high-level assumptions have been detailed below.

– Data provided by Rio Tinto was assumed to be accurate and representative of proposed Winu construction and operation activities.
– Third party consultant documentation provided by Rio Tinto to GHD are assumed to be accurate, GHD cannot take any responsibility for the accuracy of such documentation

Assumptions related to different estimation methodologies used and data assumptions or estimates applied are detailed in the relevant sections of this report.

2. Context

2.1 EPA Environmental Factor Guideline – Greenhouse Gas Emissions

This GHG assessment has been prepared to assist the Winu Project in meeting the objective of the EPA's Environmental Factor Guideline - Greenhouse Gas Emissions (November 2024). The EPA's objective for Greenhouse Gas Emissions is "To minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as practicable" (EPA, 2024).

According to the EPA, GHG emissions from a proposal will be considered where they are reasonably likely to exceed:

– 100,000 tonnes CO_2-e of scope 1 emissions in any year; or
– 100,000 tonnes CO_2-e of scope 2 emissions in any year.

2.2 Winu Project

Rio Tinto Winu Pty Ltd plans to develop a new copper-gold mine and associated infrastructure, referred to as the Winu Project, approximately 300 km south of Broome and 320 km east of Port Hedland in the northern Pilbara region of Western Australia (Figure 2) within both the Nyangumarta people's and the Martu people's Native Title Determination Areas. The Winu Project comprises the following activities:

2.2.1 Construction

– Construction of the Winu Project is expected to take place over 2 years (2028-2029)
– Land clearing of vegetation

2.2.2 Operations

– Operation of the Winu Project is expected to occur over 29 years (2030-2058)
– Mining operations
  - Open pit mining that extends below the water table.
  - Mining operations comprising conventional drill and blast, and load and haul.
– Mineral waste, including tailings storage
– Ore processing facilities
  - Nominal mineral processing capacity of 10 million tonnes per annum
  - Run of mine pad; Crushing, stockpiling, and reclaiming; Grinding with oversized recycle pebble crushing
  - Flotation, concentrate dewatering and handling
  - Carbon-in-leach (CIL), carbon acid washing and gold elution/desorption; Carbon reactivation, electrowinning, doré production and cyanide detoxification
  - Tailings thickening
  - Reagent receival, storage and delivery systems
– Dewatering and Water supply
– Power
  - Diesel–fired thermal generation (65 MW), wind turbine, solar panels, and battery storage
  - Approximately 85% renewable energy fraction via solar, wind and battery energy storage system
– Mine Support Facilities and Infrastructure
– Ore Handling and Transport
  - Transportation of concentrate by truck from the Winu Project via the Great Northern Highway to Port Hedland for export.

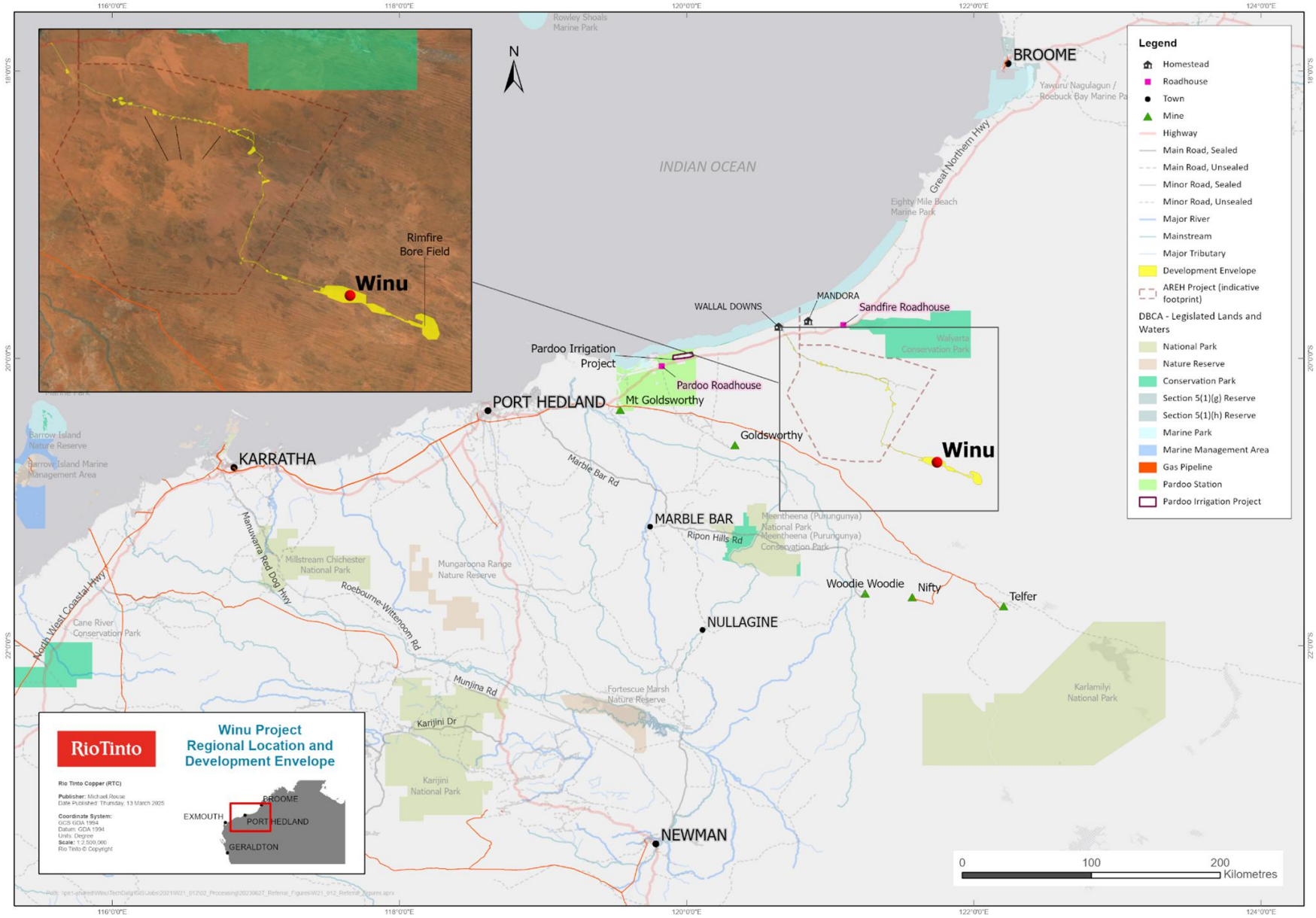

Figure 2 ***Location of Winu Project in Western Australia***

3. Carbon Accounting and Reporting

Carbon accounting is the process of identifying and measuring the amount of GHG emissions, measured in tonnes of carbon dioxide equivalents (t CO_2-e), emitted by a company, either during normal operations or during specific construction or project related activities. Carbon reporting is the process of reporting on the outcomes of the accounting process.

3.1 Methodology

In alignment with the general principles for estimating emissions contained in the National Greenhouse and Energy Reporting (NGER) framework, Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, and the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, the Winu GHG emissions inventory assessment has been based on the principles outlined in Table 3.

Table 3 Description of the general principles for estimating emissions

Principle	Description
Relevance	Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users – both internal and external to the company.
Completeness	Account for and report on all GHG emission sources and activities within the chosen inventory boundary. Disclose and justify any specific exclusions.
Consistency	Use consistent methodologies to allow for meaningful performance tracking of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.
Transparency	Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.
Accuracy	Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.

The following documents were used for the purposes of defining appropriate methods for quantification of emissions from individual sources:

– EPA Environmental Factor Guideline – Greenhouse Gas Emissions (2024)
– National Greenhouse and Energy Reporting (Measurement) Determination 2008
– Australian National Greenhouse Accounts (NGA) Factors 2024
– Greenhouse Gas Protocol Corporate Accounting and Reporting Standard
– GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard

The Scope 1 and some Scope 3 emission factors used in the emissions estimates were taken from the *National Greenhouse Accounts (NGA) Factors 2024*[2] derived from *National Greenhouse and Energy Reporting (NGER) Measurement Determination 2008*. Other Scope 3 emission factors were taken from industry-recognised sources.

[2] The National Greenhouse Accounts (NGA) Factors 2024 was the current and applicable version when the assessment was completed.

3.2 Emissions boundary

Before deciding which emission sources should be estimated as part of a company's GHG emissions inventory assessment, it is necessary to determine the control approach and to establish the emissions boundary for the company. The control approach refers to the way that a company decides what is in its boundary and can be done in one of the three[3] ways outlined in Table 4.

Table 4 Methods for determining control approaches for boundary setting

Approach	Description
Equity Share	Equity share approach, this is determined by who owns what share of the company and/or asset. This then leads the various asset owners to report the emissions as part of their inventory based on their respective percentage share of ownership of the asset.
Financial Control	Financial control is determined by who has economic control of the asset and therefore has the right to "direct the financial and operating policies with a view to gaining economic benefit from its activities". This does not necessarily require 50%+ ownership but merely that the relevant party has the control to set the economic direction. The organisation deemed to have financial control is then responsible for reporting 100% of the emissions.
Operational Control	Operational control is determined by who has authority at a facility on a day-to-day basis. This is often demonstrated by the right to set environmental or health and safety policies and procedures at a site. The organisation deemed to have operational control is then responsible for reporting 100% of the emissions.

The Winu Project will be reporting GHG emissions to the Clean Energy Regulator annually as part of NGER reporting obligations. To ensure consistency with existing NGER reporting obligations the control approach that has been used by GHD in the development of Scope 1 activities of the Winu GHG emissions inventory is the 'operational control' approach. Details of the activities included in this GHG assessment are detailed in Table 6. This is the typical approach taken by other similar projects when estimating their GHG emissions inventories. This approach is also aligned to the jurisdictional legislative requirements operating within Australia.

The GHG Protocol Corporate Standard and NGER framework divide a company's emissions into direct and indirect emissions:

- **Direct emissions**: are emissions from sources that are owned or controlled by the reporting company.
- **Indirect emissions**: are emissions that are a consequence of the activities of the reporting company but occur at sources owned or controlled by another company.

Emissions are further divided into three scopes described in Table 5, while a company has *control* over its direct emissions, it has *influence* over its indirect emissions.

[3] Financial and operational control methods are both considered to fall under the single category of 'control' methods, but for the purposes of this report have been separated.

Table 5 Overview of emissions scopes

Emission Type	Scope	Definition	Examples
Direct emissions	Scope 1	Emissions from operations that are owned or controlled by the reporting company.	Emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment.
Indirect emissions	Scope 2	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company.	Use of purchased electricity, steam, heating, or cooling.
	Scope 3	All indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including upstream and downstream emissions.	Production of purchased products, transportation of purchased products, or use of sold products.

The GHG Protocol Scope 3 Standard divides Scope 3 emissions into upstream and downstream emissions. The distinction is based on the financial transactions of the reporting company:

- **Upstream emissions**: are indirect GHG emissions related to purchased or acquired goods and services.
- **Downstream emissions**: are indirect GHG emissions related to sold goods and services.

In the case of goods purchased or sold by the reporting company, upstream emissions occur up to the point of receipt by the reporting company, while downstream emissions occur after their sale by the reporting company and transfer of control from the reporting company to another entity.

As noted in Section 1.3, the EPA has identified through the Environmental Scoping Document (ESD) that it considers for the purpose of this assessment that GHG emissions from:

– Electricity generation produced for the Proposal as Scope 1 (not Scope 2), regardless of Rio Tintos intention for the Winu Power Station to be owned an operated by a third party - given this, no Scope 2 emissions are estimated for the Proposal

– Haulage of concentrate (from mine to port), regardless of third-party contractual arrangements as Scope 1 (not Scope 3).

Noting that this does not align with National and International reporting standards in respect of emissions from purchased electricity and haulage emissions, this EPA's characterisation has been adopted in this GHG assessment and report, and these two emissions sources listed above have been assessed as Scope 1 emissions.

Table 6 Winu Emissions Boundary

Emission Type	Scope	Emission Boundary	Activity	Data Classification
Direct emissions	Scope 1	Operational control	Stationary Energy	Diesel – Dewatering Diesel – Drill & Blast (Equipment) Diesel – Drill & Blast (ANFO) Diesel – Load Diesel – Haul Diesel – Pit Support Diesel – Power Other Diesel – LME Diesel – Electricity Generation[1]
			Transport Energy	Diesel – Transport, including haulage of concentrate (from mine to port)[1]
			Land Clearing	Land Clearing
Indirect emissions	Scope 3	Upstream emissions	Category 1 – Purchased goods and services	Grinding media, Reagents and explosives spend and quantities. General spend on other mining goods.
			Category 2 – Capital goods	On-going CAPEX spend.
			Category 3 – Fuel and energy related activities (not included in scope 1 or 2)	Well to tank emissions for fuels.
			Category 4 – Upstream transportation and distribution	Diesel haulage to site.
			Category 5 – Waste generated in operations	*Not assessed*
			Category 6 – Business travel	*Not assessed*
			Category 7 – Employee commuting	Charter flights to site.
			Category 8 – Upstream leased assets	*Not assessed*
		Downstream emissions	Category 9 – Downstream Transport and Distribution	Product haulage from port to final destinations.
			Category 10 – Processing of sold products	Copper and gold processing.
			Category 11 – Use of sold products	*Not assessed*
			Category 12 – End-of-life treatment of sold products	*Not assessed*
			Category 13 – Downstream leased assets	*Not assessed*
			Category 14 - Franchises	*Not assessed*
			Category 15 - Investments	*Not assessed*

[1]Assessed as Scope 1 emissions under the EPA's characterisation

4. Greenhouse Gas Emissions Inventory

4.1 Total GHG Emissions

Winu's total Scope 1 and 3 emissions for the Construction and Operational (Life of Asset and Annualised) periods are shown in Table 7. All GHG emissions estimates are based on data provided by Rio Tinto and reasonable assumptions (Scope 3 – Employee Commuting). A detailed breakdown of the emissions estimates is presented in Appendix A.

Table 7 Total Construction and Operational emissions for Winu

Activity	Total Construction Emissions	Annual Average Operational Emissions	Peak Annual Operational Emissions (2048)	Total Operational Emissions	Total Emissions over life of proposal (construction + operations)
	tCO2-e				
Scope 1					
Land Clearing	95,642	1,175	926	34,077	129,719
Diesel consumption (excluding power generation)	66,384	48,843	65,876	1,416,458	1,482,842
Diesel consumption (power generation only)	0	37,382	39,669	1,084,073	1,084,073
Copper concentrate (transport)	0	2,501	2,695	72,516	72,516
Total	162,026	89,901	109,166	2,607,124	2,769,150
Scope 3[4]					
Total Emissions	423,626	162,662	n/a	4,717,206	5,140,832
Source	**Life of Asset Emission Intensity (t CO_2-e per tonne of product)**				
Scope 1 and 2 emission intensity – mined mineral resource	0.0092				
Scope 1 and 2 emission intensity – processed	0.0090				

[4] Category 1 – Purchased Goods and Services, Category 2 – Capital Goods, Category 3 – Fuel and Energy (not included in scope 1 or 2), Category 4 – Upstream Transport and Distribution, Category 7 – Employee Commuting, Category 9 – Downstream Transport and Distribution, Category 10 – Processing of Sold Products

4.2 Scope 1 GHG Emissions

4.2.1 Scope 1 GHG Emissions Sources

4.2.1.1 Stationary Energy

Construction emissions relating to the consumption of diesel for stationary energy purposes for construction activities and equipment used for mining has been estimated for the 2-year construction period. Emissions relating to the consumption of diesel for stationary energy purposes were estimated in accordance with the requirements of Part 2.4 Division 2.4.2 of the NGER measurement determination.

The categories of diesel consumption for stationary energy purposes that contribute to Winu construction and operational emissions are presented in Table 8.

Table 8 Stationary energy categories for Winu construction and operational emissions

Stationary Energy categories for Winu	Description	Construction Emissions	Operational Emissions
Dewatering	In-Pit Dewatering Pumps, Ex-Pit Bore Pumps, Stormwater Pond Pumps, and Regional Borefields Pumps	✓	✓
Drill & Blast (Equipment)	Fuel consumption of Drill Rig	✓	✓
Drill & Blast (ANFO)	Total Explosives	✓	✓
Load	Fuel consumption of Excavator and Loader	✓	✓
Haul	Fuel consumption of Haul truck	✓	✓
Pit Support	Fuel consumption of Track Dozer, Grader, Water truck, Service truck, Fuel truck, and Loader	✓	✓
Power Other	Power requirement for Construction phase Power requirement for Aerodrome Power requirement for ANFO storage and Elution heater	✓ ✓ ×	× ✓ ✓
LME	Light mobile equipment for mining, including vehicles for processing operations and maintenance, and administration	✓	✓
Electricity Generation	Fuel consumption to produce electricity via a Power Purchase Agreement (PPA). This is Scope 2 emissions under National and International reporting standards. However, as noted (Section 1.3) the EPA has identified that it considers this as Scope 1 emissions for the purposes of this assessment	×	✓

4.2.1.2 Transport Energy

The consumption of diesel for transport energy purposes during construction activities has been estimated for the 2-year construction period. Emissions relating to the consumption of diesel for transport energy purposes were estimated in accordance with the requirements of Part 2.4 Division 2.4.2 of the NGER measurement determination.

In the data received from Rio Tinto, Mobile Equipment classified for *Administration/General* use have been assumed to be road registered therefore fall under transport energy as per NGER Determination Division 2.4.2 Section 2.41.

The category of diesel consumption for transport energy purposes that contributes to Winu construction and operational emissions is presented in Table 9.

Table 9 Transport energy category for Winu construction and operational emissions

Transport Energy category for Winu	Description	Construction Emissions	Operational Emissions
Mobile Equipment (Administration/General)	Fuel consumption of road registered mobile equipment	✓	✓
Haulage of concentrate to port	Haulage of concentrate (from mine to port) – the EPA has identified that it considers this source (regardless of third-party contractual arrangements) as Scope 1 emissions for the purposes of this assessment	×	✓

4.2.1.3 Land Clearing

Emissions relating to the loss of potential carbon sequestration in vegetation are modelled over a 50-year period and have been estimated using the Full Carbon Accounting Model (FullCAM) tool from the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and the guidelines and methodology from Carbon Credits (Carbon Farming Initiative—Avoided Clearing of Native Regrowth) Methodology Determination 2015.

FullCAM is a calculation tool for modelling Australia's greenhouse gas emissions from the land sector. FullCAM is an empirically constrained, mass balance, carbon cycling ecosystem model used to estimate carbon stock changes across the Australian landscape, including for Australia's National Greenhouse Accounts. FullCAM integrates data on climate, soil, management and land use change observed from satellites.

The land clearing emissions factor is calculated by determining the total Carbon mass (trees + forest debris) per hectare of the cleared vegetation (tCarbon/ha) and adjusting for Molar Mass for an emissions factor for land clearing (tCO_2/ha).

The longitude and latitude coordinates of the Project location and the modelling dates are input into the FullCAM tool, which then outputs the Carbon mass of trees per ha and the Carbon mass of forest debris per ha across the modelling period. The maximum Carbon mass of trees per hectare and Carbon mass of forest debris per hectare were used to calculate the emissions factor.

Assumptions and inputs used for the FullCAM modelling are listed in Table 10:

Table 10 FullCAM Modelling Inputs

FullCAM Input	Detail
FullCAM Guideline	Avoided Clearing of Native Regrowth Methodology
Project coordinates	-20.657019114060585, 121.91913005165495
Project CFI rainfall	<500mm
Modelling period	50 years 1/1/2028 to 1/1/2078
Vegetation status	Assuming all vegetation is cleared
Other inputs	Default settings as per the FullCAM guideline stated above

Most emissions from land clearing will occur during construction based on a total land clearing of 3,501 ha. However, a smaller amount of on-going land clearing will occur during the Life of Asset operation. A total of 1,247 ha of land clearing is expected to occur over the Life of Asset operation. The category of land clearing that contributes to Winu construction and operational emissions is presented in Table 11.

Table 11 Land clearing category for Winu construction and operational emissions

Land Clearing for Winu	Construction Emissions	Operational Emissions
Land Clearing	✓	✓

4.2.2 Scope 1 GHG Emissions Estimates

4.2.2.1 Construction Emissions

The estimated Scope 1 emissions attributable to the construction period are outlined in Table 12 below. The construction period for the project is 2 years. The construction emissions relating to stationary/transport energy sources are presented as the total emissions for the 2-year construction period and have not been annualised. Emissions from land clearing was based on clearing 3,501 ha of land across the construction period.

Table 12 Total Construction Scope 1 emissions

Source	Details	Emissions (t CO_2-e)	Method of Calculation
Stationary Energy	Diesel combustion of site based, non-road registered equipment and machinery for construction and mining activities	65,859	Estimated consumption of diesel and NGER measurement determination Schedule 1 Part 3
Transport Energy	Diesel combustion of road registered mobile equipment	524	Estimated consumption of diesel (post-2004 vehicles) and NGER measurement determination Schedule 1 Part 4 Division 4.2
Land Clearing	Lost carbon sequestration potential	95,642	Based on the total clearing area, known vegetation classes, estimated potential maximum biomass class and subsequent tCO_2-e/ha emissions factor (Carbon Credits Methodology)
Total Emissions		**162,026**	

4.2.2.2 Operational Emissions

The estimated annualised Scope 1 emissions attributable to operational activities are outlined in Table 13 below.

Table 13 Annual average Operational Scope 1 emissions

Source	Details	Emissions (t CO_2-e/yr)	Method of Calculation
Stationary Energy	Diesel combustion of site based, non-road registered equipment and machinery for mining activities and electricity generation	85,963	Estimated consumption of diesel and NGER measurement determination schedule 1 part 3
Transport Energy	Diesel combustion of road registered mobile equipment, including product haulage to port	2,763	Estimated consumption of diesel (post-2004 vehicles) and NGER measurement determination Schedule 1 Part 4 Division 4.2
Land Clearing	Lost carbon sequestration potential	1,175	Based on the total clearing area, known vegetation classes, estimated potential maximum biomass class and subsequent tCO_2-e/ha emissions factor (Carbon Credits Methodology)
Total Emissions		**89,901**	

4.3 Scope 2 GHG Emissions

No Scope 2 emissions because for the purposes of this assessment, the EPA has identified that it considers fuel consumption for the production of electricity via a Power Purchase Agreement (PPA) as Scope 1 emissions.

4.4 Scope 3 GHG Emissions

Refer to Table 21 and Table 22 in Appendix A for a detailed breakdown of Scope 3 data and emissions estimates per category. The following Scope 3 emissions categories were excluded for both the construction and operational period due to immateriality or agreed scope definition with Rio Tinto:

– Category 5 – Waste Generated in Operations
– Category 6 - Business Travel
– Category 8 - Upstream Leased Assets
– Category 11 - Use of Sold Products
– Category 12 - End of life treatment of sold products
– Category 13 - Downstream Leased Assets
– Category 14 - Franchises
– Category 15 - Investments

4.4.1 Construction Emissions

The estimated total Scope 3 emissions attributable to construction activities are shown in Table 14 below.

Table 14 Total Scope 3 Construction emissions

Activity	GHG emissions source	Emissions (t CO_2-e)	Contribution %
Upstream			
Category 1 – Purchased Goods and Services	Purchase of mining and processing assets.	403,093	95.2%
Category 2 – Capital Goods	On-going CAPEX spend.	0	0.0%
Category 3 – Fuel and Energy (not included in scope 1 or 2)	Well to tank emissions for fuels.	16,359	3.9%
Category 4 – Upstream Transport and Distribution	Diesel haulage to site.	1,346	0.3%
Category 7 – Employee Commuting	Charter flights to site.	2,829	0.7%
Downstream			
Category 9 – Downstream Transport and Distribution	Product haulage from port to final destinations.	0	0.0%
Category 10 – Processing of Sold Products	Copper and gold processing.	0	0.0%
Total Emissions		**423,626**	100%
Category 2, Category 9, and Category 10 are 0 tCO -e for the Construction phase			

4.4.2 Operational Emissions

The estimated annualised operational Scope 3 emissions for the Winu project are presented in Table 15.

Table 15 Annualised Scope 3 Operational emissions

Activity	GHG emissions source	Emissions (t CO_2-e/yr)	%
Upstream			
Category 1 – Purchased Goods and Services	Grinding media, Reagents and explosives spend and quantities. General spend on other mining goods.	100,509	61.8%
Category 2 – Capital Goods	On-going CAPEX spend.	4,310	2.6%
Category 3 - Fuel and Energy (not included in scope 1 or 2)	Well to tank emissions for fuels.	21,863	13.4%
Category 4 - Upstream Transport and Distribution	Diesel haulage to site.	1,799	1.1%
Category 7 - Employee Commuting	Charter flights to site.	1,414	0.9%
Downstream			
Category 9 - Downstream Transport and Distribution	Product haulage from port to final destinations.	6,135	3.8%
Category 10 - Processing of Sold Products	Copper and gold processing.	26,633	16.4%
Total Emissions		**162,662**	100%

4.5 Winu Emissions Baseline

The operational Scope 1 emissions for the Winu Project is presented in Figure 3, showing results as per the EPA's categorisation of emissions. All emissions sources shown in Figure 3 are regulated under the *National Greenhouse and Energy Reporting (NGER) Scheme*, except for emissions from land clearing.

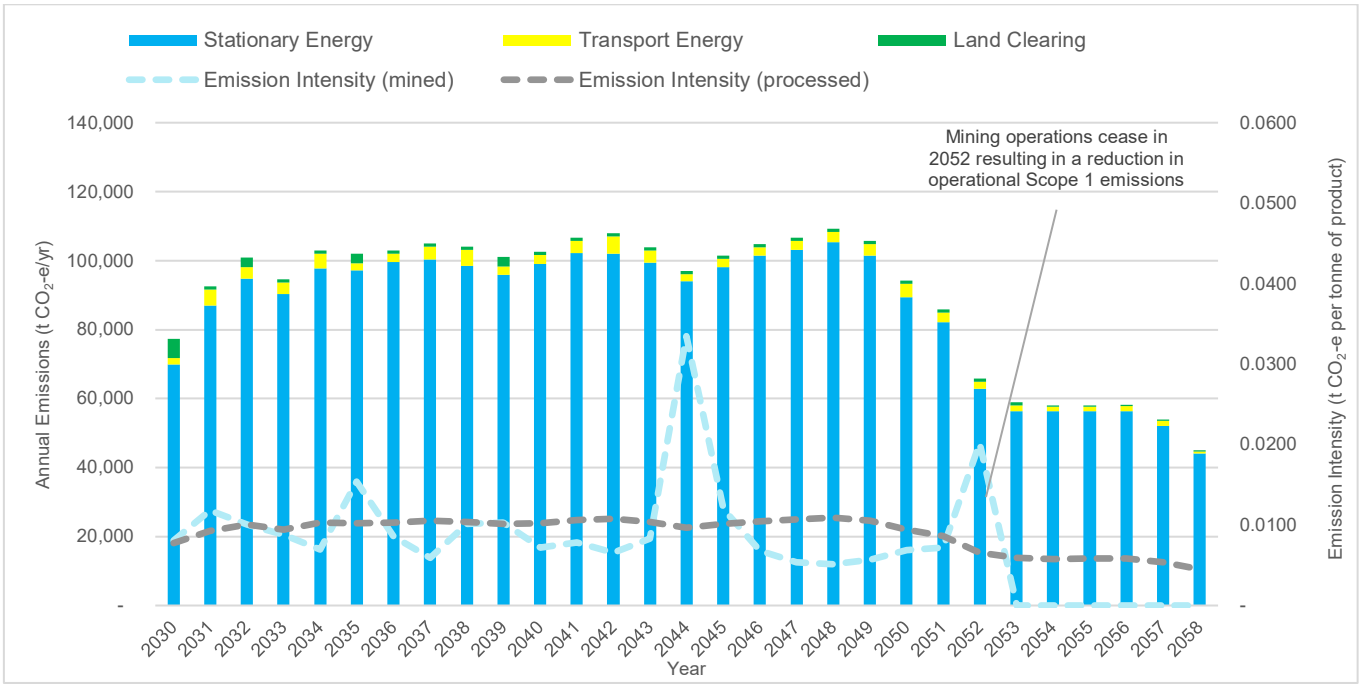

Figure 3 ***Operational Scope 1 emissions baseline for Winu***

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Appendices

Appendix A

Emission Sources and Activities

Table 16 Total Construction Scope 1 emissions (with source documentation for data)

Source	Details	Emissions (t CO_2-e)	Method of Calculation
Stationary Energy	Diesel combustion of site based, non-road registered equipment and machinery for construction and mining activities[1]	65,859	Estimated consumption of diesel and NGER measurement determination Schedule 1 Part 3
Transport Energy	Diesel combustion of road registered mobile equipment[2]	524	Estimated consumption of diesel (post-2004 vehicles) and NGER measurement determination Schedule 1 Part 4 Division 4.2
Land Clearing	Lost carbon sequestration potential[3]	95,642	Based on the total clearing area, known vegetation classes, estimated potential maximum biomass class and subsequent tCO_2-e/ha emissions factor (Carbon Credits Methodology)
Total Emissions		**162,026**	

1. Document name: Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx, Worksheet name: Fuel
   Categories: Drill & Blast (Equipment), Drill & Blast (ANFO), Load, Haul, Pit Support, and LME
   Document name: 20231109 Fuel Consumption.xlsx (2024 data), Worksheet name: Diesel Usage
   Categories: Power Other
   Document name: C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data), Worksheet name: 1500 - Water
   Categories: Dewatering
2. Document name: C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data), Worksheet name: Mobile Equipment, Cell: H13
3. Document name: Land Clearing by Year_Updated (Not used in current model).xlsx (2024 data)

Table 17 Annual Operational Scope 1 emissions (with source documentation for data)

Source	Details	Emissions (t CO_2-e/yr)	Method of Calculation
Stationary Energy	Diesel combustion of site based, non-road registered equipment and machinery for mining activities and electricity generation[1]	85,963	Estimated consumption of diesel and NGER measurement determination schedule 1 part 3
Transport Energy	Diesel combustion of road registered mobile equipment, including product haulage to port[2]	2,763	Estimated consumption of diesel (post-2004 vehicles) and NGER measurement determination Schedule 1 Part 4 Division 4.2
Land Clearing	Lost carbon sequestration potential[3]	1,175	Based on the total clearing area, known vegetation classes, estimated potential maximum biomass class and subsequent tCO_2-e/ha emissions factor (Carbon Credits Methodology)
Total Emissions		**89,901**	

1. Document name: Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx, Worksheet name: Fuel
   Categories: Drill & Blast (Equipment), Drill & Blast (ANFO), Load, Haul, Pit Support, and LME
   Document name: 20231109 Fuel Consumption.xlsx (2024 data), Worksheet name: Diesel Usage
   Categories: Power Other
   Document name: C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data), Worksheet name: 1500 - Water
   Categories: Dewatering
   Document name: C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx, (2024 data) Worksheet name: Mobile Equipment, Cell: H12
   Categories: LME
   Document name: Yearly for EPA.xlsx, Worksheet name: Power forecast including CIL, Row: 53
   Categories: Electricity generation
2. Document name: C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx, (2024 data) Worksheet name: Mobile Equipment, Cell: H13
3. Document name: Land Clearing by Year_Updated (Not used in current model).xlsx (2024 data)

Table 18 Total Scope 3 Construction emissions (with source documentation for data)

Activity	GHG emissions source	Emissions (t CO_2-e)	%
Upstream			
Category 1 – Purchased Goods and Services	Grinding media, Reagents and explosives spend and quantities. General spend on other mining goods.	403,093	95.2%
Category 2 – Capital Goods	On-going CAPEX spend.	0	0.0%
Category 3 – Fuel and Energy (not included in scope 1 or 2)	Well to tank emissions for fuels.	16,359	3.9%
Category 4 – Upstream Transport and Distribution	Diesel haulage to site.	1,346	0.3%
Category 7 – Employee Commuting[1]	Charter flights to site.	2,829	0.7%
Downstream			
Category 9 – Downstream Transport and Distribution	Product haulage from port to final destinations.	0	0%
Category 10 – Processing of Sold Products	Copper and gold processing.	0	0%
Total Emissions		**423,626**	100%
Source Documents for data: - Scope 3 20250121 CL v3 Edits.xlsx - Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx			
1. Assumed 156 flights per year			

Table 19 Annualised Scope 3 Operational emissions (with source documentation for data)

Activity	GHG emissions source	Emissions (t CO_2-e/yr)	%
Upstream			
Category 1 – Purchased Goods and Services	Grinding media, Reagents and explosives spend and quantities. General spend on other mining goods.	100,509	61.8%
Category 2 – Capital Goods	On-going CAPEX spend.	4,310	2.6%
Category 3 - Fuel and Energy (not included in scope 1 or 2)	Well to tank emissions for fuels.	21,863	13.4%
Category 4 - Upstream Transport and Distribution	Diesel haulage to site.	1,799	1.1%
Category 7 - Employee Commuting[1]	Charter flights to site.	1,414	0.9%
Downstream			
Category 9 - Downstream Transport and Distribution	Product haulage from port to final destinations.	6,135	3.8%
Category 10 - Processing of Sold Products	Copper and gold processing.	26,633	16.4%
Total Emissions		**162,662**	100%
Source Documents for data: - Scope 3 20250121 CL v3 Edits.xlsx - Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx			
1. Assumed 156 flights per year			

Table 20 Operational Scope 1 emissions baseline for Winu

Operational Year	Scope1 – Stationary Energy - Mining (tCO_2-e)	Scope1 – Stationary Energy - Power Supply (tCO2-e)	Scope 1 – Transport Energy (tCO_2-e)	Scope 1 – Land Clearing (tCO_2-e)	Total Scope 1 (tCO_2-e)
2030	53,943	16,039	1,718	5,590	77,291
2031	55,910	31,050	4,585	926	92,471
2032	56,982	37,793	3,383	2,713	100,870
2033	57,021	33,280	3,368	926	94,595
2034	58,766	38,946	4,228	926	102,865
2035	58,753	38,402	2,069	2,713	101,936
2036	60,827	38,690	2,493	926	102,936
2037	60,642	39,650	3,845	926	105,063
2038	59,107	39,333	4,735	926	104,101
2039	59,290	36,511	2,519	2,713	101,032
2040	62,008	36,993	2,671	926	102,598
2041	62,871	39,401	3,367	926	106,564
2042	62,419	39,652	4,897	926	107,894
2043	59,736	39,652	3,628	926	103,942
2044	54,256	39,719	2,066	926	96,967
2045	59,698	38,436	2,410	926	101,470
2046	63,045	38,396	2,432	926	104,800
2047	64,540	38,631	2,646	926	106,743
2048	65,613	39,669	2,957	926	109,166
2049	61,885	39,652	3,274	926	105,737
2050	49,736	39,652	3,868	926	94,181
2051	42,468	39,652	2,857	926	85,903
2052	23,180	39,719	2,045	926	65,871
2053	16,623	39,636	1,751	926	58,936
2054	16,623	39,652	1,400	365	58,040
2055	16,623	39,652	1,412	365	58,051
2056	16,649	39,719	1,442	365	58,176
2057	16,623	35,403	1,496	365	53,887
2058	13,017	31,094	560	365	45,037

Table 21 Total Construction Emissions Detailed Breakdown (with source documentation for data)

Phase	Emission Type	Activity Type	Fuel/Energy/ Commodity	Description	Qty	Unit	Energy (GJ)	Emission (t CO_2-e)	Source Document
Con	Scope 1	Stationary Energy	Diesel	Dewatering	*1,901*	kL	73,362	5,150	*C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data)*
Con	Scope 1	Stationary Energy	Diesel	Drill & Blast (Equipment)	*1,665*	kL	64,273	4,512	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Con	Scope 1	Stationary Energy	Diesel	Drill & Blast (ANFO)	*380*	kL	14,677	1,030	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Con	Scope 1	Stationary Energy	Diesel	Load	*2,771*	kL	106,970	7,509	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Con	Scope 1	Stationary Energy	Diesel	Haul	*12,651*	kL	488,338	34,281	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Con	Scope 1	Stationary Energy	Diesel	Pit Support	*2,182*	kL	84,244	5,914	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Con	Scope 1	Stationary Energy	Diesel	Power Other	*837*	kL	32,293	2,267	*20231109 Fuel Consumption.xlsx (2024 data)*
Con	Scope 1	Stationary Energy	Diesel	LME	*1,917*	kL	74,010	5,195	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Phase	**Emission Type**	**Activity Type**	**Fuel/Energy/ Commodity**	**Description**	**Qty**	**Unit**	**Energy (GJ)**	**Emission (t CO_2-e)**	**Source Document**
Con	Scope 1	Transport Energy	Diesel	Mobile Equipment	*193*	kL	7,447	524	*C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data)*
Phase	**Emission Type**	**Activity Type**	**Fuel/Energy/ Commodity**	**Description**	**Qty**	**Unit**	**Energy (GJ)**	**Emission (t CO_2-e)**	**Source Document**
Con	Scope 1	Land Clearing		Land Clearing of vegetation	*3,501*	ha	-	95,642	*Land Clearing by Year_Updated (Not used in current model).xlsx (2024 data)*
Phase	**Emission Type**	**Activity Type**	**Fuel/Energy/ Commodity**	**Description**	**Qty**	**Unit**	**Energy (GJ)**	**Emission (t CO_2-e)**	**Source Document**
Con	Scope 2	Purchased Electricity		Electricity consumed by Winu (non-renewable fraction)	*0*	MWh	0	0	*Not applicable*

Phase	Emission Type	Activity Type	Fuel/Energy/ Commodity	Description	Qty	Unit	Energy (GJ)	Emission (t CO_2-e)	Source Document
Con	Scope 3	Category 1 – Purchased Goods and Services		Grinding Media usage	*0*	t	-	0	*Scope 3 20250121 CL v3 Edits.xlsx*
				Blasting Media usage	*0*	t	-	0	*Scope 3 20250121 CL v3 Edits.xlsx*
				Reagents & Operating Consumables spend	*0*	A$m	-	0	*Scope 3 20250121 CL v3 Edits.xlsx*
				Mobile Equipment spend	*0*	A$m	-	0	*Scope 3 20250121 CL v3 Edits.xlsx*
				Other Spend data	*1,815*	A$m	-	403,093	*Scope 3 20250121 CL v3 Edits.xlsx*
Con	Scope 3	Category 2 – Capital Goods		Total ongoing CAPEX	*0*	A$m	-	0	*Scope 3 20250121 CL v3 Edits.xlsx*
Con	Scope 3	Category 3 – Fuel and Energy (not included in scope 1 or 2)		Total Stationary and Transport Fuel	*24,498*	kL	-	16,359	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Con	Scope 3	Category 4 – Upstream Transport and Distribution		Total Stationary and Transport Fuel (Haulage)	*24,498*	kL	-	1,346	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Con	Scope 3	Category 7 – Employee Commuting		Number of flights	*312*	-	-	2,829	*Assumed 156 flights per year*
Con	Scope 3	Category 9 – Downstream Transport and Distribution		Quantity of concentrate (Shipping)	*0*	kt	-	0	*Scope 3 20250121 CL v3 Edits.xlsx (applied a multiplying factor of 4 to Cu Production)*
Con	Scope 3	Category 10 – Processing of Sold Products		Copper Production	*0*	kt	-	0	*Scope 3 20250121 CL v3 Edits.xlsx*
				Gold Production	*0*	koz		0	*Scope 3 20250121 CL v3 Edits.xlsx*
Total Emissions								**585,652**	

Table 22 Total Operational Emissions Detailed Breakdown (with source documentation for data)

Phase	Emission Type	Activity Type	Fuel/Energy/ Commodity	Description	Qty	Unit	Energy (GJ)	Emission (t CO_2-e)	Source Document
Ops	Scope 1	Stationary Energy	Diesel	Dewatering	*32,898*	kL	1,269,865	89,145	*C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data)*
Ops	Scope 1	Stationary Energy	Diesel	Drill & Blast (Equipment)	*62,386*	kL	2,408,107	169,049	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Ops	Scope 1	Stationary Energy	Diesel	Drill & Blast (ANFO)	*4,126*	kL	159,255	11,180	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Ops	Scope 1	Stationary Energy	Diesel	Load	*47,576*	kL	1,836,433	128,918	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Ops	Scope 1	Stationary Energy	Diesel	Haul	*242,580*	kL	9,363,591	657,324	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Ops	Scope 1	Stationary Energy	Diesel	Pit Support	*35,918*	kL	1,386,419	97,327	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Ops	Scope 1	Stationary Energy	Diesel	Power Other	*38,529*	kL	1,487,231	104,404	*20231109 Fuel Consumption.xlsx (2024 data)*
Ops	Scope 1	Stationary Energy	Diesel	LME	*55,913*	kL	2,158,254	151,509	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx* *C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data)*
Ops	Scope 1	Stationary Energy	Diesel	Electricity Generation	*400,068*	kL	15,442,639	1,084,073	*Yearly for EPA.xlsx*
Phase	**Emission Type**	**Activity Type**	**Fuel/Energy/ Commodity**	**Description**	**Qty**	**Unit**	**Energy (GJ)**	**Emission (t CO_2-e)**	**Source Document**
Ops	Scope 1	Transport Energy	Diesel	Mobile Equipment	*2,798*	kL	107,988	7,603	*C0007-0000-G-EST-00001_C WIP_No CIL_Native for Client.xlsx (2024 data)*
Ops	Scope 1	Transport Energy	Diesel	Haulage of concentrate (from mine to port)	*26,647*	kL	1,028,591	72,516	*Estimated from quantity of concentrate. Quantity of concentrate was estimated by applying a multiplying factor of 4 to Cu Production (Scope 3 20250121 CL v3 Edits.xlsx)*

Phase	Emission Type	Activity Type	Fuel/Energy/ Commodity	Description		Unit	Energy (GJ)	Emission (t CO_2-e)	Source Document
Ops	Scope 1	Land Clearing		Land Clearing of vegetation	*1,247*	ha	-	34,077	*Land Clearing by Year_Updated (Not used in current model).xlsx (2024 data)*
Phase	**Emission Type**	**Activity Type**	**Fuel/Energy/ Commodity**	**Description**	**Qty**	**Unit**	**Energy (GJ)**	**Emission (t CO_2-e)**	**Source Document**
Ops	Scope 2	Purchased Electricity		Electricity consumed by Winu (non-renewable fraction)	*0*	MWh	0	0	*Not applicable*
Phase	**Emission Type**	**Activity Type**	**Fuel/Energy/ Commodity**	**Description**	**Qty**	**Unit**	**Energy (GJ)**	**Emission (t CO_2-e)**	**Source Document**
Ops	Scope 3	Category 1 – Purchased Goods and Services		Grinding Media usage	*167,705*	t	-	321,993	*Scope 3 20250121 CL v3 Edits.xlsx*
				Blasting Media usage	*165,084*	t	-	250,928	*Scope 3 20250121 CL v3 Edits.xlsx*
				Reagents & Operating Consumables spend	*351*	A$m	-	247,881	*Scope 3 20250121 CL v3 Edits.xlsx*
				Mobile Equipment spend	*243*	A$m	-	31,771	*Scope 3 20250121 CL v3 Edits.xlsx*
				Other Spend data	*9,285*	A$m	-	2,062,173	*Scope 3 20250121 CL v3 Edits.xlsx*
Ops	Scope 3	Category 2 – Capital Goods		Total ongoing CAPEX	*956*	A$m	-	124,993	*Scope 3 20250121 CL v3 Edits.xlsx*
Ops	Scope 3	Category 3 – Fuel and Energy (not included in scope 1 or 2)		Total Stationary and Transport Fuel	*949,440*	kL	-	634,017	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Ops	Scope 3	Category 4 – Upstream Transport and Distribution		Total Stationary and Transport Fuel (Haulage)	*949,440*	kL	-	52,162	*Mine Schedule 55 - Fuel Consumption & Material Movements.xlsx*
Ops	Scope 3	Category 7 – Employee Commuting		Number of flights	*4,524*	-	-	41,019	*Assumed 156 flights per year*
Ops	Scope 3	Category 9 – Downstream Transport and Distribution		Quantity of concentrate (Shipping)	*4,562*	kt	-	177,923	*Scope 3 20250121 CL v3 Edits.xlsx (applied a multiplying factor of 4 to Cu Production)*
Ops	Scope 3	Category 10 – Processing of Sold Products		Copper Production	*1,141*	kt	-	772,141	*Scope 3 20250121 CL v3 Edits.xlsx*
				Gold Production	*1,982*	koz	-	203	*Scope 3 20250121 CL v3 Edits.xlsx*
Total Emissions								**7,324,330**	

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